

PROFESSOR DR. ADOLF BUTENANDT

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As one of this oldest acquaintances in Japan, I have been requested to write the introduction to this memorial issue commemorating the 75th birthday of Professor Dr. Adolf Butenandt. With doubts as to whether I am the most suitable candidate, I have accepted this commission and am writing my memories as they come to mind.

As Butenandt's career is published together with his photograph in the collection of lectures when he first visited Japan in April 1955, I will not repeat it here, but only mention subjects related to this volume.

Adolf Butenandt was born on March 24, 1903, as the son of a merchant in the town of Lehe in Wesermünde, which is north of Bremen on the Weser River. This town is a large fishing port. After 4 years at the town primary school and 9 years at 'Oberrealschule', from 1921 to 1924 he studied biology and chemistry at the 'Fakultät für Naturwissenschaft der Universität Marburg'. At this time his teacher Korschelt warned him that one should not sit between two chairs and that a chemist may become a biologist, but a biologist cannot become a chemist. Also, at the university the assistant in charge of chemical experiments was Karl Ziegler and he remembers being scolded by him.

From 1924, as his doctor thesis Butenandt started work on rotenone under Professor Adolf Windaus at 'Universität Göttingen' and in 1927 published this work as a dissertation in the university press. This was published in Liebigs Annalen (464, 253-277, 1928) in the autumn of 1928 and he received his doctorate at the age of 25, which was early for that time.

In May of the same year, this author's work on rotenone was published in Berichte (61, 1003, 1928). Butenandt was evidently startled by this and sent a reprint of his dissertation to me via Professor Karl Freudenburg at 'Universität Heidelberg'. However, I had already left Heidelberg on March 8th for England, and after traveling through the U. S. A. arrived back in Kyoto on June 8th. When I reported to the university found on my desk the Ph.D. thesis "Studies on Rotenone, Part 1" together with a covering letter from Professor Freudenburg. This was exactly 50 years ago and was our first acquaintance. From then until 1932, when the chemical structure of rotenone was established, together with F. B. LaForge of U. S. A. a race among three countries continued for 4 years with much exchange of heated discussions. At that time Butenandt was also working on related fish poisons from plants, and urged on by Professor Windaus studied the isolation of follicle hormone from concentrated pregnant mare urine. In the 6th paper of this series (Hoppe-Seyler Zeitschrift 199, 243, 1931) the name of Erika Butenandt, his wife, appears as co-worker.

In 1933, Butenandt became Professor of Chemistry at the 'Technische Hochschule Danzig', where his research progressed from female hormone to male hormone. In 1934, L. Ruzicka of Zürich obtained androsterone from cholesterol by drastic decomposition, and requested Butenandt to do the identification by mixed melting point

determination. This was verified on September 20th (Helv. 17, 1397, 1934) and is a dramatic page in the history of chemical research on androsterone. This led to the Nobel Prize being awarded to these two 5 years later.

In 1936, Butenandt took over the post of Professor C. Neuberg at the Berlin-Dahlem 'Kaiser-Wilhelm Institut für Biochemie', and in 1945 when the bombing became severe moved to Tübingen where he stayed until 1955. During these years, in 1936 he had obtained material for studying the sex attractant of silkworms from the Japanese Sericultural Experiment Station. Also, work was carried out on various subjects such as genetic material, cancer and virus.

In 1953, I first visited Butenandt in Tübingen and was shown the work on silkworm sex attractant. I believe it was November 9th when he met me at the train station for our first meeting after 25 years of correspondance. After talking for about 2 hours in the laboratory, we visited an old restaurant in town for lunch with Eugen Müller and Fritz Weygand where we spent a pleasant two hours talking about various matters. It was just one week before that H. Staudinger had received the Nobel Prize and I remember Müller clenching his fists and saying that this was too late.

Two years after this, in April 1955, the General Meeting of the Japan Medical Association was held in Kyoto and Butenandt was invited at the request of Professor Senji Uchino. As I knew him well I was asked to make all arrangements together with Eiji Ochiai, Munio Kotake and Yashiro Kotake. At that time a preprint of 4 lectures was prepared and Butenandt gave lectures 14 to 15 times all over Japan. His final lecture which most deeply impressed him was at the Imperial Palace for the Emperor, who being well versed in biology listened with great interest and asked many questions.

In 1956, a new 'Max-Planck Institut für Biochemie' was built in München for Butenandt, with the 'Institut für Virus Forschung' remaining in Tübingen with Friedrich Freksa as the director. Butenandt's work on insect substances, especially bombykol and ecdyson from silkworms, is epoch making and triggered the vigorous work being done in this field by entomologists today. Also, research was done on royal jelly from bees.

