

A New Textual Analysis of the Prelog Erlkönig Legend; an Interdisciplinary Approach to Scientific History and Literary Criticism

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Der Erlkönig¹

Wer rast durch das Labor mit jüdischer Hast?²

¹ Of the many versions of this legend, Goethe's may be the best known, thanks largely to the musical setting by Franz Schubert, but the present version has many merits and is of particular interest because of the light it sheds on scientific activity and personal relationships at the Organic Chemistry Laboratory (OCL) of the Swiss Federal Institute of Technology (ETH, Zürich) in the middle years of this century. The manuscript was uncovered (by E. H.) in late 1957 and the events described may be assumed to be fairly topical. Prelog, the central figure of the poem, is not, as many readers may assume, a mythical character but an actual person. As far as can be ascertained, he was born in Sarajevo in 1906, came to Zürich in adventurous circumstances during the Second World War, and was Professor of Organic Chemistry at the above mentioned Institute for many years. Similarly, many of the other personages mentioned can be clearly recognized as actual historic figures. However, the identity of the mysterious guest (der Gast) is still a matter of conjecture. As in most works of this nature, reality is strangely and inextricably mixed and interwoven with legend. The poem is known to have been read at the 70th birthday celebration of the late Professor Leopold Ružička (1887–1976), held in Zürich in September 1957. Various versions containing minor textual differences have been in circulation since then, but we regard the present text as the most authentic and urge other scholars to do likewise.

² Prelog was known to set a fast pace in his tours of the Organic Chemistry Laboratory and elsewhere; he always seemed to be in a hurry; but the significance of the adjective is unclear. Jüdisch? Although some people may have assumed Prelog was Jewish because he knew a lot of jokes and told them well, he was not more Jewish than any other son of a typical Croat family. Nominally of the Roman Catholic persuasion, he described himself as agnostic, although he often admitted to uncertainty on this point.

Es ist der Prelog mit einem Gast.
 Die Mantelschösse³ flattern im Wind,
 Wenn er die vielen Ränke⁴ nimmt:
 Dies⁵ sind die Labors, Sie können es sehn,
 In denen all' meine Ausländer⁶ stehn.
 Von ihnen ist transannular⁷ ein jeder.
 Ja, Ja. Freund Cope,⁸ der kam etwas später.
 Dies ist ein Kolben in dem etwas simmert,
 Was mich an die erste Geschichte erinnert
 Vom Sir Robert⁹ als er die Masern hatte;¹⁰
 Oder noch eher, warten Sie mal,
 An die Gallensteine der Frau Admiral,¹¹

³ Almost certainly a white »labcoat«. Each morning, on arriving at his office, Prelog changed into a labcoat even long after he had ceased to do any experimental work.

⁴ Identifies the author of the poem as Swiss! In addition to the meaning in standard German (tricks, intrigues, ruses, *etc.*), in Swiss dialect the word has the additional meaning: curves, as along a path, or rapid changes of direction. It is noteworthy that the sense of chirality of the curves is not mentioned.

⁵ A change from third to first person: Prelog is now speaking.

⁶ At the time the events described here took place, Prelog was himself an »Ausländer«, *i.e.*, a resident of Switzerland without Swiss nationality. Indeed, Prelog counted many non-Swiss among his students and collaborators. In 1959, he acquired Swiss nationality.

⁷ A reference to Prelog's interest in transannular reactions in medium rings.

⁸ Arthur C. Cope (1909–1966), Professor of Chemistry at the Massachusetts Institute of Technology, who also studied transannular reactions at about the same time as Prelog.

⁹ Doubtless Sir Robert Robinson (1886–1975), then recently retired from his position as Professor of Organic Chemistry at Oxford University. This is the Robinson who appears in some of the best known Prelog stories, notably the one described vividly by Prelog himself in a later account: 'When we once met at Zürich airport on the way to Israel to celebrate the 25th anniversary of the Weizmann Institute, the first words we exchanged were the following: Robinson: "Hello, Katchalsky. What are you doing here in Zürich?" I: "Excuse me, Sir Robert, I am only Prelog, and I live here." Robinson: "You know, Prelog, your and Ingold's configurational notation is all wrong." I: Sir Robert, it can't be wrong. It is just a convention. You either accept it or not." Robinson: "Well then, if it is not wrong, it is absolutely unnecessary."'

