varieties of carrots, but there seem to be no definite figures available for other Umbelliferous crops. Parsnip varieties are usually isolated from each other although pollination within the umbel seems to be the rule; it is also customary to isolate celery and parsley varieties. It is therefore surprising to find so little evidence on spatial isolation of these important crops which include herbs of economic importance such as dill, fennel, carraway and anise.

Cucumbers under field conditions undergo 65–70 per cent natural cross-pollination[9]. A spatial isolation of at least 40 rods, or even more, is necessary to eliminate outcrossing between plots of different cucumber varieties. There is little information available concerning the requisite isolation of marrows.

Lettuces have been the subject of a number of investigations. Thompson[10], working in America, grew lettuce plants side by side without protection from insect visitors. He placed the plants "just far enough apart so that the lateral branches of the seed stalks did not touch". Under these conditions there was 1·33–6·22 per cent outcrossing. Under normal field conditions, therefore, the value would be much less. This supports the practice of British growers of lettuce seed crops who do not subscribe to isolation. The sunflower is generally regarded as a cross-pollinated plant, bees acting as the major contaminating agents. Putt[11] has found the amount of natural crossing is c. 70 per cent. Satisfactory isolation distances are so far not reported. Information on the spatial isolation of salsify, scorzonera and chicory is lacking. Although endive is a cross-pollinated plant, there has been little research to determine either the extent of outcrossing or the necessary spatial isolation.

Although the tomato flower is a splendid example of a self-pollinating floral mechanism, even this vegetable is not immune from a small amount of outside contamination. Under field conditions there is 2–4 per cent contamination between rows[12]. More recently Currence and Jenkins[13] have shown that 24 ft. between varieties is sufficient to reduce contamination to a negligible amount. Paschenko, who has made a notable contribution to the literature of floral morphology in the tomato, believes that thrips and not wind are the responsible transmitting agents.

The beets, besides the enforced zoning schemes, require isolation to keep varieties in a pure state. The ordinary beetroot is wind-pollinated, although pollination by insects is also possible. Thrips are important pollinating agents of sugar beets. Increasing the distances between plots definitely reduces the danger of crossing. Beyond about 2½ furlongs there is very little contamination, although it is known that the wind carries beet pollen over a distance of more than two miles. In Great Britain commercial practice requires an isolation of 1,000 yd. between the various crops, but "it became increasingly difficult to obtain isolation"[14]. Hedges definitely act as screens and quite considerably lessen crossing between two plots; there is a definite relationship between the height of the hedges and the reduction in outcrossing. Spinach flowers are wind-pollinated, but there are no satisfactory figures available concerning its isolation. Canadian growers allow at least a quarter of a mile between spinach seed fields and try to keep them out of the path of the prevailing winds[14].

All varieties of onions intercross, so that it is necessary to give a spatial isolation of c. 40 rods between plots. Insects normally carry out pollination although wind can transmit onion pollen. Canadian growers consider that half a mile is satisfactory, particularly if there are natural barriers such as an adjacent orchard. Similarly it is customary to give leeks an isolation distance of 250 yd. But further investigations on these two crops would be welcome.

Although not a major vegetable seed crop of Britain, sweet corn is gaining in popularity. Wind and gravity are the chief agencies in disseminating sweet corn pollen. Haber[15] has shown that "the degree of contamination varied with the distance from the source of contamination". Contamination is eliminated with a separating distance of more than 23 rods. But there is a record of a blackbird, which had flown four or six miles from the last maize field it had visited, that carried the pollen on its plumage. Trees are useful in reducing contamination from nearby fields. A grove of trees four rods wide between fields eliminates cross-pollination[16]. Canadian growers use a spatial isolation of one mile and preferably with a natural barrier, and in the United States the legal spatial isolation is 40 rods between varieties.

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OBITUARIES

Prof. W. M. Tattersall

WALTER MEDLEY TATTERSALL, who died on October 5, was born on November 8, 1882, the eldest of a family of eight. He was educated at Liverpool College and the University of Liverpool, where he studied under Herdman, and he graduated with first-class honours in zoology at the age of nineteen. He won a research scholarship at Cambridge and looked forward to the opportunity of working there as a postgraduate student, but he was obliged to abandon his intention owing to the sudden death of his father. He took an appointment as naturalist in the Irish Fisheries Department in 1902, and here, as one of a small band of enthusiasts under the inspiring leadership of E. W. L. Holt, he assisted in the exploration of the rich deep-water fauna on the south-west of Ireland. It was during these years that he first began his studies of the Crustacea. Throughout his life he maintained his interest in this group of animals, and our knowledge of them has been greatly extended by the remarkable series of papers he wrote.

In 1909 he succeeded W. E. Hoyle as director of the Manchester Museum, where, in addition to his museum duties, he acted as tutor at the Universities of Manchester and Sheffield to classes arranged by the Workers' Educational Association and regularly took parties of students to Port Erin for courses in marine biology. He obtained his D.Sc. in 1911.

During the War of 1914–18 he enlisted as a private in the Royal Garrison Artillery and saw service in Flanders and France. He was wounded and gassed in 1917, and later received a commission; but he never afterwards enjoyed robust health and for the last ten years of his life he suffered acutely from diabetes.

