

Searching for the Dialectics in Biology: Prof. Dr. Ergi Deniz Özsoy

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We wish to start from the beginning. You had your bachelor's degree at Hacettepe University. Where and on what topic have you completed your doctoral research? Did you continue studying on the same topic after your PhD? Would you please to talk about yourself shortly?

I always wanted to study evolutionary genetics and population genetics, and in fact I was studying it. After I got my MS degree, I started my PhD at Hacettepe University. During my PhD, when I was a research assistant at laboratory of Aykut Kence, I was visiting the laboratory and running experiments there. There is a model organism I have been working on, *Drosophila melanogaster*. I was interested in its alcohol dehydrogenase (ADH) gene which can be studied on specimen collected from nature, in other words within their natural population. For evolutionary geneticists, it is a very special gene. And I was working on estimation of genetic variability via protein variability of this gene at laboratory of Aykut Kence. It was a study of evolutionary genetics via gene frequency.

After I completed these experiments, in Holland, around the end of 1997, I got a scholarship granted by the Scientist Training Group as a part of joint PhD program of TÜBİTAK. As a part of this scholarship I traveled to Holland, Groningen University Department of Genetics, to study in the field of population genetics. The gene of ADH and the other reagents related to it were being intensively studied in the laboratory I vis-

ited. I had carried out some field researches in Turkey previously. Among the bacteria I collected I took *Drosophila melanogaster* specimen with me and for 1,5 years I studied there on ADH and two different genetic polymorphisms related to it, namely the variability, different genetic systems within a single gene, within the framework of evolutionary genetics. During my stay there, while I was studying the genetic systems within this gene, I also benefited from their library, it was a very good library. Groningen is a university town in the first place. Walking around second-hand booksellers there I bought a lot of classical books on evolutionary genetics. Hence, there I spent a good deal of working days on evolutionary genetics and population genetics. This is the content of my PhD.

After my PhD, I kept working on population genetics, but I always studied on *Drosophila* as I am still doing. In 2004, I got a four months TÜBİTAK post-doctoral scholarship for the USA. Before that, in 2000, when I was in Holland, I got a scholarship for a three weeks intensive program called Statistical Summer School at North Carolina State University and visited there. For the scholarship in 2004 I preferred that university again. Trudy Mackay, who can be counted as one of the ten leading geneticists of the world, was studying on multiple genes at North Carolina State University. In Trudy's laboratory I joined a project researching on genetic infrastructure of temperature shock feature. Thus, I started to carry out studies combining my knowledge of evolutionary genetics with the field of

genetics of multiple genes. In 2010, I got a Fulbright scholarship and this time I visited Evolutionary Biology and Ecology Department of California University for a period of eight months. It was a very lovely experience too. There, within the scope of genome-scale expressions, I studied on the question of which genes were expressed when the larvae switched between different nutrient medias. When I returned, I fairly tended to a perspective examining the complicated relation between genotype and phenotype on the basis of *Drosophila* genomic. Each time for a period of four months, I visited Trudy's laboratory twice more in 2012 and 2014. Meanwhile, we carried out two projects.

Since my graduate school years, I read and work hard on history, philosophy, and genetics of evolutionary biology. The studies I have carried out were very exciting and they still are. Recently, the researches in my laboratory rather shifted to use of quantitative genetic methods in evolutionary genetics on complex genetics of genetic diseases. Of course, beside all the very exciting technical studies, history and philosophy of science that I practiced have always been a great attraction for me. Therefore, in my own way, I always tried to avoid a perspective without them. It is how it was, and it is still the same.

Population genetics steps forward in understating of the change for it proposes mathematical tangibility. How exactly this field opens up new horizons for understanding of the evolutionary process?

Actually, in order to practice evolutionary biology with all of its requirements, you absolutely need fundamentals of population genetics and evolutionary genetics to be firmly built, regardless of field of your study. Because, population genetics, i.e. evolutionary genetics, is the key for understanding of the evolutionary change in a broader sense; understanding of natural selection, genetic drift or the processes between them can only be possible by having a comprehensible knowledge of evolutionary genetics theory. And for sure, it is mostly mathematical and statistical genetics. If you want to comprehend the latest genomic analysis or if you want to perceive the other evolutionary processes like natural selection at a genomic level, you must start from evolutionary genetics. As a matter of fact, what we call evolutionary genetics, I mean the methodology or theory that includes total population genetics, is the spine of evolutionary biology. For instance, if you want to figure out what you actually mean by natural selection or reveal relevancy of the selection type you mentioned to reality, you have to handle the issue within the scope of evolutionary genetics. Otherwise, it must be classified as the art of storytelling.

