SYDNEY JOHN HICKSON

1859—1940

S. J. Hickson died on 6 February at Cambridge after sixty years of active and distinguished professional life devoted to zoological research and to the establishment of zoology as a satisfactory subject of study in the universities and schools of this country. Born in the year 1859, he took an active part in the application of the principles of Darwinian evolution to morphology and embryology, and he was keenly interested in the rise of genetics which occurred early in the present century: later, he returned to the basal subject of systematics, a subject soon to be illuminated by experimental work in the laboratory and in the field. At the same time he was instrumental in establishing biology as a school subject and did much for the encouragement of popular natural history. He was elected a Fellow in 1895.

He was the youngest of a family of nine, his father being a prosperous boot and shoe manufacturer whose works were situated within the City of London. His father had a large house at Hampstead, which was then in the country, and drove daily to his office. On one side was a brickfield, while on the other an attempt was made to develop a ‘Vauxhall’ Park for North London, which never was a social success. There was much open country over which the boy roved, bringing home every living beast he found to the disgust of his family. Thus he developed an individuality and precocity which enabled him to appreciate the many advanced thinkers who were his parents’ guests. Of these he had vivid recollections of Charles Voysey, Mrs Besant, and Charles Bradlaugh (Iconoclast). This association made a deep impression on Hickson’s mind and did much to mould his political opinions. He was a staunch liberal, interested
in social reform. He had a particular interest in land values and was President of the League for the Taxation of the same in Manchester. In his later days he deplored the decay of liberalism, but was always optimistic of the revival of the Whig party.

After home education Hickson was sent to school at the Mansion Grammar School at Leatherhead situated in a park on the River Mole. Here his love of natural history was encouraged as had been that of Ray Lankester ten years earlier. In 1873 he was transferred to University College School, where he became distinguished both in scholarship and in athletics. He went on to the College in 1876, where he fell under the influence of Ray Lankester whose lectures fascinated him, more so perhaps than those of Huxley which he attended at South Kensington. He was Gold Medallist in the following year before proceeding to ‘Barts’ where the teaching of Klein attracted him.

It was on the advice of Lankester that he was admitted as an undergraduate to Downing College, Cambridge in 1877. In later years, he was to be a Fellow of the College and afterwards an Honorary Fellow. This was only one of the ties which held Hickson to Cambridge, but it is one from which he always derived great happiness and of which his College is justly proud. Sir Michael Foster, later Secretary of the Royal Society (1881–1903), was then a lecturer of Trinity and was actively developing biology at Cambridge—his professorship of physiology was only created in 1883—and Francis Maitland Balfour had been his favourite pupil. They were leaders of a flourishing school, which exercised a permanent influence on British science. Hickson was welcomed in every research room and made many friends. In 1881 he obtained his first class in the Natural Sciences Tripos, but he had already published an investigation of the eyes of Pecten, on which he had been occupied for two years. The technique employed was mainly that of dissection and teasing aided by a few sections cut on the sliding microtome and mounted separately. It was the first accurate histological account and provided the well-known textbook figure; it also included the discovery of the tapetum and the ‘red fluid pigment’
below it. All three species were examined and also the eyes of *Spondylus*, which proved to be of similar structure.

After taking his degree Hickson became demonstrator to Moseley at Oxford where he formed a lifelong friendship with Baldwin Spencer. His professor was a man of singular charm, formerly of the Challenger Expedition, and distinguished for his masterly reconstruction and consideration of the Stylasteridae and for his work on corals. His interest lay mainly in the study of sedentary animals and to this his demonstrator devoted his powers until he died. His first subject was *Tubipora*, in which he discovered the spreading stolon from which are budded off the earliest polyps, these being later replaced by further budding from the platforms formed at higher levels. The corallum is built of spicules, the serrations of which fit together like ‘the membrane bones of the skull’. The ciliated groove was discovered and the tabulae investigated with particular reference to any relationship to *Syringopora*.

