

## **Academician Remus Rădulet, a prestigious personality of European electrotechnics and an unforgettable presence in the scientific life of Icpe**

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This year marks the 110th anniversary of the birth of Remus Rădulet (1904) and the 30th anniversary of his death (1984). He was born on May 3rd in Brădeni (Heldorf), the son of the priest Vasile Răduleț and Ana Rădulet. Education is done in the schools of Berivoi, Sighisoara, Fagaras as a student of Radu Negru High School (1919-1923) and baccalaureate at Andrei Saguna Braşov High School (1923). He enrolled in 1923 at the Polytechnic School of Timisoara (1923-1928) and on the advice of Prof. Plautius Andronescu did his ph.d. at the Federal School in Zurich.

From 1931 to 1951 he was professor at the Timisoara Polytechnic, and from 1951 he followed the Bucharest period (Director of the Institute of Energy of the Academy), professor at the University of Bucharest, Institute of Railways, Faculty of Electrotechnics in Bucharest (until the end of life), academician and vice-president of the Romanian Academy, President of the Romanian Electrotechnical Committee (CER), President of the International Electrotechnical Commission (CEI).

### **Remus Răduleț a remarkable personality of electrotechnics**

Among the great scientific personalities that Romania has had, the academic Remus Răduleț, remains a legend not only as professor of The Electrotechnical Basics of numerous generations of engineers but also through his theoretical contributions in the field of electromagnetism and scientific terminology, with application in structured terminology of electrotechnical, the contribution brought to the development of mass technical culture in our country.

Icpe can be proud of the fact that Remus Rădulet was for his engineers and researchers, not only the erudite dascal who planted their love for electrical engineering, but also the guide in numerous projects, doctoral leader, partner in some scientific projects, moderator of scientific conferences, President of the Romanian Electrotechnical Committee working within Icpe, in the elaboration of remarkable works that remain in the history of technical : The Vocabulary of the Cel and the philosophy of development of the CIS Concept Treasure, works that appeared in Geneva in 1983 and 1986 respectively and attended by dozens of specialists from Icpe.

A 1927 graduate the Faculty of Electrotechnics of the Polytechnic School of Timisoara, he is characterized as the most brilliant student this prestigious school has had in its existence.

In 1928 he obtained a scholarship to the Federal Polytechnic School in Zurich where he developed his doctorate and in 1931 he received his doctoral thesis under the leadership of renowned professor Karl Kuhlman. The environment in which he completed his training was impressive and contributed to his encyclopedic formation, to the solidity of his knowledge, to the logic of reasoning present in any activity he would have undertaken.

It was natural that in the circumstances of the existence of this extremely elevated intellectual environment, in which present Albert Einstein, Paul Debye, Paul Scherrer, Wolfgang Pauli, Polya, Karl

Kuhlman, Max Planck, Erwin Schroedinger, Werner Heisenberg- his scientific band to evolve as a remarkable encyclopaedist, with a special elegance of thought and a very special rigor when it was about the logical ranking of knowledge.

Returned to the Polytechnic of Timisoara (1931–1951), he is entrusted with the level of knowledge, the teaching of a wide range of disciplines, started with the fundamental ones like Physics and ended with the most concrete and applied such as:

### **The technique of weak currents,**

Power plants or Electric Machines, activities that contribute to the formation of its impressive scientific and technical culture.

In the academic year 1951-1952, we find him as a full professor at the University of Bucharest (where he teaches the course of Electromagnetism and Theory of Relativity), at the Institute of Railways as well as at the Faculty of Electrotechnics of the Polytechnic Institute in Bucharest where he will teach until his retirement (1951-1974) the course of Electrotechnical Basics. At the cost of some great efforts, he also practices one year in Timisoara, where he teaches the Electric Machine course.

Corresponding member of the Romanian Academy 1955 (and holder since 1963), is director of the Institute of Energy of the Romanian Academy, where he develops research programs of high scientific standing, creates the intellectual environment in which will form people of great value, active presences in international scientific life (Mihai Popov, Augustin Moraru, C. Apetrei, Al.Tsugulea, C. Bălă).

Convinced of the need to educate the general public in the field of scientific knowledge, he is the founder and Rector of the People's University, in which thousands of people have watched lectures in the field of science and technology, culture and linguistics, history and customs, understanding as Nicolae Iorga did at the summer courses in Slănic Moldova, the importance of mass education and the need to cultivate the people.

On the line of engineering training, Remus Răduleț pays particular attention to the realization of university textbooks, engineering training works, two remaining reference: the appearance of the Engineer's Manual (HUTTE) and the appearance of the "Romanian Technical Lexicon", a work coordinated by Remus Răduleț, a work with nothing less than other works of this kind that appeared in the world:

*Larousse, Britannica, Balșaiia  
Encyclopedia!*



**First edition of the Engineer's Manual: HÜTTE published in 1947 in AGIR Publishing House, under the coordination of Acad. Remus Rădulet**

The Engineer's Manual – HUTTE appears in 1947 and is not a simple translation from German but the addition of new knowledge on: transforming the Mathematics chapter by introducing unresolved mathematical problems, amplifying the atomic physics section and treating new themes related to the frequency of torsion oscillations, measuring sound intensity. Electronics, a relatively new field at the level of those years is being treated for the first time in HUTTE. Even in the field of mechanics, the manual did not remain the same, adding the mechanics of plastic bodies, and the mechanics of elastic and non-elastic liquids have been updated, complemented by new elements that have emerged in recent years.

