cotton hairs, it was decided to commence by investigating the properties of the cotton hairs themselves, the fine fibres about an inch long and a few ten-thousandths of an inch in diameter from which all cotton yarns are made. Special apparatus was devised to compare the elastic properties of the various textile fibres in air and in various liquids, and the sponginess of the hairs proved to be of great importance.

It was early realised that there are at least two methods of attacking the creasing problem. One is to fill the spongy cotton hairs with some elastic substance : another is to combine with the cotton some substances which would eliminate its plastic nature and give it the necessary resilience. Both methods were tried and finally the introduction of synthetic resins into the fibre proved successful, though only after some years of work had shown the way to retain all the other textile qualities of cotton when it was impregnated with resin. To be suitable for this purpose, the synthetic resin molecules should be small during the impregnation of the fabric so as to enter the cotton hairs. The substances used must not damage the fabric nor must resinification by heat or otherwise be effected under conditions which damage the fabric. Furthermore, the resin must be colourless and not discoloured by strong sunlight ; it must be elastic so as to give the anti-creasing properties, and must be introduced without impairing the suppleness of the fabric. It must also withstand laundry treatment.

These conditions considerably limited the types of resin which could be used. Further investigation showed that when the resin was mainly inside the cotton hairs a soft fabric was obtained, but when a considerable amount of resin was left between the hairs and the yarns, the cloth was hard and stiff. The microscopic examination also showed that the diameter of the cotton hairs is permanently increased, causing the fabric to give better cover, and the treatment accordingly must be directed towards getting rid of all the resin between the fibres. By treating cotton and rayon fabrics in this way, effecting final condensation after the resin solution was put on the cloth, remarkable anticreasing properties were conferred. In addition, shrinkage by washing was reduced while the strength of rayon was increased by 30 per cent when dry and up to 100 per cent when wet.

The next stage of development, from the laboratory to a manufacturing scale, proved difficult as well as costly. In addition to mechanical difficulties, physical and chemical methods of control at each stage of the process had to be elaborated. Not merely the design of suitable machinery, but also the development of suitable testing methods for accurate control made demands on a combination of engineering, chemical and physical knowledge which the man with a general training was often better able to meet than a highly specialised research worker.

One of the major difficulties was concerned with an apparatus for converting the resin inside the cotton hair into insoluble form. This had to be done by running a continuous length of cloth through a machine capable of heating it evenly over its width for a short time to a high temperature. Finally an electrical method was selected, which was novel in the electrical trade, and with this machine a production of some thousands of yards sufficed to gain the experience for the design of full scale plant in which weakness of design and lack of robustness in various details were eliminated.

Discussing the successful conclusion of this research directed to a definite objective, Sir Kenneth Lee raised the question as to how much stronger our industrial position might be as a result of more well-directed research. Patents themselves indicate the extent to which our research activity is overshadowed by that of competitive countries. Even most of our newer industries are handicapped by paying heavy tribute to foreign countries in the forms of licences, and from the results achieved by his own company Sir Kenneth said that they would be glad to see other industries, particularly the older industries, pursuing the same policy to a much greater extent. He considers that the present time is opportune for a great increase in the amount of scientific research in industry, and reduced expenditure on research in other countries offers us a correspondingly greater chance of taking the lead. Researches directed to putting manufacture on a sound scientific basis would undoubtedly repay the expenditure of time, money and patience involved, and the nations doing the most intelligent research work are likely in the long run to have the greatest chance of prosperity. We have in Great Britain the necessary ability for fundamental research if only the business community would supply sufficient funds, and Sir Kenneth urged that there is no wiser expenditure for an industrial undertaking than the provision of funds for research.

Obituary

DR. D. H. SCOTT, F.R.S.

WORKERS in the fields of natural knowledge are often described as pioneers in the development of novel views, as men whose enthusiasm was stirred in early life by the preaching of a new doctrine. Dukinfield Henry Scott's early days coincided with an intellectual revolution. He was born on November 28, 1854, a few years before the publication of the "Origin of Species", and graduated from Christ Church in 1876 at a time when men were under the influence of a new gospel. He died on January 29, 1934.

Following the example of other young men of

that generation, Scott went to the famous botanical school of Sachs at Würzburg, where he took the Ph.D. degree. On his return in 1882 he took a prominent part as a lecturer and later as assistant professor in applying modern methods at University College, London. A member of a family of distinguished architects, he was attracted to the works of Nature rather than to the works of man: throughout life he experienced the joys of a true naturalist. From 1885 he occupied the chair of botany at the Royal College of Science until 1892, when he accepted an invitation from the Director of the Royal Botanic Gardens, Kew, to be honorary keeper of the new Jodrell Laboratory; two years later he was elected fellow of the Royal Society.

