

GHEORGHE ALEXA, A GREAT PERSONALITY OF THE ROMANIAN LEATHER CHEMISTRY

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Professor Ph.D. Eng. Gheorghe
Alexa (1891–1985)

Gheorghe Alexa – 130 years since his birth

The present work brings to attention one of the most representative personalities of the higher education school in Iași, Gheorghe Alexa, whose birth, 130 ago, is marked this year.

The life and achievements of the great figure of professor Gheorghe Alexa, pioneer in the chemistry and technology of leather, will be evoked in the following, as substantially viewed by the author as a historical and civic duty, addressed to the generations to come. The scientific creation of the distinguished chemistry professor remains a source of inspiration and, equally, a challenge to extending the knowledge and progress in the Romanian academic field he brilliantly represented.

Gheorghe Alexa was born on October 26, 1891 in the family of the teacher Vasile Alexa from Vutcani commune, Vaslui county. He attended the “Gheorghe Rosca Codreanu” High School in Bârlad, then, between 1912 and 1915, he studied technological chemistry at the University of Iasi, graduating in 1916. A particular role in his professional training was played by Professor Cristea Niculescu-Otin, who guided and oriented him towards the field of chemistry and leather technology. He followed a specialization stage in France, at the French school of leather in Lyon, where he obtained the title of chemical engineer in leather, thus becoming the first Romanian specialist in this field.

By his investigations, aimed at obtaining tannin substances from indigenous raw materials, at improving vegetal, mineral and mixed tannery tech, as well as by his tireless academic activity for the promotion of science, Gheorghe Alexa has enrolled his name for good as a school founder in the field of chemistry and leather technology in Romania.

The “Poni-Cernătescu” museum within the “Moldavia National Museum Complex” hosts, in the Room of Personalities in Chemistry, a display case

illustrating the life and scientific activities of the prestigious professor, Gheorghe Alexa.

His name, as a chemistry and leather school founder, is first related to some unique browsers of certain paths, immediately applied in the development of some new methods of tanning.

The successions of the discoveries, inventions, innovations of professor Alexa and his contributions in the above-mentioned field have decisively contributed to the evolution of chemistry and technology of leather processing. Recognition of these credits climaxed on the 18th of March 1971, when he was awarded the Golden Medal (for the year 1968) of the French Association of engineers, chemists and technicians in leather industry for the research performed in the field, and for his participation to the international scientific life. Prior to this, he had received the Vermeil Medal for the whole scientific activity developed in the leather sector.

Based on the scientific conclusions reached by professor Alexa, tanning involves the assembly of operations performed for transforming leather into a product not subjected to rot with isolated fibers, and with a specific endurance to water.

Observing that the process of tanning was not sufficiently explained, neither by the chemical theory of Armand Séquin (1767–1835) who, in 1795, stated that tanning is a chemical process, once treatment of leather with tannin produces an increase in weight, and showed that the leather combines with the tannin, giving a salt (more precisely, it corresponds to a chemical combination between leather and tannin), nor by the physical theory of Knapp, elaborated in the middle of the past century (according to which tanning assures wrapping of dermal fibers with tenant material, the fibers remaining isolated one from another), professor Alexa classified the tanning techniques as: tanning with organic substances (vegetal and synthetic tenants, fish oils, formaldehyde, etc.) and tanning with mineral substances (alum, chromium). He also observed that, regardless of the applied method, leathers suffer in advance some operations common in all procedures (soaking, unhairing, calking, treating with enzyme), the theoretic patterns being rather complementary instead of divergent as to the physico-chemical phenomena occurring during processing.

The most important and highly valuable direction of research followed by professor Alexa refers to mineral tanning using chromium salts, based on the progress recorded in the field.

As known, since 1853, chemist Hylter Cavalin used a mixture of potassium dichromate, alum and water, while, in 1858, Friederich Ludwig Knapp (1814–1904) found out that adding carbonate or sodium hydrate to a chromium sulphate sodium (ferric sulphate) leads to the formation of a chemical substance which easily releases the appropriate oxide, and whose combination with leather finally resulted in a superior tanned product. When subjected to impregnation with potassium dichromate and to exposure to light, leather's gelatine being soluble in water, the

dichromate is reduced and changed in chromic oxide, which combines with the gelatine, thus creating a product that does not rot (jelly-like leather). The researches performed by professor Alexa highlighted the particular importance of tanning in chromium, a procedure attained with the chromium oxide fixed on the dermal fiber, using a basic sodium of alum and chromium with a content of 1.5% chromium oxide.

In this respect, he established the influence of temperature over the chromium basic salts and the advantage of using a heated solution for this type of tanning. This was actually the topic of the thesis he publicly defended at the University of Iași, in the year 1930, entitled: *The influence of temperature over chromium basic salts*, which brought to him the title of Doctor in Science.

