JPRS L/9744

19 May 1981

Japan Report

(FOUO 32/81)

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APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000400010040-2

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POLITICAL AND SOCIOLOGICAL

SENSE OF DISTRUST SAID STEMMING FROM U.S. POLICY

Tokyo NIHON KEIZAI SHIMBUN in Japanese 30 Mar 81 p 2

[Article by Kazuo Hino: "Is the U.S. Worthy of Respect?"]

[Excerpt] It has been a little more than 2 months since the Reagan administration was inaugurated. It is too early to make a comprehensive assessment of its performance. But, will the United States be more respected than before by the nations around the world? Regrettably, the answer is negative. "Compared to the time of the Carter administration, one can feel some vitality in the country, but excessive tenseness makes one feel vaguely apprehensive" (the government source). This characterization seems to be a common reaction from the Western camp.

One of the reasons for the Western camp's unwillingness "to show respect" lies in a faulty start and lack of consistency found in the announcements and behaviors of the U.S. Government. A typical example is its policy toward El Salvador. No sooner did an important official make an aggressive announcement not to rule out the possibility of blockade or a military intervention to stop the flow of arms from Cuba and other countries, than did [the government] seem to revert back to a de facto inactivism after drawing strong criticisms from within and without, thus showing too wide extent of vacillation.

Moreover, government officials' unnecessarily strong and provocative statements are the source of increasing the uneasy feeling. President Reagan, for instance, called the Soviet Union a criminal in his first press conference after the inauguration; Secretary of State Haig, for another, said that "the Soviet Union is spreading international terrorism," thereby inviting reaction from that country.

Regarding the [military] strategy, Chairman Jones of the Joint Chiefs of Staff declared a multiple retaliatory strategy by saying that "against a possible Soviet attack on the regions, such as the Middle East, where the United States and its allies have a life-or-death interest, the United States will not only respond militarily on the spot but also launch retaliatory attacks against the militarily vulnerable points of the Soviet Union in other regions." This is a threat implying that "it may be difficult now for the United States to deploy its contingency forces to the Middle East in a massive scale; but, should the Soviet Union invade the Middle East to take advantage of this situation, (the United States) will attack the Soviet territory." To Western Europe and Japan who will be affected by this [statement], engendering such a mood of confrontation without their prior consultation is troublesome.

Another reason for their unwillingness "to show respect" is the fact that one can notice certain arbitrariness in the U.S. behaviors, thereby leading one to suspect that [the United States] came to have a diminished perception of itself as the leader of the world. The Reagan administration made a large reduction on the foreign aids given through international organizations such as the UN and the World Bank. With respect to bilateral aids, furthermore, it adopted a policy of preferential aid given on a selective basis to the developing countries having friendly relationships with the United States. This can be regarded as an unabashedly self-centered policy of "nothing-matters-but-efficiency," which says in effect that aid will be extended if it directly benefits the United States, and that if its result is in doubt, it will be resolutely cut off. As a result, the Carter administration's policy to participate in the World Bank Energy Fund (the Third World Bank), which was aimed at mitigating the problem of energy shortage among the non-oil-producing developing nations, was turned around 180 degrees. On account of this, there was even a scene in which King, Director of the World Bank and a representative of the U.S. Government, resigned from his post as a protest. At any rate, it appears that the prospect of approaching the Third World is completely eliminated from the U.S. policies.

Also on the matter of a new treaty for the law of the sea, which was scheduled to be concluded in this fall, the new administration turned its back by saying: "the manner by which the treaty tries to develop deepsea floors imposes excessive regulations on private enterprises by international organizations." This means a mechanistic application of the election platform, which promised "the relaxation of regulations and the promotion of private enterprises' dynamism," to international treaties. Thus, many measures of the Reagan administration, including that of foreign aids, show the rough edgedness which can be seen in the radical behaviors of the newly developing countries. They can be characterized as a lack of "kingly grace."

"Due to the relative decline of its national power, the United States is no longer a king. It cannot afford to care about its appearances any more" (the government source)--with this remark, the matter might have been simply dismissed. But, [the problem is that] such image was bluntly shown in the attitude of the United States toward the problem of automobile exportation at the time of Foreign Minister Ito's visit to the country.

After both parties recognized the importance of maintaining the principle of free trade, a rail was laid to the direction of Japan's voluntary imposition of self-restraint on automobile exportation at the Ito-Reagan meeting. However, it is a well-known fact that a strong demand for self-restraint from the United States was behind this decision.

If both parties have recognized the principle of free trade, it is a clear case of arbitrariness on the part of the United States to exert pressure for self-restraint on the export products which are being welcomed by the U.S. consumers for their lower prices and better qualities. Although it is understandable that the United States has complaints, bordering on resentments, against Japan for its expansion of its competitive power on export without many defense

expenditures under the protective umbrella of the U.S.-Japan Security Treaty, [the arbitrariness] will certainly become another reason for not respecting the United States on the part of the Japanese people. As Japan begins to think the problem of defense seriously from now on, and as long as the United States does not care about behavior deserving respect from the nations around the world, it is certain that there will be an ever-increasing sense of mutual distrust.

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CSO: 4105/146

ECONOMIC

EXPERTS DISCUSS SUCCESSFUL CONTROL OF MONEY SUPPLY, ITS FUTURE PERFORMANCE

Tokyo EKONOMISUTO in Japanese 24 Feb 81 pp 10-23

[Reportage on a Symposium: "What are the Shortcomings of Current Monetary Policy?"--Discussants: Yoshio Suzuki, Assistant Director, Special Research Office, Bank of Japan; Masaichi Rohyama, Professor, Osaka University; Hirohiko Okumura, Chief Research fellow, Nomura Research Institute of Technology and Economics; Chaired by Yasushi Kanishi, Chief Research fellow, Economic Research Office, Economic Planning Agency]

[Text] A storm of criticism and doubt about monetary policy is brewing in various European countries and in particular, the United States, with its unusually high interest rate. In this situation, only Japan has succeeded, during the past several years, in the control of money supply. What are the conditions that supported this success and can this superior performance be continued in the future? A third decrease in official discount rate is anticipated. To probe into possible shortcomings of current monetary policy, discussions were held in the form of a symposium.

Successful Results of Stressing the Importance of Money

In the July 1975 issue of its CHOSA GEPPO [RESEARCH MONTHLY], the Bank of Japan played up as its leading story, "On the Significance of Money Supply in Japan." From July 1978, the Bank of Japan also began to announce, at the beginning of each fourth quarter, the predicted amount of the [average balance over the previous year] of the money supply for the fourth quarter of the year concerned (at first, M_2, and since July 1979, M_2 + CD), in terms such as, "so many percent," "approximately so many percent," or "roughly below so many percent."

How the money supply actually shifted, since the Bank of Japan adopted the policy of attaching great importance to money supply, is shown in Table 1. In 1975 and 1976, when the Japanese economy rose from zero growth, there was a rather noticeable increase in the growth rate but since 1977, the rate has stabilized at around 11 percent. In 1980, when money supply was tightened to cope with the second oil shock, the rate dropped to the 9 percent level. The situation has changed drastically from 1972 and 1973, the period of excessive liquidity, when the growth rate exceeded 20 percent.

This stable flow of money supply, together with the enlightened efforts of industries and households, held to a minimum the GNP deflator (wages/profits per unit of

finished product; a "homemade" indicator of inflation). In spite of the spiraling prices of imported goods accompanying the second oil shock, the rise of consumer prices (weighted average price of GNP deflator and imported prices) was held to the 8 percent level. As a result, the reactionary drop in real GNP was small and in foreign currency exchange, the yen appreciated. Thus, the Japanese economy showed a splendid performance which could not be compared to the time of the first oil shock.

Table 1

Transition of Money Supply, Commodity Prices, Economic Growth Rate, Etc.
(* is spot rate; end-of-month yen/dollar rate;
others are comparisons with previous year, %)

Year	(M_2+CD) Average Balance	CPI	Import Prices	GNP Deflator	Real GNP	*Foreign Currency Exchange
1972	26.5	4.5	Δ 4.1	4.7	9.5	302.91
1973	22.7	11.8	21.0	10.9	10.0	271.14
1974	11.9	24.4	66.2	20.1	Δ0.5	292.44
1975	13.1	11.8	7.6	8.6	1.4	297.25
1976	15.1	9.3	6.0	5.6	6.5	296.38
1977	11.4	8.0	Δ 4.2	5.6	5.4	266.91
1978	11.7	3.8	Δ17.4	3.9	6.0	207.87
1979	11.9	3.6	28.6	2.0	5.9	221.37
1980	9.2	8.1	43.0	0.1	5.9	225.77

Note: To determine the GNP deflator and real GNP for 1981, the averages for the first through third quarters of 1981 were compared with the averages for the same quarters of 1980.

Various Conditions Which Supported Control

Probably, the control of money supply proceeded comparatively smoothly after the 1970's because of the combination of the determination of the Bank of Japan itself and various objective conditions.

Since the 1970's, the Bank of Japan was fully aware that price stability was the all-important prerequisite for continued prosperity and stable currency exchange. It placed top priority on price stability as the ultimate policy goal and as an interim objective, it kept a close watch on the movement of money supply reserve. While monitoring interest rate functions which can influence the effectiveness of its policy courses, the Bank of Japan strongly promoted liberalization and flexibility of interest rates. This overall policy was the chief factor which enabled control of the money supply.

However, the fact cannot be overlooked that, concomitantly, a number of objective factors facilitated the Bank of Japan in its execution of these policies.

First is the support of the people. After bitterly experiencing the double-digit inflation brought about by an excessive money supply and the resultant recession,

the nation's people strongly supported placing top priority on price stability and the policy of stressing importance on money supply to achieve that stability. Reflecting the people's feeling, the political, financial and governmental circles fully approved the assumption that price stability was the prerequisite to continued prosperity and stable currency exchange. The concept of "adjusted inflation" which was heard around 1972 and 1973 is no longer mentioned.

Second is the transition to floating exchange rate system. Under a fixed exchange rate system, the money supply of a country becomes uncontrollable because of international shifting of funds, reflecting internal and external monetary situations.

Whereas under a floating exchange rate, unless a country intervenes in the currency market, its money supply is determined by the monetary policy of its central bank, and therefore, controllability increases.

Third is the fact that with the decrease in growth rate from 1974, the demand for capital by the civilian sector remained comparatively stable. For this reason, the situation did not arise where money supply had to be increased because of competition between government bonds issued in large quantities and civilian demand for capital.

Fourth is that financial innovation has not made much progress. As in the United States, if new monetary funds are supplied to the people, one after the other, and they begin to function as near-monies, then it becomes difficult to control money, including the new, the currency demand becomes unstable and the determination of an appropriate money supply becomes complicated.

Fifth is the maintenance, if not the improvement, of the effectiveness of monetary policy.

In the case of Japan, the dissemination routes of policies are mainly through "window guidance" [loan control] and interest rate changes. Of the two means, the second has been strengthened since the 1970's by liberalizing and elasticizing interest rates.

In other words, changes in the discount rate show much more maneuverability, both in frequencies and extent. Furthermore, changes in interest rates on bank deposits, various types of government securities, including city banks issued government bonds, etc. have become much more flexible than heretofore (flexibility in interest rates). With the abolishment of the official quotation system of interbank market interest, issuance of certificates of deposits [CD] with unregulated interest rates, flotation of bids for medium-term national bonds, government securities market operation by Bank of Japan through bidding, etc., the areas in which interest rates are decided by market supply and demand are increasing (liberalization of interest rates).

As a result, interest rate changes are being well reflected, as never before, in the changes in attitude of Bank of Japan toward loans and discount rates and also in the various types of interest rates, including interbank rates on discount operations, government bond operations, etc. The influence on [credit activities] of banks and investments of enterprises is also increasing.

The Five Tasks Remaining in the Future

The abovementioned five objective factors, together with Bank of Japan's policy, are believed to have increased the controllability of money supply but in what ways might these factors change in the future?

As far as the first factor of people's support is concerned, appropriate execution of monetary policies by the Bank of Japan itself and intensification of public information activities are important elements for its continuation. To retain the people's confidence by not erring in policy implementation is a big prerequisite but it is also important to present an "open Bank of Japan" and to explain to the public in understandable terms, the facts and thinking underlying the bank's policies.

As for the second factor involving international finances, effects of implementing the new foreign currency law must be watched. If settlements of transactions within Japan are to be conducted in foreign currencies (a genuine currency substation country), Bank of Japan's money supply control system would lose its effectiveness. However, such extreme cases need not be considered for the time being.

In the present situation where foreign currency deposits held by residents cannot be used in account settlement unless they are converted to yen, such deposits are like foreign-held stocks and should be regarded as a type of highly fluid capital outside of the money supply.

In this case, the central core of liquidity is the money supply and if that is fully controlled, there is a limit to the effects of the outflow of such outside capital.