In vacations *Alcyonium* was being examined at Plymouth and its in- and out-flowing currents experimentally investigated in the living polyps. The results were published in the Philosophical Transactions giving the first complete account of these and proposing the now universally adopted term ‘siphonoglyphe’. In the family it proved to exist in all forms in which autozooids only are present, in *Sarcophytum* in both autozooids and siphonozoooids and in the rest of the dimorphic species in siphonozoooids alone. This work was followed up twelve years later by a detailed study of the whole anatomy and of the habits of *Alcyonium*; and twenty years later by his pupil Miss Pratt’s valuable study of the allied tropical genera from the Maldives. Hickson’s earlier papers indicate a habit in all publications of replacing text by figures where possible.

Meantime an interest in the eyes of animals continued. An examination of those of many phyla was undertaken and finally he concentrated on the eye and optic tracts of *Musca*. For comparative purposes he made an examination of the eyes of all arthropods that had previously been investigated. The resulting
paper (1885) is an excellent histological work and proved that certain elements are common to all animals and used in the same way. It summarized all previous work and cleared up the confusion that had arisen from the views of a series of investigators from Swammerdam onwards. It still to-day stands as the authoritative work on the insect eye.

Hickson had to see the sedentary life in which he had become so deeply interested in its natural environment. To this end he spent the year 1885–1886 in the Makassar district of Celebes, his account of which is given in A Naturalist in North Celebes, published two years later. He was no longer the ‘lopsided’ naturalist without field experience, but his stay was only a partial success, for, when he had started observations and experiments on the associations of animals and plants on the coral reefs of Talisse, he was attacked by malaria for which there was no known remedy. He was sent to the high lands of Makassar where he made many observations on the native tribes; in those days ethnology was not a science and he never acquired an intensity of interest in land animals. The account of the reef is vivid: ‘a tremendous interchange of goodwill between the different kinds of animals getting their living on a coral reef . . . the greatest struggle for existence that there was anywhere in the world’. The impress of the living organisms was permanent and produced in all subsequent research a most desirable attitude, so unlike that of Kükenthal to whose views he was constantly opposed.

On his return Hickson settled at Cambridge for two years, working also in Lanester’s laboratory at University College. Several times Holland was visited, and he was once characterized by Verschluys as ‘the only Englishman who could understand zoological literature in Dutch’. He made the acquaintance of Weber, Hubrecht, van Bemmelen, Sluiter, and, as time went on, of every zoologist who attained to responsibility in that country. With Max Weber, whose earlier work was on coelenterates, he was in correspondence for nearly fifty years and he was invited to take his choice of the ‘Siboga’ collections. With Verschluys
he constantly exchanged letters not only on scientific matters but on the life and politics of their two countries. In 1922 he received the rare honour of being made a member of the Netherland Zoological Society on its 50th anniversary and the Honorary Doctorate of Groningen.

During 1888 Hickson was in charge at Oxford as Deputy for Professor Moseley whose fatal illness had commenced. The following year was spent with his uncle, Sir Sydney Waterlow, the retiring Lord Mayor of London, in touring Canada, the United States, and Mexico. In 1890 he returned to Cambridge as Lecturer in Advanced Zoology. Sir John Graham Kerr, a pupil, records his 'infectious enthusiasm for his special group of Alcyonaria. His students felt that there indeed was a group well worthy of study—a feeling that was accentuated by the sight of his indignation when one of his pupils helped himself to an unduly large share of the beautiful Millepora he gave us to make into microscopical preparations'. He might well have been indignant for he was then following up Moseley's anatomical account by researches on its reproduction and species which were subsequently published in ten papers. He discovered the yolkless ovum and its formation and migration, this resulting in its final dissociation from Hydractinia. Then followed the development of the medusa, a functionally active zoid degenerating on the arrival of the germ cells, losing its mouth, protective nematocysts and basal cavity, the resulting medusa having no velum, sense organs, radial and other canals. The free medusa was not obtained until 1899, when the unfertilized ovum was found to contain zooxanthellae, the medusa itself still with closed mouth and dispersed solely owing to its specific gravity being approximately the same as that of seawater. The wound after the medusa was shed was found to heal. A search of museums in connection with Zittel failed to find any Tertiary Millepora, and Hickson was exercised as to its cosmopolitan distribution in the tropics. He commenced a systematic examination aided by collections preserved dry and in spirit from the same growths. The polyps examined histologically showed no variation, and he
concluded that he was dealing with a monotypic genus as with *Tubipora* and *Distichopora*, which he had also studied. Later, he confirmed his conclusions by the examination of large Funafuti and Maldivé collections, in which numerous specimens presented several growth-facies.