Scott's earliest papers, the first of which was published in 1881, were on the latex-bearing vessels in certain rubber trees, on Algæ, and on the anatomy of *Ipomœa*. His last paper was published in 1933. Throughout life his botanical interests were wide and progressive: while faithful to the traditions of the older school of naturalists and great systematic botanists, he devoted himself mainly to the investigation of extinct plants, particularly those from the forests of the Coal Age. In an address delivered in 1909, when, as president of the Linnean Society, he opened the new botanical laboratories at University College, London, he spoke of the late Prof. W. C. Williamson as a friend to whom he perhaps owed more than to any other man, as it was Williamson who interested him in the subject of fossil botany.

The veteran botanist at Manchester had contributed nineteen memoirs on "The Organization of the Fossil Plants of the Coal-Measures" to the Royal Society (1871–93), but comparatively few botanists in Great Britain realised the full significance of Williamson's work; and this was largely due to the presentation of the results in language unfamiliar to students whose sense of proportion and appreciation of values suffered through inability to make allowances for old-fashioned terminology and ideas. On his retirement from Manchester, Williamson asked Scott to collaborate with him and, fortunately for the botanical world, a favourable reply was given. In a prefatory note to the first of a series of three memoirs—"Further Observations on the Organization of the Fossil Plants of the Coal-Measures"—Williamson wrote: "My morphological enquiries seem to have reached a stage that makes a more minutely careful examination of these questions of development and growth desirable, but before specially undertaking this, I saw clearly the extreme importance of doing so in combination with some younger colleague whose familiarity with the details of the physiology of living plants was greater than my own." The conspicuous success of this partnership is evidence of the tact and understanding of the younger man and of the confidence and respect for his companion on the part of an experienced palæobotanist who did not readily change his opinions. Scott's transforming influence was the determining factor in bringing about a more general recognition of the fundamental importance of extinct plants.

After Williamson's death in 1895, Scott contributed a series of papers to the Royal Societies of London and Edinburgh, to the *Annals of Botany* and other journals, in which he described many new types. In 1897 he gave an exhaustive account of a remarkable cone, *Cheirostrobus*, which demonstrated the existence in the early part of the Carboniferous period of a reproductive shoot more complex in structure than any previously known vascular cryptogram, recent or extinct. This was followed by equally interesting discoveries of many other Palæozoic plants. In 1901 Scott gave an account of a cone—*Lepidocarpon*—agreeing in the plan of its construction with the cone of a *Lepidodendron*, but differing in bearing 'seeds' in place of ordinary sporangia. The seed-like bodies were described as nascent seeds which did not and could not be expected to conform "in all the morphological rules that we lay down for seeds at the present day". Scott was not a hide-bound formal morphologist.

In all his many contributions to a more exact and intensive knowledge of extinct plants, Scott combined an almost meticulous attention to detail with broad philosophical and cautious views on the bearing of the facts on evolution. In 1900 he published as a single volume a course of lectures delivered at University College, London—"Studies in Fossil Botany": in the second and third editions the book is in two volumes. The author's aim was the presentation to botanical readers of results which appear to be of fundamental importance. This book has long been a classic, a scholarly work distinguished by well-balanced judgment and clarity of style. In 1911 he contributed to the "Home University Library" a more popular account of the "Evolution of Plants", and this was followed in 1924 by the publication of a course of lectures delivered at Aberystwyth—"Extinct Plants and Problems of Evolution".

In 1904, following a most important discovery by Prof. F. W. Oliver that certain seeds known as *Lagenostoma* belonged in all probability to the genus *Lyginodendron*, a plant in habit and in foliage closely resembling a tree-form, a paper was published by Oliver and Scott in which the name Pteridospermeæ was proposed for a group of certain fern-like seed-bearing plants which played a dominant part in later Palæozoic and, as we now know, in early Mesozoic floras. For several years Scott regarded the Pteridosperms as closely related to true ferns and derived from a fern ancestry. In 1918 he wrote (in a letter): "I have become a bit sceptical about the Pteridosperms and Ferns; all the comparisons seem to be mere analogies"; at the Bournemouth meeting of the British Association in 1919 he definitely gave up the idea of a fern origin in favour of the view that Pteridosperms represent a long-extinct stock which passed through a fern-like stage. This change of view is characteristic of the man: when,

as rarely happened, the weight of evidence was against his original opinion, he did not hesitate to say so.