With regard to the liberalization of overseas credit procurement such as impact loans, it cannot be ignored, from the monetary policy standpoint, because of the big influence it might have on the capital flow within the different domestic enterprises. However, as long as a truly floating exchange system, without market interventions, is followed, this type of international fund shifts should not alter a country's money supply. That would only happen if, for some reason, high-powered money had to be supplied as guarantee.

With respect to the third factor of possible competition for capital between governmental and non-governmental sectors, from the standpoint of maintaining an active civilian economy and reconstructing finances, issuance of government securities should be kept to a minimum when the civilian demand for capital is high.

As for the fourth factor of financial innovations, there have been some activities in that direction in Japan such as the dissemination of cash cards and cash dispensers, diffusion of automatic overdraft line of credit contracts using as collateral something other than time deposits (e.g., personal trust, various types of trust, etc.), increasing realization of the superiority of postal savings both tax-wise and interest-wise, etc. However, the inflationary rate is not as high as the United States and since the development of new types of products is regulated, there is no reason to believe that there will be a drastic transfer of funds aside from the current shift to postal savings.

With respect to the fifth factor of maintaining effective monetary policies, it is essential to improve interest rates through flexibility and liberalization.

Why Was Only Japan Successful?

Kanishi: We have received Mr Suzuki's report and I believe that there are many problems involved in money supply. However, at today's symposium, I wish to focus the discussion on the theme of whether money supply control will proceed smoothly in the future in the midst of the various developments presently taking place and what points must be considered to make the control successful.

First, let us start with Mr Rohyama.

Rohyama: I think that basically, the determination of the Bank of Japan and the five objective factors mentioned by Mr Suzuki are correct. However, I feel that there is a need to delve further into the details of each.

First, the objective conditions affecting money supply control were extremely favorable. In Suzuki's report, the stable demand for capital is given as the third factor but this can be considered as one of the lucky factors.

For another, as compared with various foreign countries, the expectation of inflation fortunately calmed down after the period of excessive liquidity. On that score, Japan differed from other countries which tried to hold down inflationary trends through money supply control. If it proceeds smoothly, money supply control becomes highly successful but once it slips, it loses its efficacy no matter how much effort is put into it. That is one of its characteristics.

Thirdly, Japan faces two monetary problems, one in internationalization and the other in issuance of large amounts of government securities.

In the international sphere, Mr Suzuki places great emphasis on the exclusion effect of the free floating exchange system. It is questionable, however, whether it should be so highly evaluated....Issuance of large quantities of government securities has the effect of triggering changes in the market structure and how to cope with such developments is a problem.

Okumura: I have about three comments to make. First, it is a fact that the performance was extremely good. One of the reasons why expectations of rising commodity prices and inflation were held down is the fact that the Bank of Japan began to attach great importance to money supply control. On that point, it is stated in Suzuki's report that the people came around to supporting money supply policies but I think that there is some question about this.

For example, watching the violent fluctuations of nominal interest rates in the United States today, many Japanese entrepreneurs and people in monetary circles are highly critical. Such big changes in nominal interest rates cannot be condoned. They are hoping, if possible, for stabilization of nominal interest rates. If that is the case and if for some reason, expectations of inflation increase in Japan, will the people support Bank of Japan if it continues its present monetary policy?

Secondly, with respect to evaluation of changes in monetary activities and innovations, I wish to stress this matter further and evaluate the growth of present money supply. For example, the business practice by enterprises of saving idle money is called cash management in the United States and commercial banks and stock brokerage firms are actively performing this service for enterprises. Even in Japan, there are clear indications that business enterprises are starting cash management.

Cases are considerably increasing where enterprises, seeking capital, are aggressively selecting capital procurement methods with cheap interest costs.

Of course, because of bank connections, in an overwhelming number of cases, borrowers leave the loans alone but the ratio is increasing of borrowers taking action, depending on the situation. Because of this, the currency demand of enterprises has changed considerably. Even with family savings, there has been a noticeable trend since about spring of last year toward profitable bonds and postal savings.

Contradictions in Logic?

Okumura: Thirdly, I wish to comment on the interest rate functions. Suzuki's report stated that the Bank of Japan has progressed considerably in liberalizing interest rate and assessed that it has increased the effectiveness of its monetary policy. However, in spite of Bank of Japan's liberalization, areas in which the effect has not penetrated can be pointed out. Even if enterprises find a certain capital procurement method cheaper than the present bank loan, they cannot decide to repay the existing bank loans. If the basic reasons for this are searched, one is led to various types of regulations, prohibitive principles, etc. It is believed that part of the underlying reason is the "window regulation."

Then, the role played by "window operation" in money supply control becomes a moot point.

Kanishi: Thus far, the statements of the two persons generally support Suzuki's report. However, they have raised questions regarding each of the five factors.

In general, I also believe that money supply control has been comparatively successful in Japan. Let us consider why Japan was successful when various foreign countries failed. In some countries, money supply itself is well controlled but the real economy is not good, as for example, West Germany, while on the contrary, there are countries where the money supply itself is not under control. There are other countries where money supply is being controlled but inflation is not yet regulated. For that reason, whether or not the economy performs strongly is not simply a matter of money supply and various other factors enter in. (Refer to Table 2.)

Table 2

Money Supply Target Amount of U.S. and Main European Countries
(Note: Compared with previous year--%)

	United States (M_2)		FRG(Central Bank Currency)		France (M_2)		UK (M_2)	
	Target Am't (4 Qtrs. Aver. Bal.; Compared with prev. year)	Real	Target Am't (4 Qtrs. Aver. Bal.; Compared with prev. year)	Real	Target Am't (Year-end Balance; Compared with prev. year)	Real	Target Am't	Real
1978	6.5-9.0	8.5	8.0	11.4	12.0	12.3	8.0-12.0	10.9
1979	5.0-8.0	8.3	6.0-9.0	6.3	11.0 (Oct)	14.4	7.0-11.0 (Nov)	11.3
1980	6.0-9.0	9.6	5.0-8.0(Nov)	4.7	11.0	10.5	7.0-11.0	19.2
1981	5.5-8.5		4.0-7.0		10.0		6.0-10.0	

Note: UK target amount--
1978: Mid-April 1978 - Mid-April 1979
1979: Mid-June 1979 - Mid-April 1980
1980: Mid-Feb 1980 - Mid-April 1981
1981: Target amount for mid-term financial plan (Mid-April 1981 - Mid-April 1982)

Source: Bank of Japan's CHOSA GEPPO (Research Monthly), January 1981 issue.

Mr Suzuki has expressed his strong opinions about internationalization and issuance of government securities and on the use of interest rate functions. He has given the impression that financial innovations would be slow. Objectively speaking, that might be so but the use of interest rate functions and monetary liberalization are logically headed in the same direction. On the one hand, to say that liberalization of interest rates is fine but on the other, to criticize the establishment of monetary funds is logically contradictory. Let us hear first from Mr Suzuki.

Good Fortune and Policy Failure

Suzuki: First, I think that among the objective factors, there were elements of luck and I also believe that if monetary supply control gets a good start, a favorable cycle is born, but on the contrary, if there is a slip-up, control becomes extremely difficult and a vicious cycle results. However, I question whether the dampening of inflation expectation was due to luck.

From about 1975, when Japan realized the control of money supply was important, the supply was rigidly tightened until inflationary expectations were quieted down. What the other countries, e.g., the United States did was to start expansionary policies as early as 1976, before the previous inflationary expectation had dissipated. Their thinking was that since there was still a gap between the

existing unemployment rate of 7 to 8 percent and the normal unemployment rate (5 percent level), there would be no inflation even if expansionary policies were implemented. When the policies began to be put into effect, the unemployment rate had been lowered only to about 6 percent when a terrible inflation struck.

I would say that money supply control became difficult because the United States erred in its policies. In other words, policy failure led to the vicious cycle. On the other hand, Japan did not depend on luck alone but planned the favorable cycle.

Secondly, in international relations, I recognize the merit of flotation and have pointed out that one of the reasons why money supply control is successful is because Japan is rather independent in its monetary policies.

Mr Rohyama does not necessarily think so. With respect to this point, I want to stress that many of the European countries are in the European Monetary System [EMS] and have to be concerned with bilateral relations with other European countries. As a result, they call it a "float" but actually, in currency exchange, they have a "target." In that sense, it strongly resembles a fixed rate exchange and makes it difficult for them to control money supply.

Japan is criticized in a number of ways from abroad but actually, it is truly carrying out the float to the extent that it does not deserve criticisms. It does intervene to prevent violent fluctuations in exchange rates but in the long run, it is complying with the flotation system. Therefore, money supply control is easy. As for the point brought up by Mr Okumura, the bank loan is based on a long-term contract. So it has implications beyond business cycles. Since that is where it differs from market transactions, I do not think you can simply bring up and question that point and say that behind-the-scene, there is "window guidance."

Also, Mr Kanishi's statement, hinting that innovations will occur if freely permitted, is true as far as it goes.

However, inflation is the biggest cause for creating all the financial innovations which have swamped the United States. As inflation gets worse and the inflation rate spirals, people panic to find inflation hedges. Because there were such needs, financial innovations grew as rapidly as they did, I think.

Behind my prediction that financial innovations would not take hold in Japan or would not grow too rapidly is my assumption that there is a determination to prevent such inflation. What I am saying is that in a favorable business cycle, innovations would not grow rapidly but liberalization would advance.

Two Problems Lying Ahead

Kanishi: Various points have been discussed but I would like to take up the issue of the money itself, particularly the two problems of internationalization and government securities. Let us delve into the problems, starting with Mr Rohyama.

Rohyama: Let us say, as a very simple case, that the Bank of Japan accepts the thinking that control of cash currency, or more specifically, high-powered money ties in with control of the overall money supply.

In that case, part of the high-powered money can be actively controlled by the Bank of Japan through loans, loans on bills etc. There is also a part which is supplied because the Bank of Japan must passively accept certain funds, such as the surplus in foreign exchange balance or deficit in public finance expenditures. Even in the latter case, when the causes increase for providing high-powered money, the Bank of Japan must take measures to eradicate them. The 1972-1973 problem of excessive liquidity was due largely to surplus in foreign exchange balance. To put it conversely, for the Bank of Japan, there was a limit to its method of controlling high-powered money. The result was excessive liquidity.

Speaking of the problem of control of government securities, which are the liabilities of the Japanese Government, extremely large purchases of government securities constitute a big factor in the present supply of high-powered money. If for some reason, an inflationary situation should arise and a stringent monetary policy must be implemented, can the Bank of Japan aggressively sell the government securities to business enterprises and actively carry out the policy of tight money control?

Secondly, there is the problem of the flotation system. The various European countries have "targets" in foreign exchange while the Bank of Japan is concerned only with coping with short-term fluctuations. The Bank of Japan is being supported by the favorable trade balance. Should the trade balance become exceedingly bad, the political need would probably arise to reconsider the currency exchange situation. If that happens, despite its determination, can the Bank of Japan carry out its promises? This problem still remains.

Kanishi: Speaking of international implications, as mentioned previously, if only Japan is concerned, the economy is in a very healthy state but the fact is that it is creating various problems internationally. Since only Japan is getting along well, its international impact is necessarily large. For example, the United States might adopt the policy of attaching great importance to its money supply and as a result, interest rates in the United States might widely fluctuate or the currency exchange rate of Japan might fluctuate violently. Such a shock is possible. If measures are taken to prevent the money supply from being affected, such shocks are sure to appear elsewhere, for example, by throwing the Japanese currency market into a turmoil.

For that reason, it is difficult to enjoy forever all the favors alone. In other words, it was mentioned a while ago that everything is going smoothly because we are in a favorable cycle but for Japan only to go through a favorable cycle might cause monetary disorder later. I feel that we should be giving some thought to that possibility.

Suzuki: First, I want to express my opinion regarding Mr Rohyama's statement. Under the flotation system, high-powered money is not shifted in international payment balance. That is because if it is a clean flotation, there should be no intervention....

Rohyama: If it is a truly clean flotation.

Suzuki: From a long-range viewpoint, even the balance of public finance payments even out...as long as the Bank of Japan does not purchase government securities.

Therefore, on a short-term basis, both the balance of international payments and balance of public finance payments affect high-powered money but from a longer viewpoint, their influence is not too great.

Bank of Japan's Capability to Counteract

Suzuki: The experience of 1971 was mentioned but it must not be forgotten that the influence was great because of the fixed exchange system. As far as Bank of Japan's measures to appropriately control high-powered money, and in turn, the money supply is concerned, all it needs to do is to quell the disturbances of high-powered money in short-term balances of public finance and international payments. I believe that the Bank of Japan is adequately equipped with the capability to make such adjustments.

