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JPRS L/8386

9 April 1979

[redacted]

ASIA

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[redacted]

TRANSLATIONS ON JAPAN

(FOUO 12/79)

U. S. JOINT PUBLICATIONS RESEARCH SERVICE

[redacted]

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APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000100040022-2

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POLITICAL AND SOCIOLOGICAL

OHIRA TO TELL CARTER JAPAN WILL AID 'REFUGEE CENTER' PLAN

Tokyo YOMIURI SHIMBUN in Japanese 21 Mar 79 morning edition p 3 OW

[Text] A government source said on 20 March that Prime Minister Ohira has decided to indicate, during his talks with U.S. President Carter scheduled for early May, Japan's readiness to extend wholehearted support, including financial aid and technical cooperation, for the construction of a "temporary reception center for Indochinese refugees" which has been proposed by the Association of Southeast Asian Nations (ASEAN).

Ohira made his decision on the basis of the following conclusions: 1) the U.S. Administration and Congress have shown increasing concern over the Indochinese refugees issue not only for humanitarian reasons but also from the viewpoint of Southeast Asian security; 2) because of this tendency, Japan may be subject to harsher criticism for its negative attitude toward acceptance of refugees (for permanent residence) and 3) the proposed center stands a good chance of being established under the ASEAN's initiative, and Japan, which attaches importance to ASEAN nations in its foreign policy, should actively deal with the plan.

The prime minister plans to convey this intention to U.S. Government leaders through Foreign Minister Sonoda when he visits Washington on 5 April. After determining the amount of aid as soon as details of the plan for the center are made available, he intends to present the Japanese aid plan himself when he meets President Carter.

CSO: 4105

POLITICAL AND SOCIOLOGICAL

'ASAHI': JAPAN AGAINST TOKYO SUMMIT ADOPTING ROLE-SHARING PLAN

Tokyo ASAHI EVENING NEWS in English 16 Mar 79 p 1 OW

[Text] Japan will propose that the Tokyo summit of major industrial democracies in June should not follow the example of last year's Bonn summit by again adopting a role-sharing formula in which the participating countries set forth their targets in figures, government sources said Thursday.

The proposal will be made at the first preparatory meeting for the Tokyo summit to be held here on March 22 and 23, the sources said.

The sources also disclosed that the government will announce its intention of playing a central role in writing the sections of a summit declaration on energy and the north-south problem.

The government has already adivsed personal representatives of the foreign leaders who will participate in the Tokyo summit of its stand against adopting the role-sharing formula. West Germany and some other countries reportedly have expressed their approval.

But this proposal, together with a U.S. proposal for the adjustment of the industrial structures of the participating nations, is expected to prove controversial.

The role-sharing formula was adopted at the Bonn summit with the idea that efforts of the "three engines" of the United States, Japan and West Germany would not be sufficient to put the world economy on a normal path.

West Germany promised additional budgetary measures equivalent to up to one percent of its gross national product. France undertook to increase the fiscal 1978 state budget deficit by an amount equivalent to about 0.5 percent of its GNP. Japan pledged seven percent economic growth in fiscal 1978. The United States promised to put into effect by the end of 1978 measures to cut its oil imports by about 2.5 million barrels a day by 1985.

The government now points out: 1) the need for the participating countries to set forth their growth targets at the Tokyo summit has become less urgent

as the economies of the United States, Japan, Italy and other countries are steadily improving, 2) the U.S. energy law to make possible a reduction in oil imports has been passed, and the emphasis with respect to energy has switched to working out a common oil conservation program.

In view of these changes, the government feels that the participating leaders should try to reach a consensus on medium- and long-term structural changes in the world economy at the Tokyo summit, rather than spell out their short-term targets.

Meanwhile, the U.S. Government has informally proposed the creation of a standing consultative body, to be composed mainly of former government officials, to discuss economic issues between Japan and the United States, government sources revealed Thursday.

The proposed panel will explore ways of stabilizing bilateral economic relations on a medium- and long-term basis. Whether or not economic friction between the U.S. and Japan can be resolved could determine the success or failure of the Tokyo summit.

The creation of the body will be formally proposed by Henry Owen, President Jimmy Carter's special representatives, who will arrive here in one or two days for the first preparatory meeting for the Tokyo summit.

CSO: 4120

POLITICAL AND SOCIOLOGICAL

'ASAHI' EDITOR: FUKUDA BIDING TIME FOR COMEBACK

Tokyo ASAHI EVENING NEWS in English 20 Mar 79 p 3 OW

[Article by Jutaro Tsuchida, assistant political news editor of the ASAHI SHIMBUN]

[Text] Former Prime Minister Takeo Fukuda apparently intends to run again for the presidency of the ruling Liberal-Democratic Party next year if the circumstances are favorable, although he will not say so.

He has regained confidence about his health, and his political activities are hectic. He began a full-scale nationwide stumping tour early this month. He attended last week's rally in support of the LDP-Centrist gubernatorial candidate for Tokyo as the proxy of Prime Minister Masayoshi Ohira.

In January, Fukuda formally revived his LDP faction and set up an office for party reform within the group. He is said to be busy as when he was in power.

It is clear that he is preparing for something, but he will not reveal his target.

Fukuda criticized Ohira's leadership in a gathering of his faction last month, and in a subsequent meeting, he said: "I was not defeated (in last year's LDP presidential election). I have not retired from politics." This was taken as hinting that he intends to run again for the top LDP post next year.

But he backtracked later. As he kicked off his nationwide stumping tour, he did not say anything that might be taken as an attack on Ohira. He has also remarked that it is not correct to label his faction as antimainstream and that his bond of trust with Ohira remains unchanged.

The mood within the Fukuda faction is strongly critical of Ohira. The Fukuda group and the factions headed by Yasuhiro Nakasone, who also lost to Ohira in last year's LDP presidential contest, and by former Prime Minister Takeo Miki try to rock the boat whenever an opportunity presents itself, but they are far from being close enough to move together against Ohira.

Under the circumstances, if Fukuda came out clearly against Ohira now he would probably find himself isolated.

This makes Fukuda so guarded in his remarks and actions that even ranking members of his faction complain they cannot fathom what he has in mind.

A drive to recruit new LDP members, voters in the presidential primaries, must be launched now if Fukuda is to get himself elected as the party head next year.

But Fukuda would not say whether he would or would not run. In the absence of a clarification from him, the Fukuda group cannot start a recruitment campaign.

A junior member of the faction, worried about the situation, recently called on Fukuda and urged him to clarify whether he would run or not. Fukuda reportedly told him: "It's not necessary for me to say anything. You know what I have in mind, don't you"? It is said that the junior legislator rushed back to his constituency and is working hard to recruit new party members who will vote for Fukuda.

Despite his professed bond of trust with Ohira, there is no question that Fukuda really has no intention of cooperating with him to prop up his government.

A man very close to Fukuda, probably echoing what the former premier thinks, says: "Ohira is gearing the running of the party entirely for his victory in next year's presidential election. He spends party funds in ways that only his men benefit. He says he consults with Fukuda on all important matters, but what he actually did about the choice of the LDP candidates for the governorship of Tokyo and the lower house speakership was merely to seek Fukuda's approval of his decisions. It was not a consultation, merely a notification.

"Ohira also says he consulted with Fukuda about his decision to let the fiscal 1979 national budget be voted down in the lower house budget committee, but no word came from him. So, Fukuda has no obligation to cooperate with Ohira."

For the time being, Fukuda will keep a detached watch on Ohira's performance in dealing with various issues, implying criticism from time to time. He will manifest an anti-Ohira stance and make a bid for a comeback when he feels there are prospects for his victory in the 1980 presidential election. This is apparently what Fukuda has in mind.

CSO: 4120

POLITICAL AND SOCIOLOGICAL

JAPAN SELECTS ENERGY PROBLEMS TO BE DISCUSSED AT TOKYO SUMMIT

Tokyo NIHON KEIZAI SHIMBUN in Japanese 18 Mar 79 morning edition p 1 OW

[Excerpt] In connection with the forthcoming Tokyo summit conference, Japan has been tentatively assigned the tasks of making preparations for the summit discussions on energy problems and drafting the portion dealing with energy and nonth-south problems of a joint communique to be issued at the close of the conference. In this connection government officials, mainly of the Foreign Ministry, the Ministry of International Trade and Industry and the Resources and Energy Agency, have begun to select topics to be taken up in discussions on energy problems and subjects to be included in the joint communique.

According to a government source, in discussion held so far these officials have virtually agreed that in order to cope with the petroleum shortage resulting from the Iranian political upheaval and the rising petroleum prices, it has become necessary for the major industrial nations to cooperate still more closely in implementing a joint energy strategy. On the basis of this judgment, they have decided to call for "the implementation of a cooperative energy strategy" as a key issue at the summit conference. The Japanese Government has already conveyed this idea to the United States and other countries concerned. Officials of various government agencies have recently begun to discuss concrete aspects of the cooperative energy strategy to be undertaken by these countries.

