JPRS L/9497

22 January 1981

Japan Report

(FOUO 4/81)

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

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

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

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

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

APPROVED FOR RELEASE: 2007/02/08: CIA-RDP82-00850R000300070032-6

JPRS L/9497

22 January 1981

JAPAN REPORT

(FOUO 4/81)

CONTENTS

POLITICAL AND SOCIOLOGICAL

'KYOTOKYO' GROUP REAPPEARS IN KEY POSTS

Tokyo THE JAPAN TIMES in English 4 Dec 80 p 2

[Politics Today--and Tomorrow column - By Minoru Shimizu: "Former LDP 'Gang of 4' Resurfaces"]

[Text] During the latter part of the Miki administration, which lasted from December 1974 to December 1976, a new group called the Party Unity Establishment Council (known in abbreviated from as Kyotokyo) was formed within the Liberal-Democratic Party (LDP) and became very active. Made up mostly of anti-mainstream and non-mainstream factions such as the Tanaka, Ohira and Fukuda factions, the group accounted for more than half of the LDP's total strength. Underlying the formation of the Kyotokyo was the ulterior political motive of ousting Prime Minister Takeo Miki from the premiership, on the ground that, in his zeal to investigate the Lockheed scandal disclosed in the first part of 1976, he was failing to apply himself seriously to clearing up a pile of other political and economic issues.

The Tanaka faction, which formed the group's parent body, held strong anti-Miki sentiments due to the arrest of their leader, former Prime Minister Kakuei Tanaka, in connection with the Lockheed case.

Oust Miki Movement

The group's goal was finally achieved when Miki stepped down, taking responsibility for the substantial loss of parliamentary seats in the general election of Dec. 5, 1976. After the reins of government were handed over by Miki to the Fukuda administration, the Kyotokyo disappeared from the scene.

Heading the oust-Miki move were four staff-level members: Zenko Suzuki of the Ohira faction, Susumu Nikaido and Masumi Ezaki of the Tanaka faction and Sunao Sonoda of the Fukuda faction, leaders of the major factions that belonged to Kyotokyo. Because of the leading roles they played in the oust-Miki campaign, they became known as the "Gang of Four of the Kyotokyo."

With the establishment of the Suzuki administration, the "Gang of Four" has again moved into the spotlight, because one of them has assumed the premiership. The remaining three have all been assigned to key posts, either in the Cabinet, LDP or elsewhere, and are supporting the administration.

Executive Council Chairman

Nikaido was appointed as Executive Council chairman — one of the three top party posts — while Sonoda has become minister of health and welfare. Although still without any official title, Ezaki has been assigned to several posts including that of ambassador extraordinary to the Middle East (though his planned trip to the Middle East had to be canceled because of the Iran-Iraq war.)

Knowledgeable sources say that Prime Minister Suzuki considers these three comrades from the Kyotokyo days as the prop and stay of his administration. Supported by the party unity system centering on the three leading factions — the Suzuki, Tanaka and Fukuda factions — the Suzuki regime seems, on the surface, to be stable.

But, in reality, it cannot be said to be on safe ground. Within his own faction, there are such members as Masayoshi Ito, present foreign minister, who was closely associated with the late Prime Minister Masayoshi Ohira and whose relations with Suzuki are still somewhat reminiscent of the former "chilly" days. Meanwhile, Yasuhiro Nakasone, director-general of the Administrative Management Agency, and Toshio Komoto, director-general of the Economic Planning Agency, both contenders for the "post-Suzuki" premiership, are preparing to start open campaign activities whenever the chance presents itself. When the two start moving, it could

well trigger a chain of new leaders — including Shintaro Abe, chairman of the LDP Policy Affairs Research Council — belonging to the Fukuda and Tanaka factions that form, together with the Suzuki faction, the ruling clique. Should this happen, it would shake the foundations of the Suzuki regime.

Executive Council Chairman Nikaido is the man in whom Prime Minister Suzuki puts greatest trust. Nikaido, as well, in gratitude to Suzuki for his assignment to a key party post, is supporting Suzuki in a positive way.

Although appointed to such high posts as chief Cabinet secretary and LDP secretary-general from 1972 through 1974 during the days of the Tanaka Cabinet, Nikaido had not been assigned to any official post since then until this July, the reason being that he was one among a group dubbed "gray officials" for their alleged involvement in the Lockheed scandal.

In view of his reputation as a "gray official," even the late Prime Minister Ohira, who had close connections with Tanaka, hesitated to assign Nikaido to any top Cabinet or party post.

GOP Administration

Nikaido is scheduled to visit the United States early this month to meet with President-elect Ronald Reagan and former Secretary of State Henry Kissinger. On the assumption that Reagan would emerge the winner, Nikaido visited the U.S. before the election, at the end of September, and established contact with the Reagan camp. For his quick action, Nikaido is drawing attention as one of the very few politicians in Japan to have established a channel with the incoming Reagan administration. As Nikaido is Tanaka's right-hand man, political analysts, who view his two recent U.S. visits as reflecting Tanaka's intentions, say that the close relations between Tanaka and the incoming GOP administration deserve close attention.

However, Nikaido's scheduled visit to the U.S. is more likely aimed at laying the groundwork for Suzuki's visit to the U.S. scheduled for next May. Although Nikaido insists that his trip will be made on a purely personal basis, circles close to the prime minister take a serious view of his U.S. visit, saying that he will be acting in reality as the prime minister's ambassador extraor-

Meanwhile, Nikaido is skillfully managing the Executive Council, a top LDP organ, and has seen to it that no discontent with Suzuki has arisen in the LDP, at least up to now.

While supporting Suzuki in this way, the 71-year-old Nikaido is moving to bolster his own position both inside and outside the party.

In the latter part of October, when the Tanaka faction — the LDP's largest — resumed factional activities under the guise of the new "Thursday Club," Nikaido himself became chairman of the new group and has since been actively reorganizing and strengthening the Tanaka faction.

Meanwhile, in mid-November, addressing a national conference of LDP local chapter leaders, Nikaido made a long speech in which he said, "The political situation of the '80s will undoubtedly undergo violent change, calling for strong leadership to solve such problems as those of the economy and energy." He went on to say, "I hope our party members will foster an ability to view matters from a global standpoint," underlining his "internationalism."

Meanwhile, Health and Welfare Minister Sonoda has been boosting his position inside the Cabinet. Sonoda succeeded former Minister of Health and Welfare Kunikichi Saito when the latter had to resign because he had received political donations from Fujimi Hospital in Saitama Prefecture where malpractices have been disclosed.

Sonoda's Role

The Suzuki Cabinet inaugurated last July includes such members as Nakasone and Komoto who have their sights set on the premiership. Suzuki's appointment of Sonoda, a 66-year-old veteran politician, as a Cabinet member is said to have been aimed at holding those two contenders in check. In the case the two influential leaders show any signs in speech or behavior of putting Suzuki on the spot at a Cabinet meeting or on other occasions, Sonoda is expected to come to the prime minister's aid. Up to now the two have remained comparatively silent, showing no such signs.

According to sources close to Suzuki, Sonoda has helped the prime minister out many a time in past Cabinet meetings when criticism of Suzuki seemed likely to come up. Sensing it beforehand, he has saved the situation by adroitly shifting the course of the discussion in another direction.

The sources say that Suzuki is grateful to Sonoda for this. Sonoda indisputably possesses great ability to manage difficult situations.

Argument Over Constitution

In a recent Cabinet meeting, Science and Technology Agency Director-General Ichiro Nakagawa, a renowned hawk, engaged in a heated argument with Kiichi Miyazawa, chief Cabinet secretary and a dove. The argument was triggered when Nakagawa criticized Miyazawa for asking Cabinet members to exercise restraint in answering Diet interpellations concerning revision of the Constitution. Nakagawa supports Justice Minister Seisuke Okuno's statements advocating revision of the Constitution.

When the argument between Nakagawa and Miyazawa started to reach a dangerous point, where Suzuki's position on the Constitution issue was liable to be brought into question, Sonoda skillfully changed the subject at a judicious moment saying he would like to discuss some matters concerning health and welfare — his own field.

Ezaki, in the meantime, who has had to postpone his activities as ambassador extraordinary to the Middle East because of the Iran-Iraq war, frequently visits the prime minister at his official residence, advising him on domestic affairs as well as other matters.

In this way, the former Gang of Four of the defunct Kyotokyo has now started to play major roles at the center stage of politics. While they display much competence in steering matters inside the LDP, they still fall short in matters of policy. Thus, some political analysts are dubious about how much the Gang of Four will be able to contribute to the Suzuki government in terms of policy implementation.

CSO: 4120

POLITICAL AND SOCIOLOGICAL

SOCIALIST PARTY'S INTENTIONS STILL OBSCURE

Tokyo MAINICHI DAILY NEWS in English 5 Dec 80 p 2

[Editorial: "Socialist Without Vision"]

[Text] The Japan Socialist Party ended its three-day 45th annual convention Wednesday, but failed to produce concrete policies for its future activities. The nation, as a result, remains as baffled as ever about the true intent of the Japan Socialist Party in dealing with a raft of difficult problems ahead, to say nothing of its internal feud.

In short, the full-fledged restart of the JSP was postponed for another year. The three-day debate on the party's new policy line has only illustrated the rough going in store for the nation's No. 1 opposition party. The much-talked-about concept of forming a coalition government seems to have evaporated into thin air. No action was taken to "refresh the top personnel lineup."

The convention adopted a campaign policy for 1981 on the basis of the party's reflection on the outcome of the elections held in June, but no sense of urgency appeared throughout the discussions. Although the opposition parties had suffered a setback in the last elections, the Socialist Party alone maintained its 107 seats as before the dissolution of the Diet.

It must be pointed out, however, that the lack of leadership on the part of the Japan Socialist Party was responsible for the overwhelming victory of the Liberal-Democrats and the downfall of the opposition parties as a whole.

As expected, the leftist and rightist groups clashed over the report entitled "The Road Toward Socialism in Japan," indicating an ever widening gap between the two rival factions, especially in connection with their analysis of the international and domestic situations.

Chances are slim at the moment that they will meet halfway but the Socialist Party, often dubbed as "incomprehensible," will further lose its supporters unless they settle their wrangling once and for all. Why not engage in thoroughgoing discussions, staking the fate of the organization, instead of trying to work out a compromise or to dodge the immediate crisis?

It is now evident that the party executives are desirous of staying away from the coalition debate. At this time when the middle-of-the-road parties are moving toward a right-wing tieup, the socialists seem to have decided to remain onlookers. Is this escapist posture part of their far-sighted strategy?

The campaign policy termed 1983 as a year of "decisive battle," but what is meant by "decisive battle?" Whom are they challenging for a decisive political battle? Chairman Asukata called on the party rank and file to take "burning action," but what do they burn for?

The deeds and concept of these socialists are very much incomprehensible to us observers. Hence we cannot but throw doubt on the leadership of the present executive led by Chairman Asukata.

CSO: 4120

POLITICAL AND SOCIOLOGICAL

'YOMIURI' COMMENTS ON COUNCIL MEETING

Tokyo THE DAILY YOMIURI in English 7 Dec 80 p 3

[Behind the Scenes Column by Minoru Hirano: "A Didactic Council"]

[Text] The council of ministers concerned with overall security held its first meeting Thursday, but what was discussed vastly differed from what one would imagine from the council's name.

It was assumed that the task of the council was to discuss measures to be taken to avert danger to the national security and measures to be adopted if the national security is actually threatened.

The discussions would have been very grave and might have involved top national defense secrets if these themes were discussed, but the actual discussions proved be far from serious.

Only one hour was available for the discussions. A report by Foreign Minister Ito on the Mideast situation, which was a keynote address, was sort of an "introduction to the Mideast problems," and its text was distributed among reporters before the meeting.

What was discussed was explained in detail by Chief Cabinet Secretary Kiichi Miyazawa. The conclusions were quite commonplace: "Japan should cooperate with Western countries," "Japan should extend more aid to developing countries," "it should strengthen its domestic economy," "it should promote technological development," etc. No concrete proposals were made.

The meeting was little more than a "seminar on the Mideast problems." Accordingly, strictly speaking, it was not held behind closed doors, though reporters were not admitted in the conference room.

One ranking official of the Foreign Ministry explained the reason for distributing the text of the foreign minister's report by saying that (1) it would have been undesirable if any member of the cabinet divulged only that part of the discussions which was convenient to him and (2) the government wanted to let the people know what was discussed at the meeting. This explanation well illustrates the Foreign Ministry's attitude toward the council.

The council consists of nine members of the cabinet and the three top executive officers of the Liberal-Democratic Party (LDP)—secretary-general, Executive Board chairman and Policy Board chairman.

Inasmuch as so many persons took part in the discussions, it is difficult to keep what was discussed in secrecy. So, the Foreign Ministry did not furnish to the meeting any classified information for discussion. The meeting was a forum for enlightenment of the participants on national security problems. The above-quoted official gave the following supplementary explanation:

- The Japanese, unlike the Europeans, lack international sense. The Japanese government machinery is marked by interministerial barriers, and Japanese Government officials attach too much importance to their sectional interests.
- Because national security requires a comprehensive approach, diplomacy can display its functions only when all ministeries, and the people as well, have deeper understanding of the international situation.

On the eve of the birth of the Suzuki cabinet, the Foreign Ministry released a report titled "Security in the 1980s" to enlighten the public on national security. This zeal is reflected in the ministry's attitude toward the council.

However, if it overemphasizes the importance of educating other ministries, the Foreign Ministry would invite criticism that the ministry is trying to defend its preserves from meddling by other ministries. Unaware of the Foreign Ministry's real intentions, newpapers editorially criticized the meeting as an "inconclusive meeting" or questioned the real purpose

of the meeting. One newspaper made a scathing remark that the council would become a salon to kill time if it was a mere forum for free discussions.