Some concern has been expressed regarding the supply of high-powered money through buying operation of government securities but I wonder if it is founded. High-powered money is supplied because from a long-range viewpoint, the Bank of Japan thinks that it is better to supply that much currency to promote economic growth. The supply of that much high-powered money is consistent with appropriate control of money supply. What measure is best to supply such high-powered money? After all, for buying operation, government securities are the best. Therefore, there is no need to worry that there is an excessive supply of high-powered money being provided through buying operation of government securities.

If it desires to conduct selling operation, the Bank of Japan is fully capable of doing so to absorb high-powered money. The reason is that since both selling and buying operations of government securities are now conducted through bidding, it is free to buy or sell. That is, as long as interest rate changes are within tolerable limits.

It has also been pointed out that if the trade balance becomes bad, it is certain that the currency authorities want to correct the balance by intentionally depreciating the yen. The Japanese trade balance is already in the black. It is true that Japan is strong competietively in industrial production but the biggest factor is the stability of commodity prices.

Conversely, countries which are not appropriately controlling money supplies find their trade balances deteriorating and begin to panic. Their plight can be explained by their money approach.

Rohyama: I strongly feel that Mr Suzuki's explanation was based on the assumption that there were a clean flotation system and a free circulation market for government securities. I cannot help but feel that the actual situation might not be so. It has been said that as far as government securities are concerned, since it is a bidding system, selling operations can be conducted whenever tightening is necessary. In the supply of high-powered money, that the ratio of purchases of government securities increased is, as Mr Suzuki said, a merit for the Bank of Japan and a merit for the Ministry of Finance which issued the securities.

I do not think that the mutuality of profits will continue forever. I think that the timespan will be considerably long. In contrast, Mr Suzuki is thinking in

terms of a comparatively short timespan. There is this difference but I doubt that we can say outright that no problem remains as far as international dealings and government securities are concerned.

Suzuki: I think that Mr Rohyama is overly concerned about government securities. Political pressure will never be brought to bear on the Bank of Japan in the buying and selling operations of government securities.

Rohyama: Is that so?

Suzuki: Please be reassured. There will never be cases where the operations would have to be conducted to support the prices of government securities. Transactions of government securities will be purely monetary policy measures.

Logic and Reality

Suzuki: This is my reply to Mr Kanishi's comments, a while ago, but I believe that what he said is true up to a certain point. There is no question that the flotation system tends to favor certain parties. If the market expectation is not affected, theoretically speaking, even if U.S. interest rates fluctuate violently, that is only reflected in the spread between spot and forward rates. The shock is completely absorbed there and there is no effect on money supply control.

Kanishi: That is true theoretically.

Suzuki: Yes, theoretically. Actually, first of all, the market expectation is inevitably affected. As a result, there is some kind of an effect on the currency market. Such effects should be carefully watched and some aspects might require smoothing operations. However, if viewed over a rather long period, then as the theory states, the effect is reflected in the spread and the market is not affected.

If Mr Kanishi's worry comes true, the Japanese yen should depreciate considerably because of the great difference in interest rates. If the yen depreciation cannot be accepted, then the Bank of Japan must intervene. Logically, this would disrupt the system of money supply control. However, in actuality, the market shows yen appreciation. If the spread between spot and forward rates is examined, however, there is a vast difference.

Mr Kanishi mentioned that theoretically it was true. I want to affirm that from a long-range viewpoint, the theory holds true.

Okumura: Relative to internationalization, the procurement of impact loans became comparatively easy under the new foreign currency law. The bank connection mentioned previously becomes an obstacle here too. In reality, because a lot of money has been borrowed from the bank and because of close relations with the bank, the loan cannot be fully repaid and therefore, a great amount of impact loan cannot be obtained. Business enterprises actually want, however, to increase impact loan as much as possible if it is cheaper. If in the future, the amount of fund procurement from abroad is sufficient to facilitate raising of capital by enterprises, it might create some difficulty in the money supply control in Japan.

For another, aside from impact loans of enterprises, if Japan offers attractive yen assets to non-residents, there is a possibility that over a medium-range period, there might be a sudden inflow of capital as was seen during the past 1 year. In other words, there is a popular view that as the yen tends to become an international currency, factors will appear to obstruct the effectiveness of domestic monetary policies. Will that happen or not? In internationalizing the German mark, such debates were actively conducted.

Suzuki: The impact loan that was first mentioned will enter Japan since it has been liberalized. As to whether it will upset the stability for functional currency needs, as long as the flotation system is rigidly followed, there should be no effect whatsoever on the money supply even if impact loans come in. That will only change the credit flow.

Okumura: Money might not increase but the currency demand of enterprises will begin to differ.

Suzuki: I think that such a change is possible. The question is whether there will be a gradual change or such a drastic change in the functional needs of currency that the situation will be difficult to handle. Developments must be carefully watched. I think that the change will be gradual.

As for the second question, the answer will lie in whether the business cycle will be favorable or unfavorable. As long as the performance of the Japanese economy is sound, there is no concern over yen possession by foreigners. When the performance gets bad, confusion will result. What has been pointed out could happen. Therefore, efforts must be squarely placed on improving the performance of Japanese economy. I feel as though another demand has been imposed.

Financial Innovation and Challenge of Liberalizing Interest Rates

Kanishi: I want to go on to the subjects of financial innovation and interest rate functions.

Okumura: A while ago, Mr Suzuki stated that drastic financial innovations erupted in the United States because of the unusually high inflation rate.

Suzuki: It was high and fluctuated violently.

Okumura: There might be a difference in the interpretation of innovation but when I speak of financial innovation, I think of two types--technological innovation through mechanization, such as the cash dispenser, and though not a physical innovation, situations which give rise to new capital procurement methods.

The former type might emerge without any relations to inflation but does affect the functional demand of capital.

As for the latter type, a review of U.S. movements of the 1970's shows that, as Mr Suzuki said, it was not necessarily induced because the inflation rate was high. It did become popular, however, only after the inflationary rate became unmistakably high.

Suzuki: That is fine if you recognize that.

Okumura: Funds shift drastically when the gap widens between the regulated interest rates and the open market rates and innovation becomes popular when the inflationary rate becomes exceedingly high. That is only natural. To say that innovations are not taking hold in Japan because of the relatively stable rise in commodity prices might be somewhat misleading. Many banks and stock firms are already thinking concretely that they want to raise such new monetary funds. However, that is prevented by law. The reason is that it would bring sudden shifts in capital and the orderliness of the monetary market would be disrupted. In other words, I think innovations will occur if permitted but they are being suppressed.

When liberalization progresses, competition among monetary institutions becomes intense. In that situation, to prevent the introduction of new funds and new monetary services is a form of contradiction as Mr Kanishi has pointed out. Especially, in the next 4 or 5 years, I wish to see an aggressive attitude on the part of the authorities concerned to introduce new monetary capital.

Rohyama: Financial innovation, itself, is a historical trend and I think that it is a natural tendency in economic development. Therefore, corresponding to the extent of liberalization, technological renovations are likely to occur in different places. I think that that is a natural development in private economic enterprises.

The problem lies in the manner of its introduction and development. The big question ahead is how to stimulate well-balanced financial innovations. To speak abruptly, depending on how that is done, the method of money supply control must also be altered. In that sense, regulations and guidance of the past should be abolished so as to aptly stimulate financial innovations and eliminate monetary policy measures and methods which fail to cope flexibly with the changing situation. Otherwise, the control of money supply must be carried out at great sacrifices or while innovations progress in different ways, money supply control will begin to falter.

Okumura: When considering innovations, the most important point is not how high the rate of inflation is expected to go, but the difference between the presently regulated interest rate and what the interest rate would be if there were a free market. From that viewpoint, it would not be strange if the innovations which took place in the early half of the 1970's in the United States should occur in Japan. There is that much difference between regulated and open market rates. Being close to the market, I would like to encourage innovations but for reasons completely other than whether they would or would not disrupt the effectiveness of money supply control. It is conceivable that, as a result, money supply control might suffer.

Shock of Postal Savings

Suzuki: I also acknowledge that financial innovation is progressing in Japan.

The average balance of bank notes is about 3 percent as compared with the previous year. However, no one suspects that the nominal consumption rate has increased by only 3 percent. That is a clear indication that financial innovation has advanced to the extent that functional demand for cash has shifted and the innovation is expected to keep spreading.

What is to be feared is a sudden change. A gradual financial innovation is not too worrisome from the standpoint of money supply control. However, if inflation sets in and the inflationary rate is accelerated, the innovation might spread at an unexpected tempo. This is the worst situation for money supply control. Therefore, of the five factors supporting Japan's money supply control, I venture to say that I am most concerned about the fourth factor of financial innovation.

Recently, bank deposits shifted at an alarming rate to postal savings. One reason is that up to 3 million yen is tax exempt in postal savings and in civilian financial institutions. Up to 3 million yen is also tax exempt for government securities, for a total of 9 million yen. Presently, the average monetary holdings per household in Japan if 4 million yen. Generally, the trend in household savings is to put one-third in postal savings, one-third in civilian financial institutions and one-third in government securities. Thus, of the [excessive deposits] such as household savings which flow into the [excessive investment capital] of enterprises and public works, about half flow in via postal savings and half via civilian financial institutions. That is a serious matter for money supply control.

It is necessary to correct the present system immediately and to determine interest rates for civilian financial institutions as well as postal savings according to the same rules based on the market. The tax system is also questionable on that point. Therefore, I am not optimistic about financial innovations.

Okumura: Until now, it was thought that even in the United States, households were not too sensitive about interest rates but it has become noticeable in the past year or two that households in the upper-third income bracket are shifting their money here and there. This increased responsiveness to interest rates started to become rather noticeable in Japan from about last year.

To cite a concrete example, medium-term government security funds were started early last year, which created strong interest among individuals, and a sum of 230 billion yen was accumulated by the end of last year. Actually, it was decided not to give much publicity and the operation was carried out without fanfare, yet, the results were surprisingly good. Postal savings are very much in the news now but interest in stocks is also increasing. Perhaps, it would be correct to judge that the people's sensitivity to interest rates is gradually increasing in Japan and that the foundation is being laid for financial innovations.

Rohyama: Factors supporting financial innovations have technical problems as well as operational problems. Can the existing banks, stock brokerage firms and business agencies engaged in financial operations all carry out the innovations? To put it simply, can banks or stock brokerage firms which lost customers or could not respond to their needs because they could not successfully ride the tide of innovations effectively implement money tightening policy if called upon to do so? The policy to tighten money supply would be a little too late. There is that danger.

Therefore, isn't it necessary to aggressively induce technical renovations when money supply control is proceeding smoothly and the conditions supporting it are favorable?

Weak Points of "Window Guidance"

Okumura: In order to have interest rate liberalization successfully penetrate the financial world, capital procurement and management should be responsive to cost return. In actuality, however, past relationships with banks are regarded as very important and only a small portion of the capital is obtained and used in response to cost return. If the latter type of capital can be called "hot" money, then the former type of "cold" money is overwhelmingly large.

Banks are always concerned with the ranking of deposits, ranking of loans, etc. They operate by [static] principles. They also demand that business enterprises operate accordingly. Thus, though a firm might be dealing with three banks, the one in charge of company finances cannot make the decision to cut off one bank. This practice is closely tied in with the lifetime employment system of Japan (laughter).

The Bank of Japan's "window guidance" is believed to be influential [but does not completely control the market]. Even so, it would be improper if it takes into consideration the bank's ranking when determining the amount of loan to increase. It should rather determine the loan amount on the basis of economic rationality.

Rohyama: It is a fact that "window guidance" is closely related to the bank's cartel-like characteristics which can be termed as [fixed consciousness]. In advancing market operations, such fixed consciousness becomes an obstacle.

Suzuki: A while ago, I said that the relations between a customer and a bank is a long-term contract. The reason is that for a business enterprise to continue operating, it is advantageous for it to have maintained years and years of friendly relations with the bank. Because of that, it is not correct to think that the bank is proudly suppressing the enterprises or that business relations are irrational, simply because the two parties are on very close terms.

The money given out through "window guidance" is set and limited to appropriately control money supply.

However, when it comes to determining how much money to give to which bank, the problem of rational financial distribution arises and if anyone has the answer, I would like to hear it (laughter). No matter how it's done, the basis is the "amount." In the past, it was done mainly on the basis of deposit amount but that becomes quantitative competition and the static thinking will not be corrected. Recently, various angles are being considered such as the earning power, capital position, etc.

Also, another weak point of "window guidance" is that even if "window guidance" is stopped because the period of tightening money control has ended, banks still anticipate that at some later time, it will be reinstated and that the basis of loan would again be the deposit amount. Therefore, they rush to try to increase the deposit amount. An odd unfavorable cycle such as that results. Logically, "window guidance" is clearly opposed to interest rate liberalization and some might say that it should be stopped but actually, it is effective in speeding up supply control and is liable to be used.

