JPRS L/9616

19 March 1981

Japan Report

(FOUO 17/81)

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000300090038-8

JPRS L/9616

19 March 1981

JAPAN REPORT

(FOUO 17/81)

CONTENTS

FOR OFFICIAL USE ONLY

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000300090038-8

POLITICAL AND SOCIOLOGICAL

SUZUKI REMARK SEEN AFFIRMING HIS 'DOVISH STAND'

Asahi EVENING NEWS in English 18 Feb 81 p 3

[Text]

Prime Minister Zenko Suzuki's statement in the Diet Tuesday that those Cabinet members who do not agree with his policy of not to ammend the war - renouncing Constitution should leave the Cabinet is considered by observers as part of Suzuki's policy to firmly establish his dovish stand.

Previously, he had said on Feb. 14 in connection with the summit meeting with President Ronald Reagan, "On international problems, I will state frankly that it is a mistake to place hopes on Japan for a military role."

Then on Feb. 16 he said in connection with the activities by the League of Dietmen for An Independent Constitution, "Yoshio Sakurauchi, secretary - general of the Liberal-Democratic Party who is vice-chairman of the league, will see that there will be no excesses."

Concerning his Tuesday statement that dissenters against his Cabinet's policy should leave, he added later in the Lower House Budget Committee, "I meant cases where a Cabinet member is resolutely opposed to Cabinet policy." Suzuki's answers Tuesday firmly established his Cabinet's policy of not revising the Constitution.

Justice Minister Seisuke Okuno has been making statements since August 1980 calling for revision of the Constitution, and those around Suzuki say that the prime minister had said nothing up until now about Okuno's statements because of his desire to preserve harmony.

Observers believe that Suzuki made his strong statement Tuesday to put a stop to questions by the Opposition parties attacking Okuno's statements and also to check Okuno from making any further statements on the matter.

The hawk group within the LDP is saying Suzuki's statement is inflammatory and that Cabinet members should be free to have their own beliefs.

That is why Suzuki said in answers Tuesday afternoon that "it has not reached the stage yet (for the Justice Minister) to leave," and Chief Cabinet Secretary Kiichi Miyazawa said in a press conference, "Suzuki's statement was not aimed at any particular person. There is no intention of clamping down on debate on the Constitution by Cabinet members."

In a press conference, Okuno himself expressed the belief that Suzuki's statement was not specifically aimed at him. He said that if he is questioned in the Diet, he will frankly state his opinions on the matter.

Meanwhile, the Japan Socialist Party Tuesday began studying the question of whether or not it should demand Okuno's dismissal. At a meeting of its Diet Policy Committee Wednesday morning, the JSP obtained the shorthand record of the Lower House Budget Committee proceedings and began studying it in detail.

CSO: 4120

POLITICAL AND SOCIOLOGICAL

DEMOCRATIC SOCIALIST PARTY UP-DATED

'MAINICHI' Raps DSP Chairman Sasaki

Tokyo MAINICHI DAILY NEWS in English 19 Feb 81 p 1

[Editorial: "Why Hurry"]

[Text]

Chairman Ryosaku Sasaki of the Democratic Socialist Party declared at the annual party convention held this week that his party will concentrate upon realizing its original target when it was founded—taking over the reins of government from the conservative camp.

It was 21 years ago that the Democratic Socialist Party emerged under the leadership of the late Suehiro Nishio, seceding from the Socialist Party. Nishio then pledged that his party would wrestle the reins of government from the conservatives. At that time, the party strength was 38 in the House of Representatives and 16 in the House of Councilors, but has failed to increase since. At present, it is the fourth largest political party with 32 Lower House members and 11 Upper House members. Judging from its brief history, the party is in no position to take over the government single-handedly.

Sasaki, at the party rally, outlined his strategy to form the government in collaboration with other parties. First of all, he said the DSP would endeavor to join hands with other middle-of-the-road parties and then extend a hand to other wings, with the middle-of-the-roaders as the nucleus. In other words, he meant to include even the Liberal-Democratic

Party and the Socialist Party upon forming an alliance with the Komei, the DSP, the New Liberal Club and the Socialist Democratic League.

His idea is very simple to understand, but there are all too many unknown quantities in real politics. Chairman Takeiri of the Komei Party and Chairman Seiichi Tagawa of the New Liberal Club who attended the rally as guests refrained from touching on the issue while implying in their greetings that the time was not yet ripe for a coalition.

We wonder why the DSP is in such a hurry. Even rank-and-file DSP members are rather critical of Sasaki's rashness. The DSP, in fact, seems to be going ahead of other parties in various ways, to say nothing of its approach to the controversial defense issue.

Chairman Sasaki recently made a proposal that the national Diet should adopt a resolution to the effect that the defense forces are constitutional. Whatever his true intent is, we can hardly follow his proposal. Small wonder that the other opposition parties remained cautious about his statement.

The DSP is known for its propensity to political change. But, the party would do well to remember the time-honored maxim, "Haste makes waste."

Clarifies Minimum Defense Measures

Tokyo MAINICHI DAILY NEWS in English 19 Feb 81 p 1

[Text]

Chairman Ryosaku Sasaki of the middle-of-the-road Democratic Socialist Party clarified his party's defense policy Wednesday and said that minimum defense measures are necessary to guarantee the country's security.

He told the opening session of the party's 26th convention in Tokyo that "our Constitution does not deny the country's right of self-defense nor the maintenance of a defense capability. The majority of the nation also supports the existence of the Self-Defense Forces."

He said "the mission of our defense establishment must be limited only to self-defense" but noted Japan's current defense capability cannot be described as being sufficient for this limited purpose.

He thus expressed his belief that in addition to strengthening civilian control, Japan should not neglect bolstering its defense capability.

Regarding peace and security, Sasaki said the three points of standing for the protection of freedom, democracy and peace as a member of the Western camp; devising the minimum necessary defense measures; and giving priority in all security matters to a comprehensive global strategy for peace should be the basic policies.

Sasaki regretted that the Liberal-Democratic Party scored a big victory in the twin Diet elections last June and that the political situation reverted to the old pattern.

He declared "the source of today's lack of confidence in politics lies in the long-extended rule of the Liberal-Democratic Party and in its corruption."

Expressing his firm conviction that the structure of democratic politics must be

such that political power alternates between parties, he said "the aim of the political reform which we are trying to bring about should be concentrated on the single point of building a system of rotating political power and making it function properly."

As concrete ways to promote reorganization of the political world for this purpose, Sasaki said the "proper course for us to follow is, first of all, to collaborate with the so-called middle-of-the-road political parties which are opposed to one-party rule and dictatorship and, with this as the nucleus, to extend a welcome hand to sympathetic forces on the right and left of center."

He thus indicated a two-stage formula under which middle-of-the-road parties will first join together, following which segments of the Japan Socialist Party and the LDP will be asked to take part in the formation of a new party.

On economic matters, the chairman made known his opposition to nationalization of enterprises, saying "with the principle of market competition as the base, we should clearly state that we would not adopt as a rule a policy of nationalization of the means of production."

He said, however, appropriate measures will have to be taken to check the ill-effects of monopoly and excessive competition, and planned economic management based on medium-term consideration will be necessary.

During the three-day session until Friday, the convention will discuss and decide the party's action program for 1981 with the aim of building up a healthy opposition party which will enable smooth transfer of power.

Sasaki is seen certain to be reelected to another term as chairman of the party.

CSO: 4120

POLITICAL AND SOCIOLOGICAL

'MUZZLING' OF JUSTICE MINISTER OKUNO EXAMINED

Tokyo THE DAILY YOMIURI in English 21 Feb 81 p 3

[POLITICAL BEAT Article by Raisuke Honda: "The Muzzling of Okuno"]

[Text]

Contrary to his "militant" calls up until quite recently for revision of the war-renouncing constitution, Justice Minister Seisuke Okuno is now seemingly subdued.

Faced with a Socialist Party demand for his dismissal for his anticonstitutional remarks, Okuno has reportedly expressed to aides that he himself thinks it necessary to be "more careful" in discussing the constitution.

If Okuno is truly "repentant" over his hawkish remarks on the constitutional issue, then Prime Minister Suzuki can rest at ease, as the premier has so far had bitter experiences with the justice minister.

Why has Okuno become so somber so suddenly after a series of bullish remarks publicly venting his "political faith" in seeking amendment of the constitution?

According to Liberal-Democratic Party (LDP) sources, the main reasons are that Okuno is now aware of unexpectedly hostile reactions within the LDP to his controversial remarks, and also has noticed that Premier Suzuki is offended in all seriousness.

A former high-ranking official of the defunct internal affairs ministry, Okuno is known as a "conservative-fundamentalist" politician.

Although he is often said to be too uncompromising, Okuno in officialdom won recognition as a competent bureaucrat so that he was promoted to the post of vice-minister of the ministry.

After leaving the bureaucracy for a political career, Okuno, though affiliated with no LDP faction, won support from such influential politicians as Kakuei Tanaka and was named three times chief of the LDP general affairs bureau in charge of election campaigns, as well as education minister two times consecutively.

When the Suzuki administration was inaugurated, the prime minister appointed Okuno as justice minister at the suggestion of former premier Tanaka, presumably with no fear that the appointment would cause such a fuss as has currently been troubling Suzuki.

During the extraordinary Diet session last year, the first Diet deliberations since the start of the Suzuki cabinet, Okuno caused a commotion when he told the Diet that he believed Japan had no sovereignty at the time the existing constitution was established.

Premier Suzuki then was obliged to apologize for the "disunity" within the cabinet regarding the constitution, saying: "The government has no intention at all to revise the constitution."

Despite that commitment by the premier in the Diet, the justice minister seemed to have been overly elated by hundreds of "letters of encouragement" from rightist people across the country who highly praised Okuno's "bravery" in breaking the political taboo of constitutional amendment, according to the LDP sources.

However, Okuno was obviously self-contradictory in insisting on constitutional amendment on the one hand, while admitting the "need for refraining from making any remarks inconsistent with the cabinet policy" of not revising the constitution.

If Okuno was firmly committed to his own political philosophy, he should of course have resolved to carry out his convictions even by risking his cabinet post.

Indications are, however, that Okuno had no idea at all of giving up his cabinet post for the cause of constitutional amendment.

Following the recent statement before the Diet by Premier Suzuki to the effect that any cabinet member should resign as long as he fails to comply with the basic policy of the Suzuki government, Okuno has hurriedly pulled in his head, rather intent on showing his "allegiance" to the cabinet policy.

Regarding the disarray of the cabinet over the constitutional issue, however, Prime Minister Suzuki himself should be held responsible for his lack of strong leadership in holding earlier Okuno's remarks in check.

While committed not to revise the constitution, the premier allowed his cabinet members to speak freely, besides failing to give any warning to the justice minister against his proamendment remarks.

The premier's ambiguous stand over the constitutional issue may have stemmed from the priority he has placed on "intraparty harmony" of the ruling LDP by means of appeasing rightwing hardliners.

The premier's political style of dealing with sensitive issues without any clear-cut principle is considered very likely to give the public misunderstanding and is eventually bound to hit a snag.

CSO: 4120

POLITICAL AND SOCIOLOGICAL

SIGNIFICANCE OF JAPAN-CHINA AMITY ANALYZED

Tokyo THE DAILY YOMIURI in English 22 Feb 81 p 3

[BEHIND THE SCENES Article by Minoru Hirano: "Significance of Japan-China Amity"]

[Text]

A Chinese delegation led by a senior official of China's National Technical Import Corporation will arrive in Japan Monday to discuss the aftermath of the suspension of industrial plant imports from Japan. Japanese trading firms and plant engineering companies informed of the suspension from the Chinese side have decided to sit down at the conference table in monolithic unity despite some differences in the substance of contracts from company to company.

The general framework for the upcoming discussions took shape at thorough talks between Saburo Okita, government representative for external economic affairs, and Chinese officials in Peking February 11-12. Okita was informed of the following Chinese policy:

- The suspension of imports is limited to five plants, including the Baoshan steel mill in Shanghai. (The value involved in the cancellation is ¥300-¥320 billion according to a Japanese calculation.)
- China will continue projects financed by yen credits totaling ¥106 billion.
- To continue the suspended projects, China will seek a low-interest long-term loan from the Japanese Government or investment on a joint venture basis, and if this is difficult and the project must be discontinued, negotiations for indemnity will be started.

The negotiations in Tokyo will start with China making a concrete proposal about ways to settle the aftermath.

Foreign Minister Ito has repeatedly said that the plant import cancellation issue should not be made into a political issue as this is vitally important for the maintenance of Japan-China friendship. The Japanese companies concerned are distrustful of China which unilaterally scrapped the contracts in violation of international rules and are demanding additional low-interest funds. On the Chinese side, however, there has been criticism of Japanese economic cooperation as advance of Japanese big monopolies into China.

Japanese business circles criticize China for the cancellation of the projects saying that China is forcing losses totaling $1.5 billion on Japan, but there is a refutation on the Chinese side that China renounced war reparations exceeding $10 billion from Japan. If the situation is left as it is, the mutual distrust between Japan and China may hurt the political relations between the two countries. This should be avoided because Japan-China friendship and Japanese cooperation with ASEAN are the two major premises for Japan's policy toward Asia. Japan's Asian policy will collapse if Japan-China relations develop a crack. Because of this crisis consciousness, the Japanese Government sent Okita to Peking to alert the Chinese side to the magnitude of the problem and work out a framework for negotiations to settle the issue.

Upon his return from China, Okita alerted the Japanese business community saying that Japan-China relations were a strategic problem on which Japan's national security hinged and that the plant import cancellation issue should not be handled from the viewpoint of commercial transactions only.

Health and Welfare Minister Sunao Sonoda, when he was foreign minister, explained in more concrete terms the significance of Japan-China amity to Japan's national security. Sonoda said that in order to prevent Sino-Soviet rapprochement, the Western world should positively cooperate in China's economic construction and integrate China in the Western world's economic structure. Sino-Soviet rapprochement would be a nightmare, not only to Japan but also to the Western world. Japan stands to suffer immeasurable pressures from both North and West if China, with its very large population and potential strength, again joins hands with the Soviet Union. Because of such foreign policy speculations, the Japanese Government has deeply committed itself to China's modernization programs.

The upcoming Japan-China negotiations in Tokyo should reflect such thinking of the Japanese Government though the Japanese Government is not directly taking part in the negotiations. The range of options for the Japanese side will be limited if it respects such thinking.

Japan cannot radically change its policy of deeply committing itself to China's modernization programs even if the Chinese side shocked Japan by abruptly readjusting its modernization programs to cope with its domestic economic situation.

CSO: 4120

POLITICAL AND SOCIOLOGICAL

'NEW LIBERAL CLUB': URBAN-STYLE CONSERVATISM

Tokyo MAINICHI DAILY NEWS in English 23 Feb 81 p 2

[Editorial Article: "Urban-Style Conservatism"]

[Text]

After trials and errors for about five years, the New Liberal Club has apparently made up its mind to become the second conservative party but differing from the Liberal-Democratic Party.

