# TO THE CENTENARY OF GÉZA ZEMPLÉN'S BIRTH*

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Ladies and Gentlemen,

We celebrate in 1983 the centenary of the birth of Géza Zemplén, genius of Hungarian natural sciences. Rezső Bognár has written about him the following: "By his life and his scientific activity of more than five decades Géza Zemplén made known and reknown his name and results not only in Hungary but all over the world. He is deservedly ranged with Pál Kitaibel, Károly Than, Béla Lengyel, Lajos Winkler and Vince Wartha, the founders of chemical sciences in Hungary."

From his immense life-work, spanning more than half a century, the form of a scientist to his fingertips, of a true man unfolds. A survey of his complete life-work is impossible within this lecture, therefore, I will discuss here mainly instead of his scientific activity often commented upon rather circumstances, which contain also an actual message for our days.

We must go back to Fiume of the close of the century, the birth-place of Vince Wartha, where János Zemplén, a post-official of scanty income, had no worries with the education of his three sons, because all three of them were gifted. Two of them, Győző and Géza, were attracted already at that time by nature, and Géza laid the foundations of his botanical collection, a passion he indulged in through his whole life. The collection, containing several hundred rare plants and their professional determination, is to be found today in the Botanical Collection of the Museum of Natural Sciences. Mór Korach, who followed by a few years the Zemplén boys in the Italian language secondary school, painted years later a very perceptible picture of Fiume at the close of the century. It can be taken for certain that the Mediterranean environment of the town, its international atmosphere, and the problems of Hungary of that time precipitating there, such as emigration, left their marks on the mentality

* Commemoration lecture delivered at the general meeting of the Hungarian Chemical Society of February 18, 1983. Géza Zemplén was born in Trencsén (now Trencin Czechoslovakia) Okt., 26, 1883, died in Budapest July 24, 1956

of the impressionable Zemplén boys. The excellent certificate of the final examination, his good knowledge of three foreign languages and the merits of his brother Győző, famous physicist clear the way of Géza Zemplén for admission to the Eötvös College, reaching then the fifth anniversary of its establishment. The college, founded on the model of the École Normale Superieure, much talked-off even today, is justly called the "spiritual workshop" of those years. The contemporaries of Géza Zemplén in the college: Zoltán Kodály, Gyula Szekfü, Károly Novobátzky, Dezső Pais, Aladár Vendl, Endre Gombocz, István Jakucs, and others, became later scholars of international renown in their field of science. He had excellent teachers at the University: Béla Lengyel, Lajos Winkler, Károly Than, Lóránd Eötvös. Their tuitional work also contributed to the fact that the Rector of the university confered in 1904 on the talented young man the "summa cum laude" degree of Doctor of Philosophy, with chemistry as the major subject, and mineralogy and botany as subsidiary subjects.

It can be considered as a very fortunate turn that the young graduate was appointed in 1905, after one year of obligatory teaching practice, assistant at the famous College of Mining and Forestry, in Selmecbánya where already in 1763 chemistry has received a chair. Essentially, the tuition work of Géza Zemplén dates back to this time. Again an environment, which has a fruitful effect on the young scientist at the beginning of his career. Indeed, studies undertaken there, among others the prize-winner "Sugar and alcohol prepared from wood", already indicate his exceptional talent in the perception of themes and the individual approach to solving them. This study of 100 pages called attention to our insufficiently developed chemical industry, to our backwardness as compared to western countries, at that time.

The greatest appreciation of his activity in Selmecbánya was that he was to sent in 1908 for two years on a study-tour to Berlin, to the world-famous institute of Emil Fischer. These two years had a decisive effect on his whole further career. The institute headed by Emil Fischer, in which several later Nobel-prize winners have worked, laid at that time the foundations of carbohydrate, amino acid, protein and enzyme chemistry. Zemplén learned there, among others, precise laboratory work, later very characteristic of him, tried his hand at successful experiments, and got the mastery of classically fine interpretation of the results. He is offered the title and post of a Privat docent, which he refuses. However, he complies with the request to write the chemical chapters of the collected volumes Biochemisches Handlexikon and Handbuch der biologischen Arbeitsmethoden. He carries out this work through decades, earning full recognition. The fame of his results published jointly with Emil Fischer, spreads also in Hungary, and shortly after his return home he was qualified as Privat docent at the University of Sciences in Budapest. Main chapters of his lectures held were:

Carbohydrates and enzymes decomposing carbohydrates
Proteins and proteazes
Oxydases and fermentation enzymes.

Thus, he was the first person in Hungary, who, far ahead of his age, lectured at the university on enzymes, these physiologically very important compounds!

Meanwhile the Board of the József Technical University invites application for the chair of Organic Chemistry to be organized. The board consisting of Lajos Ilosvay, Imre Szarvas, Ignác Pfeifer and Elek 'Sigmond recommends of the candidates for this honourable task solely Géza Zemplén. A remark of the board worthy of note is that "an indispensable condition of progress is to place everybody in a post for which he is fitted and in which he can assert best his talent and knowledge". This concept harmonizes with the principle of Lóránd Eötvös, declared at that time, but still valid today, that a really good teacher can be only somebody, who is himself a researcher and furtherer of his field of science. Thus, Géza Zemplén, was appointed in 1913 full professor of the József Technical University at the age of thirty.

