The Contribution of the Cluj School of Biology to the Development of European Sozology in the Inter-War Period

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Abstract The movement of nature's protection in Romania had a number of promoters and the most representative of Alma Mater Napocensis were Emil G. Racoviță, Alexandru Borza and Emil Pop. E. G. Racoviță, Antarctic explorer, the creator in Cluj of the first academic institute of bio-speleological research in the world, was also a pioneer in defining and classifying protected areas. A. Borza, renowned botanist, the founder of the Botanical Garden of the University of Cluj, actively contributed to the establishment of the first national park in Romania. E. Pop, titular member of the Romanian Academy, supported the continuation of protective movement promoted by its illustrious predecessors.

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Sozology, a term rarely-used nowadays, was introduced into the scientific lexicon in 1965 by Walery Goetel, an early pioneer of the Polish conservationist and ecologist movements. Goetel wrote "It should be taken into account that the question of the protection of natural resources and securing the stability of their use will row to become one of the major problems of human life, and that a new branch of science dealing with these issues will develop."[1] Referring to sozology, Professor Goetel stated, "The goal of this science, containing economic and technical elements, is to aim through the conservation of natural resources to secure their stability of use"[2] so technology can meet both the necessities imposed by economy and the goals of ecology, this approach requiring the cooperation of specialists from the fields of ecology, geology, economics, technical sciences, pedagogy, and so on.

Therefore, it can be said that "at present, sozology is developing from both the conceptual and methodological points of view",[3] becoming, in the process, a science in its own right.

But despite the achievements in the field of *nature protection*, *nature preservation* or *nature conservation*, during the last two decades we are witnessing the formulation of the purpose, objectives, principles and philosophical fundamentals of the

[1] Leszek Gawor, "Walery Goetel and the Idea of Sozology," *Problemy ekorozwoju – Problems of sustainable development* 8, 1 (2013): 83–89, 85.
[2] Gawor, "Walery Goetel and the Idea of Sozology," 86.
[3] Vasile Cristea, "Traditions in romanian sozology," in *Nature conservation: concepts and practice*, ed. Dan Gafta, John Akeroyd (Heidelberg: Springer, 2006), 16.

science called *conservation of biological diversity*. This new science is considered by Primack et al. (2008) to be an integrative one, as …"a real multidisciplinary science, and even transdisciplinary in some of its sequences"[1].

Aleksandra Chaushova, *Enchanted Tea Drinkers* (detail), 2013,
pencil on paper, 166 x 96 cm

A simple look at the objectives of this science (i) study of biological diversity, (ii) assessment of human impact on this diversity (iii), development of measures to prevent extinction, preservation of variability, protection and restoration of biological communities and functions of associated ecosystems, led us to the conclusion that these two terms (sozology and conservation of biodiversity) overlap to the most.

[1] Richard B. Primack, Maria Pătroescu, Laurențiu Rozylowicz, Cristian Iojă, *Fundamentele conservării diversității biologice* (Foundations of biodiversity preservation) (Bucharest: Ed. AGIR, 2008), 7.

Our option for sozology, in addition to the priority of its launch, is based on the much wider sphere of the study subject – the biosphere –, as well as the type of approach: systemic.

The term "biodiversity conservation" was favoured by the Global Strategy for Development, the Brundtland Report and by the summits organized in Rio de Janeiro (1992, 2012) and Johannesburg (2002).

In Romania, the conservationist movement has had its fair share of prominent supporters in the scientific community, amongst whom Emil G. Racoviță, Alexandru Borza and Emil Pop are of particular interest. These individuals – all three of them great Cluj academics – contributed enormously to the development of principles and strategies for the protection of the environment both here and in the rest of Europe.

Primack et al (2008) recognize the fact that in Cluj "…it activated a great naturalist movement", that "the most important action of the conservationist movement in Romania…"[1] was represented by the First Congress of Naturalists in Romania, organized and held in Cluj (April, 1928).