These officials will divide their discussions into two categories: immediate measures and long-range strategy. Immediate measures involve the question of how to deal with the worldwide fear of unstable petroleum supply and the petroleum-producing countries; offensive for higher oil prices. According to the same government sources, there seems to be no alternative for oil-consuming nations but to do their best to implement the international energy agency decision to reduce petroleum consumption by 5 percent so that they can ward off the oil shortage and the pressure for higher oil prices.

As for long-term strategy, Japan will stress that now is the time for all advanced nations to study and develop in earnest energy sources other than petroleum. More specifically, first, the prevailing view is that Japan

should propose the creation of a "joint research and development organization" to conduct research and development work on coal liquefaction and nuclear fusion by pooling money and personnel in order to develop energy sources other than petroleum. This organization will be independent from the IEA. Japan, the United States and West Germany have already launched a joint coal liquefaction project. But the new organization will be aimed at creating a comprehensive joint energy research and development system in which various countries, including France, which is not an IEA member, will participate in developing new energy sources including coal liquefaction.

Second, Japan plans to propose that the IEA strengthen its research and development function and speed up the tempo of research and development so that solar heat and wind energy can be put to practical use at an early date. At the same time, Japan will propose creation of a system by which various countries will exchange information on the results of their independent energy research and development projects so that they can indirectly assist the IEA's research and development activities.

Third, Japan and some other countries will call for the full utilization of atomic energy. At present, Japan is virtually prohibited from building nuclear fuel plants for producing enriched uranium for use in atomic power plants and building spent nuclear fuel reprocessing plants on grounds that the building of these plants will lead to nuclear proliferation. The INFACE [International Nuclear Fuel Cycle Evaluation] is currently working on a basic framework to overcome this bottleneck. Japan will call on other countries to cooperate in reaching an early conclusion on this issue.

No objection is expected to be raised to the Japanese Government's call for a long-range "cooperative energy strategy," but there is the possibility that the Japanese short-term proposals will be criticized as being rather lukewarm.

CSO: 4105

ECONOMIC

JAPANESE ORGANIZATION SEES DANGER OF INFLATION

Tokyo MAINICHI DAILY NEWS in English 20 Mar 79 p 5 OW

[Text] A leading economic organization, Keizai Doyukai (Japan Committee for Economic Development), warned Monday of an imminent spurt of inflation and urged businesses to increase production to forestall both runaway inflation and the inset of a tight money policy.

Keizai Doyukai said the price issue has already become serious enough to command serious attention although there is still some feeling that the recent price spiral is not so serious because it is a compounded results of 1) overseas inflation, 2) rebouncing of the domestic wholesale prices which had been depressed, and 3) is a normal phenomenon in a time of economic recovery.

The situation is very similar to that just before the inset of runaway inflation of 1973, Keizai Doyukai said, in that international market prices are zooming, the world economy is on the rise, domestic land and stock prices are rising, oil prices are rising, and money supply is increasing.

However, the massive issuance of government bonds has made it extremely difficult to control money supply. In this respect the situation is quite different from 1973.

The current inflationary trend in Japan is largely caused by zooming international market prices and the slippage of the yen. Two other major inflation causes are the sustained massive bond issuance and business reluctance to boost production.

Although there is still roughly a 15 percent gap between overall supply and demand in the manufacturing sector, the slow production boost could push up prices as demand easily overtakes production.

According to Keizai Doyukai that was exactly what happened in the 1973 runaway inflation. Furthermore, at that time there was about a 10 percent gap between demand and supply.

The current upturn in wholesale prices will, with time lag, push up the consumer prices and could probably inflate pay raise demands.

To forestall such an inflationary chain reaction, Keizai Doyukai said the monetary authorities should avoid a strong tight money policy such as a raise in the official discount rate.

The government should also delay the implementation of public works projects in fiscal 1979 which begin on April 1. Public works expenditures should be curbed to some extent.

With reduced expenditures, the big business' club said, the government bond issuance volume should be trimmed as much as possible.

If continued issuance of bonds is necessary, new bonds should have a shorter maturtiy period than the current 10 years.

At the same time, the monetary authorities should establish and show the target zone of money supply, as in Europe and the U.S., to deepen public understanding of price trends, Keizai Doyukai advocated.

The organization urged the government to take every measure to foil moves to reap windfall profits as price rises abroad inevitably filter into domestic prices one way or another and profiteers are quick to take advantage.

CSO: 4120

ECONOMIC

CHAMBER OF COMMERCE PRESIDENT URGES OPEN MARKET

Tokyo MAINICHI DAILY NEWS in English 6 Mar 79 p 5

[Text] Japan should strive to trim its growing surplus in the current account by further opening up its market--namely further liberalization of agricultural product imports and allowing foreign manufacturers to bid for procurements by governmental organizations, urged Shigeo Nagano, president of the Japan Chamber of Commerce and Industry, Thursday.

The JCCI president said the surplus issue which has become a major international problem could not be solved by Japan alone. The problem also stems from the industrial and trade structures of Japan's trade partners, he said.

Nagano said it is not Japan alone that must be blamed for the current trade frictions but also its trading partners. Half of the causes of friction are misunderstandings and a lack of understanding of the Japanese economy on the part of trade partners, he said.

The JCCI president made these remarks at the opening of the 49th general assembly of the Japan Chamber of Commerce and Industry.

He said the whole for instance Japanese socio-economic system needs to be streamlined by, for instance, making a drastic revision of import controls on agricultural products whose price levels are much higher than the international market prices.

Anticipated tight supply of oil and price rises dictate that the country expedite development of nuclear power generation so that the unavailability of oil will not impede the international competitiveness of Japanese products, he said.

The economic train is pulling out of the prolonged recession tunnel and into the open, he said, although the tail-end is still in the tunnel.

An upturn is seen in private consumption, investments in inventories and equipment, and output and shipments have begun to pick up, he said.

However, he continued, the economy is beset with a major problem of unemployment, particularly that of senior aged workers. Coupled with a general price spiral trend, anticipated oil price markups, and declining Japanese exports, he cautioned, the situation warrants no optimism for business.

Turning to the controversial domestic issue of a general excise tax (value-added tax) scheme, the JCCI president called on the government to exercise the utmost prudence.

The president of the retailers' organization said rectification of the existing unfair taxation system, reconsolidation of administrative machinery, and budget economizing must precede the sales tax introduction.

Even after such streamlining, the introduction should respect the consensus opinion of the general public, he stressed.

During the one-day assembly, all the officers of the JCCI were reelected and special advisers were recommissioned. As a result, Nagano entered his sixth straight two-year term of office.

CSO: 4120

ECONOMIC

STRATEGIC ATTITUDE URGED TO TRADE BALANCE ISSUE

Tokyo MAINICHI DAILY NEWS in English 16 Mar 79 p 6

[Text] Parliamentary vice ministers asked the government Thursday not to yield easily and unthinkingly to U.S. demands for Japanese action to correct the bilateral trade imbalance.

Speaking at a regular meeting of parliamentary vice ministers, Yoshiro Hayashi, parliamentary vice finance minister, said the government should deal with the U.S. demands from an overall strategic viewpoint.

The government should not deal with the U.S. demands individually, he said.

The view was supported by Seiichi Kataoka, parliamentary vice agriculture, forestry and fisheries minister, and Ichiro Kataoka, parliamentary vice minister of international trade and industry.

Motoharu Arima, parliamentary deputy director general of the Defense Agency, said, meanwhile that the Japanese Dietmen should conduct thorough discussions with U.S. congressmen on economic problems between the two countries.

But in holding such consultations, he said, they should limit topics of discussion to overall problems.

Hisaoki Kamei, parliamentary vice minister of posts and telecommunications, said the government should establish a coordinating machinery to deal with U.S. demands on an integrated basis.

CSO: 4120

ECONOMIC

MORE POWER PLANT INVESTMENT PLANNED

Tokyo MAINICHI DAILY NEWS in English 16 Mar 79 p 6

[Text] The Japanese business community and the ruling Liberal-Democratic Party agreed Thursday to step up investments in power plants in fiscal 1979, too, to bring business recovery into full swing.

The agreement came at a top-level business-LDP meeting in Tokyo. It was attended by leaders of the four major economic organizations, including Toshiwo Doko, president of the Federation of Economic Organizations (Keidanren).

The LDP delegates included Toshio Komoto, chairman of the Policy Affairs Research Council.

Business recovery was the main topic.

Doko said business is recovering, and that the government's big budget and active investments in power plants have served as a major driving force.

He asked the LDP leaders to further step up investments in power plants in fiscal 1979 as well.

Komoto replied that active investments in power plants would continue to be made in fiscal 1979.

Referring to the proposed general excise tax, the chief LDP policymaker said, "We hope to establish the tax in fiscal 1980, but the details have not been worked."

He added that now is the time to make every effort to put business recovery into full swing. If recovery does go into full swing, corporate tax revenues would increase, making it unnecessary to impose a high-rate general excise tax, Komoto said.

