J. Zool., Lond. (1998) **244**, 157–158 Printed in the United Kingdom

John Zachary Young

1907–1997

John Zachary Young, or 'JZ' as he was known to friends and colleagues around the world, was one of the most distinguished biologists of the 20th century. Trained as a zoologist, his fields of study ranged extraordinarily widely. He was renowned as a neuroscientist for his studies of the nervous systems of animals and of the regeneration of nerve fibres after injury, and for the rediscovery of the giant nerve fibres of squids. He was an acknowledged authority on cephalopod molluscs. Besides this, he was an outstanding teacher, not only of his students but of a far wider audience through his writings. His achievements are formidable and his influence on others cannot be measured.

Born in Bristol on 11 March 1907, JZ was educated first at Well House, Malvern Wells, and then at Marlborough College in Wiltshire. Here in the VIth form he studied biology under A.G. Lowndes, whom he always spoke of as a great teacher who gave his pupils 'opportunities to find fascination in living things and the possibilities of exact investigation of them'. Next came Magdalen College, Oxford, to read zoology. After gaining the best First in 1928 he was awarded the Naples Scholarship. This enabled him to make the first of many visits to the Stazione Zoologica in Naples, which continued until very recently.

At the Stazione Zoologica he was to study the autonomic nervous system of fishes. During his stay there he met the physiologist Enrico Sereni, who introduced him to cephalopods. Together they investigated the regeneration of the nerves of *Octopus*. At this time, JZ found an undescribed structure attached to the stellate ganglion of an octopus. This, the epistellar body, he described in 1929, in his first publication, which he wrote in Italian. In the 1930s, when searching for a similar structure in a squid, he found instead huge transparent strands. These, to his astonishment, after carrying out critical but simple electrical stimulation of the strands, he proved to be giant nerve fibres. Realizing the value of such huge nerve fibres, he demonstrated his preparation to physiologists in Britain and America. This preparation allowed physiologists at that time greatly to increase the understanding of the excitability of nerves. In this period, JZ continued to study and to work out the details of the anatomy of the giant fibre system of *Loligo*.

The 1940s saw the publication, with F.K. Sanders, of his first paper on learning in cephalopods. Further studies were prevented until the end of World War 2, but afterwards JZ returned to Naples to undertake micro-anatomical studies of the nervous system of *Octopus* and test the capacity of this animal to learn. At the same time, he wrote many detailed anatomical papers on the retina, the central nervous system, the eye, and the optic lobe of cephalopods. These were beautifully illustrated and included many of his own meticulous drawings; clear and simple but with all the anatomical details needed. They ranged from a brain, built up from serial histological sections, to a single

https://doi.org/10.1111/j.1469-7998.1998.tb00020.x Published online by Cambridge University Press

nerve cell or synapse. He disliked stylized diagrams and always spent much time to ensure that his drawings were as naturalistic as possible and to give the structures depicted both shape and form.

In the 70 years that followed his arrival at the Stazione Zoologica, JZ published more than 100 papers on cephalopods, as well as the most comprehensive study of any cephalopod brain, *The anatomy of the nervous system of* ***Octopus vulgaris*** (1971). These studies, many of them now classical, led to a Symposium of the Zoological Society of London held in his honour in 1975; he continued to study and to publish many further papers about these animals, and was still at work on a jointly authored book shortly before his death. The many visits to the Stazione Zoologica and his many scientific contributions were recognized by the granting of the freedom of the city of Naples in 1991, an unusual honour and one which gave him very great pleasure.

In 1974, JZ was awarded the Zoological Society of London Frink Medal for British Zoologists for substantial and original contributions to zoology. JZ had been a Fellow of the Society since 1938, and had served on its Council and committees; in 1990 he was granted Honorary Fellowship of the Society for his contributions to zoology, not least for his books *The life of vertebrates* (1950) and *The life of mammals* (1957), which revolutionized the teaching of zoology. These books bear tribute to him as both are still in print and have been translated into several languages.

Other books developed from lectures include the Reith Lectures, published under the title *Doubt and certainty in science* (1951), *A model of the brain* (1964) from the Withering Lectures, and the Gifford Lectures as the *Programs of the brain* (1978), further developed in *Philosophy of the brain* (1987). *An introduction to the study of man* (1971) grew extensively from the introductory lectures which he gave to medical students. All of these books, and others he wrote, show his great interest and fascination with the brain and his breadth of study of animals and humans.

During the years of World War 2, JZ's studies of nerve fibres were to be used to great effect. In Oxford, he organized a group of scientists and clinicians to investigate the regeneration and degeneration of peripheral nerves to help in the treatment of nerve injuries sustained in combat. JZ moved to London in 1945 when he was appointed to the Chair of Anatomy at University College London, the first zoologist to hold such a post. Here he built up a large department and promoted research, gathering together specialists in many fields, most especially in the nervous system and cell biology.

In 1945, he was elected a Fellow of the Royal Society, and in 1967 he received the Royal Medal of the Royal Society. Among many other awards are the Linnean Gold Medal in 1973, and the Jan Swammerdam Medal from the Amsterdam Society for Natural Sciences and Medicine in 1980. In 1986, he was elected an honorary fellow of the British Academy. He was also deservedly honoured by many universities in Britain and abroad, and in 1979 he was admitted to the Degree of Doctor of Science in Oxford University.

To all who knew or met John Young it was his enormous, infectious enthusiasm and passionate interest in living organisms, and especially in their functional organization, that will remain an abiding memory. He will be greatly missed by friends and colleagues around the world, and especially by those at his 90th birthday party, whom he called his 'scientific family', and not least by his three current co-authors, but most of all by his own family. However, we are fortunate for, as he wrote in *Programs of the brain*, 'Individuals die but their genes go on. The information and order that is stored in their brains is mostly dispersed, yet some of it continues in the remembrance of them by their children and by others, more of course if they have produced writings or works of art', and JZ has left us richly endowed with his writings.

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https://doi.org/10.1111/j.1469-7998.1998.tb00020.x Published online by Cambridge University Press