The main Sozological contributions of the Cluj School

Emil G. Racoviță, "our greatest biologist and one of the most upstanding creations of the Romanian spirit"[2], summed up life in the following manner: "To know means, for man: *to be*, living one's life in contentment while accepting the prospect of *not to be* with serenity"[3]. He lived a life rich in experience, which saw him travel from "under the rays of the fiery southern sun, on the heat-blasted shores and on the eternal, surging blue waters of the Mediterranean Sea"[4], to the "never-ending icy wastelands of the Antarctic"[5]. It was Racoviță who created, organised and ran the Academic Institute for Bio-Speleological Research in Cluj, a hive of scientific activity that roved "under the earth, through passages that mastered the fear of the cold darkness"[6]. Looking back on the life and activities of this great biologist, we can see that it was "his vast culture, highly scientifically informed nature and prestigious international standing"[7] that enabled him to take on the role of "consultant for the development of thoroughly modern educational activities in the field of biology at the new Romanian University" [8] of Cluj, of which he was rector between 1929 and 1930.

A first step in the direction of nature protection in Transylvania was "the establishment of Brotherhood mountain tourism society in Cluj in 1920 by Emil Racoviță with a group of distinguished intellectuals, with the aim to protect mountains

[1] Ibid., 20.
[2] Emil Pop, "Emil Racoviță, interpret al naturii" (Emil Racoviță, interpreter of nature) in *Ocrotirea naturii* 12/1 (1968): 5.
[3] Emil Gheorghe Racoviță, *Pagini alese* (Selected writings) (Bucharest: Ed. Acad. R.P.R., 1955): 91.
[4] Ibid., 84.
[5] Ibid., 84.
[6] Ibid., 84.
[7] Ana Fabian and Vasile Cristea, "L'enseignement universitaire roumain de biologie à Cluj à son 80e anniversaire – une page d'histoire de notre vie académique," in *Contribuții botanice* (Cluj-Napoca) 1 (2000): 192.
[8] Ibid.

and forests from devastation, to organize events, meetings, and to publish articles and popularizing brochures, that can arouse the Romanian people's love for nature and its protection"[1].

In 1934 Emil Racoviță offers Romanians the first guidebook concerning natural monuments, which he defines as "all places, all bionts, all territories and prehistoric human works which because of their scientific, legendary and landscape interest, deserve to be preserved for the benefit of the public, both in the present and in the future"[2]

In 1937, Racoviță published an article in the journal of the Société de Biogéographie (Paris) entitled "*Les monuments naturels. Définition, classification, normes pour l'application des lois et règlements. Ce qu'il faudrait faire et ce qu'il faudrait ne point faire*". In this, he wrote "In brief, I fear the indifference, frivolity, ignorance, selfishness and even excessive zeal of those who will decide the fate of our natural monuments, those priceless treasures that we, the people of today, have a duty to preserve for future generations"[3].

We want to emphasize the identity of points of view on this issue, between the Romanian savant and the creator of sozology, the Polish Goetel, who said in 1971 that "Nature together with the human environment can be saved only on the condition that man will recognize his affinity to nature instead of gradually distancing himself from it."[4].

Considered by Puşcariu et al., 1981, as the "first of its kind on a world scale" [5], the article contains a series of ground-breaking ideas, the most important of which we will mention below.

- It defines natural monuments as being "all resorts, flora and fauna, subterranean deposits and prehistoric man-made objects which, due to their inherent scientific, aesthetic, artistic and cultural significance are recognised by the law as meriting conservation for public use by generations past and present"[6].
- It classifies these areas, on one hand, "in terms of their purpose and use (nature reserve, study reserve or tourist reservation)" while, on the other hand, "in terms of their nature: reserves (national parks, forest reservations, tourist landscapes, bird sanctuaries), protected geological or geographical formations, species or individual animals protected as natural monuments and designated mineral deposits and prehistoric sites"[7].