At its fourth national convention held last Friday in Tokyo, the New Liberal Club approved its action policy and basic policy for 1981. We notice in them a new direction to be followed by urban-style conservatives and a determination to support the present war-renouncing Constitution and follow a disarmament policy.

These policy lines are distinctly different from those of the Liberal-Democratic Party.

Six LDP members, including Yohei Kono, bolted from the scandal-ridden party and formed the New Liberal Club in June 1976 when the Lockheed aircraft scandal rocked the Japanese political world. The small party has experienced ups and downs in the five elections of the both Houses of the Diet since then.

The New Liberal Club has failed to gain strength because of its failure to distinguish itself from the government party in policy lines. The obscure characteristics also resulted in intraparty strifes. Thus, the New Liberal Club could not strongly impress itself as a new conservative party among voters.

In his speech at the latest convention, Seiichi Tagawa, the party leader, criticized LDP's arrogant and corruptible character, and the emergence of opinions among the government party members who call for a possible revision of the Constitution and the stepped-up defense build-up. Tagawa pointed out that LDP politics "have become more arrogant" due to its numerical strength in the Diet and pledged the NLC's efforts to apply a brake on a trend that might push Japan into becoming a military power.

On domestic policy, Tagawa said the party would call for 1) a revision of the Staple Food Control Law and further import liberalization of agricultural products; 2) introduction of regulations which will limit the private right to own land; and 3) reexamination of the state subsidy system for social welfare resources.

We notice in them some bold policies which indicate the New Liberal Club's determination to place emphasis on city dwellers. They are contrary to the LDP basic policy which pays much attention to rural voters. The NLC made the choice by apparently taking into account that it can gain heavier support from urban voters than from rural voters and also that it must win more voters in the Tokyo metropolitan assembly election in summer this year.

Success or failure of the party depends upon whether or not it can fully become a party which must rely on urban voters and thus solidify its image among these voters that the New Liberal Club belongs to city voters both in name and in reality.

Tagawa also said the party was reluctant to follow the middle-of-the-road coalition concept promoted by the Democratic Socialist Party. Tagawa said that the concept to form a coalition government by mere numerical strength among moderate opposition parties was merely similar to a union among the Liberal-Democratic Party's intraparty factions.

On this specific point, Tagawa emphasized: "The party will continue to maintain close relations with the middle-of-the-road parties. What is required of the New Liberal Club is to clearly show its independence, identity and strengthen itself quantitatively and qualitatively as a political party. The time has come for us to establish our firm posture and policy..."

We can understand that the New Liberal Club must strengthen itself. The party must conduct a difficult experiment which is common to other opposition parties aiming at forming a coalition government while maintaining their own independence.

In the 511-member House of Representatives, the LDP enjoys a comfortable majority with 287. The situation is similar in the 252-member House of Councillors where the LDP strength stands at 135. The comparative figures for the New Liberal Club are 11 and 2, respectively. The government party has taken advantage of such a numerical strength in Diet procedures. The importance of the New Liberal Club is felt all the more under such circumstances.

CSO: 4120

MILITARY

ARMS MANUFACTURER ALLEGEDLY SUPPLIED INFORMATION TO UK GOVERNMENT

Tokyo DAILY YOMIURI in English 17 Feb 81 p 1

[Text]

A Komeito interpellator Monday disclosed a "secret technical assistance agreement" between a Japanese weapons maker and the British Defense Ministry and export of technology for tank cannons to a British weapons factory.

Hiroichi Sakai told the House of Representatives Budget Committee that Japan Steel Works, a government-authorized weapons maker, concluded a technical assistance agreement with the British Defense Ministry in 1975 for the production of the barrels of 105-millimeter cannons of 74-type tanks.

Moreover, the company allegedly supplied technology for the production of the breech ring and hydraulic barrel-returning mechanism of the cannon to the Royal Ordinance Factory, a weapons works designated by the Defense Ministry.

Japan Steel Works is an exclusive supplier of 105-millimeter cannons of 74-type tanks to the Defense Agency.

The hydraulic barrel-returning mechanism is a device which automatically returns the barrel to the original position after the barrel recoils when the cannon is fired.

Japan Steel Works reportly ranks top in the world in technology to make this mechanism.

The government as a rule bans export of weapons-related technology.

But Japan Steel Works denied the alleged export of technology for cannon breech rings and barrel-returning mechanism.

CSO: 4120

MILITARY

'ASAHI SHIMBUN' EDITORIAL ON ARMS EXPORTS

Tokyo ASAHI EVENING NEWS in English 11 Feb 81 p 7

[Editorial: "Arms Exports"]

[Text]

The issue of restricting arms exports has come to the fore again with the export of semifinished weapons parts to South Korea. We are now faced with the problem of finding an effective way of restricting such exports. The Government and all the political parties should return first to the basic position that Japan is a peaceable nation and decide on the requisite measures without allowing the Diet schedule, the convenience of international trade administration and the moves of business and industrial circles to get in the way.

In debate in the Lower House Budget Committee, the Government first announced that new, effective measures would be taken to restrict the export of arms. But in the face of opposition within the Cabinet, the Government changed the wording to "aim at taking effective measures." This is clearly a backward step and one that results from the overweening confidence of the Liberal-Democratic Party now that it has a secure majority in the Diet. LDP leaders have been criticizing the Miki Cabinet for having added further provisos to the "three principles" concerning arms exports. They have even called them "one of the legacies of the age of Government-Opposition near-parity." These people aim at returning to the Sato Cabinet's "three principles" and at easing the restrictions on arms exports.

These words and actions on the part of the Government and the LDP are, at bottom, connected with the statements made by General Goro Takeda, chairman of the Joint Staff Council, with the debate on civilian control of the Self-Defense Forces and with the advocacy of constitutional amendment and augmenting the national defenses.

The views propounded by the Miki Cabinet are not so specific to their time as to have since become invalid. They express in a clearer way the basic position of our nation, which should, in accordance with the increase in its national strength and its influence in the world, assume a greater responsibility for maintaining peace in the world.

If effective measures are to be taken, the Miki Cabinet's position should be confirmed on a suprapartisan basis, as should Japan's basic peacemaking policy. If we return to the "three principles," Japanese firms will be encouraged to export arms and

there will be serious doubts abroad about Japan's "peaceful foreign policy."

The legislative steps that the Japan Socialist Party, the Komeito (Clean Government Party) and the Japan Communist Party have proposed are worthy of study in the Diet, even though they may involve administrative problems. Giving legal backing to the Miki Cabinet's position will not only result in making the restrictions on arms exports stronger, but will make even clearer Japan's desire for peace.

It seems that the JSP is preparing an arms export ban bill, and the Komeito announced its own arms export ban bill back in 1972. These should be used as the basis for a thorough discussion of the matter, and for the taking of effective measures.

The submission of a bill poses a number of difficult questions. For example, there are differences over the definition of arms, the designation of semifinished products and parts as arms, and the making of on-the-spot inspections at arms plants; and there are also many problems connected with trade administration. These must, of course, be discussed, but the Diet's most urgent task is to find a way of clamping down on arms exports as soon as possible.

One step the various parties might consider is drafting a Diet resolution that would give the Miki Cabinet's position constitutional backing. The controversy over foreign policy and defense is such that the Government must take into consideration the opinions of people who are opposed to the strengthening of the national defenses. A vague decision designed to ensure that debate of the budget bill goes smoothly will only create problems for the future.

The Diet and the Government should state clearly, for the benefit of people both here and abroad, that they intend to restrict arms exports. (Feb. 8)

CSO: 4120

ECONOMIC

COUNTRY'S ROLE AS 'CAPITAL-EXPORTING NATION' EXAMINED

Tokyo ASAHI EVENING NEWS in English 18 Feb 81 p 9

[Editorial Report: "Capital-Exporting Nation"]

[Text]

A diplomat of a rising industrial country stationed in Tokyo has complained that although Japan has become a capital-exporting country, it has not departed from its attitude when it was still exporting merchandise only. We agree with this criticism.

The relations between Japan and Mexico can be seen as an example of this. Mexico has entered the spotlight as a nation having some of the world's largest reserves of petroleum and Japan is therefore promoting the extension of economic cooperation to that country. However, Japan's policy toward Mexico appears to place too many hopes on that country's petroleum.

When he visited Mexico in January, International Trade and Industry Minister Rokusuke Tanaka told President Jose Lopez that Japan would provide Mexico with a maximum mixed loan of ¥150 billion, including a ¥30 billion yen loan and a loan from the Japan Export-Import Bank. At the same time, Tanaka made a request for a stable supply of Mexican petroleum to Japan and an increase in petroleum exports to Japan. The Mexicans, however, confined themselves to promising that they would only make efforts to raise the export volume.

In an international tender held in connection with a plan to switch the Mexican national railway to electricity—which was considered by Japan as a part of its program to extend economic cooperation to Mexico—a consortium of Japanese enterprises which had been eyeing a ¥25 billion order for equipment including locomotives and railway signals, was completely defeated by American enterprises. Disappointment in Government circles over this series of events can be seen.

Japanese enterprises are also extending cooperation to Mexico on its plans to expand steel mills and develop industrial ports. However, in surveying Mexico's economic relations with other countries, it appears that the nation's ties with Japan are not as close as they are with Spain and the United States. For a long time, the Mexican railway has used American-made locomotives and coaches; and these trains are crossing the border into the U.S. and coming back from that country every day. When this is taken into consideration, it is natural that American enterprises were successful in receiving orders for locomotives.

In other words, economic relations between Japan and Mexico must be nurtured steadily. If relations of mutual dependence—such as in Mexico's supplying petroleum to Japan while Japan helps in the industrialization of Mexico—are to be built up, a long-term endeavor based on a strong foundation will be necessary.

This is not limited to the case of Mexico alone. Overseas investments will not bring good results if attention is not paid to the history, society, culture and social etiquette of the countries where investments are being made. There is a limit to merely pursuing natural resources.

The white paper on investments in overseas markets compiled recently by the Japan External Trade Organization shows well that Japan has grown considerably as a capital-exporting country. First, the amount of overseas investments approved in fiscal 1979 recorded an all-time high of $4,995 million. Second, the keynote of surplus in investment returns has taken hold.

Third, investments were made principally in developing countries, but those in advanced countries, including the U.S., have also begun to increase. Fourth, the trend of investments made in advanced nations is said to be shifting from emphasis on commercial activities by trading firms to direct involvement in the manufacturing industry.

This shows that Japanese technology and management are coming to be very highly evaluated. As the JETRO white paper indicates, overseas investments strengthen the context of industrial cooperation. The advance of such products as automobiles and electronic equipment into Western and developing industrial nations contributes to both countries involved by increasing supply capacity on one hand, and the transfer of technology on the other.

As Japan's overseas investments go through rocky times along with changes in the investing environment, such as China's adjustment of its economic modernization policy and the revolution in Iran, it is important to conclude an investment protection agreement and make way for an overseas investment insurance system.

However, what is necessary above all else in making overseas investments is readiness on the part of Japanese enterprises to lend a hand in the development of the countries where the investments are to be made instead of seeking immediate returns. Without this attitude, the maturing of Japan as a capital-exporting country cannot be expected.

CSO: 4120

ECONOMIC

JAPAN-CHINA TRADE HITS RECORD $9.4 BILLION

Tokyo MAINICHI DAILY NEWS in English 20 Feb 81 p 5

[Text]

Two-way trade between Japan and China rose 41.3 percent in 1980 over the previous year to a record high $9.4 billion, surpassing the previous high in 1979 by $2.7 billion, the Japan External Trade Organization (JETRO) reported Thursday.

Thus, China became the fifth largest trading partner for Japan after the United States, Saudi Arabia, Indonesia and Australia, said the semigovernmental trade promotion agency.

Customs-cleared exports to China sharply increased in the latter half of last year after a slump in the first half, the report said exports in the first six months were down 0.5 percent from the like period a year ago while exports for the entire year at $5.1 billion were up 37.3 percent over 1979.

Imports from China totaled $4.3 billion, up 46.3 percent over the previous year, maintaining the uptrend.

Japan's trade surplus reached about $800 million, slightly more than the previous year, JETRO said.

Among exports, steels slumped with shipment down 6.2 percent in value and off 25.3 percent in volume due to China's economic readjustment.

In contrast, machinery exports increased 2.7 times over the previous year under the lead of heating and cooling systems which increased 8.8 times, switches and other control systems 8.7 times, loading machinery 4.9 times, dynamos 4.1 times and textile and fabrics machinery 3.9 times.

The sharp increase in machinery exports was ascribed to concentration in the latter half of 1980 of plant shipment whose contracts were concluded between 1978 and the first half of 1980.

Likewise, passenger cars and black and white television sets increased by 5.4 times and 2.3 times, respectively.

In imports, crude oil continued to increase rising by 94.2 percent in value, accounting for 70 percent of the overall increase of imports from China. Its import share expanded to 45.1 percent from 34 percent in 1979. In volume, it rose by 7.5 percent.

Coking coal rose 31.8 percent, hard coal 17.1 percent and clothings 42.7 percent.

CSO: 4120

ECONOMIC

NIPPON STEEL STUDYING POSSIBLE MERGER OF BELGIAN STEELMAKERS

Tokyo MAINICHI DAILY NEWS in English 20 Feb 81 p 5

[Text]

Nippon Steel Corp. said Wednesday it would soon complete a study of a possible merger of Belgian steelmakers, involving Cockerill S.A.

Officials said the study, now under way at the request of Cockerill, would help the Belgian firm work out a plan for a merger with minor steelmills at Charleroi.

Nippon Steel, which became the world's largest steelmaker after the merger of two mills, has been asked for help by Cockerill, hoping to learn from its experience.

Cockerill expects the merger to contribute to its effort to get out of the business slump, the officials said.

CSO: 4120

ECONOMIC

EXPERT DISCUSSES ARMS EXPORT

Tokyo MAINICHI DAILY NEWS in English 24 Feb 81 p 4

[ZOOMING-IN Article by Hideo Matsuoka: "Japanese Arms - Not for Sale"]

[Text] Iran is resuming oil export. It is said shipment to Japan will be loaded toward the end of this month. The situation around Iran has improved, due partly to the settlement of the hostage issue. But then, whatever has happened to the Iran-Iraq war?

In a war, the oil terminal of a belligerent will naturally he bombed, and the tankers of third-party countries taking in oil at the terminal run the risk of being bombed. Iran must be resuming oil export because there is no longer such risk. If this is true, then where did the war go? We have not heard about any truce being agreed to by the belligerents. So the war must still be going on. But where is it being fought?

A war which is existing but is not being fought is a rarity in modern international relations. A going war not being fought can only mean that the warring parties have run out of bullets. When belligerents are without ammunition, the fighting ceases and a natural truce takes place.