The Katchalsky in question is undoubtedly Ephraim Katchalsky-Katzir (1916–) of the Weizmann Institute, later President of the State of Israel. Many observers would deny that there was much resemblance between Prelog and Katchalsky, at any rate not enough to justify Robinson's misidentification. However, at a scientific congress that took place several years afterwards, one of us (J. D. D.) remembers Katchalsky being addressed by the hotel concierge: "Professor Prelog, I have a telegram for you."

¹⁰ The story about Robinson's measles cannot be traced and remains a challenge for future scholarship.

¹¹ As a young man, Prelog served in the Royal Yugoslav Navy. His inability to distinguish instinctively and surely between right and left led to several minor mishaps when sailors under his command were ordered to march overboard. He was then assigned the less demanding task of analyzing gallstones. Whether, and to what extent, these actually emanated from the gall bladder of the admiral's wife is unknown. Perhaps the whole story is apocryphal.

Wo das Squalen,¹² na Sie wissen schon....
 Übrigens das hier, das ist der Simon,¹³
 Und in dieses Köbli, oder vielleicht hier draus,
 Tut man etwas hinein, oder man nimmt es heraus.
 Und dieses Rohr hier ist eine Kapillare
 Vom Polarographen.¹⁴ Und vor rund einem Jahre
 Dachte der Dewar¹⁵ ein Lift sei im Schacht;
 Wir haben damals fast so gelacht,
 Wie beim letzten New Yorker,¹⁶ Sie wissen schon.
 Und was hier heiss läuft ist der Sekretärin ihr Telefon.¹⁷
 Hier unten trieben zwei muntre Gesellen
 Die Feinmechanik und die der Wellen.¹⁸
 Und hier Fräulein Gut,¹⁷ die ich gerade nicht seh',
 Wahrscheinlich raucht sie oder holt Wasser zum Tee.
 Ist Ihr Sohn auch, so wie meiner brav?¹⁹
 Dies ist der Kováts²⁰ plus Chromatograph,

¹² 2,6,10,15,19,23-hexamethyl-tetracos-2,6E,10E,14E,18E,22-hexaene, an isoprenoid compound found in large quantities in shark liver oil and to a lesser extent in many other natural oils, such as olive oil, wheat germ oil, rice bran oil; an intermediate in the biosynthesis of cholesterol and hence not recommended as a dietary supplement for people with a high cholesterol level. If a model of the molecule is folded in the right way, the resulting shape resembles that of a steroid.

¹³ Wilhelm Simon (1929–1992), Professor for Instrumental Analysis at the ETH from 1965 until his untimely death. At the time of the events described here, he was still a young research assistant who merely happened to cross Prelog's path. It is characteristic, however, that Prelog recognized this young member of the laboratory and even knew his name. The instrument described so vividly in the following two lines was a robotic device for automatic pK measurement of a series of compounds, an early example of laboratory automation.

¹⁴ The capillary was probably the only element of this instrument that Prelog was able to recognize and name with confidence.

¹⁵ Probably not the Dewar of the Dewar flask (James Dewar, 1842–1923) but Michael Dewar (1919–), noted racing motorist and chemist, who is known to have visited the Zürich laboratories around the period of interest.

¹⁶ The New Yorker Magazine, which at that time often contained amusing cartoons.

¹⁷ Prelog, and almost everyone else at the time, used to refer to his secretary as Fräulein Gut, although she was no longer a young girl but a grown-up woman. The term Fräulein was then customarily employed to describe an unmarried woman of any age. Ten years later, she would have been addressed as Frau Gut. In any case, she was sometimes conspicuous by her absence from the office. During these absences the telephone would ring for long periods, as the automatic answering device had not yet been invented.

¹⁸ Surely a reference to Hans H. Günthard (1916–) and Edgar Heilbronner (1921–), who divided their time between the construction of analytical instruments and the development of quantum mechanical theories. Note that the two colleagues are described here as »munter«, *i.e.* brisk, cheerful; this was not always the case.

¹⁹ Jan Prelog (1949–), now Dozent for medieval Latin at the University of Munich.

