JPRS L/10676

22 July 1982

Japan Report

(FOUO 44/82)

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APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000500080050-3

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CONTENTS

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POLITICAL AND SOCIOLOGICAL

KOMEI PARTY'S POSITION DISCUSSED

Tokyo TOKYO SHIMBUN in Japanese 3 June 82 p 2

[Article by reporter Kazuhiro Kobayashi, "Komei's Lonely Struggle."]

[Text] Komei Party's resistance continues in the form of boycotts of conferences for heads of ruling and opposition parties and absences from the House of Representatives' Foreign Affairs Committee which has been discussing three treaties on arms reduction. The Komei Party cannot agree to the normalization of the Diet which will likely lead to passage of the bill to revise the Public Office Election Law, which the Komei Party strongly objects. This is the reason for its boycotts. I have explored the background and purpose of the tough line asserted by the Komei Party.

The Komei Party's Anti-Diet Policy Committee discussed the handling of the three treaties on arms reduction in the morning of 2 June. About 20 Diet members, almost double the ordinary attendance, were at the meeting. "Don't agree to normalization of the Diet plotted in collusion with the LDP and the Socialist Party." "Even if the three treaties come to the House of Councilors, we should boycott discussions." Tough opinions were presented one after another. Then, they decided not to attend the Foreign Affairs Committee and the Diet session held that day.

Return of "Good Understanding"

Ordinarily, there were always some members in the Komei Party who possess commonsense and would say, "In order to promote arms reduction, we should attend the committee meeting." On that day, however, there was no member who voiced an opinion like that.

The Komei Party has firmly decided to object to the bill to alter the Public Office Election Law intended to revise the nationwide district of the House of Councilors. "We will prevent the bill from passing to the utmost of the party's power," said Chairman Takeiri. The Komei Party's reasons are: (1) that the questionable constitutionality of a bill which does not

allow an individual to run for a nationwide seat in the House of Councilors; (2) that the bill is a product of the interests and policies of large parties and is intended to benefit them; and (3) that the bill can be considered as the first step toward a small electoral district system. Therefore, the Komei Party cannot accept a long extension of the session to facilitate passage of the bill to revise the Public Office Election Law, and consequently cannot accept normalization of the Diet which would promote discussion of the bill.

A Decrease of Two Seats If the Bill Is Passed

The reason the Komei Party strongly objects to the bill is that, if passed, the Komei Party is certain to lose seats. This is the common view shared by the anti-election policy committee officials of other parties. When the seat allocation system proposed by the LDP and the Socialist Party is applied to the nationwide district ballots of the previous election, the Komei Party clearly declines in seats from nine to seven.

Moreover, there is a view that "the Komei Party seems to be expressing a fighting attitude toward the decisive political battle of '83" (a leading member of the LDP). As if to confirm this view, the opinion is heard within the Komei Party that it has become "too understanding recently," including its shift of position on the national security and defense policies to a realistic line at the end of last year. Therefore, the Komei Party needs to strengthen its checking function as an opposition party.

There is another incident. At a Komei Party's meeting discussing about the extension of the current session, one leading member made the following speech: "Whenever there is a trouble in the Diet, the relationship between our party and the Tanaka faction is mentioned. Let's object firmly to the extension of the session which has been primarily planned by the Tanaka faction. This is the best chance to prove that our relationship with the Tanaka faction is just a rumor with no basis." Then, he received the enthusiastic applause from young and middle-standing members. From this perspective one can believe that the Komei Party's resistance is a way to divorce itself from the Tanaka faction.

Isolation Increases

Nevertheless, the Komei Party cannot stay asleep during 94 days of the remaining Diet session. Even within the Socialist Party with whom the Komei Party joined to oppose the extension, voices are heard to the effect that "we cannot go along with the Komei Party forever." The Komei Party's isolation is gradually increasing within the opposition parties.

The Komei Party is also aware of this. Chairman Okubo of the Komei Party's Anti-Diet Policy Committee said: "The opening of the Budget Committee after the return of Prime Minister Suzuki may become a chance for normalization of the Diet." He intends to request an extension of one week in each house once the Budget Committee is opened. Mr Okubo also said "Since many

problems have piled up, the Budget Committee needs to have time for discussion until the end of June." He judges that the reopening of discussion on the bill to revise the Public Office Election Law will be considerably delayed.

Frankly speaking, it is a headache for the Komei Party how to set up a strategy to cope with the situation until the end of the session on 21 August.

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CSO: 4105/132

POLITICAL AND SOCIOLOGICAL

'AKAHATA' CARRIES JCP MESSAGE TO SFRY CONGRESS

OW010203 Tokyo AKAHATA in Japanese 26 Jun 82 p 7

[Text of JCP Central Committee's message of greetings to the 12th Congress of the League of Communists of Yugoslavia]

[Text] Dear comrades: The JCP Central Committee hereby extends heartfelt congratulations and solidarity to you on the occasion of the opening of the 12th Congress of the League of Communists of Yugoslavia [LCY]. Your congress opens at a time when world capitalism faces its overall, ever-increasing crisis, a nuclear arms race between rival military blocs is endlessly escalating, the danger of an outbreak of nuclear war is mounting, and movement, opposing nuclear war, seeking a total ban on nuclear weapons and extensive disarmament if gaining unprecedented momentum across the world.

We hope that your congress will score a new success in resolving various pending, urgent issues in a satisfactory way, in expediting the construction of a socialist society in a manner suitable to the specific conditions of your country, and in contributing to the development of a joint struggle of anti-imperialist forces of the world to promote peace and social progress.

The JCP and the LCY are working under different conditions, with the former struggling as a party in a highly developed capitalist nation subordinate to the United States and the latter acting as a party in a socialist nation. However, since early days both parties have unyieldingly struggled against outside interference and pressure and developed their friendship and cooperation by firmly maintaining their independent stances, observing the principles of independence, equal rights, and noninterferences in each other's internal affairs, and respecting mutual positions. In this respect, the talks between JCP Presidium President Kenji Miyamoto and President Josep Brozovitch Tito in 1978 were of epochal significance. We believe that the joint statement issued on that occasion has been of great significance, not only in relations between our two parties but also has had great international significance as proved by later developments.

Comrades, The world imperialist and reactionary ruling circles today tend more to seek a way out the capitalist crisis through large-scale arms expansion, aggression and war. While pushing a large-scale military buildup, the

U.S. imperialists regard the strengthening of their military blocs for aggressive purposes as an important pillar of their "policy of strength" and pressing Japan and other allies to strengthen arrangements for joint combat operations under the leadership of U.S. forces, and to step up armament. The Reagan administration has embarked upon a new arms race, with nuclear weapons as its core, by pushing ahead with a concept of limited nuclear war. This move, in particular, is confronting all peoples with the danger of a nuclear war. How to prevent the implementation of this dangerous concept and how to realize an all-out ban on nuclear weapons are matters of life and death to all peoples.

Under the Japan-U.S. military alliance, which makes Japan subservient to the United States, the Japanese reactionary ruling circles and the Liberal Democratic Party [LDP] government are hastening the pace of arms buildup and Japan's militarization while, in fact, approving Reagan's limited nuclear war plan and the conversion of Japan into a nuclear base to implement that plan. They are playing an active role as a U.S. ally in the economic, political and military fields. To this end, the Japanese Government is drastically reducing state expenditure for the people's livelihood and welfare under the pretext of an "administrative reform." By stepping up their reactionary offensive, Japan's reactionary circles and the LDP have turned the middle-of-the-road political parties into government parties and are now concentrating their attack on our party. However, this kind of LDP government policy is drawing criticism from broad segments of working people in all strata.

These circumstances make it all the more imperative to step up the struggle to scrap the Japan-U.S. alliance, build an independent, neutral and nonaligned Japan, codify the "three nonnuclear principles" of not possessing, not manufacturing and not bringing in nuclear weapons, effect a change in the government's economic policy in the direction of defending the working people's livelihood and rights, check the reactionary tendency in politics, and protect the people's democratic rights and freedom. In this struggle, the JCP has a still greater role to play.

In the midst of the intensifying reactionary offensive and the quickening tempo of the move to the right of the centrist parties, the JCP has stood firm in the face of stormy anticommunist attacks and has actively participated in the "National Council for Peace, Democracy and Reformist Union" movement in order to open the way to bringing all reformist forces together. Noted personages and socialist party members have also taken part in this movement. Today, a year after its inauguration, about 4.1 million members, including individuals and organizations, are participating in the movement. The prospect of union for the reformist forces in Japan largely depends on the development of this movement.

With its 60th founding anniversary coming on 15 July and with its 16th congress slated for late July, our party is actively tackling various immediate problems. At the same time, it is stepping up its drive to increase party ranks and supporters--the motive force of political reform--and striving to scale a new peak in party construction.

Comrades,

Today, when the world is at the crossroads of war and peace, the progressive forces of the world are faced with the serious task of waging struggle to prevent nuclear war, effecting a total ban on nuclear weapons, realizing a drastic disarmament, putting an end to the arms race centered around nuclear weapons, dissolving opposing military blocs serving as a tool to infringe on other nations' sovereignty, and realizing the withdrawal of foreign troops and the removal of foreign military bases. Particularly, a total ban on nuclear weapons is a cerntral task in eliminating the danger of a nuclear war and insuring the preservation of the human race. Our party strongly urges that this task be made the foremost task for world peace and that international solidarity action be launched to carry it out instead of pushing it into the background under all kinds of pretexts or making it a goal for the distant future.

In connection with the issue of world peace, we are compelled to point out, in particular, that, as developments in Afghanistan and Poland indicate, another nation's right to self-determination is being violated by a socialist country, which should be a champion of peace and national self-determination, and this violation stands in the way of the struggle of anti-imperialist democratic forces. The struggle to oppose this kind of serious error committed by big-power chauvinism and hegemonism and resolutely defend the right to national self-determination has become very important to the cause of world peace and the social progress of all peoples.

The Nonaligned Movement, which has developed into a powerful force in world politics, has an increasingly great role to play. We expect the Nonaligned Movement to make fresh successes. While strengthening the ties with this movement, our party will continue to move vigorously forward toward scuttling the Japan-U.S. military alliance and building a nuclear-free, nonaligned neutral Japan.

The JCP will continue to fight resolutely for the strict implementation of the publicly recognized norms of the world communist movement and do its utmost to promote cooperation and solidarity in common tasks.

We earnestly hope that the friendly relationship and solidarity between the JCP and the LCY will develop further in accordance with publicly recognized norms.

CSO: 4120/332

POLITICAL AND SOCIOLOGICAL

'AKAHATA' REJECTS 'TASS' REPORTAGE ON SOFIA MEETING

OW250245 Tokyo AKAHATA in Japanese 22 Jun 82 p 2

[Unattributed article: "Contravention of the Principle of Equality and False Reporting--Issues Involving the International Conference in Commemoration of Dimitrov's Birth Anniversary"]

[Text] An international theoretical conference was held in Sofia 15 to 17 June under the sponsorship of the Bulgarian Communist Party [BCP] to mark the 100th anniversary of Georgi Dimitrov's birth. Attending from the JCP were: Hidesato Numata, advisor to the JCP Central Committee; Tomokazu Shirai, member of the JCP Central Committee; and Hideo Sakamoto, member of the JCP International Affairs Committee. They carried a message from Sanzo Nosaka, chairman of the JCP Central Committee.

Chairman Nosaka's message was read at the opening plenary session by senior delegate Numata. In the message, Chairman Nosaka recalled vivid memories of Demitrov with whom he shared Comintern activities. He also referred to Stalin's errors and the significance of the Comintern's dissolution and stressed the importance of the task of overcoming big-power chauvinism. He expressed the JCP's determination to contribute to the struggle against nuclear war and for a total ban on nucelar weapons.

To our regret, however, two strange things occurred in connection with the conference, raising the question of whether the meeting measured up to standards as an international one. One event was that only the CPSU delegate had the privilege of delivering a long speech. The other was that after the conference ended, the Soviet media reported an "appeal" allegedly adopted at the conference, although no such appeal was actually adopted.

When the JCP Central Committee received an invitation to attend this conference, it sent an inquiry to the BCP, the sponsor, asking these questions: 1) Will all parties present be treated equally? And will there be a keynote speech? 2) Will a joint document, such as a resolution or declaration, be adopted?

The BCP replied that there would be no keynote report, that the Bulgarian delegate, as sponsor of the conference, might be the first to address the meeting,

but all delegations would be treated equally, that the duration of each delegation's speech would be limited to 10 minutes. The reply also said that no resolution or declaration, now any other joint documents would be adopted and that each participant would express only his view. The JCP decided to attend the meeting only after it received this reply.

But what actually happened at the meeting was that CPSU delegate Ponomarev, candidate member of the CPSU Politburo, spoke for as long as 55 minutes at the outset while all other delegates were permitted to speak for only 10 to 15 minutes. At the end of the meeting, BCP Secretary General Zhivkov spoke for about 1 hours.

Ponomarev paid tribute to the line of the 26th CPSU Congress and the present Soviet foreign policy. It is apparent from the length and nature of this speech that is was treated like a "keynote report" for all intents and purposes. JCP senior delegate Numata made a presentation to the sponsor, regretting the way the conference proceeded in violation of the principle of equality. Furthermore, the JCP Central Committee made a presentation to the BCP Central Committee through the Bulgarian Embassy in Tokyo expressing sharp regret at "this extremely perfidious attitude which runs counter to the formal promise and good faith between the two parties."

The other strange thing is that TASS and other Soviet media reported as if the conference had adopted an "appeal" calling upon the people of all countries to support General Secretary Brezhnev's statement pledging that the USSR will not be the first to use nuclear weapons.

The 18 June TASS dispatch from Sofia quoted this "appeal" as saying: "We, delegates of 140 communist parties, revolutionary democratic parties and international democratic organizations participating in this theoretical conference, hereby call upon all nations to support the Soviet initiative and the statement by Leonid Brezhnev, leader of the CPSU and the Soviet state, obligating the Soviet Union not to be the first to use nuclear weapons."

Another TASS dispatch reporting BCP Secretary General Zhivkov's concluding speech, as well as a 19 June report of PRAVDA, the CPSU organ, said that the aforementioned "appeal" was "approved unanimously" by the participants during the Zhivkov speech.

These reports are sheer fabrications. It is a common sense that a normal procedure for adopting some formal document at any conference requires a draft to be formally introduced, followed by deliberation and voting.

The three-man JCP delegation attended the conference frombeginning to end. Particularly on the final day, they never left their seats from the beginning of the Zhivkov speech to the closing of the conference. No such "appeal" was introduced and deliberated upon. Now was any vote taken.

In his speech as a BCP delegate, Secretary General Zhivkov praised the Soviet foreign policy, including the Soviet pledge not to be the first to use nuclear weapons, but this praise was not introduced as an "appeal," nor was it adopted as such.

Yet Soviet news media went so far as to concoct what they call an "appeal," and have publicized it. They even quoted the "appeal" as saying "We, the delegates of 140 communist parties...participating in this theoretical conference...," thus giving the false impression that all the participants, including the JCP delegation, actually adopted the "appeal." Their reports are an utter distortion of the facts.

As for the Soviet stand on nuclear weapons, up to the year before last, the Soviet Union maintained an attitude of opposing the UN resolution calling for the promotion of an agreement banning the use of nuclear weapons. Our party criticized this attitude in letters to the CPSU and by other means. Meanwhile, the Soviet Union at last came out in support of this resolution during last year's UN General Assembly session. Viewed against this background, the latest Brezhnev statement pledging not to be the first to use nuclear weapons--though it contains no new proposal--deserves attention, although it only proposes a partial measure which socialist countries regard as a minimum requirement in light of the fact that the United States stubbornly rejects even a ban on first nuclear strikes, not to mention a total ban on the use of nuclear weapons.

Nevertheless, as repeatedly pointed out by our party, at a time when lethal nuclear weapons capable of killing all mankind several times over are threatening man's very survival, a partial measure which does not openly and squarely call for an all-out ban on nuclear weapons cannot measure up to the demand of the hundreds of millions of people the world over. The signatures of tens of millions of Japanese submitted to the UN Special Session on Disarmament call for "top priority to be given to a total ban on nuclear weapons."

Therefore, it is not right to ask the world to evaluate the Brezhnev proposal, which does not regard a total ban as an urgent task, as if it were something supreme, and even less so to fabricate a story that an "appeal" calling for such an appraisal was actually adopted with the support of many parties. Such behavior is not only unbefitting a socialist country but also cannot be condoned from the point of view of general canons of international behavior.

These issues involving the Sofia conference have brought into relief the picture of the followers of big-power hegemonism who are trying to seize every opportunity to impose the line of regarding the Soviet Union as the center of communism upon the world communist movement. Even so, the deception, which is really a poor one and very easily disproved, casts doubt on the moral fiber and discernment of those involved.

CSO: 4120/332

MILITARY

JAPAN'S FUTURE PROPOSALS FOR DISARMAMENT DISCUSSED

Tokyo CHUO KORON in Japanese July 82 pp 90-96

/Article by Tetsuya Endo, Deputy Director-General for the UN Affairs, Ministry of Foreign Affairs: "Four Proposals That Japan Should Make."/

/Text/ Introduction

The Second United Nations General Assembly Session on Disarmament will be held at UN Headquarters from 7 June until 9 July; and Japan's Prime Minister Suzuki will attend and give a general address on 9 June. Since the First UN General Assembly Special Session on Disarmament was held in May and June 1978, it was exactly four years ago.

During this period of time, tension has heightened in various areas of the world, such as the Soviet military invasion of Afghanistan at the end of 1979, the Iran-Iraq dispute, the strained conditions in Poland in 1981, and the recent Falkland Islands dispute; detente between East and West has greatly receded and the international situation has undergone an increase in violence. There is the view that the world situation has turned in the direction of military expansion rather than disarmament.

Because of such a state of affairs, it has been asked by some with a feeling of powerlessness regarding the disarmament issue what in the world was the meaning of the First General Assembly Special Session on Disarmament and won't this second session on disarmament end in the same way as the first? However, the road to disarmament is a long, thorny one; disarmament is not something which can be realized in a day and a night; it is not something which can be solved simply because one or two UN sessions on disarmament are held. Rather, given this kind of violent international state of affairs, disarmament is a topic which is even more poignant and to which even more effort can be devoted. This present disarmament conference should be taken as the "second milepost" (the first session on disarmament was the first milepost), and although we should restrain from putting too great an expectation on this session, we should not look at it nihilistically. Rather, it is important how this occasion of 157 UN member nations meeting together in one hall and of the world's top leaders gathered together is used to promote disarmament.

In Japan, Europe and the U.S., the concern of the people toward the discontinuance of nuclear weapons, disarmament and this second special session on disarmament has recently grown tremendously, and compared to the first special session on disarmament four years ago, has risen markedly. The background and action format of citizen level concern in the disarmament issue differs depending on country and region, but it seems that what they have in common is an earnest desire that a nuclear disaster must be prevented, based on the fear that perhaps the earth and mankind will be destroyed by the rapid development of nuclear arms.

At the time of the Second UN General Assembly Special Session on Disarmament which will open under such circumstances, I would like to state below my own views concerning why disarmament is necessary, why disarmament is difficult, the course of disarmament until now, the manner of advancing realistic disarmament and Japan's basic posture toward this conference. (This does not represent the government's opinion)

Why Disarmament Now?

It seems that unfortunately the history of mankind for the most part has been a history of bloody combat and war, rather than a history of peace, but even so, it is a fact that the search for peace and efforts at disarmament as the principal means to peace have always continued, no matter how slim. Along with the fact that the method of combat has gradually become brutal due to the advances in military technology and has gone from being a fight between soldiers to one involving civilians indiscriminately, the cry for disarmament has become more earnest. Reflecting on World War I, the Geneva agreement on the prohibition of the use of poisonous gas and bacteriological weapons, concluded in 1925, distinguishes the pros and cons of disarmament, and the London and Washington naval disarmament treaties from the 1920's through the 1930's were examples of this.

However, the reason why disarmament is being demanded even more earnestly now is the atomic bombs which appeared at the end of World War II and the rapid development of nuclear arms. It is said that at present nuclear warheads in excess of one million of the Hiroshima-type bombs are stockpiled on the earth. Furthermore, not only does the quantity continue to increase, but the development of missiles, the transport means of nuclear weapons, is rapidly progressing and their flight distance is increasing and their strike precision is surprisingly accurate. These nuclear weapons have already reached an enormous number which can be called overkill; and once nuclear war occurs, there is the danger it will develop into a tragic situation involving all of mankind.

Furthermore, from the economic perspective, expenditures for military arms are in the astronomical figures. At present, when the definition of what are the military expenditures has not been established internationally, the world's military expenditures cannot be calculated accurately, but according to estimates by the group of experts commissioned by the UN, it is said that the sum more than exceeds 500 billion dollars annually. According to another

view, it is said to have reached 600 billion dollars. It can be calculated that this is equivalent to about 6 percent of the entire world's total production. In terms of human resources directly involved in the military, it is said that at present the regular armies are at a level of approximately 25 million soldiers, and about 40 million when reserve troops are included.

Naturally, military expenditures enrich the arms industry and industries related to arms. Although the effect that the development of military technology is useful in improving the ultramodern technology of industry, the problem in macroeconomics is that military expenditures disregard the principles of market economy and divert limited human resources and natural resources to nonproductive fields of the military. Moreover, looking at the past 20 years, military expenditures have steadily increased at about the ratio of a substantial 3 percent annually.

Recently, such arms have become extremely expensive economically; and more than anything else, there is the fearsome danger they are tied to the destruction of this planet and all of mankind. Consequently, it can be said that the significance and necessity of disarmament are extremely great.

Long, Steep Road to Disarmament

Disarmament is mankind's common desire, and despite the fact that its necessity is fully realized, the fact that the increase in armaments between various countries of the world, starting with the U.S. and USSR, has continued as ever is a contradiction of this desire. However, there are inevitable causes for this which cannot help but exist under present international relations.

International society at present consists of a gathering of sovereign nations and is in a situation where each nation has to guarantee its own security independently or in cooperation with other friendly nations so that there are no superpowers above these sovereign nations with the power to coerce or police. In short, the guarantee of security for each nation is eventually entrusted to the national defense efforts and military power. An actual problem often seen in today's world is the example where an armed force dispute occurs because, even though one nation wants peace, it is threatened, or invaded or intervention takes place by another nation with superior strength.

At the end of World War II, the United Nations was established after reflection upon the fact that war must not be repeated again, and the lofty ideal of preserving world peace was displayed by each nation. However, the UN is not a structure in which the UN possesses military forces in order to preserve international peace and security and guarantees security in place of each country. After all, sovereign nations are obliged to preserve their own security on their own.