Both Iran and Iraq had been prepared and equipped for war, up to a point. They had fighter planes, bombers, tanks and guns. In the early stage of the war, factories, ports and other facilities were bombed. The Iraqi capital of Baghdad was attacked from the air. But wars today are a contest to withstand the attrition of weapons. In the four warring months, a number of airworthy war planes nose-dived, most tanks have been stalled on the battlefields, and the ammo supply has run low. Neither Iran nor Iraq has the industrial capacity to manufacture modern weapons. When stocks are exhausted, there will no longer be a war. The two countries must still have some stocks of weapons. When they use up the stocks, their war potential comes down to an absolute zero.

No Fighting

Only foreign shipment of weapons to these countries can restart the war. In the first place, it was imported weapons that enabled them to launch a war. Iraq had arms delivery from the Soviet Union and several other European countries, and Iran had been supplied by about 10 Arab and European countries. These supplies made it possible for them to wage war. When these stocks are used up and there is no replenishment, there simply exists a state of war that involves no fighting.

Here we can learn about the evils of weapons export. Wars are started because there are countries exporting weapons. Of course, weapons export is not the only cause of all wars. But it is one of the major causes of war.

The Japanese government of Prime Minister Eisaku Sato set up the three principles to restrict weapons export 14 years ago. They banned shipment of weapons to communist countries, countries under U.N. sanctions, countries engaged in disputes and countries which may be expected to be involved in a dispute. It is difficult to decide which countries may be expected to be involved in a dispute. Who ever expected Iran and Iraq to go to war with each other? I have yet to hear of anybody in Japan who predicted a war between these two countries. If Japan had exported weapons to these countries on the ground that they were not expected to be involved in armed conflicts, Japan today would have to take the blame for the outbreak of the Persian War.

To eliminate the ambiguity in the arms export principles of the Sato government, the cabinet of Prime Minister Takeo Miki drew up an official government position five years ago: "In the spirit of the Constitution and in compliance with the provisions of the Trade Control Ordinance, Japan will refrain from arms exports even

to countries not covered by the three principles." In short, it means Japan will not export arms to any country.

Some elements in the Liberal-Democratic Party and the business world are maneuvering for an official recantation of the Miki principle and subsequent reversion back to the Sato principles. There are three major reasons behind this move.

First, Japanese defense orders alone do not sustain defense industries. The small scale of defense industries does not contribute significantly to consumption of steel and other products. Moreover, military science has a vast technological spinoff in scientifically pioneering areas. For lacking military science, Japan is behind in some technologies that could be helped by military research.

Second, unlike the U.S. and European countries, Japan cannot offer weapons in landing Middle East oil contracts. Compared with other industrial countries, Japan thus is at a disadvantage in the scramble for oil. But this assertion is a blackmail by business. Weapons are not the only commodity needed by Arab countries. If, by refusing to trade in arms, it becomes established that Japan is the only country in the world that does not export weapons even if to do so would facilitate its oil purchase, Japan can really prove its peaceful intentions. Japanese businessmen should be proud of this national position. Japan's industrial and technological advantage should enable the nation to take such a position.

'General Purpose'

The third problem concerns export of so-called "general purpose" goods which can serve both civilian and military purposes. This is a problem of extreme complexity. Both the Socialist and Communist parties have drawn up their own arms export control legislation. Each party seems to have had considerable difficulties in the treatment of "general purpose" commodities. Trucks, electronics, steel and other products can readily be made to serve either military or civilian needs. The crux of the issue is how far can legal technicalities go in deciding whether export of a certain general purpose commodity is to be labeled an arms export or not.

Be that as it may, it is grossly inadequate for Japan, which has a unique constitutional provision renouncing war and officially aspires to be a peace-loving country, to have only the Sato and Miki principles to rule on arms export. Since it already has such laudatory principles, it should be easy for Japan to formally legislate these principles into law. Japan's vaunted peaceful intentions will be suspect if the country refuses to provide legal backing for these principles.

The Sato and Miki principles are the products of Liberal-Democratic governments. For the sake of policy continuity, any Liberal-Democratic government would do well to respect these principles and seriously attempt to make them into law to prove that it means business.

Some say that antiweapons export principles were no more than grandstanding by the Sato and Miki governments. Sato is in the grave, but Miki is still alive for comment. Would anyone dare ask him if his principles were merely to please the crowd?

Recently, Hotta Hagane is being caught up in a legal tangle for exporting to South Korea what is presumed to be gun barrels. Concerning this case, those who oppose legislation against arms export and want the present arms export restrictions eased, say: "South Korea is the first line of defense for Japan. Export of goods that will enhance the defense of South Korea should be allowed." If they consider South Korea to be the first line of defense for Japan, they should advocate an all-out arms export and military aid to that country. An argument does not wash if it advocates a modest arms export and condemns an all-out export. But, how can an all-out export of arms be allowed at this time? Just as an all-out export is to be disallowed, so is any export.

The concept of the "first line of defense" dates back to the start of the Manchurian Incident. At that time Japan argued that Manchuria and Mongolia were its first line of defense. This is a military concept. By analogy, Japan's first line of defense today may include Habomai and Shikotan islands, the Strait of Soya, Sado Island, and you name it. For Japan which cannot survive without Middle East oil, the Middle East may well be a first line of defense for it. Is Japan, then, to export weapons to the explosive Middle East?

Japan's security is not to be preserved through militaristic consideration. Swearing off these considerations certainly puts Japan's security issue in a tough spot. But Japan is not allowed to shirk the issue. It should wade right through the difficulties by mobilizing its national resources. The weapons export problem is one of such difficulties and, as such, requires great caution in its handling.

(The Japanese original is carried on the latest issue of the weekly "Sunday Mainichi).

CSO: 4120

SCIENCE AND TECHNOLOGY

FUTURE OF TECHNOLOGY VIEWED FROM TREND IN PATENT APPLICATIONS

Tokyo NIKKEI BUSINESS in Japanese 29 Dec 80 pp 73-75

[Article by Kusuyata Shimamoto, director, Shimamoto Patent Office]

[Text] A look at the recent trend of patent applications shows such a dynamic change that one must say, "something has changed." Since the oil shock the management strategy of mass sales with an overwhelming price difference, making use of cheap crude oil and mass production technology, has become unavailable. The composition of consumption has diversified, and the flow of technological development has changed greatly.

Development of Technology Shifts Away From Oil

Specifically, in the area of high economic growth, the management strategy of producing and selling in large volumes led technological development in the direction of mass production and mass sales--toward technology which could produce large volumes and technology which enabled reduction of costs through sales of large volumes. But as consumption has diversified since the oil shock, plant size has been rationalized and the very nature of technological development has changed. This change in the direction of technological development is clearly seen in patent information.

Beginning 1 January 1971, patent applications have been made completely public after a period of 18 months. The flow of technological development and business strategy can be understood from analysis of patent information which has been made public. The trend of patent applications since the oil shock of December 1973 clearly shows that the direction of technological development has changed away from oil.

The detailed explanation, drawings and everything are published in the case of patents, but only drawings and the scope of the request are published in the cases of proposed new applications of technology. By quickly studying these public reports, one gets a close-up view of trends in new technology and the technological strategy of rival companies. It is thus possible to quickly shift to growth areas, to realize where one's own technology is behind the times, and to make decisive changes in the direction of technological development. In the past patent information had the nature of "proprietary information," but now it has come to be "new technology information."

Patent Information as a Tool of Medium-range Forecasting

But patent information cannot do everything. It is difficult to do medium-range forecasting using either the Delphic method of long-range forecasting or the variety of information used for short-range information. And so patent information has emerged as a tool of medium-range forecasting.

Research and technological development plans have to be drawn up about 5 years in advance, and a view that far in the future can be found in patent information. But patent information cannot predict 10 years ahead or within the coming year; in that sense, it cannot do everything.

Patent information can be used in many ways and for many purposes because of such characteristics as its broad range (from lipstick to atomic power), its standardization (publications are issued in a fixed format with a standardized listing of applicant, date of application, inventors, patent classification, detailed description etc.), its international nature (international classification is used), its suitability to computer indexing (by the Japan Patent Information Center), its systematic nature (ease of analysis by classification codes), and its concurrent appearance at regular intervals and in regular quantities.

The charts on pages 71 and 72 show the fields of technology (among 118 fields) in which applications for patents and proposed new application of technology have increased from 1975 through 1978. The 19 patent fields and 13 new application of technology fields are the fields of technology which have been growing, and it is clear that basic research has begun to be emphasized. According to the "Report on Scientific and Technical Research" from the Prime Minister's Office, this emphasis is backed by increased spending for basic research (16.2 percent in 1977, 16.6 percent in 1978). Calling Japan a "technology-based country" in the 1980's indicates that enterprises which withdraw from technological development cannot remain in existence.

Among patent applications, there are 19 of the 118 fields of technological development which have shown an increase each year, and 8 of these fields have grown to more than 130 percent. Let's look at these high-growth development fields one by one.

Illumination, which has grown to 199 percent, is a manifestation of non-oil technology. It takes such forms as lighting using solar energy and earthquake-activated emergency lighting, applications backed by foreign capital for such things as flashlights are conspicuous. The field of nuclear physics and engineering, which has grown to 175 percent, has focused on safety and control technology for the age of nuclear power. This is primarily technology to prevent radioactive pollution inside and outside the reactor: gas safety valve mechanisms, pressure control devices, leakage experiment equipment and so on.

Startling Growth of Electronic Medical Equipment

Water and sewage, which has grown to 160 percent, centers on technology for improvement of the residential environment, but also includes devices for localized washing of body parts, noiseless toilets, technology to conserve water or to flush automatically, devices to prevent freezing of water pipes, water supply and

distribution systems, etc. In the area of medical, veterinary and health sciences, which grew to 147 percent, the number of applications increased sharply to 3,180 per year.

The increase in electronic medical equipment is particularly striking; a base for growth products has been laid with the increase in ultrasonic diagnostic devices, CT (computed tomography) devices, ICU (intensive care units), artificial kidneys, endoscopes, laser ophthalmiatric equipment, brain wave analysis equipment, biofeedback devices, scintillation cameras, respiratory function monitors and others. There is also promising technology in such areas as artificial bone, laser surgery and cleansing of the oral cavity.

Applications have reached the 1000 per year level for laminates, which have shown growth to 154 percent, and which involves much promising technology. Laminate technology is necessary for the housing industry, and so it includes many growth areas like fiber-reinforced polymers, dressed panels and packaging materials.

The greatest number of applications backed by foreign capital are for cell structure of honeycomb panels using triangular cells, acoustical panels, metal-ceramic compunds, laminate tubes, filaform textile materials, annular three-dimensional structures, protective and decorative moldings, transparent fire-resistant panels and so on. The field of sewing, embroidery and tufting, with growth to 143 percent, increased rapidly in 1976, and there was an increase in computerized sewing machines which are sweeping the world. Computer-driven automatic and energy efficient industrial sewing machines have also come on the scene. Also to be noted are zigzag stitch machines, chain-stitch technology, programmable sewing machines and numerically controlled sewing machines.

In the area of music and sound, which grew to 133 percent, the audio boom was reflected in the advent of large amounts of new technology. There was an increase in self-playing electronic instruments--devices which automatically perform the melody or rhythm and devices which use memory to provide accompaniment semiautomatically. Electronic pianos and devices which play compositions recorded in the memory have been prominent among electronic musical instruments. In addition, voice synthesis technology has been actively developed; such things as methods and equipment to generate artificial voice signals, tuning systems for stringed instruments, electronic melody alarm clocks, voice synthesis equipment, music synthesizers, touch response circuits and devices to find and display resonances for stringed instruments stand out.

Advent of the VTR and VD Era

There has been a sharp increase in relation to ceramics in the area of cement, ceramics and sound or heat insulators, which has increased to 130 percent. Alumina ceramics for cutting tools, titanium chloride ceramics for dialectric material, silicon nitride ceramics for high-temperature structural material and nitrogen-boron ceramics for cutting and polishing materials are notable.

In the area of information recording which has grown to 126 percent, magnetic recording has been prominent with the arrival of the VTR and VD (vidio disk) era. Especially notable technology includes block multiplexer channel control methods, dynamic memory systems, address matching control methods, memory modules, memory

error loggers, memory protection, sample hold circuits, charge-coupled devices, bucket-brigade devices and magnetic valve elements.

The trend in applications for new application of technology shows increases in the following areas. In the area of steam generation, which grew to 161 pe..ent, there is a concentration of steam generation devices for atomic reactors (high-speed breeder reactors) and waste heat utilization. Those using geothermal or solar heat are also conspicuous. Low temperature heat transfer elements and waste heat absorption heaters were also prominent.

In the area of photographs, motion pictures, electrostatic copying and holography, which has grown to 135 percent, the focus has been on high-level camera technology, including autofocus, photosensor arrays, motor drive, film movement detection and focus detection using light wave ranging. Copying technology has been aimed primarily at border area technology and system controls in connection with office automation. Electronic image printers using laser beams are also notable.

Crush of Energy-Conservation and Miniaturization Technology

In the area of printing and drawing equipment, typewriters and stamps, which grew to 133 percent, there was rapid growth to 1,821 applications in 1978. This centered on automation of printing, computer control, drive mechanisms and electronic display technology. Three-dimensional printing and transfer paper were notable within printing technology, and the development of chemical materials brought an increase in pressure-sensitive paper for multiple copies, heat-sensitive paper, paper for telegrams and so on.

Prominent in the area of general vehicles, which has grown to 126 percent, are such things as reduction of the weight of automobiles, safety, wire continuity checks in response to electronification, disks, trade patterns, hydropneumatic suspension, door checks and clutch controls.