You frequently use the analogy of “storytelling”. There are also some other biologists emphasizing on the fact that the books, Wilson’s “Sociobiology” and Dawkins’ “the Selfish Gene”, should be considered as a reflection of the capitalist ideology onto the field of biology. Would you briefly mention the biological weaknesses of this approach?

Sure, these approaches sooner or later end up with storytelling. Actually, Edward Wilson is a prominent population biologist. Dawkins has some important works too, he is a very popular author. However, in my opinion, the way they present their theses, for instance the thing Dawkins does by reducing social incidents and evolutionary history of the mankind to the biology is a heavily vulgar approach. It neither fits into biological reality nor into evolutionary biology's own structure. Although they make use of a theoretical terminology, the terminology makes no actual sense at the end. Of course, there are some points being already examined by social sciences. Scientific findings provided by social sciences already exist about the social issues onto which Wilson and Dawkins are trying to focus and claiming that they reached some conclusions by a biological approach. All in all, evolutionary biology does not provide us with an accurate measure or a proper framework for understanding of social incidents. That is my opinion.

So, you say it is where its weakness lies, is it right sir? The way they try to explain the social issues by biology...

Frankly speaking, no matter how strong is the terminology they use, at the end what they do is nothing else than a refined version of biological determinism. It is not only me, a lot of people think the same way. I also think that for the reasons like gaining an ideological popularity beyond their field they speak wrongly in terms of both social sciences and biology.

In his book “the Triple Helix” Richard Lewontin also makes similar points. You translated the book into Turkish for TÜBİTAK. Now it is being published by another publishing house.

When “the Triple Helix” was published in 2000 I was in Holland. For he explains the issues from a historical and social perspective I had already been finding his approach very close to mine. Therefore, when I saw “the Triple Helix” I happily bought the book and finished it within a single day. It was a very impressive book. Before that, there was another book of him translated into Turkish with the title “the DNA Doctrine”, but this new book was an even richer work. When I returned to Turkey I recommended the book directly to one of TÜBİTAK's popular science editors. They accepted and I translated the book, then the book was put into the list of the books to be released and finally it was published in 2007. Now it is being published by Say Press.

Was that the time you get in contact with Lewontin?

It was at the beginning of 2000's. I told Lewontin that I wish to visit his laboratory. He informed me that he was retired and his laboratory was closed. We messaged each other on occasions. When Spethen Jah Gould passed away in 2002, Richard Lewontin and Richard Lewins wrote a very nice article about him. In 2003 we were preparing a series titled as “Encyclopedia of Unknown Figures” for the Journal of Kebikeç that we have been publishing since the middle of

1990's. Each of us was to focus on an individual –not necessarily a famous one- and to write about him from a historical perspective. I recommended the article on Stephen Jay Gould published in Monthly Review to Kebikeç. Then, I wrote to editor of Monthly Review and Richard Lewontin to buy translation rights of the article. They treated us very nicely and they did not demand any fee for translation. So, we managed to publish the article in Kebikeç. Later on we kept writing to each other on various topics like science or literature. He is a very modest person and a tremendous evolutionary geneticist. He can easily be named among the 8 or 10 prominent figures since Darwin. As a matter of fact, in my judgement he is the greatest figure in the last 80-90 years of evolutionary genetics. Because his works are at a very high technical level and he is a tremendous statistical geneticist and a mathematical population geneticist. But, at the same time he is also the founder of molecular population genetics. Moreover, he is also a person I greatly admired since my undergraduate years for he takes the whole work of himself within the scope of a critical historical and ideological perspective. I like both his technical and rather popular productions. When I decided to make a new translation of Darwin's "On the Origin of Species" into Turkish, I asked him if he could write a prologue for the translation. He immediately replied to me in the next day and sent me an unpublished prologue for the Turkish edition before the deadline. It is not published yet but it is almost ready and it will be an edition of "On the Origin of Species" with a prologue written by Lewontin. I also want to add the notes of J. B. Haldane too. It will be worth to wait.