For purposes of comparison Hickson in eight papers considered the species question in other 'Hydrocorallinae', from which later he separated as a distinct sub-phylum the Stylasterina. He discovered the trophodisc in *Allopora* and described the formation of the yolk within the ova. These were found to be carried in the younger branches, while the sperm morulae were confined to the older and thicker. Stress was laid upon the egg in the Stylasterina being a simple multinucleated plasmodium and the possible support given to the view that the Metazoa were derived from multinucleated Infusoria. He discussed the question of the fragmentation of the nucleus, which he never found where there was cell division.

In 1894 he was appointed Beyer Professor of Zoology at Manchester, succeeding Milnes Marshall whose early interest had been in Alcyonaria. In his Inaugural Lecture he paid tribute to him and to the fashioning and stimulation of zoology by Huxley who had recently died. Then he appealed for a widening of the range of subjects in education and the encouragement of the reading of the more popular scientific works. Here he was influenced by his knowledge of Holland, where from 1876 in all middle and higher schools natural history was studied for two hours weekly for three years. It was largely due to Hickson's efforts that during the next thirty years Lancashire took a leading place in the organization of the teaching of natural history, the development of school museums and the building of steps leading from schools to universities. For this object he wrote two popular books, *The Story of Life in the Seas* and *The Fauna of the Deep Sea*, which produced a host of correspondents.

The first ten years at Manchester were strenuous; all the classes were reorganized, agreements being reached with the medical faculty. The museum was developed for teaching as well
as for exhibition, and many open lectures were delivered, notably those in the museum and at the meetings of the City Microscopical Society with its 200 members, of which he was President for most of his Manchester life. He was also in great request for Sunday ‘talks’ to ‘brotherhoods’ which were a peculiarly strong feature of the town; and he was active in the Literary and Philosophical Society. He faithfully discharged his duty to the City and was frequently consulted, particularly on questions relating to the water supply and animal pests in slums and parks. He played an active part in the reorganization of Owen’s College as the University of Manchester, which followed on the dissolution of the Victoria University into its three constituent Colleges. This problem was approached from the viewpoint of a broad liberalism pleading for equality of the sexes and giving due regard for the maintenance of ceremonial tradition and local patriotism. Zoology grew rapidly and yeoman service was given by his assistants, Ashworth, Gamble, Hoyle, Hewitt, Darbishire, and Cameron who were also active in research. The Cambridge tradition of weekly tea parties to consider the latest trends of research was established.

It was amid a welter of business that Hickson had to prepare his address as President of Section D of the British Association. He chose as his subject variation as found in the sedentary coelenterates and concluded that species can only be determined by the methods of experimental morphology, a revolutionary idea at that time but a commonplace to-day. He was also engaged in the preparation of the volume on Coelenterata for the Cambridge Natural History which he enjoyed and which is still a standard work. He was less happy over five sections of Protozoa in the Oxford Zoology as he regarded them as very ephemeral; these were written out of friendship for Lankester who was ill and in difficulties with the Trustees of the British Museum. There was also a difficult problem raised as to the place of economic science in the curricula of the university, Hickson having accepted ‘the self-imposed duty of making free identifications and giving advice to all comers’. As a result
sub-departments of Economic Zoology and of Entomology were instituted later. Entomology was a success, but the area was unsuitable, the field laboratory far away in Cheshire, and the experiment was closed shortly after the war.