Shigeo Nagano, president of the Japan Chamber of Commerce and Industry, said that there is a strong opinion among smaller businesses against the institution of that tax. He called for increased efforts to obtain the consent of the people at large to the plan.

Komoto and party secretary general Kunikichi Saito replied that the party would take a cautious stand on the matter.

CSO: 4120

ECONOMIC

JAPAN INDUSTRY ON UPWARD TREND IN PLANT INVESTMENT

Tokyo NIHON KEIZAI SHINBUN in Japanese 12 Mar 79 morning edition p 1 OW

[Excerpts] A study of investment plans in the private industrial sector indicates that the nation's manufacturing industry this year is likely to exceed its 1978 level in outlay for plants and equipment. A "survey of industries' investing, financial and producing capabilities" for 1979, based on a poll of 1,393 firms in the private sector conducted by the NIHON KEIZAI SHUMBUN company, projects an increase of 3.1 percent in plant-equipment investment over last year's level. The manufacturing industry alone is expected to register a 3.6 percent gain in that area.

For the first time in 5 years the manufacturing industry will show an upward trend in this area; steel, chemical and textile industries have refrained from spending money on plants and equipment during this time. Meanwhile, as a result of a leveling off in investment in the electric power industry, outlays for plants and equipment by nonmanufacturing industries will show a relatively slow growth of 2.7 percent over the 1978 level.

Included among the major factors contributing to the upward trend in the manufacturing industry are 7.4 percent in steel industry, 5.4 percent in chemical industry, 7.2 percent in textile industry, and 5.8 percent in nonferrous metallurgical industry.

On the other hand, automobile and electric appliance industries, which played a leading role in this area in recent years, appear to have reached plateaus now. Otherwise, the upward trend could be even more decisive.

CSO: 4105

ECONOMIC

'MAINICHI' ON CHINA'S DECISION TO DEFER JAPANESE PLANT IMPORTS

Tokyo MAINICHI SHINBUN in Japanese 18 Mar 79 morning edition p 7 OW

[Excerpts] China has recently notified Japan of its decision to defer fulfillment of its plant import contracts, which amount to 560 billion yen. In this connection, on 17 March major Japanese firms revealed their finding that China has made no similar decisions on its contracts with firms in the United States and European countries. This fact was confirmed by the Ministry of International Trade and Industry [MITI] on the same day.

It is not clear why China's decision only involves contracts with Japanese firms, but the prevailing view among leading Japanese firms is that China has taken the step in order to obtain favorable terms in its difficult negotiations with Japan on loans.

Regarding China's decision, MITI holds the view that "excessive emphasis on heavy industry in China has resulted in the lack of a balance between industry and other sectors, including agriculture, and to remove this imbalance, China seems to have started to adjust its plant imports from Japan, which occupy a considerable part of its total foreign trade volume."

However, major Japanese firms believe that China's decision is aimed at securing favorable terms in its talks with Japan on loans. They say that this is clear from a cable China sent notifying Japan that it is taking the step "because the issue of funding cooperation between Japan and China has not yet been resolved." To back up their view, they also point out the fact that while China is actually receiving loans from Britain and West Germany, it has yet to negotiate with Japan for the settlement of the issue over funding cooperation.

CSO: 4105

ECONOMIC

JAPAN BEGINS TO STUDY JOINT AID PROGRAM FOR EGYPT

Tokyo NIHON KEIZAI SHINBUN in Japanese 18 Mar 79 morning edition p 2 OW

[Text] The Foreign Ministry began studying a possible new economic aid program for Egypt. With Egypt and Israel having agreed to sign a treaty of peace, President al-Sadat disclosed a plan to ask the United States, West Germany and Japan for a 5-year assistance program amounting to $15 billion for his country's economic rehabilitation. The U.S. President has already expressed his support for this plan. Thus, President al-Sadat and President Carter are now reportedly seeking Japan's share in the aid program. The Foreign Ministry has said that "the ministry will study the aid issue when a request for assistance has formally been received." However, ministry leaders believe that, like it or not, Japan will have to undertake its due share in the assistance program. A concrete discussion of the issue may possibly start between Japan and the United States when Foreign Minister Sonoda visits Washington in April. The Foreign Ministry hopes that it will be able to finalize the framework for Japan's share by the time al-Sadat visits Japan.

Through the conclusion of a peace treaty with Israel, Egypt hopes to center most of its efforts on reconstructing the domestic economy. To realize this hope, President al-Sadat plans to obtain funds amounting to $10 billion from the United States and $5 billion from Japan and West Germany. It is said that President Carter had this al-Sadat plan in mind when he made a statement on economic assistance to Egypt recently. A formal request for the share in the aid program is expected to be made shortly by President Carter to Japan and West Germany. In the past, Japan has actively cooperated with Egypt economically through loans in yen. Japan believes it should show an equally active response to this future aid program when formally asked to participate. Foreign Ministry officials say that, in so doing, Japan can demonstrate its support for the new Mideast development, following the Egyptian-Israeli agreement to sign a peace treaty, and can also live up to its faith in Middle East peace. However, some officials also believe that thoughtful consideration should equally be given the Arab nations' opposition to the signing of the peace treaty. Thus, the ministry believes that, in working out concrete aid measures, Japan should keep a close watch over future developments in the Mideast situation.

CSO: 4105

ECONOMIC

BRIEFS

MINING PACT WITH USSR--Sumitomo Coal Mining Co on 15 March announced plans to soon sign a technical cooperation agreement with the USSR and to send the first group of technicians to the Soviet Union in June. Sumitomo will be the first Japanese firm to undertake such cooperation with the USSR in the coal mining sector. Its part of cooperation will primarily be in the technical area of hewing in steeply inclined coal beds. [Tokyo NIHON KEIZAI SHINBUN in Japanese 16 Mar 79 morning edition p 6 OW]

JOINT URANIUM ENRICHMENT PROPOSAL--Government sources disclosed on 16 March that Japan has received an informal West German proposal for a joint uranium enrichment project among Japan, FRG and Australia. The gist of the proposal, conveyed to Japan Atomic Energy Commission by (W. Schmidt Kuester, chief for research and development bureau of the West German Ministry for Research and Technology, is as follows: 1) the enrichment plant will be built in Australia and that country will furnish the site for the plant and supply natural uranium; 2) the process of enrichment will follow a "centrifugal" method developed by a joint uranium enrichment program among West Germany, Britain and the Netherlands; and 3) Japan will furnish construction funds and take charge of the sale of the end product--enriched uranium. It is possible that Japan will respond to this proposal in view of U.S. stand that for uranium enrichment Japan give up its current singlehanded development program and instead seek a "multinational joint venture" formula. [Tokyo NIHON KEIZAI SHINBUN in Japanese 17 Mar 79 morning edition p 6 OW]

SOVIET AIRLINE PROPOSAL--Minister of Transport Moriyama has received a letter from Soviet Minister of Civil Aviation Bugayev proposing that both Japanese and Soviet airlines increase the number of their flights on the present Tokyo-Moscow air route and open new routes between Osaka and Leningrad and Osaka and Kiev. The letter, delivered by Soviet Ambassador to Japan Polyanskiy, also calls on both the Japanese and Soviet governments to conclude an agreement on introducing charter flights between the two countries. According to transport ministry sources, the ministry has little interest in the proposal because passengers using air services between Japan and the USSR are not very many and their number is not expected to go up. In addition, Narita Airport would need more fuel supply and runways to meet the Soviet proposal, and Japan is obligated to give priority consideration to similar proposals made earlier by 33 nations, the sources said. [Tokyo NIHON KEIZAI SHINBUN in Japanese 17 Mar 79 morning edition p 4 OW]

AUSTRALIAN ORE PRICES--Australia and Japan have reached an accord on the prices of ferrous ores to be exported to Japan during fiscal 1979. The new prices show an average increase of slightly more than $1 per ton over the level of fiscal 1978. The agreement also calls for a review and readjustment of export quantities every 3 months. Both sides also agreed to slightly increase export quantitites. Australian Minister of Trade and Resources Antony on 1 March called the agreement "a satisfactory one." Tokyo NIHON KEIZAI SHINBUN in Japanese 2 Mar 79 morning edition p 5 OW]

CARDBOARD FOR PRC--Japanese cardboard makers have concluded contracts with a delegation of the China national light industrial import-export corporation for the delivery of 45,300 tons of cardboard to China from April through June. In view of China's increasing need of cardboard for packing its export light industrial goods, Japan's paper industry expects to sign more contracts with China at the Guangzhou trade fair scheduled to open on 15 April. Japan's cardcoard export contracts with China amounted to 148,100 tons last year. [Tokyo NIHON KEIZAI SHINBUN in Japanese 9 Mar 79 p 7 OW]

CSO: 4105

SCIENCE AND TECHNOLOGY

'BUNGEI SHUNJU' DISCUSSES OUTLOOK FOR SCIENCE AND TECHNOLOGY

Problems in Research, Development

Tokyo BUNGEI SHUNJU in Japanese Feb 79 pp 48-154

[Article by Hiroshi Takeuchi, research director, Japan Long Term Credit Bank: "Is Another Revolution Possible in Japan's Technology?; Science as a Promoter of Japan's Economy in the 1980s"]

[Excerpt] General

Technological Advances and Position

One's interest differs according to one's position: a physician would take interest in the physiological, a literary scholar in the emotional, and an engineer in the mechanical aspects of a human being, while a philosopher would look at human values.

