Einstein e os Biólogos

Gisele A. Oda
Pós-doutoranda do Departamento de Física Aplicada
(Bifusp 06/05/2005)

Neste ano dedicado à divulgação da obra de Einstein, vale a pena conhecer fatos menos famosos mas, ainda assim, interessantes. O texto que segue é o relato de um biológo que teve, um dia, a supresa de saber que o grande fisico desejava conhecer seu sistema de estudo(*). John Tyler Bonner descreve este encontro emocionante em seu livro autobiográfico "Life Cycles: Reflection of an Evolutionary Biologist". No mesmo livro, relata também o encontro entre Einstein e Karl Von Frisch(**), da forma como ele o testemunhou.

"(...) In my early days as an assistant professor at Princeton, a friend called me to say that he had told Professor Einstein about a film of slime molds I had made as a student, and would I be willing to show to him. I was obviously thrilled and showed up with film and projector at the appointed hour. We had trouble finding a suitable screen but finally took a wall map of the United States and turned it around. After the viewing, Professor Einstein asked me if I would come into his study to discuss what we had seen. We were joined by the mutual friend who had arranged the meeting and Miss Dukas, Professor Einstein's secretary. We talked for some time, and what impressed me particularly was the depth of his questions. He wanted to know immediately the answers to all those questions that have been pursuing me all my life: How was the life cycle controlled so that it was the same each generation? Why does this kind of organism exist at all? Where does it fit in with other animals and plants? And he had many related questions. I wish I could have another conversation with him now; I have had much more time to think about these problems.

Professor Einstein was extraordinarily kind to me as a young beginner and seemed to have no trouble understanding my English. Occasionally he would stop to think, whereby those who thought he had not understood me explained in German what I had said. Each time he would flash furiously at them and ask them not to interrupt: of course he understood me! After we had finished and stood up to go, I told him that I knew the philosopher Alfred North Whitehead and had once asked him if he had ever met Einstein. Whitehead replied that indeed he had – under the most embarrassing circumstances. Lord Haldane, a very forceful man, had invited both of them to dinner. After dinner he escorted them to his study and left them there alone,saying they must have so much to say to each other. He told me, "Both Professor Einstein and I are very shy men, and we had an excruciating time – neither of us could think of what to say." I asked Professor Einstein if this memory of the event was the same. He gave me a warm smile and said it certainly was – it was a painful evening indeed. " You see", he said, " I was never able to understand anything Whitehead had written, so what could I say?" (...)''

"(...) As in the case of electrical signals of fish, honeybee language is also a moderately recent discovery, made during the Second World War. The original work was done in Austria by Karl von Frisch (for which he received the Nobel Prize along with Lorenz and Tinbergen many years later); because of the war it was unknown in the United States, France, and Britain until some time later. We first learned about it from a well-known Danish physiologist who had nothing to do with the work but felt the Allies should know, so he summarized von Frisch's work in na article in a *Scientific American* of 1948. I remember it well, because many American biologists simply refused to believe it – the story was too fantastic to be true. He claimed that bees had a language, and one bee could tell others where to go look for nectar, even long distances away from the hive. To settle the matter, a respected zoologist from Cornell found some money to bring von Frisch over to this country for a lecture tour, largely to learn whether the story was true or pure fantasy, as it seemed to many. His lecture at Princeton made a vivid impression on me. Albert Einstein, then na old man, sat in the front row to hear von Frisch's story in a spell-binding lecture. After the lecture Einstein asked

one of my colleagues if he could arrange to have von Frisch come to his house the next day. The arrangements were made, and my colleague, who was there during the visit, told me Einstein said to von Frisch that he saw a flaw in his experiments and suggested that additional ones were needed. Von Frisch replied that he had already conducted them, and they had also supported his theory. Einstein apparently was overjoyed, and they had a splendid time together (...)."

(*)Bonner dedicou a vida ao estudo de um sistema biológico fascinante, o "slime mold" (*Dictyostelium discoideum).* O fascínio está no ciclo de vida apresentado por estes organismos: o estágio unicelular corresponde a amebas que se alimentam de bactérias e que se reproduzem por divisão celular; diante de uma situação singular como a de escassez alimentar, um sinal químico é liberado ao ambiente por algum indivíduo, em torno do qual as outras amebas passam a se agregar de forma ordenada, resultando na formação de um organismo pluricelular! Este passa a se locomover como uma lesma, em busca de condições mais favoráveis; após a migração, passa a diferenciar o corpo, antes formado por amebas idênticas, e a disseminar esporos que germinam em amebas unicelulares, recomeçando o ciclo. A fantástica coordenação espacial e temporal apresentada durante o processo de agregação destes organismos tem sido amplamente analisada, hoje em dia, por fisicos da área de Sistemas Complexos.

(**)Von Frisch decifrou dois tipos de "danças" das abelhas. Quando a fonte alimentar está localizada a menos de 50m do ninho, a abelha dança em círculos e não transmite informação direcional. Para fontes mais distantes, porém, a abelha dança em uma trajetória na forma de "8" e o ângulo que uma parte desta figura forma com a vertical reflete o ângulo entre as posições do ninho, do sol e da fonte de néctar. Este ângulo é modificado conforme o tempo passa e o sol muda sua posição, ao longo do dia. Além disso, a velocidade deste movimento reflete a distância à fonte, sendo ela mais distante conforme o movimento for mais lento.