

**Chapter 1 : James Franck - Wikipedia**

*German-Jewish Pioneers in Science Highlights in Atomic Physics, Chemistry, and Biochemistry Softcover reprint of the original 1st ed. Edition.*

Particularly important was the migration from Nazi Germany when 1, Jewish scientists, forced to leave their homeland, emigrated to the United States Nachmansohn, Was this intellectual migration responsible for the increase in Jewish American Nobelists and the domination of American science in general after World War II? The myriad effects of this migration will be critically examined from the point of view of the United States as well that of post war Germany in order to ascertain the migrations impact on American science. United States Immigrant Scientists As the threat of Nazism spread throughout Europe, Jews were faced with a difficult decision, whether to leave their homeland or remain in the face of oppression. Many scientists made the decision to leave. In fact, between and , twelve Nobel prize winning scientists came to the United States because of the threat of Nazi Germany. Seven of these twelve Nobelists were Jewish. Upon arriving in the United States, the majority of the scientists worked on the east coast, at universities such as Princeton, New York University, Cornell, Fordham, Carnegie Institute of Technology, and the University of Pennsylvania Schlessinger, Bohr, who had been forced to flee Denmark, Pauli, and Dam spent the war years in the United States but left America and conducted their research after the war. The nine other Nobelists remained and had a strong influence on the scientific community Zuckerman, In addition to these Nobelists, many other great scientists fled to the United States. These included many members of the 41st chair. The 41st chair is collection of scientists who "deserve" a Nobel prize but have not won one. One such immigrant who was also a member of the 41st chair was the Austrian Erwin Chargaff. His discovery that there are specific complementary nucleic acid base pairs which bond together, namely adenine and thiamin, and guanine and cytosine, laid the foundation for the discovery of the structure of DNA. Thus the intellectual migration that occurred as a result of fascist oppression in Eastern Europe had a profound impact in generating greater intellectual activity in the United States. However, this by itself would have had little effect if the new members of the scientific community had not become actively involved in American science. Their influence can be traced in three ways: Immigrant Influence on American Science The first impact that the new scientists had was in the construction of the atomic bomb. American graduate students in physics had to spend some time studying in Germany. Because of this German tradition of excellence in physics, many scientists feared that Germany would win the race to create the atomic bomb Rhodes, Thus, a project was begun at the University of Chicago in the Metallurgical Laboratory. Here, three Nobel prize winning scientists worked to help America create the first atomic bomb. In addition to these three, Niels Bohr made frequent visits to Chicago to assist. These scientists enabled America to win the race to develop nuclear weapons. Fermi constructed the first atomic pile which allowed for a slow and controlled release of atomic energy. Wigner helped make the transformation from this type of energy to that needed for a bomb. The Americans not only were able to develop a bomb more quickly, but also were able to begin production sooner, as these four scientists and others influenced government agencies to commission companies such as DuPont to prepare for mass production Fermi, For example, Einstein wrote Roosevelt about the urgency of developing a bomb, and Fermi was instrumental in persuading the U. Army to convince DuPont to do the work MacPherson, It took almost four years with tremendous resources and brilliant minds for the United States to develop the bomb Nachmansohn, Interestingly, after the bomb was created these scientists quickly advocated peace. Niels Bohr was a major advocate of peace, and talked with Churchill and Roosevelt to warn of the dangers of using an atomic bomb. Fermi advocated no use without proper warning, and Franck advocated no use without a neutral test site for all to see. Wigner also spoke of the dangers of using a nuclear weapon. Thus the impact that immigrant Nobelists had on the atomic bomb was two-fold. First, their presence in terms of intellect and prestige allowed for quick development and preparation for production of the bomb. Second, all of these scientists, after developing the bomb, became strong advocates of peace. While the impact on production of nuclear weapons was a direct effect of the migration of European Nobelists to the United States, there were

