

## IS SCIENCE A BROTHERHOOD? THE CASE OF SIEGFRIED RUHEMANN

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In 1946 Niels Bohr wrote: "Scientists have long considered themselves a brotherhood working in the service of common human ideas (1)." Such sentiments would be accepted today without question. Even during the height of the Cold War scientific exchanges occurred between the United States and the Soviet Union. However the life of Siegfried Ruhemann (1859-1943) offers an example of how this has not always been the case. Virtually unknown in the chemical community, Siegfried Ruhemann made a most important contribution in 1910 with the discovery of ninhydrin and its use as a reagent to characterize the presence of amino acids and peptides (2). Robert West has discussed the discovery of ninhydrin as an example of the adage of the well prepared mind (3).

Siegfried Ruhemann, the son of Abraham and Marriana (nee Rosenberg), was born on January 4, 1859 in the East Prussian town of Johannesburg. Because Abraham Ruhemann, who was in the leather trade, died in 1866,

when Siegfried was only seven, the family moved to Berlin. There Siegfried received his primary and sec-

ondary education and then enrolled at the Friedrich-Wilhelms-Universität in Berlin. The death of his father left the family in a precarious financial situation so Siegfried had to work to pay for his university fees. He obtained his Ph.D. under the direction of A.W. Hofmann for a dissertation entitled, "Contributions to the Knowledge of Di-and-Triamines of the Aromatic Series," which he defended on December 22, 1881. Ruhemann continued his association with Hofmann until 1885, when an opportunity was presented to him by Hofmann to move to Cambridge University as the assistant to the Jacksonian Professor of Natural Experimental Philosophy, James Dewar (1842-1923). At this time Cambridge was a scientific backwater still steeped in the tradition of the classical education, and

Dewar also accepted the offer of the Fullerian Chair of Chemistry at the Royal Institution in London. This po-



Siegfried Ruhemann

sition did not require him to give up his Cambridge professorship; and, much to the dismay of Cambridge University, he held both positions until his death. Dewar was a brilliant researcher but had a very temperamental nature. One of his few friends, Henry Edward Armstrong, wrote of Dewar (4):

...men have sometimes said that he was cantankerous, contentious, quarrelsome, a man with whom it was impossible to work....choleric, irascible, he was certainly was at times...and a good hater."

Dewar had insisted that he should have an assistant (demonstrator) who would help prepare his lecture demonstrations. Dewar became disenchanted with Cambridge and spent more time in London, while his assistant took over more and more of the lecturing and supervision of research students. As Dewar came to realize the importance of organic chemistry, a field in which he himself had little interest or formal training, he decided the best way to improve this deficiency was to hire a German-trained Ph.D. to replace his first demonstrator who had resigned in 1884. The best possible person from whom to seek advice was A. W. Hofmann, who had been Professor of Chemistry at the Royal College of Chemistry and its successor institutions from 1845-1863. His laboratory in Berlin had become a mecca for many English students seeking to advance their education and careers by obtaining their Ph. D. in Germany. Who else was in a better position to suggest a person to fill Dewar's needs at Cambridge? Why Ruhemann was chosen is difficult to establish, but one can only speculate that Hofmann considered him a first-rate organic chemist. As a Jew, Ruhemann had a serious disadvantage to establish himself in German academia at that time. Young and single, he must have found the offer to go to England attractive. Upon his arrival in 1885 Ruhemann almost immediately took over the lectures in organic chemistry from Dewar, even though this was not part of his official duties. Space was available in the university laboratory, and within five years he had published six papers of his own work and seven in collaboration with students. These appeared in the *Journal of the Chemical Society* as well as in German journals such as *Berichte*. In his papers appearing in the *Journal of the Chemical Society*, Ruhemann identified himself as Jacksonian Demonstrator in the University of Cambridge. He proved to be an effective and popular lecturer and had a good command of English but with a distinct German accent. In his obituary notice in the *Journal of the Chemical Society* recollections of Ruhemann as a teacher by a Dr. J. T. Hewitt are quoted (5):

He always seemed to be as pleased in giving the lectures as the audience was in hearing them. Within a short time at the end of the lecture he came around the laboratory asking each individual who had been present, whether there was any further points that needed explanation. As a teacher of practical Organic Chemistry Ruhemann was even more in his element than in the lecture room.

