

Conference Report

Ada Yonath Held Inaugural Chaim Weizmann Lecture in Fribourg on March 21st, 2011

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The Department of Chemistry of the University of Fribourg has created the Fribourg Chaim Weizmann Lectureship to honor the fact that Chaim Weizmann received his PhD in Chemistry from the University of Fribourg. A few words on Weizmann:

Chaim Weizmann (Fig. 1) was born on November 12th, 1873, in the village of Motal near Pinsk (Belarus, then part of the Russian Empire). He was one of 15 children.

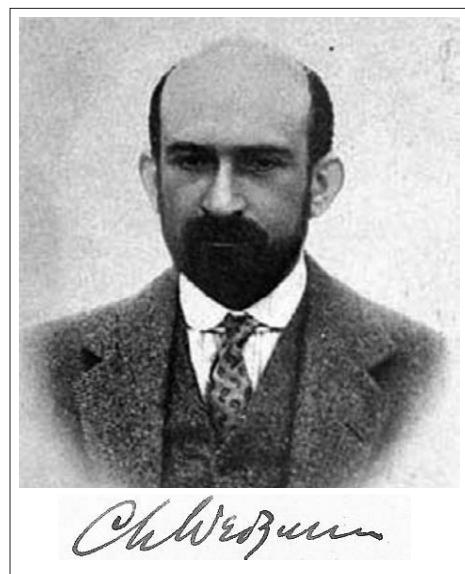


Fig. 1. Chaim Weizmann

Beginning in 1892, Weizmann studied chemistry at the Polytechnic Institute of Darmstadt, Germany, then, from 1894, at the Königliche Technische Hochschule Berlin, and in 1897, he moved to the University of Fribourg, Switzerland, where in 1899, he was awarded a doctorate with honors (see excerpt from the Faculty documents, Fig. 2). In the original thesis, of which the Department of Chemistry holds a copy (Fig. 3), Chaim Weizmann thanks his teachers, among them E. Fischer, J. Traube, J. H. van't Hoff. The excerpt from the Faculty register reveals Weizmann to be the most successful student of the time in Fribourg when he received his PhD (Fig. 4).

In 1901, still in Switzerland, he was appointed assistant lecturer at the University of Geneva. In 1904, he accepted the post as first senior lecturer at the University of Manchester, becoming a British subject in 1910. While a lecturer at Manchester he became famous for discovering how to use bacterial fermentation to produce large quantities of desired substances, and is now considered the father of industrial fermentation. He used the bacterium *Clostridium acetobutylicum* (the Weizmann organism) to produce acetone.

Name des Candidats	Datum der Promotion	Dissertation	Note	Hauptfach		Nebenfaches	Note	Gesamtnote (Summe)
				Note	Note			
Chaim Weizmann Friedrichshafen	24.Juni 1899	Zur Kenntnis der Amidierung von Säureestern auf der Reduktionsbasis des Benzylchlorids	5	Physik	1,90	Chemie	1,90	Physik: 5 Chemie: 5 Physik: 5 Summe: 15
Albert Schmid Aarau	10.Juni 1899	Über die Benzylchlorid- Reduktion des Benzylchlorids mit Wasserstoff	1,94	Physiologie	1,90	Chemie	1,90	Physiologie: 5 Chemie: 5 Physiologie: 5 Summe: 15
Chaim Weizmann (Rehovot)	17.Juni 1899	Über die elektrolytische Reduktion von 1,2- Dinitrobenzol durch Ammonium- katalysiertes Zincchlorid	2	Chemie	1	Miner.	1,5	Physiologie: 1,5 Chemie: 1 Miner.: 1,5 Summe: 4
Fritz v. Wettstein (Zürich)	29.Juni 1899	Über die Reduktion des Benzylchlorids mit Wasserstoff auf Benzylchlorid- oxyd	2,0	Chemie	1,90	Physiol.	2,0	Physiologie: 2 Chemie: 1,90 Physiol.: 2,0 Summe: 5
Paul Oberwick (London)	11.Juni 1899	Über die Reduktion des Benzylchlorids mit Wasserstoff auf Benzylchlorid- oxyd	2,0	Chemie	1,90	Miner.	1,90	Physiol.: 1,90 Chemie: 1,90 Summe: 5

Fig. 2. An excerpt from the faculty register.



Fig. 3. A copy of the PhD thesis of Chaim Weizmann.

During and after World War II, Weizmann started to devote himself to the establishment of a scientific institute for basic research in the vicinity of Rehovot. The picture with Albert Einstein (Fig. 5) shows Weizmann on a fund-raising mission – some things never change...

Weizmann's efforts led in 1934 to the creation of the Daniel Sieff Research Institute, which was renamed the Weizmann Institute in 1949, after he had been elected as first president of the State of Israel.

On March 21st 2011, it was thus our great pleasure to hold the inaugural Fribourg Chaim Weizmann lecture, awarded to Prof. Ada E. Yonath for her studies of the structure and function of the ribosome.

Ada Yonath was born in 1939 in Jerusalem. When her father died at the age of 42, the family moved to Tel Aviv. There, Ada



Fig. 4. Chaim Weizmann's last office at the Chaim Weizmann Institute displays the red and golden talar worn by Chaim Weizmann on the occasion of his PhD celebration in Fribourg.



Fig. 5. Chaim Weizmann and Albert Einstein on a fund-raising mission.