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[1] Adrian Bavaru, Stoica Godeanu, Gallia Butnaru, Alexandru Bogdan, *Biodiversitatea şi ocrotirea naturii* (Biodiversity and nature protection) (Bucharest: Ed. Acad. Române, 2007): 417.
[2] Primack et. al., *Fundamentele conservării diversității biologice*, 21.
[3] Emil Gheorghe Racovitza, "Les monuments naturels (MN.). definition, classification, normes pour l'application des lois et reglements. Ce qu'il faudrait faire et ce qu'il faudrait ne point faire," in *Societé de Biogéographie* (Paris) 5 (1937): 17.
[4] Gawor, *Walery Goetel and the Idea of Sozology*, 86.
[5] Puşcariu et al, 1981, quoted in Vasile Cristea, Simone Denaeyer, Jean-Paul Herremans, Irina Goia, *Ocrotirea naturii şi protecția mediului în România* (Nature and environment protection in Romania) (Cluj-Napoca: Cluj University Press, 1996): 203.
[6] Emil Gheorghe Racovitza, "Les monuments naturels," 18.
[7] Ibid., 19.

- The process of "ascribing the status of natural monument to an entity"[1] involves several steps, the first two being an initial study carried out by specialists and the conferring of a provisional status of natural monument on an area. This is followed by measures designed to increase the efficiency of protective measures as well as the socio-economic impact, before the area is finally officially declared as a protected one.

Individual cases of wildlife reserves and endangered species are analysed, with the ideal conditions for the protection of these being listed. The ideas put forward by the Cluj academic are in tune with those of modern proponents of sozology, stating that "the larger a nature reserve, the better it serves its purpose as a natural monument" and highlighting the fact that "ideal protection is only afforded when a species, plant or animal, can live in a large-sized reservation in its own natural habitat"[2]. Racoviță asks "the creation of large reserves, which can be removed from destruction and artificial modification, of different categories of living populations (biocenosis) that are situated in the most original biological balance, that you may find it all along the country"[3]. This idea appears later at Goetel who, in 1966, was saying "What good will bring the protection of particular elements of nature, when deep changes in human life, and especially the destruction of nature will cover the entire Earth, or even only its particular but vast areas ?"[4].

Racoviță's visionary spirit as an "avant-garde theorist"[5] in environmental issues perceived by the world of today as being extremely pressing is illustrated by a quote from the aforementioned article: "Any animal or plant species may become an important economic asset. Its true value may not be immediately apparent, but this may be revealed through a new discovery…"[6]

In conclusion, Racoviță can be considered to be one of the leading pioneers in the definition and classification of protected areas, especially given that his paper, written in French, appeared almost eleven years before that of E. Bourdelle (1948), a text often cited by UICN as one of its main inspirations.

Alexandru Borza was the main figure in fulfilling "a request by the young Transylvanian university's head of biology that scientific activities be carried out in the context of specialised, modern training, favourable research conditions and benefiting from a productive scientific tradition and integrated institutions, which would ensure that scientific work is performed to international standards and with the greatest degree of seriousness".[7]

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[1] Ibid., 20.
[2] Ibid., 23.
[3] Ioan Pop, *Ocrotirea naturii în Republica Socialistă România* (The protection of nature in the Socialist Republic of Romania) (Cluj-Napoca: Univ. Babeş-Bolyai, 1982): 12.
[4] Gawor, *Walery Goetel and the Idea of Sozology*, 85.
[5] Vasile Cristea, *Traditions in romanian sozology*, 20.
[6] Emil Gheorghe Racovitza, "Les monuments naturels," 23.
[7] Emil Pop, "Profesorul Alexandru Borza" (Professor Alexandru Borza), in *Contribuții botanice* (1972): 31.

A complex scholarly figure, Alexandru Borza was one of the greatest promoters of conservationist ideals in Romania: "Among the new directions in research and academic activity adopted by the new university we can also find nature protection (a more comprehensive field than what we currently call *preservation of biodiversity*). The will and the intellect behind this new initiative were those of Alexandru Borza, a complex, visionary naturalist, a skilled and dedicated organizer, a realist humanist thinker, a scholar in the true sense of the word".[1]

As the academic Emil Pop points out when discussing problems regarding the conservation of nature, "Professor Borza was the driving force behind these ideas, so welcome here after 1918, and, at the same time, was the central figure of the action itself once it had acquired an administrative and legal structure."[2]

As early as 1924, Borza had drawn up a list of 12 rare plant species, 43 reserves and 6 national parks and campaigned for measures to be taken in order to ensure their protection and preservation.