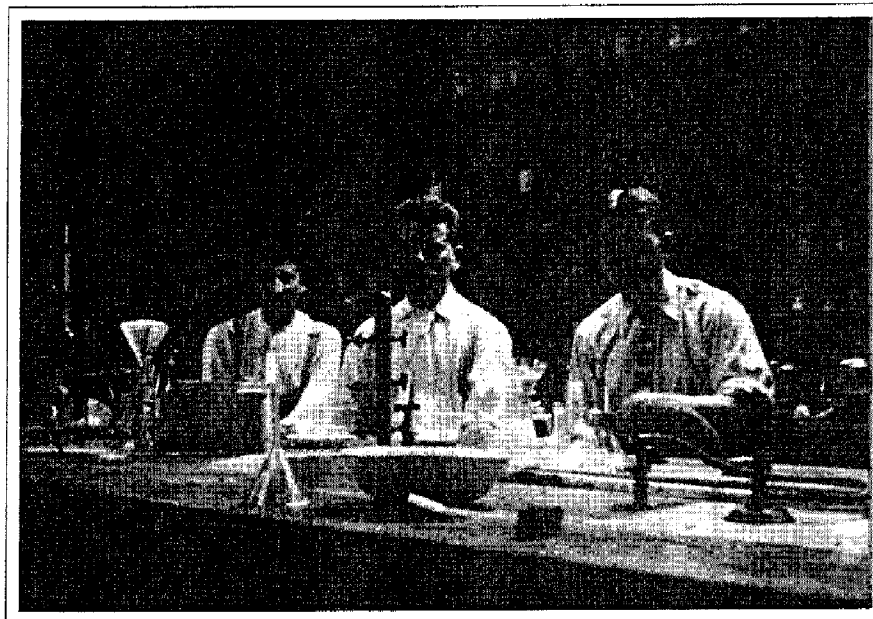
In spite of his success, however, Dewar sought to dismiss Ruhemann after five years for reasons that are still not fully known. Dewar believed that he had the sole right to hire and dismiss his assistant and did not have to offer any reason. From a pamphlet Dewar had privately printed in 1891 (concerning the Ruhemann affair), one can speculate that Dewar felt Ruhemann had been a disloyal servant to his master (6). Given the heavy burden he was carrying in teaching and research, Ruhemann expected to be treated with the respect due a colleague, whereas Dewar treated him as a servant. Dewar requested that Ruhemann resign his position on December 7, 1890. Ruhemann tried to effect some kind of reconciliation with Dewar through the offices of George Liveing, the head of the University Chemistry Department. He asked to be given a suitable period of time to find a new position. Dewar would have nothing of it, writing Ruhemann that if the resignation was not received by December 15, Dewar would assume that he had refused to resign. When the deadline passed, Dewar wrote the Vice-Chancellor of Cambridge University (the administrative head of the University) of his intention to appoint a new assistant. The Vice-Chancellor, the Rev. Dr. Montague Butler, Master of Trinity College, replied by noting the contributions that had been made by Ruhemann during his past five years (6):

It has become clear to me during the last ten days that not a few very distinguished members of the University have the strongest possible sense of the value of Mr. Ruhemann's service as a teacher, and that they regard his retirement from Cambridge, especially if it seemed to carry with it any stigma, as little short of a calamity. He is beloved and respected in no ordinary degree, and his dismissal would awaken very general and earnest sympathy.

The university committee charged with appointments, meeting on January 26, 1891, noted that Dewar was adamant in his right to do what he wanted in his capacity as Jacksonian Professor. A resolution to this situation was sought by appointing Ruhemann a University Lecturer in the chemistry department. However Liveing, who had been Dewar's research collaborator for many years, indicated that there was no room in the laboratory in which Ruhemann could continue his research.

