

DUKINFIELD HENRY SCOTT (1854–1934)

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A PALÆOBOTANIST, writing in the early nineteenth hundreds, spoke of D. H. Scott as then belonging to the same class as Nathorst and Zeiller—these three standing head and shoulders above all others in fossil botany. For Scott this verdict is certainly borne out by his long series of books and memoirs, which covers a period of forty years (1894–1933). So many well-documented obituary notices are accessible (see list at the end of this article) that it would be superfluous to reiterate the facts of his career. In this, his centenary year, I propose to confine myself to a few special aspects of his life and work.

Scott's inborn trend towards a life of research was fostered by his personal circumstances. At the age of thirty-eight he became honorary director of the Jodrell Laboratory at Kew, and from this time onwards he was free from the daily grind of academic duties. Fourteen years later he retired into the country, thus securing a still more leisurely and unhampered existence; but, while he enjoyed the liberty of the amateur, he did not suffer from the amateur's drawbacks. He had been disciplined by reading classics at Oxford; then by an engineering training; and, later, by ten years of teaching—a long enough time to put him in possession of all that this particular form of experience had to offer him. Moreover, the absence of enforced day-to-day contacts did not involve any isolation from the scientific world. Indeed, fifty years ago he had become the focal centre of British botanical life to a degree that now, in this period of specialization and sub-division of the subject, would be impossible for any one man. His commitments included such responsibilities as the chairmanship of the Editorial Board of the *Annals of Botany*, and he did much work in connexion with the learned societies to which he belonged; he also gave unstinted time and thought to helping other research workers, whose indebtedness to him can scarcely be exaggerated. None of these doings was of a mechanical type, and they all lay in the field of his genuine interests and his chosen subject; they left his mind unstrained, so that he could put the best of himself into his studies.

In thinking about D. H. Scott, comparisons with Charles Darwin (forty-five years his senior) present themselves unbidden. Both men had the advantage of freedom from monetary cares, so that liberty and independence came to them naturally; and they had each a happy domestic existence, with an extensive but close-knit background of kith and kin. The minds of both were not so much remarkable for brilliance as for the unwearying tenacity which enabled them to pursue the same problems continuously over many years. This power of dwelling on a subject steadily for an indefinite period was one that Darwin recognized in himself, and it is known to have been a principal factor in the process through which Newton's discoveries came into being. Possibly it was this concentrated tenacity which induced in both Darwin and Scott a strict canalization of all mental energy into science; at least in later life, no branch of literature or of the arts can be said to have played an essential part in the existence of either of these biologists. Another resemblance,

which though trivial is perhaps not without significance, is that both men inclined to a certain informality in the presentation of their material. This was partly, I think, a reaction against the pomposity of the professional pundit, and partly an eager desire to appeal to a wider circle than that of initiates. It may be recalled that Sachs expressed regret about the style of writing which Darwin adopted, on the ground that it degraded the severity of scientific thinking (cf. Pringsheim, E. G., "Julius Sachs", p. 167; 1932). Darwin's slightly casual approach finds some parallel in Scott's books, and also in what has been called his 'hearth-rug' manner of addressing scientific meetings. Underlying even such petty resemblances, there was undoubtedly a fundamental affinity between Scott and Darwin, which expressed itself in Scott's glowing, though not uncritical, admiration of Darwin's work.

The gains that have accrued to science from the technical progress of the present day, and from the resulting development of team-work research, are as obvious as they are vast; but they are correlated with certain losses, none the less real because they are less tangible. There is one loss, especially, that may in the long run prove tragic. It is that, as the amateur (but not amateurish) pursuit of science—typified, respectively, in a major and a minor form in Darwin and in D. H. Scott—becomes more and more impracticable, contemplative leisure fades irrevocably from scientific life. That uninterrupted periods of still meditation are essential, if the deeper insight is to be won, was recognized even long ago, when the *tempo* of day-to-day existence was much quieter than in our mechanized age. In the seventeenth century, Descartes affirmed that liberty and leisure were a necessity for the purposes of concentrated thought; moreover, he acted on this belief, betaking himself to exiled retirement, to avoid time-consuming distractions. Spinoza, again, though he was not, like Descartes, a man of means, declined a professorial chair, basing his refusal partly on the conviction that he could only teach a class at the sacrifice of his research in philosophy.

