

LETTERS OF SVANTE ARRHENIUS TO HIS FORMER CROATIAN STUDENT

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Fran Bubanović (1883 – 1956), the first professor in chemistry at Zagreb University Medical School, notable Croatian textbook writer, and author of many books and articles in popular science, was one of the first postgraduate students of Svante August Arrhenius (1859 – 1927). Bubanović spent less than two years (1911/12) in Arrhenius' Nobel Institute for Physical Chemistry and published with his teacher only one paper (1), but the short stay in *Experimentalfältet* near Stockholm in the company of the best scientists of the time stimulated Bubanović to devote much of his later writing to Arrhenius and Sweden. Moreover, eleven recently discovered hand-written letters sent by Arrhenius to Bubanović between 1912 and 1916 reveal that Arrhenius and his Croatian student had a relationship that was more than just teacher-to-student, which may be attributed to their similar personalities.

At the beginning of the 20th century, Croatia had a rather peculiar political status within the Austro-Hungarian Empire, a dual monarchy consisting of eleven major nations. Franz Joseph was formally the emperor of Austria and the king of Croatia, but Croatia had actually been split between Austria (southern part) and Hungary (northern part). Despite repeated clashes between the native Croatian population and 'foreigners' (Austrians and especially Hungarians), life in major Croatian cities differed little from life in cities all over the Hapsburg Empire. In the capital of Croatia, Zagreb (which had 60,000 inhabitants at the turn of century), German was regularly spoken, but only half a century earlier Croatian

had been recognized as the official language in the Croatian Parliament. The cosmopolitan nature of the Empire is reflected by the fact that graduate study in chemistry started in Croatia when a Czech chemist Gustav Janeček (1848 – 1929) accepted an offer to teach at the Zagreb Faculty of Philosophy in 1879. Bubanović was among professor Janeček's best students, but after his graduation in 1907 Bubanović had to take a position of grammar school teacher in a small town of Bjelovar in the north of Croatia. Fortunately, thanks to the support of influential Bjelovar citizens, Bubanović received a small stipend in 1909, which enabled him to work for two years in the laboratory of Professor Hartog Jakob Hamburger (1859 – 1924) in Groningen, the Netherlands. With his Groningen professor, Bubanović published three papers (2-4), and it was also in Groningen that Bubanović made his first contacts with Svante Arrhenius (5):

As I was finishing my papers at the end of my second year in Groningen, just before the summer recess, Professor Svante Arrhenius, a Swedish physical chemist and the founder of this discipline with van't Hoff, returned from America where he stayed a while as a visiting professor (Austauschprofessor). As I still had some time of my sabbatical left and was hoping that it would be extended for another year on account of successful papers I published, I asked Arrhenius if I could come to visit his institute in Stockholm. He must have spoken about me with my teacher Hamburger, for he soon advised me that I could come at once to his institute for physical chemistry in Experimentalfältet near Stockholm. While still in Groningen, Arrhenius

delivered a lecture on physical chemistry, which gave me an opportunity to know this great man from this aspect, too.

Bubanović in Arrhenius' Laboratory

In 1905 Arrhenius retired from Stockholm University (*Högskola*) and, supported by the Academy of Sciences, decided to build a Nobel Institute for Physical Chemistry, which was completed in 1909, about two years before Bubanović became his student. Bubanović met many eminent scientists at the Institute (H. Lundén, W. Oeholm, E. Ramstedt, Lepeshkin) and was impressed by the radioisotope laboratory. What surprised the young student most was the gay and relaxed atmosphere, which at first seemed incompatible with serious scientific work (5):

Svante Arrhenius, who was then in his 55th year of life, gave the spirit and life to the Institute. His apartment was connected with the Institute by a hallway. The building lay in a park, among stones and centuries-old oak trees. The life at the institute seemed, especially in the summer, as though people were on holidays, enjoying the beauties of the countryside and of the lake, and not as though they were doing serious scientific work. I recall, for instance, that during the summer Olympic Games in Stockholm all the Institute people were sitting in the shadow of oak trees, drinking beer and waiting for hours to watch marathon runners go by.

Despite a beer or two and a good chat, the students were not deprived of the teacher's attention, according to Bubanović (5):

Arrhenius was always with us. He was constantly engaged in the scientific research of every one of us! If you met him in a tramcar or in a restaurant, he was always ready to give you a recommendation or suggestion about what you had to do, how to continue your research in order to finish your work. And everything he was doing was so spontaneous and natural. This great man was able to entirely translate his scientific thinking in one of the most complex and abstract branches of chemistry, into common discourse, and this simplicity deeply impressed people around him.

