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Comisión Nacional Para El Conocimiento Y Uso De La Biodiversidad
An Exclusive Discussion with National Coordinator of CONABIO
Dr. José Sarukhán Kermez

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Abstract

The Mexican Commission for the Knowledge and Use of Biodiversity (CONABIO) is an Inter-Ministerial Commission dedicated to developing, maintaining, and updating the National Information System on Biodiversity (SNIB) (1-3). CONABIO supports projects and studies focused on the knowledge and use of biodiversity. It advises governmental institutions and other sectors, undertakes special projects and programs, shares knowledge on biological diversity, following international agreements on topics related to biological diversity (1-3).

The mission of CONABIO is to promote, coordinate, support, and carry out projects aimed at improving the understanding of biological diversity. The objective of CONABIO is to make society an informed and committed community in caring for Mexico's natural heritage, conserving nature and the environment, and using the natural resources of the country sustainably (3).

Dr. José Sarukhán Kermez, an Emeritus Professor, is known as the founding father of ecological research in Mexico. He is considered to be one of the most prominent ecologists and conservation scientists in the world. His research interests lie in the fields of ecology, biodiversity, and Darwinism. He has authored over 190 scientific works and 15 books with a focus on the natural capital and climate change.

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Discussion

Dr. José Sarukhán received his doctoral degree at the University College of North Wales (UCNW, United Kingdom). From 1979 to 1986, he was director of the Institute of Biology at the National Autonomous University of Mexico (UNAM). In 1987, after 14 years of working on the idea, Dr. Sarukhán Kermez founded the UNAM Environmental Research Institute, of which he is now Professor Emeritus. In 1989, Dr. Sarukhán became the President of the UNAM (1).

In 1991, the President of Mexico, Carlos Salinas de Gortari, voiced Dr. Sarukán's great vision of creating an organization that will encompass the existing knowledge of biodiversity in Mexico, during the UN "Earth Summit." As a result, CONABIO – the National Commission for the Knowledge and Use of Biodiversity, was founded in 1992. Since the creation of CONABIO, Dr. Sarukhán Kermez, with his enthusiastic team of scientists and students, investigated and developed new approaches towards biodiversity research and formal development of statistics about natural resources and biodiversity in Mexico (1-3).

Dr. José Sarukhán is a Foreign Member of the US Academy of Sciences, the Royal Society of London, the American Academy of Arts and Sciences, as well as a Member of The World Academy of Sciences, and the Mexican honorary academy, El Colegio Nacional. In 2017, José Sarukhán was acknowledged as the Champion of the Earth and won the Tyler Prize (4).

A.W. What does it mean to be the "founding father" of ecological research in Mexico?

J.S. Not even Darwin was a founding father. He continued the work that the older generation and his grandfather were fond of and involved in for a long time - transmutation of species. The similar story happened to me. I was honored to be the student of very knowledgeable pioneers of ecology in Mexico and received a doctoral degree in the field at the University College of North Wales. When I returned from the United Kingdom, the National Autonomous University of

Mexico (UNAM) board elected me as the Director of the Institute of Biology. This gave me a foundation to improve and to foster interest in ecology research among students, and finding scholarships for them. Thus, witnessing their growth in academia as well as in their personal lives is a very rewarding experience. I guess it is akin to passing down a generational legacy.

This was the start of the first doctoral program in ecology in Mexico, which took many years. The program was criticized, as many professors thought it would not be justified due to the lack of demand. I started from a very small base and came to a point where my colleagues and I established a Center of Ecology. It was a milestone that commenced my career in Mexico with the assistance and support of my students. Today, there are thousands of researchers with a doctoral degree in Ecology received from UNAM.

A.W. Can you discuss some achievements of CONABIO?

J.S. Since its foundation in 1992, CONABIO became third in its kind following the similar organisms established in Costa-Rica (INBio) and Australia (World Resources Institute). CONABIO became a bridge between academia and the government of Mexico; nothing similar existed before. This opened a new page of trust between two essential bodies of the country.

The development of CONABIO is divided into two main stages: compilation of information, then the analysis and creation of knowledge and research dissemination. Over the years, these two stages led to the vision of CONABIO - generating of intelligence and communication, that makes decisions relating to conservation and sustainable use of the natural resources of Mexico. The dedication to the research led to the construction of National Information System on Biodiversity (SNIB), which has accumulated data of nearly 11.2 million records about the specimens deposited in Mexico. It is interesting to document that back in 1992, there were only 200 biological specimens in Mexico.

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A.W. When did you explore "descent with modification" theory?

J.S. There are two stages in my career, which led me to the "world of evolution." I received my Master's in Agricultural Botany in Mexico, at the newly established School of Graduate Studies in Agriculture. This school opened the doors to evolution, more specifically, the "evolution under domestication, " which I had never studied before.