Though D. H. Scott's achievements were conditioned by his unhurried existence, which made continuous thinking possible, this does not imply that he consciously adopted the contemplative attitude. My impression is that he was not disposed to give any spontaneous consideration to processes going on in his own mind, though in correspondence he might sometimes be stimulated into revealing a defined position. He wrote to me in 1931, when he was in the seventies: "your letter causes me to enter on the religious duty of self-examination! . . . But am I an Aristotelian or a Platonist? When I read a little of the old philosophers some 55 years ago, my sympathies were certainly with Aristotle, who appeared to talk fairly plain sense. I could make nothing of Plato's philosophy, though I admired his style. . . . My interest is pure Natural History. I like to see things as they are, and to think how they became so. I don't care for Physiology. . . . But neither do I care a bit for . . . 'final patterns, eternal moulds'—all mere imaginations of the philosophising brain". In an earlier letter he had stigmatized logic as "a deceitful guide"; in his own work he relied on a strictly empirical procedure. Empirical conclusions demand, however, a theoretical basis; this, in Scott's case, took the form of a fundamental belief that "similarity (suitably determined)", distinguished from that which could

be recognized as "superficial", might be accepted unquestioningly as "a mark of blood relationship". This belief was stressed in a correspondence which I had with him, in 1930, about parallelism in evolution, as contrasted with the older picture of a monophyletic genealogical 'tree' of the plant world; the visual image of such a 'tree' had, indeed, served him throughout his studies as the frame of reference for his botanical thought. He wrote: "When I have occasionally seemed to favour parallelism ('up to a certain point, you know'—like Mr. Brooke in 'Middlemarch') my idea has not been a bundle of sticks separate all the way up, but rather a Lombardy Poplar, with a trunk bearing a number of long, parallel branches". This partial acceptance of parallelism was an instance of Scott's anxious desire not to turn a blind eye upon arguments militating against his views; he was, moreover, prepared to discard his most cherished theories as soon as he had brought himself to feel that knowledge acquired since his conclusions were reached had proved his evidence to be less than adequate. A cogent example is his relinquishment of the idea of the filicinean origin of seed-plants, which had meant much to him. It is recorded that he was fond of quoting Pope's couplet:

"And spight of Pride, and in thy Reason's spight,
One truth is clear; 'Whatever Is is RIGHT'."

This loyalty to abstract truth had, however, to contend with an innate conservatism, involving a lesser loyalty to the purely Darwinian scheme of things, which had dominated his younger days. As a general attitude to life and to religion, the tolerant form of nineteenth-century agnosticism, which seemed the most consistent position for a convinced Darwinian, was congenial to Scott's turn of mind; but, in his later years, his views tended somewhat more in the direction of theism.

It is perhaps not too far-fetched to suggest that certain traits in D. H. Scott's scientific personality were inherited from his great-grandfather in the paternal line, the Rev. Thomas Scott (1747-1821); D. H. Scott's mother could claim collateral descent from the same cleric, so that there was more than the normal chance of the reappearance of hereditary characters derived from him. To-day, Thomas Scott is most vividly remembered for his friendship with Cowper, and for the fact that "John Gilpin" was first adumbrated under his roof, though not by him. He was, in his time, known widely as a Biblical commentator. In his spiritual autobiography, "The Force of Truth" (edit. 1, 1779), he set forth the process he had gone through in reaching his religious convictions. The passage may be quoted, since it is just what his great-grandson, D. H. Scott, might have written, if he had analysed in eighteenth-century parlance his own cautious and balanced scientific method: "I sat down very coolly to search for the truth, I proceeded very gradually, and with extreme caution; I took no opinion upon trust; I gave up none of my sentiments, until the arguments by which I had learned to defend them were satisfactorily answered; nor did I admit any new articles into my creed, till either every objection was obviated, or I was pressed on the other hand with such as were still more unanswerable" (quoted from the 1821 edit.).

