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# Chemical Wave Transmission in Nerve

by

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BASED ON THE LIVERSIDGE LECTURE DELIVERED  
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## P R E F A C E

**I**N his will the late Professor Liversidge made a bequest to the Master and Fellows of Christ's College, Cambridge, "for the encouragement of research in Chemistry not in ignorance of the fact that there are already in existence other Lectureships in Chemistry but because there are none such as I contemplate namely for the express encouragement of research and for the purpose of drawing attention to the research work which should be undertaken and because having regard to the vastness of the subject I wish the subject to be elucidated by as many workers as possible and feel that the friendly emulation of the lecturers holding the various lectureships above mentioned may be of benefit".

He enjoined that "if possible the lectures shall be published. . . so as to disseminate the information for the benefit of such of the public as are unable to attend", and further that "the lectures shall be upon recent researches and discoveries and the most important part of the Lecturer's duty shall be to point out in what direction further researches are necessary and how he thinks they can best be carried out".

"Having regard to the vastness of the subject" the Master and Fellows invited, to give the lecture in 1932, not a Chemist but a Physiologist: who, gladly accepting the challenge and its implication that physiology is a branch of chemistry (as of several other sciences), chose for his subject one in which the help of Chemists (not to mention Physicists and Engineers) is an essential con-

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## PREFACE

dition of advance. The most important part of his duty being to point the way to further researches and “how he thinks they can best be carried out”, he has urged that Physiologists should seek the aid of Chemists in the study of one of the most fundamental of their problems.

For the Lecturer has observed that Chemists (not to mention Physicists and Engineers) are very intelligent people. Often, to be sure, they are singularly ignorant, not seldom they are quite unaware of the most elementary facts. He has met—incredible it may seem—persons of great distinction in these subjects who did not know that a frog’s heart will go on beating, its nerves transmitting messages, its muscles contracting, long after these are removed from their owner. He has admired the astonishment with which they regard quite simple everyday things relating to life, their readiness to accept vital phenomena as magic beyond reason or experiment. He sympathizes with them in this, for he too is often afflicted with the same wonder and astonishment. But perhaps that is because, as Ernest Starling once told him, he too is so ignorant.

One of the Lecturer’s fond dreams is of a day when all educated people will have at least an elementary knowledge of the main facts of life. At present they are apt to take no interest at all in the matter: or—what is worse—to imagine that life is merely rather complicated colloid chemistry (it certainly *is* rather complicated). For biology, after all, is the fundamental science: indeed the behaviour of the nervous system—the study of which belongs to physiology—is the ultimate basis of all education and of all intellectual activity. Our bodily habits affect even our theories of the nature of things,

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as witness the influence of ball games on doctrines of the constitution of matter proposed by British Physicists. Our conceptions of time and space and mass depend on the impressions which reach us from our sensory organs. No Biologist has not read of the atomic theory of matter: yet many Chemists—one might say most Chemists—have never even heard of the “atomic theory” of nervous activity, namely, that this depends on wave-like impulses of an “all-or-none” character, with properties as clear and as peculiar as those of any other wave. It is sad but true, and something must be done about it.

Realizing then, on the one hand, how little they know of such things, and on the other how much interest they would find if they knew and how much help they could give, the Lecturer has broadcast this, his S O S; in the hope that a Chemist or two may be induced thereby to come to the aid of Physiologists in one of the most difficult—and therefore the most attractive—of all scientific problems, the nature of the change (he forbears to call it the mysterious change!) which is transmitted in nerve.

A. V. H.

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*July 1932*