The problem of disarmament which regulates, limits and curtails armaments is a life and death problem directly concerned with the security of one's own country, no matter what country. Moreover, guaranteeing security is a requirement of sovereignty for sovereign nations.

Certainly, it is not possible to guarantee the safety of a country simply with armaments. Stability of the country's economy, government and society and the maintenance of good international relations through diplomatic efforts are indispensable requirements for security. However, it is not possible to substitute the functions of deterrence and defense which only military power has with means other than military power. In this sense, it can be said that disarmament and security, first of all, are two sides of the same coin. This is the difficulty in disarmament. In actually advancing disarmament, it is necessary to increase each country's perception of security by disarmament measures, or at least work so as not to damage the perception of security. The fact is that disarmament will not progress without that.

Course of Disarmament Negotiations

Looking back at the course of disarmament negotiations since World War II, naturally the core issue was avoiding nuclear war and promoting nuclear disarmament. However, as for the concrete places for deliberation and negotiations on the disarmament question, three places can be listed: bilateral talks with the U.S. and USSR at the center, negotiations at the Geneva Committee on Disarmament and the United Nations.

U.S.-USSR Bilateral Talks

At present, when all is said and done, the core of the world's disarmament talks is the negatiation between the U.S. and USSR. In the final analysis, even disarmament talks at the Geneva Committee on Disarmament cannot be concluded without U.S.-USSR mutual agreement. As for recent international relations, multipolarization is advancing both politically and economically, but militarily, the bipolar structure of the two nuclear superpowers, the U.S. and USSR, has continued consistently. Consequently, maybe it is natural for U.S.-Soviet bilateral talks to be the center of the world's disarmament negotiations.

In October 1962, the "Cuban Crisis" occurred when President Kennedy was ready for the possibility of nuclear war in opposing the Soviet Union's attempt to bring nuclear missiles into Cuba, the backyard of the U.S.; and he insisted that the Soviets withdraw them. The U.S. and USSR which have experienced the fear facing the threshold of a nuclear war recognize the gravity of such a situation and the importance of stabilizing relations between the two countries. And so the era of easing tensions, called detente, opened.

In this era, several international treaties have been concluded, such as the Treaty for a Partial Nuclear Test Ban, Nuclear Arms Non-Proliferation Treaty (NPT), and the Underwater Nuclear Ban Treaty, based on mutual agreement by the U.S. and USSR. The Ballistic Missile/Antiballistic Missile (ABM) Limitation Treaty, the result of the first Strategic Arms Limitation Talks (SALT-I) which were held in 1970, as well as the provisional agreement on strategic offensive weapons limitation can also be listed. Next, SALT-II, which followed in 1979, was signed but because the Soviet Union militarily invaded Af-

ghanistan in December of the same year, the U.S. Senate tabled ratification of the treaty. President Reagan, purporting the aim should be "reduction" not "limitation" of strategic weapons, re-examining the content of SALT-II and going a step further, proposed to the USSR that talks should be held with the name changed to Strategic Arms Reduction Talks (START). In response to this, Secretary Breszhnev responded to the effect that the USSR also welcomes this.

As for whether or not an agreement will be concluded in which strategic stability between the U.S. and USSR is brought about by START, in connection with the changes in Intermediate Nuclear Force (INF) talks already being held in Geneva since the end of November 1981, it is extremely important that it is from the viewpoint of nuclear disarmament and in the sense that it is tied to the promotion of detente between East and West.

Geneva Committee on Disarmament

The Geneva Committee on Disarmament is the only disarmament talks agency for large numbers of countries in today's world. Disarmament talks after World War II first took place on the stage of the newborn United Nations, but, given the severe postwar cold war between East and West, efforts of various countries in the UN toward disarmament were not rewarded and ended in deadlock. So, in 1959, the Committee on Disarmament was newly organized in Geneva, and was comprised of 5 countries each from the East and West camps, for a total of 10 countries, as the location for disarmament talks outside the limits of the UN. Thereafter, disarmament talks were separated from the UN and moved to Geneva.

Two years later, in 1961, this committee became an 18 member disarmament committee with the addition of 8 nonaligned countries. Japan has participated in the committee on disarmament since 1969; at that time, the committee was made up of 26 nations; at present, it has increased to 40 nations, including the five large nuclear powers, the U.S., USSR, UK, France and China.

In any event, many disarmament agreements and treaties have been prepared here and among them are the previously mentioned Nuclear Arms Non-Proliferation Treaty and the Underwater Nuclear Ban Treaty. At present also, efforts are continuing with the aim of prohibiting all nuclear testing and prohibiting chemical weapons.

Disarmament Issue in the UN

The disarmament issue, separated from the UN with the relationships between many countries and moved to the Geneva Committee on Disarmament showed further progress after the era of "detente" was achieved. However, in the sense of nuclear disarmament, that is, directly limiting or reducing nuclear capability, disarmament has progressed very slowly and all the while, improvement and modernization of nuclear arms has continued constantly.

Looking closely at the fact that on the one hand, during this time, the independent nations of Asia and Africa achieved political independence one after

the other, but they are unable to take off economically, and on the other hand, massive amounts and capital and resources are consumed for arms in the advanced nations, accordingly then, concern has been directed toward the disarmament question.

Although the developing nations are participating in the Geneva Committee on Disarmament---in reality, no more than some of the developing nations are participating---and also, normally they are dealing with the disarmament question in the UN General Assembly, it is no more than one topic among many, diverse topics. Thus, the idea of opening a special General Assembly session which would have disarmament as its only agenda came into existence among the nonaligned nations; former President Tito of Yugoslavia formally proposed a Special United Nations General Assembly Session on Disarmament at the Fifth Nonaligned Leaders Conference in 1976.

However, I would like to point out that the UN is a place for discussions, whether a special session or the General Assembly, and can only advise and propose. What is advocated, advised or proposed in the General Assembly is not something which will be immediately transformed into reality, but when agreement is obtained between concerned countries, the agreement can somehow change into reality. However, even so, it can be said that international public opinion on disarmament question for which a proposal was adopted will not be disregarded by any country. The importance and influence of proposing disarmament are, after all, great.

In this way, the schema for the disarmament question is U.S.-USSR bilateral talks, the Geneva Committee on Disarmament and the UN will mutually cooperate and complement each other. It is worthy of note that the UN special session on disarmament, with world public opinion as the background, has taken on the major role of adding momemtum to the U.S.-USSR talks and the negotiations of the Committee on Disarmament.

Actual Progress of Disarmament

It is thought that the balance of power among nations maintains the present peace and security of international society. During the 37 years since the end of World War II up until the present, there have been more than 100 territorial disputes. It is understood that the reason a dispute of worldwide scale was at least avoided is because there was a comprehensive balance of power both in terms of nuclear capability and conventional capability of the U.S. and USSR. It seems that based on such thinking, the nations of the world generally recognize the necessity of maintaining a certain defense capability. It is thought that this deterrent force theory or balance of power theory have fortunately operated effectively until now and have validity even now.

However, it is argued that such a balance of power theory is already an antiquated concept in the present time of nuclear arms and now a new framework of international relations must be sought. Certainly, regarding the balance of power thoery, such concepts are expressed such as, in what way is it decided

the concept of "balance" has been realized, and, won't the arms level rapidly rise in a vicious circle as a result of each country subjectively pursuing and demanding balance, and, isn't this theory tied to nuclear catastrophe if there is a signle misstep.

However, as long as there does not exist a framework which can replace the balance of power theory in present international politics, we cannot help but premise on that theory. Social science is different than natural science, and experiments are extremely difficult. Sovereign nations cannot make the survival of its citizens and the free life of its citizens, that is, its own security, material for experimentation. When such a harsh reality is taken into account, it is thought that there is no other way but to apply the brakes somehow or other to arms competition, to continue preserving the balance between nations and try and devise a balance of power at the lowest level possible.

As for the real progress of disarmament, it is not an abstract appeal for disarmament, but an accumulation of concrete, possible means. For example, a proposal which is too ambitious and which no country could possible meet in today's state of affairs, or the proposal which is thought to be clearly beneficial only to specific countries, will not be able to be supported but will only raise the question of why the proposing country is making such a proposal. And it is not something which will brighten the prospects of the realization of disarmament. Likewise, no matter how ambitious the agreement, it would not last long as long as there are insufficient verifications measures and there are loopholes. Rather it is possible it would destabilize international relations. For example, a too idealistic proposal of unilateral disarmament may be a dream, but it has the danger of destroying the balance of power and as a result, destabilizing international relations.

Disarmament is a means toward the major objective of peace and security, and this means should be real and concrete and it should be able to move forward step by step via persistent negotiations.

As the only country in the world which has suffered from atomic bombing, Japan is a treaty state of the Nuclear Arms Non-Proliferation Treaty and has given up the option of nuclear arms, and has adhered to the three principles of non-nuclearization---"not possessing, nor making nor bringing in nuclear arms." Likewise, Japan is devoted to a specialized defense under its peace constitution and possesses a minimum defense capability for self defense. And perhaps for the first time in the history of mankind, Japan is pursuing the experiment of not becoming a military power even though it is an economic power.

Furthermore, for Japan, which does not have resources except human resourcefulness and technology and which depends greatly overseas for resources, world peace and Japan's maintenance of friendly relations with the world's nations are indispensable for maintaining its own peace, security and economic prosperity.

Thus there is no other country for which disarmament, one important step toward world peace and stability, is more necessary than Japan. In particular, the discontinuation of nuclear weapons is the desire of the people of all nations, and from Japan's special position, it has the duty to propose and call for nuclear disarmament, the ultimate extinction of nuclear arms, to the world and to the nuclear power, the U.S. and USSR.

Then what should Japan insist on and what kind of proposal should it make at the Second United Nations Special Session on Disarmament which starts 7 June?

What Should Japan Insist On?

First of all, Japan must strongly insist on giving the highest priority to nuclear disarmament. Moreover, as has been mentioned repeatedly, it is not enough to simply call abstractly for nuclear disarmament; it must make proposals as realistic and concrete as possible.

One would be the total ban on nuclear testing which would put the brakes on the development and production of nuclear arms. According to the 1963 Treaty for a Partial Nuclear Test Ban, nuclear testing in the atmosphere, space and underwater is prohibited, but adding underground testing to this would prohibit all nuclear testing. Since underground testing of a certain level can be detected by means of seismologic development, verification of a total ban on nuclear testing has become possible. More detailed investigative work on a total ban on nuclear testing has begun at the Geneva Committee on Disarmament and the fact of the matter is that I hope a treaty for a total nuclear test ban will materialize as rapidly as possible.

The second would be the reinforcement of the nuclear arms non-proliferation system. The Nuclear Arms Non-Proliferation Treaty has the inequality of dividing treaty nations into nuclear states and non-nuclear states. However, approval of this inequality is bases on the two premises that the peaceful use of nuclear power by the non-nuclear states would not be obstructed and the nuclear states would make efforts at nuclear disarmament. As for Japan, along with pointing out these two premises again, I would like to have Japan make an appeal that all countries participate in the Nuclear Arms Non-Proliferation Treaty no matter whether they are nuclear states or non-nuclear states.

The third would be the development of and compromise agreement on U.S.-USSR bilateral strategic arms and intermediate range nuclear arms reduction talks. Certainly, Japan is not directly involved in U.S.-USSR bilateral talks, but the conclusion of these talks is something which will control the destiny of the world, including Japan. As for Japan, I would like us to make an appeal to both the U.S. and USSR for the development of negotiations.

Secondly, Japan should strongly insist on disarmament in the field of chemical weapons. Next to nuclear arms, chemical weapons are the most genocidal weapons and, different from nuclear weapons, many countries possess the potential for producing them. Thus, it is important to advance further the Geneva

protocal of 1925 which prohibited their use in time of war, and to prohibit the development, production and storage of these weapons. However, the issue of prohibiting chemical weapons contains many technological problems; especially difficult problems are how to clearly stipulate the scope of chemicals which are the object of prohibition and how to create verification means in order to ensure the fulfillment of the treaty obligations. Japan must endeavor to enter negotiations to draw up a chemical weapons prohibition treaty together with actively contributing to the resolution of these problems.

Thirdly, sufficient attetnion must be paid to disarmament in the field of conventional weapons. International disputes and wars since the end of World War II have all been with conventional weapons. Likewise, 80 percent of the world's military expenditures have been spent for conventional weapons and conventional capability. It is a fact that some of the developing countries which rely solely on conventional arms for their own security have not necessarily shown a positive attitude toward the regulation of conventional weapons. However, Japan must make an appeal for conventional arms disarmament in the problem of the dreadful, limitless international transfer of conventional arms which aggravate territorial disputes and are tied to new disputes. (One step would be the understanding of the present situation.)

Fourthly, I would like to take up the problem of disarmament and development. Although immense sums of money are spent militarily in the world, there are people who breathe hunger and poverty in other developing nations. Disarmament and the North-South problem are two of the world's greatest problems today. Along with the advance of concrete disarmament steps in both the nuclear and non-nuclear fields, the possibility of turning freed resources toward improvement of the standard of living of people in various countries can be expected and sufficient investigation must be conducted, including the question of a fair international ratio of military expenditures.

Japan's insistence at this Second Special Session of Disarmament would not be so spectacular as to excite the admiration of all people. Given the essence of the disarmament problem, it should not be spectacular. Japan must faithfully and quietly come to grips with this special conference as the "second milepost" on the long, steep road to disarmament, and with the momemtum gained from the U.S.-USSR bilateral talks and the Geneva Committee on Disarmament by means of such international efforts, disarmament is something we pray will move forward a step or two at a time.

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CSO: 4105/133

ECONOMIC

RECURRING PROFIT IN THE FIRST QUARTER IN 1982 REPORTED

Tokyo NIHON KEIZAI SHIMBUN in Japanese 30 May 82 p 1

[Text] With the world economy in a slump, Japan's enterprises lack the strength for recovery. A NIHON KEIZAI SHIMBUN tabulation of revenues of 788 firms (banking, insurance and securities excepted) listed in national stock exchanges and which reported their financial situation for the March quarter of 1982 as of May 29 shows that recurring profits were up in the second half (October 1981-March 1982) by 16 percent over the first half (April-September 1982). This can be attributed to the growth of the electrical machinery industry dealing with growth products such as computers and improved conditions in the shipbuilding industry which had been striving to wipe out deficits and in the depressed basic industry abetted by price hikes. Another large factor is the sharply improved monetary balance through financial relaxation. Moreover, the second half is a period of seasonal increase of profits, but still recurring profits represent a 2.3 percent decrease over the same period last year. Because of zero growth, the business conditions of enterprises are in a stalemate. Further, in the structurally depressed industry, such as chemical and oil, virtually no sense of recovery exists in view of the low level of profits or continuing deficits. Also, within the same industry, a bright outlook is limited to specific areas, depending on product line. The management's expressions are stern, suffering from the unexpectedly long legacy of the second oil crisis.

More than 90 percent of the firms listed in the stock exchanges have released their first quarter financial reports as of May 29. For the entire industry, they show that revenues increased by 8.3 percent in the second half of 1981 over the first half, and recurring profits up by 16 percent. The manufacturing industry itself registered gains, with 7.1 percent increase in revenues and 22.2 percent in recurring profits.

The industry suffered a loss for two consecutive quarters: in the third quarter of 1980 when it suffered a record loss and again after the oil crisis and deflation. It can breathe easier now that it has registered a recurring profit after a year and a half.

Along with the favored conditions of certain processing industries such as electrical machinery, the favorable turn of the basic industry is the prime mover for increased profits. Especially, the contribution of the oil industry is great. This can be traced to the penetration of price hikes for oil products from August and reduction of losses from currency fluctuations. A major national firm, Maruzen Oil Company, cut its deficits from 73.8 billion yen in the first half to 25.5 billion in the second, partly through personnel retrenchment. The six oil firms' share of total profits have exceeded 42 percent.

In addition, the paper pulp and chemical industry registered sharp profits, up 5.9 and 52.8 percent respectively over the first half. In the paper pulp industry, it was due to improved market conditions and lower prices for raw materials. The chemical industry received its support from price hikes in some products and through rationalization measures such as energy conservation. Another factor was the improved monetary balance following the monetary easement in the fall of 1980.

In industries, such as oil and chemical, plagued by a wide gap in supply and demand, improved profits imparts no sense of optimism as market recovery has fallen short of expectations. Suffering from the import of inexpensive foreign products, they have barely managed to rise to the water's surface and deterioration of their strength goes on.

In the iron and steel industry which had a 3.7 percent recurring profit increase over the first half, only the seamless pipe did well in exports. In the industry as a whole, there is a lack of sense of brightness because of depressed domestic demands. With public investments and housing in a slump, even the glass and gravel industry suffered a recurring profit loss of 8.2 percent over the first half.

Growing conspicuous is the breathing difficulty of the processing industry, having performed the role of prime mover in enterprises' business conditions. The machinery and precision machinery industries have seen their profits decline for two consecutive quarters. Likewise, the automobile industry also reported a profit decline of 8.9 percent over the first half. In the precision machinery industry, a profitable turn in camera exports due to weak yen was offset by sagging domestic demand. The machinery industry is suffering chiefly from poor sales of industrial machinery. As for machine tools, the keen price competition has resulted in a profit decline for Okuma Machinery Works, Ltd. in the second half.

Exporters of completed autos have enjoyed a high level of profits due to weak yen and boosts in export prices, but some parts-making firms have registered a profit decline because of a ceiling on auto production.

Amid such a situation, the electrical machinery industry continues to make gains. Computer, semi-conductor and office automation machinery registered a high growth as usual, with the information revolution and the energy conservation related investment boom in the entire industry. Among home appliances, only VTR saw a high level of production centered on exports.

Recurring profits were up by 12.5 percent in the second half, compared to 9.7 percent in the first half. In addition to weak yen, increased profits from fund applications due to stronger financial structure contributed to profit increases.

Interim Tabulation, March Quarter, 1982 Financial Statements

of National Stock Exchange-Listed Enterprises

(In 1 million yen and percentage; ( )=decrease)

		Sales (Rate of increase of revenues)	Recurring Profits (Rate of increase of profits)
Entire industry (788 firms)	Mar 82	97,518.2	2,268.8
	Previous quarter	8.3	16.0
	Corresponding quarter, previous year	9.6	(2.3)
	Sep 81	90,055.2	1,956.5
	Previous quarter	1.2	(15.8)
Manufacturing industry only (518 firms)	Mar 82	33,046.6	1,342.2
		7.1	22.2
		8.3	17.7
	Sep 81	30,855.2	1,098.8
		1.1	(3.6)
Entire firms excluding oil and electric power	Mar 82	88,313.2	1,983.6
		8.4	12.3
		10.0	13.3
	Sep 81	81,455.9	1,766.6
		1.5	0.9

N.B. Tabulations include 788 firms which released financial statements as of May 29, out of 864 listed in the eight national exchanges and having March settlements.

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CSO: 4105/129

ECONOMIC

ECONOMIC PROSPECTS REPORTED

No Stimulus Until Fall

Tokyo MAINICHI DAILY NEWS in English 24 Jun 82 p 5

[Text] A senior government official indicated Tuesday that no additional business-stimulating package would be adopted before this coming autumn, despite a prolonged business recession.

The signal came following separate meetings between Prime Minister Zenko Suzuki and Toshio Komoto, director general of the Economic Planning Agency (EPA), and Suzuki and Finance Minister Michio Watanabe.

The official said the three leaders agreed that under prevailing fiscal and monetary conditions, it would be practically impossible for Japan to adopt a new business-stimulating program right now.

He said the government leaders were considering submitting a supplementary budget to the Diet during its next extraordinary session in autumn or at its next ordinary session late this year. The budget would prepare funds for carrying out another reflationary program.

Few Choices for Planners

Tokyo MAINICHI DAILY NEWS in English 24 Jun 82 p 5

[Text] With an increasing number of economic indicators flashing signs of stagnation, and with policy choices limited, Japanese government economic planners are pinning slim hopes on slow recovery of consumer spending and stepped-up public works expenditure.

"The economy is overcast like the rainy season that has just set in," a government economist said. "Coupled with the yen's steep depreciation, we could be in a downpour later this year."

Most economic sectors have swung into the negative. Industrial production in April fell 1.9 percent from March for the third drop in four months in the wake of dwindling exports.

Customs-cleared exports in May sagged 6.2 percent from April, more than offsetting the previous month's 2.4 percent gain.

An Economic Planning Agency (EPA) survey of major trading firms shows they plan to export 9.4 percent more in the second half of this year than in the first half.

But a senior EPA official discounted this by saying the survey mirrored traders' expectations of larger sales based on an uncertain U.S. economic recovery.

Stocks of unsold products are swelling, still standing at levels a year ago when manufacturers began busily trying to reduce them. EPA officials say inventory adjustment will continue into the July-Spetember quarter.

Another dampener is business capital spending, which dropped 1.7 percent in the first quarter of 1982 from the previous three months.

Spending by smaller businesses is on the downhill, although big business is steadily boosting investments, according to the EPA.

Among the few bright signs is rising take-home income, which the EPA expects to tanslate into increased consumer spending.

A Prime Minister's Office survey shows disposable income of salaried workers rose for the third straight month in March, with another gain expected in April figures soon to be announced.

But EPA officials again played down the income upswing, pointing out much of an increased portion is going to lighting, heating and other obligatory expenses with less spent on durable goods and other items that would help boost economic activity.

"We have yet to see if higher income will really lead to increased consumer spending," an EPA spokesman said.

In an attempted shot in the arm for the flagging economy, the government is seeking to concentrate 77.3 percent of public works spending budgeted for fiscal 1982 in the first half (April-September).

Other reflationary measures — both monetary and fiscal — are not in the offing. Lowering interest rates is far from possible given the yen's weak value, said a Finance Ministry official.

"Pump-priming measures are even more difficult in view of the swollen budget deficit," he added.

Growth Rate May Fall

Tokyo THE DAILY YOMIURI in English 23 Jun 82 p 5

[Article by Koji Takada]

[Text]

Introducing an economic perspective, compiled by the International Trade and Industry Ministry (MITI), at a recent press conference, International Trade and Industry Minister Shintaro Abe said that real economic growth rate for the current fiscal year will be as low as 3.3 percent, far below the government-set target of 5.2 percent.

But prospects by the private sector sound far more pessimistic.

For example, Sumitomo Bank, which in January estimated the rate at three percent, downgraded it in March to between two and three percent.

The bank, revealing its third estimate, now says that there is a possibility that the rate will drop below two percent in the worst case.

A pessimistic view of this kind is also held by some

other private institutions, most of which estimate the growth rate at about three percent.

As for 1981 the government at first estimated the real growth rate at 5.3 percent, then at 4.7 percent and finally at 4.1 percent. In the long run, however, the real growth rate turned out to be as low as 2.7 percent.