²⁰ Ervin sz. Kováts (1927–), later Professor at the Lausanne campus of the ETH (EPUL). As a

Was sich oben dreht ist der Propeller,
 Und diese Stoppeln sind der Gigel Keller.²¹
 Natürlich muss ich noch schnell erzählen
 Die Story vom Roberts und den Niagarafällen,²²
 Und die wo der Bartlett,²³ na Sie wissen schon!
 Und die wo ein Mann mit Namen Kohn²⁴.....

Den lieben Gast erfasst das Grausen,²⁵
 Am liebsten wär er wieder draussen.
 Doch unerbittlich geht es weiter,
 Oft instruktiv, doch meistens heiter.
 Die Parabel vom Hasen unter den Schafen,²⁶
 Ob ächt Ziegler und Reppe bis Dezember gut schlafen?²⁷
 Die Walfischhoden in der Schüssel,²⁸

young assistant he constructed an air-heated gas chromatograph for preparative purposes, of which the propeller was probably the only feature Prelog recognized (see footnote 14 for a similar comment concerning another instrument in use in the laboratory).

²¹ Walter Keller-Schierlein (1922–), known affectionately as Gigel, was not only a pioneer in the extraction, purification and structure analysis of microbial metabolites with antibiotic activity but also an early proponent of what has come to be known as the Arafat-look, *i.e.*, a more or less constant 3–4 day growth of facial hair (Stoppel = bristle).

²² Presumably J. D. Roberts (1918–), then Professor of Chemistry at the California Institute of Technology, Pasadena, CA, but the incident is not mentioned in Roberts's autobiography.

²³ The Bartlett is probably the Harvard one, Paul (1907–), but possibly Prelog is referring not to a person but to a book, Bartlett's Dictionary of Quotations. In any case, the text shows that Prelog was assuming that the guest knew whom (or what) he was talking about.

²⁴ Probably a misprint for Cahn, namely Robert S. Cahn (1899–1981), co-author of the well known Cahn-Ingold-Prelog (CIP) rules, referred to in footnote 9.

²⁵ Change from first to third person; the narrator continues the story.

²⁶ A rather long-winded story, possibly of Chinese origin, the moral of which had something to do with the need to focus one's attention on the important aspects of a problem. But what are the important aspects? On the one hand there is Weiskracker's maxim: »Nicht in der Einfachkeit, sondern in der Erkennung der Komplexität der Dinge – darin liegt die wahre Aufgabe der Naturwissenschaft«, in a letter to Lichtenberg, October 1777 (Opera Omnia, Wiesbaden, 1825), but on the other hand, »Les règles de la Nature sont toujours très simples. C'est le devoir du savant de presenter cette simplicité dans toute son effroyable complexité«, Jean-Louis Moron, *Science et Simplicité, Les Cahiers des Sciences*, Paris, 1904, p. 299. Prelog could never quite make up his mind on this point.

²⁷ A reference to the dreaded Swedish sickness (Svenska sjukdom, characterized by insomnia, inability to concentrate, general irritability), endemic among potential Nobel prize candidates in the early autumn. Indeed, Karl Ziegler (1898–1973) shared the Nobel prize for Chemistry in 1963 with Giulio Natta (1903–1979). Walter Reppe (1892–1969) may have been equally deserving, but, as Prelog himself liked to quote: »The race is not to the swift, nor the battle to the strong.« The line places the events described in the poem as occurring in the early autumn, as borne out a few lines later. Ob ächt (Swiss dialect) = whether.

²⁸ At a somewhat earlier period, research on male sex hormones had been one of the main ac-

Der Wunderrabbi von Pschemisl,²⁹
 Dehydrierungs-Reaktionen,³⁰
 Arigoni's Wunderbohnen,³¹
 Hier ein Kolben, dort ein Sieb,³²
 Hier ein Lift (ausser Betrieb),³³
 Woodward's Whisky,³⁴ teure Weine,³⁵
 Moulin Rouge und Damenbeine,³⁶
 Gregorianik, Jazz Synkopen³⁷ –
 Thomas Mann – Zwei Isotopen³⁸ –

tivities at OCL. Although this was on the wane by the time of the events described here, the reference to whale testicles indicates that it was still operative to some extent. Before the television era, the arrival of such objects must have attracted many spectators.