The new century saw papers on *Dendrosoma*, the Siboga Stylasterina, various reports on Madreporaria and Alcyonaria, particularly the Siboga Coralliidae and Pennatulacea, the latter (1916) representing the vacation work of ten years. Here he had over 500 good specimens from depths down to 1000 metres as compared with the Challenger 76 and Valdivia (*Funiculina* excluded) 200 from depths down to 200 fathoms. The morphology—17 out of the 25 genera were represented—was reinvestigated and the spicules examined. The estimate of the order was conservative as to genera and species as compared with Kolliker and Kükenthal. The lack of knowledge of the living forms is lamented, and it is suggested that the order was derived from a free-living colony of Alcyonaria produced by budding from a primary zooid which developed a muscular body-wall and a pronounced bilateral symmetry. The production of genera and species was largely the result of the varying evolution of these characters associated with the acquirement of independent movement. These views were confirmed in a report on the Murray Expedition's collections in 1937. The subject was considered in the Croonian Lecture (*Proc. Roy. Soc.* 1918), the relative effectiveness of radial and bilateral symmetries being also discussed.

The administrative work of the university in the post-war period was overwhelming, for its position in respect to the schools had to be recreated. Many courses of lectures had to be duplicated for the sake of demobilized students, and all afternoons were passed in Committees. There were national demands for biologists, the status and pay of whom required revision. Hickson was distressed as to the members of the flourishing school of zoology and exploration at Vienna, many of whom, once wealthy, were in acute distress. Their relationship had been most friendly with this country, and he organized, collected, and administered
the necessary help. However he found time by 1924 to complete a book on that heterogeneous collection of animals and plants popularly termed ‘corals’. It bristles with original observations on their modes of life and is in general use for advanced teaching. At this date here is the description of a coral reef as ‘a huge, living, pulsating organism slowly stretching out an arm here and withdrawing one there, in some places showing youth and vigour, in others disease and death’. Otherwise research suffered, but the collection of facts for a revision of the Alcyonaria continued. Finally in 1924 the age for retirement was reached, but the University invited him to continue for two years.

Hickson returned to Cambridge in 1926. He was still vigorous and his old university invited him to deliver advanced courses on Coelenterata; their success was largely due to his enthusiasm, for his youthful style was still there. A research on the excellently preserved specimens of Gorgonacea collected by Mortensen off Panama followed (1928). This enabled a revision of Verrill’s work which was mostly on dried specimens and drew attention to the extraordinary richness of these very muddy waters as requiring experimental study. He then revised the Xeniiidae (1931) considering the dimorphism of their polyps, examining afresh their anatomy and finding new systematic criteria. This was founded on the Great Barrier Reef collections and to-day finds confirmation and extension in the experimental studies of Gohar at Ghardaqa.

One of the Great Barrier Reef reports deals with the Gorgonacea (1932) and is concerned largely with spicules and colouration. Then followed a determined attempt during the next five years to examine, both macro- and microscopically, all possible types of Melitodidae (Trans. Zool. Soc. 1937). This contained a full account of their spicules. Great systematic differences were found on the two sides of the Indian Ocean; on the African side these also existed between its northern and southern parts, whereas the same species live from Japan to Australia. The last important paper in this series is that on the Murray Expedition’s Gorgonacea, published posthumously in
1940. Here is discussed the widespread distribution of deep-sea Alecyonaria and their liability to variation, the muddy bottom leading to more rapid growth and the scarcity of food to longer internodes and more scattered and larger polyps. The belt, tube and other forms of growth are considered in respect to symbionts and this produces overwhelming evidence in opposition to Styasny who seems to regard them as normal growth forms. The report brings out his lifelong controversies with Kükenthal and other authors in respect to species in sedentary animals. He had practical knowledge of analogies in all the phyla and hence his conclusion that all his specimens of *Chrysogorgia* are growth-forms of a single species.