This is a rare case where the government's estimate showed a big difference from the actual result since 1975. The largest gap between the government's estimate and the final real growth rate was seen in 1975 when the government estimated the rate at 4.3 percent and the real growth rate turned out to be 3.2 percent.

With the index for fiscal 1970 as 100, all the years after fiscal 1976 attained more than five percent real growth rates except 2.7 percent for fiscal 1981 which was the second lowest following minus 0.2 percent growth for fiscal 1974 following the first oil crisis.

There is a strong possibility that the real growth rate for 1982 will turn out to be as low as some three percent as many private institutions forecast.

As long as the current high interest rates in the US continue to prevail, recovery from business slump in industrially advanced nations is certain to be delayed. This is because it is impossible to rely upon exports too much.

As for the domestic demand, housing business is still suffering from slump and activities among minor enterprises which contribute greatly to pushing-up of investment in plant and equipment are sluggish.

Although personal consumption seems to be recovering thanks to stabilized prices, its effect on business is not so large at present.

Economists and business leaders differ greatly in their interpretations on the low growth rate for the second consecutive year.

Keynesian economists insist that the Japanese economy can afford five percent real growth because of the high saving rate in this country and Japan's potential ability for technological innovation.

According to this theory, rigid financial management works to stem the growth rate, so that business bolstering measures by financial means are needed.

Contrary to this the "low growth" motto pushed by the business community shows that it is unrealistic to expect high growth rate only in Japan as most of the countries of the world are experiencing aftermath of the second oil crisis.

This group also insists that the greatest task at present is financial and administrative reform and that there are no reserve finances available for bolstering business, indicating a negative attitude toward business stimulation.

To decide which thought is correct will be a focus for the subsequent economic management.

Whichever view is adopted, there will be greater shortfall in tax revenue calculated upon government's estimate if the final real growth rate is far below the estimate. Moreover, such a great difference between the official estimate and the final result may help increase distrust in the government's economic policy.

CSO: 4120/322

ECONOMIC

STRATEGIES FOR REVENUE SHORTFALL DISCUSSED

Government Revenue Sources, Plans

Tokyo SHUKAN TOYO KEIZAI in Japanese 22 May 82 pp 44-47

[Article: "3 Trillion Yen Revenue Shortfall; Time for the Pretense of 'Financial Rebuilding' To Be Dropped"]

[Excerpt] The Truth Begins To Emerge as the Budget Is Passed

Tax revenues in 1981 never grew actively, but there were signs of recovery in December of last year and January of this year. However, the hopes of the government offices involved in finances were in vain. Revenue growth fell off again in February, and the growth rate fell to only 5.4 percent in March in comparison with the rate for the same month last year. The cumulative growth rate up to March, in comparison with the same months in the previous year, was 9.5 percent. This was 9 percent below the revised budget estimate. If we assume that tax revenues will continue to grow at this rate, the budget shortfall will be 2.4 trillion yen.

The government has refused to recognize the likelihood of a large revenue shortfall in 1981. However, when it realized that this could no longer be hidden, Finance Minister Watanabe began to explain the real situation in the beginning of May, after making certain that the 1982 budget would pass.

At first, the revenue shortfall was expected to exceed 1 trillion yen, but now the estimates are that it may be as high as 3 trillion yen.

Prime Minister Suzuki has made a public commitment to reduce the issue of deficit-covering national bonds to zero by 1984 without imposing a tax increase. It has now become apparent to everyone that the pretense of "financial rebuilding" is an impossibility. The problem is when and how this pretense will be dropped. The government's recognition of a major revenue shortfall is a step in the direction of readjusting the government position in line with the real situation.

Useless Argument Over Responsibility

Former Prime Minister Fukuda made a statement at the first of the year that "a large revenue shortfall would lead directly to political problems." Since

then, the revenue shortfall has become a political issue. Certainly, with respect to the revenue shortfall of 1981, the government was responsible for an excessive estimate of tax revenues at the budget revision stage. In the revised budget, the tax revenue estimate was adjusted to less than 450 billion yen, but by the end of last year it was generally expected that the revenue shortfall would be slightly over 1 trillion yen. In order to reduce the tax revenue estimate even further, it would have been necessary to cut expenditures further or expand the issue of national bonds. Either alternative would have been difficult.

Looking at the graph on page 44, we see that a shortfall in comparison with the original budget has occurred several times before. Each time, however, an expanded issue of national bonds has been used in a revised budget to fill the gap. This is shown by the rapid rise in dependence on national bonds. There has never been a revenue shortfall of 1 trillion yen at final settlement.

Government policies are shown by expenditures. Revenue is only estimated. The government is not responsible for a revenue shortfall. The revenue estimate is based on the government's economic forecasts. Therefore, if prices are unexpectedly stable or the real growth rate is reduced and goes below the nominal growth rate, a revenue shortfall is inevitable. This is exactly what happened in 1981.

The Economic White Paper published last summer declared that the "Japanese economy weathered the second oil shock." It was generally believed that a real growth of 5 percent was possible. However, it later became apparent that the second oil shock had been taken too lightly. The government's economic forecast at the end of last year lowered the estimated growth rate to 4.1 percent, and now the government estimates that it will go no higher than 2 percent.

When Fukuda was prime minister, Japan made an international commitment to keep its growth rate high, but it was unable to carry out the promise even when it took measures to stimulate the economy. In a free economy it is very difficult to carry out economic goals to the letter.

Corporations must pay corporate taxes within 2 months after annual settlement. Companies with a March settlement must pay by the end of May, and tax revenues received by this date are included in the revenues for FY81. Tax revenues for May will be counted by the early part of July, so the government must prepare measures to cope with the problem by then.

It is no longer possible to make up for the shortage of revenue in 1981 through an increased issue of national bonds. After subtracting the unused amount of expenditures (approximately 500 billion yen), it will be necessary to follow the law and use the settlement adjustment fund (approximately 250 billion yen), borrow the remainder from the national debt adjustment fund (approximately 3.5 trillion yen), and pay back that portion by the year after next (1983). The major impact of the 1981 revenue shortfall will come after that.

A Scenario of Deferred Payment Leading to a Tax Hike

The cause of the present slackening of growth in tax revenues is the slowdown in economic growth. And recently the view has gained strength that the economic slowdown is due to the effects of the second oil shock rather than the business cycle. If that is the case, the poor growth in tax revenues is likely to continue at least up to 1984, through the period of financial rebuilding.

At the time of the first oil shock, the real growth rate of the Japanese economy fell from 10 percent to 5 percent. As a result of the sudden increase in oil prices, there was a growing substitution of other production elements for oil on the supply side, and capital productivity was reduced. On the demand side, the growth rates of most other countries also slowed, and Japan was unable to greatly expand its exports.

After the inflation caused by the first oil shock had stabilized, Japan took strong public financial measures to stimulate the economy, partly at the request of foreign countries. However, it was unable to restore the high growth rate that had existed previously and only succeeded in increasing its dependence on national bonds.

In the second oil shock of 1979, a similar change seems to have occurred. Beginning in 1980 the real growth rate dropped into the 3 percent range. Now, even with public sector stimulation, there is a good possibility that the national debt will only grow larger and the growth rate will fail to increase much. Even with low growth, the rate of unemployment is not suddenly increasing. This is one reason why the financial sector is concerned more with administrative reform than with the restoration of prosperity.

There are three possible ways to deal with a shortage of tax revenues: 1) cut expenditures; 2) make up the difference with an issue of national bonds; and 3) increase taxes.

The basic government policy previously has been to cut expenditures through administrative reform and reduce the national bond issue, and then to deal with the revenue shortfall by reducing expenditures. This eliminates the effects of built-in stabilizers in government finances and has some negative effects on prosperity. Also, the greater the shortage, the tougher it is to cut expenditures. When this happens, a new problem develops in the relationship between administrative reform and financial rebuilding.

Administrative Reform Is First Priority

Yukio Noguchi (Hitotsubashi University professor) has the following view: "Administrative reform is the solution to the present problems of government finances (the 3 trillion yen deficit, etc.) and will make financial rebuilding possible. However, the idea of reducing the issue of deficit-covering bonds to zero by 1984 was only a way of showing a goal in understandable terms. It is not fundamentally related to administrative reform. There is nothing wrong with changing working objectives at any time. It is not

desirable to set firm targets for revenues and expenditures and then cover up problems with seeming cuts in expenditures and tax increases. The best method for setting working objectives is to maintain a certain percentage of the GNP for expenditures."

A real problem is the fact that it is quite possible that measures will be taken to extend the financial rebuilding period 2 more years. "However," says Masaru Yoshitomi (senior general researcher in the Economic Research Institute of the Economic Planning Agency), "the decision to get away from deficit-covering national bonds by 1984 was made before the second oil shock. Although achievement of this goal has been made very difficult by the subsequent changes in circumstances, it is no one's fault. Therefore, economists should be flexible and reevaluate their targets.

"Just the same, however, it is necessary politically to set a deadline. Once the set goals are changed, it will seem that there is a lack of discipline, and the people will lose faith in the politicians in power. If the financial rebuilding period is extended, it will go on being postponed indefinitely unless there is very strong political leadership."

If things were done in the proper order, postponement of financial rebuilding would come after a cut in expenditures. Former Vice Minister of Finance Minoru Nagaoka (now vice president of the Japan Monopoly Corporation) has this to say: "The gap between revenues and expenditures is very large, but as large a cut as possible should be made in expenditures. And if this proves too difficult, measures should be taken to increase revenues or postpone financial rebuilding. It is clear that once we relax, financial rebuilding will be postponed more and more."

The Ministry of Finance is really aiming at the introduction of a large indirect tax. Even if financial rebuilding is postponed somewhat, the tax revenue shortage will not be eliminated. Also, it will not be possible to have a large income tax cut during this period, so it will be necessary to adjust the ratio of direct to indirect taxes.

It will gradually become clear how Prime Minister Suzuki will go about dropping the pretense of "financial rebuilding without raising taxes." At the soonest, there is a possibility of shifting the use of public finances to stimulation measures around the time of the summit in the first part of June by taking advantage of outside pressure. The first part of June, when the 1981 revenue shortfall will become certain, will be another turning point. Another possible time for change will be after the election for LDP president in November. However, it will be impossible to get the people's support for a tax increase without executing administrative reform that is acceptable to them.

Greatly Expanded Issue of Deficit-Covering National Bonds Unavoidable

Tax revenues for 1982 are based on the revised budget for 1981, so a revenue shortfall in 1981 will have a direct effect on 1982. If there is a revenue shortfall of 3 trillion yen in 1981, there will be a shortfall of 3 trillion

yen in 1982, even if economic growth is achieved in line with the economic forecast. If economic growth falls behind the government's forecast, the revenue shortfall will be even greater.

The government's economic forecast is based on the 1982 budget. It predicts real economic growth of 5.2 percent and a nominal economic growth of 8.4 percent. It is now clear, however, that this is excessive. It is highly probable that the real economic growth will stay in the 3 percent range and that the nominal economic growth will stay in the 6 percent range. If the growth rate drops by two points (assuming that the income elasticity coefficient for tax revenues is 1.8), the tax revenue shortage will increase to more than 1 trillion yen. If there is a revenue shortfall of 4 trillion yen, it will be necessary to revise the budget again.

If the 1982 budget is revised, it will be difficult to make a large cut in expenditures and it will be necessary to fill in the gap by issuing more deficit-covering national bonds. The problem is whether the money borrowed from the national debt adjustment fund can be recovered by issuing deficit-covering bonds.

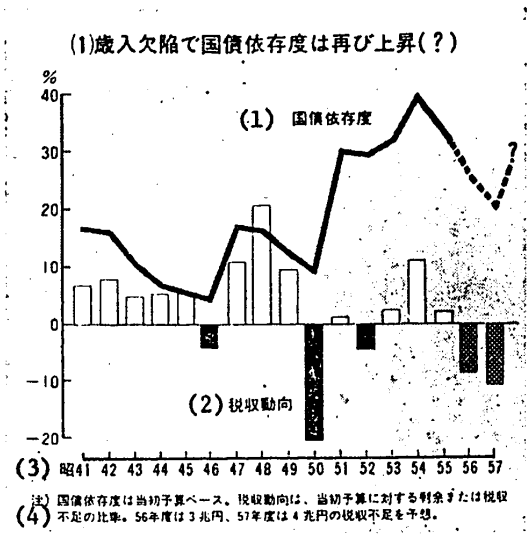
The proper procedure would be to make the repayment with the 1983 budget, but this would make it just that much more difficult to formulate the 1983 budget. Therefore the Ministry of Finance is studying the idea of revising the law so that 1) repayment could be made and everything cleared up in the 1982 budget revision, or 2) repayment would be permitted after 1984. If the repayment is made in the 1982 budget revision, an increased issue of 6 trillion yen in deficit-covering national bonds will be necessary. It took great effort to reduce the amount of deficit-covering national bonds by 5 trillion yen in the 1980 budget, and this effort would all be thrown away at a single stroke.

Budget formulation for 1983 will be even more difficult. On 5 June of last year, a zero ceiling (zero increase in preliminary budget requests) was set, and with the help of an emergency report from the Second Ad Hoc Committee, a tight budget was formulated, with an increase in general expenditures of only 1.8 percent (see Fig 2). However, it is certain that the setting of the ceiling will be greatly delayed this year.

If the budget is formulated in accordance with the idea of "financial rebuilding without a tax increase," tax revenues will be 5 or 6 trillion yen less than the estimate in the "Midterm Prospects for Public Finances" submitted by the Ministry of Finance as reference material for budget deliberation (see the chart on page 45). The "Midterm Prospects" calculates future revenues and expenditures on the basis of present systems and policies, and shows a necessary adjustment figure (balancing revenues and expenditures with a tax increase or expenditure cut) which will reduce deficit-covering bond issue to zero. The necessary adjustment figure for 1983 is 3.37 trillion yen. If this is added to the shortfall in tax revenues, it will be necessary to cut expenditures by 8 to 9 trillion yen. If the repayment of the amount borrowed from the national debt adjustment fund in 1981 is added, the necessary cut in expenditures will exceed 10 trillion yen.

The bold opinion of the financial sector, which took a position of support for administrative reform in the Second Ad Hoc Committee, is: "Since the general accounts budget amounts to 50 trillion yen, there is no reason why that much could not be cut. This is a test of whether administrative reform will be carried out in earnest."

However, this same financial sector makes the following criticism: "A right-minded person would think that such a budget was impossible. We cannot expect immediate results from administrative reform. The Ad Hoc Committee should not indulge in the fantasy that such a huge budget cut is possible." The Budget Bureau of the Ministry of Finance, of course, rejects a large expenditure cut from the outset.



(1) Increased Dependence on Deficit-Covering Bonds Because of Revenue Shortfall

Key:

1. Rate of Dependence on Deficit-Covering National Bonds
2. Tax Revenue Trend
3. 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982
4. Note: Rate of dependence on deficit-covering national bonds based on initial budget. Tax revenue trend is rate of tax revenue surplus or shortfall in comparison with initial budget. A tax revenue shortfall of 3 trillion yen is predicted for 1981 and a shortfall of 4 trillion yen is predicted for 1982.

General Accounts List

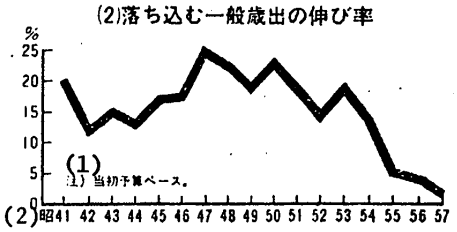
一般会計予算総表 (1)（単位：億円，%）

(2)年度		(3)56	(4)57	(5)58
(6)歳出	(7)国債費	66,542 (25.3)	78,299 (17.7)	88,500 (13.0)
	(8)地方交付税	80,835 (23.5)	92,309 (14.2)	104,400 (13.1)
	(9)一般歳出	320,504 (4.3)	326,200 (1.8)	361,000 (10.7)
	(10)計	467,881 (9.9)	496,808 (6.2)	553,900 (11.5)
(11)歳入	(12)税収	322,840 (22.2)	366,240 (13.4)	409,700 (11.9)
	(13)税外収入等	22,341 (17.1)	26,168 (17.1)	25,700(△ 1.8)
	(14)国債収入	122,700(△14.0)	104,400(△14.9)	84,800(△18.8)
	(15)赤字国債	54,850(△26.7)	39,240(△28.5)	19,600(△50.0)
	建設国債	67,850 (0.0)	65,160(△ 4.0)	65,200(△ 0.1)
	(16)計	467,881 (9.9)	496,808 (6.2)	520,200 (4.7)
(17)要調整額		—	—	33,700

（注）カッコ内は前年度比伸び率。58年度は大蔵省「財政の中期展望(昭和56~60年度)」(18)示された数字。

Key:

1. (Unit: hundreds of thousands of yen, percentage)
2. Year
3. 1981
4. 1982
5. 1983
6. Expenditures
7. Debt Service Expenses
8. Regional Transfer Taxes
9. General Expenditures
10. Total
11. Revenues
12. Tax Revenues
13. Nontax Revenues, etc.
14. National Bond Income
15. Deficit-Covering National Bonds, National Construction Bonds
16. Total
17. Amount Needed for Adjustment
18. Note: Figures in parentheses are growth rates in comparison to previous years. Figures for 1983 are taken from the Ministry of Finance's "Midterm Prospects for Public Finances (1981-1985)."



(2) Decreasing Growth Rate of General Expenditures

Key:

1. Note: Based on Initial Budget
2. 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982

Last year's zero ceiling was an ultimate effort. It was put together by reducing the amount of the burden borne by the national treasury for welfare pensions and repaying the amount with interest from 1985 on. What will happen this time? Experts in public finance look at it this way. "Even if the Ad Hoc Committee can be used again to cut expenditures, the most that can be hoped for is a ceiling of -5 percent. This will mean an increase in outside areas such as public works, so as a result, general expenditures will grow as much as last year."

Prime Minister Suzuki has said that "a transformation in thinking is necessary." It is expected that the present tax system will be reevaluated, that there will be a tax increase, and that nontax revenues will be scraped up by such means as using up the supplementary currency recovery reserve. In addition, tax revenues will probably be assessed on the high side in order to make ends meet.

Another Bond Issue Likely

Tokyo ASAHI SHIMBUN in Japanese 14 May 82 p 9

[Article: "10 Trillion Yen Over a 3-Year Period; How Can Tax Revenue Gap Be Filled? Are Deficit-Covering National Bonds the Last Resort? Idea of Increasing the Bond Issue During Budget Revision Emerges"]

[Text] It is reported that the tax-revenue shortfall from 1981 to 1983 will amount to a total of 10 trillion yen, and the Ministry of Finance bureaucrats are turning pale at the thought. It is their own fault, because they were unable to see that Japan's economic power was declining, and they went ahead with a financial rebuilding plan based on a tax revenue estimate that was too high. Now it is an almost impossible task to fill the gap. Also, they must act within the limits of Prime Minister Suzuki's public promises of "financial rebuilding without increasing taxes" and "zero increase in deficit-covering bond issues in FY84." So they complain that they are "bound hand and foot." How will the Ministry of Finance go about making up for the huge revenue shortfall?

During questioning at the Diet on 12 May, Finance Minister Watanabe stated that the 1981 revenue shortfall "may be 10 percent (of the initial budget amount)." Ten percent of the initial budget would be more than 3.2 trillion yen--or 2.8 trillion yen under the revised budget, which is reduced by 450 billion yen.

Predicting on the High Side?

The Ministry of Finance bureau involved now estimates that the shortfall will be about 3 trillion yen in relation to the initial budget, so the minister of finance gave a reply in excess of this prediction. This seems to be a shrewd plan on the part of the finance minister to predict the shortfall on

the high side in order to alleviate the shock when the actual amount is determined. At the same time, it is a fact that the bureau is not trusted, because it has continually made overly optimistic forecasts. Six months ago, at the end of last year, the Tax Bureau stated that the maximum shortfall for FY81 would be a little more than 1 trillion yen. If tax revenues have fallen so far in the "launching pad" year of 1981, what will happen in 1982? When we consider that the tax revenues for this year include corporate tax revenues through the March settlement of next year and that next year's tax revenues will include corporate tax revenues for the following year, it is impossible to predict the exact extent of the shortfall. We can see this from the way the 1981 revenue shortfall kept increasing while various predictions were being made. If the economy begins to move upward, the opposite might occur.

However, if we calculate on the basis of 1981 tax revenues, which have definitely fallen to the range of 29 trillion yen, there is a strong probability that the shortage for this year will be about 4 trillion yen less than the amount in the budget (about 36.6 trillion yen), and that for next year it will be about 4 or 5 trillion yen less than the amount forecast in the "Midterm Prospects for Public Finances" (about 41 trillion yen). The total shortage, including that of 1981, will be 11 trillion yen.

The shortfall for 1981 will be taken care of by using the settlement adjustment fund (approximately 250 billion yen) and borrowing from the national debt adjustment fund (approximately 3.5 trillion yen). This is determined by law. However, the amount borrowed from the national debt fund must be repaid by 1983. It will therefore be necessary somehow to raise 10 trillion yen with the 1982 budget revision and the 1983 initial budget. If the revised budget is formulated to stimulate the economy and an income tax reduction is added in 1982, it will become necessary to find even further sources of funds.

Expenditure Reduction and Tax Increase

The first countermeasure being considered by the Ministry of Finance for the revenue shortfall is to cut expenditures. For this purpose, the ministry has adopted a policy of a "minus ceiling" to limit the rough budget requests by government ministries and agencies for next year, with some exceptions. However, most portions of the budget, like educational expenses, are made up of items which slide up with price increases, such as social insurance, pensions, and salaries. So the real belief of the Ministry of Finance is that a substantial reduction is impossible.

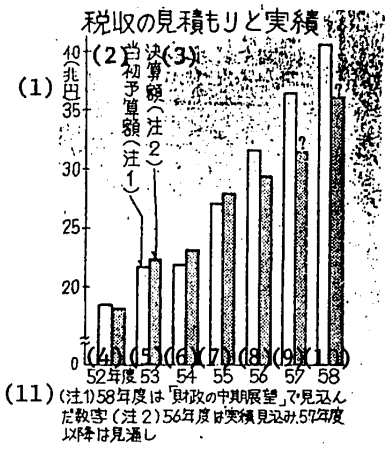
The second source of funds is the special reserves held secretly by government ministries and agencies. It is believed that Prime Minister Suzuki was referring to this when he said that "a transformation in thinking is necessary." A representative item is the "supplementary currency recovery reserve" (approximately 1.2 trillion yen). If these sorts of reserves are used, it could amount to a substantial sum. However, this is not a permanent source of funds.