Humans, from an economic point of view, expect a maximum benefit from a minimum of labor. Human behavior is considered only in terms of production, consumption and savings and investment, to the consternation of literary scholars and philosophers.

The same can be said of technological advances. Physicists may highly evaluate the existing technological level for the probe of the elemental particle structure, while biologists and chemists may regard the present age as the dawn of molecular biology.

A housewife may view the level of existing technology only in terms of new products such as a mattress drier. To a housewife caring for her parents, the drier is a lifesaver, a product of technological advances.

Japan's economy enjoyed a large growth because of remarkable technological advances made from 1955 to 1970 in most industries, including petrochemical, textile and electronics.

Stagnation of Technological Advances

These technological advances paved the way for high economic growth through the following mechanism: To introduce a new technology or create a new technological industry, major industries would make huge capital investments, create a demand for products of the metallic or machinery industry which in turn would expand its own capital investment, and even establish a new plant. With increased demand and supply, the industry would snowball into a larger industry.

With high economic growth, the wage level will rise in keeping with the supply of labor, and an increased demand for durable consumer goods will stimulate capital investment and production. In addition, the construction of huge plants by the durable goods industry and mass production techniques will drive the costs down, creating an even greater demand. And as a labor-saving measure, huge capital investments will be made in automation.

From 1955 through 1970, technological advances spurred capital investments and promoted economic growth. In the sense that technological progress enmeshed Japan's economy and changed its character, it was indeed a technological revolution. And Japan was able to turn out some of the world's best industrial products.

As in natural and social phenomena, there is a cycle in human beings from infancy to old age.

In the economic area, an oversupply will result in an economic slowdown known as a stock cumulative effect. For example, an overbuilding of residential homes will impede the growth of the home construction industry.

This is seen even in the case of technological advances. When a new principle based on natural science is found to be promising for industrial application, enterprises undertake applied research fervently, and any success provides a clue to the direction that should be pursued in other researches.

Supply of New Principles Exhausted?

Any enterprise engaged in growth-oriented research should have no trouble mustering an excellent work force. During the 1955-1965 period, researchers in the petrochemical, synthetic fiber, automobile and steel industries were the target of envy, while in 1965-1975, it was those in the computer field. Outstanding human resources tend to cluster around such growth industries, thereby accelerating applied researches.

In such a manner, applied researches on principles dealing with solid physics and synthetic chemistry underwent a remarkable progress in the

first half of the 20th century, especially in the United States. New products appearing in the Japanese market were subjected to further applied research, resulting in top quality products. Today, not even a drop of water can be wrung out of a wet towel. Petrochemical and synthetic fibers industries are a typical example. Despite huge research expenditures, it has become difficult to develop products profitable enough to recover research expenses.

Industries, such as the heavy chemical industry, where technological progress came early were caught in an intense capital investment race, resulting in surplus production capacity. Probably due to the technological stagnation and the changing international economic environment, Japan's long-term economic growth seems to have declined around 1970-75 from 10 percent to 5-6 percent. A drop of the economic growth rate from 10 to 5 percent would mean that the annual demand has been reduced by one-half.

Technological advances, in an economic sense, appear to be slowing down. (Kondorachefu) spoke of a long 55 year cycle in technological progress. Based on his theory, we would have entered a period of decline after 1965 or 1970.

Mass Production Techniques and Local Conditions

Local conditions have a strong impact on an industry, an example of which is agriculture where, in Japan, rice is the principal crop. Japan-made cars are small, with a good fuel efficiency. As the Japanese have an eye for details, the interior appointments and paints are superior to those of foreign cars. Because Japanese houses are small, even refrigerators, vacuum cleaners and air conditioners are built small and quiet.

Local conditions also affect technology. The technology in which Japan excels involves the mass production of new products and of improved products on the basis of knowhow acquired from abroad after 1955. Technological revolution thus became a reality.

This can be attributed to Japan's high academic standards and unique employment practices. Because of the system of lifetime employment, the enterprise provide constant training to employees, rotating them to new positions every few years to broaden their outlook. In plants and main offices, decisionmaking is from the bottom up, serving as an incentive to the workers.

In mass production plants of the machinery and steel industries, there are many levels of work. The important point here is that fine technological improvements are made at each level, while maintaining a balance with other levels. Japanese plants have many blue collar workers who are motivated in making improvements.

Original Products

Mass production techniques begin to lose appeal whenever the market growth slackens. When the market becomes saturated with mass produced products and there are no other products to create a mass demand, the alternative would be to develop varied products for varying demands.

In such cases, one must keep abreast of the news and come up with some clever idea. A case in point is the mattress drier.

Existing products can be improved into a higher class product, and in any form. An example would be miniaturization, as in the case of such electronic products as desk calculators and taperecorders. However, improved technology would be required because of precision parts and materials.

Also, various technology can be combined. An example would be (ratekase), incorporating a radio, television and cassette recorder, or a quartz watch combining watch and electronic technology. Another example would be the construction of earthquake resistant high rise buildings and ocean spans through structural calculation with large computers.

In such systemization of technology, a greater size and high quality will demand unusually strong materials and fine fabrication, attainable only with advanced technology.

New large products can also be developed, primarily by the electronics industry. A typical example would be facsimiles and computers for home use, and an automatic burglar alarm and fire prevention system. Although large and expensive, they may be called a small product in that there is no great demand for them. Today, many small but expensive products with high performance are being developed.

Also, there is a combination of hard and soft technology. An example would be residences, city services and plant construction industries. IN the home construction area, not only hard technology dealing with earthquake and fire, but also soft technology involving livability need to be considered. In the city services industry, the problems of noise, trash collection, transportation, green belt, and natural surroundings must be considered, together with the price of land. In plant construction, the natural environment must be protected and friction with residents must be avoided.

There are also areas in which hard technology alone cannot fully perform the tasks without the backing of an advanced soft technology, and vice versa. An example of this would be the pollution problem now being licked with anti-pollution technology.

From these observations, technological progress cannot be interpreted as the constant development of new and large products or of new

manufacturing processes based on some new principles of natural science. Technology is moving in varied directions.

Japan's technological climate has withstood the effects of mass production. Even with respect to the technology of this dark period, the Japanese were rich in small ideas. As many Japanese tended to make a fuss over even small deficiencies such as nicks on auto bumpers, quality materials and workmanship became necessary, resulting in high quality products. The dense urban population, noise and pollution and the necessity to minimize social friction led to the development of soft technology. In fact, Japan leads the world in technology on low polluting cars.

Serious Problems Face Research and Development

From a short and intermediate range, Japan's technological standards may appear bright, but from a long range view, there are some serious problems.

As stated earlier, the technological revolution was achieved without any technological tradition, chiefly through their introduction from abroad. Although the new technology had been assimilated, Japan lacks the strength to produce more quality goods through further technological advances because of its shallow history of research and development. No new knowledge is available on petrochemicals, fine chamicals and coal chemistry.

The next problem involves the capacity to develop new revolutionary technology. The ideas of Japanese tend to be narrow and confined. For example, to provide Saudi Arabia with potable water, the Japanese idea was to use surplus tankers to haul water from upstreams of the river Nile, whereas the French considered towing a vinyl-wrapped glacier from the Antarctic. This is a sharp contrast in the way of thinking.

Research and development funds are short, with enterprises, the government and universities unable to extend aid.

A greater problem is the yet undefined goal of research and development. There is no consensus on what kind of nation Japan should be. And the government is unable to make any large investments for research and development, for it cannot explain just how it benefits the nation.

There will be no additional capital investments in the absence of large-scale research and development, and Japan will not be able to extricate itself from the long stagnant economy.

And without the development of new energy techniques, the petroleum issue will probably be around for awhile.

Future of Electronics

Tokyo BUNGEI SHUNJU in Japanese Feb 79 pp 155-160

[Interview by Hiroshi Takeuchi with Shunkichi Kisaka, executive director, Technology Division Chief, Matsushita Electrical Industrial Co., Ltd: "A 1-Ton Calculator Reduced in Weight to 100 Kilos; Remarkable Miniaturization of Large-Scale Technology"]

[Text] Electronics

Technology Not in Stalemate

Takeuchi: The (Kondorachefu) theory is that a 55-year cycle exists in technological advances. I am uncertain whether 55 years is correct, but when basic technology blooms into applied technology at a certain stage, any investments in research and development may prove economically unprofitable. At that point, as all efficient manpower will have been mustered at the applied technology level, it will require about 20 years to mobilize the manpower around basic technology, commence the technological revolution and shift the axis of technology. It has generally been said that Japan, from 1955 through 1970, possessed revolutionary large-scale technology and mass production techniques for reducing costs by almost one-half. But that was before, and there being no further capital investments, a long-term economic slowdown has occurred since 1970. As we like to believe that the economy can be revived through technological advances, we tend to put the blame on the long-term or global disorder after 1973 on technology. That is the reason, I think, that the future of technology is being questioned.