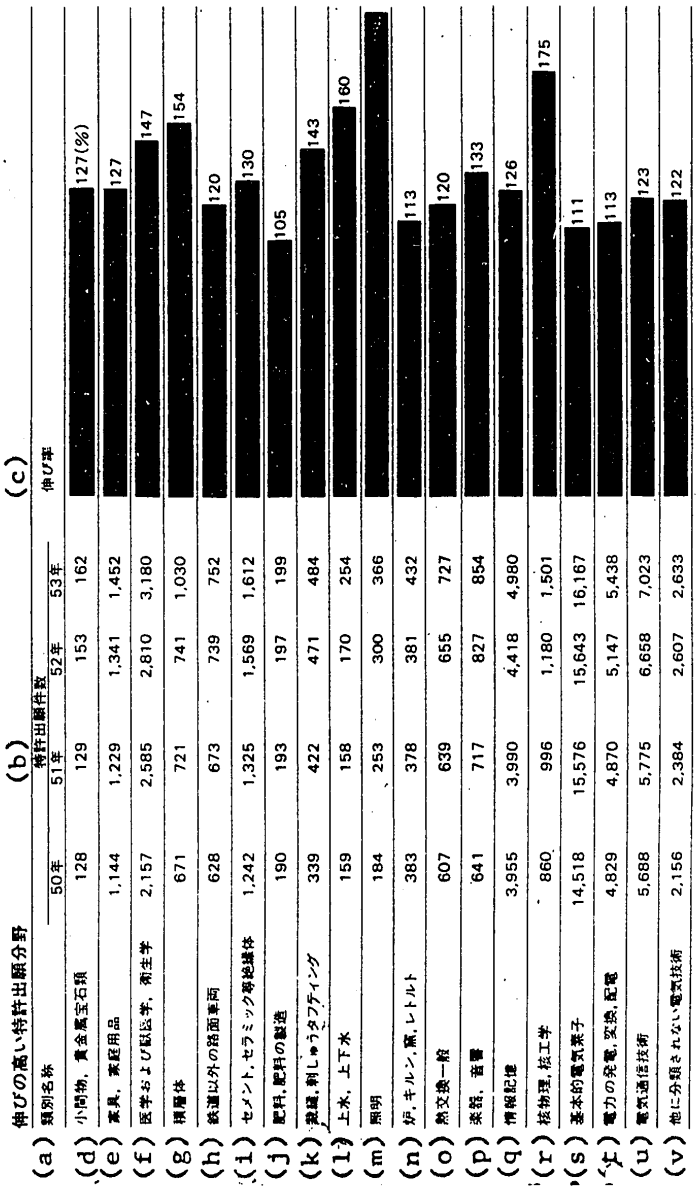
The area of generation, transformation and distribution of electric power, which grew to 126 percent, increased rapidly to 6,551 applications in 1978. There was a striking increase in linear motors and micro motors, which served a role in energy conservation and miniaturization; such things as thyristors for power electronics, generator safety controls, variable speed drives for AC equipment, and technology related to synchronous phase controls for DC equipment.

Development of practical applications was the center of attention in this field; notable items are application of pulse motor controls to electronic watches and application of linear motor controls to various types of equipment. There were thyristors used both for converters and inverters among the transformation applications. In addition there were central control devices, marine cable laying technology, gas insulated electrical devices, optical fiber connectors, and superconducting rotary equipment and transformers.

The area of electronic communication technology, which has grown to 125 percent, is highlighted by growth in the facsimile industry and compression and coding methods for transmission signals, and also by technology to improve videodisk and TVR image quality and technology relating to the move to cassettes.

An overall look at the trend of applications for patents and for proposed new application of technology thus shows that various new technology continues to come, and highlights the pattern of technology which will sustain growth industries 5 years hence.

Figure 1

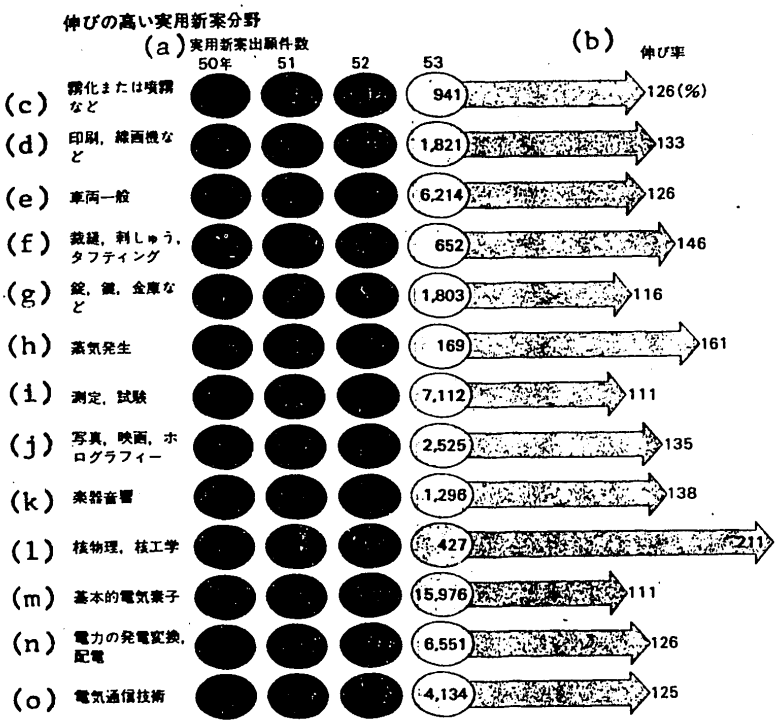


High growth patent application areas

Key to Figure 1:

(a) classification
(b) number of applications (1975, 1976, 1977, 1978)
(c) rate of growth
(d) notions and jewelry
(e) furniture and household items
(f) medical, veterinary and health sciences
(g) laminates
(h) non-rail wheeled vehicles
(i) cement, ceramics and insulators
(j) fertilizers and fertilizer production
(k) embroidery, sewing and tufting
(l) water and sewage
(m) illumination
(n) furnaces, kilns, ovens and retorts
(o) general heat exchange
(p) musical and sound equipment
(q) information recording
(r) nuclear physics and engineering
(s) basic electrical elements
(t) power generation, transformation and distribution
(u) electronic communication technology
(v) electrical technology not otherwise classified

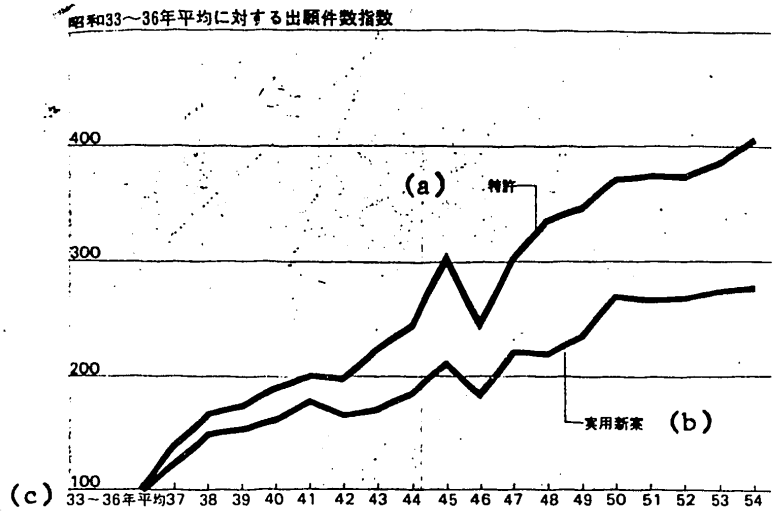
Figure 2



High growth areas for proposed new application of technology

Key:
(a) number of cases (1975, 1976, 1977, 1978)
(b) growth rate
(c) vaporization, pulverization etc.
(d) printing, graphics etc.
(e) general wheeled vehicles
(f) embroidery, sewing and tufting
(g) locks, keys, safes etc.
(h) steam generation
(i) measurement and testing
(j) photography, motion pictures, holography
(k) sound and musical instruments
(l) nuclear physics and engineering
(m) basic electrical elements
(n) power generation, transformation and distribution
(o) electronic communication technology

Figure 3



Patent applications indexed on 1958-1961 average

Key: (a) patents
(b) proposed new application of technology
(c) 1958-1961, 1962, 1963...1979

9601
CSO: 4105

SCIENCE AND TECHNOLOGY

CONCEPT OF INTEGRATED 'TECHNOPOLIS' FORMULATED

Construction Committee Chairman's Views

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 12 Jan 81 p 1

[Interview With Technopolis Construction Concept Committee Chairman Ibo Ishii]

[Text] Reporter: The making of a city with a nucleus of industry handling the most advanced technology--the so-called technopolis construction concept--is about to be put into practice. A struggle between local governments inviting the technopolis to their areas is developing at MITI, the ministry behind the project. However, for the average person, the term technopolis seems very remote and hard to relate to.

Ishii: Yes, it does seem that way. As technology becomes more sophisticated, it tends to appear cold and inhuman. The technopolis concept can be seen as the building of a city which promotes creativity. I myself thought of calling it "ingenuity village."

Reporter: I understand that the Technopolis 90 Construction Concept Committee, of which you, Mr Ishii, are chairman, will hold its first meeting this year. Let's begin by talking about the idea behind the technopolis.

Ishii: In view of the problems of resources and energy and economic security in a broad sense, our country is moving toward establishing itself on the basis of technology. The problem is what form this development is to take over the long term. Also, the city itself is tending toward regional dispersion--a movement opposite to the central concentration of the period of rapid economic growth. The industrial structure is becoming information-centered, and in the future there will be rapid progress in biotechnology and the use of new material elements. The problem is to determine what structure will be best to cope with these developments. The technopolis concept was derived from this standpoint. In order to build the city and train the personnel, advance investment must be made over a span of 10 or 20 years. In the period of rapid growth, the Japanese economy developed in a form that gulps down petroleum. The problem of pollution also emerged then. So we are coming up with new concepts of industry and city planning that differ from the structure of the past.

Reporter: So then what is the desirable form of the technopolis?

Ishii: As an extreme case, we have Silicon Valley on the West Coast of the United States where the semiconductor industry is concentrated. From now on, growth industries or vanguard industries with highly integrated technology will become necessary as the pattern of the future. And with them, a clean environment will become necessary. I observed Silicon Valley myself in 1979. It is located close to the city of San Francisco and to Stanford University. From its inception it has been tied in with a city and a university, and it performs the functions of a city. High added-value products like semiconductors are not difficult to transport. Coastal industrial sites are no longer necessary; an inland site will do. Such things as the location of an airport and a stable and plentiful supply of clean water become important. Because of the demographic U-turn phenomenon that has been occurring recently, it would be well to take advantage of the potential strength of outlying regions. The technopolis could be taken to the vicinity of regional urban nuclei. In this way, older culture and tradition could be taken advantage of and a variety of facilities could be utilized. An atmosphere like that of neighborhood bars is good, in my opinion. Without it the population will not settle permanently.

Reporter: MITI's technopolis concept includes the three elements of industry, schools, and dwellings?

Ishii: First comes an industrial zone making up the nucleus of the city where the vanguard industries are grouped. Second is an academic zone made up of universities, cooperative research facilities, and the industries' central research laboratories. Third is the habitation zone mainly for the workers in these concerns. These are the three elements making up the technopolis.

Reporter: Although industries might participate according to your plan in a period of high growth, will they do so in the present period of stable growth?

Ishii: During this era of stable growth, qualitative changes are taking place in industry. Thinking of the future, industry is turning to added-value products and actively investing in that direction. Most of the business executives I know consider technological development to be a top priority. And considering that small and medium enterprises and even very small enterprises are applying computers and utilizing high-level technology, the industries will participate if the proper environment is created.

Reporter: So you are saying that the technopolis concept fits the present period, when the country is establishing itself on the basis of technology and the outlying regions are becoming more important?

Ishii: Exactly. Since Japan lacks resources, the only way out is to use our technological capabilities. I would like to emphasize the need to develop creative technology rooted in Japan's own culture and traditions. To do this, it will be necessary to tap the energy of the masses and regional vitality to the fullest. The technopolis concept fits this region-oriented era. But at the same time, the technopolis should be a cosmopolitan, international city which fits an international age. [end of interview]

30 Cities, Towns, and Villages Extend an Invitation

Looking forward to the 21st century, what kind of new city must be built to cope with the coming changes in the Japanese industrial structure? It is from this

standpoint that MITI developed the technopolis (technologically integrated city) concept. It goes together with former Prime Minister Ohira's concept of a country of garden cities--rural space in the cities and urban vitality in the country. The new technopolis would have a nucleus of clean industry in the form of fine technology--the vanguard technologies of ultraprecision machinery, VLSI's and computer software, and engineering know-how. The ministry's goal for realization of this plan is 1990. Research expenses are included in the 1981 budget, and the Technopolis 90 Construction Concept Committee will determine the standards for selection of the candidate sites by March. On the basis of this selection, MITI will make a study of five candidate sites, with June as the target date. The plan is to narrow this down to one site and begin construction in 1983. Already more than 30 cities, towns, and villages are clamoring to have the project located in their area. It is hoped that these sites will be examined objectively and fairly. Ibo Ishii, professor of engineering at Tokyo University, was also involved with former Prime Minister Ohira's garden city concept, and he is passionately committed to construction of the technopolis. He says, "The technopolis has direct relevance to this age of internationalization."

Structure, Operation of Technopolis

Tokyo KOGYO GIJUTSU in Japanese Vol 22 No 1 Jan 81 pp 36-39

[Text] In the 1980's, as the 21st century looms just over the horizon, one important issue for the industrial sector is the establishment of the Japanese economy on the basis of technology. The issue for the people, on the other hand, is to find a better daily life and establish and maintain a zone of habitation--a concept which used to appear in urban engineering textbooks. In other words, cities, towns, and villages must be built up through more and better regional development. Therefore, "technopolis construction" is being requested by many sectors to solve these two national problems of establishing the country on the basis of technology and developing the regions at the same time. It also has importance as a necessary preparation for the future.

A report on technopolis construction was prepared by the Industrial Structure Council in March [1980], and it was favorably evaluated among the MITI policy visions for the 1980's as showing the direction for a regional policy. Then in July a basic conceptual statement was made by the Technopolis Construction Concept Committee, chaired by Ibo Ishii of Tokyo University. In this article we will discuss the construction of the technopolis, focusing on this concept.

1. The Technopolis Concept

We can observe from the construction of new industrial towns in Japan, where manufacturing practices have reached a high level, that there is a close relationship between a place of manufacture and the formation and development of a city. Viewed in this way, the technopolis (highly integrated city) is a place for expression of advanced technology where the character of the city is arranged around the central element of advanced technology industries such as the computer and information industries. In addition to this industrial area, the technopolis will have an academic area which includes all kinds of research facilities and technical universities that will carry out development in cooperation with and related to the

industrial section. There will also be a living area to provide creative vitality and moments of relaxation to the people engaged in the activities of the other two areas. In the construction concept, these three elements of industry, academic research, and habitation are connected organically. At the same time, the community which they constitute should blend harmoniously with the traditional society of the region. Therefore, construction of the technopolis will be a materialization of the concept of development of, by, and for the region, and will be an ideal tie-in with the vanguard technology that will support the Japanese economy of the future.

2. Approach to Technopolis Construction

The technopolis is conceived of as a unified community combining industry, academic facilities, and habitation. The following considerations have been pointed out as necessary precautions in construction.

First comes the industrial area. In previous industrial site procurement policies in Japan, the major concern was to find sites near the sea for materials industries such as steel, petroleum refineries, and petrochemicals. However, when we consider the future direction of the Japanese economy we see that the industries which will take the leading role in economic growth will be the advanced technology industries established by the creation or combination of new and original high-level technologies. For the developing advanced industries such as the electronics and machine industries, access to airports and highways is a necessary factor for location. Such location factors must be treated as major issues of industrial location policy. Therefore, in building the technopolis, it will be necessary to carefully consider the conditions presented by industry, taking into account the future direction of major technology.