also indirect effects as well. One of these indirect effects was mentorship. Thus to fully appreciate the impact immigrant Nobelists had on American science, we must examine how many other Nobel prizes resulted from work with an immigrant Nobelist. There is no doubt that many Nobel prize winners have worked with other Nobel prize winners. As of , 48 of the 92 laureates who won in the United States had worked with a Nobel laureate as a post doctorate fellow, a junior collaborator, or a student Zuckerman, Fermi, for example, served as the mentor for six laureates while Bohr has mentored four. The seven Jewish scientists who came over between and served as mentors for six other Nobelists. One of these six was John Bardeen who served as a mentor for two Nobelists himself. Thus, a second major impact which occurred because of the intellectual migration was multiple effects of mentorship. A third major impact of the migration of scientists to the United States has to do with renewed vigor in research of biological sciences. This changed in with the discovery of DNA. Watson and Crick had no qualms about announcing the structure and in the same paper proclaiming that this structure showed how DNA replicated itself. This new type of grand proclamation in the biological sciences was a direct result of the migration of many physicists due to fascist oppression. With the seeming end of the great era of physics, and with only atomic physics in the forefront, many physicists turned to biological questions. Particularly relevant was their attitude that most problems were solvable, and that the researchers should be looking for grand theories which could explain multiple aspects of biology. This was an attitude absent from the biologists of the times. Schr"odinger wrote a book entitled *What is Life* which greatly influenced James Watson. Thus the new biological attitude became one in which all problems could be solved. This is clearly evident in the discovery of the double helix and translated into increased vigor in the biological sciences Fleming, *Effects on German Science from the Migration* While it is true that the intellectual migration strongly influenced American science in a positive way, it is also true that migration affected German science in a negative way. This is partly due to the fact that so many Jewish scientists were forced to leave, as the number of Jewish laureates for the same period dropped from 9 to 2. This decline, not entirely due to persecution of Jews, was most likely due to poor working conditions and lack of equipment due to the financial problems in post war Germany. In addition to this, Jews were not the only scientists to leave. Non-Jewish scientists such as Enrico Fermi also left. Meyerhof, originally fled to France but had to flee again to the United States Nachmansohn, England was under constant bombardment by German forces, whereas the United States was safe. In addition to this, scientists who came to the United States were welcomed by the Americans. Despite the fact that the United States was just coming out of a depression, the scientists were offered positions at top universities, given good research facilities, and were accepted by the scientific community. Thus, these immigrant scientists, despite being foreigners, were treated well in the United States Nachmansohn, *Conclusion* Thus it can be seen that the migration of scientists due to fascist oppression had multiple impacts on the United States and Germany. For the United States the effects were overwhelmingly positive, with immigrant Nobelists aiding in the construction of the first atomic bomb, serving as mentors for other U. Nobelists, and fostering a new attitude in the biological sciences. For Germany and Eastern Europe, the effects seem to be overwhelmingly negative, as a once prospering scientific community was transformed to a much less productive one. Thus, the scientific migration due to the effects of fascist regimes, helped the United States enter into a period of scientific dominance in the years after World War II.

Chapter 2 : Carl Neuberg - Wikipedia

*The Leo Baeck Institute, to whose late president this book is dedicated, has three branches, located in Jerusalem, London, and New York. Its chief aim is the collection of documents describing the history of Jews in German-speaking countries, the manifold aspects of the association of the two.*