Taking into account the progress made in the field of insulating or metal materials, the paper introduces new data on them, suggests ways of use, monograms and spreadsheets. There is practically no chapter of the "Manual" that does not contain novel aspects, aspects that go beyond the intention of the author originally declared to translate a manual, in reality the work containing modern knowledge and utility for an engineer, regardless of the field in which he will operate.

As the Romanian technical terminology began to define concepts, Remus Răduleț noticed an important thing striving to offer solutions to take over: "Our nomenclature is not fully formed and the adoption in translation of some "termini" will impose it on others perhaps more suitable, by the spread that the manual can have, the need for terminological treatment and the proper use of "termini" , the use of the same "finish" in the different sections of the manual, in the most uniform language".

Also in 1947, at the urging of the General Association of Engineers of Romania (AGIR) and the "Politechnics" Society, in order to meet the real needs of the engineer, but also to provide new knowledge in the education of the population, Remus Rădulet conceives a work that will require almost twenty years of work, training in its elaboration "peaks" of Romanian engineering –many of them and from Icppe , known by all by its name: ROMAN TECHNICAL LEXICON (LTR).



**The appearance of the Romanian lexicon, the first edition in 8 volumes, was published by AGIR Publishing House during the years 1949-1956; the second appears between 1957-1966 in 18 volumes. The work was coordinated by Remus Răduleț and over 800 collaborators worked on it.**

The first edition appeared between 1949 and 1956 in 8 volumes with a total of 7,008 pages, comprising about 48,763 articles, to the elaboration of which 382 collaborators contributed. The emergence of new fields of technology required a diversification and development of its content, which

required the development of a new edition of the Lexicon to develop and deepen scientific information to the level required by the increased needs of science and technology.

The new elaboration of the Romanian Technical Lexicon, appears in the period 1956-1966 and includes this time 68,550 articles for as many guiding terms, ordered alphabetically, having over 20,700 figures and diagrams, as well as the definitions of tens of thousands of subordinate terms; 433 collaborators constituted the "Lexicon" team coordinated by Remus Răduleț. With the realization of this paper, the modern concept of structuring the continuum according to terminological trees is already outlined, with clear relations regarding the connections between concepts, orders that ensure the rigor of framing the terms, the need for unambiguous definitions for the concepts thus organized.

The Romanian Technical Lexicon remains as a testimony not only of a scientific conception of great value but also as the work of a man of superior culture, concerned with the preservation and enrichment of the Romanian language, by correctly taking over neologisms according to the laws of the Romanian language. suffixes in the formation of terms, the correct use of the "roots" of a word, the critical analysis of synonyms, the avoidance of homonymy.

In the history of time, Icpe has enjoyed the generous involvement of academician Remus Răduleț in the scientific life of the Institute of Electrotechnical Research (Icpe), the significant directions being:

- Scientific research (scientific councils, scientific events, Electrotechnical Journal that appeared under the guidance of Icpe);

- Electrotechnical standardization issues, in his capacity as President of the Romanian Electrotechnical Committee (CER) which provides through Icpe the secretariat of the National Committee of CEI, support to the "Quality" section of Icpe in matters of CEI norms and testing techniques;

- Development of international projects, respectively: elaboration of the Thesaurus of concepts of CEI, work of great international prestige made by CER and Icpe (numerous specialists from research departments participated in the works, plus the Icpe Computing Center that developed computer programs), Thesaurus published in GENEVA in 1986.

#### **Remus Răduleț in the scientific research from Icpe**

The scientific councils in which prominent personalities of the Romanian electrical engineering participated as guests were real schools in which the researches developed in the Institute and in various stages of solving were analyzed, new approaches were outlined, exchanges of ideas were made that enriched the knowledge of participants. In the history of these Scientific Councils, academics Remus Răduleț, Al. Timotin, Andrei Țugulea, Aurel Avramescu, Gleb Drăgan, Octav Onicescu, Matei Marinescu, continued in a way the transfer of knowledge started in school from teacher to student and continued in the institute, from mentor to collaborator.

In the process of knowledge transfer, the scientific communication sessions organized by Icpe, the thematic colloquia, the electrotechnical congresses that brought together electrotechnicians from all over the country or those with international participation of colleagues from other countries enjoyed a wide participation of specialists from universities. research institutes or industrial units, constituting real scientific events.