Kisaka: Various reasons have been cited for the 55 to 100 year cycle. However, there are two points to be considered before discussing this matter. First, in actuality, even if a calculator weighing 1 ton were reduced to 100 kilograms, or a pocket telephone/television developed, or one were to run 500 kilometers per hour around the earth, they probably would not be considered as technological revolution. Future projections being made on rather solid ground these days, a small progress would not attract much attention.

Secondly, when tracing the past history of science, we would find that similar utterances have been made repeatedly. When Newton's dynamics was perfected around the mid-18th century, some claimed that it brought an end to physics. And around the end of the 19th century when Maxwell's electrical dynamics was provisionally perfected, people believed there was nothing more that could be done with physics. However, many discoveries followed: The X-ray by Roentgen in 1895; radiation by Becquerel; radium by Madame Currie in 1896, electrons by J.J. Thomson in 1897, and Panck's quantum theory in 1900. In this way, the large buds of electronics and nuclear power began to grow in the 20th century.

Around 1940, the chief of GE's research laboratory contended that since motors, generators, electric bulbs and just about everyhting else had all been produced and there were no new inventions, the only thing left was a study of their applications. And in 1964, the director of a European research laboratory stated that the honeymoon between semiconductors and science was over. In tracing the history of science in this manner, it can be noted that whenever there has been some striking achievement, many people, including traditionalists, begin to feel that science has outlived its usefulness. However, as Marx would say, it is then that paradoxes and the bud for work in the next stage reaches maturity. Perhaps it is a desire to recapture the same dream, but it is a destiny that humans must follow, like it or not. At any rate, since a large number of the world's scientists and engineers have a stake in their problems, it may be too bold of me to negate any revolution in scientific technology, passing it off as mere undulations (laughter). I feel that nature is not so small that humans can scurry about and gain an understanding. (Laughter).

Humanity's Two Mistakes

Takeuchi: Then, for physics, it is a period of confusion, or...

Kisaka: My main field being electronics, I cannot go in deeply on other fields. But I feel that electronics is not in a state of confusion.

I must watch how I express myself, but I often ask myself whether humanity has not committed two mistakes (laughter).

The first is that humans struck upon atomic energy, and the other is that they are trying to seize upon the phenomena of life and heredity. These two things can be compared to humanity attempting to consume the forbidden fruit.

Even if humanity seized upon these things, ethics would come into play during the first or second generations, but after the third generation when sciences is transformed into a universal technology, there would be no guarantee as to how such technology would be applied. It is unthinkable that one would try to destroy the face of the earth by triggering a nuclear missile, although there may be such a gesture as in the 1962 Cuban crisis, or contemplate world dominance by changing the race through application of the genetic phenomenon. But as for the future, there is nothing we can do, other than to have faith in the wisdom of future humanity.

Takeuchi: It would be awful if microorganic chemistry really developed and germs happened to escape. They would spread quickly and bring harm to humanity.

Kisaka: There is such a danger. I do not feel that electronics today is in a state of confusion. There are views that we are in a period of shift for some star performers. From a business point of view, the market shares for TVs and radios, 30 and 40 percent respectively, may gradually change with the introduction of new products. This is possible.

Transformation to the Microcomputer Age

Tekeuchi: From a layman's viewpoint, electronics stand for miniaturization. Is progress in miniaturization that important?

Kisaka: It would be considered not as a move to make small things smaller, but as making large things smaller. A 1-ton calculator reduced in weight to 100 kilograms would simplify its operation, and a telephone which can be carried inside a pocket would provide more convenience. To do this, critical areas must be further reduced in size.

Takeuchi: Would miniaturization have a greater effect on cost reduction or the system? Do you mean that miniaturization would result in cheaper products for wider use?

Kisaka: Essentially, it would mean a lower price, but on the whole, functions will be improved, meaning high prices. The production costs of semiconductors, ICs, and LSIs have been increasing sharply from year to year.

Takeuchi: Is miniaturization contingent on advances in materials, engineering or, shall I say, principles?

Kisaka: We can say the absorption of principles into material advances, or material advances with the support of principles. For example, we displayed over 20 types of sensors last fall at the Matsushita Technological Exhibition. Sensors now are used for basic purposes, but in the future, they will take the place of human eyes, ears, noses and skin. The future direction will be, I think, towards a feedback of what is seen, heard or smelled. However, unless a great leap is made in the coming years, the sensor will be unable to serve as the eyes and ears of human beings. It is a long way off before sensors and microcomputers can perform the functions of humans made up of 15 billion cells. But the day will come. And the day will come when microcomputers and minicomputers will assume a larger role.

Takeuchi: I am well aware that sensors, resembling a nerve, will become very important. To effect the discovery of sensors, does electronics or biochemistry have to be pursued?

Kisaka: Both. A few years, someone stated in jest, "Director, let's quit our experiments on sensors and breed roaches and cat fish instead." (laughter). As Mr Takeuchi says, biochemistry and biophysics are making slow progress.

New Technology and Human Senses

Takeuchi: From an economic point of view, it seems that funds are the real issue whenever there is mention of technological stagnation or about large-scale technology not emerging for another 10 years. Technology until now has required a vast amount of money for equipment, but will not require so much in the future. So when one speaks of a cessation of technology, it probably is in an economic sense.

Even from a layman's viewpoint, the electronics industry has made rapid advances. Upon observing the Matsushita Technological Exhibition, I was deeply impressed but at the same time became concerned over whether the elderly would be able to utilize it.

Such progress would require a familiarization training for the public, ultimately changing human emotions. For example, many things can be done with a home computer. A sensor can discover a burglar breaking into a home and sound an alarm through the computer, but a human voice crying out, "a burglar is in the house," imparts better human emotions. Also, the way in which one says, "heat the bath water," imparts strong human emotions. If such emotions are gradually displaced, some future generations might become used to it, while some may not. Technology finally has reached the point of emotions.

Kisaka: This may be human destiny. Humans, especially scientists, seem to possess traits both very clever and foolish. They all think they are doing a good thing. About 30 years ago when we began our research, both science and research were considered a sacred occupation. But when the pollution issue arose about 10 years ago, one gained the impression that science and technology were involved in wrongdoings that would result in depletion of resources. Many things need to be considered. For example, if we continue to sell more calculators, including desk calendars, the human capacity for calculation will eventually be lost because of atrophy of the unused organ, and 300 or 500 years hence, the brain cells may even undergo a structural change. At any rate, it will be a repetition of trial and error by humanity. I feel that much thought should be given in evaluating a technology.

What Is a Great Invention?

Takeuchi: Does Japan's electronics technology rank the highest in the world, with no fear of the United States and European nations catching up?

Kisaka: I have heard comments to that effect, but those remarks can be attributed to the arrogance of Japanese. When we consider satellite rockets, nuclear energy, computers and semiconductors, we cannot say that Japan takes the lead.

With respect to semiconductor technology, it is true that the product is being exported to the United States because of its quality and low cost. That involves a single level of technology which is not inferior to that of the United States. But technology runs much deeper and wider. Looking at semiconductor technology as a whole, we cannot say that Japan excels the United States. In comparing the technology of the two nations, many things ought to be considered. For example, in the consumer field, Japan-made radios had a 70 percent share of the market in the United States, but it is now 10 percent owing to competition from South Korea and Hong Kong. Cassette tapes and black and white TVs will eventually suffer the same fate. A technological comparison, including prices, between Japan and the developing nations is in order. VTRs are not produced in the United States, being imported solely from Japan. The United States is unable to produce a similar quality product at the prevailing price. Therefore, Japan's VTR is considered the world' best, thus creating problems because of the yen hike (laughter). The general conclusion is that the other side leads in certain products, while Japan also leads in certain products.

Takeuchi: Nowadays, Japanese universities cannot be counted upon for technological advances, so enterprises are taking their place. But as enterprises have only profits in mind, nothing spectacular can be anticipated. In the United States, industrial and academic cooperation on national projects is possible, but not in Japan. There is no difficulty in proceeding from radio to tape recorder to television set, but the problem arises when it comes to a slightly larger technology.

Kisaka: That is ture. In the United States, government organs such as its armed forces and NASA would become prime supporters, and there even the profits of a single firm would equal the production costs of a Japanese firm. Japan's research efforts should be directed primarily on Japanese motifs. The definition of largeness also needs to be clarified. For example, the research on transistors can be termed a great success, for it created a huge market, but it can be said that the scale of research at the time was not so large.

Takeuchi: My concept of largeness is where there is an immense field of application for a new product and an expansion of the system of technology, like many twigs branching out from a tree. That is my idea of a great technology.