Dewar ordered Ruhemann to vacate the laboratory space belonging to Dewar by June, 1891. In a paper published in 1890 Ruhemann identified himself as University Lecturer in Chemistry, but without laboratory space this would seem to have been a pyrrhic victory. Fortunately for Ruhemann, many of the constituent colleges of Cambridge University had their own laboratories at this time; and he was invited to use the facilities of Gonville and Caius College. From 1891-1909, when Ruhemann was readmitted into the university laboratory following Liveing's retirement, over 50 papers of his own work, as well as 35 papers involving student collaborators, were published, all marked as contributions from the Laboratories of Gonville and Caius College. Ruhemann published an additional 20 papers of his own experimental work and 5 in collaboration with students from 1909 until his resignation in 1915. In 1914 Ruhemann was elected a Fellow of the Royal Society, a mark of distinction conferred upon him by his peers for the contributions he had made to the advancement of chemical science.

On December 30, 1900 Ruhemann married Olga Liebermann (7) of Berlin. The birth of his son Martin, his only child, on January 17, 1903 prompted Ruhemann to become a naturalized British citizen. Life seemed to be very good for the family until that fatal day of June 28, 1914, when the Archduke Ferdinand was assassinated in Sarajevo. The beginning of World War I unleashed the pent-up forces of nationalism and was to claim Siegfried Ruhemann as one of its victims. The journal *Nature* offers a glimpse of the depth of feeling against Germany that the war generated. This inescapably led to the view that naturalized British citizens of



Siegfried Ruhemann and student collaborators at Cambridge, probably circa 1900

German descent were not to be trusted. After the first battle of the Marne, September 6-12, 1914, it became evident that this was not going to be a short or glorious war. On Thursday, September 10, 1914 the *Nature* editorial ran as follows (8):

editorial ran as follows (8):

Many of us have been great admirers of Germany and German achievements along many lines, but we have now learned that her "culture" and admirable organization have not been acquired as we do not doubt was thought by the workers themselves,

for the purpose of advancing knowledge and civilisation, but, in continuation of a settled policy, they have been fostered and used in order that a military caste in Germany, with the Kaiser at its head, shall ride roughshod over Europe, all treaties and national rights abrogated, all conventions set aside, all honour thrown to the winds, all laws of war and even of humanity disregarded. We are back in the days of the Huns.

In a letter to the editor appearing in the September 24, 1914 issue, the Secretary of the Dutch Society of Sciences, J.P. Lotsy, a neutral observer, succinctly summarized the scourge of nationalism for the scientific community. By this time the pattern of static trench warfare that would persist over the next four years had been established (9):

To my mind, worse than the young lives sacrificed, worse than the destruction of ancient monuments of arts and science, is the almost inevitable consequence of this terrible war: the sowing of hatred and distrust between different nations. Now it is my firm belief that it is the duty and the privilege of scientific men all the world over to do all in their power gradually to allay these feelings of hatred and distrust.

On October 8, 1914 *Nature* published the extremely virulent and inflammatory remarks of Sir William Ramsay titled *Germany's Aims and Ambitions* (10). The 1904 Nobel Prize winner in Chemistry for his discovery of the noble gases, Ramsay was one of the most vocal critics of Germany in the scientific community, especially in the early stages of the war. He began his remarks with a statement made in 1893 by Lord Rosebury: "We have to remember that it is part of our responsibility and heritage to take care that the world, so far as it can be molded by us, should receive the Anglo-Saxon, and not another character." Ramsay then presented a racial argument for the aims of Germany in the war (10):

.....and their ideal, with which they have infected practically all Germans, is to secure world supremacy for their race, in the conviction that the condition of humanity will thus be ameliorated. This is the aim which has permeated all classes of German society during the past generation; this is the cause of the present war. No means are to be neglected to secure this end; righteousness, truth, and justice are to be sacrificed in order that the German race may persist.

Further on Ramsay made the following statement (10):

The originality of the German race has never, in spite of certain brilliant exceptions, been their characteristic; their *metier* has been rather the exploitation of the inventions and discoveries of others;...The same obedience to command and the same attention to detail may be noticed in their industrial and scientific work as in their army...The conclusion is that this war is a war of humanity against inhumanity; principle against expedience; of right against wrong.