Second, the place where the technopolis is built, while centering on advanced technology, must fulfill the necessary conditions for a site of future human activity. It should be a place where the growing desire for settled life is realized--a space far away from major cities, surrounded by a lush natural environment and a regional culture built upon a wealth of tradition. It is in this context that technopolis construction is most closely tied to the issue of regional development.

Third, we must take seriously the aspect of the technopolis as a place for human life. The technopolis population includes researchers, engineers, and technicians working in the universities, high-technology industries, and related industries. These people are probably heavily oriented toward city life and have a wide variety of lifestyles. In building the technopolis, it will be necessary to meet the needs of these scientists and technicians and at the same time seek a form of community that harmonizes with the culture and tradition existing in the region.

3. Geographical Conditions for the Technopolis

Macroconditions: When the technopolis is placed on the map, it is necessary to consider two opposing prerequisites. The first is related to the function of the technopolis as a place for advanced technological expression. It should be more than just a physical base for production. Since exchange and integration of information will be necessary, the industrial section should pursue the advantages of such integration as much as possible. The second condition is that the

technopolis must be some distance away from the big city, surrounded by an abundant natural environment and a regional culture built upon rich traditions as a suitable environment for the researchers and technicians who will be the chief permanent residents of the technopolis.

Based on these conditions, the technopolis must be away from large urban centers but within a 1-day roundtrip from a major city by plane; a nearby airport is a prerequisite. It will also be necessary for movement to be possible within a week's time by highway or railroad trunk lines to nuclear cities in regional blocks with cities over 1 million population.

Microconditions: To consider the microconditions, let us imagine that the technopolis is sitting in a display case. The central plants will be IC and computer assembly plants, and other industries will include related electronics part manufacturers, molding and machining industries, related distribution industries, and subcontractors. The number of employees is estimated at approximately 11,000 people. Also, the academic area will include universities concentrating on technical subjects, company central research laboratories, cooperative research facilities associated with national universities, and technical high schools. The population involved in this area, including students, is expected to be approximately 10,000 people. According to these estimates, the size of the technopolis will be from 40,000 people in an area of 1,500 hectares to 60,000 people in an area of 2,000 hectares.

Since most of the inhabitants will be researchers or technicians who are city oriented, the technopolis will require a city concentration above a certain standard in size. The standard being considered as a rough guideline is a city of at least 200,000 people. With the exception of satellite cities of the major urban centers, the technopolis communities should be on the level of cities next in size to the prefectural government seats. (Tables 1, 2) Therefore, the smallest area for locating the technopolis will be a city of at least 200,000 people and an area which is directly related to it in the living of daily life. Therefore, the city is likely to take the pattern of an existing urban core of at least 200,000 people unified and directly connected with the technopolis by subway or linear motor car.

Table 1 Technopolis Site Policy

	Population of 400,000		Population of 600,000	
	Hectares	Percentage	Hectares	Percentage
Industrial site	120	16.0	120	12.0
University site	80	10.7	80	8.0
Habitation site	400	53.3	600	60.0
Central area	30	4.0	50	5.0
Medical	5	0.7	5	0.5
Supply processing	5	0.7	5	0.5
Main roads	110	14.7	140	14.5
Subtotal	750	100(50)	1,000	100(50)
Wooded land, etc.	750	(50)	1,000	(50)
Total	1,500	(100)	2,000	(100)

Table 2 Average Distribution of Facilities in Relation to Community Size

Facility / Population size	University	Hospital (10 divisions or more)	Cultural center (seating over 1,000)	Library	Library (over 100,000 volumes)	Large bookstore (over 500m²)	Large retail store (over 15,000m²)	Museum (over 3,000m²)	Art museum (over 3,000m²)	Hotel (affiliated with association)
Over 600,000 (13)	●	●	●	●	●	●	●	●	●	●
400,000 to 600,000 (8)	●	●	●	●	●	●	●	O	O	●
300,000 to 400,000 (11)	●	●	●	●	O	O	O	Δ	O	●
200,000 to 300,000 (23)	●	●	●	●	O	O	O	O	Δ	●
15,000 to 20,000 (15)	O	●	●	●	O	O	Δ	Δ	Δ	O
10,000 to 15,000 (27)	Δ	O	●	●	Δ	Δ	X	Δ	X	Δ
5,000 to 10,000 (115)	X	O	O	●	X	X	X	X	X	X

Note: Satellite cities of major urban centers are excluded. Facility size cutoff points used in the survey are shown in parentheses.

● found in almost all cities
O found in about 50 percent of the cities
Δ found in about 20 percent of the cities
X found in almost none of the cities

4. Inner Structure of the Technopolis

In the technopolis, it is desirable that the industrial, academic, and living sectors develop in a form where they are mixed together and mutually supportive. The community will be laid out with an industrial zone, an academic zone, and a habitation zone corresponding to the three areas.

Contents of the industrial zone: The industry in the technopolis will consist of advanced technology industries which can be expected to have future growth both domestically and internationally and industries which are related to them directly or indirectly as part of a complex. Industries which are considered to have real capacity for growth include semiconductors, opto-electronics, computers, lasers, ultrasonics, measuring instruments, composite robots, space flight, linear motor cars, ocean development, superalloys, and medical equipment. The industries making up the nucleus of the technopolis, the industrial complex, will probably come from this group.

Contents of the academic zone: The technopolis is a place for expression of advanced technology. The purpose of the industrial zone is to express advanced technology in the form of production. The academic zone has the role of importing greater vitality to existing advanced technology and developing new advanced technology. The academic zone is responsible for research and education and provides a basis for self-development in the technopolis. The research function will be carried out by national and local government basic research facilities and development and application research facilities of the companies. The educational function will be carried out by high schools offering intermediate education, junior colleges, technical high schools, universities, and other special educational institutions that will provide personnel training and basic study.

Also, creation of a supportive environment for research activities will be required for research facilities separated from large cities, so research support facilities such as an information center, an international convention center, and a researchers' salon will be necessary.

Contents of the habitation zone: In building the technopolis, it is essential to create a comfortable living space for the inhabitants. First it is necessary to provide a relaxing environment to relieve the great stress of developing advanced technology and to nurture the vitality necessary for creative thought for the people working with the advanced technology. Also, it must sufficiently meet the needs of children, youths, the elderly, and women according to their age, occupation, social class, and sex.

In creating a good living space for the inhabitants, it is absolutely necessary to provide an environment that will give relaxation and suitable stimulus for enhanced vitality as well as convenience and safety in daily living.

Conclusion

The major focus of previous industrial policies has been the proper arrangement of the plants where production takes place. This plant layout has been an important element in city planning as well. In the technopolis concept, however, the arrangement of research and educational facilities which support the technology used in production has received attention along with the arrangement of plants using advanced technology. The plants, which are a place for expression of advanced technology, and the research laboratories that develop the technology are treated as parts of a single city structure. In the present situation, it is urgent that construction of the technopolis be carried out as part of an industrial site procurement policy. Japanese industrial technology has reached the highest standards in the world and our industry has become knowledge-intensive. We should be very conscious of the fact that we cannot hope for greater success in Japanese industry unless we develop our own technology.

The ancient Roman aqueducts which traverse broad valleys and continue on in an unbroken line to the horizon are a memorial to the technical level, centering on civil engineering, of the Roman Empire, the most advanced civilization of the time in Europe. Likewise, the technopolis, built as a city that shows our pride in the most advanced technology will be a gift for future generations that will demonstrate our technical level, centering on the fine technology of semiconductors, opto-electronics, and computers.

Construction of the technopolis is highly desirable. It will provide a base for development of future Japanese industry as well as give Japan an international position as a technology-developing country.

9651
CSO: 4105

SCIENCE AND TECHNOLOGY

EXPLOITATION OF MARINE RESOURCES TO BE PROMOTED

Deep Sea Survey Vessel

Tokyo NIHON KEIZAI SHIMBUN in Japanese 12 Jan 81 p 15

[Text] The first full-scale deep sea survey vessel in Japan, the "Shinkai 2000" (displacement, 24 tons), will be launched on the 21st at the Kobe shipyard of Mitsubishi Heavy Industries, Ltd. It has been under construction since JFY 1978 at a cost of 3.7 billion yen for the foundation, the Center for Marine Science and Technology (S. Kurachi, director). The supporting mother ship "Natsushima" (gross tonnage, 1,300) was launched on 1 August of last year at a construction cost of 3.8 billion yen, and it is being outfitted at the Kobe shipyard of Kawasaki Heavy Industries, Ltd.

Joint trial runs for the "Shinkai 2000" and the "Natsushima" will begin in April in Kii channel. At the end of July, the first underwater navigation to a depth of 2,000 meters will be undertaken offshore from Kumano. The vessel will be delivered after the performance of the hull and machinery is fully confirmed, and it will be formally completed this fall. Approximately 50 firms participated and cooperated in building these vessels with materials, machinery, measuring instruments, etc. It is the essence of Japanese shipbuilding technology.

Atmospheric pressure is 1 on land, but at a depth of 2,000 meters underwater, an additional 200 atmospheres of hydraulic pressure are present on all sides. Special ingenuity in design, construction, and materials is indispensable so that the vessel will not be crushed by the pressure. The "Shinkai 2000" has a double construction, with a shell of 5 mm thick FRP (fiberglass reinforced plastic). Since water is retained inside, this thickness is sufficient. Crew space is in the spherical shell, which is made of a 3 cm-thick special steel, "NS90." It is almost a perfect sphere, with a sphericity of 0.06, so the pressure is uniformly distributed.

The interior of this sphere is 2.1 meters in diameter and 5 cubic meters in volume. Since machinery will take up space, there is a net space of only 4.5 cubic meters. And on top of that, three crew members will go in. Thus, other than the pilot who sits on a chair, the others will either lie face down or sit Indian sytle at best. They will observe 7-8 meters ahead, illuminated by 5 projectors (500 watts each), they will operate inboard television (black and white) and stereo cameras (color), and they will be busy measuring and recording.

The living quarters are maintained at 1 atmosphere and 17°C, and the air will be circulated by removing the carbon dioxide with a lithium absorbent and adding oxygen. The standard time for one submerging trip is 8 hours total: 1.5 hours for submerging, 3 hours for underwater work, 1.5 hours for surfacing, and 1 hour before and 1 hour after submersion. However, the air circulation system is designed to last 10 times that long--80 hours.

The "Shinkai 2000" will be transported on the afterdeck of the mother ship to the survey site and lowered into the water with a crane. Upon touching the surface of the sea, it will submerge under its own power. No rope or cable will be present between it and the mother ship, and telephone communication will be by wireless while on the surface and by ultrasonic waves while submerged. The underwater vehicle is 9.2 meters long, 3.0 meters wide, and 2.9 meters high. It allows 3 crew members and equipment up to 100 kg aboard. Batteries (silver-zinc), propulsion gear, projectors, underwater television cameras, sonar, manipulators, etc. are mounted on the hull from the beginning. Underwater speed is 3 knots maximum, averaging 1 knot. It can rotate left and right in a stationary position.

In addition to observations using television, camera, and the naked eye, samples up to 20 kg can be collected using the manipulator and as much as 50 kg can be loaded into the port basket. The manipulator is built in such a way that when caught in rocks, etc., it automatically breaks off to free the vehicle. Instruments to measure salinity, water temperature, and depth as well as a directional flowmeter are also on board. The mother ship waits within 100 meters directly above at all times.

After completion, the "Shinkai 2000" will conduct observations in areas such as Sagami Bay and Suruga Bay. Crew members include Captain M. Sakakura (36) and others comprising two groups totaling six persons. Five seagoing trips are planned in a year, with 15 underwater surveys during one trip. The cost for one seagoing trip is approximately 40 million yen. The vessel can be lifted and lowered in sea conditions up to a wave height of 2.5 meters. Therefore, the mother ship carries a computer to enable satellite navigation, position maintenance, collision avoidance, meteorological observation including maritime weather, and survey of submarine topography.

There are 14 vessels in the world that are capable of submerging 2,000 meters: they are American, Russian, French, and Canadian. Among them are the 10,000-meter submerging depth class Archimedes (French), the 4,000 meter class Alvin (American), and the 3,000-meter class Cyna (French). The "Shinkai 2000" is the 15th. However, it is capable of submerging more than three times deeper than the now retired "Shinkai" (4 passengers, 85 tons, submerging depth of 600 meters). Preliminary studies have also begun on the next stage, the "Shinkai 6000" (tentative name). The mean depth of the Pacific Ocean is 4,000 meters. Therefore, it will be a deep sea survey ship capable of covering 98 percent of the world's seas, excluding the Mariana Trench and the Japan Trench. Construction cost, including the mother ship, will be approximately 30 billion yen. With today's shipbuilding technology in Japan, domestic production is possible. The Oceanographic Development Council recommend "desirable completion by 1987."

Manganese Nodule Exploitation

Tokyo NIHON KEIZAI SHIMBUN in Japanese 6 Jan 81 p 4

[Text] In order to establish a structure for the development of deep seabed manganese nodules, which contain strategic metal resources such as nickel and cobalt, the government has confirmed its intention to establish a "Deep Seabed Mineral Resources Development Law" (tentative name). The United States and West Germany successively formulated a domestic law in 1980 in order to develop seabed resources, and they are about to set their mining areas independently for exploration. Thus, in order to cope with this situation, the objective is to formulate a legal foundation so that Japanese enterprises too can participate in prospecting. The main points are 1) to follow the principle of reciprocity with the "party with the head start" such as the United States and mutually recognize the mining areas, and 2) to make environmental assessment (prior evaluation) a requirement for development... etc. However, protests from developing countries, based on their individual domestic laws, are strongly against the exploration by advanced countries of deep seabeds on the high seas. Therefore, the government intends to make it a "temporary measure" until international rules for development are formulated by the U.N. Conference on the Law of the Sea.

Manganese nodules are metallic ingots on the seabed about 5,000 meters in depth. They contain large quantities of nickel as well as copper, cobalt, manganese, titanium, etc. According to estimates in the United States and elsewhere, there are as much as 16.4 billion tons (273 times the terrestrial reserves) of nickel and 5.8 billion tons (similarly 3,600 times) of cobalt in the Pacific region alone. Japan is totally dependent on the import of all of these resources, and their development is regarded internationally as "the strategic industry of the 21st century."

The United States formulated a "Deep Seabed Hard Mineral Resources Act" in June 1980. The objective of the law is to promote the investment by U.S. enterprises for discovery of promising mining areas during the period until the U.N. Law of the Sea treaty, aimed at formulating international rules for manganese nodule development, becomes effective. At the same time, it is an attempt to control in advance the investigative activities of Japan and European countries so that they do not overlap and cause confusion.

The United States, particularly, pushed forward the principle of reciprocity and proposed mutual guarantees of investments by the enterprises for development recognized by respective domestic laws. They are urging Japan and West Germany to expedite a domestic law. In response, West Germany has already passed such a law, and Great Britain and France are said to be preparing theirs.