*Remus Răduleț at the Electricians Congress organized by Icpe. In the figure from right to left: Prof. C. Diclescu, Deputy Prime Minister Gogu Rădulescu, acad. Remus Răduleț, acad. Aurel Avramescu, prog. Felician Lăzăroi Director of Icpe.*



### **Remus Răduleț presiding over scientific events organized by Icpe**

In the management of the Theoretical Electrical Engineering section of the structure of these scientific meetings, Remus Răduleț was a presence that proved a competence that for us was a bar he dreamed of, always impressing the audience not only by the complexity of his scientific personality, but also by the modesty with which he intervened. competent in a discussion, in presenting a point of view, always careful that what he says is useful to the interlocutor without giving him the feeling that there could be a difference in intellectual level between them!

Remus Răduleț also developed an equally active and competent participation in the editorial board of the magazine ELECTROTEHNICA, edited under the coordination of Icpe. Together with Acad Aurel Avramescu, a researcher at Icpe, he stimulated many talented researchers to publish, to enter the circuit of scientific values of the world.

Although at that time "ISI" was not the only criterion with which you assessed whether a paper is "GOOD" and level, the journal ELECTROTEHNICA was reviewed in the Journal of the Journal, Bul Signalletrice, sent the journal to many scientific institutions. The fact that through the policy of documentary exchanges, ELECTROTEHNICA magazine was found in large libraries around the world, allowed the valuable results obtained in Icpe and published in the magazine to be known and cited by

many specialists from many countries around the world, to increase the prestige of the institute. The "Icpe brand" amplifying its visibility.

In the field of "Electrotechnical Sandarding" and collaboration with the Quality Section Icpe and CER, its activity was one of the directions of high impact, in promoting a viable quality policy and granted with the norms of the International Electrotechnical Commission (IEC) imposed by world trade. electrical products.

And as Romania became an important supplier of electric machines and transformers, energy equipment, low medium and high voltage appliances, cables, drive systems, consumer electrical and electronic goods, the quality certification had to be done according to internationally recognized standards, namely those promoted by the CEI, recognized by everyone.

In his capacity as President of the National Committee of the CIS, whose secretariat was provided by Icpe through the Romanian Electrotechnical Committee (CER), he consistently promoted the harmonization of Romanian standards with those of the CIS, determining the Romanian electrical industry's compliance with the rules world, which allowed an easier penetration on the foreign market of Romanian products.

It promoted the participation of specialists from Icpe and the electrical industry in standardization activities, over 50 specialists participating in the Technical Committees as permanent members or observers. Romania was an active presence in the promotion of some norms, many of the observations made being taken over in the definitive form of a standard. Romania enjoys a special prestige within the CIS, Remus Răduleț being, even in a period of certain retention towards the Eastern European countries, elected president of the CIS, a high dignity whose prestige, Romania enjoyed many years after the end his mandate. I remind that among the 34 presidents that the CEI has had since its founding in 1904 and until today, Remus Răduleț, the 17th President, joins with great electricians, such as Lord Kelvin, Semenza, Bud, Feldman Kenelly , Thomson, Popov, a recognition of his contributions in the field of electrical engineering.

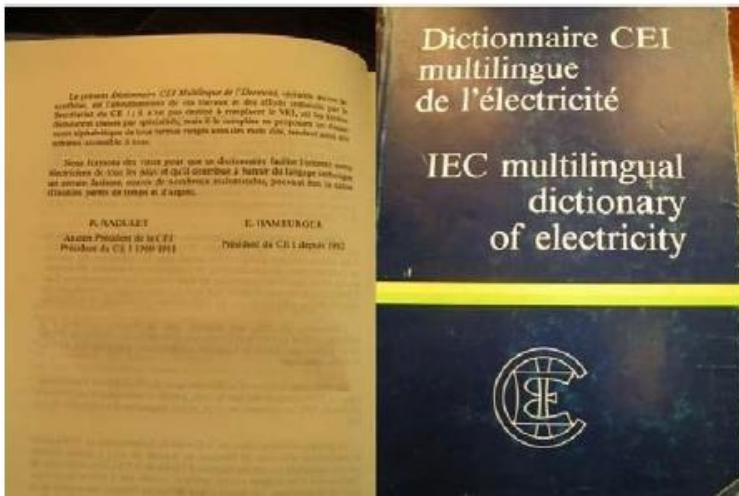
His choice in this high position also has an explanation: his remarkable personality, his culture through which he dominates without ostentation any interlocutor and in any field. Modest, with crystal formulations, with a logic that opened up worlds and previously unthinkable visions, he could take you into a world that surprised you with the unity with which "they all connected", a recognition of its scientific and human value. Remus Răduleț promoted through CEI a wide international opening of Icpe, ensuring contacts between specialists from the country and from abroad, proved a great vision in promoting actions when their promotion in the political situation of 1970–1980 was not easy. taken. When within the CAER countries, the electrotechnical standards were elaborated in accordance with the Russian GOST standards, Remus Răduleț perseveringly promoted the alignment to those elaborated by the CEI, provisions of the GOST being possibly attached to them.

It is a very important thing that allowed that after 1990, Romania to harmonize more easily its standardization according to the European norms. The prestige that Remus Răduleț enjoyed within the International Electrotechnical Commission (IEC) was impressive, a fact worth mentioning being the following.