The third possibility is a tax increase. With respect to the prime minister's public commitment of "no tax increase," high officials in the Ministry of Finance say: "It was an expression of commitment that no large or new tax increases would be made without efforts to reduce expenditures." They are interpreting it very loosely. They maintain that a tax increase within the limits of the present tax system or a tax increase to obtain sources of funds to make up for a reduction of income would not violate the public commitment. With an election for the House of Representatives coming up next year, it may be impossible to have a large tax increase. Some tax increase is inevitable, however, in the name of "correcting unfairness."

Public Promise Becoming Obscured

The three measures mentioned above will require revisions in the law, so they cannot be carried out immediately. Also, there is a limit to the amount of funds that can be obtained. What then emerges as a last resort is the issue of more deficit-covering national bonds in the budget revision for this year. The Ministry of Finance, latching onto the fact that the prime minister's public commitment is targeted for 1984, claims that an increased bond issue in an interim year and in a budget revision does not violate the commitment. An increased issue of 5 trillion or 6 trillion yen in deficit-covering bonds would cause great political problems, and there is also the problem of how to efficiently digest that amount of national bonds in the economy. However, the majority of Finance Ministry officials lean toward the view that there is no better proposal than an increased bond issue. The prime minister's commitment is now being expressed rather vaguely. "We will get away from a system of dependence on deficit-covering national bonds in FY84."

Meeting with these Finance Ministry officials, one is reminded of the scene in Washington at the beginning of last year. The Reagan administration's Office of Management and Budget Director Stockman fought with the various government agencies and departments and Congressmen, and 2 months after taking office he came up with a revised budget proposal that was 6 percent less than the estimate produced by the previous administration. There is a great difference between Japan and America in the bureaucratic system for making up the budget and in the public reaction to reductions in social welfare payments. It is also a fact, however, that the Japanese Government's budget is overblown as a carryover from the high-growth period. In spite of this, the determination of the Ministry of Finance to make improvements seems very slight in comparison with that of Washington.



Tax Revenue Estimates and Actual Results

Key:

1. (trillion yen)
2. Initial Budget Amount (Note 1)
3. Amount at Settlement (Note 2)
4. 1977
5. 1978
6. 1979
7. 1980
8. 1981
9. 1982
10. 1983
11. Note 1: Figures for 1983 are the estimates found in "Mid-term Prospects for Public Finances." Note 2: Actual-result figures for 1981 are the expected amounts; figures for 1982 and 1983 are forecasts.

9651
CSO: 4105/119

ECONOMIC

JAPAN URGED TO FOSTER INDUSTRIAL COOPERATION

Tokyo DAILY YOMIURI in English 23 Jun 82 p 1

[Text] Japan, which owes 'much' of its economic success to booming exports, should promote industrial cooperation among highly advanced countries, extend technological know-how to other nations and stimulate domestic demand, the 'White Paper on International Trade '82 said Tuesday.

The annual report, prepared by the International Trade and Industry Ministry (MITI), also said Japan should contribute to the harmonious development of the world economy by maintaining the principle of free trade and expanding economic cooperation with developing countries.

This outline of the country's future trade policy was approved by the cabinet Tuesday.

As one of a few industrial states with a relatively low unemployment rate and high productivity, Japan advised the US and Western Europe to expand technological development and plant and equipment investment to combat unemployment and lagging productivity.

The white paper also suggested that Japan's Western allies take steps to keep labor costs from rising, streamline labor-management relations, and produce an antiprotectionist market environment.

Japan barely managed to achieve a 2.7 percent real economic growth in fiscal 1981, which ended March 31, with exports contributing 2.1 percent. The rate was far below an official target of 4.1 percent and was the lowest growth since 3.6 percent in 1975.

The country posted a $4.77 billion current account surplus last year against a $10.7 billion deficit a year before.

Japan's exports in 1981 grew by 17.1 percent to $152.03 billion, reflecting the strong competitive power of the country's processed and assembly industries.

These successful industries, the white paper said, lowered production costs through aggressive equipment investment, developed products which met consumer needs and conducted an ambitious overseas market campaign.

Imports on the other hand recorded a modest 2 percent gain to total $143.29 billion due to stagnant demand for petroleum and other raw materials.

The white paper proposed an upgrading of Japan's export structure, calling for greater overseas shipments of high quality and high value-added products, diversification of markets and "prudent" activities to avoid irritating its trade partners.

Japan's market is not as closed to imports as the Americans and Europeans say in light of the current tariff rates and residual import quotas, it said.

Noting the Japanese Government's market-opening measures since last December, the white paper urged Japan's trading partners to make further efforts to sell their goods in the Japanese market which it predicted is capable of absorbing more manufactured products from abroad.

It blamed the economic malaise gripping the industrialized West on a decline in labor productivity caused by the absence of large plant and equipment investment and technological innovation.

One solution put forward was industrial cooperation among highly advanced countries to create more jobs, revitalize local industry and promote technological exchanges.

For Japan, this option would promote internationalization of industrial management, form a close sense of mutual dependence and help develop harmonious external trade ties.

CSO: 4120/323

ECONOMIC

MITI'S ECONOMIC SUPPORT ON DEPRESSED INDUSTRIES EXAMINED

New Structural Recession Law

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 24 May 82 p 1

[Text] Voices are growing in the industrial world for enactment of a new law to take the place of the temporary measures law on stabilization of specific recession industry due to expire at the end of June next year to ensure the de facto extension of the original law. As a result, Keidanren (Japan Federation of Economic Organizations) plans to convey the views of the industrial world for new legislation when its chairman, Inayama, and others confer with Ministry of International Trade and Industry's Administrative Vice Minister Fujiwara and members of his staff on May 28 to discuss measures for each industry. MITI has already begun a study of the new legislation and will take the views of the industrial world into consideration.

Strong Endorsements of Paper Pulp and Petrochemical Industries

The Structural Recession Law is a legislation of 5 years duration enforced in May 1978 to render aid to industries suffering from structural recession following the initial oil shock. It applies to 14 types of industry, such as aluminum refinery and ammonia manufacturing which, excluded from application of the Anti-Monopoly Law, have been disposing of surplus equipment. But with such steps almost over, those advocating the extension of the law were limited until last year to sectors such as the paper pulp industry.

However, when Keidanren's Industrial Policy Committee (chairman, Ryoichi Kawai; president, Komatsu Ltd.) recently polled top officials of 12 industrial organizations centered on structural recession businesses as petrochemical and paper pulp, it was found that there were strong opinions in support of a "law to take the place of the structural recession law after its expiration."

The industries concerned were primarily fertilizer and aluminum. Industries receiving benefits but cool toward the law's extension seems to be limited to the textile industry such as synthetic fibers and cotton. Like the paper pulp and petrochemical industries, there are other industries hoping for the enactment of a new law and coming under its purview. Among other industries coming under the provisions of the law, electric open-hearth furnaces and

ferroalloy industries have also backed the extension. Together with the textile industry, the shipbuilding industry remains cool regarding the extension.

The reason for stronger voices in the industrial world for new legislation and defacto extension of the Structural Recession Law is that business conditions, which once appeared to improve, are sliding again. The managements' underlying motive appears to be: "A flexible application of the Anti-Monopoly Law is essential to improve and revitalize the constitution of enterprises under conditions of low growth. But if great expectations cannot be placed thereon, there must be such a thing as the Structural Recession Law (Eiji Suzuki, chairman, Mitsubishi Chemical Industries Ltd.)"

At the moment, MITI is studying the enactment of a new law, to include the matter of oil tax reduction and electric power rate discounts. It hopes to boil down the substance by listening to the views of the industrial world at the Industrial Structure Council. Eventually, coordination will be required with the Fair Trade Commission and the Ministry of Finance, but owing to the strong desires of the industrial world, the chances of the Structural Recession Law being extended have greatly improved.

Iron-Steel Industries Reconstruction

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 25 May 82 p 7

[Text] From the point of view of maintaining international competitive power, the Ministry of International Trade and Industry has launched a study of a policy for full support for an equipment replacement program centered on the iron and steel industry. The bulk of major equipment being constructed between 1965-1975, the time has come for its replacement. It is feared that if nothing is done, basic industry such as iron and steel would lose their international competetive power around the second half of the 1980's and become afflicted with the same "U.S. ailment." MITI hopes to study concrete support measures for inclusion in the new fiscal 1983 policy from three angles: (1) early implementation of iron and steel equipment investment program; (2) equipment investments related to new technological developments; and (3) investments to gain higher added values. However, the reduction of equipment amortization term is considered as difficult from an objective situation. Hence, a study group is likely to be set up in the Industrial Policy Bureau.

According to a survey by the Industrial Structure Council's Industrial Fund Group, the ratio of enterprises responding "not absolete" as to the degree of equipment absolescence fell from 52.6 percent in fiscal 1976 to 32.5 in fiscal 1982.

Japan's iron and steel industry's large furnaces are among the world's best. The inexpensive, plentiful and high grade steel produced by these furnaces is a major reason for the strong international competetive power of other

processing and assembly industries. But as most of this steel producing equipment was constructed in 1965-1975, it requires a complete change after the next fiscal year.

In fiscal 1980 and 1981, the iron and steel firms managed to finance such projects themselves. But after this fiscal year, they are unable to do so and must depend on outside loans because of greater amount of funds needed for complete restoration, adverse profitability due to decreased domestic demand for steel arising from a prolonged business stagnation, and price hikes enough to cover only the rising cost of raw materials. For instance, at Nippon Steel Corporation, this fiscal year's equipment investment (payment basis) amounts to 290 billion yen, but it can only put up 200 billion within the range of equipment amortization and the rest of 90 billion would have to rely on external financing by floating debentures or foreign loans. Without government support for greater restorative investments after fiscal 1983, implementation of the project will face difficulty and increase the chances of Japan's iron and steel industry facing a situation similar to its counterparts in the United States.

Hence, there are feelings in MITI that a positive support is needed to maintain international competetive power over an intermediate and long-term period, rather than taking the view that equipment investments in the iron and steel industry represent a prime mover of economic policy. Presently, intra-departmental coordination is taking place within MITI on whether the target of aid should be limited to only the iron and steel industry or whether other industries should be included and on what shape it should be. As for measures for the basic industry, the aluminum and petrochemicals are hard pressed and require immediate attention. Though there are feelings that the iron and steel industry can wait since it involves intermediate and long-term measures, it can be said that equipment replacement which helps maintain international competetive power is extremely vital as viewed from the future of Japan's whole economy. Thus, the Basic Industry Bureau is hoping for early action by the industry on the equipment replacement program and plans to come up with some plan of support for the program which involves the development of new technology, a key point, and higher added values.

Iron-Steel Industry's Equipment Financing Plan

(Net increase or decrease; unit: in million yen and percentage. MITI survey)

	Fiscal 81		Fiscal 82		Fiscal 83	
	Amount	Structural Ratio	Amount	Structural Ratio	Amount	Structural Ratio
Stocks	10.8	1.7	6.4	0.8	0	0
Debentures	(10.2)	(1.6)	175.2	20.6	149.1	15.0
Loans	(235.2)	(36.8)	(192.2)	(22.6)	89	0.9
Equity	874.4	136.7	859.6	101.3	838.1	84.1
(Depreciation)	660.0	103.2	744.2	87.7	745.7	74.9
(Others)	214.4	33.5	115.4	13.6	92.4	9.3
Total	639.7	100.0	848.9	100.0	996.1	100.0

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CSO: 4105/126

ECONOMIC

PUBLIC WORKS PROJECTS IN 1983 DISCUSSED

Public Works Funds Increase

Tokyo NIHON KEIZAI SHIMBUN in Japanese 31 May 82 p 3

[Text] A move is growing in the government and the Liberal-Democratic Party calling for an increase of public works funds in the fiscal 1983 budget. Since 1979, such funds have remained at about the same level for 3 consecutive years as compared to the original budget, but the prevailing thought is that they should no longer be restrained due to their relations with economic buoyancy and tax revenue increases. The move centers around the Ministry of Construction and partly on the LDP. They will call on the Ministry of International Trade and Industry to establish a separate ceiling for public works funds apart from the estimated demands for the next fiscal budget. Also, the Economic Planning Agency plans to ask the Ministry of Finance to increase the public works funds for the next fiscal year by 5-10 percent. The moves, therefore, are expected to greatly affect the fiscal 1983 budget.

Confrontation with Ministry of Finance Inevitable Over Next Fiscal Year's Budget

Because of the critical shortage of sources of revenue, the Ministry of Finance is determined to draw up a minus ceiling to reduce the scope of estimated requirements for the next fiscal budget over the current budget. But the Ministry of Construction argues that "revitalization means a cutback of current spendings more in line with revenues, and that treatment of public investments the same way as current expenditures is improper." (Construction Minister Shiseki) Separate handling of public works funds was also requested at the ministerial conference on economic measures on 28 May.

Further, on the same day, proponent LDP members of both the Upper and Lower Houses convened a "discussion meeting of Dietmen for promotion of public investments" and drew up demands for an increase of fiscal 1983 public works funds. At the meeting, the Ministry of Construction reported on its analytical findings on the public investment's economic impact.

According to the report, (1) public works funds for fiscal 1982 show an actual decline of 11 percent over fiscal 1979; (2) as a result, in regions highly dependent on public works such as Hokkaido, Tohoku, Shikoku and Kyushu, the economy is in a serious slump; (3) if nothing is done, Japan's economy will

be in for a diminished equilibrium. Then, it calculated that had public funds been increased an average of 10.5 percent yearly after fiscal 1979 as was proposed under the new economic 7-year plan, "nominal GNP would be 0.5-2.4 percent higher than actual, and tax revenues, both national and local, be higher by about 2.3 trillion yen in 3 years."

Some dietmen commented, "The Economic Planning Agency has come up with the same sort of analysis. Government funds should be allocated on a preferential basis for investment type expenditures that bear fruits in the future." A decision was made to convene a joint meeting of LDP's four groups--construction, agriculture and forestry, transport and commerce--and to expand the circle of demands for more public works funds.

Further, the Ministry of Construction plans to launch a "public investment fund increase campaign" by explaining the analytical findings on the public investment's impact.

In the meantime, the Economic Planning Agency plans to ask the Ministry of Finance that when it decides on ceilings of estimated demands for fiscal 1983 budget, it establish a separate limit for public works and grant increases over this fiscal year's original budget. Coordination has already been effected between Economic Planning Agency Director Komoto and Construction Minister Shiseki on a separate ceiling for public works funds.

Against a backdrop of serious economic stagnation, small and medium-sized enterprises are making strong appeals for an economic boost through increased public investments. A frontal confrontation seems likely between the "allied front," composed of the Ministry of Construction, Economic Planning Agency and some LDP members, and the Ministry of Finance whose policy is to hold down the fiscal 1983 budget at any cost.

Public Works Budget

Tokyo NIHON KOGYO SHIMBUNSHA in Japanese 31 May 82 p 1

[Text] As of June 1, the Ministry of Finance reshuffled its staff and will commence work on the fiscal 1983 budget under Yasuo Matsushita, the new administrative vice minister. In keeping with the desires of Finance Minister Watanabe to "curtail general spending as much as possible," it will reduce the minus range of the ceiling for estimated demands expected to be presented in early July and conduct a thorough review of revenues, to include non-tax revenues. Hence, the prospect of realization of the request centered on the Ministry of Construction for a separate public works ceiling is considered slim. It seems certain that a "tax increase line" will be pushed, starting off with a review of the enterprise-related tax system, involving possible higher tax rates on oil, higher taxes on wage withholdings for retirement, and adjustment and rationalization of special tax measures.

Oil Tax Increase

With respect to insufficient tax revenues for fiscal 1981, the Ministry of Finance asserts, "No specific figures are yet available." But it has decided to resolve the problem under the existing law by using up the settlement adjustment fund (approximately 250 billion yen) and borrowing from the government bond adjustment fund (about 3.5 trillion yen). As for their repayment, it hopes to "arrive at a decision" while considering the financial situation of fiscal years 1982 and 1983. (Finance Minister Watanabe). This represents a tilt toward a "divisive formula" separating 1982 and 1983 from the earlier proposed method of including the fiscal 1982 shortfall in the fiscal 1982 supplementary budget.

It is based on the reasoning and judgment that: (1) it would be premature, as fiscal 1982 has just begun, to draw up a supplementary budget to integrate a revised economic outlook; (2) there is no reason to arrive at a hasty conclusion, for repayment is not required until fiscal 1983. As for insufficient tax revenues in fiscal 1981 and 1982, the matter is to be dealt with separately.

However, the Ministry of Finance is considering the floatation of new government bonds as "there is no choice but to float more deficit government bonds" and there are no new sources of revenue.

However, since the goal with respect to fiscal 1983 is "zero floatation of government bonds in fiscal 1984," it is absolutely essential to extricate from the physical constitution of government bonds (debts). For this reason, it has decided on a policy for a drastic reduction of expenditures, making up the shortfall in tax revenues in fiscal 1981 and 1982 by increasing revenues through tax hikes as much as possible.

On the ground that "nothing can be treated uniformly" (Finance Minister Watanabe) with respect to expenditure reductions, the proposal is to set up 4 separate ceilings for energy, economic cooperation, defense and science and technology as in fiscal 1982, the idea being to implement a minus ceiling on all except these special ceilings to hold down general expenditures as much as possible. Specifically, a drastic minus ceiling of 2-5 percent is sought, but an "unrealistic one would be useless" (Finance Minister). Thus, a more realistic reduced limit is to be drawn up hurriedly and presented to various ministries and agencies in the early part of July.

Also, with respect to the request of the Ministry of Construction and some industries for a "separate ceiling on public works to stimulate domestic demand," it states "it has no desire to study the matter." Instead of a separate ceiling, it hopes to include it within the ceiling.

Regarding tax hikes, "We talk about drastic cuts in expenditures, but in the sectors involved, it amounts to less than 1 trillion yen. From our past experiences, it only amounts to about several tens of billion yen" (Finance Minister Watanabe). Thus, MITI plans to look into drastic measures on the judgment that making up several trillions of yen would be difficult.

Though the introduction of large, indirect taxes such as the general consumer tax would be difficult, indirect taxes will be hiked through an expansion of the list of items subject to the commodity tax (now 80 items) and a higher tax rate on oil (now 3.5 percent, with a large focus on the enterprise related tax system.

Specifically, wages withheld for retirement would be subject to increased taxes and special tax measures adjusted and rationalized. As for retirement withholding, a reduced tax exempt cumulative rate from the current 40 percent to 30 percent is expected to yield more than 200 billion yen. In the case of special tax measures, the lowering of the tax exempt cumulative rate on Excess Hazard Reserve, Drought Reserve and Reserve for Damage from Redemption of Computers will be studied.

However, such a "tax increase line" is bound to be furiously opposed by financial and industrial circles which are strongly demanding that Prime Minister Suzuki carry out his commitment of "financial revitalization without a tax hike." It is expected to be a subject of bitter debate hereon.

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CSO: 4105/124

SCIENCE AND TECHNOLOGY

RESTRUCTURING OF SCIENCE AND TECHNOLOGY COUNCIL DEBATED

Reorganization This Fall

Tokyo NIHON KEIZAI SHIMBUN in Japanese 15 May 82 p 1

[Article: "Science Administration To Be Made Mobile; Reorganization of Science and Technology Council in the Fall"]

[Text] The Science and Technology Council (Prime Minister Suzuki presiding), which is a deliberative organization under the direct control of the prime minister, and is in charge of steering Japan's policies on science and technology, is to be reorganized in order to build a mobile structure so that timely policy deliberations can be carried out that will meet the needs of today's rapidly advancing science and technology. An overall reevaluation of the organization of various sectional meetings, centered around the Science and Technology Agency of the Executive Office, is under way.

The council is in the position of being the "headquarters" which promotes Japan's science and technology. However, the council cannot be said to have demonstrated its functions sufficiently so far, and the direction in which to strengthen its functions was being worked out in the second special administrative investigative meeting. This organizational reevaluation which is being undertaken is along the lines of the deliberation carried out in the special inspection, and the council is undergoing a structural reform in order to strengthen its functions, with the aim of completing [the reform] by fall, while keeping an eye on the special inspection report.

The objective of the reorganization is to create a structure that will enable Japan, which aims to base the nation on technology, to cope promptly with the development and advancement of science and technology and to work out instantly the necessary research and development promotion policies or to shape international strategies. As the fields of advanced science and technology, such as electronics, life sciences, and new materials, become wider, how Japan as a nation should decide which field is to be chosen as the key field, how to eliminate obstacles and promote research and development, how to advance international cooperation, and other such questions must be deliberated quickly, according to the circumstances, and decisions must be made promptly.

At present, the full council consists of six well-informed members and the relevant cabinet ministers, including the prime minister, the minister of finance, the minister of education, and the secretary of the Science and Technology Agency. Since, by the nature of its membership, the full council meeting cannot be held very often, the council cannot operate with mobility under the present setup. Therefore, a steering council consisting of the well-informed members and the secretary of the Science and Technology Agency is to be established in order to achieve mobility. However, the steering council cannot digest and solve all the problems, and it also lacks the power to make decisions.

At present, under the council, there are five sectional meetings (each consisting of approximately 30 members), including the consolidated sectional meeting and the research goals sectional meeting, plus nine departments. Except for the life sciences sectional meeting, which has the urgent theme of drafting guidelines for a gene-rearrangement experiment, many other organizations are in a state of hibernation and are not necessarily in a mobile structure.

For the new organization, the idea has been brought up to establish a steering committee (tentative name), which may be called an expanded version of the steering council, consisting of approximately 15 members, including well-informed members chosen from industry, government, and academia. This steering committee would have a mobile structure capable of reflecting the views of various areas and also would have some power. Proposed as its subordinate organizations are a policy planning sectional meeting, various sectional meetings according to the technical fields, and various sectional meetings according to the problems. These various sectional meetings would deliberate the makeup of research, among other things.

Reinforcement of Its Function

Tokyo NIHON KEIZAI SHIMBUN in Japanese 17 Mar 82 p 3

[Article by editorial staff member Koji Sasaki: "Wordy Battle at Special Administrative Investigative Meeting Over Strengthening the Function of Science and Technology Council"]

[Text] The first sectional meeting (Junsei Umemoto presiding) of the special administrative investigative meeting has used the knife of reform on "science and technology" as an important administrative field, and a considerable amount of argument has been boiled down. The target of this argument was the overall reorganization of the science and technology administration, and a heated debate was conducted, centering on the way the Science and Technology Council (an advisory organ to the Prime Minister) ought to function. One faction insists that the regulatory function of the council ought to be strengthened through the use of the science and technology promotion fund, while another faction, wary about this, wants to restrict its regulatory function. The two factions stood face to face right opposite one another. It will be interesting to watch how the special administrative investigative meeting will pass judgment on the matter from the standpoint of administrative and financial reform.