Arrhenius' "simplicity" produced unusual results (5):

At the Institute we'd organize a small colloquium in a small room every Saturday, at which we'd report on our work or on books and papers which we were asked by Arrhenius to read. Of course, Arrhenius called the tune, puffing his obligatory cigar, and here and there he'd surprise us that he forgot his own formulas and that he used such tentative phrases as 'it may well be', 'you may be right,' and so on.

Arrhenius' "forgetfulness" is also recalled in a letter dated March 28, 1913:

Ich habe mir diese grosse Mühe gegeben damit unsere Publikation (Abhandlung für Nobelinst.) wirklich begreiflich wird und es möglich wird zu finden wie Ihre Resultate berechnet sind, sonst fürchte ich wird niemand sicher sein, dass die Rechnungen nicht stark fehlerhaft sind. Also bitte ich um ganz klare Auskunft, wie Sie gerechnet haben, damit ich das in die Korrektur einführen kann.

Es ist möglich dass ich Ihre Rechnungen einmal verstanden, aber vergessen habe. Auf alle Fälle ist es doch unwahrscheinlich, dass ein Andern sie verstehen wird wenn er die Abhandlung liest. Dann wird er darauf verzichten sie weiter zu lesen. Und das wäre doch Schade (6).

Arrhenius' habit of discussing scientific topics "in a tramcar or in a restaurant" and freely mixing scientific and every day problems is also reflected in his letters. In the same letter and often in the same paragraph, Arrhenius would write about changes to be made in a manuscript, social events in his laboratory, as well as about political and family affairs. A good example is the postcard dated May 30, 1913 (Fig.):

Lieber und verehrter Herr Professor: Ich danke Ihnen herzlich für Ihren letzten Brief und gratuliere Ihnen herzlich zu den darin bevorstehenden schönen Ansichten für die Zukunft. Jetzt haben wir uns revanchiert. Meine Frau gebar heute um 12:40 U M eine Tochter, die den Namen Ester tragen wird nach einer dahingeschiedenen Liebblingschwester meiner Frau. Alles ging sehr glücklich. Maja und Esterschen ruhen jetzt nach ihren Anstrengungen aus. Im Labor ist es rechtstille. Dr Taylor reiste vor einer Woche und kommt in Juli zurück. Mr. Kendall geht nach Amerika und bleibt hier bis zum ersten Juli, wann Gardner und Lundén kommen. K. hat eine 1.200 doll. Assistentenstelle bei Alexander Smith in New York erhalten. Gardners Frau und Kinder kamen heute früh von Petersburg und wohnen im alten Haus. Frl. Dr Ramstedt ist Assistent an Lundéns Stelle.

Ich schreibe so viel ich kann um am 4 Juni für die Akademie zwei Abhandlungen fertig zu haben; es ist dann die letzte Sitzung vor den Ferien. Mit herzlichen Grüßen und Wünschen von Haus zu Haus. Ihr ganz ergebener Svante Arrhenius (7).

Despite official titling ("*Lieber und verehrter Herr Professor*") in all Arrhenius' letters, it turned out that he godfathered Bubanović's first child (letter dated March

