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Following the first mention of Biomechanics

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ABSTRACT: It is often stated that the term Biomechanik (Biomechanics) appears to have been used for the first time in 1887 by Dr. Moriz Benedikt, in *Über Mathematische Morphologie und Biomechanik*. However, in his Multilingual Database (2008), Georg Toepfer publishes what would be, to date, the first written mention of the term [1]. In this short article, we show a complete sentence with the first mention given by William T. Preyer in 1873.

KEYWORDS: History of Biomechanics, Biomechanik, first mention of the term.

I. INTRODUCTION

William Thierry Preyer (1841 – 1897)was born in Rusholme, England. He studied in Germany, where later on developed his career as a Professor of Physiology at the University of Jena. Preyer might have been the first to use the term Biomechanik, contrary to what is held in current historiography, which attributes the origin of this term to Dr. Moriz Benedikt. The latter mentioned it in *Über Mathematische Morphologie und Biomechanik*, within the framework of the Congress of Naturalists in Wiesbaden (Germany), in1887. The purpose of this work is to present, as far as we know, the first mention of the term in a complete sentence.

II. MATERIALS AND METHODS

To carry out the work, we have reviewed books and articles in which the term Biomechanics appears. The books and articles analyzed were published in German, English, French and Spanish.Through this procedure we identified 11 original texts written by William Preyer and Moriz Benedikt, between 1873 and1923.

Texts by W.Preyer

- Über die Erforschung des Lebens (1873) [2]
- Elemente der Allgemeinen Physiologie (1883) [3]
- Éléments de Physiologie Générale (1884) [4]

Texts by M.Benedikt

- Über Mathematische Morphologie und Biomechanik (1887) [5]
- Kraniometrie und Kephalometrie (1888) [6]
- Manuel technique et pratique d'anthropométrie cranio-céphalique (1889) [7]
- Das biomechanische (neo-vitalistische) Denken in der Medizin und in der Biologie (1903) [8]
- Biomechanical laws in medicine (1903) [9]
- Krystallisation und morphogenesis: Biomechanische Studie (1904) [10]
- Biomechanische Grundfragen (1910) [11]
- Biomechanik und biogenesis (1912) [12]

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Texts by other authors

- Humboldt. Monatsschrift für die gesamten Naturwissenschaften (1888) [13]
- Richard Avenarius' Biomechanische Grundlegung der Neuen Allgemeinen Erkenntnistheorie (1894) [14]
- Biomechanik, erschlossen aus dem Principe der Organogenese (1898) [15]
- Does Man Think With The Help of the Brain? (1908) [16]
- Materialismo y Empiriocriticismo (1909) [17]
- Bios : die Gesetze der Welt (1923) [18]

III. RESULTS

The expression "Mechanik des Lebens" [Mechanics of life] was already present among physicians and physiologists in the mid-nineteenth century.In A*llgemeine Physiologie des Koerperlichen Lebens*, written by H. Lotze (1851), we can find this expression in the title of the second chapter, as well as the interest in "the usefulness of physical concepts to explain life" (Von der Brauchbarkeit der physikalischen Begriffe für die Erklärung des Lebens) [19].

However, as far as we have been able to verify, the term "Biomechanik" appears for the first time in *Über die Erforschung des Lebens* (1873), written by William Preyer. After the preface (Vorwort), it can be read in German language that:

> Die Biomechanik unternimmt es aber keineswegs alle Mysterien des Lebens zu entschleiern. Das kann sie nicht, und sowie sie es versucht, verliert sie an Ansehen [2].
>
> [Biomechanics, however, does not claim to reveal all mysteries of life. It cannot, and as soon as it tries, it loses reputation].

Ten years later,Preyer places the term Biomechanics in the introduction (Einleitung) of *Elemente der Allgemeinen Physiologie* (1883), when he refers to the application of physical principles to the phenomena of life, relating the concepts Biokinetik, Biostatik and Biodynamik:

> z. B. *Biomechanik*, d.i. allgemeine Bewegungslehre der Organismen (*Biokinetik*), mit den beiden Unterabteilungen *Biostatik* oder Lehre vom Gleichgewicht der Organismen, und *Biodynamik* [*Zoodynamik* und *Phytodynamik*] oder Lehre von den Bewegungen der Organismen, im engeren Sinne *Phoronomie* [3].

Just a year later,in *Éléments de Physiologie Générale* (1884), similar words can be read:

> telle est, par exemple, la *biomécanique*, c'est-à-dire la science générale du mouvement des organismes (*biocinétique*), avec les deux suhdivisions, *biostatique*, ou science de l'équilibre des organismes, et *biodynamique* (*zoodynamique* et *phytodynamique*), ou science des mouvements des organismes, dans le sens propre de *phoronomie*" [4].
>
> [such as, for example, biomechanics, that is to say, the general science of the movement of organisms (biokinetics), with the two subdivisions, biostatics or science of the equilibrium of organisms, and biodynamics (zoodynamics and phytodynamics), or science of the movements of organisms, in the proper sense of phoronomics].

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IV. DISCUSSION

The term "Biomechanik" was introduced by Preyer in the text published in 1873, but as he says in its preface, the content of this script comes from a lecture he gave at the first general meeting of the 45th Assembly of German Naturalists and Physicians on 12 August 1872 in Leipzig [2].Therefore, we may suppose that he mentioned this term at that time.

Although the term was first introduced by Dr.Preyer, it will have to wait until Dr.Moriz Benedikt (1887) begins to assign value to express a new science. Benedikt proposed its first Principles and laws, established the first fields of application, proposed a new way of thinking medicine and biology and gave empirical support for their ideas. Perhaps he even coined the concept of biomechanics independently of its predecessor.It is due to use and resignification were given by Benedikt that the term “Biomechanik” begins to have the importance that we assign to it today, as we have expressed in previous papers [20] [21] [22].

NOTE

An interesting fact that resulted from our research is that Vladimir Lenin has also expressed himself on issues related to Biomechanics -we would strictly call it the Philosophy of Biomechanics -,while discussing idealism and materialism.

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