Starting in he attended the Wilhelm-Gymnasium , which was then a boys-only school. Intending to study law and economics, Franck entered the University of Heidelberg in , as it had a renowned law school. While there, he met Max Born , who would become a lifelong friend. Franck found this topic too complex, so he changed the focus of his thesis. He was called up on 1 October and joined the 1st Telegraph Battalion. He suffered a minor horse riding accident in December and was discharged as unfit for duty. He took up an assistantship at the Physikalische Verein in Frankfurt in , but did not enjoy it, and soon returned to Frederick William University. They were married in a Swedish ceremony in Gothenburg on 23 December They had two daughters, Dagmar Daggie , who was born in , and Elisabeth Lisa , who was born in This could be achieved with either another major thesis or by producing a substantial body of published work. Franck chose the latter route. There were many unsolved problems in physics at the time, and by he had published 34 articles. Wood , Arthur Wehnelt or Wilhelm Westphal. His most fruitful collaboration was with Gustav Hertz , with whom he wrote 19 articles. He received his habilitation on 20 May Franckâ€™Hertz experiment Anode current arbitrary units versus grid voltage relative to the cathode. This graph is based on the original paper by Franck and Hertz. In , Franck teamed up with Hertz to perform an experiment to investigate fluorescence. They designed a vacuum tube for studying energetic electrons that flew through a thin vapour of mercury atoms. They discovered that when an electron collided with a mercury atom it could lose only a specific quantity 4. A faster electron does not decelerate completely after a collision, but loses precisely the same amount of its kinetic energy. Slower electrons just bounce off mercury atoms without losing any significant speed or kinetic energy. But they also provided evidence supporting the model of the atom that had been proposed the previous year by Niels Bohr. Before a collision, an electron inside the mercury atom occupies its lowest available energy level. After the collision, the electron inside occupies a higher energy level with 4. This means that the electron is more loosely bound to the mercury atom. There were no intermediate levels or possibilities. They showed that the wavelength of this ultraviolet light corresponded exactly to the 4. The relationship of energy and wavelength had also been predicted by Bohr. In December he was sent to the Picardy sector of the Western Front. He became a deputy officer offizierstellvertreter , and then a lieutenant leutnant in Sent to the Russian front , he came down with dysentery. He was discharged from the Army on 25 November , soon after the war ended. His new post came with more pay, but was not a tenured position. It did however allow Franck to pursue his research as he wished. He was allowed two assistants, so he brought Hertha Sponer with him from Berlin to fill one of the positions. Pohl, a gifted teacher, headed the First Institute, and handled the lectures. His doctoral students included Hans Kopfermann , Arthur R. The principle states that during an electronic transition , a change from one vibrational energy level to another will be more likely to happen if the two vibrational wave functions overlap more significantly. The following month it enacted the Law for the Restoration of the Professional Civil Service , which provided for the retirement or dismissal of all Jewish civil servants, along with political opponents of the government. As a veteran of the First World War, Franck was exempt, but he submitted his resignation anyway on 17 April He did not require his daughters to attend religious instruction classes at school, [37] and even let them have a decorated tree at Christmas; [38] but he was proud of his Jewish heritage all the same. Biological processes turned out to be far more complicated than simple reactions in atoms and molecules. He co-authored two papers with Levi on the subject, which he would return to over the following years. He decided to provide financial security for his children by dividing his Nobel Prize money between them. The gold medal itself was entrusted to Niels Bohr for safekeeping. He placed the resulting solution on a shelf in his laboratory at the Niels Bohr Institute. After the war, he returned to find the solution undisturbed and precipitated the gold out of the acid. The Nobel Society then recast the Nobel Prize medals. A more intractable problem was that the university had no money to hire skilled staff.

Franck was concerned about his family members remaining in Germany, and needed money to help them emigrate. He therefore accepted an offer from the University of Chicago, where his work on photosynthesis had attracted interest, in Franck arranged a position for Pringsheim at his laboratory. His daughters still were, though, so they were restricted from travelling, and could not take care of their mother when she fell ill and died on 10 January, although they were permitted to attend her funeral. Compton established its Metallurgical Laboratory at the University of Chicago. As part of the Manhattan Project, its mission was to build nuclear reactors to create plutonium that would be used in atomic bombs. Compton then turned to Franck, with some trepidation owing to his German background. How Franck welcomed an invitation to join our project! It was a vote of confidence that far exceeded his hopes, and it gave him a chance to do his part for the cause of freedom. They have a stranglehold over Germany. The German people are helpless until we can break the strength of their Nazi masters. Nickson, Eugene Rabinowitch, Glenn T. Wallace of their fears that "mankind has learned to unleash atomic power without being ethically and politically prepared to use it wisely. Finished on 11 June, it recommended that the atomic bombs not be used on the Japanese cities without warning. Meitner saw no break between his early and later work. She recalled that Franck enjoyed talking about his problems, not so much to explain them to others as to satisfy his own mind. Once a problem had aroused his interest he was completely captivated, indeed obsessed by it. Common sense and straight logic were his main tools, together with simple apparatus. His research followed an almost straight line, from his early studies of ion mobilities to his last work on photosynthesis; it was always the energy exchange between atoms or molecules that fascinated him.

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*German-Jewish Pioneers in Science Highlights in Atomic Physics, Chemistry and Biochemistry. David Nachmansohn.*

### Chapter 4 : The Impact of the Intellectual Migration on the United States and Eastern Europe

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