Kanishi: Things cannot be done according to theory even from a long-range viewpoint (laughter).

Assessment of the Low Level of 7 Percent

Kanishi: I think the conclusion has been reached that money supply control has been comparatively successful in Japan. Even so, if the expectation of inflationary rate changes, the demand function for currency might also change considerably. The demand function for currency might unexpectedly shift drastically depending on the changes in regulations and system. These problems have been pointed out on a number of occasions.

Next, I would like to hear your impressions regarding recent trends. First, the growth of money supply has declined to the 7 percent level. This development might be due to the reckless decrease of cash currency, which was mentioned earlier, or the influence of postal savings. The M_2 + CD which had been stabilized at 11-12 percent has dropped now to the 7 percent level. As a monetary problem, how would you assess it, in terms of regulation and structural changes. Also, how would you assess it in relation to the economic growth rate and business condition? The problem remains of assessing its relations with future monetary policies.

Rohyama: That the increase rate of money supply has slowed down recently to this extent is of great concern in some quarters. There are opinions, like those of Nishiyama (Chiaki) of Rikkyo University, that if this trend follows classic cases, recession will result. That opinion seems womewhat exaggerated in that it considers money fixed as M_2. The matter should be considered from a broader perspective. Regardless, it can be said that the control method tends to decrease money supply.

What the ultimate effects will be, I myself have difficulty in judging, but one thing can be said. If that brings deflation and conversely if some form of policy must be formulated to aggressively stimulate the economy, there is a possibility that other problems might arise. That is, excessive liquidity was controlled and the anticipated inflation spiral was suppressed because there were certain basic characteristics, such as wage flexibility and increasing productivity rate which supported the Japanese economy.

If the money supply control becomes excessive and causes recession, it is possible that the other good aspects of the economy might be destroyed. Adverse conditions brought about in that manner will probably create serious problems over a long period. Consideration must be given, not simply to the question of business condition, but to preserving the special structural characteristics which are supporting the good aspects of present day Japanese economy.

Table 3

Transition of the Average Balance of M_2 + CD in 1980

January	10.6
February	10.8
March	10.6
April	10.4
May	10.3
June	9.6
July	8.8
August	8.3
September	8.0
October	7.6
November	7.9
December	7.8

The Wavering Tacit Assumption

Okumura: I believe that the slowdown in the recent growth rate of money supply is due largely to the slowing demand for currency or money supply by business enterprises. Then, the question is whether the low increase rate of currency is making it difficult for business enterprises to raise capital. By the way, comparing the [liquidity ratio on hand] with the [indicator to determine raising of capital] for about the past 10 years, the dissociation between the two becomes highly noticeable from about 1976-1977. From about 1976-1977, the liquidity ratio on hand has not risen and instead, has dropped recently but there has been no pressing demand to raise capital. Then, the [pressure of monetary calculation] vis-a-vis [real product calculation] has lessened. I think that such structural changes have been reflected.

The interest rate liberalization is showing some effect and for business enterprises, "return" and "costs" have become apparent when conducting monetary transactions. In that case, the selection of real product assets and monetary capital can be done rather logically and if excess capital is available, it can be used to repay some of the debts so that unnecessary money need not be kept as in the past. I think that in marginal cases, such actions are being carried out.

Another point is that in the procurement of capital, enterprises need not rely only on bank loans as heretofore but have diversified means such as through repurchase agreements, impact loans from abroad, loan from foreign banks or sale of private bonds to OPEC buyers. Until now, practically the only method was bank loans so even if funds were not necessary, cash was kept as reserve but that necessity seems to have somewhat declined at present. This has "compressed" monetary calculations.

If the slowdown in the increase of money supply is largely due to such structural changes, full consideration must be given to them when stimulative policies become necessary in the future.

Kanishi: The reasons that Mr Okumura gave for the recent decrease of money supply appears to be reasonable but at the same time, if currency demand changes so much that a drop from 12 to 7 percent is not considered unusual, then the control of

money supply becomes extremely difficult. Considering money supply as important was regarded as a good policy bec-use there was a tacit assumption that money supply should be retained in a stabilized state. The argument as to whether it should be M_2 or M_3 is not a desirable development in the policy of attaching importance to money supply.

Another opinion I have is that one of the reasons for the drop to 7 percent level is the influence that interest rate expectation is exerting in various ways. Since interest rate expectation can create big changes in currency demand, it is possible that the result would be the addition of another complicated factor in money supply manipulation. In other words, if the demand function for currency changes so much, money supply might be controlled but it is doubtful whether a good performance can be guaranteed.

The First Error in Predictions

Suzuki: Since July 1978, the Bank of Japan has announced its prediction, at the start of each fourth quarter, the money supply for that particular quarter. Generally, the prediction has been correct. However, in the July-September term of last year, for the first time, the actual figure fell far below our prediction. Presently, it is the 7 percent level. When adjusted seasonally, last year's July-September period was the dullest as compared with the previous quarter. During the October-December term, the growth recovered. Thus, it seems that the decrease from the previous year has stopped. The foregoing are facts.

Next, I personally believe that as long as inflation continues, the increase rate of money supply can drop at a very gradual tempo if it does not cause disorder. In other words, the drop itself is alright but the problem is the manner in which it dropped.

Then, one of the reasons for the unexpected sudden drop in the July-September quarter was the shift to postal savings. Another reason is that, at that point, there developed an anticipatory assurance over interest rates. With the expectation that the official rate will finally be discounted, business enterprises refrained from borrowing and decreased the liquidity ratio on hand.

It is a fact that both factors harbor problems. The problem with regard to the shift to postal savings has been mentioned earlier. With regard to the second factor of anticipatory assurance over interest rates, the rates would have actually dropped suddenly when the feeling of assurance arose, if interest rates had been truly freed. However, because interest rates had been regulated, the rates did not drop despite the anticipation. The biggest reason why the rates could not drop was that the rates were tied in with postal savings interest rates. For that reason, it is a very problematical development.

If you were to ask whether the present money supply had dropped so much as to create a problem, the answer is no. I feel that it is practically at the bottom of a certain desirable zone or very close to the permissible bottom. Therefore, I do not think that it is a critical drop which would create a strong deflationary impact.

Rohyama: As pointed out in the discussion today, there are many aspects of the Japanese monetary setup which must be changed.

In money supply control, information which will enable a sharp distinction as to whether the demand for money is cyclical or structural must be obtained before any decision is made. There isn't much concern over the recent slowdown in the growth rate of money supply because the cuases are partly known. However, will that always be the case? I think that considerable attention must be given to information and its analysis.

Suzuki: The discussion heretofore considered objective factors but I think that the attitude of the Bank of Japan is very important. The Bank of Japan should be candidly open. The Bank of Japan must make public its thinking and borrow the ideas of the people. The Bank of Japan officials, with the president at the forefront, all think so.

Kanishi: Though not a Harvey Road hypothesis, there are some things in the world which might not function properly simply by the theory created at Hongoku-cho, Nihonbashi, Tokyo. Therefore, everyone should strive to maintain the favorable cycle of Japanese economy. To maintain the present favorable cycle, in-depth study and accurate judgment are necessary, now and hereafter, concerning changes in monetary demand.

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SCIENCE AND TECHNOLOGY

ROBOT INDUSTRY TO GROW RAPIDLY IN 1981

Automobile Manufacturing

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 7 Jan 81 p 10

[Text] While the worldwide small car war is becoming more and more violent, Japan's industrial robot manufacturers are steadily developing their "worldwide automobile strategy." With the popularization of robots among the domestic automakers as their foothold, they are attempting to expand their sales all at once to the big European and American manufacturers as well as to communist circles, with the focus on European and American manufacturers who are earnestly engaged in the development of small cars. The top robot manufacturers of Japan--Kawasaki Heavy Industries with its proud spot-welding robot, and Robe Steel Manufacturing with its painting robot--have each made inroads on the Big Three (G.M., Ford, and Chrysler) of the United States, while in related fields such as automobile parts, Yasukawa Electric Works and Hitachi Works have completed the groundwork. As a result, there is a strong probability that Japanese-made robots will be more active this year on the automobile industry stage here as well as abroad.

Since the end of last year, Kawasaki Heavy Industries has negotiated with two major European and American automakers one after another about matters related to exporting its spot-welding robot, the "Kawasaki Unimate Model 6060" (multi-arm robot, hydraulic, multi-jointed, five-degree-of-freedom, positioning accuracy of 1 mm, and weight-lifting capacity of 10 kg). A formal contract is expected to be signed soon through the U.S. Unimation Co., from which the technology was introduced. The robot referred to above was developed by Kawasaki Heavy Industries, using as the basis the technology developed by Unimation Co. Kawasaki Heavy Industries began accepting orders in 1978 and so far it has delivered more than 300 of this most advanced form of robot to domestic automakers, including Toyota and Nissan. According to the contract signed by Unimation and Kawasaki, the latter may carry out business activities only through the window of the former outside its monopoly area (Japan and Southeast Asia). Therefore, only six Model 6060 robots have been exported as samples so far. The recent negotiations seem to indicate that the said robot has been highly rated in Europe and the United States. If the negotiations are successful, Kawasaki is expected to export 200 or so robots to Unimation each year.

Since the first order was received from the Moscow Memorial Automobile Factory (ZIL) in 1978, Kawasaki received an order in late 1979 from the Volga Automobile Factory (VAZ) for 28 spot-welding robots (approximately 100 million yen). With the blessing of Unimation, Kawasaki will continue its efforts to expand exports into communist countries.

On the other hand, the top manufacturer of the painting robot, Kobe Steel Manufacturing, is full of zest. According to the contract signed by Kobe Steel and the Tralfa Co. of Norway, from which the technology was introduced, Kobe Steel may not export this robot anywhere except to its monopoly area (Japan, the Far East, and Oceania). For the time being, therefore, Kobe Steel is trying to produce some results in the communist circles which belong to the negotiable area. At the same time, in negotiations concerning modification of the cooperation agreement, which began in earnest late last year, Kobe Steel is trying to gain domestic production of the main body--except for the wrist--of a brand new "flexiarm robot" (electric-hydraulic, multi-jointed, six-degree-of-freedom, positioning accuracy of 2 mm, and weight-lifting capacity of 5 kg), and a plan is being made to manufacture a "standard model" including main body and the control device for export to Europe and America. Export of the control mechanism is expected to materialize this year. When everything comes to a satisfactory conclusion, the possibility that a Japanese-made painting robot will be used by European and American automakers will become even stronger.

Robots for arc-welding of parts have a greater demand than do spot-welding robots. The major manufacturer of this type of robot, Yasukawa Electric, last September signed a sales cooperation agreement with the U.S. Hobart Co. Yasukawa Electric has set a goal to export 50 units before the end of this year, and 100 units of its "Motoman" (electric, multi-jointed, five-degree-of-freedom, positioning accuracy of 0.03 mm, and weight-lifting capacity of 10 kg) next year. The company has already signed a sales cooperation agreement with three European firms (Tols Technique Co. of Sweden, Messergrisheim Co. of West Germany, and G.K. Lincoln Co. of England), and the number of exporting units has been raised since October of last year, including 50 units to be exported this year. Having established a sales expansion posture in the two regions, Europe and America, Yasukawa Electric is expected to show substantial results quickly in the allied field of automotive parts.

Hitachi Works late last year joined for the first time in technological exports in the capacity of robot manufacturer. Through an agreement with the U.S. Automatics Co., Hitachi Works will export 50 of its "process robots" (all-electric, multi-jointed, five-degree-of-freedom, positioning accuracy of 0.2 mm, and weight-lifting capacity of 10 kg) as OEM before the end of this year. Early next year, Automatics Co. will manufacture in the United States the main robot body, which will be combined with a control device developed by the same company and built into an arc-welding robot and distributed in the North American region. In either case, their activities are aimed at the needs of the automobile industry, and a greater effort will be spent on cultivating new markets.

The world's major automakers, who are struggling furiously for the development of small cars, have, one after another, begun to adopt a large number of robots in order to lower production costs and maintain high productivity. General Motors is planning to introduce 470 robot units by the year 1983, and similar plans are being made by Ford, Chrysler, Volkswagen of West Germany, Peugeot-Citroen of France, and Fiat of Italy. The Nissan cars which have made inroads into the U.S. market have decided to adopt welding and painting robots in their U.S. plants and have contacted the robot manufacturers concerned. This positive movement by the automakers to popularize robots is expected to grow even more widespread in the future. Therefore there is a strong probability that Japanese-made robots may plan an important world role on the automotive industry stage (Kanji Yonemoto, executive directive director, Industrial Robot Manufacturing Society of Japan).