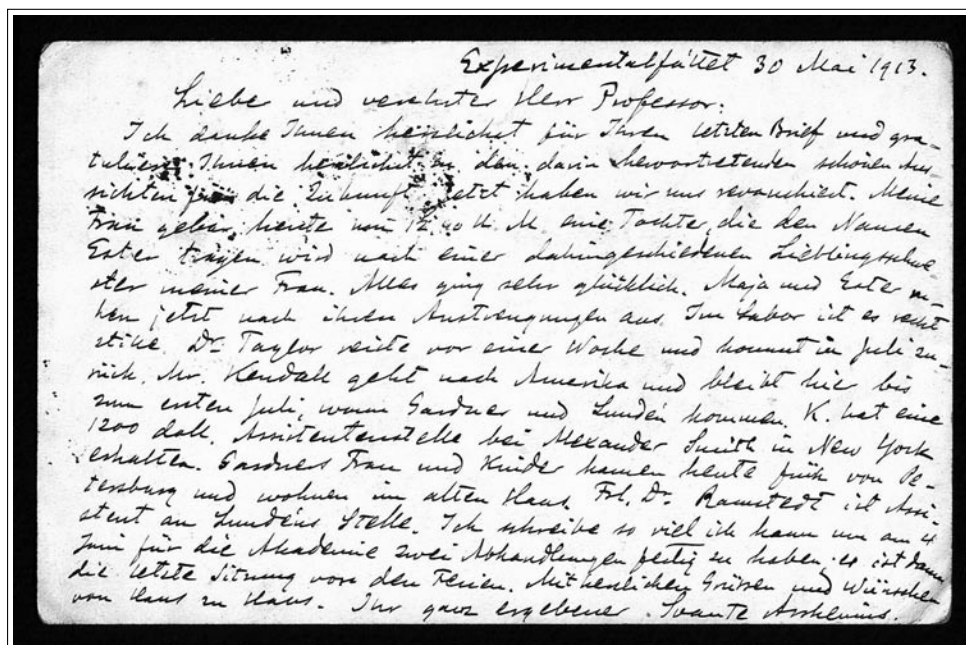


Figure. In his postcard of May 30, 1913, Arrhenius notifies Bubanović that he fathered a daughter and continues with the news from his laboratory (see text).

17, 1913); this was mentioned in the sentence “Jetzt haben wir uns revanchiert” on Arrhenius’ postcard dated May 30, 1913. The baby was born in 1913 in Stockholm and was christened Svea, a name quite uncommon in Croatia. His second child, Aleksandar was born in 1923, in a train en route from Stockholm to Zagreb (8). Bubanović married in 1911, and his wife Ivanka contributed significantly in connecting the Arrheniuses and the Bubanovićs. A letter dated December 31, 1912 describes how Ivanka, that is, “Frau Gemahlin,” brought the Arrheniuses some apples and wine produced by the Bubanovićs in the village of Gornje Vrapče, near Zagreb:

Ich hätte Ihnen längst schreiben sollen, habe aber Ihren letzten lieben Brief mit der neuen Adresse verlegt – ich hoffe doch dass dieser Brief richtig in Ihre Hände gelangt und Ihnen sowohl wie Ihrer lieben Frau Gemahlin die aller besten Wünsche zu einem erfreulichen und erfolgreichen neuen Jahr überbringt. Ausserdem soll er Ihnen unseren herrlichsten Dank für die freundlichen Weihnachtsgeschenke sagen die heute angekommen sind, nämlich die prächtigen Äpfel und die 5 Liter Wein. Diese werden vom neugierigen Zöllner geöffnet werden, so dass ich den schönen Geruch, der mir so wohlbekannt war, fühlte. Ich lasse jedoch den Wein einige Zeit stehen, da ich bei der vorigen Sendung fand, dass die Qualität dadurch sehr bald gewann (9).

Arrhenius’ Relationship with other Scientists

Bubanović first met Arrhenius in Hamburger’s laboratory in Groningen. In three letters (September 10, 1911, May 6, 1911, and July 17, 1912) mailed to Bubanović in Stockholm, Hamburger also included best wishes to Arrhenius (“Mit meinen besten Grüßen, auch an Herrn Prof. Arrhenius.”) A letter written by Arrhenius on December 20, 1913 reveals that Hamburger was Arrhenius’ host when the latter attended a physiological congress in Groningen:

Ich war in diesem Sommer zu Besuch in Groningen anlässlich des Physiologen-Kongresses. Ich und mein Schwager Prof. Johansson wohnten bei Hamburger, wo wir es ausgezeichnet hatten.

Hamburgers geben Frühstück- und Mittag-Essen für etwa 20 Personen jeden Tag während einer Woche; es muss für die Frau ausserordentlich anstrengend gewesen sein; sie blieb aber stets lustig und munter. Der Kongress verlief ganz ausgezeichnet, die Gastfreiheit und die Freundlichkeit der Groninger waren überaus grossartig. Ich wurde da u. A. mit Prof. Charles Richet bekannt, der einen äusserst sympathischen Eindruck machte (10).

The same letter reveals that, after the congress in Groningen, Arrhenius traveled to the United Kingdom where he met many colleagues and friends:

Von Groningen reiste ich nach Birmingham, wo ich eine sehr angenehme Zeit verlebte. Bei der British

Assoziation sah ich die meisten von meinen alten englischen Freunden wieder und machte ausserdem eine recht grosse Zahl von neuen Bekanntschaften unter den jüngeren Herren. Ich wohnte bei dem schwedischen Konsul, der mir eine grossartige Gastfreiheit erwies.