A Collection of Super Bigwigs

The Science and Technology Council is chaired by the prime minister, and its membership consists of various cabinet ministers, including the ministers of finance, education, economic planning, and science and technology; the president of the Japan Science Council; and men of learning and experience (Yoshishige Ashihara, Michio Okamoto, Yasuhira Suzue, and Isamu Yamashita). It is Japan's highest deliberative organization dealing with policy matters relating to science and technology. It is one "rank" higher than other advisory organs related to science and technology, such as the Atomic Energy Commission, the Space Activities Commission, and the Oceanographic Development Council. The fact that it consists of super bigwigs has turned out to be a disadvantage, because it cannot make "small turns." As a result, it cannot fully demonstrate its function, and people often wonder aloud what on earth the Science and Technology Council is doing.

If Japan wants to establish the position that the nation is based on technology in the 1980s, it is imperative that a consolidated, effective science and technology administration be developed. At present, the science and technology administration is implemented vertically. That is to say, matters related to the universities are handled by the Ministry of Education; matters related to mining and industry by the Agency of Industrial Science and Technology of MITI; and agricultural and fishery technology [matters] by the Ministry of Agriculture, Forestry, and Fishery. As a result, governmental sectionalism is strong and the system is far from a "consolidated and effective science and technology administration." Therefore, the Science and Technology Agency was created as the governmental office to carry out consolidated regulation among the various ministries and agencies. Its power is weak, however, and so it has ended up managing those gigantic projects not undertaken by other ministries and agencies such as atomic power, space, and oceanography.

Therefore, an argument has grown for strengthening the function of the Science and Technology Council. To do this, the council must have money, and so a sum of money (3.35 billion yen) was appropriated to a science and technology promotion regulatory fund in the 1981 budget without request for an estimate. The use of this budget was left entirely to the Science and Technology Council. [Some of] this money was immediately distributed for newly established creative science promotion work and as a special research promotion regulatory fund for regular business. The rest, amounting to 1.35 billion yen, was allotted to seven research and development themes which the Science and Technology Council considered important.

Challenging the "Vertical System"

The science and technology promotion regulatory fund was increased to 6 billion yen in the 1982 administrative budget bill, nearly twice the amount of the previous year. Not only that, but the estimated request was [only] 4 billion yen; yet the budgeted amount exceeded the request even though circumstances are harsh, as characterized by the zero ceiling. If this trend continues, the Science and Technology Agency, which is the executive office

of the Science and Technology Council, may become a "second ministry of finance" shielded by the council. It is quite natural that such misgivings should be felt by the concerned ministries and agencies.

Men of learning and experience who are the members of the Science and Technology Council have even said: "Consolidated regulation probably will become feasible with a budget of approximately 50 billion yen." Although not much can be done at the level of the present budget, a considerable amount of work can be done at the level of several tens of billions. Therefore, the argument about the proper functioning of the Science and Technology Council reached a climax during the first sectional meeting of the special administrative investigative meeting, [with the debate] centering on the science and technology promotion regulatory fund.

The concerned ministries and agencies insist that their own science and technology policies become very difficult to implement when the promotion regulatory fund gets bigger and bigger. That is to say, the promotion regulatory fund has been strongly conceived as a challenge to the traditional, vertical administrative relationship. Therefore, voices have been advocating more and more strongly that the promotion regulatory fund should somehow be restricted, so that each ministry and agency may be able to implement its own science and technology policies as usual.

Consolidated Policy Is the Future Theme

However, the faction supporting the Science and Technology Council argues that the promotional regulatory fund was newly added to the budget because the traditional, vertical administrative system is no longer able to provide adequate science and technology policies for a nation which aims to base itself on technology. It is incomprehensible to these people why someone would want to restrict this fund. This fund should be utilized effectively, superimposed on the science and technology policies of each individual ministry and agency. It is quite impertinent to try to upset it.

Originally, the Science and Technology Council was supposed to be in a position to grasp the overall situation of the science and technology policies of various ministries and agencies and to make decisions. However, the scientific research projects carried out by the universities have almost never appeared in the "ring" of the council. If the function of the Science and Technology Council is to be strengthened through the use of the promotion regulatory fund as a steppingstone, the constitution of the council must be reformed so that science and technology policies nationwide may be implemented broadly and effectively. Namely, the council should not remain the Science and Technology Council of the Science and Technology Agency alone, but must evolve into a science and technology council which is "open" to each and every ministry and agency.

9113
CSO: 4106/108

SCIENCE AND TECHNOLOGY

MITI SURPRISED BY CRITICISM OF 64K RAM EXPORTS TO UNITED STATES

Tokyo SHUKAN TOYO KEIZAI in Japanese 6 Mar 82 pp 28-31

[Article by Reporters K. Komabashi and T. Ikui]

[Text] The U.S. Department of Commerce is currently conducting a keen analysis as to why the West German economy has become stagnant. Among various factors, the fact that the electric machinery manufacturers representing West Germany, such as Phillips [not a German firm] and Siemens, have lost the international development competition with respect to semiconductors and IC is being studied seriously.

It is a very interesting fact that the United States is seriously worried that the U.S. semiconductor-IC industry may repeat West Germany's mistake if the current situation is allowed to persist.

This feeling is not in any way limited to the Department of Commerce, but with slight shades of difference the USTR (U.S. Trade Representative), the Department of State, and the Department of Defense all feel an enormous sense of crisis for the American semiconductor industry.

Top-level officials in charge of the actual work, such as Under Secretary of Commerce Olmer, USTR Deputy MacDonald, and Under Secretary of State Homatz /Phonetic/, are the central figures who feel a deepening sense of crisis toward the leading technology industry of semiconductor-IC. The Department of Defense does not hide its impatience with the technical progress and reliability of ICs that are to be incorporated in the cruise missile and MX missile, which are to be the central weapons in the U.S. defense plan.

Needless to say, the Japanese export offensive with the 64K-bit RAM semiconductor is playing the role of igniter of U.S. irritation. As is well known, in the case of the 16K-bit RAM the United States took the technological lead, following which Japanese enterprises squeezed in. In the case of the 64K, however, with a drastic leap in fine technology the Japanese enterprises have overwhelmingly taken the lead. As a result, the Japanese indeed hold as much as 70 percent of the 64K market in the United States.

Although 64K production has just gotten on its feet, the sense of crisis heard from Under Secretary of Commerce Olmer, among others, is that "once we

allow Japan to outdistance us with the 64K, which is the basic hardware of VLSI's, it will be impossible to catch up with her in the subsequent real battle for 256K or 1M (mega) VLSI's. If we were swept over by Japan with VLSI's, the oil of the industry, it would be a national security problem."

Possible Invocation of Article 232 of the Trump Card

In the case of automobiles or whatever, the conventional pattern of Japan-U.S. economic friction has been first to stir up labor unions and local groups, upon which businesses ride, following which strong views are expressed one after another in the U.S. Congress. The "customary practice" has been for the U.S. Government to play the role of appeaser. In the case of 64K semiconductors, however, the unique situation is the fact that the voices of criticism about Japan heard from some segments of Congress or of industrial circles are sort, while the four departments, State, Commerce, USTR, and Defense, which do not get along too well together, have a common sense of crisis.

Some even observe that offices like the Department of Commerce may instigate a firm like TI (Texas Instruments), which took a neutral position in the previous case of the 16K Japan-U.S. friction, to bring an "antidumping suit." Furthermore, if the Japanese share of 70 percent persists, there is even consideration of freezing out Japanese imports by applying Article 232, the "national security" provision of their trump card, the 1962 U.S. law on trade expansion.

The above article has been invoked only once, when the U.S. petroleum industry was driven into a corner due to the flow of cheap oil into the United States from the Middle East in the 1960's. A sense of crisis on the part of the U.S. Government can be perceivable.

Nervous MITI

MITI is dumbfounded by the U.S. Government's sense of crisis. As much as 60 percent of the semiconductor market of the world is in the United States, 30 percent in Japan, and 10 percent in other parts. Thus, the significance of the American market is considerable.

Should Japan be faced with a shutout of its U.S.-destined exports of the 64K, the Japanese semiconductor industry will receive a great blow. Furthermore, should a "dumping suit" be brought, both MITI and the semiconductor industry will end up expending enormous energy in response.

Nor is the raising of export prices as a countermeasure for "dumping" so easy, since it is the nature of the semiconductor [industry] to strive for low cost through mass production. If this is done, then the end users in computers and various other industries may on the other hand bring suit over the "anti-trust law" (the current minimum price for a 64K in the U.S. market is $5.5-$6.).

For this reason, MITI hastily sent for the industry's leaders in mid-February and warned them "not to make too conspicuous moves."

The basic policy of MITI is "coexistence and coprosperity with the United States. We are not even dreaming of Japan's holding a 70 percent share forever." Thus [MITI] is intently and tirelessly stressing the idea of coexistence and coprosperity with the United States. In a press interview on 24 February, the Japan Electronics Industries Association showed that it is keeping pace with MITI by stating: "The competition for demand for the 64K, if we use a marathon race as an analogy, has just begun. It is a field in which the demand will reach a 4.8-fold growth in 1985. If the United States establishes its mass production system, they will catch up all at once and we can coexist." (Managing Director Takai)

Overwhelming Differences Between the Two Sides

Incidentally, full-scale demand for the 64K will reportedly begin in the latter half of 1982, and vigorous competition is developing even among Japanese manufacturers. Aiming to regain the No 1 position in Japan, Hitachi announced loud and clear last fall that it will increase its monthly production from 700,000 to 1 million units in March.

In opposition, Nippon Electric Co., the leader in Japan and No 2 in the world in outside sales, announced that it has increased its production by 150,000 units every month since the monthly production structure of 300,000 in October of last year, and that it will reach 1.05 million units in March. Bullish production plans were also disclosed by others, such as Fujitsu's goal of 700,000 units in March; Toshiba's 300,000 in March and 1 million units by yearend; Mitsubishi Electric Corporation's 1 million units in October, up from the current rate of 300,000; and Oki Electric's goal of a 500,000-unit structure.

On the other hand, on the American side, although IBM and Western Electric have begun volume production for internal use only, even the world's No 1 outside vendors TI and Motorola have reached a monthly production of only 300,000. It is only natural that the market share of Japanese manufacturers would reach 70 percent.

A further decisive blow to the U.S. side was the development problem of the 256K, the next hardware to follow the 64K. The newspaper NIHON KEIZAI reported at the end of the last year "...volume production in 2 years"; and U.S. Government officials were amazed, wondering: "As early as that?" However, when asked, MITI and the industrial circles stated [this report] was "groundless," without hiding their anger. At any rate, the fire had been lit.

According to a leader in industrial circles, "it takes 1 year to produce a perfect sample, and 1 year to reach volume production." Thus [the report] doesn't seem totally groundless.

Decisive Difference May Appear With 256K and 1 Mega

A 64K-bit RAM is a memory (random access) that can write in, store, and read out 64,000 bits of information on demand. It is one of the important basic parts used in a computer.

The reason why this 64K is drawing this much attention is that it is a product for "entering into VLSI." Semiconductor IC's are upgrading the integration degree each year through fierce competition to develop "smaller, faster" chips, and the VLSI is at the top. Over 10,000 elements are built on a silicon chip of several millimeters square, and an incredibly small circuit pattern of less than 2 microns (hair is 100 micron thick) is drawn. This requires an extremely high degree of technology.

For that reason, it is an area with such a highly strategic character with respect to nations that (V)LSI is called "the crude oil of the industry" in the United States, and "the rice of the industry" in Japan.

And the only VLSI currently in commercial production is a 64K-bit RAM. In other words, the 64K is a symbol of Japan-U.S. competition (Europe has dropped out) with VLSI development to upgrade the degree of integration. Once outdistanced in this competition, [a firm's] chances of winning future competition in development become slim. Thus, the U.S. side is displaying a sense of impatience.

Difference in Output

This does not necessarily mean that the U.S. manufacturers got a slow start in developing the 64K. Although the research laboratory of Nippon Telegraph and Telephone Public Corporation and Fujitsu took the lead at the trial-manufacture stage, the U.S. manufacturers lined up on practically the same line at the final practical application stage with respect to the standardization problem.

However, the fact that this much difference has developed between the United States and Japan at the present time is due to "differences in volume production technique." As in the case of the automobile industry, Japanese manufacturers are more advanced in automation and quality control, the technical irregularity of the workers is low, and their morale is high. This difference has allowed improved output and permitted cost-effective production. Stated from the opposite side, the situation in the United States is its output is poor and it cannot compete with the price.

LSI technology can be divided roughly into design technology and manufacturing technology. The American side is superior in the former, whereas Japan is leading in the latter--that is, output. And, output is precisely what affects the power of the semiconductor industry as an industry.

In the case of the 64K, the technique is an extension of the technique of the previous 16K generation. Consequently, Nippon Electric, which controlled the 16K in Japan, is also showing strong confidence in 64K development. However,

since Mostek, which was the world's leader with the 16K, is running behind with the 64K, the American side is feeling restless.

Furthermore, the cause of even more impatience on the U.S. side is the competition for the development of the 256K-bit RAM, the next step up from the 64K. With 256K, the circuit pattern is further reduced to half the size, reaching 1 micron. At this stage, a big change is needed from the technology used up to 64K to a new technique such as an electron-beam exposure system.

Japanese manufacturing technology has also taken the lead with the 256K. In February 1980, Nippon Electric-Toshiba's information system laboratory and Nippon Telegraph and Telephone's electrical communications laboratory announced they would be trial-manufacturing. The blow was felt even harder because the former is an outflow of the VLSI joint technical research association, which was a joint research group of five Japanese firms started in 1976 under the auspices of MITI, and was criticized by U.S. industrial circles as a "concerted civilian and government effort."

On the other hand, it is reported that in the United States, only IBM and Western Electric have succeeded, but no concrete announcement has been made by other speciality manufacturers. The volume production by Japanese manufacturers was reported competitively under such circumstances, and the U.S. side became impatient. In the case of the 1 mega (1 million) chip, the circuit pattern is again reduced by half, to 0.5 micron.

However, it is the natural course of LSI to advance in the fine-process technology to 256K and to 1 mega. And the special announcements of the volume production time of various firms serves no other purpose but to fan competition.

Actually, the volume production time for the next product can be conjectured from the past pattern of development. From 1K to 64K, the degree of integration increased fourfold in approximately 2 years. Following the 16K, which was at its peak in 1980, volume production of 64K will drop in 1982.

Shifting from 64K to 256K, however, the technique takes off with a leap, and "the pace will be fourfold in 4 years, with 256K sitting on the throne in 1986 and 1 mega in 1990, plus or minus a year." (A. Oouchi, vice president of Nippon Electric).

Hint of Crisis Before the Fact

As is well known, this is not the first U.S.-Japan semiconductor war. It is still fresh in our memory that small and medium-size manufacturers in the United States organized SIA (U.S. Semiconductor Industry Association) and brought a suit for dumping before the ITC (International Trade Commission).

In the end, although the accusation was cleared, SIA and IBM succeeded in getting a development fund of 200 million dollars by bringing out the VHSIC (very-high-speed IC) development project from the Department of Defense.

On the other hand, the Japanese side has also increased the customs duty to 4.2 percent and enforced it from 1982. In addition, ventures into the United States are taking place one after another, beginning with Nippon Electric, followed by Hitachi, Toshiba, Fujitsu, etc.

U.S. enterprises such as TI, Motorola, Fairchild, and Intel have production bases in Japan, and at least as a trade issue "there is no reason for the United States to complain." (Nippon Electric's Oouchi). Moreover, in overall semiconductors, the U.S.-Japan trade balance is at an equilibrium.

In the present situation, if Japan controls exports of the 64K, which is short in stock as it is, loud displeasure will certainly be forthcoming from U.S. users. The U.S. Government is not necessarily showing its displeasure after adjusting to that situation, and it is undeniable that there is considerable hint of their sense of crisis before the fact. Although they do not market it abroad, the IBM and Western Electric 64K is no less competitive than the Japanese ones.

Nevertheless, MITI has taken up Alert 6 (the maximum alert posture), as long as the U.S. Government is deepening the sense of crisis from the national security viewpoint. The time to show a fight is up until the end of March. There is no telling what will jump out, including application of the trade expansion law. "The odds are 6 to 4"--showing their extreme nervousness.

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CSO: 4106/78

FY82 GOVERNMENT PROJECTS ON ELECTRONICS LISTED

Tokyo NIKKEI ELECTRONICS in Japanese 12, 26 Apr 82

[12 Apr 82 pp 217-219]

[Part I: "MITI: Three Long-Range, Large-Scale Projects Started"]

[Text] The projects on electronics included in the 1982 government budget will be introduced in three installments, starting in this issue. Beginning with MITI, the following offices will be picked up in the order shown: the Science and Technology Agency, the Defense Agency, the Ministry of Transport, the Ministry of Posts and Telecommunications, and the Nippon Telegraph and Telephone Public Corporation.

In spite of the hue and cry about "zero ceiling," MITI's electronics projects are in many instances growing in scope (Table 1). The three large-scale projects started in 1981, including "R&D on the fifth-generation computer," "R&D on a high-speed computing system for science and technology," and "R&D on new function elements (R&D on basic technology for the next generation of industry);" will begin research and development activities in earnest starting in 1982. Therefore, almost no new projects will be started in 1982.

The specifications for the "fifth-generation computer" will be drawn up and design work implemented over a period of 3 years, with the cost expected to be approximately 10 billion yen.

The research and development period of "the fifth-generation computer" of the non-Neuman type has been extended an additional year beyond the original plan to 1991--a total of 10 years. The ultimate goals include the realization of mechanical translation, question and response, voice application, and drawing and image applications which are to be the foundation of the application systems of the 1990's. The basic functions that are required for achieving these goals include capabilities for problem solving, reasoning, knowledge base management, and intelligence interface.

For the problem-solving and reasoning capabilities, a maximum reasoning execution rate in the range of 100 MLIPS-1 GLIPS (logical inference per second) is the target. One LIPS is equivalent to 100-1,000 IPS (instructions per second).

Knowledge base management capability comprises a data base machine having a capacity of 100-1,000 G-bits as a nucleus and the ability to reach the knowledge base for information needed in reasoning within several seconds. The purpose of intelligent interface is to enable interaction with the computer through the use of voice, drawings, and natural language, so that man may be able to exchange information with the computer by natural means of communication.

For the elements used in the hardware, it is considered necessary to have an element that is an extension of LSI but has a much higher density than today's LSI, GaAS element, and Josephson junction element. However, this project will not be concerned with the development of these elements. Whatever element that is available at the time will be used.

This project is divided into three periods: 192-84, 1985-88, and 1989-91, designated respectively as the first, the second, and the third periods. The total cost is expected to be 100 billion yen over a period of 10 years. During the first period, the basic technology will be developed at a cost of approximately 10 billion yen. During the second period, a small-scale system will be constructed at a cost of approximately 50 billion yen, and during the third and the last period, several consolidated systems will be completed at a cost of approximately 40 billion yen. The greater part of the 3 years of the first period will be spent in drawing up the specifications, and a portion of the specifications may becarried out through the processes of designing and trial construction (of both software and hardware).

The 1982 budget is approximately 430 million yen (the 1981 budget was 1.5 million yen).

The bureau which is to carry out the preparation is tentatively located in the Electronics Industry Promotion Association, but the activity structure has not yet been formally decided on.

Research Partnership for "Science and Technology Computer" Begun

The "science and technology computer" is to achieve a high-speed processing capability of 10^4 MFLOPS (million floating point operations per second), and a research partnership which is to undertake this task was established a step earlier. The name of the research partnership, which was started officially last December, is "Science and Technology Computing System Technical Research Partnership." It consists of the following six firms: Hitachi Ltd., Toshiba Corp., Mitsubishi Electric Corp., Nippon Electric Co., Fujitsu Ltd., and Oki Electric Industry Co. This project is one of the big projects undertaken by the Industrial Science and Technology Agency. This project, too, has been extended to 1989, 1 year beyond the original plan, for a total of 9 years. The budget has also been adjusted downward to a total of 23 billion yen.

R&D will be undertaken on a parallel-processing format, in which from several hundreds to 1,000 basic processors are operated simultaneously, and on high-speed logic elements and memory elements, in addition to the conventional Si LSI which are needed to achieve high-speed computation. Development of three

types of elements--GaAS field effect transistor, high electron mobility GaAs transistor, and Josephson junction element--will be undertaken, and whichever is the most advanced in development will be used at the time the equipment is to be trial-constructed. If everything goes well, these three types of elements will be used separately in the high-speed computation parallel-processing equipment, in the large-capacity, high-speed memory equipment, and in the parallel-processing equipment for distributed processing.

For the parallel-computing format, both MIMD (multiple instruction stream, multiple data stream) and SIMD (single instruction stream, multiple data stream) will be investigated. The challenge to achieve 10^4 MFLOPS will be tackled by a combination of high-speed element and parallel-processing format.

In 1982, investigative research will be started with a budget of approximately 810 million yen (30 million yen in 1981). Investigative research is expected to continue until the middle of 1983, and the conceptual design will commence in 1984.

As for the development of the elements: the GaAS field effect element will be developed by Hitachi, Toshiba, Mitsubishi, and Nippon Electric; the GaAS high electron mobility element by Fujitsu and Oki Electric; and the Josephson junction element by Hitachi, Nippon Electric, and Fujitsu. The Electronic Technology Consolidated Research Center will also take research on the Josephson junction element and parallel-processing format.

530 Million Yen on "3-D Circuit Element"

"R&D on new function elements," which in the beginning was planned to continue for a period of 10 years until 1990, will have a 1982 budget of approximately 1.13 billion yen, an increase of approximately 68 percent over that of the previous year. Approximately 530 million yen of this budget is earmarked for R&D on the 3-D circuit element; approximately 340 million yen for the superlattice element; and approximately 260 million yen for the environment-proof strengthened element.

The total budget over a period of 10 years for this "new function element" project undertaken by the Industrial Service and Technology Agency is expected to be approximately 30 billion yen.

The "Association for R&D on New Function Elements" was established last August as the group that is to carry out this project. This association consists of 10 firms.

R&D on the 3-D circuit element is entrusted to Toshiba, Nippon Electric, Mitsubishi, Oki Electric, Matsushita Electric Industry, Sanyo Electric, and Sharp. Three-dimensional integration is to be achieved, starting from the conventional 2-D integration of LSI. There are roughly three themes: 1) integrating memory and computational functions; 2) complexing sensor, memory, computational functions, and output; and 3) raising the speed and capacity of memory.