The economic situation of Romania in 1984-1989 was particularly difficult to pay the membership fee and in which you received the standards published by the IEC was delayed, its non-payment, leading to suspension as a member and failure to receive the standards that Romania needed

so much. to a work that Remus Răduleț undertook to do: The CEI Treasury, the Commission continued to transmit standards, useful for the elaboration of the Treasury, even if Romania had not paid the fee, not depriving the electrical industry of the high utility standards it needed.

This decision was based on the importance that the IEC attaches to the elaboration of a “Thesaurus of Concepts” extracted from the IEC standards, which only Remus Răduleț was able to make. We mention that previously, as President of the Technical Terminology Committee (CT1), he wrote the CEI Vocabulary, a basic work of the CEI, published in Geneva in 1983 and in which many Icpe engineers also participated. The realization of this Treasury, built according to an original conception developed by Remus Răduleț, was a reference work for electrical engineering.



*The cover of the Vocabulary, a reference work made by Remus Răduleț who remains in the technical dowry of the CEI, participating in its realization, numerous specialists from Icpe and CER.*

Vice-president of CEI during 1961-1964, President during 1964–1967, Remus Răduleț together with Icpe, CER, Ministry of Industry organized in 1961 in Bucharest, the General Meeting of CEI attended by over 500 specialists from abroad, a prestige that is transferred from Remus Răduleț, to the Romanian electrical industry, appreciated for its development.

The importance of this meeting held in the premises of the Faculty of Law, at that time one of the rooms where an event of this magnitude could be organized, enjoyed a wide participation of the scientific and industrial environment, the governmental one, the opening meeting benefiting from the participation of the Prime Minister. Gheorghe Maurer, of 7 ministers who in their preoccupations had contact with electrical engineering, the presidents of the International Electrotechnical Commission (IEC) and ISO.

It was the first meeting of the CIS held in a socialist state, it was a real success that paved the way for international collaborations and access to top licenses, and its organization and results were talked about for a long time.



***The opening of  
the 27th CEI  
Meeting held in  
Bucharest in  
1961***

Participating as President of the Romanian Electrotechnical Committee at the General Meeting of the CIS held in 2004 in Berlin on the occasion of the 100th anniversary of the establishment of this Commission, when in the famous Hall of Fame of the CIS, in the gallery Scientists and Inventors who made major contributions at the development of electrical engineering, along with Faraday, Ohm, Siemens, Kelvin, Heaviside, Tesla, Marconi, Giorgi, two Romanian electrical engineers also appeared: C. Budeanu and Remus Răduleț and were presented to those gathered from all over the world, I felt proud that Romanian Electrical Engineering participated in enriching the treasury of world knowledge.





**Remus Radulet  
(1904 – 1984)**

The main fields of Radulet's scientific creativity were electrotechnical theory and technical terminology. An exceptional person both in scientific and technical terms, Radulet blazed new trails in theoretical electrotechnology, as well as in semantic analysis of terminology for any specialized language, Radulet devoted 17 years to editing two versions of the Romanian Technical Lexicon (RTL), the first in seven volumes between 1949 and 1956 and the second in 19 volumes totalling 12,000 pages and 70,000 entries from 1957 to 1966. His talents were put to the forefront by his role as IEC President (1961-1964) as well as by his role as Chairman of IEC Technical Committee 1 (Terminology) between 1970 and 1981. The importance of the RTL was not just specific to Romania: while this vast encyclopaedia helped to define the Romanian technical vocabulary, the methodology used to create it could also serve as a model for any other similar encyclopaedia. Radulet's experience in writing this tome thus helped him to co-ordinate the International Electrotechnical Vocabulary (IEV) and the 1983 edition of the IEC Multilingual Dictionary of Electricity. With the help of a working group from the Romanian National Committee (CER), Radulet created the first edition of a thesaurus containing technical expressions used in IEC publications. In doing so, he concerned himself with the structured identification and organization of concepts independent of any particular language. Accordingly, he developed a thesaurus that was organized by logical relations prior to the development of specialized multilingual dictionaries. This was presented at the 1983 IEC General Meeting in Tokyo, where Radulet was encouraged to carry on with his efforts. Unfortunately his death in 1984 brought these efforts to an end. However, following up a suggestion by the IEC, the Romanian National Committee continued his work based on concepts defined in the IEV, and in 1986 furnished a draft version in French of the IEC Thesaurus of Electricity, giving hierarchical relations to concepts. This work continues as more languages are added and as new chapters of the IEV appear.

### **Remus Răduleț as Hall of Fame appears**

#### **Remus Răduleț and the elaboration of the Thesaurus of concepts of CEI, reference work in the terminology of specialized languages: Electrotechnics**

If the participation of Icpe and CER in the elaboration of the CEI Multilingual Vocabulary was only for a few fields in electrical engineering, in the development of the CEI Treasury, the involvement was total, the specialists from the two institutions made a recognized contribution and the Icpe Computing Center was the one who elaborated a complex calculation program, meant to analyze and order the terms according to the original relations conceived by academics Remus Răduleț and Alexandru Timotin (Direct Relationships and vice versa: Species-Genus, Part-All, Derivative-Original, Property-Entity, Restricted – Wide, synonymy relations, ononymy).