Prime Minister Suzuki said he was glad the meeting had been held anyway, but some persons cynically said Suzuki felt relieved that the meeting had been held at last—without questioning its substance.

It was the prime minister himself who first proposed such a meeting, and it took about five months for the meeting to materialize after many twists and turns.

It is a proof of the peaceful Japan that a meeting for national security, a grave issue, should be a target of cynical criticism. But is the Foreign Ministry right in trying to continue the educational seminar by taking advantage of this peaceful mood?

CSO: 4120

POLITICAL AND SOCIOLOGICAL

CONSTITUTIONAL DEBATE IN LDP ANALYZED

Tokyo MAINICHI DAILY NEWS in English 9, 10, 11 Dec 80

[Three parts of article: "Constitutional Debate in LDP"]

[9 Dec 80 p 2]

[Article: "Group Favoring Present Text Emerges"]

[Text] *"Independent revision of the existing Constitution" has long been one of the most important party planks of the Liberal-Democratic Party. In fact, the party has discussed the same thing over and over during the past 25 years since the LDP was inaugurated on Nov. 15, 1955, through a grand conservative merger.*

The recent statements of Justice Minister Seisuke Okuno and Party Secretary General Yoshio Sakurauchi backing constitutional revision has once again touched off heated debate between the government and opposition parties. However, things have changed quite a bit this time with the emergence of a pro-constitution group within the Liberal-Democratic Party.

A questionnaire survey conducted by the Mainichi Newspapers has also revealed that many LDP members have grown cold toward this "important party policy." This was a somewhat stunning revelation. Has the LDP developed a schism in its otherwise solid unity concerning the constitutional revision all of a sudden, just like a bolt from the blue?

As the ruling party, LDP moves will have an important bearing on the future of the nation's political stance. A background study of the conflicting views on the issue within the party will provide a key to exploring the LDP's step into the future. The following series of articles, beginning today, will deal with this important aspect of the LDP on the Constitution.—Editor

• • •

On the night of Nov. 11, a dozen constitutional authorities including six former justice ministers met at a private gathering held at the Japanese restaurant "Fukudaya" at Kioi-cho, Tokyo.

They were Diet members, Yoshimi Furui and Isaji Tanaka, Yuichi Kori and former Diet members, Osamu Inaba, Tetsuzo Kojima, Tokutaro Kimura, and Haruhiko Uetake; commentator Ryugen Hosokawa, former Supreme Court Justice Tsuyoshi Mano, Professor Emeritus of Waseda University Kunitoshi Onishi, Professor Emeritus of Hitotsubashi University Joji Tanoue, and Professor Emeritus of Tokai University Tadashi Yoshimura.

They had all been members of the Constitution Research Council (Chairman: Kenzo Takayanagi) established within the cabinet from 1957 to 1964. Ichiro Otomo, formerly counsellor to the secretariat of the council, arranged the meeting.

It was the first time that so many key members had gathered since the council was dissolved. There is little doubt that mounting discussion on the revision of the Constitution, started by the Okuno statement, prompted such a meeting.

When all were seated, their conversation naturally centered on the Constitution, and the one who opened the conversation was the then Justice Minister Kimura, the only survivor of the signatories of the promulgation of the present Japanese Constitution.

Kimura, now over 90 years old, appeared rather hard of hearing and started talking one-sidedly without taking heed of others present. To sum up, he said:

"After all, we accepted the MacArthur draft and drew up the present Constitution. No wonder, many constitutional problems have been pointed out since then. I was opposed to it. That's why I took the initiative in creating the 'three forces' (the Self-Defense Forces) without regard to the Constitution. MacArthur wanted to purge me, but he had to use me to create the antisubversive law."

Others also expressed their views following Kimura, and their statements were as follows according to those present:

Kojima: I felt it to be quite strange to call His Majesty the Emperor the "symbol of the state." I insisted that he should be designated as either head of state or monarch. I am used to it now, but I still view it as very singular.

Onishi: Whether he is a head of state or monarch is not much different from the symbol if it is only a matter of choice of words.

Kori: The prewar Constitution stipulated that the emperor shall exercise the right of legislation with approval of the Imperial Diet. So long as there is no special provision to the effect that he shall take command of the armed forces and administrative affairs, he is no longer a supreme commander as he used to be whether we describe him as head of state or monarch.

Hosokawa: I personally believe that Article Nine of the Constitution is the source of all the trouble. It says that this country will not wage aggressive war and that to realize it this country will renounce war. When it is viewed another way, they say self-defense is constitutional since it is not mentioned. This is very strange. We must revise the Constitution to make it clear on this point.

Inaba: It is highly questionable that we do not have a law calling for a national referendum (to decide on the advisability of revising the Constitution).

Kori: I thought of it, too, when I was in the Home Affairs Ministry. The then Home Affairs Minister Seiichi Omura was not so interested in it because he said to me "Are you serious?" We did not have legal precedents of other countries either so we could not make up our minds.

Yoshimura: West Germany has conducted national referendums several times.

Tanoue: Even if we do not have a law on a national referendum, we should at least have a law on, say, formal decrees, as we had before the war.

Kori: Members of the present LDP Constitution Study Council (Chairman: Mitsuo Setoyama) asked me to explain about the "draft" mapped out by the council in June 1972, under the chairmanship of Mr. Inaba. At that time, I said: "The draft was mapped out just before the Tanaka cabinet was formed. I do not think it was approved by the party's general affairs committee. It must have been left as it was." Mr. Inaba, how about briefing them in detail?

Inaba: ....

Kojima: Mr. Setoyama says he could wind up the work in three years as he knows where the problems lie. I think he had better hurry up...

Time Tunnel

The recent constitutional wrangling appeared quite abrupt to them. They were under the impression that sentimental discussions prevailed over those regarding the more concrete items. They hoped that their "erstwhile debate" could be utilized in one way or another in the course of the present-day discussion.

In a sense, the discussions held at the Fukudaya restaurant have become almost traditional because they have been repeated again and again by the Liberal-Democratic Party. One might say that the old discussion on the constitution has suddenly popped up today after going through a 20-year-long time tunnel.

More than half of the members of the government Constitution Research Council, totaling 80 altogether, are dead now. Of those present at the Nov. 11 meeting, Mano was the only one known for his opposition to revising the constitution. The others were in favor of either total or partial revision. The distribution was just about the same as before.

Parallel Discussion

Only a day before, however, something they could hardly imagine happened at the meeting of the LDP's Constitution Study Council. Tadashi Yoshimura, one of those present at the Fukudaya meeting, personally experienced the changing atmosphere as he attended the meeting of the LDP's study council as a lecturer. In response to a request to outline his view, Yoshimura said:

"The whole question rests with the procedure in which the present Constitution was promulgated. In the course of translating the English text into Japanese, the contents were not examined nor have the Japanese side and the Occupation Forces ever discussed it face-to-face. In short, it was patch-up job."

Illustrating the cases in which the authorities of the Occupation Forces had taken forcible, one-sided measures, Yoshimura stressed the need to revise the Constitution.

Hardly had he finished his speech when he was showered with a criticism from those present. Former Deputy Chief Cabinet Secretary Koichi Kato questioned: "Then, how do you want to revise the present Constitution?"

Kunio Hatoyama commented, "Well, we can't map out a draft without an ideal," while Katsuhiko Shirakawa said: "Well, well, born in 1950, I am only familiar with postwar history. Would you say that this country has erred for 25 years under a defective Constitution? Do you mean to say that the voters who elected me were all wrong?"

Both Yoshimura and Kori, who was also present at the council meeting, retorted that the Constitution should be consistent and that it was high time that we should reevaluate it since it was promulgated through immature procedures in those days. Heated debate continued for about one hour to no avail.

The latest meeting, in fact, was a clear-cut contrast to the previous one held on Oct. 27 when 24 persons to one favored a revision of the Constitution; each pointing out the controversial problems and related defects.

Threatening To Bolt

One of the speakers that day went so far as to say that "if the party continued advocating a revision of the Constitution, we cannot help it if the party is split some day." Within the Liberal-Democratic Party, whose party plank calls for a revision of the Constitution which was a conservative merger pledge 25 years ago, has emerged a group calling for the protection of the existing Constitution. The LDP Constitution Study Council on that day urged this group to go to the forefront and defend the Constitution.

Deep changes have suddenly surfaced, however. What meaning does it have for the Liberal-Democratic Party? Since the confrontation is centered on the Constitution, the basis of all policies, it should be regarded as deeply-rooted in the party.

[10 Dec 80 p 2]

[Article: In the Shadow of U. S. Strategy]

[Text] In July 1976, the Foreign Ministry released a formidable number of diplomatic documents relating to the occupation period from the end of World War II through the coming into force of the Peace Treaty.

Among the many documents was a letter that attracted the special attention of "experts." It was dated Jan. 3, 1947, signed by the Supreme Commander of the Allied Forces Gen. Douglas MacArthur and addressed to Prime Minister Shigeru Yoshida.

The existence of such a letter had long been pointed out by constitutionalists, but it was the first time that the original letter was made public. In the letter, Gen. MacArthur said in part:

"In the light of past political developments in Japan, the allied countries have reached a decision to assure the Japanese nation of overall and permanent opportunities to amend the new Constitution, if necessary, by conducting a reevaluation and reexamination on the basis of experience obtained through actual enforcement of the Constitution. The decision also called for a formal reevaluation of the Constitution by the allied countries and the Japanese Diet sometime between the first and second year after the coming into force of the Constitution."

The documents released also contained classified material typed and printed on a letterhead of the cabinet, dated March 14, 1948. The document is now called the "S Plan," after the initial of Tatsuo Sato, then director general of the

Legislative Bureau, who headed a group which drafted a revision of the new Constitution. The "S Plan" is an important document, which endorses the fact that a revision of the Constitution had been studied by the government in the year following its promulgation.

The "S Plan" called for a revision of a total of 36 items such as institutionalizing the position of deputy prime minister in the Constitution and legislating the tenure of office of members of the House of Representatives from two to four years. The plan, however, was confined to technical problems and indicated a clear demarcation concerning debates on the Constitution centering on a revision of Article Nine.

So, there existed a move for constitutional revision from the very beginning under the initiative of the GHQ. It also gave the GHQ an indirect excuse against the criticism that the new Constitution was forced on the Japanese nation. Such a move gave rise to the "S Plan" and a number of other theories from scholars calling for a revision.

Priority On Rehabilitation

These opinions regarding constitutional revision, although limited to the technical aspects, played an important role in the rise of constitutional wrangling over the "remilitarization of the country." Those in favor of revision were certainly encouraged psychologically, as they believed that even the Occupation Forces had begun thinking of revision.

Ryutaro Nemoto, ex-agriculture minister, revealed the following behind-the-scenes story:

"I was chairman of the party policy research committee at the time of the third Yoshida cabinet. One day I said to Mr. Yoshida, 'How about revising the Constitution while MacArthur is in Japan?' 'That may be a good idea,' he replied.

"In Mr. Yoshida's opinion, Japan was in dire need of foodstuffs, and that top priority should be given to feeding the nation rather than such (constitutional) matters, while leaving Japan's security in the hands of the occupation forces. Mr. Yoshida believed that Japan's economic reconstruction should take precedence over other problems."

Nixon Statement

The general trend within the Liberal Party at that time seems to have been in favor of "protecting the new Constitution." The basic line of the party was to place importance on economic affairs rather than a revision of the Constitution and rearmament. This philosophy of Yoshida had been supported by a group within the Occupation Forces whose primary purpose was to prevent Japan's remilitarization. Testimony has revealed since then that the Yoshida regime had been supported in one way or another by this group.

But then, the visit to Tokyo of U.S. Vice President Nixon on Nov. 19, 1953 marked a significant shift in American policy vis-a-vis Japan. At a luncheon meeting given in his honor at the Tokyo Kaikan Hall, Marunouchi, Tokyo, Nixon said:

"The United States made a mistake out of its goodwill in 1946. The renunciation of war advocated in the Japanese Constitution was a mistake committed by the United States, because it misunderstood the true intent of the Soviet Union at that time.

"The United States, as a result, endeavored for disarmament, but the world situation today does not permit us to indulge in disarmament."

Clearly the United States had then changed its policy toward Japan. His speech was significant in that the U.S. government, concerned for the first time, referred to a revision of the Japanese Constitution officially. Yasuhiro Nakasone, who was then a Progressive Party Diet member, has this much to say:

"Nixon at that time asked me if there was anything that might capture the interest of the Japanese audience, and I advised him to say that the United States had made a mistake by forcing the Japanese people to accept such a Constitution. He did just that."

It is doubtful, however, that a man in a high position such as the vice president made such an important remark on the advice of a Japanese Diet member. The heart of the matter, perhaps, was that the United States itself was changing its Far East strategy toward the direction mentioned in the Nixon speech. The United States was then moving toward an anticommunist line in the face of the emergence of the People's Republic of China in October 1949, and the outbreak of the Korean War in June 1950.

In January 1948, U.S. Secretary of the Army Kenneth C. Royall said: "Japan should be built up as a citadel against the totalitarianism." In January 1950, Gen. MacArthur said: "Japan is not to be denied its right of self-defense." In 1951, Gen. MacArthur declared: "Japan should be rearmed." It is not too much to say that the Nixon speech climaxed these statements.

Nixon did not make such a remark on the spur of the moment. Hayato Ikeda, ex-

prime minister and the special government emissary to the United States, met with Assistant Secretary of State in charge of the Far East Walter Robertson in Washington on Oct. 13, about two weeks before Nixon arrived in Japan.