Consequently, the Japanese Government has been studying the possibility of legislation, and 50 million yen was approved in the JFY 1981 budget proposal for seabed manganese mining technology development. With the prospect of a preparatory system to be in order for development, the government confirmed its policy to establish a law similar to those legislated in the United States and West Germany.

Based on studies thus far, the gist of the law is likely to be 1) mutual recognition of mining areas based on the principle of reciprocity between countries which have laws concerning deep seabed resource development, and 2) requirement of an environmental assessment (prior evaluation) from the exploring enterprises. If possible, the bill will be presented to the current Diet session. No enterprise with the ability to exploit manganese nodules independently has appeared in Japanese industry. However, the Sumitomo group and the Mitsubishi group have begun investigative activities in collaboration with U.S. capital firms such as Kennecott. When these enterprises become independent in the future, their exploration will be approved based on this law.

However, developing nations are strongly opposed to such a movement by advanced countries, stating that it is against a 1970 decision by the United Nations that "deep seabeds are the common property of mankind." In addition, opposition has not been resolved at the U.N. Conference on the Law of the Sea regarding the manner in which technology should be transferred from advanced nations to developing nations. Thus, assuming that the rulers are formulated at the United Nations, it will be around 1988 [before this takes place].

For this reason, the government, in an effort to alleviate opposition by developing nations, has clearly stated that a law, when legislated, is "a temporary measure until a conclusion is reached at the U.N. Conference on the Law of the Sea."

Editorial on Marine Technology

Tokyo NIHON KEIZAI SHIMBUN in Japanese 14 Jan 81 p 2

[Text] This year will probably become "the first year of the new Law of the Sea." The drafting committee of the Third U.N. Conference on the Law of the Sea began meeting on the 12th. It convened for the final work of making the new Law of the Sea treaty draft official, based on the north-south agreement at the reopened ninth session in Geneva last summer. If it is formally approved at the 10th session, to be held in New York in March, the shortest plan now calls for the signing to take place in Caracas, the capital of Venezuela, in September. This is a mammoth conference attended by more than 150 nations of the entire world, and it is a marathon conference spanning over more than 7 years since the first session in December 1973. And, the third U.N. Conference on the Law of the Sea has at last entered its final countdown. Japan is now pressed to positively cope with the new order of the sea and with the new era of the sea.

The first step is domestic legislation for the development of deep sea resources. Manganese nodules that lie in the deep seabed, as deep as 4,000 meters, contain useful metals such as nickel, cobalt, copper, iron, etc., aside from manganese. The estimated reserve in the Pacific Ocean alone is 500 billion tons, and that of the entire seabed several trillion tons. It is said that these can support the world's metal demands for 140,000 years for manganese, 420,000 years for cobalt, and 2,000 years for copper. They are riches of the sea under our nose and cannot be overlooked by Japan, which imports as much as 133.12 million tons of metal raw materials, amounting to 4.8 billion dollars.

Exploration for manganese nodules, proposed by Malta in December 1969, is currently frozen by the "moratorium resolution of deep seabed resources development" passed by the U.N. General Assembly. When the new Law of the Sea treaty comes into effect, the International Seabed Authority is to be established and the moratorium will be dissolved. However, that time will be 1 year after the number of states ratifying the new treaty reaches 60; this is expected to be at least after 1988. The United States and West Germany, among others, are preparing domestic legislation as a transient measure until then. Japan will join the international consortium of the U.S.-European group, and the Ministry of International Trade and Industry will begin its own large-scale project beginning in JFY 1981. The amount of nickel to be collected from manganese nodules is expected to be 69,300 tons, a dependency of 28.3 percent in 1990, and 153,500 tons, or 40.1 percent, in 2000. Naturally, it is time to consider domestic legislation.

Japan must seek new economic relief in the sea. Although Japan is a small country, 50th in the world when land area alone is considered, her 200-mile economic zone is sixth in the world, after the United States, Australia, Indonesia, New Zealand, and Canada. When sea and land are combined, [Japan] jumps up to the level of 10th in the world in size. The sea is flat and moreover has depth and an abundance of water, and solar energy pours upon it. By making full, multiple use of that resource, enormous space, energy, water, minerals, and living organisms, a boundless, wide frontier will undoubtedly open for the Japanese economy.

Substantiating the Marine Survey Ability

To that end, we must first build an oceanographic research structure. Our present survey ability is much too meager for the sea surface, seabed, and resources of an extensive economic zone that is 12 times the land area. The Ministry of Transportation has made an inquiry for "a policy to promote oceanographic investigation in the 1980's," and the oceanographic development division of the Transportation Technology Council is hurrying its work, with a target date of June for its reply. In order to conduct oceanographic studies in the 200-mile era, ships above 500 gross tons are required. However, among the 18 survey vessels belonging to the Ministry of Transportation, only 4 can meet this criterion. Even when the vessels of the Defense Agency, the Fishery Agency, and the Ministry of International Trade and Industry are combined, the number reaches only 11. The USSR already possesses 37 vessels of this class, the United States 29, Canada 18, France 14, and Great Britain 13.

"Shinkai 2000," to be launched at Kobe on the 21st, is the first full-scale deep sea survey vessel in Japan that can submerge to a depth of 2,000 meters. Teamed with the mother ship "Natsushima," which was launched last summer, it is eagerly expected to become the new fighting force for oceanographic surveys in the vicinity of Japan. However, there are already as many as 14 ships in the world that can submerge to a depth of more than 2,000 meters, and the "Shinkai 2000" is the 15th. Included among them is the large vessel "Archimedes" (French) that can even reach a depth of 10,000 meters. Being near the Japan Trench, which is more than 8,000 meters deep, and having a long coastline and an extensive economic zone, Japan should substantiate its oceanographic survey ability urgently to match the need.

An artificial satellite is one of the important means of oceanographic survey. The marine observation satellite "MOS" series to be launched by Japan in JFY 1984 can instantly transmit long-term marine survey, observation, and surveillance data from a wide area to the earth center in cooperation with ocean buoys, ocean bases, and underwater or seabed sensors and perform general analyses. The sensitivity of modern satellite sensors has increased to the point where the navigation tracks of a submerged nuclear submarine can be detected from the exhaust heat of the vessel.

The USSR recently made a request that Japan allow a survey of the sea in the vicinity of Iojima, but the government refused the request. The appearance of a new island is possible in this area, due to volcanic activities at the sea bottom. If such an island is discovered by a foreign flagship or aircraft first, not only the ownership of the island but an economic zone greater than the entire Japanese land area up to a maximum of 430,000 square meters, will be established by that country. Constant surveillance thus should not be neglected.

More Investment in the Sea

Japan should make more positive investments in the sea. The oceanographic development fund based on the JFY 1981 budget proposal is 17,923 million yen, an increase of 80.9 percent over the previous year for Science and Technology Agency concerns alone. However, compared to the nuclear development fund of approximately 200 billion yen and the space development fund of approximately 100 billion yen, it is far too small. Even when the shares for the ministries of Agriculture, Forestry and Fishery, International Trade and Industry, and Transportation are combined, the total is approximately 40 billion yen (JFY 1980) by general account, and 1 trillion yen/year in operating expenses. In view of the expanse and richness of the sea, this [amount] is not yet sufficient. The Oceanographic Development Council estimates that "an oceanographic investment of 2,510 billion yen in research and development and 53,100 billion yen in operating expenses are necessary" for the next 10 years.

There are three sea-based industries in Japan today that rank as the world's No 1 class. They are fisheries, shipbuilding, and maritime transportation, and all are in the scale of 2 trillion yen/year. Using that fertile ground as a foundation, further multilateral development should be made as we head for a new era. Fish catches exceed 10 million tons, supplying approximately one-half of the 36.3g daily animal protein intake of the people's nutrition. In order to obtain 1 ton of meat, 6-7 tons of feed are necessary. Thus, the value of the fisheries industry is great. If we make full use of the 200-mile zone, there is more room to increase production.

In the shipbuilding industry, new markets are being developed such as a floating airport, a generator ship, and a plant ship using floating body technology as well as coastal development. The offshore artificial island concept being studied by the Ministry of Transportation, in cooperation with the Federation of Economic Organizations, is also one of the projects. For example, if an artificial island with an area of 130 hectares is constructed in the ocean 5-7 kilometers offshore, where the water depth is 20-25 meters, the total construction cost is estimated to be 690 billion yen. It assures a place for three units of 1 million kilowatt class coal-fired steam power plants and their ash disposers, and the power generating cost is estimated to be about a 10-percent increase over the construction of the land counterpart. In the area of maritime transportation, Japanese industrial technology has already contributed to the reopening of the Suez Canal, and a collaborative plan is being studied for a second Panama Canal. Japan should pay close attention at all times to the enormous potential of the sea.

7722
CSO: 4105

SCIENCE AND TECHNOLOGY

NAGOYA UNIVERSITY'S PROJECT ON THERMONUCLEAR CHAIN REACTION

Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 13

[Text]

The Institute of Plasma Physics of Nagoya University recently revealed hope to realize the world first succesful experiment to start a practical chain of thermonuclear reactions by 1989.

The institute of the national university, from fiscal 1981 starting April 1, will begin its 10-year R-Project to prepare and then build a test thermonuclear reactor for a hardware cost of ¥40 billion. The entire project will require almost ¥100 billion of investments to complete.

If all goes well, it could envision the world's first successful "kindling" of thermonuclear reactions by fiscal 1989, it says.

Similar tries are being planned in the U.S. and West Europe, but such Western ventures involve use of huge facilities, like those being built by the governmental Japan Atomic Energy Research Institute, and therefore involve also numerous problems.

The institute is going to seek a much more compact and less troublesome test facility.

During the first three years, the institute's existing thermonuclear fusion test facility, JIPPT-II, will be remodelled and used for preparations to build the reactor.

A full-fledged nuclear fusion chain reaction will require at least one second of capturing an immense concentration of plasmas (split-up atoms in gaseous condition) at a minimum temperature of 100 million degrees C.

JAERI's new facility, JT-60, to be completed by 1984, looks similar to the proposed reactor, but intended only for creation of conditions for such reaction.

The Nagoya University reactor, one-fourth the size of JT-60, and of the same doughnut-shaped Tokamak type, will make possible penning up of deuterim and tritium for at least 0.1 and 0.2 seconds to create a small-scale chain reaction.

CSO: 4120

SCIENCE AND TECHNOLOGY

FIRMS CONTINUE TO LOSE PLANT DEALS TO FOREIGN COMPANIES

Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 7

[Text]

Japan's industrial plant builders, despite their advantages over Western rivals in quality and quick delivery, have been losing international jobs recently to their British, French and American counterparts.

U.S. and European plant enterprises outpoint the Japanese industry by offering attractive credit terms to client developing countries.

In vying with Japanese rivals in international plant tenders, Western enterprises offer lower interest rates and longer redemption periods in financing their plant exports. This finance system, called "mixed credit," is composed of private export finance and government loans. By mixing government loans, they can offer far easier credit terms than their competitors from Japan.

Japanese plant builders have been hard hit by suspension of construction-engineering projects caused by the Iran-Iraq war and the ensuing unilateral cancellation of contracts by China.

Coupled with these unpredictable plights, the industry, handicapped in credit terms, has been bowing to Western enterprises in winning contracts from Morocco, Tunisia, Algeria and Egypt.

As a step to regain lost ground or protect themselves from losing ground further, Japanese plant enterprises want their government to work out some measures to improve export credit terms.

Morocco invited international tenders some time ago to construct a lubricant plant, worth some ¥32,000 million, in which a Japanese consortium was underbid by France's TECHNIP.

The Japanese team, composed of trader Mitsui & Co., Niigata Engineering Co. and Mitsui Engineering & Shipbuilding Co., was outfought by the French competitor because of the latter's easier credit terms.

In the Moroccan bidding, TECHNIP initially offered an annual 8 per cent interest rate and a 10-year installment repayment, while the Japanese consortium had a good fight by offering an Export-Import Bank of Japan loan.

In the final stage of post-tender negotiations, the French beat the Japanese by changing the initial terms to a 3.5 per cent interest and a 25-year redemption with support of its home government.

Such "mixed credit" systems adopted frequently by Western enterprises have led to their successes in another Moroccan tender for a steel plant, an Algerian tender for an electric power generation plant, and an Egyptian tender for communications equipment.

Japanese plant concerns thus have lost international jobs, worth some ¥200,000 million, over the last year.

Also in a Tunisian cement plant tender now underway, a Japanese team, comprising traders Marubeni Corp. and C. Itoh & Co., and Kawasaki Heavy Industries, Ltd., are having a hard time facing strong rivalry from U.S. and European participants.

Sources say success of the Japanese team depends on whether the Japanese Government will grant its Overseas Economic Cooperation Fund to finance the proposed plant deal.

CSO: 4120

SCIENCE AND TECHNOLOGY

JAPANESE AIRCRAFT-ENGINE INDUSTRIES TO BE COORDINATED

Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 6

[Text]

Japan's widely-scattered civilian aircraft and engine research and development projects are expected to be brought under the control of a single central coordinating system by sometime during this autumn if a reorganization drive now in progress goes well.

Such systematization of aircraft and engine development was recommended last summer by the aircraft committee of the joint governmental-civilian Aircraft & Machine Industry Council of the Ministry of International Trade and Industry.

Accordingly, the drive was launched last autumn by various Japanese aircraft makers centering on three major industrial corporations, Mitsubishi Heavy Industries, Ltd., Kawasaki Heavy Industries, Ltd. and Fuji Heavy Industries, Ltd.

Continued lack of some centralized coordination was feared to weaken the capacities of the Japanese aircraft and air engine industries, especially because of increasing joint international development projects involving many Japanese fuselage and engine makers.

They are now grouped into three interest organizations of their own — Nihon Aeroplane Manufacturing Co., which has already successfully developed Japan's first, postwar civilian transport plane series, YS-11; Civil Transport Development Corp., now jointly developing the successor to the YS-11 series (YX series), with Boeing Co.'s Boeing Commercial Airplane Co. (of the U.S.) and Aeritalia S.p.A. (of Italy in the form of the proposed Boeing 767 (and 777) series, and the Engineering Research Association for Aerojet Engines in charge of a current Japanese-British RJ500 jet engine development project and a projected Japanese STOL plane's FJR engine development venture.

Another organization may become necessary if a planned followup of the YX series, New YX(YXX), is also developed as a multinational project.

It has so far been tentatively agreed among the coordination planners that the centralizing body take over control of research and development projects and governmental subsidy receiving and distributing.

It also plans to incorporate as its headquarters facility the innovational aircraft technology development center of the Society of Japanese Aerospace Companies, Inc.

But the whole drive is now being stalled by a dissenting view of Ishikawajima-Harima Heavy Industries Co., the top-rated engine manufacturer, that such simple and unprecedented project unification would hardly work well and that engine makers servicing many aircraft builders should be separately grouped.