International Standardization

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 12 Jan 81 p 12

[Text] As Japanese industrial robots win high appraisal, a movement to unify worldwide standards for robots, or an international standardization movement, is gaining momentum. Standards for robots are being prepared or drafted by several concerned countries, including Japan, but the range is only partial. Therefore, the Industrial Robot Manufacturers Association of Japan (Hikoo Ando, president) is strongly urging the International Standardization Organization (ISO) to establish a special committee to deliberate on the standards for robots in order to avoid future confusion. As one of the advanced nations using robots, Japan is to play a leading role. In the coming 11th International Symposium of Industrial Robots (ISIR), to be held in Tokyo this fall, various major countries will be consulted.

As far as robot standards are concerned, Japan is an advanced nation. The "Terminologies" were standardized in January 1979, "Symbols" in February 1980, and "Characteristics Indicating Methods" in January this year, and each was made a part of the JIS. "Function Measurement Methods" will be standardized in the middle of this year, and "Safety Standards" by the end of this year. There is no country other than Japan in which standardization of robots is undertaken as a national project, and this activity caught the attention of various Western nations in the very early days. In addition to those standards cited above, there are many more items that are in need of standardization, such as wiring, tubing, joint between arm and wrist, and manipulator. As the range of robots becomes broader, it will become more and more difficult to achieve cooperation (common features) among the major nations.

The purpose of the ISO (headquartered in Geneva) is to draft unified standards for the entire world to help promote the international exchange of goods and labor. Originally, a special committee, TC970SC8, was to take up matters related to the standardization of robots. However, the committee appears to be bogged down by the numerically controlled machine (equipment) and has practically accomplished nothing on robot standards. There is a great possibility that the question of international standardization of robots will surface sooner or later, in view of the trend that robots are becoming more and more popular not only in the advanced nations but also in communist circles and in the developing nations. It was against this background

that an urgent request was submitted by the robot manufacturers association to the ISO to establish a special committee as soon as possible to work on matters related to standardization of robots in order to achieve rationality in the international production and utilization of robots.

The said association has already established, as part of its technical committees, an "ISO Original Draft Preparation Special Committee" (Chairman Kensuke Hasegawa, a professor at Tokyo Industrial University), and the committee has already started preparing the original draft on the technologies and symbols of robots. This work will soon be finished, and the work will be presented to the ISO business bureau to be used as a foothold toward the international standardization of robots. Japan is prepared, if necessary, to serve in the capacity of a manager in order to push this matter forward.

On the other hand, during the 3-day International Symposium of Industrial Robots to be held on 7-9 October at the assembly hall of the Japanese Federation of Economic Organizations, in addition to the presentation of research papers, the question of international standardization will be raised anew in the meeting of the coordinators representing various nations. The ISIR is an international symposium in which the newest developments related to robots are reported by the various research groups, organizations, and enterprises. Japan has hosted this symposium 4 years in a row. More than 120 applications to present papers at the symposium have been received so far. The desire by every nation to participate has never been so high, and it is quite fitting and proper to promote international standardization, which is so closely related to the orderly worldwide development of the robot industry, at a meeting for international exchange.

Future Trends

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 24 Jan 81 p 4

[Text] The demand on industrial robots is increasing very rapidly today. Total robot production last year, which was coined "the first year of robot," reached approximately 22,000 units, amounting to approximately 62 billion yen. The number of units and the monetary value of robots produced last year were each approximately 50 percent over that of the previous year. To learn more about the situation in the "second year of robot," Hikoo Ando, president of the Industrial Robot Manufacturers Association of Japan and vice president of Kawasaki Heavy Industries, was visited. Here are what he had to say about the trends in technology, production, and the demand. (Reporter Hirano questioning):

Q. The growth rate over the past several years has been 40-50 percent annually. How big will the market be this year?

A. At the present rate, it may reach 100 billion yen this year. However, robots are getting more and more sophisticated, so that the number of robots produced will not grow as fast as their monetary value.

Q. Is it safe to say that the robot industry has now completely "taken off?"

A. Yes, I think so. The Manufacturers Association assembled a "long-range forecast of demand on industrial robots" last spring. According to this projection, the demand will reach 290 billion yen by 1985, but the demand is actually growing at a much faster pace. According to an estimate, 900,000 workers in the secondary industries will become unnecessary in the next 5 years. If the work done by 50,000 workers is done by robots each year, it means, by a simple calculation, a demand of 500 billion yen a year. I believe that the time will come when robots will be mass-produced, just as automobiles are today.

Q. All robot makers are said to have suffered from red ink in the past, but the prospect of making ends meet has improved significantly today.

A. Kawasaki Heavy Industries was able to go into the black 2 years ago, when a monthly production of 15 units was reached. We were able to make a profit rapidly thereafter, once we surpassed this production scale. Although a monthly production of 50 units today is still small in scale, it has grown into a high-profit department. Several years ago, only the research and development expenditures accumulated, and the industry was in a poor state. Compared with this, we feel as if we are living in a different world today.

Q. Advanced robots used to be confined mainly to spot-welding robots. But the need for arc-welding robots and painting robots has grown rapidly in recent years. What are some other fields of application that may open up in the future?

A. To be sure, the demand for spot-welding robots has dulled somewhat. Production of robots for arc-welding and painting will certainly increase. Other special-purpose robots such as those that may be used in construction, civil engineering projects, maintenance and repair of nuclear furnaces, and robots to take care of patients will no doubt increase in number in the future. However, the robots used in these fields of application are in need of a sensor equivalent to the human eye. With a sensor as described above, a microcomputer will be needed to process the information gathered by this sensor. More and more microcomputers will be used in future robots. The demands made on robots by industrial application is gradually shifting from the materials-handling robots of relatively simple construction to intelligent robots of much more complex structure.

Q. There was a small robot boom in the West lately. In the United States, the top magazines such as BUSINESS WEEK and TIME printed special issues featuring robots, while in France, the book "Challenge of the World" by J.J. Servan-Schreiber took up Japanese robots extensively. In either case, it was pointed out that Japanese-made robots are a threat to Western enterprises. Is it really so?

A. I cannot follow the Shreiber argument. The fact that Japanese robots have caught the attention of the world was fine, but the one-sided emphasis of the situation was too bad. This ought to be an age of international cooperation. It is quite obvious that trade frictions will be unavoidable if Japan exports a large number of robots to the Western countries. But in fact, with the yen at its high, it will be impossible to export too many robots. We must first of all dispel the misunderstandings held overseas. With this in mind, an "International Symposium of Industrial Robots" will be held in Japan in October this year. We would like to take advantage of every available opportunity to exchange information actively with our overseas colleagues.

Technological Developments

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 30 Jan 81 pp 12-13

[Article by Sachio Hasegawa, Professor of Waseda University: "Current and Future Technology"]

[Text] The tempo of the technological development of industrial robots is very fast. According to an investigation carried out by the Industrial Robot Manufacturers Association of Japan, the demand today is centered around the sequence robots, whose production costs and volume are quite fixed. However, technologically more advanced playback robots such as spot-welding robots are growing in number, and numerically controlled intelligent robots are expected to become very popular in the future.

The industrial robot manufacturers of Japan, approximately 140 in number, are burning with the desire to develop a technology which combines electronics and machinery, and to develop various types of sensors in order to produce more advanced robots such as intelligent robots.

Introduction

Several dozen inspecting parties have visited Japan since last year, dispatched by the advanced Western nations to look into the secret behind the strength of Japan's manufacturing industry.

A special feature program entitled "If Japan Can, Why Can't the United States?" was broadcast all over the United States last summer by NBC, and it received a great response in the United States. A portion of the program was also introduced to Japan. The history of Japan's manufacturing industry after the war and its success in raising its productivity and the quality of its product was rated embarrassingly high.

Positive introduction of industrial robots was cited as one of the specific reasons for Japan's success in raising its productivity.

According to one way of thinking, it could be interpreted as a deliberate way of making industrial robots a symbol of the driving force of Japan's industrial development.

In fact, the number of robots manufactured annually and the number of robots in possession by Japan at present surpass the sum total of those in the advanced Western nations, so it is correct to say that Japan is the world's leading robot-producing country.

According to a number of economists, we are at the trough of the Kondrachev technological cycle today: a period of technological stagnation.

However, as far as the field of production technology is concerned, the 1980's will meet a wave of changes resulting from the appearance of a brand-new production method based on computer technology, such as robots, numerically controlled machine tools, automatic transport equipment, and automatic warehouses.

And industrial robots may constitute the most important trigger that will set off all of these technological changes.

How Robots Are Being Used

The two figures show the changes in the number and value of the industrial robots manufactured in Japan and their future projection.

Although unconfirmed, it has been estimated that approximately 17,000 units of robots valued at 60 billion yen were manufactured in 1980, and the cumulative number of units has definitely surpassed 70,000.

According to an estimate made by the Industrial Robot Manufacturers Association of Japan, robot production in the future will grow according to a geometric pattern and will soon develop into an industry comparable with the machine tool industry, with a gross annual product of several hundred billion yen.

Now then, how did Japan's robot production and utilization grow so much and so fast as to lead the world? Its main reason as conceived by this writer will be examined below.

1) The high educational background of the labor force: According to this writer's estimate, the number of research and technical personnel engaged in research and development of industrial robots in Japan is the largest anywhere in the world.

Likewise, both the number and the quality of the technicians and workers who are introduced to the production site to maintain and operate the robots are at a much higher level in Japan than in any other advanced nation.

Some especially enthusiastic user enterprises have established robot schools within their own organizations. The enthusiasm with which robots have been introduced in order to eliminate monotonous, tiresome, and dangerous operations may be considered an indication of the high level of the people who work at the production sites.

2) A desire for a flexible production system: From the Nixon shock to the oil shock, Japan's industry has repeatedly suffered from and taken great pains to overcome violent changes in the economic environment. And the lesson learned from this experience is to organize an enterprise having a constitution flexible enough to be able to cope with various unpredictable situations.

This way of thinking and the characteristics of individual robots are so much in harmony that even during those depression days immediately after the oil shock, the investment in robots continued to increase.

3) A desire for greater productivity: Improved productivity during a high growth period is achieved by mass production, or by increasing the volume of production. However, improvement of producitvity today in the midst of a steady growth period must be achieved without increasing the volume of production.

In order to be able to do this, a measure of automation such as the use of robots was conceived by many concerned as being an effective means of achieving the goal.

The recent trend of investing more in rationalization of the system than in equipment for the purpose of increasing production is based on the same kind of reasoning.

4) The vision and courage of the entrepreneurs: The great majority of robot manufacturers in the Western nations belong to middle- and small-scale enterprises, or so-called venture businesses, with only a very small percentage of large enterprises.

In Japan, on the other hand, every representative heavy industry, consolidated electro-mechanical, and machinery manufacturer has become a robot manufacturer, and jointly they strive to develop newer and better robots.

There have been many user enterprises which courageously subjected themselves to experiment even before the effectiveness of robots was firmly established.

The courage and magnanimity of Japan's entrepreneurs to allow such adventure within their enterprises are the envy of those who engage in robot-related businesses in the West. The merits of the life employment system, in which the achievements of an executive will not be given a clear-cut evaluation on a short-term basis, can be clearly demonstrated in this instance.

5) A nationality in love of new things: At a certain international conference related to robots, this writer was approached by leaders from England and France who wanted to learn the secret of Japan's success with robots. In their efforts to popularize robots, they are perplexed by the paradox that you can lead a horse (user) to water but cannot make it drink. This writer had never heard of the parallel of their trouble in Japan.

In the case of Japan, the horse was sufficiently thirsty, and the question was how to lead the horse to water, which is not only tasty but also good for its health in the long run. The nature of the problem was fundamentally different from that of the Western nations.

Namely, the national character of Japan itself may be described as more receptive to and conscious of the problems requiring machines based on new concepts such as robots.

Along this line of thought, I can positively say that it was not accidental that Japan should lead the world in the production and utilization of robots, because Japan is blessed with the necessary fundamentals which have accumulated over the centuries.

Expectations Toward Robots in the Future

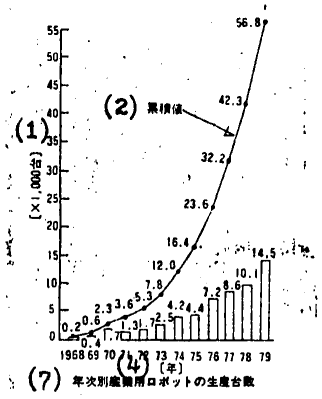
Stimulated by Japan's success with robots, many Western nations have in the past year started in earnest the development and introduction of robots.

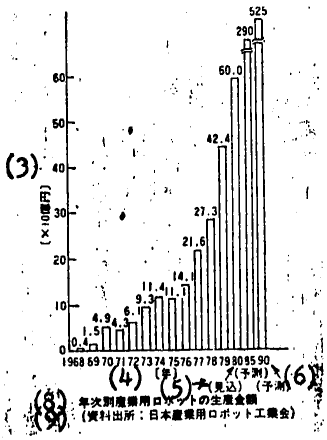
On the eve of the arrival of a true robot age, I should like to describe the expectations toward industrial robots in the future.