Robertson was then quoted as saying that the lack of patriotism and spirit of self-defense was the major stumbling block in the way of rearming Japan. His remark was just the opposite of the Nixon speech, and it appeared Japan could not free itself from the changing moves of the United States.

The Progressive Party which was formed in February 1952, declared in its policy plank that "all the laws and systems including the Constitution introduced during the occupation days should be completely reappraised."

The League for Japan's Reconstruction which was inaugurated in April the same year called for the establishment of a system as an independent country by revising the Constitution, one of its five major policies. The central figures of the league were depurged politicians including Ichiro Hatoyama, Bukichi Miki and Nobusuke Kishi. Kishi who became prime minister later was then the most outspoken advocate for a revision of the Constitution.

Politics At Odds With Economy

Yoshimi Furui, ex-justice minister, who was then a member of the Progressive Party, says:

"The primary target of Mr. Kishi was to fully rearm Japan. While he was in Sugamo Prison on charges of committing war crimes, the U.S. Far Eastern strategy had been undergoing a gradual change. He was very quick at noticing the change. He advocated a revision of the Constitution, in order to fill the blank during his incarceration, to build a footing for his political activities. It sounds very nice if you emphasize the independence of a nation, but what he meant was no more than that."

Such was the political concept held by Kishi et al, contrasting Yoshida's ideology which gave top priority to economic affairs. Although they justified their position with such slogans as anti-Yoshida line, anti-occupation policies and independence of the nation, they appeared to jump on the bandwagon voluntarily taking sides with the United States and its anticommunist line.

Debates held on the Japanese Constitution in this country cannot be interpreted independently of American policy toward Japan. Those advocating revision, too, cannot be free from this trend. They are opposed to a Constitution forced upon the nation, but are they not forcing a revision on the nation?

[11 Dec 80 p 2]

[Article: "Revision Policy, By-Product of Merger"]

[Text] The controversial paragraph calling for a revision of the Consitution was inserted in one of the platforms entitled "Improvement of Japan's Structure of Independence" when the Liberal-Democratic Party was inaugurated in November, 1955. The paragraph reads in part:

"The existing Constitution shall be revised independently and the laws promulgated during the occupation days shall be rescrutinized, abolished or revised in conformity with the conditions of the country while abiding by the principles of pacifism, democracy and respect to human rights..."

This paragraph has remained the only source on which the LDP based its advocacy for a revision of the Constitution during the past. With this paragraph behind them, advocates at times criticized the moderates as if the latter had violated party policy.

Expressions Lack Vigor

The expressions contained in the paragraph appear rather casual and lack vigor.

Prior to the merger of the Liberal and Democratic parties, both parties selected ten members each for drafting the platform of the new party on July 1, 1955. The party plank was mapped out on July 28. Ex-Justice Minister Isaji Tanaka, who was then a policy committee member representing the Liberal Party, said:

Nobody thought at that time that a revision of the Constitution was the focal problem. Now capitalizing on this passage of the platform, they insist on revising the Constitution, but it did not carry so much weight before. Someone voiced the need to have an independent constitution and the view was reflected in the plank without fanfare. This is the true story."

Ex-Chief Cabinet Secretary Ichitaro Ide, also a member of the policy committee representing the Democratic Party, said: "We gave importance to the merger itself rather than our policies. We thought of comparing the policies of both parties and picking up those agreeable to both sides."

Yuichi Kori, a member of the policy committee from the Liberal Party, recollected the atmosphere of those days, saying:

"We exchanged heated debates on fiscal problems, food control measures, labor laws and education in addition to constitutional problems. When the new party was formed, it had to go through a general election. Then, someone said that the constitutional problem was not strong enough to help the new party win the election. So, we arranged the priority of the platforms on the strength of winning the election."

The paragraph calling for a revision thus appeared in the sixth and last platform.

* * *

As mentioned earlier, Shigeru Yoshida stuck to his belief...to give top priority to economic rehabilitation and leave the matter of defense in the hands of the United States. He remained reluctant to deal with the revision issue throughout. On April 28, 1952 when the San Francisco Peace Treaty went into force, Yoshida declared: "The question of rearmament will be handled only after the nation has restored its strength. Now is not the time to revise the Constitution."

Anti-Yoshida Froces

The anti-Yoshida forces within the conservative camp led by Ichiro Hatoyama, Nobusuke Kishi and Mamoru Shigemitsu raised their voices calling for rearmament and a revision of the Constitution, partly as a gesture to counter the political posture of Yoshida. They further stepped up their politics-oriented posture and nationalistic leanings. The discordant note between the Yoshida and Hatoyama factions eventually exploded into a split in the Liberal Party.

In the meantime, American expectations, if not actual overt pressure, on Japan's rearmament gained momentum. In the course of negotiations on U.S. aid to Japan under the Mutual Security Act in 1953, the American side began urging Japan to commission the then Security Forces with the task of dealing with "direct aggression."

(The police reserve forces had been reorganized in October, 1952 into the Security Forces whose main task was to maintain peace and security at home.) Yoshida, who had nothing in mind but economic reconstruction, was then compelled to take up the matter since it was a prior condition attached to the American aid.

Yoshida hurriedly called a meeting with Hatoyama on Oct. 17, 1953, and accepted the two conditions served by the latter, namely the establishment of a Constitution Research Council and a Foreign Policy Research Council. Tadao Kuraishi who arranged the Yoshida-Hatoyama meeting behind the scenes recalled the rendezvous, saying: "Mr. Yoshida repeated strongly that the time was not ripe for rearmament although

Mr. Dulles recommended that Japan be rearmed."

Hirohide Ishida who also acted the same role as Juraishi said: "In those days we did not think of the Constitution as a big problem. We agreed to establishing the two research councils purely out of consideration for Mr. Hatoyama's stand. Even today, I believe it was nothing more than a futile discussion."

Reluctant Yoshida

Yoshida changed his stand vis-a-vis the Constitution problems bit by bit, though unwillingly.

Hatoyama parted with Yoshida again and formed the Japan Democratic Party with the Progressive Party of Mamoru Shigemitsu et al toward the end of 1954 and defeated Yoshida. Hatoyama who took over the helm of government carried out the general elections in February, 1955 under the slogan calling for a revision of the Constitution.

The so-called "Hatoyama boom" helped the Democratic Party emerge as the No. 1 party, beating the Liberals. Even then, he failed to topple the wall of the pro-Constitution groups led by the Leftist and Rightist Socialist parties, the Communist Party and the Labor-Farmer Party. Their efforts to "revise the Constitution as a first step to correct the evils of the occupation policies" were foiled at the outset.

Hatoyama, however, refused to give up. He declared at an Upper House budget committee meeting on March 29, the same year, that "I am still hopeful of revising the Constitution. The Constitution forced upon us during the occupation days should be regarded null and void."

Nobusuke Kishi, then party secretary general, called on the Liberal Party to "form a conservative tie-up as a prerequisite to a conservative merger and establish the Constitution Research Council, the Long-Term Defense Plan Research Council and the Council for Revising the Public Elections as a curtain-raiser for the proposed tie-up."

President Taketora Ogata of the Liberal Party who succeeded Yoshida flatly rejected the call. "The Hatoyama cabinet appears to be intent upon revising Article nine of the Constitution. There is no need for the Liberal and Democratic parties to join hands in studying a revision of the Constitution," said Ogata.

Soon afterwards the situation changed, however. The two split Socialist parties began moving toward reunification. The conservative forces, too, were alerted over the changing circumstances and could not dwell at length over such a "trifling matter."

"Frankly speaking," says Yuichi Kori, "members of the respective committees of both parties were fully aware of the difficulty ahead of the Constitution problem in spite of the noisy fanfare.

"We could not write in the party platform more than what the paragraph in question meant. And the prevailing sentiment at that time was to leave the concrete matters to the research council following the debut of the new party," he added.

The policy platform in question was, at best, the product of compromise between the group calling for a revision and the other determined to protect the Constitution. In a sense, nobody felt it was significant as the pro-revisionists later charged the moderates as "having infringed upon the party decision."

Judging from the discussions held afterwards, the question seemed to have been left up to the government's research council.

CSO: 4120

POLITICAL AND SOCIOLOGICAL

RELATIONS WITH PRC EXAMINED

Tokyo THE DAILY YOMIURI in English 9 Dec 80 p 3

[Focus on Asia Column by Swadesh De Roy: "Sino-Japanese Relations"]

[Text] With the exception of the US no other country receives as much Japanese attention as does China. And of course no other country trades with China half as much as does Japan.

The Sino-Japanese relationship, ever "deepening and unshakable" as the latest joint statement claimed, will amount in "down-to-earth" terms to just under $9 billion on trade account this year, not counting the aid and loans afforded by Japan. China is proving to be a very lucrative market, field of investment, and source of raw materials. With proper and patient tending it may become one of Japan's best economic partners.

Both China and Japan are fully aware of this prospect. Japan knows China's worth and China is not ignorant of the fact that there are others equally eager to be its partners. If Japan is favored today it is because Japan serves China's purposes better than others can. To retain this favored position Japan must pay constant attention to the Chinese cause and never must try to take any political advantage of the profitable economic relationship.

Ever since the normalization of Sino-Japanese relationship China has maintained total political independence despite its fast-growing dependence on Japanese and other Western economic assistance. Few others in comparable situation have been so successful.

As a matter of fact, relationship with China is almost entirely on Chinese terms. President-elect Ronald Reagan will soon know of this if he persists in trying to improve upon the terms the outgoing US president had managed to obtain. The Japanese are not too happy at the prospect of any unsettling move Reagan might make in the Sino-US relationship.

How does China maintain its dictating position?

Besides its economic resources, it has its enmity with the Soviet Union which it can sell on the Western market for as much as its "four modernizations" might cost. This political capital is self-creative. But its value to the West will always be determined by Soviet policies and behaviors. Nevertheless it today is an asset for China.

Last week at the Sino-Japanese ministerial conference Japan found itself in disagreement with China on the need of a political settlement of the Kampuchean issue. The Chinese ministers, according to reports, told their Japanese counterparts that a Kampuchean solution would not be easy to find. They refused to soften their own position. Why?

Because a political solution for Kampuchea that does not decisively weaken Vietnam's position in Southeast Asia might devalue all that China has invested in its confrontation with the Soviet Union so far.

CSO: 4120

NATION'S WORK ETHIC EXAMINED

Tokyo MAINICHI DAILY NEWS in English 9 Dec 80 p 2

[Zooming In column by Hideo Matsuoka: "Sobering Examination of Ourselves"]

[Text] The trend is still very much alive among the Japanese to debate and argue about Japan and the Japanese. In the recent screening of job applicants at the Mainichi Shimbun, the applying students were required to write a short essay on the subject of "The Japanese."

Another company in the media business asked its applicants to write on "Japan 100 Years from Now." If I were applying at that company, I would write: "A hundred years from now, half of the Japanese will be living outside Japan."

It should be impossible to keep feeding a population of over 100 million indefinitely in this resources-poor land. Moreover, I believe the Japanese have to and will change into a tougher breed with less sense of nationality discrimination, capable of setting up home anywhere in the world. Like it or not, the Japanese will have to become more of a world citizenry.

The current fad to discuss Japan and the Japanese comes as reaction in the United States and Europe to Japan's economic inroads there. It is distinctly different from the past discussions about Japan and the Japanese which were made largely from literary and sentimental angles. Taking the cue from these discussions, the Japanese began discussing themselves in a self-examination. It is in the inborn nature of the Japanese to mind what foreigners think about them.

Following the Meiji Restoration, the Japanese took it for a supreme imperative to build a modern nation that was in the class of advanced industrial countries such as America and the European countries. In that process, they had to always look around to see how their progress in modernization was being assessed by the Western nations. Japan watched the Western reaction to its modernization because it served as useful reference in deciding when to start talks to correct the unequal treaties that foreign powers had imposed on it. It was toward the end of the Meiji Era that Japan won the right to set its own customs duties. Japan kept minding foreign reactions to its state of modernization throughout the whole of the Meiji Era.

Thus, minding foreign reactions to themselves became the second nature of the Japanese. After all, they kept doing so for 40-odd years. It will be a surprise if it did not become part of the national idiosyncracy. Whenever they invite a guest, the Japanese anxiously watch the guest's reaction to see if he was satisfied with the treatment. This nature of the Japanese may well have whetted the Japanese appetite for minding foreign reactions.

In 1883, the Japanese government built the Rokumeikan to hold Western-style dance parties. The place was intended to be a showcase of Japan's Westernization. Japan wanted to be recognized as a "Westernized nation." Having a thing about foreign reputations and criticism of themselves lives to this day among the Japanese. It has not changed from the days of the Meiji.

Recently, there were two lectures by foreigners, one in Tokyo and the other in Osaka, which could be regarded as significant analysis and criticism of the Japanese by foreigners. One was by Alvin Toffler, author of *The Third Wave* which has sold a million copies, and the other by John Kenneth Galbraith of *The Age of Uncertainty* fame.

'Third Wave'

Toffler explored the future possibilities for Japan in the postindustrial age which he says is "the third wave" that would follow the agricultural

revolution and industrial revolution. But the subject somehow lacks urgency for Japan which is still in the midst of industrialization.

Galbraith spoke at the World Congress of International Jaycees in Osaka. He cited the following as factors that enabled Japan to achieve its celebrated growth:

(1) In Japan, confrontation among government, business and labor is not as sharp as that in America or Europe;

(2) For 35 years after losing the war, Japan spent little for defense and pumped the money thus saved into economic growth;

(3) In Japan, corporate decisions are made not by one powerful management executive but by a group of managerial experts.

He even tickled the Japanese pride, saying he saw possibilities for Japan to further improve its lot. The pleasing prediction, however, had one big proviso—that Japan does not pour money into greater defense efforts. In other words, he was warning the Japanese that a spending shift from the peace sector to the defense sector will inevitably lead to undesirable results because defense spending ends up as barren investments that do not return anything that is productive.