R&D on the superlattice element is entrusted to Hitachi, Fujitsu, and Sumitomo Electric Industries. One [element] that has a structure consisting of alternating layers of very thin, several nm, GaAS and AlAS layers, and another that has a structure similar to that of triode vacuum tube inside the semiconductor, with a distance corresponding to the cathode-anode gap of less than 0.5 mu, will be investigated. The Industrial Science and Technology Agency calls the former the supperlattice function element, and the latter the superstructure lattice element.

R&D on environment-proof strengthened elements is entrusted to Hitachi, Toshiba, and Mitsubishi. Development of elements which can be used in extreme environments, such as those in outer space, inside a nuclear furnace, and in an automobile engine compartment, will also be undertaken. Resistance to radiation, heat, vibration, and impact will be improved.

The budget for "R&D on solar photoelectric generation technology" as part of the Sunshine Project (Industrial Science and Technology Agency) was raised to approximately 6.6 billion yen, an increase of 14 percent over that of the previous year. Approximately 5 billion of this amount is in a special account and the rest, approximately 1.6 billion yen, in the regular account. The special account is earmarked for construction of a 500 kW class solar cell and solar panel experimental manufacturing equipment, a low-cost SI refining plant, a utilization system for schools and factories, and a focusing-type photoelectric generator.

Approximately 1.1 billion yen of the 1.6 billion yen in the regular account is earmarked for R&D on Si solar cells. Starting in 1982, investigations into reliability will be carried out.

One of the Industrial Science and Technology Agency's large-scale projects, "instrumentation and control system for optic application," was begun in October 1981 by the "Optical Technology Joint Research Center" in Kawasaki. This research center will undertake the development of a light-focusing circuit, which constitutes the center of this project. The 1982 budget for the entire project reached 3,237 billion yen, an increase of approximately 34 percent over that of the previous year. Up to 1981, most of the work consisted of discussions of various subsystems according to their functions. Starting in 1982, construction of an engineering model and detailed design work will begin.

"Aid Fund for Important Technology" Continues Its 9-Year Decline

The majority of the projects introduced so far are those whose themes have been determined and the work assigned by MITI, and the participating firms have been almost exclusively large enterprises. In contrast, the aid fund for R&D on important technology (Industrial Science and Technology Agency) is also available to medium and small enterprises. This aid fund is granted for R&D proposals submitted by private enterprises. However, the 1982 budget is smaller than that for 1981. The 1982 budget is approximately 2.9 billion yen, a decrease of approximately 3 percent over that of the previous year.

Although the decrease is not significant in magnitude, this fund has been declining steadily since 1974.

The new themes to be introduced in 1982 are expected to be decided by mid-May. The themes on electronics which began in 1981 and are continuing through 1982 are as follows:

The nuclear technologies include: 1) application research on the high-brightness, wide-viewfield, head-up display unit carried aboard aircraft (Shimazu Seisakusho, 1981-83); 2) industrialization test on a mapping display system (Nippon Avionics Industry, 1981-83); 3) application research on a solid electrochromism display element (Citizen Watch, 1981-82); 4) research and trial construction of an intelligent complex automatic recording system using LSI (Automatic Instrumentation Technology Research Association, 1981-82); and 5) research and trial construction of short-duration annealing of semiconductors.

No new themes on "untrod, innovative technology" and "energy conservation technology" were started in 1981.

Table 1. MITI's Major Projects for the Development of Electronics (unit: million yen)

表1 通産省のエレクトロニクス開発関連主要プロジェクト（単位：100万円）

	項目 (1)	(2) 担当機関、種別 (3)	(4) 56年度	(5) 57年度	(6) 備考 (28) (29)
(7)	●次世代コンピュータ用基盤技術の開発促進	(26) 通産省、補助金 (27)	6,200	5,616	54～58年度、合計23,500
(8)	▷基本ソフトウェア技術		5,150	4,986	54～58年度、合計20,000
(9)	▷新周辺端末装置技術		1,050	630	54～58年度、合計3,500 (30)
(10)	●第5世代コンピュータの研究開発	(26) 通産省 (32)	15	426	56～66年度、総額100,000（要求ベース）
(11)	●自学技術用高速計算システムの研究開発	(31) 工技院、大型プロジェクト	30	813	56～66年度、総額29,000（要求ベース）
(12)	●次世代産業基盤技術の研究開発	(31) 工技院	2,714	4,786	56～65年度、総額100,000（要求ベース）
(13)	▷新機能素子の研究開発	(32)	673	1,128	56～65年度、総額31,000（要求ベース）
(14)	●光応用計測制御システムの開発	(31) 工技院、大型プロジェクト	2,419	3,238	54～61年度、総額21,000（要求ベース）
(15)	●超高性能レーザ応用複合生産システムの開発	(31) 工技院、大型プロジェクト	2,718	3,311	52～58年度、総額13,000（要求ベース）
(16)	●自動縫製システム	(31) 工技院、大型プロジェクト	0	30	新規 (34) (36)
(17)	●太陽エネルギ技術開発	(31) 工技院、サンシャイン計画	7,990	8,730 (35)	49年度から、特別会計6,591を含む
(18)	▷太陽光発電の研究開発	(33)	5,850	6,660 (35)	49年度から、特別会計5,050を含む
(19)	●重要技術研究開発費補助金	(31) 工技院、補助金 (27)	2,998	2,916	(36)
(20)	▷重要技術研究開発課題		1,583	1,398	(37) 56年度のエレクトロニクス関連の
(21)	▷未踏革新技術研究開発課題		355	319	実行対象テーマは合計24件
(22)	▷省エネルギ技術研究開発課題		391	623	
(23)	●ソフトウェア関連技術の推進など	(38) 情報処理振興事業協会	2,658	2,620	
(24)	●情報処理高度化対策	(26) 通産省	0	9	
(25)	●ヘルスケア・ネットワーク・システムの開発	(26) 通産省	222	196	53～58年度

Key:

1. Item
2. Office in Charge
3. Type
4. FY81
5. FY82
6. Remarks
7. Promotion for the development of basic technologies for the next generation of computers
8. Basic software technology
9. New peripheral terminal device technology.
10. R&D on fifth generation computer
11. R&D on high-speed computing system for science and technology
12. R&D on basic technologies for the next generation of industry
13. R&D on new function elements
14. Development of instrumentation and control system for topical application
15. Development of complex production system for ultrahigh-performance laser application
16. Automatic sewing and manufacturing system
17. Development of solar energy technology
18. R&D on solar photoelectric generation
19. Aid fund for R&D on important technology
20. Important technology R&D themes
21. Untrod, innovative technology R&D themes
22. Energy conservation technology R&D themes
23. Promotion of software-related technology
24. Advanced information processing countermeasure
25. Development of health-care network system
26. MITI
27. Assistance fund
28. FY
29. Sum total
30. Request base
31. Industrial Science and Technology Agency
32. Large-scale project
33. Sunshine project
34. Brandnew
35. Starting in FY74
36. Including special account...
37. Total number of object themes related to electronics granted in FY81: 24.
38. Information Processing promotion Business Association.

Note to Table: The name of and budget for the major electronics projects and the projected duration of the budget are shown. Some budgets with a known sum may be without a theme. Some budgets shown may not be used exclusively on electronics projects. Budgets which are not known are not shown. (The same rule also will apply to tables in later installments.)

[26 Apr 82 pp 229-233]

[Part II: "Defense Agency: Missiles Are the Focus of R&D"]

[Text] The Defense Agency's 1982 budget is 2,586.1 billion yen. This is an increase of 7.8 percent compared with the 1981 budget of 2.4 trillion yen. The preferential treatment the Defense Agency budget has received is quite conspicuous against the background of the relatively small increase of 6.2 percent for the regular account as a whole. Its proportion to the gross national product has been raised to 0.93 percent (from 0.90 percent in 1980 and 0.91 percent in 1981). With regard to R&D, the budget of the Technical Research Headquarters increased to 35,618 million yen, 12.3 percent over that of the previous year.

R&D on missiles, including a new surface-to-ship missile (SSM), an intermediate-range antitank missile, and the former portable surface-to-air missile, constitutes the focus of R&D activities for this year. There are also a number of items related to land-based weapons, including the first trial-construction of a new tank and a new automatic antiaircraft cannon. R&D begun last year on a medium training plane (MTX), an improved-capacity mobility vehicle (CCV), and a high-speed homing torpedo will continue to be carried out this year.

As for business and procurement, the suppliers of "Badge X," involving a total budget of more than 200 billion yen, will be determined.

Development of Surface-to-Ship Missile To Begin

Table 1 shows the details (centered around R&D) of the defense-related 1982 budget. The Defense Agency's Technical Research Headquarters will initiate four new development projects. They are the surface-to-ship missile, the medium-range antitank missile, the new tank, and the new automatic antiaircraft cannon. Research and trial construction of these items have been under way, carried out by the relevant manufacturers such as Mitsubishi Heavy Industries and Kawasaki Heavy Industries, but activities will be conducted in earnest starting in 1982. These projects are expected to last 5 years or so. The R&D cost of some of these items may well exceed 20 billion yen, showing that they are very large-scale R&D projects.

The surface-to-ship missile, to be used from land to launch counterattacks against invading ships, will be developed on the basis of the air-to-ship missile (ASM1). It has a long range, 120-130 km, so it can be launched from a mountain cove several tens of kilometers inland from the coast. The missile will fly, avoiding obstacles, toward the target, the ship. Even if a multiple number of missiles are launched simultaneously, these missiles can be made to detect and select different targets, so the missiles will not be concentrated on the same ship. This type of "random target selection format" is said to be incorporated into the system. The Defense Agency is putting extra effort into the R&D of this missile as defensive equipment appropriate for Japan's defense-only defense objective.

The Defense Agency's Technical Research Headquarters plans to carry out the first trial construction of the surface-to-ship missile over a period of 3 years, 1982-1984; the second trial construction in 1985; and technical experiments in 1986; its development is to be finished in 1987. The total development cost is estimated to be approximately 20 billion yen; the 1982 budget is approximately 5 billion yen. Mitsubishi Heavy Industries, which was the major contractor for the ASM1, is again the major contractor for this missile. Mitsubishi Electric is in charge of the construction of the guidance device; Nissan Motors, the auxiliary propulsion device; and Nippon Oils and Fats, the propellant.

The Defense Agency's procurement plan after completion of the development of the surface-to-ship missile has not yet been decided. However, its unit price will certainly exceed that of the ASM1 (120-130 million yen), so an order amounting to several tens of billions of yen can be expected.

The medium-range antitank missile (ATM) is a missile for attacking tanks; its range is 1.5-2 km. The major contractor is Kawasaki Heavy Industries. A number of other firms, including Nippon Electric, will participate in the trial construction of various components. The first trial construction is to be carried out over a period of 2 years starting in 1982 (with a budget of 500 million yen), and its development is to be completed in 1986. The total cost is expected to be approximately 7 billion yen.

The medium-range ATM has a range of 1.5-2 km; it uses a "laser homing" format for aiming. A laser light is directed onto the tank, and the missile traces the reflected light. This antitank missile follows after the wire system "Type 79 antiship, antitank missile" (range, approximately 4 km), and a higher hit rate with high accuracy is to be achieved.

The new tanks are scheduled to be formalized (formally adopted into the troops) in 1988, so they are called Type 88 tanks. They will replace the Type 74 tanks, which are the newest tanks today, and become the main force after the latter half of the 1980's. According to the development plan, the first trial construction is to be conducted in 1982-1984 and the second trial construction in 1985-86. The new tanks will have improved firepower and motive power and improved performance through use of computerized FCS (fire control system), compared with the Type 74 tanks. As part of the 1982 budget, the Defense Agency requested 7 billion yen to cover the entire first trial-construction cost, but only 1.3 billion yen of that portion was approved for 1982-83. The total development cost is expected to reach 20 billion yen. Mitsubishi Heavy Industries is the major contractor.

The new automatic antiaircraft cannon consists of a 35-mm antiaircraft cannon mounted on the chassis of a Type 74 tank, with emphasis on automation and conservation of power. Its development cost of 3 billion yen for a period of 2 years, 1982-83, has been appropriated. It is to undergo trial construction in 1982-83; various tests are to be carried out in 1984; and it is to be formalized in 1985. The Japan Steel Works will have responsibility for the cannon, Mitsubishi Heavy Industries for the chassis, and Mitsubishi Electric for the FCS.

Medium Training Plane for the Next Period To Enter Into Partial Trial Construction

The medium training planes (MTX) for the next period, whose development was started in 1981, are the training planes which will replace the T-1 and T-33 in use today. Their development will continue until 1987, at a cost of approximately 37 billion yen (1980 cost). Kawasaki Heavy Industries, Fuji Heavy Industries, and Mitsubishi Heavy Industries competed vigorously to become the major contractor, and Kawasaki Heavy Industries was the winner. Division of the production work is as follows: Kawasaki will be in charge of the construction of the forward fuselage, the control room, and the final assembly; Mitsubishi, the midsection of the fuselage and part of the tail wing; and Fuji, the main wing. The engine is expected to be the F3 engine being developed by the Ishikawajima-Harima Heavy Industries. Partial trial construction will be begun in 1982, and the first flight is targeted for 1984.

In addition, research and trial construction of an improved-capacity mobility vehicle (CCV) is also under way, with the first flight planned for 1983. The research and trial construction of a portable surface-to-air missile (SAM) is also being carried out under a 3-year plan which started in 1981. This missile is characterized by its image homing device using CCD (charge coupled device) and infrared-ray homing. Toshiba has the main responsibility for its development. In addition, the development of IR-CCD as a semiconductor sensor for military applications will be undertaken in earnest. This sensor is scheduled to be installed on the domestically manufactured missile in early 1985. Its 1982 budget is approximately 800 million yen.

As for procurement and business, the major concerns for 1982 include the selection of a major contractor for the construction of an automatic air-defense warning control system (Badge X). The major contractor will be decided this summer, based on estimates submitted by Fujitsu, Hitachi Works, and Nippon Electric, and development will be implemented in 1983-87. Total cost is expected to reach 250-300 billion yen.

The aircraft includes 23 F15 fighters, 7 P3C antisubmarine patrol planes, and 12 AH-IS antitank helicopters--all very expensive craft. Electronic parts produced in Japan will positively be adopted on the F15 and P3C ordered in 1982. According to the predictions by the machinery manufacturers, some 400 billion of the approximately 2 trillion yen in orders for F15 and P3C after 1982, will be spent on machinery, and 30-50 billion yen will be spent on parts. Orders for metal film resistors, connectors, transformers, and condensers, in particular, are expected to increase appreciably.

Science and Technology Agency, Ministry of Education: N-II Rocket-Launching Projects Brewing

In the budgets of the Science and Technology Agency and the Ministry of Education, activities related to space development occupy the largest part in the field of electronics. The sum of the space-related budgets of these two organizations is 100.6 billion yen, an increase of 2.7 percent over fiscal 1981. The total budget for space development, including all other agencies and

ministries, is 108.5 billion yen; this is an increase of 3.3 percent over the year before. A small increase of 2-3 percent has continued for the past 2 or 3 years. The fiscal 1982 limit for national treasury future obligation authority is 67.6 billion yen.

Other newly budgeted major projects include the development of a geostationary meteorological satellite (GMS-3) and research on the next generations of communications satellite technology. The budget comes to 6.1 billion yen and 20 million yen, respectively (Table 2). The GMS-3 follows the GMS-2 (Himawari No 2), which was launched by the domestically manufactured N-II rocket on 11 August 1981. The GMS-2 was the first practical satellite which was successfully launched by a domestically produced rocket. The scheduled time of launching for the GMS-3 is the summer of 1984. The major contractor for the GMS-3 is Nippon Electric.

Launching of the next-generation communications satellite, the CS-3, is expected sometime after 1987. The rocket that is to be used to launch this satellite is the H-I rocket, which is bigger than the N-II rocket that launched a satellite weighing 350 kg. The H-I rocket will launch a satellite weighing 550 kg.

Fresh courage probably has resulted from the successful launching of the GMS-2, and plans are brewing for the launching of satellites by means of the N-II rocket. According to National Space Development Agency plans, after the CS-2a is launched in the winter of 1982 (January-February 1983), the CS-2b will be launched in the summer of 1983 (August-September 1983); a No 2 broadcast satellite (BS-2a) in the winter of 1984; the GMS-3 in the summer of 1984; a No 2 broadcast satellite (BS-2b) in the summer of 1985; and a No 1 marine observation satellite (MOS-1) in the summer of 1986.

The performance characteristics of the CS-2 communications satellite are similar to those of the experimental communications satellite (CS) "Sakura" launched by NASA in December 1977. Its main objectives include ensuring communications in times of emergency and disaster and maintaining communications with the offshore islands. Its major contractor is Mitsubishi Electric.

The broadcast satellite BS-2's performance characteristics are similar to those of today's experimental broadcast satellite (BS) "Yuri." Its major contractor is Toshiba. For the next broadcast satellite, the BS-3, a budget of 210 billion yen has been appropriated by the Radio Regulatory Bureau of the Ministry of Posts and Telecommunications, Launching of the BS-3 is scheduled for February 1989.

The marine observation satellite MOS-1 is to maintain surveillance of the ocean surface, mainly of its color and temperature, in order to understand the conditions of ocean pollution and to detect the changing of the tides and the red tide. Its major contractor is Nippon Electric.

Besides the CS-2a, an experimental technology satellite, the ETS-III, is scheduled to be launched in 1982. The launch is scheduled for this summer.

With regard to the new H-I rocket, the development of its ground tester and two-stage tester will be started in 1982. The H-I rocket was originally a three-stage rocket; however, the experiment will be carried out with two stages. Launching is scheduled for the winter of 1985.

The Ministry of Education has a plan to launch a number of science satellites: No 8 will be launched in the winter of 1982; No 9 in the winter of 1983; No 10 in the summer of 1985; and No 11 in the summer of 1986. The rocket used to launch these satellites will be the M rocket, which is smaller than the N-I rocket.

Specified Research Settled Upon

In the Ministry of Education's budget for electronics, aside from the space projects, the specified research projects are relatively large in scale. These are allocated from the scientific research fund. The 1982 scientific research fund amounts to 38 billion yen, an increase of 6.1 percent over that of the previous year. Of this figure, 30.1 billion yen has been allocated to the "advancement of superior research projects." Specific research is further broken off from it. Specific research projects usually last 3 years, and the budget per project over the 3-year period comes to around 600-700 million yen.

There are eight new specified research projects starting out this year, as well as 14 ongoing projects. The themes of the new research projects starting this year have been decided on, but their budget scale has not yet been determined. Themes related to electronics include "microstructure electronics" and "research on functional ceramics."

"Microstructure electronics" has nicroworking technology and micro devices as its objectives. "Research on functional ceramics" includes research on sensors of environment, heat, pressure, and light, plus research on materials for these sensors.

Table 1. The Defense Agency Budget (unit: million yen)

表1 防衛庁関係予算（単位：100万円）

(1) 項目	(2) 担当機関	(3) 56年度	(4) 57年度	(5) 後年度負担額	(6) 備考
(7) (a) 研究・開発関係					
(8) ●新規研究開発費等 (32)	防衛庁技本	13,276	14,799	22,642	(33)
(9) ▷誘導武器関係	防衛庁技本	1,022	1,483	5,951	地対艦誘導弾など
(10) ▷電子機器関係	防衛庁技本	1,440	1,339	3,657	レーダ電子戦シミュレータなど (34)
(11) ▷火器・車両関係	防衛庁技本	984	1,242	3,496	新戦車など (35)
(12) ▷艦艇・水中武器関係	防衛庁技本	1,134	1,226	1,804	高速ホーミング魚雷など (36)
(13) ▷航空機関係	防衛庁技本	1,319	795	6,279	中等練習機など (37)
(14) b) 事業・調達関係					
(15) ●装備の充実					
(16) ▷甲類	防衛本庁 (38)	104	175	45,262	
(17) 79式対舟艇対戦車	防衛本庁	0	0	1,612	8セット (39)
(18) 誘導弾発射装置					
(19) 74式戦車	防衛本庁	0	0	24,604	72両 (40)
(20) ▷地対空誘導弾	防衛本庁	3,029	2,778	51,299	
(21) ホーク	防衛本庁	1,931	1,335	27,225	
(22) 短距離地対空誘導弾	防衛本庁	829	0	22,399	9セット (39)
(23) （短SAM）					
(24) 携帯式地対空誘導弾	防衛本庁	270	1,268	1,268	65セット (39)
(25) （携帯SAM）					
(26) ▷航空機	防衛本庁	5,985	5,578	273,478	84機 (40)
(27) ▷艦船	防衛本庁	7,335	3,445	164,803	10隻、1万2520トン (41)
(28) ●防衛マイクロ回線の建設と	防衛本庁	5,727	4,196	6,950	
(29) 中央指揮システムの整備					
(30) ▷防衛マイクロ回線	防衛本庁	5,125	2,245	3,161	古河～相馬原等 (42)
(31) ▷中央指揮システム	防衛本庁	601	1,951	3,789	

Key:

1. Item
2. Office in Charge
3. FY81
4. FY82
5. Future Obligation
6. Remarks
7. R&D
8. New R&D fund
9. Guidance weaponry
10. Electronic devices
11. Firearms and vehicles
12. Warships and naval weaponry
13. Aircraft
14. Business and procurement
15. Replenishment of equipment
16. Armored
17. Type 79 antiship, antitank

18. Missile launchers
19. Type 74 tanks
20. Surface-to-air missiles
21. Hawk
22. Short-range surface-to-air missiles
23. Short-range SAM's
24. Portable surface-to-air missiles
25. Portable SAM's
26. Aircraft
27. Ships
28-29. Construction of defensive microcircuits and consolidation of central command system
30. Defensive microcircuits
31. Central command system
32. Defense Agency's Technical Research Headquarters
33. Surface-to-ship missiles, etc.
34. Radar electronic war simulators, etc.
35. New tanks, etc.
36. High-speed homing torpedoes, etc.
37. Medium training planes, etc.
38. Defense Agency Headquarters
39. Sets
40. Vehicles
41. 10 12,520-ton ships
42. Furukawa-Somahara, etc.