Ramsay argued for a victory that would lead to the destruction of the German nation as a threat to humanity in the future (10):

The motto of the Allies must be 'Never Again.'...Will the progress of science be thereby retarded? I think not. The greatest advances in scientific thought have not been made by members of the German race; nor have the earlier applied sciences had Germany for their origin. So far as we can see at the present, the restriction of the Teutons will relieve the world from a deluge of mediocrity. Much of their previous reputation has been due to Hebrews resident among them; and we may safely trust that race to persist in vitality and intellectual activity.

This curious remark by Ramsay perhaps reveals his lack of understanding of the situation of the Jewish population in the Kaiser's Germany; or was it a very clever insult to the Germans in the sense that their great scientific prowess was the result of a people who were never really accepted as true Germans? In contrast to the mil-

lions of Jews in eastern Europe in 1914, the total Jewish population of Germany was approximately 570,000. More than 70% of that group lived in Prussia and Berlin in particular. Although Jewish emancipation had been realized by the time of the unification of Germany under Kaiser Wilhelm I in 1871, there was a persistent strain of anti-semitism in the population.

In theory all professions were open to Germans of Jewish background; but in practice, appointment to the faculties of universities especially in the humanities was almost impossible even for the most assimilated Jews. The law, civil service, and election to public office were also very restricted for Jews. The sciences as well as medicine were fields that were much more open, and the numbers of Jews in these fields vastly exceeded their proportion of the population. Although university professorships in the sciences were difficult for Jews to obtain, there were many opportunities in the expanding chemical industry.

The increasing prosperity of Germany after unification greatly reinforced the feeling of many Jews as being German first who happened to be of Jewish ancestry. Although strict religious observance was practiced by some German Jews, many of the highly assimilated Jews became members of the new reform movement which had begun early in 19<sup>th</sup>-century Germany. The precepts of the reform movement with its emphasis on adapting traditional Jewish beliefs, laws, and practices to the modern world were more in line with the growing sense of German identity. A portion of a letter from Chaim Weizmann to the British Foreign Secretary Arthur Balfour in 1914 succinctly summarizes the situation (11):

Those Jews who are giving their energies and their brains to the Germans are doing it in their capacity as Germans and are enriching Germany and not Jewry, which they are abandoning.

On November 12, 1914 in a commentary in *Nature* entitled "The Place of Science in Industry (12)," Ramsay disparaged the success of German industry by pointing out what he believed were deficiencies in industrial organization. Ironically, these deficiencies were the very reasons why the British chemical industry was not prepared in the least for a prolonged war. The editor of *Nature* on January 14, 1915 wrote with particular vehemence about the war. He pointed out that many German academics, such as Prof. Kuno Meyer, who had had long careers in Britain, now returned to Germany to act as agents of the German government. Meyer, who had been Professor of Celtic Studies for 30 years at

Liverpool University, was now trying to stir up feelings among the nationalist community in Ireland and of the American Irish in favor of Germany (13):

But the individual, in these days, must suffer ... Savages have a code that, after breaking bread in a man's house, it is treacherous to war against him; not so Prof. Kuno Meyer...It behooves us to treat with suspicion all naturalised aliens of Teutonic extraction; and yet we know, alas! that in doing this, we are acting unjustly in some cases for the crimes of his countrymen. It is such instances as these which make the Allies determined that such a race must be deprived of power to do mischief, whatever be the cost in life and money.

Ruhemann had stayed in his post in Cambridge through the 1914-1915 academic year with no thoughts of leaving. As a German, however, even though a naturalized British citizen and having lived in England for 30 years, he was viewed with suspicion in some quarters. The sinking of the *Lusitania* on May 7, 1915 (14) was to be the deciding factor that ended his Cambridge career.

The Cambridge Daily *News* of May 15, 1915 printed the following (15):

Many people are asking what the authorities intend to do about German members of the university-graduate and undergraduate. There is at least one German drawing a good salary from the University who has never made any pretense of concealing his anti-British sympathies....Incidentally, I notice that Cambridge University will probably receive a Government subsidy towards chemical research work. It is to be hoped that before parting with the taxpayers' money for this purpose the Government will see to it that the proposed researches are carried out by Britons.....

