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Alexander R M. *Animal mechanics*. London: Sidgwick & Jackson, 1968. 346 p.
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The branches of mechanics that had been useful in zoology were explained, and many investigations that had used them, described. There are chapters on force and energy; joints and mechanisms; elasticity and viscosity; strength; pressure, density, and surface tension; motion in fluids; and vibration and sound. [The *SCI*® indicates that this book has been cited in over 200 publications.]

Engineering in Zoology

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I started working for my PhD at Cambridge in 1955. The head of the Zoology Department was James Gray, the pioneer of animal locomotion research, and much of the work of the department reflected his interests. I nevertheless tried to become a neurophysiologist, investigating unsuccessfully the pressure sense of fishes. Fortunately, I was sharing a laboratory with Ken Machin, the physicist turned zoologist, who encouraged me to think of fish buoyancy as a problem in mechanics, so saving my PhD. I continued research in biomechanics, investigating the swimming and feeding of fishes and the properties of various animal materials.

In 1966 Rodney Dales wrote to me as editor of a series, inviting me to write a book on "the mechanics of animal structures." I accepted and within two weeks had a contract.

I decided to write a book that would teach zoologists the mechanics most likely to be useful to them and would show them the wonderful things that had (even then) been achieved by applying mechanics to animals. I expected that many readers would find mechanics alarming, so I explained it as simply as possible, omitting formal proofs. I organized the book by mechanical topics, progressing from statics and dynamics through properties of materials and fluid mechanics to acoustics. I tried to hold the interest of readers by alternating sections on mechanics and on zoology, so that explanations of basic mechanics were followed immediately by examples showing how the mechanics had been applied to animals.

The book got good reviews, and an (unauthorized) Russian translation soon appeared. Six months after publication I was appointed to a chair in the University of Leeds, where I concentrated my research on the mechanics of legs and running.

The book went out of print, but a new publisher issued a second edition in 1983.[1] By then, comparative biomechanics had become far more popular: there had been six international symposia in 10 years, and the Society for Experimental Biology had formed a biomechanics section. I revised the book extensively, adding mechanical topics and zoological examples to reflect progress, but in one respect the new edition is less satisfying than the old: some of my explanations had to be rather incomplete because biomechanics had become so much more sophisticated.

Animal Mechanics is used by undergraduates but has probably had most influence as a reference book for research workers, who find it more accessible and more relevant than standard engineering texts. It is frequently cited as a source for an equation or an explanation of a mechanical principle.[2,3] No other author has attempted so comprehensive an account of biologically useful mechanics, but there have been several distinguished books on biological materials[4] and on biological fluid mechanics.[5]

1. **Alexander R M.** *Animal mechanics*. Oxford, England: Blackwell Scientific, 1983. 301 p. (Cited 30 times.)
2. **Kavanagh M W.** The efficiency of sound production in two cricket species, *Gryllotalpa australis* and *Teleogryllus commodus* (Orthoptera: Gryloidea). *J. Exp. Biol.* 130:107-19, 1987.
3. **Feldkamp S D.** Foreflipper propulsion in the California sea lion, *Zalophus californianus*. *J. Zoology* 212:43-57, 1987.
4. **Wainwright S A, Biggs W D, Currey J D & Gosline J M.** *Mechanical design in organisms*. London: Arnold, 1976. 423 p. (Cited 260 times.)
5. **Vogel S.** *Life in moving fluids*. Boston, MA: Grant, 1981. 352 p. (Cited 135 times.)

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