In 1985 Lewontin and Levins wrote a book together titled as "The Dialectical Biologist". You declare that you also embrace the same perspective. Would you please clarify what opportunities dialectical materialism provide for biology?

The first person who made use of it as a method in evolutionary genetics is Richard Lewontin. Lewontin has a lovely book named as "The Genetic Basis of Evolutionary Change" published by Colombia University in 1974. This is a very deep book dealing with arguments that derived from fundamental contradictions in evolutionary biology, and indicating, for instance, those who support natural selection and those who don't suffer from the same problems. Although it was published in 1974, I can say that it is among the first books that every evolutionary geneticist and every evolutionary biologist should read from cover to cover. Sometimes it is asked to Lewontin why he is not making a new edition of this book. Because genetic markers he referred to express himself are not being frequently used anymore at chromosome or protein levels. This is what Lewontin says; there is simply no need to rewrite it at DNA level, because it is only the reagent that varies. There is no change about the perspective. In consequence, in the book there is a perspective focusing on dependence of evolutionary processes to historical conditions at the beginning, new conditions emerging from the contradictions, progress of evolutionary processes via historicity of the conditions, and nature of evolutionary processes as a product of historical conditions. This perspective is a must for any evolu-

tionary biologist. He does not follow a quote and quote vulgar materialism. Obviously, he is a Marxist, but he makes use of a refined perspective that he learned from Marxism. Later on, they published “The Dialectical Biologist” together with Richard Lewins in 1985. Here, Lewontin is a contributor. So, actually, it is more like a Levins’ book. It is a collection that consists reviewed versions of previously published articles written by Lewontin and Levins, and it is a very informative book in deed. It approaches both ecology and evolutionary genetics from a dialectical perspective. For instance, if we talk in terms of ecology, it has an ecological and evolutionary perspective that simply “questions” inner potentials of organisms asserting that organisms create their own environment rather than being born into an independent one; that is to say, ecologically organisms do not enter into a niche out of their will, but they themselves create the niche. We can say that Levins is the founder of this perspective and I think it must be the spirit of evolutionary biology. This method is a perspective that explains evolutionary biological phenomena in a much better way.

Well, if we speak of Turkey... Last year, Foundation of Evolutionary Biology and Ecology held a series of meetings that you also participated with ministry against removal of the unit on “evolution and the beginning of life” from curriculum. We witnessed that the minister himself described evolution as “high level knowledge”, and claimed that junior high school and high school students cannot understand it. Do you think that evolution is extremely complex and

hard to understand?

No, I don’t think so. Well, in order to make a field research of evolutionary biology and to focus on evolutionary biology via concrete problems, there is an intense body of knowledge to be learned. In this sense, it is not an easy field of study. On the other hand, it also has some concepts that can be explained rather easily like natural selection or genetic drift. But it is how it should be done; you have to avoid a vulgar definition of natural selection, I mean, it must be done without turning it into a mere struggle or fight for survival. You can date all the species back to a single ancestor via a relation based on balance of similarities that can be constructed between living things at a lower level of organization, at level of organs. It is easy to show. I mean, it is very easy to show similarities. It is very easy to reveal a common origin at factual level of evolution. Evolutionary biology gets easy to understand as much as the other courses if you chose right examples while explaining natural selection and genetic drift. How they do it in other countries? Starting from different aspects of it at very young ages, all students comprehend evolutionary biology. If we have to follow the Iranian example, it is actually not a bad one. In fact it is a country that has an enormous cultural heritage. There are courses on evolution in many Middle Eastern Arab countries, only except Saudi Arabia. In these countries the students learn evolution properly.

I guess teaching evolution also means something...