Ladies and Gentlemen! Surveying the way of becoming a scientist up to this point, attention must be paid to at least three circumstances. Undoubtedly, in addition to talent of decisive character, there are several further conditions of becoming a scientist of international fame. One of these is command of languages. But where can you find today a high-school graduate, who speaks, writes and reads three foreign languages? It is true, we could say that Zemplén was from this aspect in an exceptional position in multilingual Fiume, but couldn't we expect without Fiume the command of at least one language? The other question: where is or where are such stimulus-rich colleges, as the Eötvös College was at that time? Is everything done for the talented university students of today to give them some surplus during their college-years? Finally, as shown also by the life story of Zemplén, study-tours are also of decisive importance. It is a very fortunate phenomenon that today this has already became a practice, and this possibility is offered also to talented young people, working in the industry. The relevant question is only when, for how long, and mainly where this study-tour shall be undertaken.

After the raising of this questions let us return to the first years of Géza Zemplén at the Technical University. He himself writes the following about them: "In 1913, when I was appointed professor to the newly organized Department of Organic Chemistry of the Technical University ... I found empty walls and a few desks. I had no dotation, and couldn't even hope for adequate equipment, because in 1914 World War I broke out, which annihilated even my prospective expectations". For him the war ment also grave mental shock, he lost his beloved brother Győző, professor of physics at the same University who died on the Italien front.

The organizing capability of Zemplén is developed under adverse conditions. Soon he forms a close connection with Chinoin Works, which was essentially maintained until his death. He flings himself whole heartedly into research work: besides solving industrial problems he continues research in carbohydrate chemistry, and discovers his famous method, the saponification of acetylated sugars with Na-methylate in this period. Characteristic of the repute and the soundness of this method still used is that it was included in the title of a foreign paper published in 1982. The principle mentioned above, i.e. the healthy harmony of theory and practice, remained his guiding principle up to the end. How much he estimated works of practical aim and what perspectives his thinking had are proved by a less known paper written in 1926. In this he directs the attention to developing those industrial branches, for which the raw materials are to be found in Hungary. Thus he urges in the first place the processing of products of plant or animal origin yielded by agriculture, the utilization of medical plants and the processing of Hungarian brown coal tar. He writes in this study that "Moreover, it is definitely worthwhile to take up systematically the preparation of pharmaceutical products". The recognition of the importance of organic intermediates is manifested by the fact that already in the session 1925/26 the subject "Manufacture of organic preparations" is introduced in 3 hours per week. Essentially these lectures formed the basis for Zoltán Csürös to introduce at the end of the thirties for the first time the "Chemistry of plastics", as a subject preceding thus several European universities. The attachment of Géza Zemplén to practice, to industry, is shown also by the fact that when he later names his best ten students, seven of these work in the industry. His lasting contacts to the pharmaceutical industry merit a separate chapter. As a result of his connection with Chinoin, mentioned already and fruitful for both parties, the manufacture of several intermediates is realized on the basis of processes developed by Zemplén. It rates as original pharmaceutical research that he synthesizes besides several new barbituric acid derivatives new hydantoin derivatives, of which Béla Issekutz writes the following: "I investigated the narcotic effect of these compounds with no practical results. Regrettably we did not know at that time that hydantoins comprise important drugs of epylepsy." Indeed, the friendship between Zemplén and Issekutz was the first Hungarian example pointing to the importance of chemist-pharmacologist cooperation in pharmaceutical research. The mutual estimation of them is well exemplified by the following words of Issekutz: "I collaborated over decades with several of his pupils, and got to know through them his genial activity, with which he turned the attention of his pupils to pharmaceutical research. Herewith he laid the scientific and often practical foundations of the Hungarian pharmaceutical industry". Indeed, it seems that besides practical results the most valuable contribution of Zemplén to the development of the pharmaceutical industry

was to direct pupils such as Zoltán Földi, Sándor Hoffmann, Árpád Gerecs and Lajos Pillich to the pharmaceutical industry.

At the end of the twenties, under more favourable financial conditions created by himself, his research activity gathers headway, more and more of his papers are published in "Berichte der Deutschen Chemischen Gesellschaft", the leading chemical journal of that time. The sugar-degradation method named after him, and research results reaching into the thirties, glycoside and disaccharide syntheses with Hg-acetate, are classical results to be found also in modern textbooks. Neither is recognition missing. In 1923 he is elected corresponding member and in 1927 ordinary member of the Hungarian Academy of Sciences, and in 1928 he is awarded the Great Prize of the Hungarian Academy of Sciences, the highest honour attainable at that time by a Hungarian Scientist.