His efforts and of the other naturalists from Cluj University empowers "professor V. Stanciu to convince (on 12th August 1919) the Grand National Council (reunited in Sibiu) that the agrarian law project should also include the following stipulation: "...all places that represent a special interest in scientific way, to be entirely expropriated for science (art. II par. I.c)"[3]. Unfortunately "the Transylvanian project of agrarian law had been abandoned and replaced with a new law that was elaborated in Bucharest, in which the bright mood of Transylvanian law on nature protection is absent".[4] Having direct contact with the manner in which the activity for nature protection was organized in other countries (in 1926 he visited a number of national parks in SUA), Borza explicitly requests "We need therefore a special law for nature protection that consolidates the results achieved... Our national parks and scientific reserves need to be eternally protected in order to accomplish its great scientific, cultural, national and economic mission".[5]

With the passing and implementation of Romania's first law for the protection of natural monuments in 1930, Professor Borza became a member of the Central Commission (CMN), subsequently becoming head of the Transylvanian commission and, in 1938, president of the Central Commission and director of its scientific office. It must be stressed that this first law for natural preservation was due in large part to the work of Professor Borza, as it was based primarily on ideas put forward by him in 1927.

Furthermore, he was the main campaigner for the establishment of the Retezat National Park, an undertaking in which "professor Borza's patience and capacity for hard work were put to the test. In this manner, he was able to present to our descendents a noble achievement of patriotic, scientific and educational importance"[6].

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[1] Vasile Cristea and Franco Pedrotti, *Cuvânt înainte* (Preface) in Alexandru Borza, *Protecţiunea naturii: pagini alese* (Nature protection: selected papers), ed. Vasile Cristea and Franco Pedrotti, *L'uomo e l'ambiente* 45 (2005): 7.
[2] Emil Pop, *Profesorul Alexandru Borza*, 29.
[3] Cristea, V. et al, *Ocrotirea naturii şi protecţia mediului în România,* 198.
[4] Ibid., 199.
[5] Ibid., 200.
[6] Pop, E., *Profesorul Alexandru Borza*, 29.

The First National Congress of Romanian Naturalists provided the ideal platform for Prof. Borza to express his concept of natural protection and explain the strategies necessary for its implementation in Romania. "Only in this way can we leave to our descendents a Romania as rich in beauty and natural treasures, of ethical, aesthetic, scientific and economic importance as the one we have inherited from our forefathers and as is known to the entire world. We will create such an atmosphere of holy respect for ancient Nature, that will be the most powerful source of a well understood patriotism and cultural universal sense of solidarity that should guide future humanity".[1]

In 1929, during his opening address to the Krakow Congress, Prof. Borza put forth the idea of creating trans-border parks and reservations "given the fraternal links between the countries we represent – Czechoslovakia, Poland and Romania – I am certain, my dear fellows, that the purpose for which we are gathered here today, namely the creation of a national park that spans the borders of our three neighbouring nations, will be fulfilled promptly and with ease".[2]

As well as the creation of an (Inter-)National Park in the Tatra Mountains that would include territories from Czechoslovakia and Poland, the congress passed a resolution proposing a park comprising of territory situated along the common borders of the three signatory states. It urged the three governments to co-operate towards this goal, and recommended the creation of a national park along the Romanian-Polish border. Another resolution dealt with the protection of animal species: "Czechoslovakia, Poland and Romania are urged to take measures to ensure the immediate and complete protection of certain endangered species of mountain animals",[3] while yet another resolution touched upon the protection of plant species, with the delegates agreeing to the strict protection of the Carpathian Juniper.