Von da kehrte ich über London und Gothenburg zurück und fand bei meiner Ankunft hier alles in der besten Ordnung (11).

All letters indicate close connections between the chemists of the time. At the turn of the century, chemistry had not yet been highly institutionalized, and its adepts considered themselves to belong to one big family. The center of chemistry was in central Europe (Mitteleuropa), and Germany was the premier chemical power of the world until its downfall in World War I. As a consequence, German was the standard language of all chemists. According to Wilhelm Ostwald's autobiography, it was not at all uncommon for a professor from a provincial university to spend his summer holidays visiting his colleagues on a tour around Europe (12). Arrhenius was undoubtedly among the first tier of European and international chemists, in contrast to Bubanović, who was active only in Croatia. But the optimistic and open nature of both chemists proved to be the cornerstone of their deep and abiding friendship.

Arrhenius versus Bubanović

Because of poor social conditions at that time in Croatia, Arrhenius did not greatly influence Croatian chemical research; but owing to his close personal relationship with Bubanović, he doubtless influenced substantially public awareness of science in Croatia, as well as attitudes toward Nordic people, their culture and science. Noteworthy in this respect is Bubanović's hypothesis that the people from the north of Europe are "sober and sophisticated," in contrast to the southern inhabitants, because of their high-fat diets (13). The origin of this hypothesis could be easily traced to Bubanović's investigations and interest in brain lipids (14).

In 1927 Bubanović wrote Arrhenius' obituary to be published in the Croatian (Yugoslav) (15) scientific journal *Farmaceutski Vjesnik* (Pharmaceutical Herald) (16):

If it is true that only a good man can be a great and genuine scientist, then it is personified in Svante Arrhenius. Moreover, he was an uncommonly good man! Wherever he could help, in scientific work or in life, he would do it with an impressive commitment, frankness, and openness.

These words echo in Bubanović's own obituary, written by Professor Tomislav Pinter, his successor at Zagreb University Medical School (17):

Bubanović was of a gentle nature, a man who readily helped everyone, who spared no effort to fulfill anyone's wish. It is quite unimaginable that Bubanović would decline any politely expressed wish, much less that he would do anybody, even his enemies (if there were any), any harm on purpose.

Both chemists had pronounced affinities for poetry, philosophy, and all aspects of public affairs. Both were fluent writers. It is not well known that Arrhenius, in addition to his work in chemistry, made an excursion into astronomy and was the author of both chemistry and astronomy books aimed at the general public. Bubanović, like Arrhenius, wrote about many subjects, ranging from medical and physical chemistry to philosophy and history of science. His books were very popular in Croatia among chemists as well as among laymen. It is obvious that Arrhenius served as a role model for Bubanović, who always spoke highly of his teacher (16):

He [Arrhenius] was at home not only in the scientific circles of his country, but all over the cultured world, in the same way in St Petersburg, as in New York, London, or Paris. He was among the first so-called Austauschprofessor [visiting professors] to be invited to the US. At the Sorbonne he delivered a number of lectures. He received so many honorary degrees, from the Japanese to the oldest German University, that they could hardly fit in a big wardrobe [...] He nevertheless retained a sort of classical naïve modesty in communication with people, especially with the young people who devoted themselves to chemistry, and also in all his scientific and cultural discussions and polemics. This modesty adorns all great spirits who, as Socrates put it, know that they know nothing.

The letters Arrhenius wrote to Bubanović (18), and which are now published for the first time, certainly corroborate Bubanović's eulogy of his Nordic mentor.

Scientists Mentioned in Arrhenius' Letters

James Kendall (1889 – 1978) and *Alexander Smith* (1865 – 1925) were British-American chemists notable as textbook writers. *Charles Robert Richet* (1850 – 1935) was a French physiologist awarded the Nobel Prize in Medicine and Physiology in 1913. *H. S. Taylor* was a specialist in catalysis.