Without Galbraith pointing it out, we know that defense investments simply delight defense industries and stop short of starting a cycle of reproduction that is beneficial to the national economy. Such spending is money down the drain. Building warships means making huge steel boxes and keeping them just floating on the sea. Tanks are steel vehicles to be just deployed on fields. They hardly have anything to do with improvement of the national economy.

Poor in natural resources, Japan imports raw materials with hard-earned foreign currencies, and the products manufactured from them serve the domestic needs and also are exported to earn foreign currency. This is the regular cycle of the Japanese economy. Diverting the earnings to defense production is a bold folly and a waste that the Japanese economy cannot afford. This is part of the basics of economic theories. Galbraith's warning is very matter-of-fact and contains no revolutionary reasoning.

In forming his cabinet in October 1945 immediately after the end of the war, Prime Minister Kijuro Shidehara strongly asked Keizo Shibusawa, former governor of the Bank of Japan, to become his finance minister. Shibusawa declined several times, saying he had no confidence in his capability to rebuild Japan out of the sheer ruins of war. Then he had second thoughts: "From now on, Japan will not have to spend a yen for the military. If the country can really get away without paying military expenditures, I thought maybe I could rebuild the country. So I agreed to take the job." These are the words I heard directly from Shibusawa in an unforgettable personal conversation. Shibusawa's view is basically identical with that of Galbraith.

We should not make light of the fact that Japan did not invest heavily in defense. And that fact holds the key to Japan's postwar reconstruction and the spectacular economic growth. Article 9 of the Constitution that renounces war and preservation of war potentials is no empty idealism. It has practically and visibly benefited the nation. In this context, the article can be said to be a very realistic and pragmatic provision. Galbraith merely pointed out the historical fact without reference to the Japanese Constitution. But his remarks should remind any Japanese of the country's "peace constitution."

The behavior of Japanese labor unions was among the primary factors that Galbraith cited as being behind Japan's economic success. This notion is not anything that is particularly new. But an endorsement by no less an authority than Galbraith adds to the weight of this wisdom.

Recently, I read a news report that a London newspaper which installed new bundling and delivery facilities could not either reduce or relocate any of the workers in the delivery department, and that, as a result, the workers were reporting to work everyday just to loaf away their hours. I heard a similar story from a news reporter who returned from his London stint some 20 years ago. This is one symptom of the English Disease. It is little wonder that the years of this affliction has made a shambles of the British economy, especially in the field of international competition.

Now Americans and West Germans are following British workers into dubious work ethics. Such a trend makes the Japanese worker look all the more hardworking. The Japanese are always obsessed with fear that the Japanese economy will fall apart as soon as they slacken off at offices and production lines. In Japan, where there is little deposit of natural resources and little stock of personal assets, one must work to live.

CSO: 4120

SCIENCE AND TECHNOLOGY

NEW METHOD OF SYNTHESIZING BETA SILICON NITRIDE

Tokyo NIKKAN KOGYO SHINBUN in Japanese 12 Nov 80 p 3

[Article: "New Method of Synthesizing Beta Silicon Nitride by the CVD Method"]

[Text] The research group of Tohoku University Metal Material Research Institute consisting of Prof Toshio Hirai and others has successfully synthesized, for the first time in the world, a plate-like silicon nitride body having a beta crystalline structure directly by means of chemcial vapor deposition (CVD) method without going through the alpha-beta phase transformation of the crystalline structure. This method of synthesis is characterized by the use of a raw material gas such as silicon tetrachloride which is reacted with "titanium tetrachloride vapor." The plate-like body thus obtained was found to consist of 92 percent of beta silicon nitride, 4 percent of alpha silicon nitride, and 4 percent of titanium nitride. Moreover, the titanium nitride deposition was found to be fibrous, presenting a form of composite material. The fruit of this research effort which was achieved by raising the reaction temperature above the conventional level has caught the attention of the industry as well as academia here and abroad not only because it has overturned the established theory that the beta silicon nitride is obtained from alpha silicon nitride through a phase transformation, but also because it has helped explain the mechanism of the powder sintering process of silicon nitride, a ceramic, which has recently received great attention as a superhard material for the gas turbine blades still considered to be far behind in development compared with the metal material. It has, above all, provided an important hint concerning development of practical industrial (ceramic) materials.

In addition to being a high-temperature structural material, silicon nitride has also caught attention as a functional ceramic material to be used as a coating material or as a heat generating body. Therefore, there is a world-wide effort to develop it into an industrial material. In the powder sintering method, which is considered to play a main role in its production, its alpha powder is usually mixed with an appropriate sintering aid and then sintered at a high temperature of the order of 1600 degrees celsius which may vary somewhat according to the purity of the silicon nitride. As a result of sintering, a sintered body containing beta crystalline structure can be obtained. This alpha-beta phase transformation is generally considered to increase its mechanical strength. However, it is yet unclear as to why the alpha-beta phase transformation will take place, or whether it is the alpha phase of the beta phase which is the more stable phase.

Prof Hirai, Assistant Shinho Lin, and Technician Akira Okubo who makes up the research group of the Tohoku University Metal Material Research Institute added approximately 4 percent of titanium tetrachloride to a raw gas mixture consisting of silicon tetrachloride and sicon precipitation of ammonia and the gas mixture was then synthesized by the CVD method at a temperature of 1350 degrees celsius and a pressure of 30 torrs. As a result, silicon nitride in the form of a plate was deposited on a graphite substrate at the rate of 0.5-0.6 millimeters per hour. The plate-like deposition measured 20 mm x 40 mm x (1-2) mm thick. This plate-like body was found to contain a large propostion, 94 percent, of silicon nitride having a a beta crystalline structure with fibrous titanium nitride deposition.

Synthesis of this type of silicon nitride containing titanium had been studied by the U.S. G.T.E. Sylvania Co. in the reaction temperature range of 1100-1350 degrees celsius. Their data indicated that when noncrystalline silicon nitride powder was heat-treated at a temperature of 1400 degrees celsius, 60 percent of the powder was found to have crystallized. Of which, 97 percent belonged to the alpha type with only 3 percent of the beta type.

Therefore, the fact that a plate-like silicon nitride body containing a large quantity of the beta type was successfully synthesized directly by the CVD method without going through the alpha-beta phase transformation by the research group of the Tohoku University means not only that a new method of synthesizing silicon nitride has been found but also that an important clue to the understanding of the mechanism of forming silicon nitride, whose importance will no doubt increase with the progress of its industrialization, has been obtained. The research group is expected tp publish the details of its findings in various journals here as well as abroad.

Assistant Professor Akihiko Shimada of the Osaka University Industrial Science Research Institute expressed that it is of great concern because it has been held until now that the beta type could not be synthesized directly. The fruit of this research is probably the first of its kind in the world.

General Research Scientist Kichizo Inomata of the Inorganic Material Research Institute said that the material will be of great interest if the titanium nitride were dispersed linearly in the membrane.

9113
CSO: 8129/0290

SCIENCE AND TECHNOLOGY

MITI OUTLINES 1981 BUDGET FOR INFORMATION INDUSTRY

Tokyo COMPUTOPIA in Japanese Oct 80 pp 107-110

[Article: "Information Industry Policy for JFY 1981 Set Up"]

[Text] Large Project Heads List

The Ministry of International Trade and Industry's budget for the information industry for JFY 1981 has been roughed out. The feature of this budget is the arresting framework which limits the "expansion of the total budget to 7.5 percent of the previous year's budget," so that the shifting strains hit all at once. What seems to be slated for increases are the subbudgets related to medium and small industries and to energy. Some faint voices are being head questioning the ministry's activities, to the effect that "there are no new policies in any of the various agencies within the ministry. The lack of new policies seems to reflect no activity within the ministry." Since energy-related funds come under a special budget, and so should be considered separately, while the budget for medium and small industries is slated for increase even if nothing is said, the laments regarding the ministry bureaucracy become even more apparent.

Despite this situation, there is one item which stands out, and that is the development of the "ultrahigh-speed computer" which is being taken up as one of the large projects of the Industrial Science and Technology Agency. This computer is intended for the structural analysis of aircraft, safety analysis of nuclear reactors, and treatment of data transmitted by the Resources Search Satellite. It is a superhigh-performance science and technology computer, with a speed several thousand times greater than the best of the computers in use today.

The Ministry of International Trade and Industry has set up guidelines to develop the anticipated civilian transport plan (YXX) which is supposed to follow the YX (Boeing 767), and is presently looking for a joint development partner. There is also a plan to come up with a "Japan-made" nuclear reactor, and the Resources Search Satellite is slated to be launched in 1985. These projects are ones whose significance as advanced technological industries is being stressed by this ministry, and the superhigh-speed computer, which is tied in to these technological developments in all phases, is expected to be completed and to "bring about a spectacular advance in the level of Japan's scientific and technological development."

This computer will employ new elements such as the gallium arsenide semi-conductor and the Josephson element. The need for research on new elements has necessitated the extension of the development plan for 8 years, starting in 1981. Funding is set at 30 billion yen, with the initial year's budget set at 80 million yen.

This computer is expected to have a performance of several tens to several hundred BFLOPS (billion floating operations per second), according to the ministry.

On the other hand, the Ministry of Finance has let it be known that it will not recognize new projects. However, research and development on the "pattern information handling system" is slated to be completed in JFY 1980, and it is the Ministry of International Trade and Industry's plan to follow this up with the superhigh-speed computer. It is said that the Ministry of Finance will go along with this plan.

The fact is that there has been a very powerful rival to the acceptance of this computer as a large project nominee. This rival is the "electronic translation system."

The scale of the project and the development period of the electronic translation system were about the same as for the superhigh-speed computer. Such a system has already been started by the European Community (EC), which embarked on a 5-year plan this year on their EUROTRA plan, and this subject was proposed as a large project candidate, with the admonition that Japan should not fall behind. This system, which is intended to handle translations between Japanese and foreign languages as well as translations between other foreign languages, places heavy emphasis on grammatical construction and algorithm research heading the software area, and this interest was thought to reflect the importance in the shift of emphasis from "hard to soft" in the information industry policy of this ministry (Ministry of International Trade and Industry).

However, the following reason was given for opposing delegation of this system as a large project status: "It is highly coherent as projects go, but the net effects are superficial. Its appeal to the rank and file of the ministry is weak" (Bureau of Machine Information of MITI). The plan was discarded.

Certainly, association treatment by word analysis and deductive capability are indispensable functions of the "fifth-generation computer," and the adoption of the translation system into the ranks of large projects will be equivalent to developing element technology to make the tie-in with the fifth-generation computer, but the Ministry of International Trade and Industry explained its reason for denying this selection by saying: "Here again, it seemed to us that this was a development in the hard area, when all the problems were considered."

The Ministry of International Trade and Industry held a hearing prior to the selection of the project, and technologists of manufacturers who participated in the hearing showed interest in the superspeed computer, while the Electrotechnical Laboratory of the Industrial Science and Technology Agency, which was to spearhead the project, displayed an attitude of interest in both projects. However, it leaked its feelings that "when viewed in the light of the present situation regarding research systems, the translation system seems to be a side road. To be sure, the importance of the individual element technologies cannot be overlooked, but we will be in trouble if our researchers begin to lose confidence as the result of taking on this project."

The selection of the superspeed computer was determined by these reasons, but there is another factor in the selection. This was the problem of involvement with the United States.

A high-speed computer for scientific and technological use has already been developed in the United States; the Cray Company of the United States developed its "CRAY-1" in 1976. The CDC Corporation is expected to come forth in 1981 with its "CYBER 205," with performance five times that of "CRAY-1," while the National Air and Space Administration of the United States, in a cooperative effort with the CDC Corporation and Bellows, is engaged in development of a high-speed computer for wind tunnel simulation.

The United States is also feverishly engaged in the development of high-speed computers, and the concern which led to the decision to enter into development of ultra-high-speed computers seems to have been the result of anti-Japanese criticism that "the Japanese Government is granting large subsidies to its computer manufacturers." Since this project was to be taken up in earnest and to encompass even the development of new elements which are considered the brain cells of computers, this great concern on the part of the United States seems more than warranted.

The Ministry of International Trade and Industry has clearly disregarded this situation, stating that "there is absolutely no need for any tie-in or concern with respect to semiconductor competition to date." It has been said that there was some degree of anxiety on the part of the manufacturers about the time the project was initiated, but the Ministry of International Trade and Industry sidestepped this concern and held fast to the basic plan to push private plans to combat IBM.

Now, the superhigh-speed computer is a large project, but the department in charge is the Electronic Equipment and Electrical Equipment Department of the Machine and Information Industries Bureau. This department also will promote the following policies in JFY 1981:

A new project which is small as far as budget outlays go (2 million yen requested) is the newly installed commendation system for ME equipment. This is intended to recognize equipment that will provide superior comfort to physically handicapped people. The nature of the commendation has not yet been decided.

Where subsidy-related items are concerned, there is an overlapping with the Electronic Policies Department, and the basic technology development promotion subsidy (the OS subsidy fund is 5.785 billion yen, compared to 4.085 billion yen for JFY 1980) for the next-generation computer will be increased by 500 million yen; about 6.3 billion yen will be requested. In addition, there is a small fund for the cost of a statistical survey on computer acquisition and discard.

Densei [Electrical Administration] Related Items in Preparatory Period

It has been said that Densei-related activities will "be in a preparatory stage in JFY 1981, and it will be JFY 1982 or 1983 before any real activity will begin" (according to the Machine and Information Industries Bureau). New budget requests by this department for JFY 1981 are limited to costs for a survey research on a "fifty-generation computer" (14 million yen). Survey research on a fifth-generation computer has been underway since JFY 1979, using the Machine Promotion Fund; this

present step is merely conversion to the general budget and is, i reality, a continuing activity. There are already some intermediate reports which have been issued.

