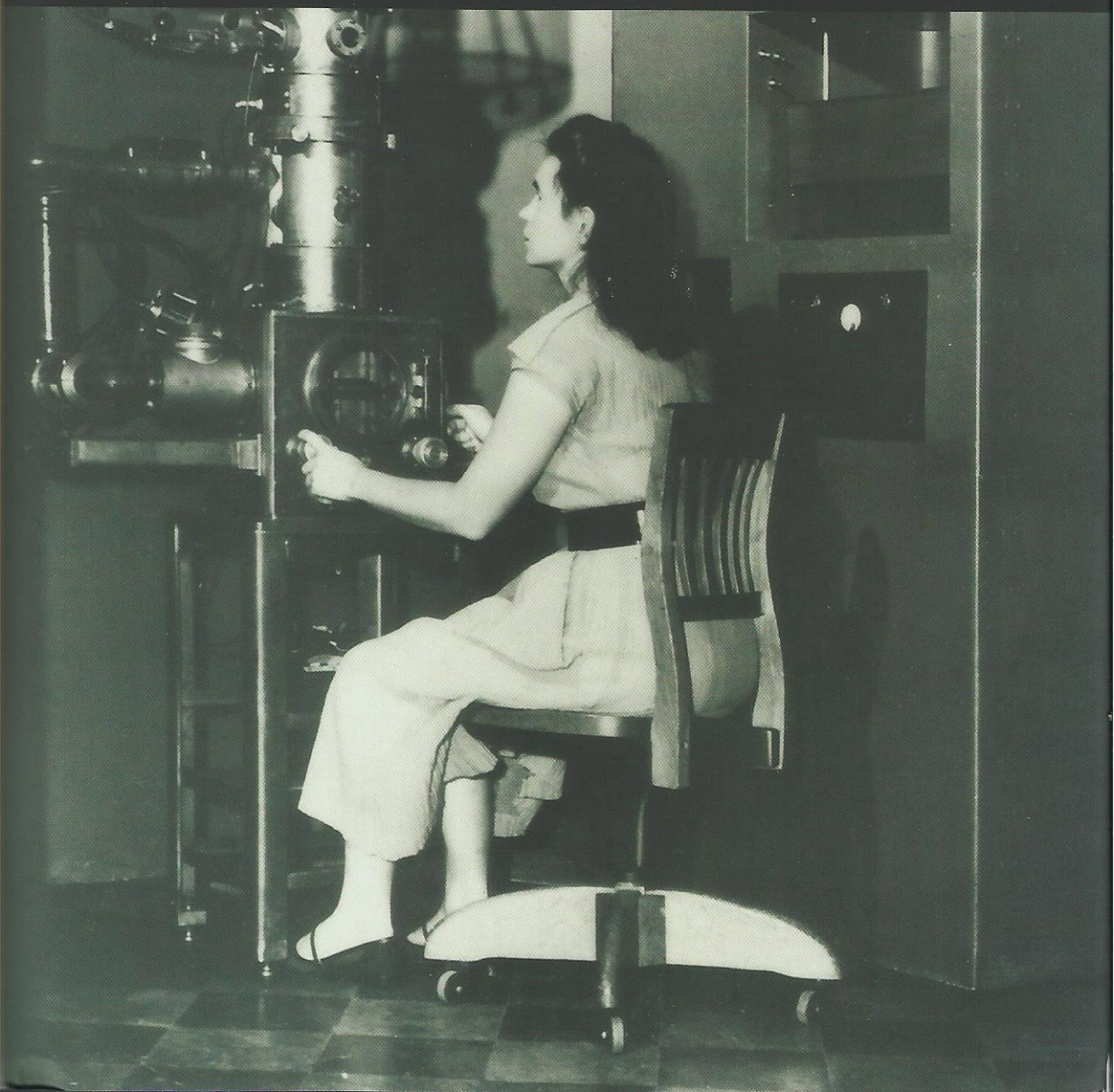


Women Scientists

Reflections, Challenges,
and Breaking Boundaries

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WOMEN SCIENTISTS IN TURKEY

In 2008, I was invited to talk at a conference on Women in Science at Istanbul Technical University. I noticed with surprise that it is not uncommon in Turkey for a woman to hold the position of rector (president) of large universities. I talked with two such rectors, and these conversations and another with a chemistry professor of Istanbul University serve as the basis for this section.