Professor Borza paid particular attention to cultivated plants, especially traditional varieties. His interest in this field was demonstrated by exhibitions he organised, but also, more pertinently, through his writings on the subject, where we can find his synthesised proposal for the creation of a living collection, which he considered to be "with a view to the future, when, following the standardisation of production they will be forgotten and disappear…we will therefore… preserve… a living archive of our cultural history and we consider that it is indeed a debt of honour to perform this deed in the history of science"[4].

To sum up the preservationist ideals of this *veritable athlete of the movement for natural protection in Romania*, we will make use of his own words: "in carrying out what we have proposed…we will be able to stand with our heads held high in front of the rest of the world, which has every right to ask us how we intend to carry out our

[1] Alexandru Borza, *Compte rendu du Congrès scientifique des représentants de la Roumanie, la Tchécoslovaquie et la Pologne, touchant la Protection de la Nature sur les terrains limitrophes des trois états, Cracovie, 13-14 dec. 1929*", in Alexandru Borza, "Protecțiunea naturii," 312.
[2] Ibid. 312.
[3] Ibid. 315.
[4] Alexandru Borza and Cornel Gürtler, *Varietățile de mere cultivate în Grădina Botanică din Cluj* (Apple varieties cultivated in the Botanical Garden in Cluj) in Alexandru Borza, "Protecțiunea naturii," 252.

mission as masters of his plot of earth from whence we came. Science is universal, and the right and duty to study nature belongs to everybody, with the protection of natural monuments being, therefore, an issue of international importance"[1].

Professor Borza's ideas and achievements with regard to sozology were widely known amongst the European academic community, especially given that they were not only published in Romanian, but also in English, French, German and Italian. After 1947 he often received invitations to attend international scientific events, but was unable to do so due to his punishment by the communist regime for his unrepentant desire to be a 'global citizen'.

Emil Pop, on the occasion of his 70th birthday in 1967, said about himself: "I'm a man of the Cluj university – in it I gained instruction and method, it has enormously facilitated my research, and the pioneering spirit of its early academics was ever-present, inspiring me in my work…".[2]

Climbing the steps of the academic ladder, he was accorded the rank of full professor in the 1938/39 academic year, and in 1955 became a member of the Romanian Academy. In his memoirs, Alexandru Borza stated: "Emil Pop is, in fact, one of the most brilliant of my disciples".[3]

One of Emil Pop's many scientific concerns was the protection of nature, about which he wrote: "The movement for the protection of nature has, as its focal point, the reaction of naturalists and concerned citizens to the errors committed by certain individuals with regard to nature, be these the result of ignorance, laziness or even sheer, wanton destructive zeal"[4].

Between 1932 and 1937, Professor Pop held courses for post-doctoral students that, under the general umbrella of sozology, were entitled *Genetic Fitogeography as Applied to Romania*. In the introductory lecture of this discipline (which he also entitled *Genetic Botanical Geography*), he stated: "Such classes, through the fact that they serve to deepen knowledge of certain limited chapters of a science in light of recent research, through the fact that they delve into the intimate subtleties of a scientific field and bring you to places where the thread of problems get lost in the darkness of the unknown – such classes can, in all probability, have the effect of pushing the listener to familiarise himself with the realities of science and activate his passion as a researcher"[5].

According to Professor Pop, "botanical geography is the science that deals with the multifaceted relationships between plants and the environment that surrounds them"

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[1] Alexandru Borza, "Protecțiunea naturii în România," (Nature protection in Romania) in *Alexandru Borza, Protecțiunea naturii,* 25.

[2] Emil Pop, in *Emil Pop. O sută de ani de la naştere* (*1897–1997)* (Emil Pop. One hundred years since his birth (1897–1997), ed. Aurel Ardelean and Viorel Soran (Cluj-Napoca: Ed. Risoprint, 1999), 176.

[3] Vasile Cristea and Ana Fabian, "Emil Pop, Un professeur pour l'éternité," *Contribuții botanice* (1998): 38.

[4] Ana Fabian and Iustinian Petrescu, *Profesorul Emil Pop. Pagini alese* (Professor Emil Pop. Selected writings) (Cluj-Napoca: Ed. Efes, 2004), 9.