While there is talk of a "fifth-generation computer," this does not mean that there is clearly defined concept. The fourth-generation computer age has just been entered, and surveys and research have just started to conjure its image. The intermediate reports deal with discussions of this image. It was in April of last year [1979] when the survey and research stage was initiated. The Japan Information Handling and Development Association (President Koshichi Ueno) established its "Fifty-Generation Computer Survey Research Committee" (Chairman, Professor Itaru Motooka of the University of Tokyo). This was followed by survey and research on the part of six computer-related companies, including the Electrotechnical Laboratory, Fujitsu, and Hitachi. The final report is expected to be issued in March of 1981. Based on this report, plans for JFY 1981 will include the assembly of a much greater research staff to handle the private sector activities on the research theme and to discuss the makeup of specific development systems. Research and development will come after JFY 1982, and the "preparatary stage" of the Densei Department will end at this point. According to informed sources, an international joint development plan involving cooperative efforts with American and European computer manufacturers is also being studied.

Budget requests at department- and bureau-level discussions include, in addition to fifth-generation computer-related projects: 1) Office automation within the ministry; 2) Structuring of an energy database; and 3) Promotional planning for a "system house."

Intraministry office automation, the first item above, is intended to enhance office automation for the new Ministry of International Trade and Industry building, which is expected to be completed in 1982. The officials in charge have said that they would like to "avoid the label of government offices being pictured as constant scenes of confusion," and this budget eventually became a secretariat budget item. In other words, half of it was assigned to the Ministry of International Trade and Industry. On the other hand, there are voices in opposition, saying in effect: "Office automation has advanced in the private sector because of the need to rationalize. In this respect, the upper echelons of these offices do not seem to have realized any need for office automation, so how far do you think such automation will proceed?" Thus there are some opinions which run counter to the direction taken by recent innovations within government circles.

That is to say, "should there be some problem, the young hands work feverishly at producing data and at times (it may be at times, but it is more likely daily) they put in overtime as well. They produce data by the truckloads for international meetings. The department members make any number of copies for distribution where intraministry liaison items are concerned. Furthermore, there is no overtime pay for such work." That seems to be the case.

The energy database was placed under the Resources and Energy budget. The energy database is tied in with the training and promotion planning on databases, to be described below, and is intended to systematically combine the energy data which the various bureaus, agencies, and ministries are producing, and to compile therefrom a database. The Resources and Energy Agency will promote local energy systems in JFY 1981, and the database will be included as one phase.

The "system house" promotion plan presently takes in about 200 companies and about 400 parties, including individual businesses, but "system house" is a new industry which has not been recognized as an "industry" and is lacking in funds, as a result of which efforts have been made to obtain special funding. On the other hand, this plan was dropped because it did not fit in with the administrative policy according to this ministry.

Emphasis on Database

Shifting to the software-related area, the budget request for information handling promotional activities will be about 3 billion yen, which is an increase of 300 million yen, or 8 percent over that for JFY 1980 (2.78 billion yen). Nearly all of this increase is slated for the information handling activities group.

First of all, there will be attempts to lower the software cost. The "software production technology development plan," aimed at automated production of programs, was started in JFY 1976. However, the increase in cost for the maintenance of the programs accompanying developments in production technology has become a problem. It may be said that this area accounts for 70-80 percent of software costs. As a result, the "establishment of maintenance technology" will be the theme in JFY 1981, and a "software maintenance technology development plan" will be started. This plan is slated to last 5 years and have a total budget of 4-5 billion yen; the first year's budget will be 150 million yen.

As far as software production technology is concerned, the Ministry of International Trade and Industry has assessed its essential completion, but they say: "Any number of completed programs are being accumulated. Once a software product has been completed, it does not necessarily suffice, and there is a need to make alterations with different situations. This is where the plan looks toward reworking the programs efficiently and at low cost, without letting the costs run out of hand" (Information Department).

There is a new activity called "development promotion activity of leading information handling technology." While the aforementioned "maintenance plan" is also new, this other plan is designed to make practical use of the research results from information handling technology, and this is the objective of the new policy of the Information Department.

Information activities are advancing, and organs such as universities and laboratories are pushing research on information handling technology. In addition, a large project on pattern information handling system development is under way at the Industrial Science and Technology Agency. On the other hand, such research merely puts out research results, and further research is necessary for their application.

In the case of the information handling industry, there are very few situations in which there is margin to allow the practical application research results. If the use of micons is to be expanded, every manufacturer will be busily engaged in this direction, but it is said that the information handling industry is "one in which one's hands are full simply with work at one's fingertips." This is where this new activity proposes to extend the arms of this policy, and technology development and practical research responding to users' needs will be pursued.

Specific research themes will be determined, taking into consideration the wishes of the industry, and there are plans to pursue five themes in parallel manner during JFY 1981. Themes presently being considered include CAD (computer-associated design) for plant engineering use, DBMS (database management system), and DBCMS (--complex--). In no case will a specific program be drawn up, but "we will create a target to be fabricated" (Information Promotion Department). In the case of CAD for plant engineering use, a model developed by the pattern information system will be applied, and researchers of the Industrial Science and Technology Agency, users, and manufacturers will be assembled at the Information Handling Activities Association to form a project team and conduct research. The same also applies to DBMS. The requested budget is about 600 million yen. In other words, each theme will cost close to 100 million yen. It is planned to request budgets on a similar scale from here on.

What should be noted here is that a new budget, a database budget, has made its appearance. This is a database which, in the Western world, is being built up on a country-level scale, but there is no real setup in Japan. Put in stronger terms, one can cite the Japan Patent Information Center, which deals with patent information.

At the early stages of discussions on new policies, there was a proposal to set up a true database in Japan by consigning the database to some developmental organization. While this proposal was undergoing discussions within the ministry, it disappeared, and any form of system requests also disappeared. As a result, the database structure itself was consigned to private parties, and the government took over support from the side. In other words, DBMS was initially involved in consigned development, but it ended up as research on development. At the same time, a framework was newly established for the database program within the consigned developmental activities on specific programs which had been conducted in the past, and a budget of 100 million yen was provided to developmental research.

Consigned development of specific programs have up to now consisted of the multi-client method, or "production according to order," and the packaged program method, or "production according to outlook." Database was taken up as a third method. The JFY 1980 budget for all activities was about 1.2 billion yen, and this is to be increased to 1.35 billion yen in JFY 1961.

In addition, subsidies will be used as database development funds, and these will be the objectives of an information handling promotion funding system which will undertake loan obligations in line with this policy. Furthermore, a type of "propaganda pamphlet" in the form of a "database register" listing all types of databases and utilization methods available in Japan will be compiled and distributed.

The database which aims at joint utilization by all of society of the resource called information will not only serve to promote the acquisition of information by the entire nation but will also provide a major technological dissemination function to the information industry. At the same time, the need for a readily available database is emphasized so that independence from foreign factors can be realized where information is concerned.

More than 600 databases have been set up in the United States with the aid of the federal government since the "1960's, and database networks are being established

in European countries under government leadership to counter these databases in the United States. The JICST (science and technology literature information) was started in 1970 in Japan, but it has been underway only 10 years. Its sales volume is about 10 billion yen, which is woefully small compared to the roughly 242 billion yen of the United States.

This is why the Ministry of International Trade and Industry, which senses this urgency to acquire databases at one's fingertips, has been hurrying its program, but there seems to have been a backward step when compared to the start. A database entails considerable cost for both construction and maintenance, and government aid and sufficient dissemination of government data need to be maintained. This should be the first step in that direction.

In another direction, there is, first of all, the loan system to promote system safety measures in the realm of the software fiscal front. These safety countermeasures will start off with a registration system in JFY 1961. The Development Bank's loan framework has been expanded to 52 billion yen (from 48 billion yen in JFY 1980), 1 billion yen of which is earmarked for this purpose.

At the same time, the Medium and Small Industry Loan Treasury will also bear part of these loans.

Development Bank funds are funds to be directed toward the development of software, and the funding objective for JFY 1981 will be "purchase of computers and land to permit the buildup of software." The sum of 2 billion yen has been requested to this end, which also comes within the scope of the 52 billion yen Development Bank fund framework.

The involvement of the Development Bank in the loan system was extended in JFY 1980, and this bank was also assigned responsibility for database development funds in JFY 1981. At the same time, the Medium and Small Industries Fiscal Treasury established a special framework to promote an information handling industry directed at medium and small industries, and it has assumed responsibilities in the areas of operating and equipment funds. These were formerly within the realm of loan functions, but the system was not acceptable to the medium and small industries, and so this change was made.

2267
CSO: 4105

SCIENCE AND TECHNOLOGY

ROK QUIZZES JAPAN ON ATOMIC FUEL REPROCESSING POSSIBILITY

Tokyo JAPAN ECONOMIC JOURNAL in English 9 Dec 80 p 6

[Text]

A member of the Republic of Korea Atomic Energy Commission recently inquired unofficially about reprocessing in Japan spent nuclear fuel from Korean nuclear power reactors. The Japanese atomic energy commissioner responded favorably, it was learned.

According to informed sources, the inquiry was made late in November by Pak Gun Sik, Seoul's AEC member, when he met four members of the Japan Atomic Energy Commission in Tokyo. Pak had been visiting Japan to attend a Japan-Republic of Korea atomic energy industrial seminar held in the Japanese capital.

Susumu Kiyonari, acting chairman of the Japanese commission, one of the quartet, was extremely cooperative in answering the inquiry. He said that since ROK is Japan's neighbor, his commission and other Japanese nuclear energy services will be willing not only to accept such a reprocessing job, but to cooperate in enriching uranium and treating radioactive wastes.

Kiyonari himself told the press after the meeting that the inquiry had not been official. Japan is yet to have enough of a spent uranium fuel reprocessing capacity to do such an international service, he said. But he cited an idea recently announced by Dr. Hiromi Arisawa, chairman of the Japan Atomic Industrial Forum, to create an "Asian regional nuclear fuel center" in Japan to do reprocessing and enriching services for friendly Asian countries. Kiyonari thus reasoned that Japan will, and should, accept the request of Korea and other neighboring nations.

Pak's sounding out of Japan was a clear indication the Republic of Korea has a strong desire to have its spent uranium fuel reprocessed and utilize plutonium resulting from such reprocessing.

The sources, however, said the Japanese nuclear energy or other experts' views are divided as to their prospect of such Japanese cooperation with ROK. Many were skeptical of the possibility of such cooperation in the foreseeable future. They cited the fact that Japan itself is operating just a single test type of spent nuclear fuel reprocessing plant with an annual capacity of only 210 tons of plutonium.

Then, too, the future of Japan's own reprocessing program, tentatively started with Washington's provisional nod, still delicately hinges on whether Washington will ultimately okay Japan's continuation of the program under its international nuclear non-proliferation policy introduced by outgoing President Jimmy Carter. A new round of Japan-U.S. atomic energy talks under a treaty concerned is scheduled shortly.

But some other saw a possibility that the coming U.S. administration of president-elect Ronald W. Reagan would give the okay and allow Japan's quick progress with the program in view of his apparently better understanding of it. Such international cooperation then could be studied and okayed in future Japan-U.S. talks, they said.

CSO: 4120

SCIENCE AND TECHNOLOGY

JAPAN SCORES FIRST IN SPACE LAB TESTS

Tokyo MAINICHI DAILY NEWS in English 13 Dec 80 p 12

[Text] The National Space Development Agency has succeeded in fabricating a nickel compound alloy and ternary amorphous semiconductor in recent space laboratory tests for the first time in the world.

The tests were conducted in a weightless and high-vacuum condition in a small rocket launched Sept. 14 by the agency from its Tanegashima Space Center in southern Kyushu, officials said.

The rocket carried three small electric furnaces, two of which were used in a nickel compound alloy fabrication experiment and the last in a semiconductor fabrication test.

The nickel alloy thus made turned out to be about twice as hard and heat-resisting as that produced in a ground-based experiment, the officials said.

The ternary amorphous semiconductor—high-quality material for a solar battery—was produced much faster than in a ground-based test.

The officials said that in a six-minute nickel alloy test, nickel metal and titanium carbide powder and whisker were heated up to about 1,500 degrees during the first two minutes, were left for another two minutes, and then the melted metal was subjected to a gas pressure of 20 kilograms per square centimeters. Later, the metal was fast cooled for about two minutes to produce a nickel compound alloy, they said.

In a six-minute semiconductor test, silicon, arsenic and tellurium were melted into ternary amorphous semiconductor by using about the same process—within a far shorter time than in a ground-based test, the officials said. The only difference, according to the officials, is that in the semiconductor test, no gas pressure was applied.

CSO: 4120

SCIENCE AND TECHNOLOGY

METHANOL-FUELED POWER GENERATION STUDY STARTED

Tokyo TECHNOCRAT in English Sep 80 p 56

[Text] * A project has begun which intends to utilize "methanol" which is simply an industrial raw material, as in the manufacture of formalin, and "methacoal" which is a mixture of methanol and pulverized coal, as alternative fuel for oil in existing oil-fueled power plants, etc. The Japan Energy Economy Laboratory and the Integrated Energy Engineering Laboratory will shortly start "an integrated study on the introduction and utilization of methanol and methacoal". Again, the Ministry of International Trade and Industry will start next year a 5 year plan for the study of methanol and methacoal with a total budget of ¥35 billion. Brown coal as an unexploited resource and natural gas unsuitable for LNG production are intended as raw materials for methanol. Since manufacturing technology for methanol is available and methanol, like oil, as liquid at room temperature and atmospheric pressure and thus easy to transport and store, it is considered that methanol could prove a satisfactory alternative fuel to oil. At the earliest, power plants exclusively methanol-fueled, could start operation in 1985.