The statistical data are quite astonishing. A study in 1970 showed that while women's participation in professions such as engineering, architecture, law, dentistry, and medicine was only about 5.7 percent in the developed countries, in Turkey it was 25 percent¹—and this was more than forty years ago! The latest data show that the percentage of women full professors in Turkey's universities is 28 percent, compared, e.g., with Germany (15 percent) or the Netherlands (13 percent); the EU-27 average is 20 percent.² This, together with the relatively large number of women in high administrative positions in science and education, made me wonder what the reason might be.

Turkey is a predominantly Muslim country with a history of centuries of polygyny^a back in the Ottoman Empire. Considering the patriarchal cultural heritage of the empire, one would not expect women to occupy important positions in society. The reasons for this surprising fact are rather complex.³

The major change in women's status in Turkish society happened along with the major political change of the country. The year 1923, under the leadership of Mustafa Kemal Atatürk, brought about the end of the Ottoman Empire and the foundation of the secular Turkish Republic. This event meant major changes in women's status. Primary school education became compulsory for all children, and soon it became coeducational. The Civil Code of 1926 outlawed polygyny and granted equal rights to women and men, at least in certain matters, such as divorce and child custody, although complete legal equality came about only in 2001. There were many other important changes, among them the lifting of bans on employing women outside the home. The wearing of the headscarf and full body covers for women was made illegal (until recently—see the discussion by Professor Ulubelen in this section). After the 1920s, women's position changed in a major way, and this was considered a measure of the modernization of the country.

Women who were interested in getting higher education and, later on, in entering the professions came from educated urban upper-class and middle-class families. With the rapid development of the country, there were jobs available for them; it was more reassuring for employers to hire women living close by than men living far away.⁴ According to Professor Çiğdem Kağıtçıbaşı, in society's eyes there were no appropriate or inappropriate jobs for women, because earlier they had not been allowed to work outside the home in the first place. Thus, in this new world women could choose even professions that in the West were traditionally looked at

^a "Polygyny" means one man having multiple wives. The better known word "polygamy" strictly speaking refers to one person having multiple spouses.

as “unfeminine.” This is why there have been more women in engineering than in most Western countries. According to the latest statistics, for 2010, while the EU-27 average for full professors in engineering is 7.9 percent, in Turkey it is 19.1 percent. Even in the natural sciences there is a larger percentage of women than in the EU countries, 13.7 percent for EU-27 versus 25.7 percent in Turkey.⁵

There is, however, an important caveat. The relatively large ratio of women in academia does not translate to the general population. Looking at employment rates in the country, we find that Turkey has a lower rate for women in employment than any of the EU-27 states. While the average female employment rate is 62.4 percent (74.6 percent for men) in the EU member states, it is a mere 30.9 percent (75.0 percent for men) in Turkey; the data are for 2012.⁶ One of the reasons is the difference between educated urban women and women living in rural areas. A large portion of Turkey’s 75 million inhabitants live in faraway underdeveloped rural areas. Mustafa Kemal’s ideal of abolishing the segregation of women meant that job opportunities should have opened up for women in all segments of employment. However, only a relatively small number of privileged women could benefit from the changing situation: young women belonging to the upper and middle classes, the intelligentsia, and bureaucracy—that is, mostly women living in the cities.

Furthermore, the traditional role of women in the family did not change, as is shown by the fact that in 89.6 percent of families with children younger than five years the mother does not have an outside job.⁷ This state of affairs might also be a problem for women professionals who cannot afford outside help. However, because most professional women come from well-off families, they can usually afford help for child care and domestic work. Accordingly, their husbands do not need to feel that by “letting” their wives work, they would need to share household duties that might alienate them from the idea of a working wife.

The three women introduced below are successful scientists and equally successful science administrators. When I wondered about how women could reach such high positions, the general comments I heard were not too encouraging, in that positions in science and higher education may not be sufficiently attractive for men. However one-sided such opinion may be, it does not sound too unrealistic.

AYHAN ULUBELEN

Chemist



Ayhan Ulubelen in 1997. (photo by I. Hargittai)

Ayhan Ulubelen is “one of the pioneers in scientific research in Turkey and a worldwide recognized authority in Natural Products Chemistry,” according to the guest editors in the special issue honoring her in the journal *Phytochemical Letters*.¹ In 2011, there was a conference in her honor celebrating her eightieth birthday and her sixty years in natural products chemistry. She has worked most of her life under much poorer conditions than most of her colleagues in the West.