In 1922 Tattersall was appointed professor of zoology and comparative anatomy at University College, Cardiff, a post he held throughout the remainder of his life. Starting with only a single post-intermediate student, he and the able staff he gathered around him succeeded in building up a flourishing school of zoology, and shortly before the present War he had sixteen honours and nine research students, with sixty students in the final class. As a teacher of zoology Tattersall had outstanding qualities. With a broad and comprehensive knowledge of his subject he combined the gift of inspiring others with his own unquenchable enthusiasm, and by his simple unassuming ways he won the devotion of his students. He insisted on the importance of field work, and for a long series of years he regularly took a party of students to Loch Ine in Co. Cork. Last May, the twenty-first anniversary of his appointment at Cardiff was commemorated, a celebration attended by 121 of his old students, while eighty others sent cables and telegrams of congratulation.

In the course of his busy life at Cardiff, Tattersall was for seventeen years a member of the Court and Council of the National Museum of Wales, and many universities called on his services as external examiner. He edited the natural history volume of the Glamorgan County History and served as president of the Cardiff Scientific Society. At University College he was for a time dean of the Faculty of Science and latterly deputy principal. He had been a member of the British Association for more than thirty years, and there was scarcely a meeting he did not attend. He travelled with the Association to Australia and Tasmania, to Canada and to South Africa, and went to India as delegate to the Indian Science Congress. He served as secretary and recorder to Section D, of which in 1939 he was president-elect.

Tattersall will long be remembered as our foremost authority on certain groups of Crustacea—principally the Isopoda, Amphipoda, Tanaidacea, Mysidacea and Euphausiacea. He was the ideal systematist, careful, thorough and methodical in everything he undertook, and with that well-balanced outlook that sees in taxonomy a means to an end rather than the end itself. Above all he was a prodigious worker. Busily occupied throughout his life with important educational work, he always found time to continue his personal studies, and the steady stream of valuable papers which he contributed over a span of forty years is a monument to his industry and ability. Reports by him are to be found among the results of almost every marine biological expedition which has set out from Great Britain during the present century, and from all parts of the world collections were sent to him for examination and description. He was a naturalist in the best sense of the term; interested as much in the development, habits and distribution of species as in their identification, and taking immense trouble, as in his latest paper on the relict fauna of Ennerdale Water, to find a logical interpretation of his results. In addition to his work on Crustacea he made important contributions to our knowledge of the Cephalochorda and Enteropneusta; he was the first to trace the life-history of the periwinkle, and he described the very remarkable larvæ of the starfish Luidia.

At the beginning of the present War he had just completed the manuscript of a volume on the Mysidacea for Bronn's "Thierreich", and since then he finished a report, to which he had devoted four years of work, on a large collection of Schizopods from the American Museum of Natural History. There are hopes that the Ray Society monograph of British Mysidacea, on which he was recently engaged, is sufficiently advanced for publication.

Tattersall married Olive Selden Attride in 1916, and much of the fruitful work that he was able to undertake in his long years of illness is due to her unremitting care and devotion. As a student of science she was able to give him very substantial assistance, and she herself drew nearly all figures which illustrate his papers.

In Great Britain Tattersall seems not to have been appreciated at his full worth: a foreign zoologist once asked me why it was so. Perhaps it was partly because of his unassuming modesty, his lack of 'push' and hatred of self-advertisement, his contentment in the interest of his subject and in the satisfaction that comes of honest work faithfully performed. But in part, I believe, it was because with new methods of approach in zoology we have been led to underrate—as being old-fashioned—the fundamental work of the naturalist in which Tattersall showed such skill. Yet he has left a permanent mark on the literature of his subject, and his name will be honourably remembered when much that is modern has passed into forgetfulness. His many friends will remember him for his genial, good-humoured outlook on life and personal charm, for his intellectual honesty and for the cheerful courage with which he faced adversity. STANLEY KEMP.

Mr. J. J. A. Jones

WE regret to record the death on November 1 of Mr. John Jenkin Ashton Jones, of the Central Research Department of the United Steel Companies Ltd., Sheffield, and well known in metallurgical research circles.

John Jones was born in 1894, and graduated from Aberystwyth in 1915. Shortly afterwards he joined the Royal Welch Fusiliers and saw active service in the War of 1914–18, during which he was awarded the Military Medal. In 1917 his military service was terminated as the result of wounds, and he joined the Research Department at Woolwich, where he assisted Dr. R. H. Greaves. In conjunction with the latter he presented four papers before the Iron and Steel Institute, of which he became a member in 1920. He was co-author of one other paper, and in his own name contributed six further papers to the Institute.

In 1930 Mr. Jones joined the United Steel Companies Ltd. and, with Dr. T. Swinden, director of research, he took a large part in planning the Central Research Department of that group at Stocksbridge. When the Central Research Department opened he became the manager, a post he held to his death. He leaves a widow and a son and daughter.

Mr. Jones represented the best type of scientific worker, and the quality of his scientific papers needs no elaboration. He did much other valuable work which was not so well known. His quiet yet forceful personality and the multiplicity of his contacts gained him many friends, to whom his many other qualities endeared him. As an example of his modest self-