Table 2. The Science and Technology Agency's and Ministry of Education's Budgets for Space Development (unit: million yen)

表2 科学技術庁、文部省関係の宇宙開発関係予算(単位:100万円)

	(1) 項目 (主なプロジェクト)	(2) 担当機関	(3) 56年度	(4) 57年度	(5) 国庫債務負担行為額(57年度)
(6)	●静止気象衛星3号(GMS-3)の開発	宇宙開発事業団 (22)	0	6,110	12,468
(7)	●海洋観測衛星1号(MOS-1)の開発	宇宙開発事業団	8,354	7,288	8,840
(8)	●通信衛星2号(CS-2)の開発	宇宙開発事業団	13,052	21,733	
(9)	●放送衛星2号(BS-2)の開発	宇宙開発事業団	7,884	12,724	9,656
(10)	●技術試験衛星Ⅲ型(ETS-Ⅲ)の開発	宇宙開発事業団	5,368	9,235	
(11)	●合成開口レーダなどセンサの試作試験	宇宙開発事業団	702	669	703
(12)	●シャトル搭載実験システムの研究	宇宙開発事業団	369	431	
(13)	●H-Iロケットの開発	宇宙開発事業団	16,022	20,475	22,125
(14)	●科学衛星研究経費	宇宙科学研究所 (23)	3,153	4,765	6,947
(15)	●Mロケット開発費	宇宙科学研究所	2,223	1,896	
(16)	●スペース・シャトル計画(SEPAC)に関する参加経費	宇宙科学研究所	374	200	
(17)	●液水エンジン開発の基礎研究経費	宇宙科学研究所	504	441	
(18)	●次世代通信衛星技術の研究	宇宙開発事業団 (22)	0	20	
(19)	●地球観測情報の受信処理	宇宙開発事業団	1,845	3,311	
(20)	●液酸・液水ロケット・エンジン要素の研究	航空宇宙技術研究所 (24)	106	95	
(21)	●衛星基礎技術に関する研究	航空宇宙技術研究所 (24)	36	62	

(25) 注) 宇宙科学研究所は1981年4月に東京大学宇宙航空研究所を改組して出来たもの

Key:

1. Item (Major projects)
2. Organization in Charge
3. FY81
4. FY82
5. Future Obligation Authority (FY82)
6. Development of GMS-3
7. Development of MOS-1
8. Development of CS-2
9. Development of BS-2
10. Development of ETS-III
11. Trial construction and testing of sensors such as synthetic aperture radar
12. Research on experimental systems carried on-board shuttle
13. Development of H-I rocket
14. Science satellite research fund
15. Development fund for M rocket
16. Fund for participating in space shuttle project (SEPAC)

17. Basic research fund for development of liquid water engine
18. Research of the next generation of communications satellite technology
19. Reception and processing of earch observation data
20. Research on the elements of liquid acid, liquid water rocket engine
21. Research on basic satellite technology
22. National Space Development Agency
23. Space Science Research Center
24. National Aerospace Laboratory
25. Note: Space science Research Center was established in April 1981 by reorganizing the Aerospace Research Center of Tokyo University.

9113
CSO: 4106/111

SCIENCE AND TECHNOLOGY

NTT'S INFORMATION NETWORK SYSTEM PROJECT DESCRIBED

Tokyo EKONOMISTO in Japanese 27 Apr 82 pp 80-83

[Article by Kazuhisa Maeno of the Society Section of MAINICHI SHIMBUN: "The Era of a Telephone That Can 'Read, Write, and See' Is Coming; Expectations and Uncertainty Concerning NTT's INS Project"]

> [Text] Our society will be changed significantly as a result of the unification of communication and information processing, and their advancement...
>
> Experimental application of the INS (advanced information communication system) project is to be started this fall by the Japan Telephone and Telegraph Corporation [NIT]. It is a far-reaching project, with a huge investment amounting to 25 trillion yen; it is targeted for completion at the end of this century. What kind of impact will it have on Japanese society? The following is a report filed by our society section reporter who covers the field.

From Analog to Digital

Tsune Mafuji, president of NTT, appeared amazed himself when he stated the following at the press conference: "When it is completed as NTT has planned, I don't know what the world will look like. It is a little bit scary to think of it." The "it" referred to by President Mafuji is the "INS project" into which NTT is pouring all its resources.

INS is the abbreviation for information network system. In the language of NTT, it means "advanced information communication system." Translated into the society section reporter's language, which is easier to understand, it is a project by which the telephone today, through which we can "talk and listen," will be changed into a more convenient telephone by which we can "read, write, and see."

Although it may become somewhat technical, I will explain it in some detail, because we must consider the future electric communications system. There are two ways in which the signal (information) can be transmitted by electric communications system today: analog format and digital format.

Japan's electric communications networks can be roughly divided into five groups: telephone, telegraph, subscription telegraph, data communications, and facsimile. The telephone network, with its circuits strung out all over the country, is based on the analog format. Therefore, even though other networks may employ a digital format in their network trunkline section, eventually they must convert to an analog format.

When we use this means, however, we cannot expect to have efficient telephone and telegraph transmissions, because analog means "similar." Take the telephone, for example. The wave form of the human voice is converted into an electric current having a similar wave form and then is transmitted and received. On the other hand, digital means "numerical." The digital telephone to be employed by the INS project digitizes the wave form of human voice, which varies as a function of time, and transmits the numerical signal. At the receiving end, this numerical signal is converted back into the original wave form, and thus the human voice is reproduced.

Doing it this way has many advantages. With a telephone circuit using analog format, the transmission rate is 50 bits per second. If the circuit is digitized, the transmission rate can be increased more than 1,000 times, to 464 kilobits per second. Moreover, using digital format, the wave form of voice over a 1-second period can be compressed to 0.014 second and then transmitted, so that the remaining time, 0.9986 seconds, can be used to transmit other signals. This is called time-sharing multiplex transmission.

Furthermore, using digital format, the signal can be temporarily stored and the useless signal can be eliminated. For example, TV telephones are expected to make an appearance in the future. The background of a person who is talking on the phone is usually a wall, which does not move. In such a case, if the signal representing the background at rest is eliminated, useless transmission can be avoided.

Now then, the circuit used in the future to transmit these signals will not be the conventional coaxial copper cables. Instead, optic fibers will replace copper cables. Optic fibers consist of transparent quartz glass fibers, and the signals will be transmitted through these fibers by the use of laser. It is a broadband cable capable of transmitting and receiving 10,000 circuits of telephone channels using a line as thin as a human hair. Of course, the exchange will also be converted into the newest digital exchange.

Then the telephone circuit, which heretofore could be used only for telephone communications, can be shared by other modes of communications, such as data and facsimile transmissions, by using different terminals. In other words, what the INS project is trying to accomplish is to take today's system, which is thin and narrow so the information (car) can only travel slowly, and turn it into a big, wide superhighway so that high-speed travel may be realized.

For this purpose, NTT is starting experimental application of INS this year in an area in the vicinity of the Musashino Electric Communications Research Center, including Mitaka City in Tokyo Metropolis. Basic technologies needed by this experiment have all been established, and approximately 10,000 general subscription telephones, 250 digital telephones, and 750 nontelephone terminals such as ultrahigh-speed facsimile, "drawing communications" with which handwritten letters and drawings can be transmitted simultaneously, and "TV conferences" in which images are transmitted and received, will be involved in this experiment.

As for the other construction projects, since the useful life of a telephone network is approximately 20 years, old facilities which have reached retirement age will be converted one after another. The project is far-reaching, involving an estimated total investment of 25 trillion yen. Although NTT finances in the future are "full of problems," including the telephone rates reaching the ceiling and an increasing debt burden, NTT's plan includes the introduction of optic fiber into the trunk network linking the major metropolitan areas of every prefecture by 1985, and conversion of every family subscriber circuit to optic fiber by 1995. The entire INS project will be completed by the 21st century.

Internal Affairs of NTT

When this INS project is realized--in the realm of business activities, utilization of an on-line electric communications system (business telecommunication center--BTC) by OA and industrial robot will become feasible and, as a result, rationalization of production and management will be achieved. In the realm of personal life, using a home telecommunications terminal in which the four basic functions--telephone, data, facsimile and image--have been integrated, a person will be able to acquire culture, livelihood, and local information inexpensively. This then is NTT's rosy dream.

However, it was last August when NTT suddenly became enthusiastic about undertaking the INS project. In the background are NTT's internal affairs.

Two years ago, NTT completed its two important operational goals: "settlement of accumulated and delayed telephone installation," and "instant dialing." Against this background, it was highly probable that the INS project was proposed as the next operational goal. Therefore, some criticized it as "a project solely for the convenience of NTT, without any regard for the people's needs." President Mafuji, who previously was president of Harima Heavy Industries in Ishikawajima, and who took office last January, was himself perplexed at the time and was at a loss to make up his mind.

However, stimulated in part by France's "telematique," the president too began to recognize the need for a sound infrastructure of communications in order for Japan to be able to make progress in the 21st century, and he is said to have been completely behind the INS project since last summer.

However, some sectors are still apprehensive about this INS project. For example, some suspect that "NTT may have the ambition to grasp Japan's entire information system in its hands" because a single optic fiber can carry various media, including data and facsimile communications. The Ministry of Posts andTelecommunications is still half in doubt and is watching NTT's moves carefully.

To be sure, when various media are carried by a single cable, management of information can make further progress. Furthermore, if a citizen identification number system is to be implemented, this could provide a fertile ground for it.

There once was an incident concerning the forgery by the NTT staff of a CD card through the wiretapping of a data communication. New crimes similar to this computer crime can be expected to increase. Moreover, fear of invasion of privacy is quite justified, because the personal data stored in the data base can easily be retrieved. The modern technological innovations are all a double-edged sword. They can work both ways, depending on how they are used.

There is an aspect which can thus be criticized. Whether we like it or not, however, we cannot help but move deeper into an informationalized society today. Therefore, what we probably ought to do is to watch the progress of the INS project closely, with an understanding of its problem areas. In fact, in spite of the criticism, much can be expected of the project.

As its first merit, NTT Vice President Yasusada Kitahara cited a significant change in the rate structures, whereby "the difference in rates based on distance can be expected to be rectified." Since the same network is shared by various media, including facsimile and data communications, the construction cost of the circuit will be low and the charge for usage will also be low as a result. Furthermore, the rate structure will change basically. At present, a time-based charge system, based on "how many minutes and seconds the circuit was used," is in effect. After the INS project is completed, it will become an information-based charge system, based on "how much information was transmitted." In a digital system, it is very easy to count the number of bits--the amount of information--so charges based on the number of bits can easily be set up.

Moreover, today's telephone rates differ significantly according to distance, with a difference as great as a ratio of 1 to 60. Within the Tokyo Metropolis, the rate is 10 yen per 3 minutes. Between Tokyo and Kagoshima, however, 10 yen buys only 3 seconds of telephone time. According to the INS project, information can be stored temporarily and transmitted all at once at a very high rate when a circuit becomes available. The circuit utilization rate can be increased significantly, so circuit costs can be reduced and the difference in rates due to distance can be rectified.

Blossoming of New Media

As another merit of the INS project, we cannot ignore its contribution to the development of new media. For example, the "captain system,"

by which information consisting of letters and drawings stored in a computer located at the center in the downtown Ginza can be projected onto a Braun tube (cathode ray tube) at home via a telephone circuit, is to be put to practical application in the summer of 1983. Moreover, TV letter multiplex broadcasting, by which letter information such as telop of newsbrief can be shown on the TV screen by means of superimposing letter signals in the gap between TV scanning lines, is to be started experimentally toward the end of 1983. Furthermore, also within the same year, a stationary satellite is to be launched into the space 36,000 km above the equator for the purpose of bouncing TV waves back to the Japanese islands, and each family will be able to receive a TV image directly by means of a parabolic antenna. Satellite broadcasting is to begin.

The year 1983 may thus be called the first year of the new media. However, many people in the field of mass communications are not overly excited, in view of the fact that "when CATV (community antenna television) first appeared in early 1965, the mass media were greatly excited, but it did not develop as much as expected." However, the difficulties encountered by the independent broadcasting stations of CATV were due in part to regulatory restrictions and also to the high cost of setting up a program and selecting materials. These became the bottleneck of CATV development.

But the INS project can make information gathering simpler and less expensive. The appearance of new media supported by the INS project will be fundamentally different from that of the 1960's. A typical example is the captain system mentioned previously. Traditionally, the IP (information provider) such as a newspaper office must prepare a manuscript for a TV program, which must be delivered to the center downtown on the Ginza. And the delivery of the manuscript from the IP to the center is dependent on "manpower," using a motorcycle as a means of transportation. As a result, while electric communication systems such as telephone circuits are being used otherwise, the program-making stage becomes the bottleneck and the media cannot fully develop the characteristics of speedy reporting.

Last fall, however, NTT developed a Japanese word processor that accepts a handwritten manuscript as input. This is one of the indispensable terminals for realization of the INS project. When a sentence consisting of a mixture of kana and kanji is written on a special board, after computer processing, the sentence can be printed out. If this sentence is transmitted via a telephone line to the newspaper office, the "print" can be picked up and organized into a news report. Utilizing this system, input to the captain system can be carried out in real time, and the speedy reporting which is characteristic of the captain system can be fully demonstrated.

An Era of Work At Home

Vice President Kitahara predicts that, as described by the American critic on culture A. Toffler, "work at home will also become widespread

in Japan" after the INS project is completed. In Japan, where the people engage in the cultivation of rice, and where festivals have been a part of the people's lives since the age of the gods, work at home cannot be expected to catch on instantly. However, it appears to be a fact of the future that instead of people coming to a place of work, the work will be transferred to where the people are. The INS project is expected to have an impact on the people's life style and mode of movement.

Being close to the INS project, NTT has already begun to implement the concept of moving work toward the people. The dial 104 business, the telephone directory information, is very busy within the Tokyo Metropolis--as many as 200,000 inquiries a day--while the same activity at a telephone exchange office in the Tohoku area is not busy, with approximately 5,000 inquiries a day. Ordinarily, this problem would have been solved by transferring information clerks from the local districts to the busy Tokyo office. However, the great majority of these female clerks not only are married but also have an agreement with the union that they cannot be transferred forcibly.

Thereupon, NTT came up with the idea of transferring directory inquiries which come into the Tokyo office to the district offices in the Tohoku and Shinetsu areas, where the activity is less busy, and processed there. For example, when a call is made from Sagamihara City, Kanagawa Prefecture, to inquire about a phone number in Tokyo, the call does not go to the directory information office in Tokyo. Instead, the call is routed to the Omagari office in Akita Prefecture, where the person in charge will check the telephone book of Tokyo Metropolis and reply. This type of business transfer to outside directory information offices has already been implemented in Tokyo and Osaka. This is a preview of one of the ideas to be introduced by the INS project.

Since information does not exist in substantive form, it can easily be transferred to the local districts by means of electric communications. Therefore, the information difference that exists today between Tokyo and the local districts can be diminished significantly in the future by the INS project.

To consider how our society may be affected by it, take education for example. Education is itself an information business, and it is the first field in which the difference between the metropolis and the local districts can be rectified by the INS project. Probably it will become feasible in the future for people who live in local districts to utilize the literature and documents stored in the National Diet Library or the official document office in Tokyo through the use of data communications and facsimile transmission. Thus a professor in the literature department, in which no experimental equipment is needed, will be able to accomplish much while living in a local district as long as he or she has the ability.

Another example: The popular correspondent correction companies among the high school students who are preparing for the college entrance

examination include F bookstore in Okayama Prefecture and G company in Shizuoka Prefecture. That fact that these enterprises are located not in Tokyo but in local districts is proof that education is information that can be transferred by mail. This trend is expected to be promoted even further by the progress of the "INS society." You may live in a local district, but if your idea is unique and has marketable value, you can "sell" it nationally.

Moreover, in the world of new music today, there are many singers who live in a local district while their music is selling well in the "market" of the metropolis; for example, there are Munesachi Sato of Sendai City and Chiharu Matsuyama of Ashiyose-cho, Hokkaido. This trend is expected to become stronger in the INS society, and the averaging of information levels between the metropolis and the local districts will progress further through this mechanism.

In the INS society, the flow of "man, money, and goods" will also change drastically. Business travel will be replaced by TV conferences; cash by credit cards; and the world of circulation will also witness drastic changes.

To be sure, electric communications can move only information and not goods. However, it will be easy to order Yame tea, the famous product of Kume City, on Kyushu, by means of data communications in an INS society. Of course, to bring the tea itself home, one still has to rely upon such means of transportation as truck and railroad freight. If so, the transportation and circulation of small items of freight such as books and packages will become very active in the future, as the process of placing an order is made simpler.

Coping With Virtual Image Society

NTT has organized an "INS working group," consisting of 20 young staff members who are assistants or section chiefs at its main office, to conduct a study concerning the impact of the INS project on future society. The results of this study will soon be published in a report. According to this report, the place occupied by the primary and the secondary industries will be lower in the future and the tertiary industry will grow even bigger. Especially, the appearance of mass communications, a direct information industry, will reportedly be altered most significantly.

In the newspaper industry, it is believed that the printing and distribution departments will undergo the most significant changes as a result of the introduction of terminals in keeping with the INS project. The group considers that speedy reporting will be strengthened further. Some sports newspapers are already using facsimile transmission facilities today to send their papers electrically nationwide to every prefecture seat, where the papers are printed and distributed locally. In an INS society, this type of activity will be more advanced, according to the INS working group. Local papers, which are enjoying a peak of prosperity today, may receive a blow when the metropolitan papers advance into their territories in the future.

Broadcasting stations today monopolize the airwaves, which constitute a finite national asset, and are making huge profits for themselves. When optic fibers, which have a band broad enough to contain 10,000 circuits, become reality through the INS project, the number of broadcasting stations utilizing this wire-broadcast system can be expected to increase, so the existing broadcasting stations cannot take it too easy.

What is even more noteworthy is the possibility of transmitting and receiving moving pictures through optic fiber. Very beautiful TV pictures can be obtained if the signals are carried by optic fiber, so the existing broadcasting stations using the airwaves will be significantly affected. This mode of image transmission has been shown to the public experimentally by NTT's Ibaragi Communications Research Center. The image was so refined that it looked as beautiful as a photogravure. In the world of radio, young people abandoned AM when FM with its beautiful tone quality appeared. A similar phenomenon is bound to take place in the world of TV in the future. The impact of the INS project on the field of mass communication is immeasurable.

The report also states that it may be useful in improving today's formalized, indirect democracy to be able to install a voting terminal in every family [home]. However, we should not forget that as a result of the progress made in an informationalized society, too much detailed information about a person may be gathered and the people's attention may become concentrated on this, thereby diluting his interest in the big political issues.

After all, media such as the telephone and the telegraph are nothing but a proxy for man's five senses. The telephone substitutes for the mouth and ears; television for the eyes. But a substitute is always a substitute and can never replace the real thing. Telephones cannot transmit the facial expressions of the speaker. Even if the facial expressions may be made visible through the use of a TV telephone, the lower half of the body is still out of sight. And even if the lower half of the body too is made visible, the house in which the speaker lives cannot be seen.... The media cannot transmit every detail of the background. The media, like journalism, gather the clipped parts and present them as if they represented the whole. That is to say, an informationalized society is a virtual-image society. We must keep this in -ind when we cope with the INS society that is to come.

9113
CSO: 4106/110

SCIENCE AND TECHNOLOGY

NTT'S PLANS TO LAUNCH CS-3, BS-3 DISCUSSED

CS-3 Project

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 20 Feb 82 p 9

[Text] Nippon Telephone and Telegraph Public Corporation (NTT) (H. Mafuji, president) is going to embark on the full-scale development of a large-capacity communications satellite (CS). This is part of promotional work to form a new network for building a high-level information network system (INS) aimed at the information-oriented society of the 21st century. NTT's satellite communication plan thus far is to launch CS-2 in FY1982 for disaster and emergency use as well as for distant island communications. However, the plan is to expand the range drastically, even to general public circuits and data communication circuits, by developing a large-capacity CS. For this reason, they will launch a 1-ton satellite (25,000 telephone circuits) in 1987 and a 4-ton (100,000 telephone circuits) communications satellite (CS) around 1995. For the launch, the plan is to use NASA's (U.S. National Aeronautics and Space Administration) space shuttle. NTT has already begun CS-related development.

Beginning in FY1982, however, the development of multibeam satellite antenna systems will be undertaken [by NTT] so as to cover the entire Japanese archipelago, as well as attitude control. Such concepts by NTT will certainly influence Japanese communications satellite policy a great deal.

Part of INS Network Buildup

The NTT concept of INS centers on digital technology. Optical fiber communications, digital data exchange (DDX) service, automobile telephones, etc., have already been practiced, and the groundwork is steadily being consolidated. Under such circumstances, it has been deemed necessary to build a comprehensive network combining satellites with the conventional network suited for terrestrial communications, and the concept of launching a large-capacity communications satellite has been solidified.

The Japanese communications satellites (CS) are in accordance with the space policy guidelines of the Space Activities Commission, and present plans include launching a medium-capacity utility satellite 'CS-2' (weight: 350 kilograms; 3,000 telephone circuits) in February 1983 and a second-generation CS-3 (550 kilograms, 600 circuits) with a target date of 1987 using the Japanese-made H1A booster rocket. With regard to the CS-3, the specific content of the satellite will be determined by the Space Activities Commission in 1982; no decision has yet been made. NTT plans to use both the CS-2 and the CS-3 in times of emergency and disaster affecting ground trunk lines or distant island communications.

However, the circuit capacity of the CS-3 is only double that of the CS-2 and is insufficient to fully demonstrate the INS concept of supporting the formation of high-level information-oriented society of the future. Based on this judgment, [NTT] has decided on a plan to launch a large-capacity communications satellite itself. The planned launch time is also set to coincide with that of the CS-3.

The INS network conceived by NTT will be built by connecting satellite circuits of antennas installed without reinforcement on the rooftops of major central exchange offices and ground circuits using fiber optics cables. Within the network, a multibeam system will be employed for satellite communications in order to effect efficient use of frequency. This is due to the fact that the angle of frequency emission from the satellite is as high as 40-50^{o} in the case of Japan, and negligible interbeam interference occurs. This permits the exchange of 20 mega bits/sec. digital information with a 4-meter earth exchange antenna by mounting a large transmission antenna on the satellite. NTT clains that, in the case of the 1-ton satellite planned in 1987, only four beams will be required to cover Japan. Since smaller earth antennas will do as the satellites become larger, NTT is even contemplating expansion of 30 beams in the case of the 4-ton satellite.

NTT set up a new, large-capacity satellite communications research laboratory within the Yokosuka communications research laboratory in January of this year and is building up a research structure in coordination with the conventional satellite communications system and the satellite communications system research laboratory.

Statement by Y. Kitahara, vice president: The use of large-capacity satellite communications as one of the INS network systems has many advantages. On this satellite, we will rely on the United States for launching technology, satellite technology within space, etc.; NTT will lead in the development of various technologies related to the main body of the satellite. For the time being, it will be used for general public circuits, but it will eventually become open to special circuits and value added network (VAN) enterprises.