In his retirement a research on *Gypsina* (1934) was a great source of joy to Hickson, because he had vivid recollections of the 'Great Eozoan Controversy', which commenced in 1875 and had known personally most of its principals. In 1930 when searching through my shelves for *Polylemma* and its allies to re-examine his previous work he discovered many further specimens of *Gypsina*. In 1933, having also received Crossland's collections from the Society Islands and Red Sea, he came to the conclusion that he was dealing with a cosmopolitan, monotypic genus. He examined the anatomy again in comparison with the fossil *Stromatopora*, the coelenterate affinities of which he had always doubted. After publication of his results (*Quart. J. Micr. Sci.* 1934) he sent his preparations with other material to Professor Parks at Toronto whose research on the fossil side was renowned. The conclusions of Hickson were accepted by him, the stromatoporoids being really rhizopods, *Gypsina* to be especially compared with *Actinostroma*. It is interesting to observe that he had discussed this question exactly fifty years earlier with Alleyne Nicholson.

To estimate the research work of a teacher, colleague, and friend is always difficult. Hickson’s descriptive work is characterized by a strictly impersonal attitude towards anatomical facts and it is certain that these must be accepted without any reservations after a re-examination of his microscopical preparations, all of which together with his type material has been given to the British
Museum. The thoroughness with which he corresponded with directors of Museums and his success in obtaining fragments from many type specimens were characteristic of him; these enabled him to obtain spicules which had often been neglected and yet are critical in the systematic study of the Alcyonaria. A passage from a letter of an American specialist in Alcyonaria, Dr Deichmann of the Agassiz Museum at Harvard, may be quoted: 'He had the old fashioned naturalists' great interest in animal life, the anatomists' interest in structure, and the endless patience of the good systematist. His works have not the harshness of the modern systematists' writings; his style was good and there was no unnecessary padding; each sentence contained some valuable information. Even if some of his new species turn out to be forms which were previously described (and very poorly described), even if some of his theories turn out to be wrong, his work will undoubtedly stand the test of time. To mention only one paper, his monograph on the Siboga Pennatulacea is a truly great work and typical of his careful method of working'.

As a professor Hickson built up a fine school at Manchester and what pleased him most was that it was fed from the neighbourhood. All his life he was interested in women's education and was instrumental in securing equality of sex in his university. As a Governor of the Manchester High School for Girls his advocacy was important in improving the training of women and the securing to them of opportunities of applying their knowledge; he was particularly pleased in that several of his lady pupils proved highly competent in research. He was greatly interested in the Manchester Museum and acted as Director for six months when Hoyle went to the new Welsh National Museum, and for periods on several other occasions. He was in his turn Dean of the Science Faculty and he had several periods of service on the University Council. Here he was known 'for his carefully considered and well expressed opinions controlled by practical common sense'. Discussion on a proposed Faculty of Theology was a difficult matter in a non-sectarian university and brought out his insistence on the importance of the Study of Comparative
Religions, which finally was accepted as a compulsory part of the curriculum. He was disappointed that a scheme for the physical training and medical examination of students was rejected, but it is now recommended for general application by the University Grants Committee. To his students Hickson was kindness itself and his 'wise but quiet and forceful' advice was available to all research workers, to whom he was most generous in the loan of his research material. He enjoyed social events and his house was a centre both for his colleagues and students. His outlook was essentially boyish, and he never lost his enthusiasms. When young he had been a good cricketer and gymnast and later as Treasurer he was instrumental in buying and improving the University Ground and a second Ground for the women students. Saturday afternoons were devoted to encouraging the matches on these grounds and a week-end's absence in term-time was unknown to him. This was typical of his conscience which ordained a devotion at all times and in all ways to the University which employed him. This was a fine and most valuable feature in one who was happy and radiated happiness to those around him, even if almost impossible in the more strenuous struggles of to-day.

Hickson married in 1896, Anne Maud Fletcher, a member of an old Cumberland family and a student of Girton College, Cambridge, who survives him. For many years she gave unstinted time and service to the Ashbourne Hall of Residence as Honorary Secretary. He leaves a daughter, Dr Guthrie, who is a children's specialist in Manchester, and a son who is Secretary of the University Extension Board at Cambridge.

The portrait is from a photograph kindly lent by Mrs Hickson, which was taken in 1926.

J. Stanley Gardiner