Ayhan Ulubelen was born in 1931 in Istanbul. Her father was an army officer and her mother a homemaker. Originally, Ayhan planned to become a journalist, but during her high school years she saw a movie about Madame Curie, and that affected her so much that she decided to become a chemist. She said, “All the girls in my class did too, but only I went through with it.”² She studied at Istanbul University and after graduation tried to get a job in industry, but at the time there was bias against employing women. Fortunately, the Faculty of Pharmacy of Istanbul University offered her a position. In a few years’ time, she received her PhD there. She went to the United States for postdoc studies at the College of Pharmacy of the University of Minnesota. When she returned to Turkey, she became an assistant professor at Istanbul University, where she stayed as full professor until her retirement in 1998. She spent a few years in the United States, in Germany, and in Japan. Since her retirement, she has continued her research activities as professor emeritus.

There has been a strong interest in the plants of Turkey, especially the plants that have been used in folk medicine for centuries to treat various ailments. "The villagers use these plants extensively. We have special stores, even in Istanbul, called 'AKTAR,' that sell plants and plant extracts used as traditional medicine."³ Ulubelen and her group have tried to identify ingredients that could be assigned to specific physiological effects. When they identify and isolate the active ingredients, they determine their structures using a variety of physical techniques such as nuclear magnetic resonance (NMR), infrared spectroscopy, and mass spectrometry.



Ayhan Ulubelen at her eightieth birthday in 2011; *from left to right*: Barbara Timmermann from Kansas University, and some of Ulubelen's former students, now all professors: Sevil Öksüz, Gülaçtı Topçu, Ayhan Ulubelen, Ufuk Kolak, Nezhun Gören, and Solmaz Doğanca. (courtesy of A. Ulubelen)

One of their studies in the late 1990s concerned a plant that used to be taken by pregnant women to cause spontaneous abortion. This particular plant had been used as an antifertility agent not only in Turkey but also in China. Both countries used to have high birth rates. Ulubelen and her colleagues reasoned that if successful, they could offer a natural remedy against unwanted pregnancy by causing spontaneous abortion without side effects. In Ulubelen's words⁴:

Of course, I'm aware of the fact that researchers in many other places are involved in finding such abortive agents, and the World Health Organization also supports such research. The goal is to find something from natural sources that women can just drink.

I happened to be in America when Carl Djerassi's birth control pill was being introduced, and it has prevented a lot of unwanted pregnancies. But it also contributed to the spread of free sex all over the world and that has seriously damaged family life. . . .

The pill may also cause some cardiac problems and may also be carcinogenic. The agent causing spontaneous abortion may be much more advantageous, and it would be used only when truly needed. The women in our villages and in the villages of India and Pakistan, and many other countries, could use it when really

needed, and its use would be very easy. However, so far there is nothing like that has been found.

The plant they investigated was *Ruta chalepensis*; they checked both its roots and aerial parts. They isolated different types of compounds, and checked their effects with mice one by one, and they found several compounds that had the abortive activity. However, follow-up studies showed that some of the mice developed cysts in their ovaries and had other problems as well. Therefore, they could not suggest this plant as an abortive agent; on the contrary, women had to be warned of the hazards of its use, and the suggestion was to avoid using it.

This was about fifteen years ago, and eventually they dropped this particular research topic. As it happened, the Turkish Ministry of Health had some programs to reduce the birthrate and they apparently worked well—so much so that presently the country is facing the opposite problem, and the government is now trying to encourage women to have more babies.

Ulubelen and her colleagues have been involved with many other interesting studies to find out what compounds are the active ingredients of the plants used in folk medicine. Some of them have been used against cancer, others against HIV, and yet others in treating cardiovascular diseases, diabetes, and so on. The study of plants that are potential remedies against cancer has been their top priority. Ulubelen's group joined the plant screening program that had been started in the early 1960s by the US National Institutes of Health (NIH) to find cures against cancer. Within this program, about a hundred Turkish plants have been tested.