Was the last part of this statement a veiled reference to Ruhemann? Did Dewar, who was known to be a vindictive person, have some influence on having this appear in the newspaper?

Both Ruhemann and his family were harassed by the intense hostility felt after the sinking of the *Lusitania*. Martin Ruhemann was shunned by his schoolmates, and their family doctor refused to treat them any longer. Having received threatening letters, Ruhemann felt he must resign his lectureship for the sake of his family. Since it was impossible to return to Germany during the war, he lived quietly in Cambridge until 1919 when he returned to Berlin. As a testament to his belief in the international nature of science, however, he did not resign his fellowship in the Royal Society, where he continued on the rolls until 1924, when contact between the society and Ruhemann was severed.

Back in Berlin, Ruhemann first served as an assistant in Emil Fischer's laboratory and in 1921 was made head of an industrial research institute working on lignite and peat. These were happy and productive years in spite of the difficult times. His son Martin obtained his doctorate in physics in 1928 at the University of Berlin and later became an authority in the field of cryogenics, contributing pioneering applications to air separation and gas processing (16).

After Siegfried Ruhemann retired in 1930, he looked forward to a peaceful retirement in his native Germany. This was not to be, for within three years Nazism had swept Germany into a dark era that would only end in 1945. As a retiree he probably did not feel the full force of the Nazi racism directed against Germany's Jewish population. He belonged to that large group of assimilated Jews who thought of themselves as Germans first and Jews second. There was no thought of his leaving Berlin again, inasmuch as he was 74 years old when Hitler came to power. Where was he to go anyway? Even though still a British citizen, his experience in England had been in the end less than happy.

His son Martin had married a fellow physicist Barbara Zarnico in 1930. With no prospects of employment for either, they had gone in 1932 to work at the newly created Institute of Applied Physics at Kharkov in the Soviet Union. By 1937, Stalin's paranoia had led to the beginning of the purges, and foreigners were no longer welcome to work in the Soviet Union. Fortunately, Martin Ruhemann, who had established a reputation in low-temperature physics, was able to emigrate to Britain and obtain a research post at Imperial College. The events of 1938 culminating in the infamous *Kristallnacht* finally convinced Siegfried Ruhemann that he, too, should leave; and in 1939 he returned to Britain with his wife to spend his last four years living in North London near his son. He died of natural causes in August 1943 at the age of 84.

By no means was Siegfried Ruhemann the only innocent person who suffered at the hands of the rampant nationalism and xenophobia of the era. Many distinguished British scientists of German descent, such as the physicist Arthur Schuster (1851-1934), who was elected Secretary of the Royal Society in 1912, were questioned about their loyalty. Schuster, born in Frankfurt, had moved with his family to England in 1870. During the course of the war he was hounded by a small minority to resign an office to which he had been elected, merely because he was of German descent. Even after

the conclusion of hostilities, there was still a great deal of enmity toward German science and scientists from the British and American scientific communities. The events discussed in this paper do not have a strict parallel in World War II. The rise of fascism and the emigration of many prominent scientists from Germany and Italy had an effect which moderated the extent of the venomous exchanges of 1914-1918. Perhaps one of the great ironies is that Churchill's scientific advisor was Frederick Lindemann, Lord Cherwell (1886-1957)—a German-born British citizen.

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7. The Liebermanns were a business family involved in the textile business. An uncle of Olga Liebermann was the noted late impressionist painter Max Liebermann. Another member of the family was Karl Liebermann, Professor of Chemistry at the Technische Hochschule, Charlottenburg. Among his students was Fritz Haber.
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11. D. Nachmansohn, *German-Jewish Pioneers in Science 1900-1933*, Springer Verlag, Berlin, Heidelberg, New York, 1979, 12.
12. W. Ramsay, "Place of Science in Industry," *Nature*, **1914**, 275-76.
13. Anonymous Editorial "The War," *Nature*, **1915**, 94, 527-528.
14. The controversy still exists today as to whether the Lusitania was carrying war cargo. If so, its sinking was not as barbarous an event as the British government made it out to be.
15. Ref. 6.
16. For a biography of Martin Ruhemann, see *Cryogenics*, **1994**, 34, 691-693.

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