D. H. Scott's most conspicuous impact on the study of plants has been through his classic corpus

of memoirs on structural palaeobotany, begun under W. C. Williamson's inspiration; but a more general effect has radiated from his original training in research (1880-82) under Julius Sachs. Scott himself said that going to work in a German laboratory, when he was in his twenties, was, to him, like a pilgrimage to Mecca to a pious Mussulman. It was fortunate that, at Thiselton-Dyer's suggestion, he decided upon the University of Würzburg, since it is no exaggeration to say that Sachs possessed one of the finest minds that have ever been devoted to plant study. Goebel, his assistant, who was about Scott's age, had been a pupil of Hofmeister (born 1824), and was thus a link with the heroic age of German botany. Sachs himself bore the impress of a wider and deeper intellectual tradition. The Czech physiologist, Purkinje (born 1787), who has been described by Nordenskiöld as ranking among the great geniuses of biological discovery, employed Sachs, from the age of eighteen, as his personal assistant. This relation with Purkinje meant that Sachs, in his formative years, had intimate contact with a man who had been directly influenced by Goethe, for it was the "Farbenlehre" that had stimulated Purkinje's early studies in the physiology of sight, and had led to his friendship with the poet. Sachs's school at Würzburg thus inherited some of the best elements in the stream of biological thought which can be traced back to the Goethe period. After Scott's sojourn in Germany, he introduced unconsciously, wherever he might find himself, the spirit of research with which he had been imbued in Sachs's laboratory, and this spirit—passed on through a succession of younger botanists—continues to work as a living leaven among students of the plant world.

Accounts of D. H. Scott's life and work, in alphabetical order of authors' names: Arber, A., "Diet. Nat. Biography", Supp. 1949, for 1931-40; Oliver, F. W., *New Phyt.*, **33**, 73-76 (1934); Oliver, F. W., *Ann. Bot.*, **49**, 823-40 (1935), with bibliography by Edwards, W. N., and Wonnacott, F. M.; Rendle, A. B., *J. Bot.*, **72**, 83-88 (1934), with D. H. Scott's autobiographical notes; Sahni, B., *Current Science*, **2**, 392-95 (1934); Scott, D. H., *New Phyt.*, **24**, 9-16 (1925) (reminiscences of research in Germany); Scott, D. H., in Oliver, F. W., "Makers of British Botany", 243-60 (1913), for Scott's precursors in fossil botany, and especially for his relation with W. C. Williamson; Seward, A. C., *Nature*, **133**, 317-19 (1934); Seward, A. C., *Obit. Notices Fellows Roy. Soc.*, 205-27 (1934); Weiss, F. E., *Proc. Linn. Soc.*, Session 146, 1933-34, 166-69.

BRITISH WELDING RESEARCH ASSOCIATION

OPEN DAYS

THE laboratories of the British Welding Research Association, at 29 Park Crescent, London, W.1, were open for inspection during November 23-24, the previous occasion being in February 1950. Visitors may well have been surprised at the evident expansion in research effort, with the corollary increases in research facilities, equipment and number of staff during the space of but a few years.

The main research effort is divided equally between steels and the light alloys, though visitors heard and saw something of the working of the Liaison Department, the Library and Information Services, and the other and minor research activities now in hand.

One of the most interesting developments from the steel welding researches is a method for the assessment of weldability of high-strength low-alloy steels by means of a dilatometric method. This method depends on the relationship between hardened-zone