CER organized a team called "Treasure", still operating today in an institute of the Romanian Academy (unfortunately with a reduced activity due to funding) and the research departments in Icpe have appointed specialists in their fields of activity and for others that he did not have, associating specialists from other institutes and from the electrical industry, joining them to this activity.

As the secretariat of the CEI and operating under the coordination of academics Remus Răduleț and Alexandru Timotin, CER was the one who coordinated the conception of some activities, the analysis

of terms by semantic neighborhoods, provided the Computer Center with the terms to be analyzed and the terminological trees. At the same time, the standards transmitted from CEI were introduced in the CEI STANDARDS LIBRARY, the existence in the Institute and made available to the entire electrotechnical sector in Romania, which thus benefited through the efforts of Icpe, from the latest CEI standards.

The history of the CEI Treasure has older roots and is worth remembering.

After the end of his term as President of CEI (1984) Remus Răduleț was elected President of the Technical Committee CT-1: Terminology. CT 1 is the oldest and most traditional IEC Committee, which has appeared since the establishment of the International Electrotechnical Commission, whose attention has focused on issues of international terminology, which will facilitate a better understanding of things, contributing equally to the exchange of ideas. as well as products and technologies.

The tradition of this Commission was old and rich, within it activating over the years electrotechnical personalities of the time: Kennely, A Siemens, Boucherot, Javet, Giorgi, who contributed to the creation of unit systems, to the terminology in electrical engineering that had to be unitary in all directions that were outlined in electrical engineering with the advances of science and technology.

The International Electrotechnical Vocabulary of the IEC (VEI) was first published in 1938 and contained about 2,000 terms, with the definition of the notions they represented, classified into 14 chapters and 100 sections. The element of progress he presented compared to other vocabularies was the fact that he went from a dictionary of words to a dictionary of notions, an idea that was then taken over by many scientific and technical organizations.

The second edition appeared in 1945 and included 9000 terms divided into 24 chapters, published in independent issues, dedicated to specific fields.

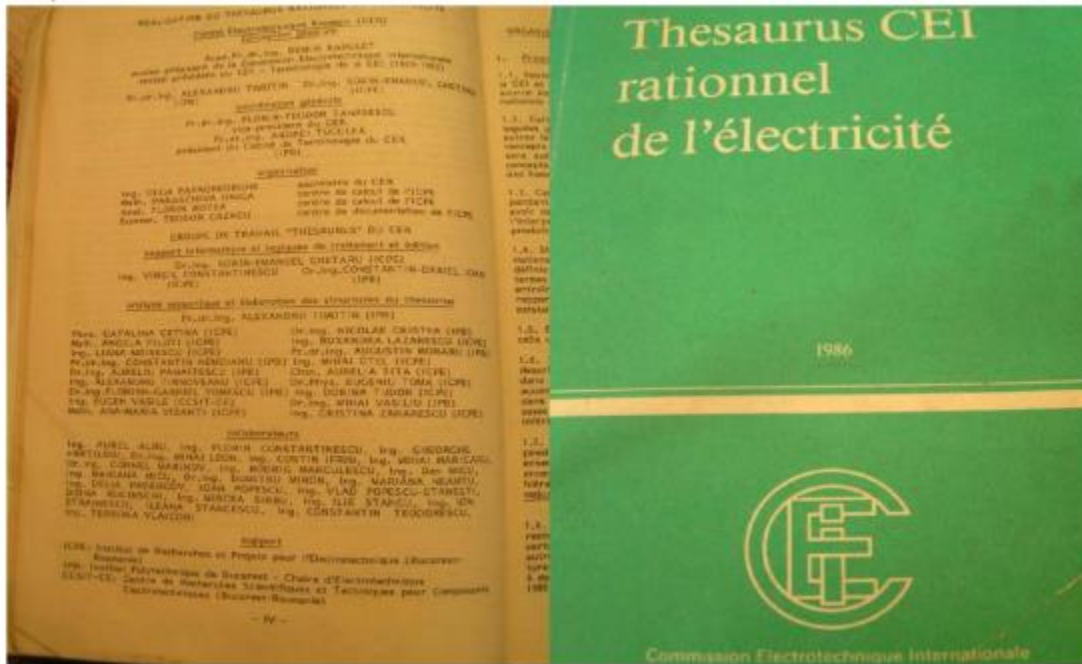
The need to give new valences to these dictionaries, imposed that since 1974, the Terminology Committee CT 1 of the IEC, to start a new edition, constituting within the IEC 70 working groups of 5-10 experts each, which correctly defines in French, English and Russian the terms in electrical engineering and for certain chapters in German, Spanish, Italian, Dutch, Polish and Swedish. In parallel with this action, the general index of the French and English terms of the Vocabulary was elaborated, the first editions being published in 1976 and 1979.