Ulubelen received a *Merendera* species, called *Merendera caucasica*, from eastern Turkey, where it has been used for its antitumor effect. She and her colleagues found that it is the alkaloids in the plant that have major activity, and they determined the structure of several alkaloids extracted from the plant. Furthermore, they identified different plants showing activity against different tumors.

Fifteen years earlier, they had been doing their research under much more modest circumstances than their colleagues in most other countries. Research funding was quite a problem. The university provided small amounts of money, and there was an additional source, called TÜBİTAK, the Scientific and Technological Research Council of Turkey. They helped, but only to purchase small things, not large instruments. At the same time, the Turkish government was keen on improving the country's science. Therefore, when researchers published their results in refereed international journals, they received a premium. This consisted of two parts. One was for personal use; this came from TÜBİTAK. The other was for their group to get minor items that they needed in their work.

The past fifteen years have brought further positive developments in science funding. Istanbul University and other universities formed their own Research Foundations, which are responsible for providing the necessary funds for research at their institutions. They themselves have to find the necessary money in some way, by doing commissions for small industry, by treating patients (in case of the Medical Faculty), or using other means. The University of Istanbul established a Central

Research Laboratory that by now has all the necessary instruments and equipment that the different research groups need, and when a new instrument becomes necessary, they can apply for it. The researchers have to pay from their own grants for the use of these instruments. There are several places to apply for grants; the State Planning Institute, the Turkish Science and Technology Institute, and the Turkish Academy of Sciences are the most important. Ulubelen feels that today it is relatively easy to do research at a high level.

The earlier financial difficulties notwithstanding, Ayhan Ulubelen has published about 300 research papers and received many awards and distinctions. She was a member of the NATO Scientific Committee for four years. She is a member of the Turkish Academy of Sciences—or, rather, she used to be. On November 2, 2011, 74 of the Academy's 137 members resigned, among them Ayhan Ulubelen. This was in protest against a government decision that, either directly or indirectly, the government would appoint two-thirds of the academy membership. A few weeks later, on November 25, 2011, seventeen former members of the Turkish Academy of Sciences—Ulubelen was one of them—founded the Science Academy Society as an independent, self-governing, civil-societal organization to promote scientific merit, freedom and integrity. Today, their members number well over one hundred. The new institution endorsed the time-honored traditions of integrity, independence, and social engagement, and aims to spread these traditions within the academic community.

Seeing the revival of religious dress for women in Islamic countries already at the time of our first meeting, we discussed the question of how women students dress at the university. This is what Ayhan said in 1997⁵:

In the old days, that is, before the Turkish Republic, Turkish women used to have “çarşaf” [a garment that completely covers the body, together with most of the face] in the cities and baggy pants and a head scarf in the villages. Today, the women in the cities have modern clothes, and the outfits in the villages haven't changed much, except that the younger generation is switching toward modern outfits. During the last 10 years, increasing numbers of women started to wear “çarşaf,” and many young girls wear uniformlike outfits, very long and loose coats and very long, large scarves that come down to their waistlines. There is nothing traditional about this way of dressing. And in a profession one should have proper clothing; a medical doctor, a nurse, a lawyer, etc., should dress whatever way is appropriate for the profession.

I asked Ayhan in 2013 whether there has been any change since then.

Unfortunately, since 2002 we have a religiously inclined government. They, and some intelligentsia (newspaper men mostly and some university professors, some high bureaucrats) approved that this is more democratic, and free dressing was accepted by the university. Slowly but continuously they are increasing their influence on women; these women believe that by covering their head and dressing longer skirts, they are freer. In a way this is so because many of these girls

are able to go out of their houses, free from their fathers but mostly from their brothers. They could freely flirt, walk around hand in hand with boys, and they could go out to the movies with boys; as long as they cover their head they are considered good girls by their families. Of course, this is only a group but I have to admit that the number of conservatives is increasing. At the moment at least 20% of the university girls are head-covered.⁶

Ayhan is not married. She adopted her nephew, who lives with her together with his daughter. Ayhan has been busy all her life with her science, and that has given her great satisfaction. Many of her past graduate students are now in important positions in chemical and pharmaceutical companies and in academia. Her former students, the three guest editors (all women) of the special issue in her honor, speak about her warmly. They emphasize her teaching abilities, her radiating enthusiasm about research, and her obvious joy at the bench in the laboratory. She is a role model for young women and men alike.