First of all, the range of application ought to be broadened to include more difficult applications by further improving the functional capabilities and the performance of robots. Application of robots should not be confined to the field of manufacturing but must be expanded into the field of construction as well as primary industries in order to achieve the labor-saving effects. In order to be able to do this, intelligent robots with sensors, hybrid robots which can be controlled either automatic or manually, and robots capable of moving around must be developed.

Secondly, better applications of robots to further demonstrate the characteristics of robots must be researched and developed. Many ways of making good use of the merits of robots can be thought of, including the improvement of product quality from stabilized operation, and improvement of the general productivity of a factory from nonstop operation day and night.

Finally, we must conduct studies in earnest concerning labor welfare and the social assessment of a mixed man-robot system. In order to ensure that only the good effects will come from the popularization of robots, we must assemble research organizations consisting of specialists from the fields of sociology, economics, and psychology in addition to robot specialists, and we must study the matter extensively.





Key:
(1) x 1,000 units
(2) Cumulative value
(3) x billion yen
(4) Year
(5) Expected
(6) Predicted
(7) Number of industrial robots produced annually, by year
(8) Monetary value of industrial robots produced annually by year
(9) Source: Industrial Robot Manufacturers Association of Japan

Let us briefly observe the present status and the future trend of demand on industrial robots according to the type of application. "The long-range demand forecast" compiled by the Industrial Robot Manufacturers Association of Japan last year will be used as our main source of reference.

First of all, the present status...Applications of robots may be divided roughly into two categories: general operations and special operations. General operations may be further subdivided into 1) casting, 2) diecasting, 3) resin molding, 4) heat-treatment, 5) forging, 6) pressing, 7) arc-welding, 8) spot-welding, 9) painting, 10) plating, 11) machining and polishing, 12) assembling, 13) loading-unloading, 14) inspection-measurement, and 15) other; while special operations may be further subdivided into 1) submarine operations, 2) nuclear power, and 3) other.

The [value of] total actual robot shipments made during the 1979 calendar year was 38 billion yen. Of this figure, machining and polishing robots occupied the top place, amounting to 6.129 billion yen or 16 percent of total shipments; followed by the resin-molding robots, 6 billion yen; assembling robots, 5.6 billion yen; pressing robots, 5.2 billion yen; spot-welding robots, 4.3 billion yen; other, 3.1 billion yen; arc-welding robots, 1.9 billion yen; diecasting robots, 1.4 billion yen; loading-unloading robots, 1.1 billion yen; and painting robots, 800 million yen.

Characteristically machining and polishing robots were demanded largely by the automakers, and the greater majority of the models belonged to fixed-variable sequence type. The demand for the resin-molding robots, which occupied second place, increased significantly compared with the first half. Nearly 70 percent of the resin-molding robots were taken by the plastic processing machinery industry, which is in a very satisfactory condition today. Besides these, the assembling robots were taken mainly by the electric machinery and the automotive industries, while the spot-welding robots and the arc-welding robots increased rapidly in number, centered around the automotive industry.

The playback type spot- and arc-welding robots in particular have shown the largest growth; e.g., spot-welding robots increased more than 500 million yen during the first half, while arc-welding robots increased more than 800 million yen all at once. This proves how good a growth stock arc-welding robots are. Although they failed to make the top 10 list of 1979, inspection-measurement robots, including intelligent robots, reached 5.6 billion yen, which amounted to a more than twofold growth compared with the first half. This was quite noteworthy.

At this point, let us arrange various types of robots according to their different applications. Robots may be divided into the following categories: 1) Manual manipulator, which is remotely controlled and operated by man (handling heavy objects and dangerous objects); 2) Fixed and variable sequence robots, which repeat a sequence of preset operations; 3) Playback robots, which, once taught, can store the sequence of operations in its memory and can reproduce the sequence of operations by playing back its memory; and 4) Intelligent robots, such as numerically controlled robots and robots which have the senses of sight and touch and are capable of performing advanced operations.

The total number of robots in Japan at the end of 1979 was estimated (by Nomura Consolidated Research Institute) to be 56,800. According to the applications, casting robots are mainly of the fixed sequence type, while diecasting, resin-molding, forging, pressing, machine tool processing (machining and polishing), and assembling robots belong mainly to the fixed-variable sequence type. On the other hand, arc-welding and painting robots are mainly of the playback type. Approximately 80 percent of all existing robots belong to the sequence type; 13 percent to the manipulator type; and only 7 percent to the "advanced robot" type, including the playback type and intelligent robots.

Industrial robots truly became popular in Japan in 1980. An industrywide movement to raise productivity resulted in robots being adopted in large volume, first by the automobile industry and the electronics-electric industry, and then gradually by the other enterprises, including medium- and small-scale enterprises. Advances in electronics have brought a technological revolution of the control devices. This revolution not only has improved the operation and the functional capabilities of robots, but also has contributed significantly to lowering the price of robots (an economic improvement) and also raised their reliability.

The government itself has also implemented various measures to promote the popularization of robots. In particular, the robot lease system using Development Bank capital (operated by the Nippon Robot Leasing) was so extensively utilized that its contribution to the success of robot popularization far surpassed original estimates.

The year 1981 may be called the "year of rapid progress" built upon the momentum gained in the past (Hikoo Ando, president of the Industrial Robot Manufacturers Association of Japan). Now then, what types of robots will grow most rapidly in the coming years?

According to the "long-range demand forecast," the demands for the three periods of 1980 (1), 1985 (2), and 1990 (3), expressed in units of 100 million yen, and the average growth rate for the periods of 1980-85 (4) and 1985-90 (5), expressed in percent, are as follows:

Casting: (1) 20, (2) 30-40, (3) 70-85, (4) 8.4-14.9, (5) 8.5-16.3
Diecasting: (1) 20, (2) 30-35, (3) 40-45, (4) 8.4-11.8, (5) 5.9-5.2
Resin molding: (1) 45, (2) 80-90, (3) 110-12, (4) 12.2-14.9, (5) 6.6-5.9
Heat-treatment: (1) 10, (2) 50-55, (3) 80-90, (4) 38.9-40.6, (5) 9.9-10.4
Forging: (1) 10, (2) 30-35, (3) 40-50, (4) 24.6-28.5, (5) 5.9-7.4
Metal press-shearing: (1) 30, (2) 100-110, (3) 150-165, (4) 27.2-29.7, (5) 8.4-8.4
Spot-welding: (1) 70, (2) 180-185, (3) 260-265, (4) 20.8-21.5, (5) 7.6-7.5
Arc-welding: (1) 45, (2) 200-215, (3) 350-370, (4) 34.8-36.7, (5) 11.8-11.5
Painting: (1) 30, (2) 90-95, (3) 170-175, (4) 24.6-25.9, (5) 13.6-13.0
Plating: (1) 5, (2) 20-25, (3) 40-45, (4) 32.0-38.0, (5) 14.9-12.5
Machine tool processing: (1) 140, (2) 250-290, (3) 440-480, (4) 12.3-15.7, (5) 12.0-10.6
Assembling: (1) 60, (2) 210-435, (3) 500-102, (4) 28.5-48.6, (5) 18.9-18.6
Inspection-measurement: (1) 30, (2) 100-200, (3) 200-500, (4) 27.2-46.1, (5) 14.9-20.1
Other: (1) 100, (2) 300-330, (3) 550-590, (4) 24.6-27.0, (5) 12.9-12.3

In short, during the first 5 years until 1985, the growths of machine tool processing, arc-welding, and assembling robots are expected to be most rapid. Inspection-measurement robots, too, are expected to make a strong showing. By the year 1990, the demand structure for robots will have changed significantly. In addition to the possibility that the demand for assembling robots will reach the 100 billion yen mark alone, inspection-measurement robots will continue high rate of growth, followed by machine tool processing and arc-welding robots. The growth rate of spot-welding robots will be down to a single digit, but painting robots will keep up a steady growth rate.

Robot manufacturers are formulating their strategies step by step according to this demand forecast. Take the arc-welding robot market, for example. In addition to the early starters, such as Shinmeiwa Industry and Yasukawa Electric Works, which have already expanded their business, newcomers such as Matsushita Business Machines and Mitsubishi Electric have joined representative robot manufacturers such as Hitachi Works, Kawasaki Heavy Industries, Kobe Steel, Fujigoe, Osaka Transformer, Dainichi Machinery, and Toshiba Precision Machinery to pursue the arc-welding robot market in earnest. The shortage of skilled welders and the shortage of workers in general in the future are expected to create a greater demand for welding robots. It will be interesting to observe how robot manufacturers will compete with one another on matters related to function, reliability, and price (less than 10 million yen).

On the other hand, assembling robots are expected to gain a foothold during the next 5 years and to attain the largest market by 1990 (i.e., from the late 1980's to the 1990's). In order to be ready for this, Fujido-Wagner of Japan has signed a joint robot development agreement with Semens of West Germany, and it is exerting great efforts on the development of NC machine tool processing robots as a preparatory stage. In addition to Hitachi, electronics-electric manufacturers are also eagerly pursuing the field, so that the development race in this field will be worth watching in the future. As the robots become more and more advanced in nature, cooperation between the users and the manufacturers is expected to grow, also.

Factory Automation

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 30 Jan 81 p 14

[Article by Kenji Kirino, Chief Research Scientist, Industrial Economy Research Department, Nomura Consolidated Research Institute]

[Text] "Why does man manufacture robots, and then let the machines do the work man does? The reason is unclear." These were the opening lines of "Iron Arm Atom" by Jimushi Tezuka, written in 1951. He continued: "Following the invention of ultra-miniature electronic computers and the development of electronic brains in 1974, mechanical robots approximating various human faculties will be onstage by 1982." What an amazing foresight his was.

Apart from the technological forecast, the capabilities of today's robots such as sight and judgmental ability in order to be able to recognize objects and the ability to move around are far from comparable with the level of human faculties. Nevertheless, the number of industrial robots of various types used on the production lines today is estimated to be 60,000-70,000, and they are used most extensively in the industrially advanced nations. The number of robots is said to be increasing at the rate of 10,000 units a year. Of these robots, those which can be categorized as advanced robots, such as playback robots and intelligent robots, are of the order of only several thousands today, but the demand for this type of robot is growing at very rapid rate.

The word "robot" was originally invented by the theatrical world to describe "a person" swung around "like a machine." However, today's industrial robots are creating a factory in which "machines" work "like human beings." Nevertheless, apart from robots the likes of Iron Arm Atom, a factory in which machines work like human beings, or a completely unmanned (automated) factory, is far from a reality with today's technological standards. Human and animal faculties are so much better in performance that they can not be easily simulated mechanically. It is even more difficult to commoditize the human faculties and performances using the economic value standard.

To say nothing of the somewhat distant future, when completely unmanned factories may be realized in many areas of industry, automation of production lines is progressing steadily, with industrial robots playing the main role. With further progress in industrial robot technology, and improvements in the economics of the robot investment made by the users, the growth in the 1980's is expected to be greatly accelerated. In those industries whose main products consist of a number of solid objects assembled together, such as the mechanical industry, and in chemical plants where the raw materials are transported and processed in reactors and pipes, robots capable of handling solid objects, operating various machines, and using various types of tools to do work directly on or to process various parts become necessary if automation is to be realized.

We have seen the limitations on automation afforded by the special purpose machines used in a mass-production system. Therefore, general-purpose industrial robots which can be programmed arbitrarily are taking over these automatic production systems today. Specifically, a large number of robots have already been engaged in a wide range of processes, including, for example, NC machine tool processing, press, arc- and spot-welding, painting, heat-treatment, diecasting, and plastic molding. Advances in future robot technologies, such as object recognition, sensor, soft-grip, and software, will certainly promote other applications of robots in such different areas as assembly and inspection.

We shall next discuss how the utilization of industrial robots is evaluated and what some of the problem points are concerning robot utilization. Utilization of robots is usually evaluated according to the following four points:

1) The direct laborsaving and the consequent improvement in productivity afforded by the production system: This does not necessarily mean a completely unmanned operation. According to how and where the robots are utilized, the human operators whose place the robots have replaced may now be the robot instructors or the operators in charge of several robots, or they may remain in the production system as onsite managers. In either case, robots are used to replace human operators to perform simple and monotonous work, or labor-intensive work, so that productivity is raised while the process cost is lowered.

2) Improvement of the work environment: Robots are used to replace human operators in work areas which are physically or chemically harmful to human health. For example, workers are liberated from the fumes, light, intensive heat, and sparks generated by the arc-welding process. Human operators are engaged in carrying out temporary welding in preparation for the work to be done by one or two welding robots. This mode of operation is fast becoming the most typical work arrangement in the field.