Given the large volume of work required by the analysis of the proposed terms and definitions, Remus Răduleț appealed to the most valuable specialists in education, Icpe and other research institutes, people from industry, attracted within the CER which became "his staff".

The need to rigorously standardize their definitions, notions and their inclusion in a logical structure, given that they came from countries with different formulations, meant not only a huge volume of work but also a high level of intellectual activity, on that only a man of scientific stature of the academician Remus Răduleț could provide an explanation of the fact that the CEI was addressed to carry out this work.

Le Dictionnaire CEI Multilingue de l'Electricite, a true work of synthesis published in Geneva in 1983, under the coordination of the academician Remus Răduleț and Mrs. E. Hamburger who follows him to lead CT 1, is a great work scientific value, which critically processes everything that many specialists have worked on for over 30 years.

But the fundamental work that Remus Răduleț develops for CEI is “CEI's Thesaurus of Concepts: Le Thesaurus CEI rationelde l'electricite” which will see the light of day in 1986 in Geneva, edited in French.



Even before reaching the magnitude that is given today to linguistic engineering, Remus Răduleț noticed what the hierarchy of notions means, the structure of such a work and the logistics necessary to put it into practice.

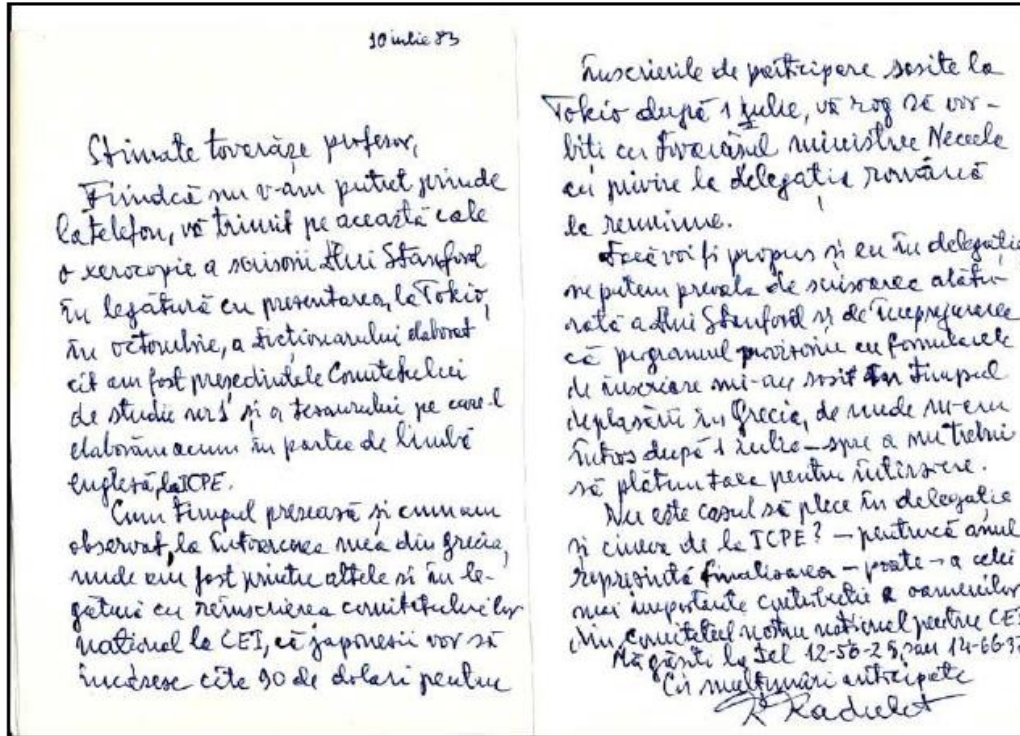
Taking into account his competence in the field of terminology, which he successfully proved in the elaboration of the Vocabulary, the Central Bureau of the CEI requested him at the end of 1981 to set up an ad hoc working group within the Romanian Electrotechnical Committee (CER). to start the activity of establishing a Treasury that was to deal with all the fields of activity of the IEC, to become a means of indexing the norms and probably of the specifications and regulations elaborated by the IEC.

We mention that at that time, there was no coherent system of rules at national or international level for extracting the terms of a Treasury, selecting descriptors and updating procedures.

Initially, a group of 15 people chaired by Remus Răduleț began to develop the concept of a Thesaurus of terms (descriptors and synonyms), using as main source of terms CEI publications in Icpce-CER libraries, Icpce becoming the center of this activity to which it was then added, with the same passion, teachers from the Faculty of Electrical Engineering in Bucharest, specialists from other research institutes.

In a letter addressed on August 26, 1983 to the Secretary General of the CEI, Mr. Stanford, Remus Răduleț states the conception of the work, modern and original as a structure, with a scientific foundation and clairvoyance, which we who participated in his team at I always felt the elaboration of the Treasure and we still remember with great respect, that period of work and search.

In a letter he sent me, he told me what else needed to be done to inform CEI about the work.