²⁹ Countless stories are attributed to this personality. It is impossible to identify the one that Prelog was referring to.

³⁰ Gas-phase dehydrogenation of cyclodecane yields azulene as well as naphthalene. This observation was the origin of Prelog's unpublished theory of why the sky is blue. Volatile terpenes produced by plants are dehydrogenated in the upper atmosphere to yield substituted azulenes. This proposal needs to be taken up again in connection with the ozone problem.

³¹ Duilio Arigoni (1928–), then a young assistant, from 1962 Professor at Prelog's Institute. Arigoni's wonderful beans? The most likely explanation is that this refers to an Italian-Swiss version of the Jack and the Beanstalk fairytale, which appears to be widely spread among many folk cultures throughout the entire Northern hemisphere; examples are known as far apart as American Indian tribes and nomadic Lapp peoples. Indeed, the old Norse name for a bean, Quegonna, can easily be transformed by a series of consonant and vowel changes, to Arigoni.

³² Self-explanatory.

³³ Due to an oversight in planning, the so-called Neubau (new building), where Prelog and his guest had reached, had only a single lift (elevator). It was somewhat erratic and frequently out of service.

³⁴ Woodward's whisky is a little known brand of Scotch malt whisky, under no circumstances to be confused with Dewar's whisky. The two do not mix well.

³⁵ It is surprising that Prelog, who has always tended to favour CocaCola[®], should start talking about expensive wines. Maybe he was trying to impress the guest.

³⁶ The reader may well assume that Prelog is again trying to impress the guest with a reference to the Moulin Rouge girlie show in Paris and to the ladies legs that featured there so prominently (recall that this would still have had a rather risqué flavour). Indeed, our researches show that at the 1957 IUPAC Congress in Paris, shortly before the events described here, Prelog and some of his younger colleagues, together with their wives, took part in a Congress Social Program excursion to the Moulin Rouge and found themselves seated in the very front row, in a position where they were in almost direct confrontation with the whirling legs of the dancers, a quite unexpected and potentially embarrassing situation for the members of the party. At the close of the performance, Albert Eschenmoser (1925–) commented: "What a waste of ATP!", thus expressing for that time a remarkably farsighted concern for the world's energy resources. Prelog used to tell this story to anyone who would listen..

³⁷ An indication of the wide range of Prelog's musical appreciation.

³⁸ It appears that a manuscript entitled »Zwei Isotopen« by the great German author (1875–1955) was inadvertently sent to *Helvetica Chimica Acta* and forwarded for review to Prelog, who did not consider it suitable for publication in that journal. His review stated that the manuscript would benefit from extensive rewriting, that it contained much extraneous material, that the sentences were far too long, and, in general, that the text should be drastically shortened.

Anekdote – Doktorhut –
 Massenspektrograph (kaputt) –
 Vakuum – Treppe – Gänge – Witz³⁹ –
 Manser⁴⁰ – Poldi⁴¹ – Geistesblitz –
 Seufzerbrücke⁴² – erster Zehnter⁴³ –

³⁹ The themes here follow one another so rapidly that individual explanations become impractical.

⁴⁰ One of Prelog's best stories involved Werner Manser, who was in charge of the microanalytic laboratory and enjoyed a worldwide reputation. When K. Wiesner (1919–1986), who had worked in the OCL and grown to appreciate Manser's microanalytic skills, emigrated to Canada and became Professor of Chemistry at the University of New Brunswick, Fredericton, he periodically sent samples to Prelog, who passed them, under his own name, to Manser's laboratory. Occasionally, samples containing sulfur passed along this path, much to Manser's annoyance. Everyone knows that sulfur ruins the normal oxidation catalyst and that sulfur-containing samples must therefore be specifically marked as such and directed to special handling procedures. After experiencing Manser's complaints on such occasions, Prelog used to write to Wiesner (no FAX or E-mail in those times) with the very understandable request that sulfur-containing samples should be clearly marked, so that he could give Manser the necessary information. Sometimes it worked, sometimes not. One day, it is told, an angry Manser burst into Prelog's office. "My equipment is ruined because you again sent me a compound for analysis that contained sulfur! After so many years as professor of chemistry, you should know enough about the subject as not to send me sulfur-containing samples that are not marked as such! You should be ashamed of yourself." When Manser left, slamming the door behind him, Prelog sent a note to Wiesner, roughly as follows: "Dear Professor Wiesner, This is to inform you about Professor Prelog's tragic death. He was found this morning in his office with a glass tube through his heart. On questioning by the police, the Institute's microanalyst, Mr. Manser, confessed to the crime but claimed extenuating circumstances, as Prelog had submitted a sulfur-containing compound for microanalysis without special mention and had thereby caused his instrument to be ruined. The investigating authorities agreed that this was sufficient justification for Manser's misdeed."