Beside tanning in chromium, the combined tanning chromium-tannin – initiated in 1933 and presented at the Amsterdam Congress by doctor Karl Helmer Gustavson (1896–1973) – will represent a new field of international concern and affirmation for professor Alexa; the conclusions about the influence of the factors involved in this type of tanning (nature of vegetal tannin, length, pH, temperature, pickling) are discussed in the thesis entitled *Contributions to combined tanning chromium-tannin study* presented in 1936 in Brussels.

Starting with the year 1949, professor Alexa initiated new researches on other types of tanning: formalin-chromium, formalin-chromium-tannin, aluminium-tannin, thus demonstrating that leather acquires characteristic qualities through mineral tanning and organic tanning (high endurance to traction, superior suppleness). He also ran applicative researches related to indigenous vegetal tannins, involving study of the conditions for obtaining some vegetal tanning extracts, as well as of their chemical-technological properties; the results were presented in a monograph devoted to the vegetal indigenous tannins from Romania, a volume of special interest both in our country and abroad.

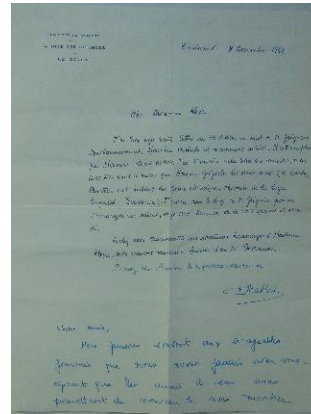
Other important contributions refer to the mineral tanning of leathers for foot and footwear faces, the results obtained being presented in various works delivered at various international scientific manifestations, held in Hague (1963), Lyon (1965), Lucerne (1967), London (1969) and Prague (1971).

At the same time, extending the investigations related to the influence of raw materials, in 1963, professor Alexa published the treaty entitled *Raw and auxiliary materials in leather industry*, a copy of which is exposed at the “Poni-Cernătescu” Museum of Iasi. Several articles included in this volume have influenced the investigation directions of several specialists from prestigious European universities.

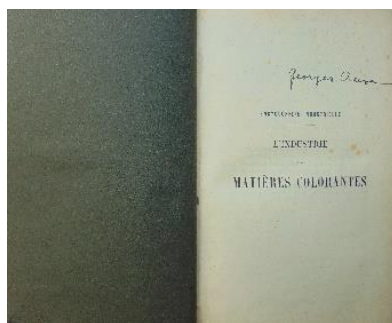
Professor Alexa formed and trained many disciples, among whom the future academician Cristofor Simionescu, endowed with special teaching and research qualities, so that, after graduation, he became his assistant, under whose guidance he elaborated, in 1948, his PhD thesis devoted to the auto-oxidation of vegetable oils.



The scientific journal of leather industry,
N^o.2 (1964)



Letter addressed to Professor Alexa
(Toulouse University- Faculty of Sciences, 1969)



Book with J.Dupont author's dedication
for professor Gheorghe Alexa (1902)



The pen of Professor Gheorghe Alexa



Professor Gheorghe Alexa and his colleagues
at the University of Iasi (1960)



The scientific session of chemistry for higher
education professors
(Cluj, 1962)

As a final conclusion, for establishing the position of professor Gheorghe Alexa among the European personalities of the leather chemistry field, worth mentioning are the 1950 citations in “Gebereichimie und Geberetechnologie” (professor H. Herfeld) and also the 1956 ones, in “Chemistry of Tanning Processes” (professor Gustanov) and, last but not least, the allocution of the President of the French Science Academy, professor E.M Guitton, delivered on the occasion of the awarding of the Vermeil Medal on March 18, 1971 (following a ceremony held in the Palace of Discoveries in Paris): “As the author of numerous scientific works delivered at national and international congresses, professor Gheorghe Alexa provides outstanding service to the leather industry” – an illustrative proof of the importance of the contribution brought by the Romanian scientist to the growth of leather processing technologies worldwide.

Professor Gheorghe Alexa remains the founder of the Iași high school of skin chemistry and leather substitutes. His research projects, his inventions and innovations attest the valuable contribution he brought to the development of leather processing technologies at European level.

REFERENCES

1. Alexa, Gh. *Raw and auxiliary materials in the leather industry*, Didactic and Pedagogical Publishing House, București, 1963.
2. Alexa, Gh. *The evolution of different tanning methods*, “V. Adamachi” Scientific Revue, Iași, **2**, 1968.
3. The 7th Symposium on Leather Chemistry and Technology and Leather Replacements, Iași, October 17–19, Iași, 1991.
4. *Homage to dr. doc. prof. ing. Gheorghe Alexa*, Light Industry Revue, 1971, **11**, 678.
5. Alexa, Gh., *The constitution and properties of basic chromium salts and their importance in tannery*, “Vasile Adamachi” Scientific Journal, Iași, 1936, **XXII**, 79–90.