George William Scarth: 1880-1951

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ON SEPTEMBER 6, 1951, plant physiology lost one of her ablest and most creative devotees in the death of George William Scarth, of McGill University. Even in retirement he continued professionally active, and the issue of *Plant Physiology* that celebrated his seventieth birthday also contained one of his last two published papers. Although his publications were not numerous, they were models of logic, clarity, and conciseness, and true contributions to science. His early papers on "The Toxic Action of Distilled Water and the Antagonism by Cations," "The Elasticity of Gelatin in Relation to pH and Swelling," "The Penetration of Cations into Living Protoplasm," "Structural Organization of Protoplasm in the Light of Micrurgy," etc., all showed his keen interest in the physiology of the cell; and their value is evident from the frequent citations to them in the articles and texts of other workers. His distinguished rhetorical style was attested to by one European colleague who told Scarth that one thing he always enjoyed about his papers was the fact that he always learned new words from them.

Scarth's unique contribution to science was his determined and enlightened search for mechanisms, as shown by his papers on "The Mechanism of Accumulation of Dyes by Living Cells," "Mechanism of the Action of Light and other Factors on Stomatal Movement," and "The Frost Hardening Mechanism of Plant Cells." His solutions have usually made the problems involved appear deceptively simple. As one physiologist put it on hearing his theory of frost resistance, "It is like the story of Columbus and the egg." The desire of other scientists to learn his viewpoint was shown by the frequent requests for his participation in symposia on such diverse topics as permeability, protoplasm, frost resistance, and stomatal movement.

Scarth's originality and creative spirit extended to his teaching, as well as to his research. His course in General Physiology, given in conjunction with the late F. E. Lloyd, was a striking departure from the usual run of plant physiology courses. The text resulting from this course (*Elementary Course in General Physiology*) was a good example of his ability to organize a variety of material into a clear, concise, and uniform whole. His conciseness was sometimes troublesome to students accustomed to having everything repeated several times. The more discerning students have often stated that every time they read his text they discover something new. His point of view was always broad, and, like so many of the older school of scientists, he always maintained an appreciation of the plant as a whole, although he was primarily a cell physiologist.

His theory of the mechanism of stomatal action, though not universally accepted, stands to this day as the explanation in closest accord with the known facts. His theory of frost resistance is also the best we have. Although onslaughts were made on his "mechanisms," he always succeeded in digesting the criticisms, accepting and extending the valid arguments against his concepts, and decisively disproving the fallacious criticisms. His last two papers, appearing in the April and July issues of *Plant Physiology* for 1951, in collaboration with his former student Michael Shaw, are excellent examples of this. His constant search for new methods of approach was shown by his quick appreciation of the value of the infrared absorption method for determining the CO_2 and H_2O content of the air and his further development of this instrument as a means of measuring continuously transpiration, photosynthesis, and respiration.

To his students, Scarth was always a source of inspiration and new ideas. He had the faculty of going straight to the core of a problem, ignoring the unessential and superficial factors. To those who knew him well, his quiet manner failed to hide a keenness and an enthusiasm for his research that stemmed from an inner excitement and an anticipation of the thrill of discovering a new fact or idea. For his greatest pleasure was the discovery and propagation of truth. Yet he always maintained a sense of humor that led to his now famous rhyme beginning:

> It was four fundamentalists to learning much inclined
> Who went to see the Protoplast (though all of them were blind),

and to many other humorous limericks that are not so widely known.

Great as his contributions were to the field of science, an accomplishment of equal value was his ability to kindle the fire of research in others; for it is to him that many of today's plant physiologists both in Canada and in the United States owe their interest in research. The contributions of these men and their students are in no small measure due to Scarth, and in them his spirit lives on.