Kisaka: Some researchers start out with a big goal, while others grow as time passes. As you know, the transistor, an example of the theory of effect, was preceded by a vacuum tube and a crystal detector. The question was wether a detector having the same functions as a vacuum tube could be produced. Even Shockley, the inventor of the transistor, experimented with this in 1939 but failed. He conducted another experiment in 1946, but with poor results. Puzzled, he reviewed his work, wondering whether his computations were correct. He then turned his

attention to the silicon surface, leading to the development of the transistor, a great invention when we look back now. But at the time of discovery, it was said that it had only a limited application as it could not be used in high frequency areas and was too small to provide electricity. That was around 1952 or 1953.

With the discovery of the transistor, researches were commended on noise reduction. Power had to be increased, but as heat would destroy the transistor, a larger mount was installed for heat dissipation. Thus, the transistor was gradually improved to today's level. No one imagined then that the application of transistor would grow as it has, leading to even ICs and LSIs.

Takeuchi: That means that the transistor was discovered accidentally, as in the case of nylon.

Kisaka: Yes. Bakelite, X-rays, radiation, super conduction and the transistor were all accidentally discovered. Sometimes the views are divided as to whether they were accidentally discovered or were inevitable. In some cases, it may be termed as an inevitable reality through an accident. Shockley himself states that he had a firm belief that such a device could be developed, but if we overlook that one point, it would become accidental.

Flexible Technicians

Takeuchi: In other words, a genius may come up with an invention, but would require help from others in furthering it. There is a limit to an individual's vision and senses. This seems to be the destiny of technicians. Just as Edison's and Bell's later years were ill-fated, a worthwhile invention would end upon discovery and no other ideas would emerge.

Kisaka: There are many such cases, not only in technology but among scientists as well. Edison worked on direct current, but took an opposite stand on alternating current. Watt even said that the person who should further his work was (Torevishikku) or that Fulton should be the one to do shipwork. There are many Nobel Prize winners who refute new theories. The memory brain cells are probably being hardened with one's own concepts. Once they harden, a rejection occurs toward any deviation. A judgment based on past memory is unable to predict the future. That is where the dream of science and technology lies.

Takeuchi: In those circumstances, a person who becomes the chief of a research laboratory should have less achievements to his credit and be flexible as a slug (laughter).

Steel Industry

Tokyo BUNGEI SHUNJU in Japanese Feb 79 pp 172-177

[Interview by Hiroshi Takeuchi with Tadashi Ohtake, executive director, Research and Development Division, Nippon Steel Corporation: "Technological Advances Conserve Resources; Hopes on (Amorufasu), the Dream Metal"]

[Text] Steel

80,000 Kinds of Steel Produceable

Takeuchi: The steel industry has made remarkable progress since the end of the war. Cost reductions were notable, but what about the quality of steel?

Ohtake: Presently, we maintain a master file of about 80,000 cases, which means that we distinguish between 80,000 kinds of steel in the production process. Because it would be impossible for human beings to keep track, we have installed a computer system.

Takeuchi: How much of 80,000 was produceable in 1955?

Ohtake: Virtually none. High tensile strength steel came to be used on naval vessels around 1953. Also, around that time, the automobile industry, professing to be a potential growth industry, gave us a word of encouragement. But we felt then that it was "preposterous." The (alumikirudo) steel for automobile bodies was first produced around 1953.

Takeuchi: Take the case of the battleship Yamato, for example. Have there been advances to justify the claim that today several centimeter thick steeel plate would equal several tens of centimeters in ability to withstand pressure and destructive power, or that steel would be rustproof for many days rather than for a week?

Ohtake: I do not know how deep old submarines could submerge, but modern ones can submerge for several hundred meters. We are not trying to develop a steel plate for a survey vessel, capable of withstanding an ocean floor pressure of 6,000 meters.

For the 3,000 meter leve, we should come up with something much sooner.

Takeuchi: Does that technology depend wholly on the strength of steel?

Ohtake: At 6,000 meters, there would be an atmospheric pressure of 600.

Takeuchi: Reverting to something more familiar to us, have there been great advances in steel for auto bodies?

Ohtake: One problem has to do with the fuel costs of automobiles. Cars can be made smaller to obtain greater mileage per liter of gasoline, or can be built lighter. We are not directly involved in making the cars smaller, but in making them lighter. Presently, steel for auto bodies has a strength of about 30 kilos per square millimeter, but will probably be increased in the future to around 40 or 50 kilos.

The change cannot be made sooner because of the mechanical capacity of presses maintained by automobile manufacturers. Existing machinery cannot be replaced until depreciation. New products are introduced when equipment is changed. As far as we are concerned, we already have the technological improvements to deliver those kinds of steel.

"Steel Is Not Steel"

Takeuchi: Every metal has its own characteristics, and steel competes with aluminum and plastic. What are the prospects of steel surpassing aluminum as far as efficiency in concerned?

Ohtake: Up until around 1950, we studied the property of steel as a material, using optical microscopes, X-rays and other physical, analytical methods. Later, a new method as adopted, using electronic microscopes to observe internal friction. This shed some light on steel's dynamic behavior. Subsequently, through a method known as polar diagram, an improved version of the X-ray method, the crystalline position and the collective structure of steel were clarified.

Thus, problems related to an outstanding electromagnetic sheet steel for transformers, deeply pressable steel plate, and their qualities were cleared up.

The technology existing at that time was generally applied, and in 1960, an experimental method was adopted. For example, there was the EPMA (X-ray microanalyzer) to accurately detect and identify any abnormality in the micron order in steel. Another technique introduced showed ways to judge steel geomorphologically with a scanning elecrronic microscope. As a result, many new guidelines were formulated on refinery techniques that had been overlooked, bringing about the current changes.

A greater problem has to do with the introduction of the so-called surface analytical method. This was after 1970, being preceded by the introduction of a very high voltage electronic microscope. From these, various phenomena occurring within steel were clarified.

Takeuchi: Did the surface analytical method become possible because of advances in the electronics industry?

Ohtake: Yes, physically. Researchers in many fields had long waited for them. Their invention was spurred by news of their needs. As a result,

questions on the material's two dimensional (ongusutoromu) order were answered. In other words, we think that a steel is steel, but there are cases where one particle and one atomic layer or two particles and two atomic layers on the surface are not necessarily steel. That's what was revealed (laughter).

In other words, rust and soldering all has to do with the surface, and as problems becomes known, there will be all sorts of measures to deal with them.

Is Steel Making With Atomic Energy a Possibility?

Takeuchi: Steel, then, is still a growth metal.

Ohtake: That is my feeling. There are still many unknowns, as to its properties.

Takeuchi: If there is a great leap in technology, can steel be produced as efficiently as aluminum?

Ohtake: From the standpoint of energy, the energy required for conversion of ores into a ton of steel is about one-twentieth of that for an equal amount of aluminum. It is an economic problem, after all.

Takeuchi: Will manufacturing costs be lowered further in the future?

Ohtake: There is a way to simplify the manufacturing methods. Under the existing process, productivity is stressed at each level of operation. The problem facing us is how to link them and come up with a balanced process for improved quality.

Although continuous founding is very efficient, we unfortunately do not possess the technology to accommodate 80,000 kinds of steel. Special steel calls for complex methods. The current problem is how to deal with this. Its discovery would be revolutionary.

Under the existing process, energy and material are wasted, as heat or cold treatment must be repeated as required. If the product is subjected to heat only once, a system must be devised to use the same heat throughout the entire operation. That is the essence of a great technological development.

Takeuchi: That means that steel making by atomic energy or direct steel making is far off, and that there will be a gradual build up of technological improvements for awhile.

Ohtake: Yes. Our present weakness is in coal. Nuclear energy can solve this problem, but the current problem is how to produce steel making cokes under a method that does not require coking coal. The use of coking

ovens is now controversial because of their environmental impact. As there are means to produce metallurgical coke from ordinary coal and at the same time conform to environmental requirements, researches will be directed toward this end.

Takeuchi: Existing steel mills have been constructed inside the bays or on shores along the Inland Sea. Since no additional sites are available, they probably have to be located by the sea facing strong waves or forests. Wouldn't a new construction technology be required then?

Ohtake: This is a rather dimensional issue involving the rate of progress of marine technology and civil engineering. When the Sakai and Nagoya steel mills were built, I think that land afforestation proceeded on a yearly basis, while at Kimizu steel mill, it was on a monthly basis. When the Oita steel mill was constructed, a 25 meter deep quay was needed for unloading raw materials from large ships docking alongside. This quay was built according to the seaberth method, a first experience for the steel industry. Under this method, a quay becomes unnecessary when a berthing site is erected at the end of a long pier and materials are hauled with proper moving equipment.

After building it by the outer sea, the question is whether some kind of system can be developed to keep out waves to ensure a safe docking by vessels. If this can be resolved, the day will come when water depth at the site will no longer present a problem.

Takeuchi: When the Nippon Steel Corporation erected a steel mill in Kimizu, it had a city construction project under consideration. The relocation of its workers and the construction of a town and plant simultaneously represented a major technological progress.