This message was sent to Wiesner's home address and arrived when he was at the University. His wife, recognizing the Zürich postmark and knowing that Wiesner always looked forward eagerly to news from there, opened the letter and tried to make sense of it. All she really understood was that Prelog was dead, so she telephoned her husband at the University, where he was called out of his lecture, to give him the news. Wiesner was so shocked that he dismissed his class, sent his co-workers home, and declared the day as Day of Mourning for Prelog. When Prelog heard about this, he confessed that he was deeply moved by Wiesner's reaction. Whether this had any effect on subsequent samples sent for microanalysis is unknown.

⁴¹ Poldi is Leopold Ružička (1887–1976), Prelog's famous predecessor as head of OCL. It is remarkable that he should make his appearance so late in the poem. One unanswered question is whether Prelog's tour of the laboratory took place before or after the transfer of power. According to the records, this transfer took place on October 1st, 1957, shortly after Ružička's 70th birthday. In our opinion, the cryptic words at the end of the immediately following line refer to October 1st, written in the European fashion as 1.10 *i.e.* »erster Zehnter«. Prelog would surely be talking to his guest about the great future he foresaw for himself rather than about his past achievements, about which he has always been characteristically modest.

⁴² Not the famous Ponte dei Sospiri in Venice but the bridge connecting the »old« and the »new« buildings. Students coming from the old building to Prelog's office for examinations had to pass over this bridge, hence, perhaps, the name.

⁴³ See footnote 41 for a possible interpretation.

Nochmals Witz (bereits erwähnter),⁴⁴
 Zweimal rechtsum,⁴⁵ Höllenschuss,
 Nochmals Witz und Rundgangschluss.⁴⁶
 Sie erreichen das Büro, mit Mühe und Not,
 Pg⁴⁷ munter plaudernd, doch der Gast ist tot.⁴⁸

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SAŽETAK

Nova tekstualna analiza legende o Erlkönigu posvećene Prof. V. Prelogu; interdisciplinarni pristup znanstvenoj povijesti i literarnom kriticizmu

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Analizirajući parodiju poznatoga Goetheova spjeva, posvećenu Prof. V. Prelogu već u jednoj ranijoj prilici, autori na specifičan način otkrivaju mnoge nove zanimljivosti iz njegova života i rada. U kontekstu te duhovite analize spominju se brojna imena znanstvenika s kojima je Prof. Prelog dugi niz godina surađivao ili održavao prijateljske odnose, što ovoj “tekstualnoj analizi” daje posebnu draž i već danas povijesno značenje.

⁴⁴ A skillful reference to Prelog’s habit of repeating the same joke (with slight variations).

⁴⁵ The end of the tour was approaching. Prelog’s office lay along a route from the »old« to the »new« building. On entering the latter over the Bridge of Sighs (see footnote 42), the two travelers would turn once right into the secretary’s office and then another right into Prelog’s office.

⁴⁶ The wording suggests that the tour not only ended at Prelog’s office but also started there.

⁴⁷ Pronounced: peh-geh (German) or pee-gee (American English). An obvious abbreviation for Prelog, much used by junior colleagues who wished to avoid such formal modes of address as: Herr Professor, Herr Laboratoriumsvorsteher, or even plain Herr Prelog, but did not feel intimate enough with our hero to address him as Vlado or Vladimir. Suggests that the unknown author of the poem may have been in this ambivalent relationship to Prelog.

⁴⁸ The available documents fail to record that any academic visitor to the ETH ever actually died during a tour of the laboratories, although several cases of extreme exhaustion, with symptoms resembling those of mountain sickness, have been reported.