Bernoulli, Johann
Dissertations. On the mechanics of effervescence and fermentation. On the mechanics of the movement of muscles. With an introduction by Troels Kardel. Transl. from the Latin and edited by Paul Maquet with the assistance of August Ziggelaar. (English) Zbl 0932.01074

It is well known that Daniel Bernoulli was a trained doctor as well as mathematician. Less familiar is the fact that in this respect he followed (and surpassed) his father John (1687-1748), who attended to medical and related matters early in his career. This valuable book contains the main evidence, in the form of a reprint of two dissertations presented to Basel University, translated into English for the first time. Related material is also included and translated, some within the introduction.

In the first dissertation, of 1690, Bernoulli distinguished between effervescence and fermentation by rate of process rather than by kind, and sought to explain both effects as caused by mechanical interaction between the molecules of acids and alkalis, each composed of molecules conveniently shaped into known geometrical solids. The dissertation was nicely reviewed in 1691 in the journal Acta eruditorum; the author has recently been identified as Leibniz. At its head he mentioned that John’s brother James had adopted the same view about the phenomena; the introduction does not provide the details.

The second dissertation, of 1694, is notable as the first deployment of the (new) calculus to biology, forming and handling a differential equation to represent the contraction of muscles. Bernoulli published his own summary in the Acta eruditorum in 1694; it was rendered into English in a book by S. Browne of 1698, and appears again here. The dissertation was reprinted in 1721, quickly exciting an anonymous response in the Acta eruditorum, which is also reprinted and translated. Bernoulli rejected a rival theory explaining the action of muscles in terms of the contraction of its fibres; then seen as less ‘mechanical’, it gained a better reception later.

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01A75 Collected or selected works; reprints or translations of classics
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