CSO: 4120

DIFFERENTIAL-TEMPERATURE MARINE POWER PLANT BEING PLANNED

Tokyo TECHNOCRAT in English Sep 80 p 56

[Text] * Shimizu Construction Co. will shortly make practical, a construction plan for a test plant (output: 100kW) for differential-temperature marine power generation, intended to be adopted by Tokyo Electric Power Co. and Toden Sekkei Co. at Nauru Island located near the equator. The key point in the construction is the technique for installing a water collection pipe about 900m long on a sloping sea bottom. Toden Sekkei is planning to review the construction plan made by Shimizu and start preparations for construction early next year, intending to complete construction work for the test plant by summer.

Differential-temperature marine power generation makes use of temperature differences between hot seawater near the sea surface and cold seawater at depths of about 500m in the sea. The basic system designed by Tokyo Electric Power Co. uses Freon gas, having a boiling point of 24°C, for the heat medium. The system is designed to evaporate Freon gas with hot seawater around 29.8°C, feed the vapor into the turbines for power generation and return the gas vapor to the original liquid by using cold seawater around 7-8°C. The plant will be constructed in the Republic of Nauru, an island located near the equator. Total construction costs will be about ¥1.1 billion.

Toden Sekkei explains that subject to the results of the new test plant, the government of Nauru intends to construct a commercial plant with an output of 2,500kW in the Republic. In the construction industry, Tobishima Construction Works is also engaged in the research of differential-temperature power generation in cooperation with Saga University. It is very likely that trends toward the development of the new energy source through- differential power generation will become highly practical.

CSO: 4120

SCIENCE AND TECHNOLOGY

EFFICIENT UTILIZATION OF COAL MAKING STEADY PROGRESS

Tokyo TECHNOCRAT in English Sep 80 p 56

[Text] * Sumitomo Metal Industries started a full scale test for coal liquefaction using a solvent extraction coal liquefaction process. This is being dealt with as part of the "sunshine project" commissioned by the Institute of Science and Technology of the Ministry of International Trade and Industry. Distillation plants, etc. will be completed within the year and a consistent system for testing of coal liquefaction by distilling collected artificial crude oil into light fuel oil, etc. will be provided to collect basic data. The construction of a second full scale test plant will be started in 1972, at the earliest.

There are several methods of coal liquefaction including direct water addition and synthesis. The mini-test plant (daily capacity:1t) by Sumitomo Metal Industries uses a solvent extraction system developed by joint research with Sumitomo Coal. This is one of the most orthodox methods of coal liquefaction and is expected to be practicalized very soon. The method consists of forming a mixture of coal and a solvent, heating it in a furnace and adding hydrogen to it for liquefaction.

CSO: 4120

WORLD'S LARGEST FIRING FURNACE IN OPERATION

Tokyo TECHNOCRAT in English Sep 80 p 56

[Text] * Shinko Pfandler Co., Ltd. has, since February, been promoting efficiency-doubling and rationalization of an electrically fired furnace installed at the company's principal factory, at the total cost of ¥450 million. Now, the work has been completed and is in full operation as the world's largest energy-saving electrically fired furnace.

The newly completed furnace consists of an existing electrically fired furnace and a mobile furnace of the same type newly constructed near the inlet of the former, both of which are set together for use as a single unit. At the same time with the construction of this new furnace, the existing furnace was modified internally by using ceramic fibers, which for furnace walls, are adiabatically better than refractories. Ceramic fibers were also used in the new furnace. This has changed the inside of the furnace from a regenerative type to a non-regenerative type, effectively reducing energy costs by more than 30% for those using conventional refractories.

In order to prevent corrosion in storage tanks holding raw materials and products in the chemical and food industries, glassed-steel tanks, which are tanks lined with glass over the internal surfaces, are often used. In order to manufacture glassed-steel products, semi-products sprayed with liquid glass and then baked at a temperatures around 800–900°C in a firing furnace. Since glassed-steel products are limited in size by the capacity of firing furnaces, there has been strict limits to the manufacture of very large products. Nevertheless, in the food industry, such as by breweries, there has been a strong demand for larger glassed-steel products. This has led Shinko Phandler to take the lead in completing the world's largest firing furnace.

CSO: 4120

SCIENCE AND TECHNOLOGY

DAIDO DEVELOPES NEW SYSTEM FOR METHANE GAS FROM GARBAGE

Tokyo TECHNOCRAT in English Sep 80 p 56

[Text] * Daido Chemical Engineering, which is a general engineering company manufacturing waste acid complete collectors, etc., has developed a solar heater by applying its own technology in a new field and also a methane gas generator for home use which continuously and automatically generates methane gas from kitchen barbage by unaerobic fermentation using the solar heater. The company will start practical operation this coming fall. This new technology has innovative merits in two ways: reduction of discharge of garbage from homes and energy saving.

This development was encouraged by a large rise in gas prices. It not only enables garbage from homes to be utilized instead of being thrown away, but also supplies all the gas for home use from methane gas generated by an upright methane gas generator made of a transparent resin.

CSO: 4120

SCIENCE AND TECHNOLOGY

HEAT DRIVEN PUMP - UTILIZATION OF HIGH TEMPERATURE WASTE HEAT

Tokyo TECHNOCRAT in English Sep 80 p 57

[Text] *The National Research Institute for Pollution and Resources of the Agency of Industrial Science and Technology has developed a new type liquid transfer and transportation system called a "heat driven pump", which effectively utilizes high temperature waste heat. The institute has confirmed that the pump is able to discharge 180kg/hr when provided with heat of about 3000kcal/hr. Detailed analysis and improvement of the pumping principle and mechanism are required further to develop a practical pump. When completed, the pump will be unique, utilizing high temperature waste heat, saving energy and with no mechanical pumping unit, suitable for plants etc.*

The pump has inverse U tubes with check valves at the ends. Cyclic boiling and condensation of the liquid in the tubes causes pressure to change, which in turn transfer the heat and liquid simultaneously. The test pump has two parallel inverse U tubes connected with two vertical pipes, each having a check valve to allow the liquid in the pipe to flow in only one direction. The tubes have copper fins which are heated by high temperature waste heat. The fluid rises up in one pipe and sinks in the other pipe. The first test pump has heating tubes of 360mm effective length and 15mm diameter. Each tube has 45 plate-type copper fins 75mm x 116mm x 0.6mm in size. The experiment using the first test pump has achieved maximum 180kg per hour discharge by providing 3000kcal per hour heat. The liquid's temperature was 15°C at the inlet and 37°C at the outlet.

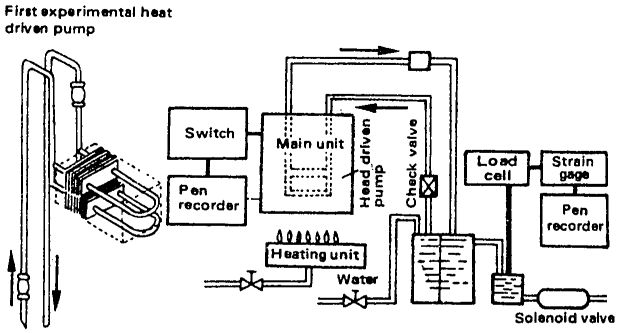

Fig. 1. Experimental Heat Driven Pump

CSO: 4120

SCIENCE AND TECHNOLOGY

COAL GASFICATION UTILIZING PLASMA

Tokyo TECHNOCRAT in English Sep 80 p 57

[Text] *Unique coal gasfication research conducted at the National Research Institute for Pollusion and Resources of the Agency of Technology and Science utilizes the high energy of plasma to decompose coal and to directly produce acethylene gas. They have recently found that mixing coal with gaseous and liquid hydrocarbons which are generated in the gasfication process improves significantly acetylene conversion efficiency. Basic experiments will be conducted with a bench scale model. Coal gasfication using plasma needs only simple equipment and operation to produce acetylene, a basic chemical material. The greatest drawback, however, of the method is the large power requirement. Therefore, it is expected that high acetylene conversion efficiency because of effective utilization of by-products will provide a great leap towards making practical use of the method.*

In Japan, under construction is a plant with 7000m^3 daily capacity using high calory gasfication technology, and a 5 ton daily plant has been under test operation for low calory gasfication power generation technology. Though third plasma utilization is still in the basic research stage, it can easily produce acetylene that is more stable at high temperature than any other hydrocarbon. Thus, once technical problems are solved, it is expected that prospects of the third method will equal the two former methods. The method involves squeezing an arc column by a cold gas flow which increases current density in the center resulting in a continuous and stable plasma jet with very high temperature and very high velocity. Tightly bonded coal molecular are decomposed by the high energy of the plasma and acetylene, and hydrogen is directly produced. Important development subjects remaining are, how to expose a test material to high temperature, and high speed plasma flame, how to enlarge the contact area, and how to extend contact duration. The institute has accumulated basic knowledge to improve acetylene conversion efficiency using hydrogen or argon gas plasma (100kW power). Test material of various kinds of coal are sent to a merging point of plasma flames from 3 torches. A recent experiment has shown that

there is a possibility of significant overall cost improvement. Higher acetylene conversion efficiency is obtained by mixing a hydrocarbon type fluid which becomes material as well, when the test material is ejected. The next experiment is aimed at to investigating the economical aspects of the method in datail, by checking the relationship between the required power and type, amount and conditions of the fluid to be mixed.

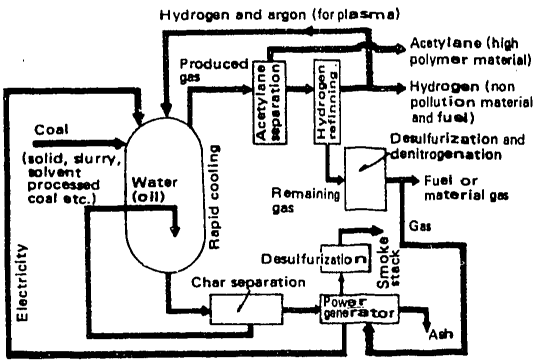

Fig. 1. Plasma Gasification Process

CSO: 4120

SCIENCE AND TECHNOLOGY

BWR DECOMMISSIONING AND DISMANTLING TAKE SHAPE

Tokyo TECHNOCRAT in English Sep 80 p 58

[Text] The Tokyo Electric Power Co., Ltd., in cooperation with Toshiba Corporation, Hitachi Ltd., and Bechtel Nuclear Corp., U. S., the world's leading engineering firm, has been studying on its own basis the decommissioning of 800-1,000Mw (electrical) scale BWRs. It has obtained a fair prospect of being able to dismantle crucial reactor core and pressure vessel by means of a remote controlled underwater arc cutter. Dismantling expenses will be about 20% those of plant reconstruction, approx. 0.6 yen per 1 kWh. While decommissioning and rebuilding are big problems from the viewpoints of radiation control, exposure of personnel, and siting limitations, this is the first feasibility achievement.

According to the study, when a reactor is required to be disposed of, first the nuclear fuels are transferred and crud deposited on the core structures is chemically removed; then the neutron activated core and pressure vessel are to be disassembled by under water arc cutting.

In this case, from the standpoint of radiation control, it is by far easier to perform the job 40-50 years later than right after terminating operation. Volume-reduced wastes are to be stored over about 100 years for subsequent final disposal.

The Ministry of International Trade and Industry formed a committee in May comprised of power companies, manufacturers, technical expoerts, and commenced work to evaluate different kinds of dismantling methods concerning environmental impacts along with technical and economical aspects.

CSO: 4120

ENERGY-SAVING TYPE TRAINS

Tokyo TECHNOCRAT in English Sep 80 p 68

[Text] * Yearly, there have been increasing expectations for development of "energy saving type trains". For example, the energy saving train of Teito Rapid Transit Authority (the subway corporation) in Tokyo receives ¥60 million a year as an energy saving charge from Japan's National Railways Corporation who uses its energy saving train, thanks to its energy saving characteristics. There has so far been no other cases where the balance for the electric power consumption rates of both trains is calculated for payment.

What is generally called an energy saving type train is one using thyristor chopper control having electricity regeneration brakes. Thyristor chopper control is a voltage controlling method of switching on and off at a high speed, the electric current which flows into a motor, by using a thyristor in place of conventional resistor controlling methods.

The regeneration brake functions to generate electricity by the rotating motor acting a generator driven by the force of reverse inertia when the train is braked. The electric power generated by regeneration is sent back to the overhead conductor and used as travelling energy for other trains running in the same area. Regeneration brakes are divided largely into two systems, field chopper and amature chopper. The latter system is more attractive by the degree of energy saving and the braking characteristics at lower speeds.

Such energy saving type trains can save about 40% of their electric power consumption when compared to conventional trains. For example, the energy saving train on the Chiyoda line of the subway corporation saves 39% of its consumption by conventional trains, and the energy saving train of the Yuraku-cho line saves 44%.

Accordingly, it is expected that energy saving type trains will increase in number from now on. The subway corporation already owns 310 cars of energy saving type out of a total of 1,597 cars, and has decided to employ energy saving type on all new lines in future. Japan's National Railway Corporation too is scheduled to order energy saving stock for 5 to 6 trains (10 cars per train) in their new car manufacturing program in 1980.

CSO: 4120

SCIENCE AND TECHNOLOGY

MINISTRY STARTS STUDY OF MERCHANT VESSELS FOR ICY WATERS

Tokyo TECHNOCRAT in English Sep 80 p 68

[Text] * The Ministry of Transport has decided to start from 1981, a full-scale study of merchant vessels for use in icy waters.