U.S. Satellite as Launcher

Tokyo DENPA SHIMBUN in Japanese 8 Mar 82 p 1

[Text] "We should seriously consider asking other countries to launch the next-generation domestic utility satellites (CS-3, BS-3) with the U.S. shuttle and not with a Japanese-made rocket." Two major users of domestic satellites in Japan, Nippon Telephone and Telegraph Public Corporation [NTT] and NHK [Japan Broadcasting Corporation], demonstrated in unison a position in opposition to the present space development program. This is due to the fact that, when relying upon a Japanese rocket, there is an economic problem as well as a risk of being left behind in the world stream. The space development project planned by the Space Activities Commission is reevaluated every year, and reevaluation requests from relevant ministries and agencies are submitted from June to August. Preceding the above event, a change in rocket-launching is expected to be discussed in May or June as an important item at the "four-party council" (which consists of the Ministry of Posts and Telecommunications, NTT, NHK, and KDD [International Telephone & Telegraph]). According to related sources, the trend is to lean heavily toward the use of foreign rockets.

Four-Party Council

The progress in satellite communications and broadcasting is remarkable. In order to cope with the satellite era, Japan in 1968 established the Space Activities Commission (with the director general of the Science and Technology Agency serving as chairman) under the Prime Minister's Office, made up of related ministries and agencies, and planned the Japanese space development program. Development and practical applications have been advanced accordingly. With regard to communications and broadcast satellites, an experimental communications satellite (CS) was launched in December 1977, and an experimental broadcast satellite (BS) in April 1978. The plan is to launch a utility communications satellite (CS-2) in February 1983 and a utility broadcast satellite (BS-2) in February 1984.

Up to this point, the plans have moved along without problems. However, regarding the next-generation utility satellites, which are expected to be full-scale domestic satellites with respect to their capacity, signs to seek a change in plans are beginning to arise among communications and broadcast businesses.

Increasing Views for Reevaluation

Although the space development project is an absolute plan, a reevaluation is made once a year. For FY1981, it is scheduled to take place this month. This reevaluation will be conducted along the lines of the reevaluation

requests submitted by various ministries and agencies in June-August of this fiscal year. Regarding communications and broadcast satellites under the jurisdiction of the Ministry of Posts and Telecommunications, it is expected that a plan will be proposed to launch the next-generation communications satellite (CS-3) in FY1987 (term of February 1988), using a Japanese-made H-1 rocket. However, more and more voices to change this plan have already been heard.

At the present point, a change in the March reevaluation proposal seems difficult with respect to time, but a reevaluation is contemplated in FY1982. In the FY1982 reevaluation requests, the launching of the BS-3 next-generation broadcast satellite in FY1983 is even considered, and the object is to open the way to request that the launching of both the CS-3 and the BS-3 be made by a foreign country, for example with the U.S. shuttle, and not with the Japanese H-1 rocket. At the four-party council to be held in May-June to solidify the plan of the Ministry of Posts and Telecommunications regarding the FY1982 reevaluation, this proposal is expected to become the focus of discussion.

Europe Closes in Fast

An upgrading of international technology also has the purpose of space development. Putting ripple effects aside and focusing on the main objective, the major basis for the use of a foreign launch vehicle proposal is the increasingly strong concern that Japan may fall behind the world's level if it relies on domestic products for a launch vehicle. The development of space communications and broadcasting has been led by the United States, with France and Japan in pursuit. Other European countries are catching up remarkably fast, however, and the Japanese position is being threatened. Especially in the Pacific region, it may be said that it is Japan's duty to take the leadership, and a speeding up of the satellite project is considered necessary, in view of the opposition posed by the United States and France as well. To this end, it is reasonable to use a foreign launch vehicle, which is conceivably more advantageous costwise rather than relying on a Japanese-made launch vehicle. Incidentally, launching by shuttle is said to be already assigned as far [in the future] as No 50, and an early decision is necessary even when using a shuttle.

In addition to such launching problems, it has become necessary to study the operation of the satellite itself as well as the present communications and broadcast satellite structure, such as operation by users themselves, namely NTT and NHK as the major force. In the service work, multilateral developments are being sought, such as applications to future communications and new media regarding data transmission, image transmission, prime broadcasting, still-image broadcasting, etc., as well as applications to mobile radio. Various problems related to satellites are brought into focus one after another, and a total reworking of the space communications and broadcast development program is becoming urgent. Upon receipt of a report to be submitted soon by the survey and research council on versatile broadcasting (reported in this paper on the 6th), the Ministry of Posts and

Telecommunications plans to formulate a long-term vision. Along with substantive measures, sufficiently fast responses are strongly urged.

7722
CSO: 4106/82

SCIENCE AND TECHNOLOGY

RESEARCH, DEVELOPMENT OF SOLAR BATTERY UPDATED

Improved Silicon Cell Efficiency

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 30 Apr 82 p 7

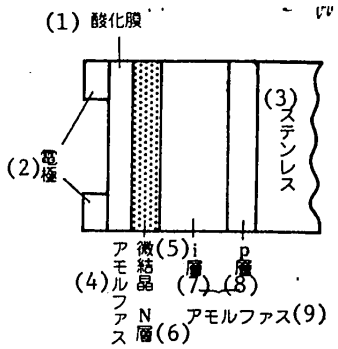
[Text] The Fuji Electric Company (president, Shigeo Abe) has successfully improved the energy-conversion efficiency of amorphous silicon solar cells by 2 percent, using amorphous (nondistinct crystalline) silicon with a fine crystal structure. Furthermore, they have discovered that the efficiency can be improved by selecting the quantity of boron contained in the "i" layer of the solar cell, and they intend to achieve "8-percent efficiency for a 100 cm^2 cell" before the end of this fiscal year; this is the goal of the Sunshine Project, which is the nation's comprehensive new energy development project.

The company has been working to improve the performance of amorphous silicon solar cells, one theme of the Sunshine Project commissioned by the Ministry of International Trade and Industry. This cell is predicted to be the real winner for practicalization, as it is considered easy to manufacture at lower cost even among silicon solar cells regarded superior in cost and energy efficiency to other materials. The biggest problems for practicalization have been the scale-up and improvement of performance.

The company has improved the efficiency of the conventional N-i-P structure solar cell approximately 2 percent by replacing the outside N type amorphous silicon with especially made amorphous silicon containing 90-percent fine crystals. The manufacturing method for the N layer is characterized mainly by: (1) the dilution of silane gas by 20-fold with hydrogen, (2) the discharge of 150-watt, 13.5-megaHertz high power. This treatment produces fine crystals of the 60 Angstrom level.

The improved performance is considered attributable to the effective use of the short-wavelength band with high energy, as a result of improved optical properties of better light permeability and less light reflection, in addition to the improved electric conductivity following the adoption of amorphous silicon containing fine crystals. Also, simultaneously, when the concentration of boron in the center "i" layer was controlled, they found it possible to prevent the deterioration of efficiency due to the reuniting of ionized electrons caused by defects in crystals.

According to the current state of silicon solar cells, the energy efficiency of the single crystal type is 10-12 percent for a 1 cm^2 cell, and that of the amorphous type is about 6 percent for the same cell. What is more, a drop in efficiency is anticipated in association with the scale-up. The goal of the Sunshine Project is to achieve 8-percent efficiency for a 100 cm^2 cell. Fuji Electric has already achieved 6.1-percent efficiency for the same cell, and plans to aim at 8-percent efficiency in the future by controlling the boron concentration in the "i" layer.



Structure of Fine Crystal Amorphous Solar Cell

Key:

1. Oxidized film
2. Electrode
3. Stainless
4. Amorphous
5. Fine Crystal
6. "N" layer
7. "i" layer
8. "P" layer
9. Amorphous

High-Speed Solar Cell Manufacture

Tokyo NIHON KOGYO SHIMBUN in Japanese 26 May 82 p 1

[Text] Hokusan (president, Kenzo Mizushima) has succeeded in developing an epochal new technology which almost instantly manufactures in less than a second a large solar cell silicon sheet (thin plate) with a diameter exceeding 15 cm. This is the world's first method for manufacturing practical solar cell materials at such high speed. The complete process takes only 2 seconds, even including the time to retrieve the manufactured sheet. Productivity will indeed be enhanced 30- to 100-fold, compared to the current process in which a silicon single-crystal ingot rod is produced. In addition, while approximately half of the ingot is scrapped as shavings from cutting during processing, the thickness of this sheet matches the solar cell exactly, and no portion of the sheet will be wasted. This feature can reduce the silicon material cost, which is one half to one third of solar cell costs,

to 1/10-1/20 in one fell swoop. Photoelectric conversion efficiency is a bit low: 6 percent. As it improves with time, a 10-percent level of efficiency is attainable, according to a professional source. The company intends to achieve a 10-percent level of efficiency before the end of this fiscal year and plans to go into commercialization.

The toughest issue regarding solar cells is the reduction of costs. The silicon single-crystal ingot currently in use requires a large quantity of power for manufacture, and about half of it is, in addition, wasted as loss in the cutting process. Consequently, substrate is obtained at only about 1.3 cm^2 area/hour (area deposition rate), resulting in an inevitably high price.

Therefore, the major proposition is to develop a "post-single-crystal silicon"; three ideas have surfaced: amorphous silicon, ribbon silicon, and multicrystal silicon.

The question as to which will emerge the winner has yet to be debated, but silicon sheets at this time are made of multicrystal silicon composed of countless clustering small crystals.

As for multicrystal silicon, the West German [firm] Wacker has established a casting method which produces ingots in the same manner as the casting of moldings and has come up with solar cells of about 10-percent efficiency. In Japan, Nippon Electric also developed an original casting method and made trial solar cells of 11-percent efficiency. However, multicrystal silicon has the same loss during cutting as single-crystal silicon.

The new manufacturing method just invented has completely solved the problem of loss due to cutting.

The process is extremely simple. Everyone wonders why no one had thought of it before.

First, a rotary plate made of quartz is heated to 500-900°C and spun at a speed of about 160 rpm. Then, heated and melted silicon is dropped in an argon gas atmosphere.

Subsequently, according to the inventors, the molten silicon dropped on the rotary plate is spun out by centrifugal force and instantly spread thin and hardened to form a multicrystal silicon sheet. The whole process takes less than a second. The total time, including retrival of the sheet, will be about 2 seconds.

In experiments, silicon sheets about 15 cm in diameter and 0.3-0.4 mm in thickness were obtained. However, area scale-up is achievable if the diameter of the rotary plate is extended. The thickness is also said to be controlled as desired.

Likewise, a square is preferable to a circle as a solar cell, in the sense that squares can be lined up neatly without wasting space. Square cells can be made if the rotary plate has a square shape.

With all these good indications, practicability is very high. The area deposition rate has reached 36-100m^2/h, equivalent to 30-100 times more than that of a single-crystal silicon, and this promises to reduce the cost to 1/10 or 1/20.

Comment by Assistant Professor Hiroyuki Matsuba, Electronic Engineering Department, Engineering School, Kyoto University: "Cells of considerably good quality are produced. Performance (efficiency) is upgraded daily. I think it is an epochal method. The peak (improvement of efficiency) has not yet been reached, but it will not be that high. If they can achieve 9-percent efficiency, they have nothing to be afraid of and can proudly announce it to the world."

Review

The ribbon silicon area deposition rate is 0.12-0.18m^2/h. The area deposition rate claimed by the multicrystal silicon film manufacturing method, the "SOC method" (in which silicon is deposited on a ceramic substrate), said to be in development by American Honeywell, is also still at the 0.36m^2/h level. Hokusan's manufacturing method has indeed achieved an astonishing speed that is equivalent to some hundred times more than these [methods].

The silicon sheet that is obtained has a uniform thickness and can, without polishing, be made into solar cells that have practically the same efficiency as polished ones.

That leaves only the problem of efficiency to be solved. The efficiency achieved by the multicrystal silicon improves with the increase in the size of crystal grain. The current average crystal size is about 200 microns. How large the grain can be made is one of the points connected with improvement of efficiency.

Nevertheless, the outlook for silicon sheets seems bright, as can be seen by the following indications: 10-percent efficiency is reported to be achievable as long as the crystal size measures 100 microns; the quality of the column-structured crystals obtained by the new manufacturing method is good; a larger grain size is realizable by optimizing manufacturing conditions.

Spectral Division Solar Battery

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 24 May 82 p 3

[Text] A research group headed by Prof Masayoshi Umeno and Assistant Shiro Sakai of the Nagoya Institute of Technology has succeeded in producing a trial spectral division type solar cell with a gallium/arsenic element and a gallium/aluminum/arsenic element by the metal organic chemical vapor deposition method. This solar cell is designed to absorb efficiently the spectra

from short-wavelength bands to long-wavelength bands (the conventional method is designed to absorb the short-wavelength band spectrum) by placing gallium/arsenic elements and gallium/aluminum/arsenic elements in layers. This achievement is expected to raise photoelectric conversion efficiency to over 30 percent, three times more than the currently practical silicon single crystal solar cells, and approximately 50 percent more than the gallium/arsenic solar cells being studied for practicalization. Practicalization in the field of space development is drawing attention.

In solar power generation, which makes the most of gallium/arsenic technology, the Mitsubishi Electric Corporation and Sumitomo Electric Industry have developed a heteroface (hetero-surface contact) solar cell with gallium/aluminum/arsenic and gallium/arsenic elements. Mitsubishi achieved a high conversion efficiency of 21.6 percent with a trial element made in April 1979 (12 percent in the case of the silicon). However, the element was processed by liquid deposition, and the adopted system stratified gallium/arsenic and gallium/aluminum/arsenic on the substrates.

In contrast, the research by Umeno and his group is characterized by the use of the metal organic chemical vapor deposition (MOCVD) method.

The merits of this method over the liquid deposition method are that it is a simpler process and has a larger element area.

The crystal deposition method uses a reactor to administer high-frequency heating of flat square graphite (black lead) base. Trimethyl gallium (TMG), trimethyl aluminum (TMA), and diethyl zinc (DEZ) are kept at a predetermined temperature in an electronic cooler.

Among those chemicals, TMG and TMA are transported to the reactor in liquid form bubbled with hydrogen. On the other hand, DEZ is transformed into a solid in a vessel in the next step and transported to the reactor with the hydrogen blown over the solid. DEZ is the raw material for impurities of the P type, while hydrosulfide is the raw material for impurities of the N type.

N type gallium/arsenic with silicon impurities and semi-insulating gallium/arsenic with chromium and oxygen impurities were used as the substrate. Crystal deposition conditions are as follows: deposition temperature, 700-800°C; total hydrogen flow rate, 1.7-2.4 liter/m; hydrogen flow rate containing TMG (minus 10-0°C), 5-10cc/min; containing TMA (20-30°C), 5-30cc/min; containing DEZ (minus 35°C), 10-40cc/min.

The flow rate of arsine (2 percent) is 100-500cc/min. The flow rate of hydrosulfide (200 ppm) is 100-600cc/min. The deposition rate is 0.1-0.2 micron/min. Professor Umeno and his group established these crystal deposition conditions for the MOCVD method.

The MOCVD method can obtain an uniformal epitaxial layer (to make single crystal thin film deposit to the same axial direction of the semiconductor substrate) over a large area, and therefore it is excellent as a highly efficient mass production technology for gallium/arsenic group solar cells. In

order to prove the point, a heteroface solar cell was made using elements obtained by the MOCVD method.

The following were deposited in regular sequence on top of the N type gallium/arsenic substrate with silicon impurities: gallium/arsenic without impurities; p type gallium (0.2)/aluminum (0.8)/arsenic with zinc impurities. PN (plus minus) contacts were formed in the gallium/arsenic layer by the diffusion of zinc during deposition.

The typical thickness of each layer is 3 microns for N type gallium/arsenic, 1 micron for P type gallium/arsenic, and the same for P type gallium/aluminum/arsenic.

Spectral division is 1 micron, and P type gallium/aluminum/arsenic is the same.

As a preliminary step toward the spectral division type solar cell, the group challenged the task of producing a heteroface solar cell and obtained good results in fabrication of elements and conversion efficiency.

Bandgap (forbidden bandwidth) energy of the gallium/arsenic layer is virtually the same as the optimal bandgap energy of a solar cell, thus contributing to the production of highly efficient solar cells. Furthermore, the gallium/aluminum/arsenic layer can be adjusted to the solar photo spectrum to enhance the conversion ratio by selecting the proper percentage of aluminum.

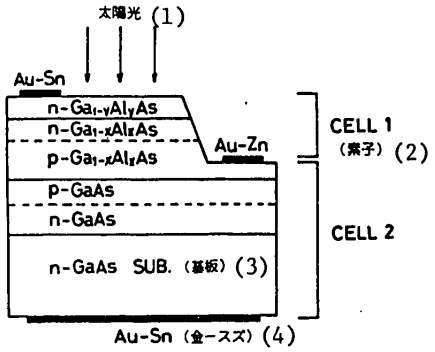
Professor Umeno proposed a spectral division type solar cell which used gallium/aluminum/arsenic and gallium/arsenic in order to apply these principles for efficiency enhancement. The trial solar cell made in accordance with the above design operates to improve energy conversion efficiency by absorbing the short-wavelength component of solar photo energy into a gallium/aluminum/arsenic layer (element) having a large bandgap, and by absorbing long wavelength component into gallium/arsenic layer (element) having a small bandgap.

The solar cell is comprised of an N type gallium/arsenic substrate with silicon impurities and sequential epitaxial depositions without impurities of N type gallium/arsenic layer, P type gallium (0.7)/aluminum (0.25)/arsenic layer, N type same layer, and N type gallium (0.2)/aluminum (0.8)/arsenic layer over the substrate. P type gallium/arsenic layer was formed by the zinc diffused from P type gallium/aluminum/arsenic layer. The thickness of each layer is 3.5 microns, 1.2 microns, and 0.8 microns, respectively.

One of the characteristics of the MOCVD method is its ability to mass-produce gallium/aluminum/arsenic epitaxial thin film. However, many problems remain to be clarified with respect to its crystallinity. Particularly, the diffusion length become markedly short in proportion to the increase in the aluminum component ratio. This phenomenon dampens the special quality of spectral division type solar cells that are designed to achieve high-energy conversion efficiency.

The above-mentioned deterioration of gallium/aluminum/arsenic crystals is assumed to have resulted from the residual hydrogen and steam in the reactor. This problem can be solved by purging the reactor with TMA.

The solar cell being developed by Professor Umeno and his group is still in the laboratory stage, but a conversion efficiency of up to 31 percent can be hoped for in terms of theoretical value. This means that efficiency can be improved about threefold, compared to a cell with a silicon element. Another advantage is that, unlike the silicon element, the efficiency improves if the light is further focused. Use of gallium/aluminum/arsenic can focus the light almost 200 times greater than regular sunlight. One other feature is the reduction of the element thickness to 5 microns, about one fifth of the silicon which is 100 microns. [as printed]



Spectral Division Type Solar Cell Structure

Key:

1. Sunlight
2. Element
3. Substrate
4. Gold-tin

8940
CSO: 4106/126

RADIO-WAVE ABSORBENT FERRITE DEVELOPED

Tokyo SHUKAN SHINCHO in Japanese 25 May 82 p 29

[Text] A radio-wave absorbent consisting mainly of ferrite for effective absorption of super-high-frequency radio waves used in radar and microwave communication has been developed by Nippon Electric Company [NEC]. The Tokyo Electrochemical Industry (TDK) developed a similar ferrite coating last year.

Both companies claim that "this technology is aimed for civilian use, such as in steel towers, bridges, skyscrapers, electronic ranges, etc., to prevent the irregular reflection and leakage of radio waves." However, the topic of conversation has turned to military use, as it did when TDK's development became known. This is because the absorption of radar waves would permit missiles and aircraft to sneak through the defense's monitoring network and attack the enemy by surprise.

Ferrite is a magnetic material consisting mainly of iron oxide with manganese, magnesium, nickel, and lead added. That developed by NEC is a three-layer material. One layer is a transformer layer consisting of a mixture of ferrite and epoxy resin which allows free passage of radio waves. The other is a radio-wave absorbent consisting of a mixture of ferrite, metal short fiber, and epoxy resin. These two layers are mounted on a metallic plate. When the high-frequency radio wave hits this absorbent, it penetrates the two layers and bounces off the metallic plate. The reflected wave refracts within the transformer layer, where it loses its energy and is absorbed. This "three-layer plate" can be processed in many ways depending on the quality for coating materials, rubber sheets, etc. The absorbent can effectively absorb 99 percent of the frequencies of 1 to 20 gigaHertz (1 gigaHertz = 1 billion Hertz). It is said that it will cost "100,000-150,000 yen per square meter."

On the one hand, a report on TDK's ferrite coating introduced by the U.S. Air Force at a symposium on electronic warfare held last October at Andrews Air Force Base stated, "It is a mixture of powdered ferrite and paint, and it became known that when a metallic surface is coated with this [material] to a thickness of 2.5 millimeters, reflected waves from frequencies ranging from 7 to 92 gigaHertz can be weakened by up to 250:1."

Japan's Defense Agency also has focused its attention on this technology, and it is reported that the U.S. national military establishment has requested samples to be used in joint research as part of Japanese-U.S. military technology cooperation.

The NEC's recent ferrite technology may not be able to avoid being the target of Japanese-U.S. military cooperation. NEC denies this, saying, "It was developed strictly for civilian use, and we are not thinking of converting it to military use." It needs to be made lighter for military use, and NEC says, "We are not thinking along those lines." An absorbent about 2 centimeters thick would be required for a 1-gigaHertz-range television relay, but in the case of a radar, a thickness of 4 millimeters in the commonly used 10-gigaHertz range and a 2-millimeter thickness in the 20-gigaHertz range would be sufficient. It has been calculated that the "use of a 4-millimeter-thick material weighing 6.3 kilograms per square meter is feasible in a military aircraft."

TDK has said, "We have not yet achieved the practical stage for a coating. It would surely become heavier as a coating; therefore, militarization cannot come to mind."

Both companies say, "Our product is not for military use." But as long as the U.S. military is eyeing it, the question would be whether the matter can be settled by saying that there is no connection.... Ever since radar appeared, efforts have been made to develop a technology to make it ineffective. It is claimed at this time that the best method is absorption of radio waves. This is known as "stealth technology." Both the United States and the Soviet Union are putting great energy into this. The Reagan administration has been aiming for the stealth operation of the B-1 strategic bomber and cruise missiles, and because of the lack of an effective radio-wave absorbent, they were attracted to TDK's technology. If stealth technology can be realized, its strategic and tactical significance would be great, because a surprise attack could be carried out by "unseen missiles and aircraft."

Because of this, the new technology of both manufacturers in Japan is attracting great attention. At present, however, new technologies of all sorts are losing their clear-cut distinction between civilian and military usage.

9218
CSO: 8129/1299

END