Letter addressed by acad. Remus Răduleț, director of the Research Institute for the Electrical Industry in Bucharest, Ph.D. Florin Teodor Tănăsescu regarding the presentation in Tokyo of the state of the Treasury and his remark regarding the value of the work: "completion of the most important contribution of the people from our national committee for the CEI".

The first results were presented at the Tokyo General Meeting (Oct. 1983), the IEC Action Committee, noting the "passionate work of Professor Remus Răduleț", noting that it is mandatory for this Treasury to become fully acceptable for the electrotechnical field and electronic". The document ended as follows: "to encourage Professor Remus Răduleț to continue his efforts for the preparation of the CEI Treasure", "You and your group, you worked with remarkable speed; "And this remarkable activity has been going on for more than 5 years!



His premature and painful parting, on February 6, 1984, did not allow his reign to see the final form of the Treasury, but we felt it among us, stimulating our pride and pride that we would continue a work that a novel had begun! And the chance of the Treasury was that another scientific personality of Romanian electrical engineering trained in the school of Professor Remus Răduleț Academician Alexandru Timotin took over the coordination of the Treasury, managed to keep us together, overcoming the troubles that accompanied the realization of a work that everyone needed, but when it came support, it belonged to no one.

Both during its elaboration and the presentation of some stage results, the paper enjoyed high appreciation both from the Executive Bureau of the CEI in Geneva and from the scientific community in the country.

When the Treasury appeared in Geneva in 1986, Academician C. Bulucea sent a congratulatory message to the team, shared with us the confession of Professor Remus Răduleț sent to him in a private conversation, that "he wanted this work to be written by a Wallachian", a feeling of pride that he inoculated us with.

In the face of the pressure exerted by neologisms on a language and the chaotic takeover of some terms, Remus Răduleț brings a series of new guidelines in the field of Terminology, objectives that can meet those requirements he noted, to avoid anarchy in Terminology, standardization and internationalization of terminological activities, guidelines that require:

- the need for standardization in the terminology of specialized languages, standardization that can be agreed internationally
- unification of technical terms and internationalization of concept definitions so that certain essential features can be attributed to the terms through terminology
- the established term, to reflect as real as possible, the concept it represents
- establishing clear rules on the principles that should guide modern and efficient terminology, how language borrowing should be done

In his conception, the development of technical sciences requires the creation of intellectual or material structures to help the person working in this field, to have tools that allow a correct framing of new terms or phrases, the exact definition of concepts independent of language and apt to be permanently enriched with the emergence of new terms.

In the desire to order this activity, he is a follower of a "new order" that established, can lead to the realization of vocabularies consisting of given concepts, their succession being systematic and explicitly defined, placed in a system where their neighborhoods are logically established. In this way, interesting structures can appear, such as trees, which allow a correct framing of the concepts, organized after the application of some relations between them.

Academicians Remus Răduleț and Alexandru Timotin, can be considered within the international community of electricians, pioneers in establishing new structures of terminological vocabularies and hoards of concepts, based on principles and norms derived from their conception of terminology, about organizing concepts by structures tree.

The need for any concept to be defined, as much as possible by a single term and the ordering of terms according to established relationships, were essential concerns of specialists. *Eugen Wüste*

In Austria (1968), his doctoral dissertation sets out the bases and principles that must underlie a specialized terminology, an activity successfully promoted by the "Vienna School", whose leader is considered to be.

The Academy of Sciences of the former Soviet Union has been developing a first form of theoretical electrical engineering terminology since 1953 and under the signature of a well-known

Russian electrical engineer -R Neiman-, published in 1957 in *Electricestvo*, the finalized form of this terminology.

It is interesting to note that Romanian electrical engineers knew this work, as evidenced by the fact that in the Editorial Board of *Electrotehnica Magazine* whose college included Remus Răduleț, Andrei Tugulea, Alexandru Timotin, Aurel Avramescu, in issue 11/1957, a Romanian point of view regarding this work, correct and constructive.

Pointing out the valuable elements of the action, the Editorial Board also notes the need for approach and other objectives, which the construction of the CEI Electrotechnical Treasury will make: coherence of definitions, the need to treat differently the definitions of physical quantities and definitions of concepts related to body properties and phenomena. the definition of each quantity made only by means of the previous quantities, thus avoiding the appearance of a vicious circle. Through this, the Thesaurus becomes a more flexible tool than a vocabulary, the Thesaurus becoming an organized set of terms whose structure is defined by certain properties attached to them and a group of binary-hierarchical relations, associative and synonymous, established between these terms.

Without containing definitions, a thesaurus will present each term accompanied not only by the immediately superior terms, but equally, by the associated terms or the immediately inferior ones, being able to achieve a certain hierarchy, the construction of some trees.