3) Evaluation of the versatility of the operational robot: The use of general-purpose robots will enhance the versatility of the entire production system and lower the investment on special-purpose robots. The versatility of general-purpose robots is valued as a great advantage by users who contemplate introduction of robots into their production lines.

For example, in the automotive industry, the utilization of general-purpose robots is more advantageous in many cases from the viewpoint of the cost and time of developing special-purpose machines. The needs for design change are quite frequent, and the shape, precision, and function of the parts can be improved quite regularly. Even if it is feasible to remodel an existing special-purpose machine to meet new requirements, in a production line which abhors stoppage it becomes impractical to do so, because a production break that is long enough for the remodeling to take place cannot in general be afforded. General-purpose robots are valued highly among medium- and small-scale enterprises and by small businesses engaged in processing small parts and handling a relatively small number of products, because automation using special-purpose machines remains impractical for these industries. Industrial robots having a certain fixed generality are said to be born as "a first measure of automation" for that particular format of production referred to above.

4) Improvement in the process quality as a result of robotization: This is in general true for any one of the more common forms of automation, and is not necessarily attributable exclusively to the use of robots. However, in the case of robots, the production system after automation closely resembles the production system operated by man, so that improvements, in quality and stability of operation are more readily detectible. Many users value stability of operation as the most important advantage in utilizing arc-welding robots.

Besides, utilization of robots is further judged in accordance with the characteristics of a given production system, including, for example, the ease with which the operation shift can be changed, or the prevention of explosion and damage to the equipment from precise movements of the machine.

On the other hand, after counting the advantages of using robots, what are the problems ushered in by robots? At present, there is none serious enough to merit mentioning. But, if we must choose, it is the stoppage of the entire production system caused by robot breakdown, and the problems related to the relocation of human operators displaced by robots. However, neither problem is considered to be too difficult to solve.

The operation rate of the production system did not decrease as a result of improvements in robot reliability or in the user's utilization technique. Instead, the operation rate actually improved. Moreover, with regard to the labor problem, according to the practice of Japan's labor-capital relationship, no worker has ever lost his job as a result of the introduction of robots. The supply and demand of labor in Japan today in those types of occupations in which robots have been introduced is such that it is impossible to retain enough labor by recruiting new labor force. For example, there is a shortage of approximately 30,000 skilled workers in the field of welding alone.

The shortage of workers is most acutely felt by medium- and small-scale enterprises, whose work environment tends to be inferior. Therefore, the introduction of robots means to each individual enterprise "not so much to save labor in order to reduce the number of workers as to gain new employees in order to increase production."

Coming back to the question of why does man make robots and then let the machines do the work man does, as far as industrial robots are concerned, an answer materializes naturally from the users' viewpoint of evaluating the robots. As long as people, especially young people, are uninterested in becoming skilled manual workers who work in a relatively inferior work environment, as encountered in the foundry, forging, heat-treatment, and welding, and as long as there exists an imbalance between supply and demand in those areas of industry as compared with the intellectual and service types of occupation, industrial robots will be needed to fill the gap. Moreover, industrial robots may also be introduced to the production lines in order to be able to meet the increased demand for goods.

Improvement of quality and productivity through automation or unmanned operations will no doubt remain an important problem for enterprise management in the 1980's, together with the problems related to the development of new technology and new products.

Robots That Are Available

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[Article: "An Introduction to the Various Products and Technologies Available To Meet the Needs of the Users"]

[Text] Iwata Painting Equipment Industry

The "Mitsubishi-Iwata painting robot" manufactured by the Iwata Painting Equipment Industry has many superior features compared with conventional robots. It is capable of painting larger and more complicated work. Since robot performance is affected significantly by the method of teaching, this robot is equipped with a number of teaching formats so that the best format for teaching the robot may be chosen according to the work and equipment involved. The teaching formats include CP, PTP, remote control, and data program format using a microcomputer. The control device uses digital format, and its memory medium is wire memory. Its detecting device uses a photovoltaic shaft encoder, so that the entire control system is highly reliable. In addition, a data processor, a miniature wrist, and other special features are available as options.

Osaka Transformer [Daihan Henatsu]

The Daihen arc-welding computer robot "Soa" has been on the market since last May and has been enjoying popularity ever since among both big and medium-small users. This robot is a culmination of the rich arc-welding technology developed over a long period of time by the leading specialist welding machine manufacturer, Osaka Transformer, and the mechanical technology developed from manufacturing more than several

thousand arc-welding jigs, combined with the newest advanced computer technology. This robot has enjoyed a special popularity because incorporated into it are many special features that only a specialist welding machine manufacture can bestow.

Moreover, as a result of mass production, its price is also coming down to a more easily accessible range. One of its most important features is its unique torch attitude control mechanism, with which a torch attitude most suitable for the work being welded can easily be attained, just like a human wrist.

Oji Precision Machinery Industry

The heavy object handling robot, "Servo Arm," manufactured by the Oji Precision Machinery Industry is the offspring of a good deal of knowledge and the firm's strong background in hydraulic systems. This robot is known for its reliability and delicate maneuverability.

This robot belongs to a group called the manipulator type. Its field of application typically includes operation in a hostile environment, such as in the treatment of nuclear waste material where there is danger of radioactivity, in the handling of work during the forging process, in the removal of a cast from its mold or in cleaning sand off the cast in a foundry shop, for operations in front of the furnaces in an iron works, and in the operation of various steelmaking processes exposed to high temperature and other dangers. This robot is best suited to replace a human operator in an environment harmful to human health and safety. Its superior features include the following: 1) it can handle heavy objects smoothly; 2) it is tough enough to be able to withstand vibrations and impacts; 3) it can withstand high temperature and a dusty environment; and 4) it can be remotely controlled.

Orli

With 20 years of experience in the manufacture of automatic press equipment, Orli manufactures a variety of robots, from small automatic machines to ultralarge lines. Its NC line in particular has enjoyed wide popularity.

Among its many products, the "PY Robot System" for secondary press work is an answer to the needs of the time for the small production of a large variety of goods. In addition to its safe operation and high productivity, the reliability of its performance and safety has been significantly improved by the adoption of a control system using microprocessor. Surveillance equipment consisting of a color TV is available as an option. The firm will soon make public its large-scale "RY Robot" (maximum weight-lifting capacity: 30 kg; travel distance: 1,500-2,000 meters; cycles: 20-25 per minute). A new "06 Blinking System" feed device for primary press process work is being developed today.

Dainichi Mechanical Works

The "Babot," manufactured by the Dainichi Mechanical Works, possesses soft movement capability, resembling the action of the human muscle. The characteristic that is indispensable to an operational robot which must be able to cope with variations in the content and range of operations--in short, adaptability--is the main theme of this robot.

This robot has achieved what could not be achieved in the realm of the manipulators--a weightless state, or complete balance--so that it can respond to any external movement with a very high degree of sensitivity, and operate faithfully in response to the smallest external force. Because of its weightless state, it can easily track the irregular movement of an external machine or equipment. Therefore, if the robot is used for the assembly of a machine part, the object and its counterpart are brought together and held so as to leave room for the tightening of bolts and nuts. The bolts are tightened with a nut-runner, and the movement of the bolts during the tightening process is absorbed by the manipulator. These are some of its important features.

Toei Electric Works

The "Velconic-T," manufactured by the Toei Electric Works, is a servo system having high-precision servo performance over the entire speed range from normal to ultralow speed. It has had a significant impact on improving and expanding the range of process capability of both machine tools and ordinary industrial machinery. The number of conventional drive systems being replaced by this servo drive system is steadily increasing.

The DC servo motor "Velconic-DS," another product of the Toei Electric Works, is fast becoming an indispensable driving source capable of faithfully executing computer commands issued by production robots. There are seven low-speed machines in this series with a power rating in the range of 0.1-3 kW. These units are characterized by their high torque, high power rating, and large allowable instantaneous current.

Nippon Moog

Nippon Moog supplies high-performance servo valves to such areas of application as rolling machines, vibration testers, plastic injection molding machines, and industrial vehicles. A recently developed servo valve which enjoys popularity among users was developed with an eye to industrial robots. The main characteristics of this new valve include the following: cheaper than conventional valves of comparable performance; compact, with smaller external dimensions; improvement in its static stability resulting from a significant reduction in the neutral point shift due to the changes in temperature and pressure; a dual-gain flowrate characteristic which simplifies usage; and adjustable lap state of the spool valve to match the objective of the robot application.

The "J077" series and the "J078" series of this valve, together with its worldwide service network, enjoy a great popularity among users.

Hitachi Works

The Hitcahi Works pioneered the commercialization of robots controlled by microcomputers. With its unique mechanism, this type of robot enjoys popularity here and abroad. The firm is placing emphasis on robots to be used in the fields of welding and painting today, and these robots are as follows:

The process robot (all-electric, multiple-jointed operational robot) is microcomputer controlled, so that it is capable of achieving a high degree of path accuracy and also is easily taught. It is also quite economical and is becoming very popular in various fields centered around arc-welding.

The arc-welding robot "Mister Aros" uses an ultraminiature, noncontact type of sensor as its sight to follow the welding line accurately, and the robot is easily taught to fix positions. It is also capable of carrying out continuous welding around corners and on a curved surface.

The painting robot is also microcomputer controlled and is equipped with various computational capabilities. It can be taught by means of a remote teaching mode using a simple button operation. It comes in both vertical and horizontal models.

Fuji Electric Works

The industrial robots for mechanical processing manufactured by the Fuji Electric Works include "electric, hand, rectangular coordinate, industrial robot," "Fuji robot," "press hand," and "unit hand, FM type." However, the most spectacular one is the "Videosensor system," which is a robot capable of discriminating the external appearances of objects. This is a result of Fuji's pioneering work in the area of visual inspection systems, considered the theme of the 1980's.

This is a unique system having an industrial TV camera as its eye and a microcomputer as its brain. It has stored a number of image patterns in its memory. It is capable of correctly identifying an object at high speed without contact with the object, by comparing the image of the object with the image pattern in its memory.

Fuji Filter Industry

The Fuji Filter Industry has caught the attention of business circles as a specialist filter manufacturer by showing an annual growth rate of 20-30 percent.

This firm was able to quickly build its foundation today through technical cooperation with the Bendix Co. of the United States, which is one of the world's famous manufacturers of machine parts, and it has successfully developed new technologies and created new products through technical exchanges. It has recently built a new plant in Tochigi Prefecture containing the latest equipment, and it has launched its filter manufacturing business into orbit.

At present, the firm is actively exporting its products in addition to [offering them for] domestic consumption. As is evident from its motto--"Always develop goods which are newer and better than those of the competitors"--its superior technical developing power is the driving force behind its high rate of growth.

Matsushita Industrial Machinery

By concentrating its advanced electronics technology, Matsushita Industrial Machinery has commercialized its "Pana-Robo AW-1000," which is an industrial robot with five-axis joint and wide range of operational capabilities suitable for arc-welding. Its high-precision control characteristics and the ease with which it can be operated enable it to cope easily with mixed production at the welding site. Moreover, its price has dropped to 9.8 and 10 million yen, each. The robot has five axes of rotation and is also multiple-jointed, so that it can be flexed freely at every joint. As a result, the robot occupies but a small amount of floorspace and is capable of performing delicate work. The ingenious design of its arm structure and its driving mechanism extend its reach to 20 percent more than that of a conventional robot, and the robot is very easy to operate.

Within its memory capacity of 600 steps, four different programs can be selected arbitrarily. The robot can be taught easily, and various welding conditions can be set or changed with ease. It is further equipped with a self-diagnostic capability.

Mizuno Iron Works

The Mizuno Iron Works is a specialist manufacturer of robots for NC lathes, and single-function machines. In addition to its conventional R20 series, the Model H introduced last year is a high-performance robot which takes only 6-8 seconds to change workpieces and has a positioning accuracy of $\pm$0.3 mm. It is enjoying great popularity in industrial circles.

The more recently developed and commercialized Model S occupies only 0.12 m^2 of floorspace, so that it does not interfere with the setting operation of the lathes. It is capable of five functions: forward and reverse, turning, up and down, bank rotation, and wrist movements including up, down, and rotating. Use of electric drive enables it to be quite versatile, such as operation involving servo units.

This robot can be used for center work or chuck work. It is an epoch-making robot which is suitable for small lot production of a large variety of goods. Patent application has been completed, and mass production has begun.

Miyoshi Mechanical Works

The Miyoshi Mechanical Works, which is one of the major manufacturers of universal joints, has commercialized a socket-type joint which can be engaged or disengaged in mere 5 seconds and is enjoying great popularity. The firm recognized early a trend in the West of transition from the pine-needle type of multiple spindle to the block build system (BBS), and so without delay it developed this socket-type joint before any other firm.

