# AN EIGHTEENTH-CENTURY EXPERIMENT ON THE PROMOTION OF LARVAL DEVELOPMENT BY ELECTROSTATIC CHARGES

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In the Eighteenth Century many speculative naturalists supposed that charges from electrostatic generators might stimulate organic processes. Their writings are of considerable interest to the historian of ideas concerned with various notions about all-pervasive subtle fluids and electrical energy, which seem to have had their principal origin in the hypothetical queries appended to NEWTON's *Opticks*. Discoveries of "natural electricity" in the atmosphere and in varieties of electric fish lent impetus to the ideas, which influenced the experimental work of LUIGI GALVANI and ALEXANDER VON HUMBOLDT, among others. These ideas permitted naturalists to acquiesce in preconceived theories of life which satisfied curiosity but, with the exception of a few Continental investigators, did not provoke experiments on living things.

One of the exceptions may interest modern insect physiologists. In 1788 and 1789 a French naturalist, D'ORMOY, of whom nothing else is known to me, performed experiments which seem to indicate that electricity may stimulate larval development. His results were reported in ROZIER's *Observations et mémoires sur la physique . . .* for September, 1789 (Vol. 35, part 2: pp. [175-176]), under the title, "De l'influence de l'électricité sur la végétation, prouvée par de nouvelles expériences." I translate the portion of his article devoted to the experiment as follows:

> On the 22nd of April I took one hundred and fifty silkworms, which had all emerged that day from the same eggs. I divided them into two groups: one destined for electrification and the other to remain unelectrified, but with the same exposure and food. I communicated the electric fluid to them in the following manner: when they were still young I simply put them on the magic table [the so-called "prime conductor" of electrostatic generators], which was charged with three or four hundred turns of the wheel hourly from six in the morning until nine in the evening. When they had grown to a larger size I placed them on a cake of resin which communicated with the conductor by means of a strip of metal. I would further observe that I fed them only twice a day, just as was done with those not electrified.
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> By June 4th I had more cocoons among the electrified silkworms.
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> By June 5th and 6th the majority were occupied with spinning while those not electrified were still in their third stage of growth.
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> In 1788 I had the same results in conducting the same experiment and I observed, as I did this year, that electricity made them more vigorous, increased their

hunger, and preserved them from those diseases to which those not electrified were so strongly subject, when, for example, I gave them to eat two leaves cut when they were moist, or after the rain.

The temperature in the apartments during these experiments ranged from 13 to 17 degrees centigrade. Through the use of controls D'ORMOY sought to isolate any special circumstances which may have promoted growth in his experimental group. Even the more advanced group, incidentally, began to spin about a week later than those observed by LINNAEUS in Uppsala, as described in *Phalaena bombyx, Amoenitates Academicae,* vol. 4: pp.560-561; 1760.

D'ORMOY also tabulated the size of plants grown from seeds which had been electrified, in pots which were electrified, and compared them to control specimens grown under similar conditions of light, heat, and moisture. The effect of small electric charges in promoting the growth of plants has been the subject of recent investigation, but a search of the indexes discloses that this has not been the case in insect development. It is tempting to dismiss D'ORMOY'S experiments as crude efforts in which crowding of the larvae and a disposition in favor of theories of electrical influence may have had more effect than the electrostatic charges. I think that the wiser course, however, would be to bring this account to the attention of those able to judge its merit in the eyes of modern science.

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