[5] Emil Pop, *Fitogeografie genetică, (I), Geografie botanică*. (Genetic fitogeography (I) Botanic geography), manuscript , folder no. 16, Academy Library, Cluj-Napoca branch, 1932/1933, 171 p.

while "fitogeography refers to the succession over time of layers of plant cover, with the reasons for this succession falling within the scope of genetic fitogeography"[1].

In describing his classes, the author continues: "we will examine the succession of plants from the Paleozoic Era up to today and attempt to interpret the different climate patterns that caused the developments of such diverse types of flora"[2].

After describing the methods of study to be used in this discipline, methods that include paleogeography, paleobotany, study of the paleoclimate and corological analysis, Pop stresses that, of all the methods, "pollen analysis is the closest we can get to perfection; it permits us to closely follow the social structure of the succession of quaternary forests... it is the method that provides us with the most precise data for the interpretation of the climates of the Interglacial and, especially, Postglacial periods – therefore, its significance in paleoecology is enormous".[3]

In the second part of the course, dealing with specialised genetic fitogeography with special reference to the situation on contemporary Romanian territory, the evolution of flowers from varying geological periods is closely examined. In accordance with the principles of sozology, man's decisive influence in the evolution of these flowers is stressed..."we must mention a factor of great importance that appeared on the evolutionary scene and which managed to further complicate the natural process of development – man. Through his varied eating habits as a frugivore, carnivore or vegetarian, he has always interfered in nature, be it through destroying certain species or be it through the propagation of species that he needs. This is especially true when talking about man's agricultural activities, such as cattle farming, the concentration on cultivating certain plants and the introduction of different plant varieties from abroad along with the weeds that are generally associated with these. He hacked down forests with ferocious zeal, pounded down vast swathes of earth with his cattle and destroyed primitive vegetation".[4]

His beliefs as a dynamic activist in favour of the protection of the environment are evidenced in the following quotes, which display an acute understanding of reality: "there is one condition that prevents the effective protection of nature here in Romania: the lack, or, shall we say, the timidity of the public mindset with regard to this issue… with so many impressive, expressive monuments we can be proud of, it is not permissible for us to do things by halves in this generous, extraordinary movement of civilised peoples. Each naturalist, explorer or even simple nature lover must have, by definition, a deep understanding of this movement, and must participate enthusiastically in it in order to actively propagate its ideals".[5]

In the inter-war period, Emil Pop attempted to establish a new scientific discipline – that of genetic fitogeography – known nowadays as fitogeography. In the field of sozology, however, this much-missed academic displayed the extent of his principles by continuing to support the environmentalist movement and propagate the ideals of environmental protection in the difficult years of the communist dictatorship.

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[1] Ibid.
[2] Ibid.
[3] Ibid.
[4] Ibid.
[5] Fabian and Petrescu, *Profesorul Emil Pop. Pagini alese*, 91.

> The significance of the scientific work carried out by these great Cluj academics for current and future generations can be summed up in the words used by Emil Pop to describe his own professors: "I have sipped from the cup of science, humanity and patriotism, offered by what were, at that time, probably the greatest professors in Transylvania…they were men of great cultural and moral authority."[1] These titans of Romanian science and higher education offer us a shining example of "duty, tenacity, professionalism and forward thinking, qualities without which scientific research could never advance and the protection of the environment could never be achieved"[2].

If we were to generalise, it could be stated that, without a clear knowledge of the history of science, science in itself could evolve towards pseudo-science or in the direction of ever more sophisticated techniques increasingly detached from nature, or even, in the worst-case scenario, employed against nature.

All sozology aims to do is to create harmony between human activities and nature, as Goetel visionarily stated in 1971 "Sozotechnology consists in the practical activity of industry that aims to counter the negative sides of scientific-technological revolution and to protect the humans from the future dangers brought about by the excessive technologizing of life."[3].

[1] Emil Pop, in *Emil Pop. O sută de ani de la naştere* (1897 – 1997), 175.
[2] Cristea, *Traditions in romanian sozology*, 23.
[3] Gawor, *Walery Goetel and the Idea of Sozology*, 87.