**In the construction of the Electrotechnical Thesaurus, following his terminological research and the experience gained in creating the CEI Vocabulary, Remus Răduleț considers that in technical activity, concepts can be linked through a series of relationships that involve a certain organization, namely:**

\* logical relations, the case of a "species" concept subordinated to a "genus" concept

(Linnaeus used this relationship in classifying species);

\* ontological relations, the case of a concept related to another through a neighborhood of individuals, reflected by the contact in space, time or by the relation of determination or inclusion of one in another;

Of remarkable importance is the fact that most systems of concepts organized according to logical or ontological relations, admit the organization through sets of trees.

Avoiding the "disorder" that is also encountered in a specialized language can only be achieved by defining clear criteria for assimilating the terms, each term must be framed correctly, which can only be done when establishing the neighborhoods between them, through rigorous, general relationships that can be mastered by all.

The structure of the Treasury conceived by Remus Răduleț and Alexandru Timotin, through the proposed relations, responds to the requirements of ordering and organizing a Treasury, constituting according to the author of this communication, original contributions that we compare as weight with those communicated by Wüster in 1968, when His PhD in the field of machine tools, lays the foundations of modern terminology, stating a series of principles and methodology for dealing with terms.

The relations introduced by Remus Răduleț and Alexandru Timotin in the construction of a Treasure are hierarchical (ascending and descending) and associative (symmetrical) relations, their chaining allowing, starting from a given concept, to realize global semantic structures, arborescent, attachable to fields. semantic.

**Hierarchical relationships are of 5 types: linear, asymmetric (have an inverse), logical in nature when looking at concepts and factual when looking at designated elements or areas of use. They are of the S-G type (species-genus); P-T (part-all); E-Q (property-entity); D-O (derivative - original); R-L (narrow-wide) and have their inverses G-S; T-P; Q-E; O-D; L-R.**

**The first 5 relationships are ascending (<), and the other 5 are descending (>)**

**Given that the structure of a Treasure is multi-hierarchical, with many ascending relationships, to build a unique tree, only one of the ascending relationships of each concept can be chosen as a priority by associating the graphic symbol <<.**

**HIERARCHICAL RELATIONS are:**

- asymmetric and all have an inverse
- immediate (links a concept closest to it)
- logical, when looking at concepts
- factual, when they concern the designated elements or areas of use

#### **1. Strict logical subordination S-G (specific relation)**

- S (species) <G (genus) with inverse G> S
- Ex: S-G => telegraphy (S) is a species of telecommunications
- (G proxim)
- G-S => power line (G) is the type of power line (S)

#### **2. Logical attribution Q-E (attributive relation)**

- Q (property) <E (entity) with inverse E> Q
- Ex: Q-E => color (Q) is a property of entity E which is light
- E-Q => geometric figure (E) is an entity with respect to the shape (Q) which is a property

#### **3. Logical affiliation D-O (Derivative, Derivative-Original)**

- D (derived concept) <O (original concept) with inverse O> D
- Ex: D-O => D (electromagnetism) <O (electromagnetic phenomenon)
- O-D => The Coulomb-Lorentz force (O) originates from the electric field strength deriving from the first

#### **4. Factual inclusion of P-T temporal space (partitive)**

- Part (P) <(T, all) with inverse T> P

- Ex: P-T => the power line is a part (P) of the power system (T)
- T-P => the equipment is everything (T) to the appliance, which is only a part (P)

### 5. Vague factual subordination R-L (narrow-wide)

- Narrow concept (R) <wider concept (L) with inverse L > R
- Ex: R-L => R protection device (device) <L (protection-function)
- L-R => L traction-field of use > R (technically produced vehicle)

The associative relations established by Remus Răduleț and Alexandru Timotin are of 4 types, namely: simple association (AA); defining association (DD), antonymy (NN); quasi-synonymy (QQ). The database of electrotechnical terms made by the Romanian Electrotechnical Committee is the basis of numerous dictionaries that have been written for Romanian specialists, responding to real needs for correct rendering of technical definitions. It is especially important that in these dictionaries are presented the main descriptors, the accepted synonyms, the terms to avoid.

The recognition of the contribution brought by Remus Răduleț to the development of the technical terminology was concretized by the fact that all the significant works published by Remus Răduleț and his team were concentrated in one volume.



Remus Răduleț and the Romanian Contributions to the development of electrotechnical terminology, is a reference work published in 2006 by acad. Alexandru Timotin, prof. Florin Teodor Tănăsescu and computer scientist Paraschiva Onica, collaborators of academician Remus Răduleț.

Among the great scientific personalities that Romania had, the academician Remus Răduleț, the teacher of many generations of students to whom he planted his passion for electrical engineering, remains the man of high culture, generous in transmitting knowledge to all those who were in around



him. His contributions in the field of theoretical electrical engineering and specialized language terminology, consecrated him in the gallery of the great "Inventors and Scientists" of world electrical engineering, as appears Remus Răduleț in the "Hall of Fame" of the International Electrotechnical Commission (IEC)

President of the International Electrotechnical Commission (IEC), Remus Răduleț remains in the field of electrotechnical standardization as the one who conceived and realized the Multilingual Vocabulary of the IEC. treatment of terms in the language of electrical engineering and neighborhood relations.

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