For the next stage of my career, I chose to be involved in a less descriptive and more experimental plant competition study. Thereby, I pursued a doctoral degree in Wales, United Kingdom, with a top scientist in plant population ecology, Dr. John L. Harper. This was a phenomenal experience. When I was in Wales, I studied my supervisor's paper on "Darwinian Approach to Plant Ecology." This was an assessment on how the number of plants implies very little about the real nature of the population. The more I studied it, the more the realm of evolution changed my research interest, perception of life, and the environment.

A.W. In your book "Las musas de Darwin," you state that concepts play a very important role in the biological sciences. Can you talk about social and cultural concepts affecting biology?

J.S. It is well-known that no book can change the world overnight. Still, both my book and Darwin's ideas were based on organizing the concept of biology. In fact, biology is a study of over a dozen research areas that have no generic concept. It was evolution based on natural selection that made biology even more significant in science. Theodosius Dobzhansky had an excellent definition for the relation of evolution and biology: "Nothing in biology makes sense except in the light of evolution."

Biology alone is a separate description of things. When researchers put biological descriptions together in accordance with the evolutionary system, they become an ongoing, interconnected,

interrelated, and amalgamated process. Medical or ecological research cannot be scientific without the consideration of evolution. Today, scientists try to understand the correlation between illnesses, autoimmune diseases, and evolution. Many scientists argue that medicine is biology, even though medical doctors do not accept this fact.

A.W. What does keep ecosystems live, and how do they function? Why are some regions more biodiverse than others?

J.S. To be clear, there is no demographic distribution of biodiversity, rather environmental factors. For instance, most biodiverse areas are zones with the least climatic restrictions: tropics with plenty of water, and fertile soils of their own, without intervention. And when environmental conditions are wide-ranging without restrictive conditions and interventions, with many species, biomass, more food for predators, this will create biological diversity. The biological system is mostly regulated through the relations of predator-prey, parasite-host without any constrictions. There is an interesting story about how I have been involved in the tropics study of Mexico. There was a project to erect a monument in every country of the world to Dioscorea villosa, a vine plant growing in Latin America, mostly Mexico. The most important contribution to humanity and science made by this plant is the first hormones extracted from this plant, i.e., contraceptive pills. This was an essential feature, which made huge sociological and demographical changes on the planet. Before this discovery, Cortisone, a steroid hormone, was produced from animal tissue, which was very expensive and complicated.

Moreover, the treatment with this hormone often was an inaccessible therapy for many people. My contribution to this project was to study the ecology of this plant, the available quantity in Mexico, how it can be reproduced, and its levels of efficiency. This is how I entered to tropics of Mexico and started making stories about all the tropics in Mexico and vegetation.

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A.W. Aging is an unsolved biological problem. There is a theory that DNA damage contributes to aging. What is the possibility if we return to the original molecular and cellular structure of DNA, we can slow the aging process?

J.S. Actually, the age expectancy in the developed countries was raised to an average of 70 years. This is a result of external elements, environmental essentials such as healthier food, sanitation, modern medicine, physical activity, etc. Still, all living organisms have their biological clock. When studying the methods of organ or tissue transplantation more in-depth, one will discover that this is a "rebirth" of person's organism. However, the degree of artificial intervention is not so high, as to return the organism to the original molecular and cellular structure of its DNA. As a biologist, I find that numerous transplantations will lead to robotization, rather than healthy human beings.

A.W. Can you discuss ethical standards in relation to the biological and physical environment?

J.S. This question is very relevant to what I teach nowadays - the ethics of the relations between species and environment. When discussing ethics, my concern is that bioethics is constantly associated with medical ethics and relations with patients. In my opinion, bioethics is a multi-leveled and multi-factorial concept, which includes more intellectually stimulating discussions, such as human relations with the planet Earth. Humanity came from the ecosystem, which they tend to destroy, hampering the further process of evolution on this planet. Thus, when observing ethics, first of all humanity needs to consider itself as a part of the evolutionary process, rather than a special creation of a special entity.

The second essential part of ethics is the nature. Humanity was born from the nature, and continues to grow in nature, using its resources as a supply for food and life. Therefore,

humanity needs to protect the nature and environment. This approach in science is called anthropocentric vision of environmental ethics. As a species, human beings have reached the point of understanding their position on this planet, which is why we have a duty to act responsibly in relation to the planet, other species, and humans. We, as a humanity, should have ethical understanding of nature and our surrounding world.

A.W. If not ecological science and biodiversity, what would you like to study?

J.S. The reason why I went into biology was that I wanted to study neurosciences. This science did not exist separately then, except choosing the profession of a medical doctor, which did not appeal to me. But through biology, I appeared into another major science of ecology. I was fascinated by how the Earth could transform physical signals into colors, sounds, poetry, and forms; I wanted to know all about it.

If I had an opportunity to choose something very different from biological sciences, it would be architecture. I am quite a good painter.

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