CSO: 4120

SCIENCE AND TECHNOLOGY

ELECTRONIC EQUIPMENT PRODUCTION CONTINUES TO CLIMB

Tokyo BUSINESS JAPAN in English Vol 26, No 2, Feb 81 pp 19-20

[Text]

The output of Japan's electronic industry is expected to continue to enjoy a double-digit rate of increase in 1981. According to a forecast of the nation's electronic production in 1981 compiled by the Electronic Industries Association of Japan, the industry's output is expected to total ¥8,559,100 million, 13.1% up from 1980. This does not include the output of such items as wire communication equipment, desk-top electronic calculators, wire communication parts and magnetic tapes. If these items are included, the industry's total output will reach ¥9,770,000 million, up 12.9%. Following the nation's auto industry, the electronic industry is expected to soon reach the ¥10 trillion level in output. The industry will thus play a vital role as the mainstay of the nation's industries.

The nation's electronic industry drew a very favorable picture in 1980 in all the three fields of electronic equipment – for general use, for industrial use, and electronic parts. Total output is estimated to have reached ¥7,570,100 million, up 24% over the previous year. This was due to the fact that against the background of rapidly growing exports, electronic products for general use played a major role in accelerating the industry's output. Such electronic equipment is estimated to have contributed by 44.5% in the output increase of the electronic industry as a whole. Such a favorable trend is expected to continue in 1981 also and the industry's output is expected to total ¥8.559,100 million or an increase of 13.1% over 1980. By categories, electronic equipment for general use will reach ¥3,287,500 million in output, up 11.1%, those for industrial use ¥2,539,800 million, up 13.8%, and electronic parts ¥2,731,800 million, up 14.8%. Thanks to the sharp increase in the output of video tape recorders (VTRs), the total output of electronic equipment for general use is expected to surpass the ¥3 trillion mark for the first time.

Item-wise, the output of electronic products is expected to grow as follows:

Equipment for General Use – Exports that started to recover from the middle of 1979 played an important role in facilitating the industry's total production. As domestic demand increased and consumers' needs diversified, the shipments of many items registered an all-time high. As a result, their output in 1980 is estimated to have increased by 28.3% to ¥2,957,900 million. Video tape recorders in particular increased most phenomenally, and assumed the top position among all electronic items.

Supported by strong overseas demand and steady domestic demand, the output in 1981 is expected to increase by 11.1% to ¥3,287,500 million, surpassing the ¥3 trillion level for the first time. Above all, the output of VTRs is expected to reach ¥750 billion, equal to the past highest record of color TV sets. The output of VTRs for home use is expected to reach 6,150,000 units, up 38.2% The output of color TV sets is expected to reach 11,630,000 units, up 0.5% over 1980 and a record high. The combined

Outlook of Electronic Production in 1981

(Unit: ¥1 billion)

	Results in 1979	Results in 1980 (estimate)	Rate over previous year (5)	Outlook for 1981	Rate over previous year (%)
Equipment for general use	2,305.6	2,957.9	128.3	3,287.5	111.1
Equipment for industrial use	1,925.1	2,231.7	115.9	2,539.8	113.8
Electronic parts	1,874.6	2,380.6	127.0	2,731.8	114.8
Total	6,105.3	7,570.1	124.0	8,559.1	113.1

value of both VTR and TV sets including both color and monochrome sets to be produced in 1981 is expected to reach ¥1,498,800 million, up 11.1%.

The expected output of audio equipment in 1981 includes 64,940,000 sets of tape recorders, up 10.3%, and stereo sets valued at ¥639,900 million, up 8.4%. The combined value of these two items will be ¥1,648,500 million, an increase of 12.2%. While radio sets are expected to total 18,350,000 units, up 2.6%, the output of transcievers should reach 1,100,000 units, up 0.9%.

Equipment for Industrial Use — The output of electronic equipment for industrial use enjoyed a marked increase in domestic demand thanks to the steady increase in plant and equipment investments; total output is estimated to have reached ¥2,231,700 million, up 15.9% in 1980. Electronic equipment (excluding wire communication equipment and desk top electronic calculators) include such items as devices applying electronic technology and electronic measuring instruments for automated operation and labor saving. Along with the expected continued electronification of industries for energy conservation, resources conservation, industrial rationalization and medical electronics in 1981, equipment for industrial use is likely to continue to show a stabilized growth. Above all, devices applying electronic technology are expected to increase in output and surpass the previous year's figure by 15%. Such devices will be extensively used in newly installed plants and equipment, automated offices, government and public offices, and foreign countries. The output of electronic equipment for industrial use as a whole will reach ¥2,539,800 million, 13.8% up.

The expected output of major items is as follows: Wireless communication equipment, ¥357,500 million, up 21.3%, devices applying electronic technology, ¥1,569,800 million, up 15.1%, and electronic measuring instruments, ¥304,400 million, up 14.3%. Wireless communication equipment for amateurs in particular is expected to increase by 50% in output. Among electronic measuring equipment, those to be used with computers will increase by 13% in output.

Electronic Parts

Electronic parts manufacturers have been flooded with many orders due to a strong demand for various electronic products and electronic equipment for industrial use. There is a tremendous backlog of orders. In 1980 alone, the output of parts reached ¥1,163,600 million, 23.7% up and an unprecedentedly large figure. In 1981 also, as demand is expected to further expand, the total output of electronic parts is expected to increase by 12.3% to ¥1,307,000 million. As electronic equipment for general use will become smaller in size, lighter in weight and more complicated in functions, and those for industrial use will be more widely used even in the fields where no use could be seen previously, electronic parts manufacturers will enjoy a brisk market.

The output of moving parts in 1980 markedly increased by 30.3% to ¥1,217,000 million. The value can be divided into ¥357,300 million for electron tubes (up 20.1%), ¥291,400 million for semi-conductor elements (up 14.8%) and ¥568,300 million for integrated circuits (up 48.4%).

The output of parts is expected to increase steadily in 1981 to finally reach ¥1,424,900 million, up 17.1%.

CSO: 4120

SCIENCE AND TECHNOLOGY

BRIGHT PROSPECTS INDICATED FOR JAPAN'S PUMP INDUSTRY

Tokyo BUSINESS JAPAN in English Vol 26, No 2, Feb 81 pp 61-63

[Text]

THE origin of Japan's pump industry dates back to 1892 when Kawasaki Shipyard Co. manufactured waterworks pumps and delivered them to Tokyo City. Pumps also have been used for irrigation for many years. It was only after World War II, however, that the pump industry developed as a modern industry, and especially after the development of water sources for electric generation was given prominence in order to reconstruct the war-hit country. The nation's power industry then shifted its main emphasis from hydraulic generation to thermal generation and the pump industry was urged to improve its technology because of the need for more pumps to be used for supplying water for thermal power generation. When Kyushu Electric Power Co. constructed a power station, many large pumps were required. The discharge capacity of feed pumps has markedly increased along with the increasing output capacity of power stations, and the latest model has as high a pressure as 300 kg per 5 cm^2. Previously the driving force was electric motors but now turbines of rapid revolution are used. Domestic technology has now reached an international level and many large capacity pumps are used for pumping-up water for power plants. Their reliability has phenomenally improved. Japanese-made pumps have been installed in both waterworks and for sewerage in huge cities, and in long undersea tunnels.

The types of pumps can be divided basically into centrifugal pumps, axial flow pumps, diagonal flow pumps, rotary pumps and reciprocating pumps. By use, they can also be classified into corrosion-resisting pumps, submarine pumps, etc.

Centrifugal pumps are used to feed liquid with centrifugal force by rotating the impeller within the casing. Such pumps assume some 45% of the total output of pumps and are extensively used for water supply and drainage at power stations and factories, and for agricultural irrigation.

Axial flow pumps are used to feed liquid in the direction of the axis like a motor fan and are suitable for water feeding for a low head in large capacity. Diagonal flow pumps make use of both the thrust of the rotating blade and centrifugal force and have the characteristics of both centrifugal pumps and axial flow pumps. Such pumps have high cavitation characteristics and are highly adaptable to varied flows, so that they are widely used for drainage systems. The output of diagonal flow pumps has increased even in the period of recession following the oil crisis, and their output has increased year after year. Rotary pumps are resistant to high pressure and are used in fields where durability is required as compared with reprocating pumps.

In many cases, a centrifugal pump is submerged with a motor to be used as a submarine pump. Such pumps are suitable for use in civil engineering works, sewerage, deep wells, etc. As they are comparatively easy to maintain, their use has shown marked progress in recent years.

Vacuum pumps have shown rapid progress in postwar years and include two types, mechanical and diffusion. The mechanical type includes several models including the Nash and Lutz

models, and is used for machines with comparatively low vacuum. Along with the development of vacuum engineering in recent years, requirements for super high vacuum pumps have increased, and large-scale oil diffusion pumps and others are manufactured for use in nuclear power generation and space development.

Pumps of large size and capacity are exclusively produced by the ten leading manufacturers, and as for small-size general-purpose pumps, large manufacturers have established mass-production setups through standardization. In the case of medium-size pumps, as they vary by use in capacity, pressure, temperature and liquid to be handled, medium and smaller specialized manufacturers are mostly engaged in their production.

As far as feed pumps for boilers in thermal power plants are concerned, the discharge pressure was at a level of 60 kg per 5 cm^2 or so in prewar years. Tokyo Electric Power's Tokyo power station built in 1954 used pumps with a pressure of 120 kg. Pumps for use in power stations with an output capacity of 1,000 kW in recent years have a pressure of 310 kg per 5 cm^2 and a water feeding capacity of 1,740 tons per hour. At pumping-up power stations, machines with high capacities for both pumps and water wheels are in general use. The size of stations has become much larger than before, and today the largest power plant has an output capacity of 350,000 kW.

Pumps for waterworks and sewerage systems are capable of feeding water over a very long distance. They are equipped with highly advanced control systems so as to cope with the seasonal variations of demand. Control of these pumps is all automatic. As for pumps for handling liquefied gases, domestic production has not yet materialized because of very special technology required to produce them.

Production of pumps has made tremendous progress since the war through the induction of foreign technologies and the industry's effort to establish domestic production, supported by the high-paced growth of the nation's economy. Demand for pumps is still markedly growing for the construction of industrial plants in developing countries and public works being conducted in Japan.

Demand for pumps throughout the world is never likely to decrease. Japan's pump industry is urged to strengthen its foothold and establish a setup to develop its own technology. There are many problems to solve in this respect including the development of types of pumps that can contribute well to the causes of conserving resources and energy. At the same time it is necessary to strengthen their structures and eliminate vibrations and noises, along with the development of new sealing systems and bearings, all of which will contribute to the industry's successful future. ◻

CSO: 4120

SCIENCE AND TECHNOLOGY

MEDICAL ELECTRONICS EQUIPMENT MAKERS TO PROMOTE EXPORTS

Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 8

[Text] Japanese medical electronics (ME) equipment manufacturers have been stepping up efforts to boost exports of ultrasound diagnostic equipment, X-ray computer tomographs (CT), blood dializers (artificial kidneys) and other ME equipment.

Originally, these equipment were developed abroad. But Japanese companies have succeeded in highly elaborating them and greatly expanded the domestic market. They now have turned their attention to markets overseas.

Top leaders of the Japanese ME industry are trying further to strengthen their positions in the domestic market on the strength of favorable export business.

Among them, top maker Toshiba Corp. is the most aggressive toward exports. The company is estimated to have yearly ME sales of around ¥100 billion in the current 1980 term ending March. The sales value is nearly double that of the second-ranked Hitachi Medical Corp., an affiliate of Hitachi, Ltd. As its position in the domestic market already has been firmly established, Toshiba has shifted its target to the world market and now hopes to catch up with Siemens of West Germany and Philips of the Netherlands, which are the world's No. 1 and No. 2 ME makers, respectively.

Toshiba's ME sales still account for only half that of Siemens. In order to fill the gap, Toshiba must penetrate into the U.S., or the world's largest ME market.

In the U.S., Toshiba now has yearly sales of about ¥5 billion through its ME marketing subsidiary Toshiba Medical Systems Co. The company hopes to boost the sales in the U.S. to ¥20 billion in the next several years. To achieve the target, Toshiba plans to start local production in the U.S. As for Europe, the company is planning to set up marketing subsidiaries in major European countries.

As a first step, Toshiba will raise the export ratio (share of exports in total sales) to more than 20 per cent from the present 15 per cent.

Japan's No. 2 ME maker Hitachi Medical also has been greatly increasing exports mainly to the U.S. and Europe. Until early last year, the company had difficulty in boosting sales in the U.S. because its business arrangement with Picker Corp. restricted marketing under Hitachi Medical's initiative. However, the unfavorable terms have been revised and sales started picking up remarkably in the latter half of last year, centering on ultrasound diagnostic equipment.

Under the situation, Hitachi Medical's export ratio is estimated to increase further in 1981. The company also eyes China, South Korea and Southeast Asian countries as it sold ultrasound diagnostic equipment and X-ray CT scanners to China and South Korea in the past. It pins a big hope on marketing of X-ray CT scanners to Southeast Asian nations in the future.

Fukuda Denshi Co., top maker of electrocardiographs, has developed an electrocardiograph with a built-in microcomputer, which automatically analyzes the electrocardiogram that is printed out. It plans to export 20,000 of them this year.

Asahi Medical Co., top maker of artificial kidneys, is cautious about their exports to the U.S. Instead, the wholly-owned subsidiary of Asahi Chemical Industry Co. is planning further to boost exports to European countries. The company started artificial kidney exports in 1976, and its export ratio now stands at around 30 per cent.

On the strength of the favorable export ratio, Asahi Medical has been enjoying good business, although the domestic artificial kidney market is under a cutthroat marketing competition. Asahi Medical's artificial kidney sales are estimated to top ¥10 billion in the 1981 business term.

CSO: 4120

SCIENCE AND TECHNOLOGY

ROBOT THAT WALKS LIKE HUMAN BEING DEVELOPED

Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 13

[Text] A two-legged robot closely resembling human beings in the way of walking has been developed by a research team of the School of Science and Engineering, Waseda University in Tokyo.

It was recently disclosed by the team led by Prof. Ichiro Kato, simultaneously with a public demonstration on the university campus.

The new brainchild of the team, named WL-9DR, worked well during the show, stepping just as smoothly and fast as a normal human being walks.

According to the team, all conventional walking machines, intended for aiding the physically-handicapped people with both legs incurably paralyzed, had been capable of performing no better than a one-year or younger human toddler.

That had been because all conventional types had been based on the statics phase of the theory of dynamics, compared with the kinetics phase.

The team's own idea represents a decided departure by starting from the kinetic type of walking to simulate the human manner of walking — to keep the center of gravity always ahead of the body by quickly shifting its support between the two legs by making the most of the force of inertia of each moving leg. That makes quite a difference from the conventional machines all placing the gravity center on the sole of each leg for slow interchanges.