His energy seems to be inexhaustible. In the three years of his deanship he submits several propositions, which are pointing ahead even from the present aspect. He represents the University at important celebrations, thus at the commemoration of the centenary of birth of Berthelot, organized in Paris, at the great muster of the chemists of the world. Meanwhile, he is president of the Chemical Section of The Society of Natural Sciences between 1929 and 1938, and not only Zemplén but almost all his pupils hold lectures at the sessions of the section. He is also over almost ten years member of the National Council of Natural Sciences. In the meanwhile he has time to maintain relations with the leading organic chemists of Europe, with Karrer, Irvin, Hudson, Freudenberg, Kuhn, Butenand and others. When Professor F. Micheel visited Hungary for the invitation of the Hungarian Academy of Sciences in 1973, 16 years after the death of Géza Zemplén, he began his lecture instead of the usual thanking words by saying that he regrets how rarely he visits Hungary "as before the war I was often here, to learn from Géza Zemplén". Notice was taken of his scientific and public activity at home and abroad by the higher authorities, and in 1931 the Corvin-Coronal, founded in memory of King Mathias Corvin was conferred to him, though Zemplén has never estimated distinctions. If possible at all, the scientific work of Zemplén is still more fruitful in the thirties and fourties. His attention turns to naturally occurring flavone glycosides, and he solves with spectacular facility with his excellent coworkers the structure determination, then the total synthesis of several compounds. These investigations supplied the scientific background and stimulated the isolation and industrial utilization of biologically active substances present in plants.

As a recognition of his work, in 1940 the German Chemical Society invites him to hold a lecture in Berlin, the scene of the beginning of his scientific career. According to Helferich the lecture was a work of art, and after the lecture he was awarded the Hofmann gold medal, a distinction granted only to the greatest of German scientists.

Ladies and Gentlemen! I wish to say now a few words of Géza Zemplén, the man. I said at the beginning that he was out and out a scientist. Indeed, he subordinated all his activities to the service of science and tuition. For years he provided equipment and chemicals needed for the tuition of the students with his own money. His famous collection of chemicals, worth of millions, was destroyed by the bombardments of World War II. Similarly, he purchased with his own money the most important periodicals and books, which remained after his death at the Department. Only few persons know, for how many of his collegues he paved the way, e.g. by his recommendations for membership of the Academy. In order of time: László Zechmeister, Albert Szent-Györgyi, József Varga, Gyula Groh, Elemér Schulek, Tibor Széki, Győző Bruckner, Rezső Bognár, to mention only the greatest.

Géza Zemplén was a colourful personality of congenial disposition, nobody could resist his charm. He liked classical music, first of all that of Wagner, he painted excellently, and knew by heart Dante's Divina Comedia—in Italian. The same was characteristic of his entertainment as of his scientific work; he spared no energy. He liked humour, and on excursions rewarded the best jokes. This brimming over with life, the liking of the easier sides of life, was his best medicine in the years of his illness, when confined within four walls he struggles with inevitable fate. In this grave period of his life, when friends and pupils visited him on his birthday, when he couldn't speak anymore, he still was the spiritual leader of the gathering.

It is not mere chance that human features, which also today are the criteria of the true scientist, were left the last: instinctive clearsightedness in world problems, fight against spiritual oppression, respect for human rights, etc. In addition to resistance to numerus clausus, to his demonstration at the funeral of Ignác Pfeifer, his true patriotism as a scientist is manifested in 1944. This was narrated a few years ago by the now 90-year old Ambrus Ábrahám, with the truthworthiness of the eye- and ear-witness: An undersecretary of the Hungarian nazi government summoned the university professors in autumn of 1944, and made known in a lengthy speech the neccessity and at the same time the fact of the relocation of the university students to the west. In the silence following the speech a single man, Géza Zemplén stood up, and said the following: "If Mr. Undersecretary fears his skin, he can safely escape to the west. We Hungarian university professors remain at our place". Some days later nazi henchmen drag him off to the military prison of Margit körút, from where he is discharged after weeks, presumably with the help of one of his pupils in high position.

Owing to the sheer madness of the last months of the war, his beloved Institute is completely destroyed. Rebuilding is completed only in 1949, as a result of the self-sacrificing work of Rezső Bognár. Thus, it is easy to understand that in 1947 Zemplén accepts the invitation of the Georgetown

University of Washington as visiting professor. He is attacked there by a fatal disease, causing his early return and his last hard years. In 1946 he is elected out of the eminent ordinary members of that time Honorary Member of the Hungarian Academy of Sciences, and in 1948 he was one of the first on whom the gold grade of the Kossuth prize, bestowed for the first time, was conferred, and becomes one of the five members of the Presidency of the Scientific Board. However, partly because of the progression of his illness, and partly because of the distortions of the years of personality cult, his unremitting spiritual energy can serve only in a decreasing rate Hungarian and universal culture.

Ladies and Gentlemen! Undoubtedly Géza Zemplén was one of the greatest personalities of Hungarian scientific life. His life-work is a clear spring, from which succeeding generations can always safely draw for answer on questions of true humanity and pure science. His heritage survives in the work of his pupils and in the work of those taught by them.

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