Yonath was accepted to Tichon Hadash high school although her mother could not pay the tuition. She returned to Jerusalem for college, graduating from the Hebrew University of Jerusalem with a bachelor's degree in chemistry in 1962, and a master's degree in biochemistry in 1964. In 1968, she earned a PhD in X-ray crystallography at the Weizmann Institute of Science. This was followed by postdoctoral positions at the Carnegie Mellon University (1969) and MIT (1970). At that time, she spent some time in Harvard in the lab of William N. Lipscomb, who was subsequently awarded the Nobel Prize for Chemistry, where she became acquainted with very large structures. In 1970, she established the first protein crystallography laboratory in Israel. From 1979 to 1984, she was a group leader with Heinz-Günter Wittmann at the Max Planck Institute for Molecular Genetics in Berlin. She headed a Max-Planck Institute Research Unit at

DESY in Hamburg (1986–2004) in parallel to her research activities at the Weizmann Institute, where she is the incumbent of the Martin S. and Helen Kimmel Professorial Chair.

Among her scientific achievements are the complete high-resolution structures of both ribosomal subunits. She discovered within the otherwise asymmetric ribosome, the universal symmetrical region that provides the framework and navigates the process of polypeptide polymerization. Consequently she showed that the ribosome is a ribozyme that places its substrates in stereochemistry suitable for peptide bond formation and for substrate-mediated catalysis. Two decades ago she visualized the path taken by the nascent proteins, namely the ribosomal tunnel, and recently revealed the dynamics elements enabling its involvement in elongation arrest, gating, intra-cellular regulation and nascent chain trafficking into their folding space. Ada Yonath has also elucidated the modes of action of over twenty different antibiotics targeting the ribosome, illuminated mechanisms of drug resistance and synergism, deciphered the structural basis for antibiotic selectivity and showed how it plays a key role in clinical usefulness and therapeutic effectiveness, thus paving the way for structure-based drug design. To facilitate ribosomal crystallography Yonath introduced a novel technique, cryo biocrystallography, which has become routine in structural biology and allows the investigation of intricate projects which would otherwise be considered formidable.

Ada Yonath arrived by train in Fribourg at half past midnight on Monday morning, where she was met by the author and accompanied to the hotel where one of her first concerns was the access to internet as she had some reference letters to send to the US... Picking her up a little later in the morning, we went to see the Chaim Weizmann memorial in the main building of the university at Miséricorde. From there, it was a short ride to Pérrolles where Ada Yonath gave me photos of the Weizmann office and his former laboratory at the Weizmann Institute. She also discovered our original PhD thesis of Chaim Weizmann, as well as the one of his sister Chana. After lunch, during which Ada told me that she had just returned from Japan where she had just finished one of her talks when the Earth shook. Ada was enthusiastic to discuss with students and colleagues of the chemistry department as well as from Biochemistry and the Adolphe Merkle Institute. During the afternoon, I received the message that the Ambassador of Israel to Switzerland would nevertheless be able to come to the conference, which made the day a little more hectic as security had to be adapted. At a quarter to five, the apero commenced,



Fig. 6. Katharina M. Fromm presents the inaugural Fribourg Chaim Weizmann Lectureship diploma to Ada E. Yonath.

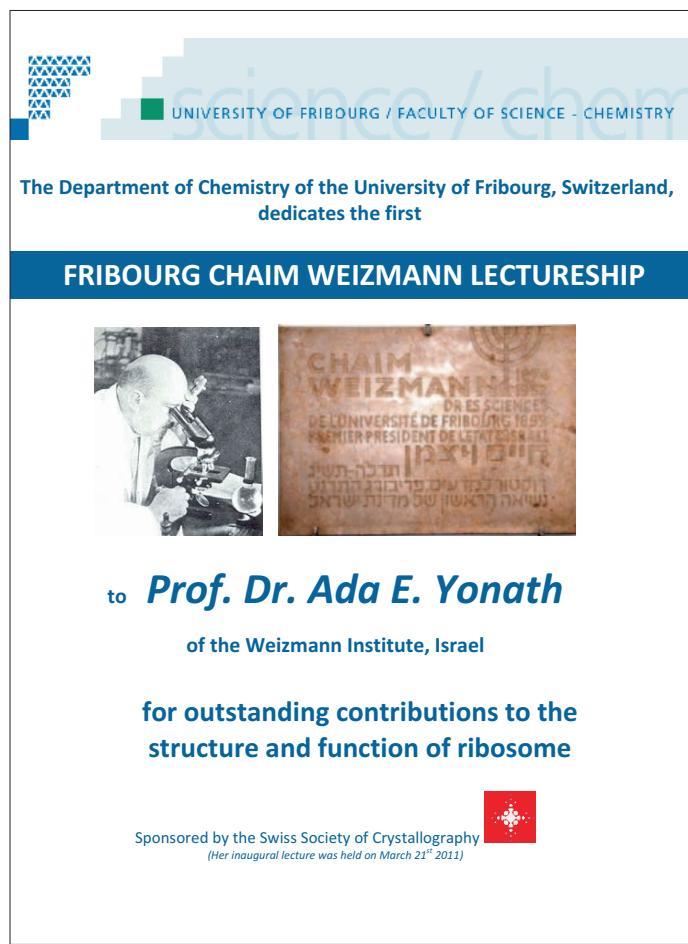


Fig. 7. Diploma presented to Ada E. Yonath.



Fig. 8. Signing after Ada Yonath's lecture

with hundreds of students lining up... Ada Yonath then gave her talk in front of more than 300 guests in the big lecture hall of the chemistry department. Enthusiastic students listened to her fascinating presentation on the ribosome, this molecular factory which produces all of our peptides. After one hour, students wanted more, and Ada gave us 20 minutes more of her fascinating world. The conference was then completed by the presentation of the diploma of inaugural Chaim Weizmann lecturer (Fig. 6, Fig. 7), together with some local Swiss chocolate and a T-shirt designed for the International Year of Chemistry 2011, to which Ada Yonath's talk contributed. Finally, Ada was happy to sign a large number of booklets, papers, etc. for her fans, especially the younger ones (Fig. 8).

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