ACKNOWLEDGMENT

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2. H. J. Hamburger and F. Bubanović, "The Permeability of the Red Blood Cells under Physiological Conditions," *K. Akad. Wetenschappen*, **1910**, 19, 216-228.
3. H. J. Hamburger, J. de Haan, and F. Bubanović, "Influence of Iodoform, Chloroform and other Fat-soluble Substances on Phagocytosis," *K. Akad. Wetenschappen*, **1911**, 20, 982-1002.
4. H. J. Hamburger and F. Bubanović, "On the Permeability of Red Bloodcorpuscles in Physiological Conditions, more especially to Alkali and Earthalkali Metals," *Proc. Akad. Wetenschappen*, **1910**, 19, 216.
5. F. Bubanović, "My Teachers of Chemistry," *Farm. Vjes.*, **1936**, 26, 68-82.
6. It took me a great deal of trouble to finally come to understand our publication (*Abhandlung für Nobelinst*) and calculations. I'm afraid no one can be positive that they are error-free. Could you explain them to me, so that I can revise them accordingly? It may well be that your calculations were clear to me earlier, but they must have slipped my mind. In any case, it is very unlikely that anyone else will be able to understand them, and this will discourage others from reading our article through. Now, that would really be a shame.
7. Dear and esteemed Professor: Thank you very much for your last letter. I congratulate you with all my heart on the lovely imminent prospects. Now we return the compliment. My wife gave birth today at 12.40 P. M. to our daughter, who will be named Ester after my wife's late favorite sister. Everything is on the right track. The troubles for Maja and baby Ester are now over. It is very quiet in the lab. Dr. Taylor left a week ago and will return in July. Mr. Kendall leaves for America, where he is to stay till July 1st, when Gardner and Lundén will return. K. got a \$1,200 assistantship with Alexander Smith in New York. Gardner's wife and children arrived from Petersburg this morning and are staying in the old house. Assistant Lundén was replaced by *Fräulein* Dr. Ramstedt. I write as much as I can in order to finish both papers for the Academy before June 4th, when the last meeting before holidays takes place. With best regards from our house to yours. Sincerely yours, Svante Arrhenius.
8. A. Bubanović, personal communication.
9. I should have written to you a long time ago, but I misplaced your last kind letter and your new address. Anyway, I hope that this letter will come into your hands and bring you and your kind wife my very best wishes for a gratifying and a successful New Year. In addition, it should convey our greatest gratitude for the kind Christmas gifts that arrived today, that is to say, for the beautiful apples and 5 L of wine. Curious customs officials must have opened it, so I could smell its beautiful bouquet, so familiar to me. However, I will shelve the wine for a while because your previous shipment proved to gain in quality with time.
10. I paid a visit to Groningen this summer on the occasion of the Physiology Congress. I and my brother-in-law Professor Johansson had wonderful accommodations with the Hamburgers. The Hamburgers provided breakfast and lunch for about 20 people every day for a week; it must have been extremely tiring for his spouse; nevertheless she was witty and cheerful all the time. The Congress went extremely well; the hospitality of the people of Groningen was exceedingly kind. I was introduced, among others, to Professor Charles Richet, whom I found awfully nice.
11. I traveled from Groningen to Birmingham where I had a wonderful time. I saw most of my old English friends of the British Association and made numerous new friends among younger gentlemen. I stayed there with the Swedish consul, who honored me with his delightful hospitality. I returned via London and Gothenburg (Göteborg). On my arrival here, I found everything in tiptop shape.
12. W. Ostwald, *Lebenslinien. Eine Selbstbiographie*, Klasik & Co. GMBH, Berlin, 1926.
13. F. Bubanović, "Nordic People and Us," *Thank you, Chemistry*, Tomo Jovanović & Vujić, Belgrade, 1939, 45-53.
14. F. Bubanović, "Untersuchungen über die Gehirnlipoide in der Oellösung, I. Mitteilung," *Liječ. Vjes.*, **1928**, 50, 835.
15. Croatia was a part of the Austro-Hungarian Empire until 1918; later it became part of the Kingdom of Yugoslavia (1918 - 1941), then a German satellite state in World War II (1941 - 1945), and the federal state of the "new" Yugoslavia, ruled by communists (1945 - 1991).
16. F. Bubanović, "Svante Arrhenius. On the Occasion of his Death on October 3, 1927," *Farm. Vjes.*, **1927**, 17, 831-837.
17. T. Pinter, "Prof. Dr. Fran Bubanović (1883 - 1956)," *Croat. Chem. Acta*, **1957**, 29, 53-62.
18. Arrhenius' letters are now the private property of his son Aleksandar Bubanović, Šoštarićeva 8, HR-10000 Zagreb.

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