The BBS enabled construction of compact multiple spindle heads and significantly shortened the idle time for changing arrangements. Socket joints that can be engaged and disengaged in one step are used in large quantity as a part of the spindle drive in the BBS. Its cluster plates are easily changeable, so that significant effects can also be achieved in medium- and small-scale production of a large variety of goods. The main applications of this robot include boring machines and drill units.

Motoda Electronics Industry

The Motoda Electronics Industry has been engaged since 1970 in the research, development, manufacture, and maintenance of industrial robots using electric automatic control devices. The robots manufactured by Motoda Electronics are well-known for their high reliability, ease of operation, low cost, and large variety from which to choose. According to the needs of various applications, it offers the following different types of robots: 1) "Waiman" is a balancer known for ease of operation; 2) "PL robot" is most suitable for operations involving transporting, stacking, moving, and packaging heavy objects requiring precision; 3) "Ampman" is for the automation of simple, repetitive operations; 4) "Full area robot" is a robot which utilizes the whole space up to the ceiling; 5) "Line robot" is a modular robot which can be installed without changing the existing plant layout; and 6) "Universal robot" is for light, repetitive operation. This robot can be moved around and reprogrammed easily.

Yasukawa Business

The "Motoman" which enabled Yasukawa Business to realize automation of arc-welding is a culmination of the superior DC servo drive, NC control technology, and the manufacturing knowhow of Yasukawa Business, combined with every known technology related to welding. It is an all-electric robot which displays its power especially in the field of arc-welding.

This robot, which has five-degrees-of-freedom joints driven by the DC servo motor and is capable of rotating, raising, lowering, and tilting its arm, can draw a smooth trace in a three-dimensional space at a maximum rate of 8 m/min, with the result that it can also be applied to many other fields of application, such as applying adhesive materials and constructing line systems, by combining it with another Yasukawa product, "Motohand," which is used in large quantity in the automation of work transport. The main features include: 1) large reach of movement in comparison to its size and the space it occupies; 2) although the PTP control format is employed, the CP (continuous path) movement is also possible at low speed.

Yoshida Works

The "Pocketer" robot hand for automatic lathes, developed independently by Yoshida Works, has been very well received since it came on the market because of its superior performance and ease of operation.

The treatment of workpieces after they are processed by automatic lathes used to be carried out by human labor, and the work was tedious. The firm recognized the fact that rationalization of posttreatment of workpieces was the key to improving the efficiency of automatic lathes, and thus it worked for many years to develop a device to unload the workpieces automatically. The "Pocketer" is the fruit of this effort, and it is highly valued by many users, from automotive parts manufacturers to powerful enterprises.

The firm is actively engaged in the research and development of new products, anticipating diversified demands in the future.

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SCIENCE AND TECHNOLOGY

U.S., USSR INQUIRE ABOUT MITSUBISHI HEAVY INDUSTRIES MACHINE TOOLS

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 20 Apr 81 p 6

[Article: "U.S. and USSR Inquire About Purchase of Mitsubishi Heavy Industries Machine Tools; GM and Ford of the U.S.; Hobbing Lathes for Efficient Manufacturing of Drive Gears"]

[Text] Mitsubishi has disclosed that the U.S. and U.S.S.R. inquired about the purchase of machine tools. With regard to the U.S. deal, GM and Ford inquired about the purchase of a total of 10 hobbing lathes. The Soviet deal amounts to 2.5 billion yen and includes multi-axial automatic lathes and MC (machining centers). The purchase order by the U.S. "Big Two" would renovate their plant and equipment to remain competitive with Japanese small car manufacturers. The Soviet purchase inquiry is associated with the 11th 5-year plan which started in 1981. Mitsubishi believes that "both parties are planning to reinforce their production plant and equipment by introducing Japanese machine tools and plan to use them to enhance their competitive position in the world."

USSR Plans to Import Multi-Axial Lathes Under the 5-Year Plan

The U.S. "Big Two" inquired about the newest gear hobbing machine "GH250P" which Mitsubishi exhibited last fall at the International Machine Tool Fair that was held in Tokyo. This is a high-speed hobbing lathe for mass production of drive gear, which broke the 30-second record for machining one set of manual transmission gear. This record was considered very difficult to break. One of these lathes can support the production of a single assembly line.

In the automobile industry, where the small car war is intensifying, a need is growing for a faster gear mass production line to minimize equipment cost and management expenses. In past production lines, it was difficult to coordinate the pre- and post-work processes because gear cutting took time. This required the installment of multiple gear cutting machines, which in turn complicated the production line. In order to solve this problem, there was a need to reduce the gear cutting time from 40-50 seconds to less than 30 seconds. The reason why the U.S. "Big Two" turned their attention to this "GH250P" is to improve productivity of the gear mass production line.

Mitsubishi is hopeful about the current business deal and stated that "we have just received an order for one hobbing lathe GH201 from GM. Also this year, we

have delivered 4 large hobbing lathes to Ford. Based on this past experience, we will probably be able to successfully complete this business deal for the GH250P."

The Soviet purchase inquiry was made by STANKOIMPORT (the All-Soviet Machine Tool Import Export Corporation). The total amounts to about 2.5 billion yen for 25 multi-axial automatic lathes, 5 machining centers, 2 horizontal boring lathes, and 10 gear cutting lathes. Some of them may have been procured under the 10th 5-year plan which ended in 1981. Mitsubishi believes, however, that most of the purchases are being made under the 11th 5-year plan which has a goal of rehabilitating the Soviet economy through revitalization of economic activities and improvement of productivity.

Japan's machine tool industry has been closely watching trends in Soviet procurement of machine tools to determine when procurement under the 11th 5-year plan will start. Executive Director Shozo Shimizu of Mitsubishi stated that "this business deal shows that the Soviets have finally started to move. Mitsubishi has stated that they would like to negotiate the final details on the standard and the time of delivery, and hopes to successfully complete the deal.

CSO: 4105/155

SCIENCE AND TECHNOLOGY

USSR INQUIRES ABOUT POSSIBILITY OF LARGE SCALE PURCHASE OF WELDING ROBOTS

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 10 Mar 81 p 1

[Article: "Soviets Inquire About Large Scale Purchase; 180 Welding Robots for the FF Car Production"]

[Text] The Soviet's largest passenger car factory, VAZ, has inquired about a large scale purchase of 170-180 spot welding robots from Kawasaki Heavy Industries, Ltd. (headed by Zenji Umeda). The purchase price will be formally presented and business negotiations will start as early as this week. The Soviets have already made similar inquiries in West Germany and Italy, and thus there will be a triangular competition for the Soviet order. The entry of Kawasaki into negotiations will begin the race.

The Soviets plan the FF (front wheel drive) car to be their next generation automobile. It is reported that the Soviets are planning to establish new production lines in the VAZ factory by introducing the world's most advanced technologies, and that they are also sounding out the possibility of the transfer of FF car technology from Japan. The current Soviet inquiry with Kawasaki concerns the welding stations on the VAZ's production lines.

Kawasaki sold 15 Unimate Model 2600s to the Soviet truck factory, ZIL, in 1979, and following this, Kawasaki received last year from VAZ an order for a total of 26 Unimate Model 2600s and 6000s. Thus, Kawasaki has established a positive business relationship with the Soviets. But because West Germany and Italy are strong competitors, Kawasaki regards the race to obtain the Soviet order to be a very severe one.

Therefore, it is viewed that the sales price which will be presented will be considerably below 10 billion yen.

CSO: 4105/153

SCIENCE AND TECHNOLOGY

TAIYO, LTD. TO LAUNCH ROBOT EXPORT DRIVE TO U.S., USSR, EUROPE

Tokyo NIHON KOGYO SHIMBUN in Japanese 20 Apr 81 p 9

[Article: "Taiyo, Ltd.; Industrial Robot Export Drive; Centers on the U.S., USSR and Europe; Goal is to Quadruple the 1983 Sales"]

[Text] Taiyo, Ltd. (headed by Kimio Kitaura, located at 1-1-1 Kitaeguchi, Yodogawaku, Osaka, capitalized at 200 million yen; Telephone 06-340-1111) has decided to launch an all-out drive to export industrial robots this fiscal year. Taiyo's prospective major consumers consist of the U.S.S.R., U.S. and European countries. In cooperation with Mitsui & Co., Ltd., Taiyo has begun business negotiations with the All-Soviet Automobile Industry Import Corporation and the All-Soviet Industrial Machine Import Corporation regarding export of automatic assembly robots. Taiyo has also started negotiations in order to establish by next spring sales representatives in West Germany, England, France and Sweden following Belgium, and also in Detroit and Chicago.

Taiyo Began Negotiations to Establish Sales Representatives at 2 Locations in U.S.

Taiyo has set an ambitious goal of rapidly expanding exports of industrial robots starting next fiscal year. It is planning to export 30% of its robot production, increase the sales of its Machine System Division from the current 1.8 billion yen (the total sales in the previous fiscal year) to 7 billion yen, or 3.8-fold in the next 3 years in 1983. The FY 1983 total sales of the Machine System Division is expected to increase to about 35% (16% in the previous fiscal year) of the entire 1983 company sales goal of 20 billion yen (10.8 billion yen in the previous fiscal year).

Taiyo's specialty robots consist of automatic loading systems which can load, transport and unload heavy objects, automatic assembly machines for factory efficiency, and NC robots for sealer application which were jointly developed with Toshiba Silicone at the end of last year.

Making use of the technology used in the sealer application NC robots, Taiyo is planning to develop two types of cake-making NC robots, which can automatically frost cakes. Taiyo has given up an effort to develop an export market for this type of robot since Taiyo established Stalpalto (?) Corp (located at Brussels), a Belgian automatic transport machine maker, as its sales representative at the end of 1979. The reason for this fiscal year's export drive is that "inquiries from U.S., Europe and U.S.S.R. about this type of robot are rapidly increasing,

and we have gained confidence in future export expansion" (Executive Director Shinzo Kitaura, Chief, the Machine System Division).

In order to develop the Soviet market, Taiyo will cooperate with Mitsui & Co., Ltd. and hold a robot exhibit in Moscow from 19 to 23 October this year. In this exhibit, Taiyo will make the first public presentation of sealer application NC robots and heavy load transport robots, and will make an effort to obtain business deals to sell these machine tools to the All-Soviet Automobile Industry Import Corporation, the All-Soviet Industrial Machine Import Corporation, and the All-Soviet Machine Tool Import Corporation. It also plans to export automatic assembly systems for automobile factories, in which the Soviets have shown interest. Earlier, 3 company executives including Executive Director Kitaura visited the U.S.S.R. for 2 weeks, and made sales presentations on the energy saving advantages of automatic robot technology which can be used in truck and passenger car factories.

In Europe, Taiyo has planned to establish sales and service offices in four more countries, West Germany, England, France and Sweden, in addition to its current office in Belgium. Taiyo will select one company each for these four countries among those which are currently applying and conclude a contrate as early as next spring. Taiyo will sponsor a robot exhibit in Paris, France, in early December as part of the European venture in cooperation with Mitsui & Co., Ltd. Beside Western Europe, Taiyo will also make efforts to export robots to East Europe including Yugoslavia and Czechoslovakia.

With regard to the U.S., Taiyo has succeeded in obtaining an order for one auto-loading system for PPC assembly lines from CBM Corp (California) which is a local manufacturing company of Canon Copiers. Taiyo will dispatch 6 engineers to CBM on 29 April and begin installation work as well as PR activities. Taiyo will presently focus its sales drive in the U.S. on major automobile makers such as GM and Ford and their parts manufacturers. Executive Director Kitaura stated, "We want to establish sales offices in Detroit and Chicago as soon as possible."

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SCIENCE AND TECHNOLOGY

YAMBURG PROJECT NEGOTIATING TEAM WILL VISIT USSR ON 27 APRIL

Tokyo NIHON KOGYO SHIMBUN in Japanese 23 Apr 81 p 1

[Article: "Trade Negotiating Team Will Visit USSR on 27 Apr; Large Diameter Steel Pipe for the Yamburg Project; 4 Steel Companies"]

[Text] According to a disclosure by the iron and steel industry on the 22nd, four major steel pipe makers including Nippon Steel Corporation have decided that they will proceed to negotiate a regular commercial deal to export large diameter steel pipe for the Soviet Yamburg project. They will dispatch a working level negotiating team as early as 27 Apr in order to sound out the Soviet negotiating position.

West Germany recently concluded a regular commercial deal with the Soviets to export pipe because the U.S. interferred with the Yamburg deal, saying that "support of the Yamburg project would create a national security problem." Thus, Japan has decided to adopt this "West German method."

The Japanese negotiating team will present the Soviets with this proposal: 1) Japan will supply 500,000 tons of steel pipe by March 1982, 2) private banks will finance this purchase, 3) the deal is to be made in the form of a regular commercial deal which is independent of the Yamburg project. The Japanese are hoping to export 500,000 tons of steel pipel this fiscal year.

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END