But, because of difficulties of immediately producing a complete replica of the living human legs, the team has adopted a semi-kinetic type of walking manner. When one leg steps ahead, the gravity center is kept in its sole, but when the other leg follows, its inertial force is made to work very quickly to take over the gravity center.

Shaped like the lower half of an adult human being, and about as large, the strong, lightweight robot made of aluminum alloys and carbon fiber, and equipped with a microprocessor and sensors, the 1-meter tall, 40.7-kilogram heavy robot walks at a speed of 9 seconds a step of 45 centimeters wide.

Compared with the best conventional equivalent, it goes more than four times as fast, paces about three times as wide, and weighs only one-third as heavy. It can also walk uphill or upstairs and step back.

CSO: 4120

SCIENCE AND TECHNOLOGY

JAPANESE FIRM SAID TO BE BUILDING NAVAL PORT IN MALAYSIA

Tokyo ASAHI EVENING NEWS in English 9 Feb 81 p 1

[Text]

A document clearly showing that a port being built on the west coast of Malaysia by a Japanese construction company will be the largest naval port in the five ASEAN countries has been obtained by Shozo Kusakawa, a Lower House member affiliated with the Clean Government Party (Komeito).

In March, 1978, Saeki Construction Co. of Osaka announced that it was signing a contract to build a large port at Lumut for shipping out timber and for other trade purposes.

The value of the contract, signed two months later, was ¥9.1 billion, according to the International Finance Bureau of the Finance Ministry. Saeki Construction won the contract in competition with six other companies, including West German and French companies.

By 1984, Lumut Port is scheduled to be Malaysia's principal naval base, capable of accommodating almost all the ships of the Malaysian Navy. It will be complete with building and repair facilities for ships and a personnel training center.

In signing the contract, Saeki Construction removed docks from it under guidance from the Construction Ministry, which took the measure after consultations with five other related Government departments. The company consulted with the Construction Ministry for fear that the contract might be a violation of the three principles banning exports of arms.

A copy of a book of bidding specifications on Lumut Port, which has been obtained by Kusakawa, who belongs to a Komeito-aligned organization, has the lettering of the Malaysian Ministry of Defense on the cover. It contains a drawing showing naval vessels, such as frigates, high-speed missile boats, patrol boats, mine sweepers and landing ship tanks, moored alongside a deep water jetty and a shallow water jetty.

The deep water jetty is about 600 meters long and the shallow water jetty is about 500 meters long.

When the matter was taken up in the Diet in March last year, the Government said Lumut Port is not necessarily for military purposes alone and it may serve as a trading port and a home port for rescue boats as well.

But, judging from drawings of auxiliary facilities in the book of specifications, it will not be used by both private and military vessels. The latest edition of the Jane's Fighting Ships describes it as Malaysia's principal naval base.

In a recent statement, the Government said Japanese firms can undertake the construction of hospitals, barracks, roads and facilities which can be used by civilians as well even at military installations without violating the three principles on arms exports.

CSC: 4120

SCIENCE AND TECHNOLOGY

NEW TECHNOLOGY FOR AMORPHOUS SILICON PRODUCTION DEVELOPED

Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 13

[Text]

A new simple method of producing amorphous silicon film at speed 10,000 times faster than the best known process has been experimentally developed by a research team of Toyohashi University of Technology at Toyohashi.

According to the group led by Prof. Mitsugu Hanabusa, amorphous silicon so far has been commercially applied in Japan by some electronic firms for making solar cells.

It makes possible production of solar cells of only 1 to 3 microns in thickness, about 1/100th of those to be produced from crystal silicon.

But its biggest drawback has been great difficulties in commercial production. Hitherto, it had to be produced by making silane, a compound of silicon and hydrogen, react to an electric discharge and attach to a glass or a stainless steel substrate in a thin film form. Such a process had posed many tough problems of setting proper reaction conditions or controlling the whole process.

The method developed by the team involves to simply placing amorphous silicon and a glass plate inside a vacuum chamber and intermittently bombard the amorphous silicon with a 0.5-micron laser beam of YAG (yittrium-aluminum-garnet) type.

Although requiring at least some care for the vacuity, purity of the material, and intensity of the laser beam, the method has promised to work at least 10,000 times as fast as the latest type of electric discharge process.

The team has spent 2 minutes to experimentally produce a 1-micron-thick type of filming.

CSO: 4120

SCIENCE AND TECHNOLOGY

TOSHIBA DEVELOPED SMALL TYPE UNIVERSAL PRESSURE SENSOR

Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 13

[Text]

Toshiba Corp. recently disclosed development of a tiny universal type of silicon semiconductor-utilizing pressure sensor. It is an inexpensive and widely applicable version of existing high-priced and sophisticated sensors used for industrial purposes in Japan and abroad.

According to the Japanese electric-electronic machinery and appliance maker, its new product works the same as the existing but expensive precision pressure sensors used for pressure gauges, flow meters and other measuring apparatus in chemical, electric power and other major industrial plants.

The idea is to determine electrical and other physical pressures by electrically indicating distortions of silicon semiconductors sensitive to such pressures.

But its new product measures no more than one centimeter in diameter, and thus is far lower in production cost. Its pressure detector is a dispersed layer of a resistance substance built on a 4-mm-square silicon semiconductor substrate (base board) by utilizing the IC producing technology.

Since the semiconductor's changes in size under pressure depend on environmental temperatures, a temperature change-compensating electronic circuity has been built into the silicon substrate to offset temperature-created shifts in the substrate's sensitivity to pressures.

To check the pressure of gas, the new product has a pair of slender gas pipes, one each protruding from the center of its top and bottom. One piece of pipe is filled with gas of standard pressure in a vacuum condition. Differences between the standard pressure and the pressure in the other pipe will show the desired gas pressure. The gas pressures are measurable up to two atmospheres. The environmental temperatures can be found by reading out the pulse signals of the temperature compensating circuitry.

Although somewhat lower in precision than its major industrial counterparts, the new product is applicable to the automobile fuel-supply and emission controlling electronic sensing devices, refrigerators, washers and other home appliances, hemadynamometers and other health care apparatus, barometers, thermometers and many other items.

CSO: 4120

SCIENCE AND TECHNOLOGY

ISHIKAWAJIMA-HARIMA'S FLOATING DOCK USED TO REPAIR MINSK

Tokyo MAINICHI DAILY NEWS in English 12 Feb 81 p 1

[Text] A floating dock, exported by Ishikawajima-Harima Heavy Industries Ltd. (IHI) to the Soviet Union in 1978, a detente year, has been used in repairing the 32,000-ton aircraft carrier Minsk and other Soviet warships at the Soviet Far East naval base of Vladivostok.

The military use of the floating dock, whose export was granted for commercial use, has been confirmed by American reconnaissance satellites and other means and notified to the Japanese government by American sources.

At the time of export in September 1978, the Japanese government cleared the dock export by designating its use as commercial, although the export ran the risks of brushing with the Japanese weapons export ban principles. The principles also ban the export of equipment and facilities related to the manufacture of weapons.

The opposition parties are now planning to introduce a bill banning weapons exports in the current Diet session. The bill stipulates that in the case of equipment and facilities exported for general-purpose use, if and when it becomes known that they are intended for military purposes, the export could be banned.

IHI delivered the dock to the Soviet side at Nagoya port in September 1978 under a contract worth some 12,000 million yen (about $144 million then). IHI won the Soviet order when the Japanese shipbuilding industry was in severe recession in June 1977.

According to the Defense Agency and the Maritime Self-Defense Force, the floating dock was designed to accept vessels up to 80,000 tons. They said that after the floating dock reached Vladivostok, the Soviet Union transferred the aircraft carrier Minsk, to the Far East. The USSR possesses only two flattops.

The Minsk was last sighted in late June 1979 moving northward through the Tsushima Strait and was not sighted for 14 months until late in August last year, suggesting strongly that the aircraft carrier had undergone a major overhaul in the floating dock, they said.

The Ministry of International Trade and Industry said it had approved the export because the dock was structured not to house the submarine locator of a warship and deemed to be designed for commercial use.

The dock was large enough to accommodate the large Soviet flattop for repairs.

Soon after the delivery, the United States and certain Liberal-Democratic Party members strongly voiced their apprehensions.

At that time IHI explained that the floating dock might be used in repairing warships but the primary use would be in repairing commercial ships.

The issue was also taken up at the IHI's general shareholders' meeting in June, 1979. The then IHI President Wataru Shindo said that the company would excercise due consideration in advance in receiving these kinds of orders.

IHI maintains that Shindo's remark remains conclusive on the dock issue.

CSO: 4120

SCIENCE AND TECHNOLOGY

SUBSIDIES TO BE GRANTED TO OIL REPLACING PROJECTS

Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 13

[Text]

Various oil-substitute energy projects, including electric power generation using resin in ion exchange methanol combustion, will be subsidized by the Japanese Government from April, under the Ministry of International Trade and Industry.

According to MITI's Agency of Industrial Science and Technology, an additional ¥300 million annual national budget appropriation beginning in fiscal 1981 from April 1, has been allotted by the Ministry of Finance to MITI's Oil-Substitute Development Subsidy System inaugurated as of April 1980 with an initial annual appropriation of ¥2.4 million. So far, projects to develop synthetic and other oil-related kinds of energy have been chiefly subsidized.

With the increase in the annual appropriation, the Agency will invite new eligible private research and development projects entirely free from oil, starting April, for subsidization.

The idea is to help speed up completion of effective substitutes with three to six years, chiefly as small-scale regional or localized means of electric power development.

The most promising of the prospective subsidized projects is a methanol-burning project now under intensive study.

The conventional fuel cell requires cracking of methanol (methyl wood alcohol) a cheap material easily derived from coal, into carbon, oxygen and hydrogen. Only hydrogen is extracted as the energy source.

In contrast, the proposed methanol electric generating method is to produce a new methanol version of the fuel cell to utilize a special type of ion exchange resin for instant electric generation by simply pouring methanol into the cell.

Under normal room temperature, the new cell will generate electricity through the reaction between the methanol and atmospheric oxygen. A single cell will produce only about 1 to 2 kilowatts of power, but a chain of such cells could produce a maximum of 1,000 kilowatts.

Other eligible projects in progress at industrial level include 1) One to turn turbines by converting the lower temperatures generated by waste organic matters into a turbine turning force of evaporation for a target of building a 3,000-kilowatt class power plant; 2) Another to develop a big heated water steam preserver, something like a "steam thermos bottle" and using the steam for running a power plant turbine; and 3) A high-efficiency sewer sludge fermentation heat-steam power plant building project for development of a 1.3 million kilowatt class power plant in case of small communities of 50,000 inhabitants. (Garbage-burning heat types are already common.)

CSO: 4120

SCIENCE AND TECHNOLOGY

STEEL COMPANIES CUT DOWN OIL CONSUMPTION ABOUT 30 PERCENT

Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 6

[Text]

Japan's steel industry has reduced its oil consumption by about 30 per cent in the past year.

According to a recent estimate by the Japan Iron & Steel Federation, the industry's consumption of petroleum-based fuels (fuel oil, gas oil, liquefied natural gas, etc.) is likely to amount to 56 liters per ton of crude steel produced in fiscal 1980, down 29 per cent from the year earlier.

This is because, JISF said, Japanese steelmakers have placed primary emphasis on the so-called exodus from oil in their energy conservation efforts, such as by propelling oil-less operation of blast furnaces.

Petroleum-based fuels accounted for a little more than 20 per cent of the total energy used at steel works here late in 1973 when the first oil crisis took place. The percentage dropped to 10.6 per cent in the first half of fiscal 1980 and seems to have dropped below the 10 per cent level in the second half.

JISF also revealed that the steel industry's overall energy consumption in fiscal 1980 is expected to decline 5.8 per cent from the preceding year to around 77 million tons. The volume represents an 18 per cent decrease from fiscal 1973.

Setting the energy consumption per ton of crude steel produced in fiscal 1973 at 100, such consumption dropped to 91 in fiscal 1979 and further to 88 in the first half of fiscal 1980.

The industry's oil-based fuel consumption is estimated to reach about 5,970,000 kiloliters in fiscal 1980, down 33 per cent from the preceding fiscal year and 61 per cent from fiscal 1973.

From 128 liters in fiscal 1973, the oil-based fuel consumption per ton of crude steel fell to 92 liters in fiscal 1978 and seems to have dropped to 56 liters in fiscal 1980.

The ratio of oil-based fuel in total energy consumed dropped from 21.3 per cent in fiscal 1973 to 10.6 per cent in the first half of fiscal 1980. During the same period, the ratio of coal-based fuel increased from 61.1 per cent to 69.8 per cent.

As of the end of December, 1980, 30 out of the 44 blast furnaces operating in Japan were in oil-less operations. Owing to such oil-less operations, energy consumption per ton of pig iron produced rose from 462 kilograms to 470 kilograms in fiscal 1980, because of the increased use of coke. Fuel oil consumption per ton of pig iron, however, dropped from 29 to 13 kiloliters.

Among other energy conservation efforts were recovery of waste gas in basic oxygen furnaces, increase in the continuous casting ratio and power generation by blast furnace top gas pressure. As of the end of fiscal 1980, 29 blast furnaces will be equipped with top gas pressure power generating equipment and their power output will total about 220,000 kilowatts.

CSO: 4120

SCIENCE AND TECHNOLOGY

BRIEFS

CONTRACT WITH SWEDEN--Kawasaki Steel Corp. said it signed a contract with Sweden's Svenskt Stal AB, and is holding talks with several other foreign firms, on the licensing of its beam blank forming technique that makes it possible to roll wide-flange beams from continuously cast slabs or blooms. The licensed technique, developed about a year ago by Kawasaki Steel at its Mizushima, Okayama Pref., Works, permits the forming of the continuously cast semifinished steel into beam blanks prior to their final shaping on the H-shape mill. The use of the continuous casting machine's output for H-shape production leads to yield improvement, as well as substantial cost and energy savings, as it allows the bypassing of several steps, such as the ingot teeming, stripping, reheating and rolling, that are involved in the less energy-efficient primary mill operations. [Text] [Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 6]

MACHINE TOOL ORDERS--Machine tool orders received in Japan last year reached a record high, propped by brisk sales both at home and abroad. The Japan Machine Tool Builders' Association said that orders won by its 68 member companies in 1980 totaled ¥621,500 million, up 42 per cent from a year ago. Orders from abroad swelled by 40 per cent to ¥ 164,600 million, centering on those from the U.S. and Europe. Domestic orders burgeoned by 80 per cent to ¥ 165,500 million. Heavy orders came from automakers which are now striving to install more sophisticated equipment to survive amid the small car war in world markets. Notably, orders for tools equipped with numerical control devices, such as NC lathes and machining centres, turned sharply upward. The share of NC device-equipped tools accounted for almost half the total order in the year. [Text] [Tokyo JAPAN ECONOMIC JOURNAL in English 17 Feb 81 p 7]

CSO: 4120

END