Ohtake: Probably. To a nation like China, civil engineering technology for steel mill construction advancing to other technology for town and plant construction has a great appeal (laughter).

(Amorufasu), the Dream Metal

Takeuchi: Are there any prospects for the development of some revolutioary kind of steel?

Ohtake: It all depends on how we look at what we have now. Steel with third dimensional or memory features has already been made, but its application is still a long way off. (Amorufasu), a non-crystalline metal stands out, however, Ordinarily, the atoms are aligned in a crystalline structure. To speak in a somewhat complex language, what is known as a (Laue's) spot is formed due to defraction of X-rays. But when a steel is made under a certain method, it is still steel but without (Laue's) spot. It is a mass, but not a liquid mass (laughter). That's the kind of steel that is formed.

Takeuchi: Is it something like a piece of plastic?

Ohtake: Glass is a mass, but not a crystal; it is rather an overfrozen liquid. Thus, (Laue's) spot will never appear. Steel having this resemblance has already been produced. Although a very small group of people from Japan, the United States and Germany are studying this steel, not much is known.

But it is known that it has a very interesting characteristic.

Takeuchi: What is that characteristic?

Ohtake: For example, making possible a material, very inexpensive and more corrosion proof than stainless steel.

The strongest steel now made registers 300 kilograms per square millimeter, but it can only be made in the shape of wires for use in automobile tires as steel cord or piano wire. Theoretically, it can be subjected to pressure of 300 kilograms or even three times greater to 1,200 or 1,300. But (amorufasu) steel has a strength of 300 kilograms without any special work (laughter). This is a dream steel, indeed.

Japan Excels the United States

Takeuchi: In steel technology, does Japan excel the United States?

Ohtake: It is difficult to say, as the United States may be engaged in such work, systematically.

Takeuchi: In the case of the United States, if there is a need for strong steel for Polaris submarines and subterranean bases, it can develop the steel with military procurement expenditures.

Ohtake: Yes. We do not have military expenditures. It is well that we do not, but from the standpoint of technological advances, it is a weakness. If there are no financial constraints, a good product can be produced, aside from the question of economic feasibility (laughter).

Takeuchi: Where technology is pursued unmindful of economics, the United States probably takes the lead.

Ohtake: It probably is ahead. Japan has a big lead in technology transfer.

Takeuchi: Why is it that Japanese universities and enterprises are unable to come up with geniuses?

Ohtake: They probably don't want to recognize anyone as a genius. Japanese prefer to pull the leg of high capable individuals (laughter).

Saving the Equivalent of One Coastal Steel Mill

Takeuchi: Can we expect a genius from the steel industry who develops some manufacturing method which might beat his name, such as Ezaki diode?

Ohtake: No. Since the industrial revolution, there have been only two ways, I think, of producing steel. One is the (Badoru) method employed until around 1870, when the power revolution got underway. It gradually transformed into the Siemens-Martin method, a so-called indirect process which increased production velocity twentyfold. Using the same capacity equipment, production was increased 20 times. This was indeed a revolution.

Takeuchi: Was Mr Siemens responsible for this?

Ohtake: Yes. The underlying principle was the heat regeneration system.

The second important achievement was, as earlier explained, the conversion of the blast furnace/open hearth furnace into the revolving furnace system. The Chiba Steel Mill, which originally started out with 500,000 ton capacity, now has almost 9 million ton capacity. From the standpoint of today's general technological level, three revolving furnaces, each with a 250 ton refining capacity, would suffice to produce 6.5 million tons of steel annually. Under the open hearth furnace system, however, 20 or even 30 of the 250 ton open hearth furnaces would be needed. In other words, with the same capacity equipment, the production velocity had been increased nearly tenfold. The same thing that had been achieved under the Industrial Revolution had been realized.

Takeuchi: Then, despite the talk of a descending movement of the (Kondorachefu) cycle or stagnation of technological advances, it is not as serious in the steel industry.

Ohtake: Looking in from the outside, I think there is a stagnation. But I think the portion that is moving inside is ferocious.

Takeuchi: Does that mean that after the huge coastal plant, designed with scale merits in mind, has been completed and no further progress can be anticipated, there will be a reversion to such basics as the non-crystalline steel mentioned earlier?

Ohtake: No, no reversion. It will be performed in parallel. Technological advances during the 7-year period from 1970 through 1976 resulted in conservation of resources. The yield rate climbed sharply from 82 to about 88.6 percent over the processes of blister steel to the finished product. To explain in detail, Japan's 1976 production of ordinary steel was 93 million tons of blister steel, out of which nearly 83 million tons were for finished products. In other words, 93 million tons of blister steel were produced in order to produce 83 million tons of steel products. If there had been no technological advances during that time, about 100

million tons of blister steel would have been required in order to come up with the needed 83 million tons. In short, it meant a savings of 7 million tons of blister steel. Technological advances helped save an equivalent of one large coastal steel mill.

Chemicals Manufacture

Tokyo BUNGEI SHUNJU in Japanese Feb 79 pp 161-166

[Interview by Hiroshi Takeuchi with Sadataka Mukoyama, advisor, Toray Industries, Inc.: "Coming Technological Revolution to Begin With Biochemistry; Possibility of New Products Among Special Products"]

[Text] Chemicals

Mass Production Alone Is Not Enough

What are the chances for a new technology for synthetic fibers so that it can stage a comeback from its current depression? Or is it a pessimistic outlook with no new technology in sight?

Mukoyama: It is common knowledge among us technicians that technological advances have become stunted. But it depends on the yardstick that we use in discussing this stalemate. If there is a demand, even chemicals and materials plants will pick up. If the demand for materials were small or there were little application, a materials manufacturer would have little or no interest even if there were fairly high technological standards. For example, materials are the key element of technology, as in the case of very large scale integration. Japan's technology is remarkable, but the amount of materials used, in terms of their weight, is very small. For the materials manufacturer, the problem is how to make a profit on such a small quantity of special materials.

In the area of chemistry, fine chemicals are doing well, but their volume is small. In producing a product in small quantity and in a large variety, these chemicals, in many cases, are measured not in tonnage but in kilograms per year. Therefore it becomes necessary to change the mode of thinking: not about selling products but selling information unrelated to the product.

To cite a radical example, (interfelon), a highly acclaimed cure-all, is being sold on a trial basis for about 10,000 yen per million unit. A vial of a million unit is said to contain only one-thousandth of a milligram of the pure, effective ingredient, so a gram of pure (interfelon) is worth about 10 billion yen. In such a case, the current thinking of the materials manufacturer becomes outmoded.

Takeuchi: Instead of very huge equipment, a scale and test tube are used (laughter).

Mukoyama: Our chemical industry has given no thought to small production volume as it has concentrated, since the advent of petrochemicals, on mass production only. Per capita investment, therefore, is very high in Japan. In the case of Bayer and (Hekisuto) of Germany, it is below one-half that of Japan, and their profit ratio has not suffered even during the current oil crisis. Unlike in Japan, they have other sources of income from drugs and dyes. Japan's chemical industry should also shift in those directions, but it would be a formidable task.

I am not saying that a new technology is beyond all hope, but depending on new applications, chances are that new specialty products will be constantly introduced. For example, our carbon fibers have a very special application, and world demand for them is expected to be around 200 or 300 tons annually. Therefore, the key is not only production but also how to broaden their application.

Takeuchi: In a way, Japan's superiority in mass production technology constitutes a drawback.

Mukoyama: Yes, but conversely, that's because one does not have his own seed. If something looked promising, they would all flock to it. For example, all synthetic fiber companies would engage in production of imitation leather, and more than 10 firms in the production of artificial kidneys. If fine chemicals or some specialty chemicals appeared promising, everybody would join in. We must be extremely careful to find a path that the people do not tread (laughter).

We all speak about a stagnation of technology, but the fact is that there is little technology to take in. Rapid progress was attained in the postwar period because modifications were made to the superb technology from abroad. But now, there is no technology to bring in. Even if there were, it is not so simple as Japan is a competitor. Technological advances must be achieved independently, but such sconsciousness and action are lacking in Japan as a whole. Even the companies, much less the people, are unprepared. That is the primary problem.

Eerie Biochemistry

Takeuchi: At Dupont, nylon was accidentally developed while trying to make polyester. Aren't there any technological advances which would accidentally result in some new product?

Mukoyama: A clue may come accidentally, but nurturing it into a product requires conscientious research. In the case of nylon, it was not accidental, for research efforts were directed after a person had worked on it and was convinced that it could lead to something.

Takeuchi: Have synthetic chemicals reached the point where any further development of applied technology cannot be expected?

Mukoyama: According to those concerned with chemicals, it appears that there is not much left to do. What is left, however, is biochemistry, which is now making great advances. For instance, recombination of genes and studies on delineation of organic and inorganic matters have progressed too far, instilling a sense of fear in us.