Not only was Butenandt a biochemist, but he was also very active as a committee member for the national organizations on the educational system and on furthering of sciences and technology. Especially for the ten years from 1960 to 1970, as president of 'Max-Planck Gesellschaft' he was a representative of the German academic world and for his sake the headquarters of the organization was moved from Göttingen to München in 1962 with a room in the old palace as the president's room.

In April 1963, Butenandt and his wife visited Japan again at the invitation of the Japan Medical Association. In his lecture at the meeting, he stated that the subject of his research in biochemistry was first on humans and higher animals, but later by changing the subject to insects and microorganisms he was able to make great advances. These are truly very wise words.

In 1961, since it had been 50 years since the establishment of the 'Max-Planck Gesellschaft' and its former body the 'Kaiser-Wilhelm Gesellschaft', a ceremony was held in Berlin. To commemorate this occasion the '50 Jahre Kaiser-Wilhelm-Gesellschaft und Max-Planck-Gesellschaft' was published and the first paper was the presidential address 'Über den Standort der Max-Planck-Gesellschaften in Wissenschaftsgefüge der Bundesrepublik Deutschland'. The high standard of Butenandt's lectures is acclaimed

in Germany, and those people who listened to his lectures in Japan were impressed at the content and excellent mode of expression. His German is that of the northerner and very fluent, with no accent like the German of people from Rheinland or Bayern making it easy to understand. His writings are well refined and of a high standard. This 50 year anniversary lecture covers 17 pages and the way he explains and stresses the importance of academic research makes it a classical work. It is said that when our 'Rikagaku-Kenkyusho' (Institute of Physical and Chemical Research) was established in 1917 in Tokyo, the research organization of the 'Kaiser-Wilhelm Institut' was the model. However, I wonder if we have managed to uptake not only the visible format but also the true spirit of research. Is the difference between the national character of the German and Japanese people truly non-interchangeable?

On September 20th, 1967, the 'Gesellschaft Deutscher Chemiker' (the former 'Deutsche Chemische Gesellschaft') held its centennial in Berlin and Butenandt gave the ceremonial address at that time (Berichte 1967, 12). I do not think all is said of the society that built the German chemistry and its chemical industry to its world leading positions, but I was taught much by the humility and courteousness of his speech as representative of that society.

In 1970, Butenandt resigned as president of the 'Max-Planck Gesellschaft' to become honorary president, and also no longer directs the research. He was also invited to Japan next year to attend the centennial of the Japanese Academy.

I understand that about ten Japanese have had the opportunity to study in Butenandt's laboratories, but among them I only know Naofumi Koga, Hiroshi Kotake, Tsuneo Tomita and Genji Matsuda.

Up to now I have introduced the academic and public side of Butenandt, but from here I will introduce the human side as I have seen him personally.

Born in a fishing port in northern Germany, the fact that he attended the vocational 'Oberrealschule' instead of the academic 'Gymnasium' is an unthinkable anomaly when one considers of his latter career. However, he entered the 'Fakultät für Naturwissenschaft der Universität Marburg', first studied biology and then chemistry with the hopes of finding a field that would include both sciences, and on hearing a lecture by Windaus at Göttingen on chemical research of physiologically active substances, he thought this was a new academic field that at last tied in both biology and chemistry. By choosing this path he was able to open an academic area that he preferred, naturally and without resistance.

Of course he has an exceptionally brilliant mind and also is very dextrous with his hands. On his visit to Japan he was adept with the writing brush and chopsticks, and his small and neat writing on a picture postcard is something that this author cannot copy. He must have been a skillful technician when it came to chemical treaties of minute substances. I have often received handwritten letters and always most enjoyed at the sight of his facile pen.

Among persons who know Butenandt, it is acknowledged that he is always well groomed and correct in dress, his verbal expressions are beautiful, and even Dr. Kakuji Goto, a friend of mine well known for his acrimonious tongue and knowledge of foreign languages, praised Butenandt's German saying it was like hearing angels talk. As I have said before his talks, speeches and lectures are famous even in Germany. Regarding his lectures in Japan, I do not know how many times he edited and corrected,

but the manuscript was completely recorded in his mind and although he spoke without a manuscript, to my surprise it was always letter perfect.

In Kyoto we were invited to a tea ceremony at 'Urasenke' and on the wall was a picture of Mt. Fuji partly covered with clouds by the artist Taikan Yokoyama. When Madam Sen informed us that the water being used for the tea was melted snow water coming from Mt. Fuji, Butenandt was greatly impressed. After the tea ceremony Madam Sen brought out a new bamboo tea ladle and asked him to name it. Butenandt looked at it for a while and answered "flinkes Schiff". When I translated this as a quick boat, the madam gave a cry of surprise. And when I asked her the reason she explained that one of the treasures of the Sen family was an identical tea ladle which was named 'Hayate' (a quick boat) by their ancestor Rikyu.