The research and development in Japan of such merchant vessels is largely lagging behind Europe and the USA. A test tank representing icy waters (35m long, 6m wide and 1.8m in depth) for the first time in Japan will be available at the Ship Research Institute of the Ministry from 1981. With this facility in use, the ministry is determined to launch the design and research of a merchant vessel suitable for icy waters.

Concretely, it has an idea of realizing in a 5 year program, a test design of an LNG vessel with ice crushing capacity required for transportation of natural gas around the Arctic Ocean. "Blue Prints" indicate the size of the vessel will be about 100,000t at the maximum. The design intends to give the vessel a cruising capacity of continuously crushing pack ice of about 2.5m thick without stopping.

CSO: 4120

DEVELOPMENT OF A FLYING BOAT IS EXPECTED

Tokyo TECHNOCRAT in English Sep 80 p 68

[Text] * The Committee for Flying Boat Development and Research, has discussed possible development of an amphibious flying boat as a leading subject for the aircraft industry in 1980's along with the "YXX (next but one new civil passenger aircraft)" and a "small type aircraft". A conclusion has been reached development and use of a flying boat are a present requisite and will shortly submit a report to that effect to the Aircraft and Machinery Industry Council.

According to the draft of the report to be submitted, the use of flying boats will become a supplementary transport system for the existing aircraft system consisting of over 70 land airports around Japan. For the areas left out of the super highway networks and rapid transit railways, flying boats are considered very effective means for future development of local cities and their industries, including measures for isolated islands, and for the cooperation with underdeveloped countries.

Latent demand for flying boats in 1985 will be about 10 million persons taking advantage of them and 4,000 million passenger/km in terms of travelling distance. As a result, it is expected that the number of lines will be 127 and 147 flying boats will be used. Also, 40 water airports will be built.

Latent demands for flying boats in the whole world are expected to be over 800. Supposing, however, that the number expected to be developed and manufactured for the time being is 350 to 500, the market scale for the whole will be ¥600 to ¥1,000 billion. Domestic demand will be one quarter or so but will exceed the market scale of the YX (the next civil passenger airplane), which is said to be approximately $1,000 million.

Specifications of the amphibious flying boat for use with existing land airports will be as follows: The number of seats is 30 to 50. The total weight is 14 to 21 tons. The length of a runway required is 1,000m on water and 800m on land. The cruising radius is 500 nautical miles (1,200 nautical miles at the maximum).

Flying boats are already attracting the keen attention of Okinawa, Nagasaki, Amami Islands, Ogasawara Islands, Akita, etc. Interlocked with a program for local promotion and development, it is expected that a flying boat age will come in Japan.

CSO: 4120

SCIENCE AND TECHNOLOGY

CONTROL OF A TRAIN WITH INVERTERS

Tokyo TECHNOCRAT in English Sep 80 p 68

[Text] * Toyo Denki Seizo K.K. has established a basic technique for a train control device using inverters, which is effective in power saving as by use of thysistor chopper control, and for which maintenance is simple. This control is to control with a special inverter induction motors which are far easier in respect of maintenance than direct current motors. It has already been put to practical use in subways and streetcars in West Germany, and else where. In Japan too, Hitachi Co. and others are manufacturing for trial use inverter controlled trains for a subway in Osaka.

The inverter controlled trains can save electricity without using registance and recovers electric power by regeneration brake. The power saving effect is considered to be about the same as for a thyristor chopper – 30 to 40% of the amount of electric power consumed.

A thyristor chopper controlled train requires a considerable cost for maintenance of commutators and brushes used for the direct current motor, while the inverter controlled train requires almost no such maintenance as an induction motor is used. Further, the thyristor chopper controlled train requires a switch used at the start and regeneration braking or when moving forwards and rearwards, which the inverter controlled train does not require.

The device recently completed by Toyo Denki Seizo is equipped with a three-phase squirrel-cago induction motor of 175kW and can drive an actual train.

CSO: 4120

SCIENCE AND TECHNOLOGY

TWIN-BANK ENGINE EQUIPPED MEDIUM-SIZE TANKER COMPLETED

Tokyo TECHNOCRAT in English Sep 80 p 69

[Text] *Hitachi Shipbuilding & Engineering Co. has completed a medium-size tanker equipped with a twin bank diesel engine which has achieved a 24% reduction in fuel consumption.*

The twin-bank engine was developed independently by the company in 1976 to meet the needs for saving energy and higher economy of ship operation. The newly tanker is the first to mount this twin bank diesel engine.

The twin bank engine system has the following features: 1) It has two engines mounted on a common base and uses a geared reduction system. Thus, it enables fuel consumption to be largely reduced. 2) It permits the use of low-grade oil. 3) It has a low revolutional speed and is highly reliable. 4) It permits maintenance of the engine on one bank while the engine on the other bank continues to run.

In practice, tests of the newly built medium-size tanker have proved that compared with conventional medium-size tankers, it achieves a 24% reduction in fuel consumption and generates less vibration and noise.

Besides, the tanker has the following features: 1) It employs a double hull structure in compliance with IMCO requirements. 2) It adopts a large bulbous bow to improve propulsion performance. 3) It allows the main engine to be remotely controlled from the steering room, enabling navigation to continue for 24 hours with the engine room unmanned. And 4) the tank is provided with three types of piping, enabling three types of liquid to be loaded.

CSO: 4120

SCIENCE AND TECHNOLOGY

AP N

NEW MANUFACTURING OF HIGH-QUALITY SINGLE-CRYSTAL SILICON

Tokyo TECHNOCRAT in English Sep 80 p 70

[Text] * Making use of a strong magnetic field, Sony Corp. has developed a process (the MCZ process) for manufacturing single-crystal silicon of far higher quality than conventional types.

The MCZ process gives a strong magnetic field over 2,000 gauses to the side of the silicon "crucible" to control thermal convection of the molten silicon. Applying a magnetic field causes the viscosity of the molten silicon to increase resulting in a decrease in convection. This causes the surfaces of the solution to become very calm and at the same time temperature fluctuation will nearly cease. This enables crystals to grow smoothly, and uniformly, showing no stripes due to the local unevenness of impurities in the cross sections of the crystals.

Oxygen included in silicon crystals by a chemical reaction between the quartz "crucible" and the silicon solution can be controlled to an appropriate density (6–15ppm) by varying the intensity of the magnetic field, because the oxygen is attracted by the field and is prevented from drifting toward the crystal's surfaces in growth.

Thus, the crystal has the following features: (1) high uniform quality, (2) very low level of crystal defects and (3) little or no deflection of wafers. Thus, this is expected to contribute greatly, in respect of materials, for mass production of ultra LSI's which require ultra-high integration of the order of submicron.

CSO: 4120

GLASS-COATED HIGH-RELIABILITY HIGH-VOLTAGE-WITHSTANDING TRANSISTOR

Tokyo TECHNOCRAT in English Sep 80 p 70

[Text] * Toshiba Corp. has developed and succeeded in mass production of a high-reliability, high-voltage-withstanding transistor with its P-N interface protected with glass. This development is to prevent external environmental pollution and widely increase durability and thermal resistance by protecting the P-N interface of a special mese structure of the high-voltage-withstanding transistor with glass.

The company has established a unique glass passivation technique by (1) developing high-accuracy silicon processing technique for forming deep grooves free of crystal defects and (2) developing new electrodeposition technique and baking technique which achieve complete filling-in of grooves with glass without excess filling. The electrodeposition-baking technique developed by the company soaks pulverized glass in alcohol to make a colloidal solution, in which are placed an electrode and silicon wafers with surfaces other than grooves insulation coated, and a current and a voltage are applied between the electrode and the wafers. This arouses migration, causing charged glass particles to deposit in the grooves where the silicon is expoed. Subsequently, these glass deposits are baked at a temperature below 1,000°C to soften, fluidize and densify the glass.

For glass as a material, a special type has been developed which has excellent temperature characteristics and grain distribution, a coefficient of thermal expansion suited to silicon, is physically and chemically stable and has resistance to aging. This has enabled a high-voltage-withstanding transistor to be developed which has leak current as low as one tenth that of the conventional levels and shows little deterioration by heat resistance.

At the same time, with the adoption of this glass passivation technology, the company has completed a fully automated assembly line to absorb rises in prices resulting from complication of processes. This will, it is expected, make the price of the glass-passivation high-voltage-withstanding transistor comparable to those of conventional types.

CSO: 4120

SCIENCE AND TECHNOLOGY

ULTRA-SPEED SEMICONDUCTOR ELEMENT DEVELOPED

Tokyo TECHNOCRAT in English Sep 80 p 71

[Text] *The Fujitsu Laboratories Ltd. has developed an ultra-speed semiconductor element "high-electron mobility transistor" (HEMT) based on new principles. The HEMT is an application of that electrons move at extra-high speed in a material formed by a combination of crystals of non-dope garium-arsenic and garium-aluminum and arsenic.*

The principles of the HEMT were published in 1978 by the Bell Telephone Laboratory but had not yet been applied to real semiconductor systems. On the basis of its experience accumulated in research and development of semiconductors, the Fujitsu Laboratories made a transistor structure of a combination of garium-arsenic and garium-aluminum-arsenic by using a molecular-beam single-crystal growth techniques adopted in the research and development of GaAs FET. The test model made had a GaAs layer 200mm thick, an AlGaAs layer 70mm thick and a donor density of $6x10^{17}cm^3$. The laboratory then generated an ultra-high-speed electron current and succeeded in controlling it in a gate electric field. Key points in this success were 1) Two layers of garium-aluminum-arsenic containing impurities (silicon) and a garium substrate were provided. 2) Variation of impurities were controlled at the interface of these two layers.

Data from the company show that the electric mobility of HEMT measures $37,800cm^2V^{-1}S^{-1}$ and is theoretically calculated to be $100,000cm^2V^{-1}S^{-1}$ (both as measured a the temperature of liquid nitrogen). A unti test model achieved electronic mobility 6 times as high as that of GaAs FET. In addition, theoretically it has been proved that it is quite possible to achieve performance exceeding that of a GaAsFET by a factor of more than 10 and that of silicon transistors (MOS FET) by a factor of more than 50.

CSO: 4120

INDEPENDENT TECHNOLOGY FOR SATELLITE COMPUTERS

Tokyo TECHNOCRAT in English Sep 80 p 72

[Text] * MITI has decided on encouraging development of independent technology for "on-board space computers" to be mounted in an artificial satellites. Making much of the space industry, MITI has started in the current fiscal year to develop a unique resources survey satellite called MERES, aiming to launch it in 1985.

The development of on-board computers is intended to be completed in 1987 or 1988 and aims at computers for a variety of domestic artificial satellites which will be launched in the latter half of the 1980's, without direct concern with MERES. And it can be regarded as a new nuclear theme in MITI's policy for promoting space the industry, following MERES.

Most of Japan's conventional artificial satellites are designed to effect attitude control by remote operation from an earth station, and to generate and consume power from solar cells while transmitting data to the earth without processing it.

This system, however, has the drawbacks of being incapable of fine control, involving loss of valuable energy and failing to follow the coming satellite age requiring increasingly complicated operations. Again the new satellites are expected to be multifunctional and larger and to deal with increased data. Thus, they are required to be at least capable of primary data processing. And this role can be undertaken by on-board space computers.

MITI intends to utilize the computers for various types of control such as control of the receiving angles of solar cells to direct them consistantly to the sun, giving commands to assign generated power either to batteries or operation, and control of temperature in satellites.

While starting conceptual designing from 1981, MITI intends to start research and development of shielding materials which will protect elements, processors and memories against severe space environmental conditions such as radiation and the non-existance of gravitation. MITI is planning to develop machine No.1 after the model of NSSC1 developed by US IBM.

CSO: 4120

SCIENCE AND TECHNOLOGY

NEW OPTICAL FIBER TRANSMITTING CO_2 GAS LASER LIGHT

Tokyo TECHNOCRAT in English Sep 80 p 73

[Text] *A new optical fiber capable of transmitting carbon dioxide gas laser light has been developed by KDD.*

This is a single-crystal optical fiber quite different from present quartz optical fibers. This success was made by devising a newly drawn single-crystal fiber and using "KRS-5", a kind of alkaline inorganic halide as a compound of alkaline earth metals and halogens, as the base material. Quartz optical fiber is unable to transmit infrared rays with a wavelength of 10.6μ of carbon dioxide gas laser light. The new fiber thus shows the prospect of fiber transmission of such rays and there is much anticipation about its outcome.

The Figure shows a sketch of a newly developed drawing system for single-crystal fiber. A rod of KRS-5 as a mixed crystal of thallium bromide and thallium iodide is loaded on the top of hopper-like material melting furnace and is heated to about 400°C to make a fluid. The fluid flows down into a capillary and drops to a pipe called a shaper. Here, a seed crystal is applied to the fluid, and by drawing down the fluid with a roller, a single-crystal fiber as thick as the shaper can be obtained continuously. The key point of this system is to determine the flow rate of the fluid by the thickness of the capillary and to control the diameter of the single-crystal fiber by the thickness of the shaper. Tests have proved that a 0.4–1mm thick single-crystal fiber with a cross-section very near a true circle can be obtained at a rate of 0.5–3cm per min.

For single-crystal optical fiber, the recent success is the first in Japan.

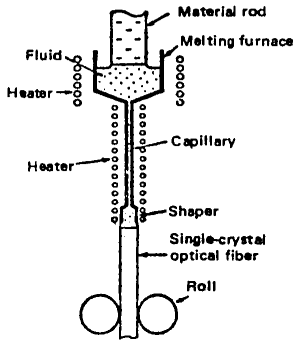

Fig. 1. Newly Developed Single-Crystal Optical-Fiber Producer

CSO: 4120

UTILIZATION OF HEAVY OIL RESIDUES

Tokyo TECHNOCRAT in English Sep 80 p 78

[Text] * The Resources and Energy Agency of the Ministry of International Trade and Industry has announced that it will start to promote the utilization of heavy oil residues at the total cost of ¥50 billion in a 3 to 5 year plan.