Of course, by a biological understanding and an understanding of biological diversity at cellular level, at metabolism level, at genes level, at tissue level, at any level, by a perspective of evolutionary biology you may very meaningfully and sympathetically introduce behaviors of single individuals, interspecies relations, speciation, and biological phenomena. How they handle high school level education in other countries? In order to understand biological phenomena they focus on the many aspects of it touching upon agricultural problems, fundamental ecological problems, man-made environmental problems, or medical science. Thus, if you want to comprehend biology in such an integrity, including its fields of application, you cannot skip knowledge of evolution. In my opinion, the ministry's perspective of evolution is unrealistic.

In your interviews, you recommend Marxist theory rather than biology for those who want to understand the society. Can you tell us why? What is the extra thing that Marxism may offer to understand the society?

The Marxist methodology is one among the many other methodologies, but with its historical projection and with the way it handles relations and contradictions of a great number of cultural and social layers, it offers a very rich perspective. Therefore, I think benefiting from Marxism or other socially refined approaches instead of biology is a much better way of dealing with social events. It is an intellectually correct position. Because social conflicts, or other types of economically based historical and ideological clashes cannot

be understood through biology. If you create a terminology out of biology to understand them, it is simply wrong, it is moving it out of its context. For example, while you are explaining differences between societies or "differences between the civilizations", if you start to put it as a difference that resulted from a naturally selective "competition", that means you are to hit the wall. Because you cannot talk about natural selection here in the real sense of the word; I mean, natural selection must be based on conditions of evolution, heritability of the relationship between genotype and phenotype, and an environmental variable underlying genetic of the feature which you claimed that it was evolved by natural selection. You simply cannot apply it to a social problem. For instance, if you handle inequality of status between men and women explaining it merely by evolutionary biological differences as the sociobiologists do, you hit the wall. We have matriarchy, patriarchy, their historical aspects, their manifestation in different geographical areas, we have science of anthropology, history; I mean in presence of all these, making up something of evolutionary biology does not make any sense to me.

How did you get acquainted with Marxism? Your curiosity was driven by biology or political atmosphere?

I have never been engaged with a single political group. I have read it on my own. I made a reading of history, I have read the first volume of Das Kapital. I have read good works of Marxist historians like Gordon Childe or Marc Bloch. Thusly, I acquired a conscious

perspective of history through them. On the other hand, as I learned to approach historically while understanding biology, as I learned to approach with contingency perspective of Lewontin, i.e. within the scope of dependence on initial conditions, as I realized that more realistic results can be reached by this approach, it opened broader horizons for me. I can tell you that this is how I refined my method. Except these, I was not influenced by a political atmosphere or got engaged with a political group.

Now that we mention readings, you are also said to be a good collector of books. How did this interest get started? Could you find important books about our country's history of science?

I like to have first edition of a book, but it is not necessarily chasing for a collection. Sometimes I attend auctions. We are publishing the Journal of Kebikeç for almost twenty five years. In the first years of the journal, we had a tradition of auction that continued for almost ten years. The team that published the journal was also organizing the auction of books. For the auction we were receiving very important books. We were receiving very beautiful books, books in Turkish and in foreign languages, books that were unseen, books without a second edition. Since my childhood there has never been a single day that I spent without reading a book anyway. We were especially encouraged by our elders. For instance, I remember a 15 or 20 volumes of children's classics series published by Cem Press. I remember that I bought all the books when politically active elders of our neighborhood brought books to be

read by children. And now, I am visiting second-hand booksellers and I also buy ancient and valuable materials if I can afford them. For instance, I recently started to study Ottoman Turkish. I collect books printed in Ottoman Turkish on evolution, medicine, and biology. I have, for example, the first ottoman hard-cover books on evolution. I am trying not to miss opportunity when I find Ottoman books on epidemics that contain interesting biological information peculiar to Asia Minor. I have such a collection for it is also related to my field of research. Except these, I can say that on occasions of finding them I buy books that I like, that are crucial for perspective of literature and history.

It is said that scientific studies fell very short in the Ottoman period. In this respect, what is the result that your book and second-hand booksellers surveys indicate?

It must be considered as history of thought. Mostly, there are individuals that thought on scientific matters and produced popular or rather serious texts. Except these, in its modern sense there is no scientific production in the Ottoman era. There are a lot of people that wrote in terms of history of thought. Actually, it is a very rich climate regarding history of mentalities. Not only in the Ottoman era, also after the republic, after the switch to Latin alphabet, there are very interesting books.