When we visited the Katsura Detached Palace, we viewed the gardens together with several other persons and listened to the explanations of a guide. As Butenandt could not understand what was being said, he silently stood looking at the trees and rocks and then told me that here the trees, grass and rocks are talking together which is something that cannot be thought of in Germany. He also went on to say that there stones are used for walls and stairs, but here they are part of the garden and blend beautifully with the trees, grass and moss, and although he cannot understand the guide he could understand the garden. I was much surprised to be taught something we Japanese are forgetting.

We also went together to Ise. After visiting the Outer Shrine, we were walking along the approach to the Inner Shrine with its tall cedar trees, when he stated that for the first time he had enjoyed "Orientalische Ruheigkeit". Although he had obtained

foreknowledge from guide books, his manner of feeling was somewhat different from that of other foreigners.

On our way to Tokyo we traveled in the observation car of the special express Fuji on the old Tokaido line. Together in the car were 4 or 5 middle aged American female tourists. When I said that as the weather is good Mt. Fuji surely will be beautiful today, he nervously and worriedly told me never to say such a thing as by saying so we would not be able to see Fuji. After crossing Fuji River a beautiful Mt. Fuji appeared in sight, but with a few clouds. Butenandt who was watching the view with the Americans, suddenly shouted something. I wondered what was the matter when he muttered discontentedly that they are hopeless. Asking him why, he answered that they had said "without clouds how much better" and he had shouted "mit Wolke viel besser".

In those days there were not many foreigners who liked Japan, but Butenandt truly liked Japan. Perhaps it was due to being born in a fishing village on the north sea, but he likes all fish dishes, has a discerning palate regarding freshness and taste, preferred Japanese inns to hotels and above all the wooden bath with the fragrance of Chinese black pine pleased him very much. When we stayed at the Kyushu Hotel in Unzen and asked whether he would prefer Japanese food to foreign, he answered of course Japanese food. The hotel had to get the meal from an outside restaurant and served in the dining room on a table and we sat on chairs. Butenandt seemed a little dissatisfied and sadly muttered that Japanese food tasted better when eaten sitting on 'tatami'.

The Nobel Prize for 1939 was awarded to Butenandt and Ruzicka, but this was just before the second world war and when Hitler was in full power. Butenandt was only



36 and extremely young for a chemist. However, on the day following the announcement the secret police informed him of Hitler's order that he refuse to accept the prize. They also warned the family to urge him to refuse. A few days later papers stating his refusal to accept were brought for signing with the threat of being exiled if it was not signed immediately. After the war had ended, the Nobel Prize Committee informed him of their understanding the situation at that time and were willing to re-award if it would be accepted now. Butenandt accepted the award with pleasure, but as he laughing told me later, the prize money having not been claimed within one year had reverted to the Swedish National Treasury and he did not receive that.

After the war ended, the U. S. army scientific inquiry teams examined the German research facilities very strictly and took away all report papers, which were later published in the massive P. B. Reports. The German researchers hid nothing and gave over all they had. When they saw the 4 large trucks filled with reports leaving their institutes, they scornfully bid them farewell with the thought that these alone will pay for all the war expenditures of the U. S. A. and although they can take our reports they cannot take away our brains. When ordered to fill out a report on work performed during the war years, Butenandt honestly wrote about his work on bombykol and ecdyson of silkworms. However, the U. S. army would not believe such an important scientist had been doing such trivial (?) work at the time his country was fighting for existence and thoroughly investigated even the young co-workers, only to find that this was the truth. Even a man like Hitler had honoured the freedom of academic research and there was no general mobilization of scientists as during the first world war. However, it was a great pity that many brilliant young scientists had been conscripted and died

in the front lines as ordinary soldiers.

In March 1960, I visited Butenandt in München. It was while we were being driven to his laboratories by his daughter when I mentioned that I knew of a 'Liebig Strasse' and a 'Bunsen Strasse' in Germany, but not a 'Butenandt Strasse'. His daughter immediately answered that the inauguration as president of the 'Max-Planck Gesellschaft' would be held in May in Bremen, and it is there where a 'Butenandt Strasse' is planned. I was very amazed and asked if it was not a rare case where a street was named for a man still living, and went on to say that there was a town named Takei in the country where I was born. However, this town had been in existence long before I was born. This caused a lot of laughter.

Lastly, when Butenandt first visited Japan, together with Munio Kotake the three of us went sightseeing in Hakone and Nikko. While were idly passing the time, I told him although he knew two Kotakes, one meant "Kleinerbambus" and the other "Alterritter". When asked the meaning of Takei I told him it was "Ritterhaus", and he told me it should be "Ritterhof" which is a German name. As Butenandt is derived from "Ausserland", in Japanese it would be "Tokuni" and as Adolf means "Edelwolf" a suitable translation would be "Hidero". In his personal letters to me Butenandt still signs himself Tokuni or Hidero.