The project includes the following 4 developments: 1) development of power generation using gasified residues in gas and steam turbines; 2) gasification and calorific improvement of residues to produce city gas; 3) development of hydrogen manufacturing processes; and 4) other utilization of residues as industrial materials.

As increasingly more heavy crude oil is being imported recently, studies are becoming active on new dissolution processes which produce no residuals (asphalt, oil coke and pitch) as by products. The development of this technology, however, will require long lead time and also involves some risk. Thus, the Resources and Energy Agency has decided as an emergency measure to establish technology for disposing of such residues. The first plan consists of the development of a complex-gasification cycle power generation system. At present, gas turbine power generation uses naphtha as a fuel to cope with maximum demand. The new system is designed to gasify heavy oil residues for gas turbine power generation, while using waste heat to operate steam turbines for steam power generation. Plans have been made to utilize the system for in-plant power generation, by installing it in oil refinery conglomerates.

For utilization as city gas, joint research and development is expected between city gas companies and oil refining companies.

For the development of hydrogen manufacturing processes, so far no practical schemes have been determined for promoting research.

The Agency believes that even though new types of technology for dissolving heavy oil will be developed, technology for utilizing residues in the above ways can be applied in utilizing such produced in large quantities in transforming and refining oil sands and oil shale and the liquefaction of coal.

CSO: 4120

SCIENCE AND TECHNOLOGY

DEVELOPMENT OF APPLICATIONS FOR FUNCTIONAL MEMBRANES

Tokyo TECHNOCRAT in English Sep 80 p 78

[Text] * Industry shows movements to utilize functional membranes developed by technology for high-molecular chemistry for saving energy.

Functional membranes have numerous small pores and are able to filter molecules of certain sizes. They have primarily been used in artificial organs and water producing systems. Another application which has already developed for them is the condensing of sclutions and gases and the extraction of water from various materials, for the purpose of saving energy.

A special development is for "oxygen enriching membranes" made by synthetic textile makers, which can produce high-density oxygen out of the air. When used in boilers, they increase the combustion efficiency of boilers.

Teijin Co., which leads in the field, has since 1979 been maintaining a 3 year plan for the development of oxygen enriching membranes, aiming to increase the density of oxygen in air from the natural 22% to 33%.

Other applications of oxygen enriching membranes are for activated sludge disposers and oxygen chambers in hospitals. However, the greatest application is in the field of energy saving. The use of these membranes at the air inlets of combustion chambers of boilers will increase combustion efficiency, contributing to reducing expenses for heavy oil.

In addition, a hopeful application of oxygen enriching membranes may be in automobile engines, which is expected to increase their combustion efficiency.

CSO: 4120

COLLECTION OF WASTE SULFURIC AND HYDROCHLORIC ACIDS

Tokyo TECHNOCRAT in English Sep 80 p 78

[Text] * Daido Chemical Engineering Co. has decided to export their technology for their multi-utility energy-saving complete collectors for waste sulfuric and hydrochloric acids, which uses a vacuum evaporation process they developed. The company to receive the technology is Ferguson, a general plant engineering company in the U.S. Daido have already been negotiating with American steel makers for complete waste acid collection plants to the value of ¥1 billion.

The company intends a period of 5 years for its technological exportation for the entire territories of the U.S. and Canada, with agreements based on a down payment and a royalty.

In Japan, Daido has made more than 60 deliveries of its new collector to such companies as steel, textile, titanium oxide, automotive parts and electronic parts manufacturers.

The complete waste acid collection system of Daido is well appreciated because it is an energy-saving type with a steam requirement of only 2/3 that of conventional levels and thus pays for itself just a few years.

CSO: 4120

SCIENCE AND TECHNOLOGY

NEW HETEROPOLY-ACID CATALYST

Tokyo TECHNOCRAT in English Sep 80 p 78

[Text] * Tokyo Institute of Technology has newly developed a heteropoly-acid catalyst which enables olefine hydrocarbons to be obtain from methanol.

Recently, studies have been very active of materials as alternatives to oil in the petrochemical industry. Since technology for synthesizing methanol from coal has been established, efforts are being directed to the development of technology for synthesizing hydrocarbons as materials for petrochemical products from methanol.

The new heteropoly-acid is 12-tungst phosphate or 12-tungst silicate as improved, and has been found to have the same catalystic properties as synthesized zeolite.

Tests using this catalyst have proved that hydrocarbons yielded are up to 71% including 11% methane, 9% ethylene, 5.2% ethane, 3.8% propylene, 34% propane, 26% butane and 7.2% pentene with little aromatic hydrocarbons included. It has also proved that the catalyst can last for more than 52 hours.

CSO: 4120

TECHNOLOGY FOR TRANSFORMING WASTE PLASTICS INTO FUEL

Tokyo TECHNOCRAT in English Sep 80 p 80

[Text] * The Ministry of International Trade and Industry, it is presumed, has decided to designate as important in a new program beginning next year, technology for extracting energy from wastes, particularly the development of technology as joint research by the Waste Plastic Disposal Promotion Association and Mitsubishi Heavy Industries, for transforming waste plastics into solid fuel.

The project aims not only at producing fuel, but also at making materials. The Ministry is planning to couple the project to the development of C_1 chemical technology which was started this year as a project of the Agency of Science and Technology. Positive efforts have thus begun to reclaim waste plastics in an integrated way.

For transformation into fuel, the Ministry considers that costs for transporting collected plastics will be an expensive disadvantage economically. Thus, it intends to carry out plans from the beginning on a practical basis by operating the entire system from collection and transportation of waste plastics to the development of technology for transforming them into fuel, and then utilizing the fuel in predetermined ways. It will appropriate about ¥40 billion for the total budget.

CSO: 4120

SCIENCE AND TECHNOLOGY

SURVEY OF OCEANIC-CURRENT ENERGY

Tokyo TECHNOCRAT in English Sep 80 p 89

[Text] *The Science and Technology Agency has decided to conduct surveys of how much energy the Japanese current has in order to make use of "oceanic current generation" in the future. For this purpose, the Agency will install an instrument for measuring the speed and direction of the Japanese current a short distance off the Tokara Islands located to the south of Kagoshima Prefecture this fall and will collect data for about 6 months.*

Compared with wave force generation and oceanic differential-temperature generation which also make use of oceanic energy, oceanic-current generation has been left far behind without practical development plans being made. Under these circumstances, the Science and Technology Agency published a report on the application of the Japanese current for power generation (see TECHNOCRAT Vol. 12, No. 4) last year. And it intends to make use of recent surveys as basic data available for when oceanic-current power generation systems are developed in the future.

The Agency has picked 4 places including the sea area near the Tokara Islands, as being suitable places and intends to collect data on the other three places by conducting similar surveys in the next 3 years.

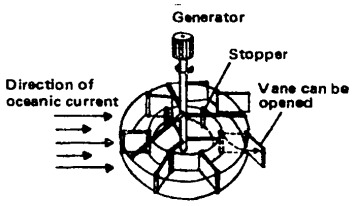

Fig. 1. Totally Current Facing Vertical Shaft Water Wheel Type System ~ One of Oceanic-Current Power Generation

CSO: 4120

JOINT-VENTURE COMPANY IN NEW GUINEA

Tokyo TECHNOCRAT in English Sep 80 p 92

[Text] * Sanyo Kokusaku Pulp Co. has decided to establish a new joint-venture company, with Nissho-Iwai Co. and the Papua New Guinea Government as the other parties, in order to start forestation of encalyptuses and the construction of chip plants.

At present, the business has been planned as follows. The company will borrow a national lot covering about 20,000ha in New Britain from the Papua New Ginea Government and plant there eucalyptuses and Ruseana with a density of 2,500 per ha on average. These two families grow fast, the Ruseana maturing in 5 years and the eucalyptus in 7 years. In accordance with these growing speeds, the company will construct a chip plant and a shipping harbor, aiming to complete them in 7 years. The chip plant will have an annual production capacity of about 300,000t. The company estimates about ¥4 billion for the total cost of this enterprise.

The capital of the joint-venture company consists of an authorized capital of about ¥1.2 billion and a paid-up capital of about ¥400 million. The Papua New Guinea Government will cover nearly 30% and the Japanese parties slightly over 70%.

The new company will have the merits of contributing to the stable supply of materials for paper manufacture such as pulp and chips for Japan, and the Papua New Ginea Government have the merits of 1) to increasing employment, 2) acquisition of foreign currency and 3) promotion of integrated development.

CSO: 4120

SCIENCE AND TECHNOLOGY

SCIENCE AND TECHNOLOGY AGENCY PROMOTES STUDIES ON GENE REARRANGEMENT

Tokyo TECHNOCRAT in English Sep 80 p 92

[Text] * For the Research Center for Gene Rearrangement, the Science and Technology Agency, which has been making plans since 1978, seems it will start construction of its facilities in the next fiscal year, aiming to start operation in 1983.

The Agency has been in the belief that in order to largely speed up the studies on gene rearrangement in Japan which is somewhat behind other countries, it is essential to establish a laboratory that has the function of physical containment of the highest level (P4 level) and determine standards for the assessment of safety which are helpful as guidelines for studies. Recently there are trends mainly in Europe and in the US toward easing safety standards for studies on gene arrangement and opinions are heard denying the necessity of P4 facilities. However, the Agency, in the belief that it is necessary for Japan independently to establish objective and convincing safety standards, has decided to make a request to the Ministry of Finance for a budget of about ¥2.3 billion for the construction of the necessary facilities.

Studies on the assessment of safety to be carried out in the P4 laboratory includes the following: 1) studies of the movement of vectors as rearranged DNA molecules into bacteria other than their hosts in, e.g., human or other stomachs and intestines, 2) studies of the toxicity of bodies in which rearrangement is made, 3) studies of the biological activities of cancer viruses which have propagated in the microbes used as a host vector system, and 4) studies of the biological activities of bodies treated with gene rearrangement, which have complementary DNA to RNA viruses.

CSO: 4120

OBTAINING ELECTRICITY FROM CHLOROPLASTS SUCCESSFUL

Tokyo TECHNOCRAT in English Sep 80 p 93

[Text] *A group under the leadership of Hideo Ochiai, professor at the Faculty of Agriculture, Shimane University, has succeeded in generating electricity using as an electrode, live cells of blue-green algae (Mastigocladus laminosus) that grow in spas.*

For the study of obtaining an electric current from chloroplasts, a project team including Prof. Ochiai, and sponsered by the Ministry of Education, in 1978 succeeded in tests using chloroplasts of spinach and the like. The tests, however, showed that the chloroplasts, in 10 minutes at a temperature of about 45°C, became less active and in 1–2 hours, the action stopped.

In principle, the tests were successful, but the concept was difficult to make practical because chloroplasts seemed too vulnerable to heat and light to endure long in solar heat. So, a new group, under Prof. Ochiai of Shimane University, picked up the theme and have made observations of blue-green algae. Blue-green algae grow in hot spring water and their chloroplasts are resistant to heat. In fact, the algae can be used alive and they are capable of self-reproduction. They also grow even during producing electricity.

Generation of electricity using chloroplasts is effected as follows: Exposed to optical energy, chloroplasts obtain electrons from water. These electrons are successively distributed around in the chloroplasts until they are consumed to produce carbon dioxide. An electric current can be generated by extracting the electrons before they are consumed.

Chloroplasts have to be secured before they can be made to form electrodes. Prof. Ochiai et al. fixed blue-green algae with calcium alginate. In their test, a large quantity of blue-green algae was cultivated in the laboratory and was spread thin on 7cm square glass plates coated with stannic oxide to form electrodes. These electrodes were soaked in an electolyte together with platinum electrodes. Applying light of 50,000 lux, slightly weaker than the sunlight on a fine day, to the side of blue-green algae electrodes caused a current of 10–20μA to flow between the two electrodes. Adding an organic compound (indophenol) as an electron carrier to the electrolyte actually caused the electron flow to increase by 10 to 40 times and the flow continued for about 20 days.

Prof. Ochiai explains that this system is applicable in making up for some of the drawbacks of solar cells. Solar cells work particularly well in ultraviolet rays but not in visible rays. Chloroplasts, on the other hand, are effective in using visible rays. Given the same temperature and humidity, chloroplasts show the same ability even in cloudy days or dimmly lit days in winter.

Table 1. Photosystem Activity of the Thermophilic Blue-Green Alga in Intact Cells

Reaction	Specific activity*.
Overall reaction†	832
+DCMU	112
PS-I	446
PS-II	332
+DCMU	0
NADP+ reduction‡	0

* Electron (microequivalent per mg of chlorophyll per hr).
† $H_2O \rightarrow$ methyl viologen.
‡ $H_2O \rightarrow NADP^+$.

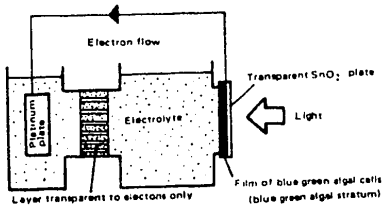

Fig. 1. Principles of Chloroplast Power Generation

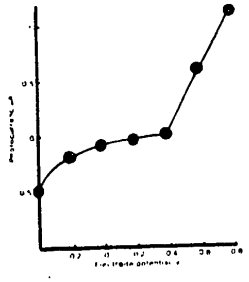

Fig.2. Photocurrent-potential curve with the PVA/algae film deposited on an SnO_2 optically transport electrode, with a Y-46 filter, which cuts off light of wavelength shorter than 460nm. Photocurrent is shown as μA per 10μg of chlorophyll per cm^2 The electrode potential is in V (against a standard calomel electrode).

CSO: 4120

END