Biochemistry may be difficult to understand for those who studied chemistry a long time ago. For example, in tissue culture, a tissue is taken from you, and when nutrients are supplied, it grows steadily. Even after you have died, that tissue from a part of your body continues to grow. Drugs are injected and new medicinal products are made from those cells. This is the procedure with (interfelon).

Takeuchi: It is eerie. It would be a shock to learn that cells taken from me would continue to grow and finally emerge as a pair of shoes (laughter).

Mukoyama: The thought of genetic recombination also shocks me, for it would create varied living creatures. For instance, in the case of humans, there could be remarkably strong soldiers or laborers. There must be some controls; the technology may be highly effective through cell restructuring, but it also poses a danger. The Japan Academy of Science has come out with a policy to restrict any research involving genetic recombination.

Overwhelmingly Strong Fermentation Technology

Mukoyama: Fortunately, Japan is ahead in biochemistry, particularly in the field of fermentation where it has a tradition. For example, when penicillin was developed after the war, it was claimed it would take 10 or 20 years for Japan to produce it on a large scale, but it only took 2 to 3 years. Because of its tradition of miso (soy bean paste) and shoyu (soy sauce), Japan is exceptionally strong in the fermentation technology. Japan is not so strong in medicinal products, but is strong in antibiotics produced through fermentation.

Japan dominates the amino acid field as well. I think that is very promising.

Takeuchi: In macromolecular chemistry, is the direction of new technology changing?

Mukoyama: In chemistry, the most spectacular postwar advances were in macromolecular chemistry. But it has subsided and there has been nothing new. It has been commonly recognized that there will be nothing like a daily output of several tens of tons on mass production level. For example, even in the case of synthetic fibers or synthetic resin where a large amount is used, production probably would not be increased beyond the existing output.

Takeuchi: Is that because global enterprises flock to and seize on whatever they can get when a new macromolecular chemical principle is born?

Mukoyama: They would all converge at once, peck on a small portion after things had quieted down, and take the next move. Macromolecules henceforth would appear as living bodies and functional macromolecules. University researchers have virtually abandoned the study of ordinary macromolecules. Since 1955, no one at universities is studying natural macromolecules. But in the United States, natural things are being studied once again. Even Brazil, owing to a lack of oil, is trying to make many things from agricultural products. Even alcohol is mixed with gasoline for cars.

Despite talk of use of solar energy, plants seem to be the only hope, ultimately.

Mass Production and Systematized Products

Takeuchi: Are fine chemicals considered to be a market-oriented technology?

Mukoyama: It has to do with something that is directly linked to demand and can be slightly modified or combined. For example, in the case of a shopping bag used in supermarkets, a thin and strong bag can be made by slightly increasing the polymerization rate on a very thin polyethylene film. About 100,000 tons have been manufactured annually, and have financially benefited the petrochemical industry. Some similar products should come up, such as the mattress drier (laughter).

Takeuchi: Is the technology for their development fairly simple once the market demands are known?

Mukoyama: Rather than a complex research, it can be called product-making through a combination of existing technology. There is much opportunity for this, but it depends on obtaining information on the need for a certain product early enough.

Takeuchi: Can that be called an ordinary technology?

Mukoyama: Being a combination, it is not an original technology but a systemization using technology in a soft, wide sphere. There is much room for advancement in this area.

Takeuchi: Aren't systematized products unsuited for mass production?

Mukoyama: The higher the technology, the less mass production. A combined systematized product would go into mass production. For example, in the housing industry, growth is attainable by producing new things by combining the existing technology even though it may not be new.

Takeuchi: When technology stabilizes at a certain level, does the synthetic fibers industry move upstream to develop raw materials or go downstream to widen the end uses?

Mukoyama: When technology becomes stabilized in the case of materials, they all become the same. For example, such chemical products as polyethelene and polypropylene do not differ so much, so the price would be the key factor. As excessive competition would lead to less profits, some other products will become desirable. To overcome these problems, some link should be maintained with the end uses.

Takeuchi: If technological advances in the chemical industry were to be distinguished between a plant and process, who will assume responsibility for the former?

Mukoyama: My firm. But with the advent of an engineering firm, it will be mostly responsible.

The chief concern, however, is that an engineering firm will sell good machinery to virtually anyone, resulting in a loss of uniquesness to the industry.

For example, upon discovery that a new German machinery produces a good quality paper, everyone would attempt to purchase it, destroying the uniqueness.

Synthetic fibers also have reached that stage. In the old days, it was not possible to buy synthetic fibers equipment in a package. To establish a plant, manufacturers had to design their own machinery and order them. But if a machinery manufacturer designs and sells the machinery as a package, anyone with money can start the business, although the operating knowhow may be costly. Keen competition would then occur.

Japan's petrochemicals were in that same condition. I badmouth the petrochemical industry, but it had no money, no workers and no technology, only guts (laughter). It seemed to have only guts, for money was borrowed from a bank, personnel were brought in from somewhere, technology was purchased from the outside, and the plant was procured from an engineering firm. Gradually, the industry grew, so the individual who got in early was the inner. It would be very difficult for fine chemicals to duplicate this because of the lack of technological buildup and tradition.

Development of New Drugs Is Costly

Takeuchi: I wonder how that tradition or technological buildup is achieved. I suppose that means a large number of people with a sixth sense or workers doing intricate work.

Mukoyama: It is related to people. At one time, synthetic fibers was a highly profitable business. That technology was achievable by a

a chemical firm, but in Japan a chemical firm was not able to assert itself on the market. What counted then probably were the weaving technology and market proximity.

Takeuchi: Do chemical firms, with a tradition of non-participation in the rayon area, possess a weakness in the synthetic fibers technology as a whole?

Mukoyama: Textile-related firms, from botton spinning to rayon and synthetic fiber, are close to the market.

When Dupont and other synthetic fibers firms first went into artificial leather, they found it very difficult to penetrate the unique leather market, which differed markedly from the fibers route. Customs and traditions also differed. Thus, all firms, except Kurare, backed out.

As our firm was unsuccessful in artificial leather shoes, we changed to suedes and re-entered the fibers route. Even though they were of artificial leather, there was a sense of intimacy in the fibers route and the product sold rather easily. Our (ekusenu) of artificial suede is our biggest moneymaker.

Even in the case of drugs, a chemical company producing medicinal products on the basis of its technology will find it hard to market without going through estalbished drug stores. For bulk sales, the price must be one-tenth of the end consumer's price or it will not sell.

Takeuchi: Isn't the development of new drugs a gamble, as a large investment is required and success it not assured?

Mukoyama: The profits on drugs are very high. It is expensive and time consuming to introduce new drugs. In the United States, it is very difficult to introduce new drugs on a private level because of so many restrictions.

Takeuchi: There is also the question of a hit or miss.

Actual Research Funds Decrease

Takeuchi: Toray is considered a typical enterprise which comes out with new technology. Is that due to the strength of money or to good management of research and development?

Mukoyama: Management is poor (laughter). In the synthetic fibers industry, the number of workers was expanded because it appeared promising. In the 1955-1965 period, most graduates of chemistry courses went into macromolecules, with the synthetic fibers firms employing a fiarly large number of capable personnel.

Takeuchi: Better growth industries are able to hire people direct from universities without lifting a finger.

Mukoyama: But conditions have deteriorated after 1965. Hirings have been suspended, and actual research funds have not been increased, despite inflation. In fact, the funds have decreased, and research has slowed down. The United States faces the same problem. Actual research funds have thus been reduced.

Because of the growth of electronics after 1965, many chemical workers went to that industry. But there is a lack of chief researchers to act as a nucleus. Synthetic fibers companies have a surplus, so I think they can transfer them or their jobs, but that is a hard thing to do in Japan.

Takeuchi: It would be well if the technological cycle corresponds with human longevity. But if the timing should be off, the gap would remain forever.

Mukoyama: That is true. It was around 1955 that the macromolecular chemical industry prospered. Universities established such courses in many areas, recruited instructors, and the faculty became firmly rooted after 1965. But when the students were ready to graduate, the macromolecular industry had passed its peak. The timing posed a serious problem.

Today, not too many desire to enter the chemical field. New chemical researches focused on bilogical science are in progress; in fact, some are being applied in certain areas of the medical field where the next technological revolution is predicted.

However, there are many pitfalls and problems before it can be developed into industrial technology. If it should expand into general industrial technology, the existing shape of the chemical industry, from raw materials to processing and the finished product, is likely to be completely changed.

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SCIENCE AND TECHNOLOGY

BRIEFS

NEW TRANSISTOR--Sendai-Tohoku University here has developed a high-frequency transistor. A new miniaturized transistor capable of nearly five times and much electrical output as the best conventional transistor of equal frequency has been experimentally developed by Prof Junichi Nishizawa. Nishizawa has named it a "static induction (-type) transistor" or "sit" for short. The first commercial version of one megahertz (one million hertz or cycles per second) frequency and one kilowatt in output is already being produced by a Japanese company for domestic marketing, starting next month. [Tokyo MAINICHI DAILY NEWS in English 20 Mar 79 p 5 OW]

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