Scott's influence was by no means confined within the limits of palæobotanical research: his "Introduction to Structural Botany", an elementary textbook in two volumes, Part 1 of which is now in its eleventh edition, is a model study of representative examples of flowerless and flowering plants. Mr. F. T. Brooks of Cambridge is associated with Dr. Scott as joint author of the last edition of both parts.

In 1921 Scott was the Wollaston medalist of the Geological Society of London; in 1906 he received a Royal medal and in 1926 the Royal Society awarded him the Darwin medal. In 1921 he was awarded the Linnean medal of the Linnean Society. He was president of the Linnean Society in 1908–12 and of the Royal Microscopical Society in 1904–6; foreign secretary (1912–16) of the Royal Society; twice president of Section K (1896 and 1921) and a general secretary (1900–3) of the British Association. He was an honorary LL.D. of the University of Aberdeen and D.Sc. of the University of Manchester, also honorary member or corresponding member of many foreign academies and societies.

Though neither by inclination nor temperament attracted to administrative work, Scott conscientiously discharged such duties as he felt called upon to undertake: he was essentially a student, a dreamer with a 'passion of the past'; a man with strong international sympathy and a keen sense of justice. On occasion impulsive, quickly roused by unreason; a man of lovable personality to those who knew him well. Few men of his age made a stronger appeal to the affection and loyalty of colleagues. Scott will be gratefully remembered by many younger men and women whom he treated as equals. It is fortunate that he was able to devote the best years of his life to research without the hampering necessity of spending the greater part of his energy in teaching.

Scott was happy in the companionship of a wife whose personal qualities were complementary to his own: from her he had much help in his work both directly and indirectly. He leaves four daughters: his younger son died at school (1914) and the elder son was killed in France (1917) when serving with the Royal Engineers. By friends in all ranks of life, Scott will be remembered for many unrecorded acts of kindness: as a botanist he has left a worthy memorial in his work and in the services he rendered to exact knowledge.

A. C. SEWARD.

DR. WILLIAM PAGE

WITH Dr. William Page, who died at Middleton in Sussex on February 3, at seventy-two years of age, has passed a singularly gracious personality, whose loss is regretted by a wide circle of friends. A far wider public will mourn, and continue to mourn, the editor of the most extensive and successful attempt ever initiated in Great Britain to produce a comprehensive series of county histories, a task to which Page devoted the last thirty-two years of his life.

At the outset, indeed, a very different career had seemed to lie before Page. After leaving Westminster School, he became a civil engineer, and for a time (1880–84) was assistant executive engineer to the Government of Queensland. But he already had other ambitions. At the age of twenty-five he abandoned engineering, and with his brother-in-law, W. J. Hardy, established a firm of record agents and legal antiquaries which achieved considerable distinction, and was engaged in a number of peerage, coronation and other claims. During this period Hardy and Page jointly published the "Feet of Fines for London and Middlesex" (1892), and Page was incidentally able to develop that extensive and peculiar knowledge of local and customary history which was to serve him in good stead later. In 1902 the Hardy-Page partnership was dissolved, and Page joined Mr. H. A. Doubleday as joint-editor of the "Victoria County History", which had been established two or three years previously; whilst two years later, on the retirement of Mr. Doubleday, Page became sole general editor.

The task which Page thereby undertook was immense alike in time and in space, including as it did the history, archæology, geology, botany and zoology of the English counties. Nor was it merely in breadth of knowledge and academic sympathy that the work demanded exceptional qualities in the editor. The human problem—the problem of co-ordinating the work of innumerable specialists and local students, of harmonising their divergent views, abilities and eccentricities—drew incessantly upon Page's unfailing patience, courtesy and astuteness. The contributions which he collected from these miscellaneous sources necessarily vary in value, but it is rarely that they fall below that high minimum of scholarship which he set himself to maintain. On the documentary side, the editor's wide first-hand knowledge was a sufficient guarantee. On the architectural side, Page's association with Sir Charles Peers resulted in the evolution of methods and standards which are likely to control all future research of the kind. Indeed, these methods have received an enduring sanction in their adoption by the Historical Monuments Commission (England), which is in many ways the child of the "Victoria County History".

Nor did the editor's human problem end with his contributors. Financial difficulties were never far from Page's mind, and more than once the "History" seemed to be doomed to founder on this rock. But Page's untiring courage did not fail him, and on more than one occasion he was able to secure at the last moment the patronage which his work demanded. In 1910 the generosity of the late Lord Hambledon carried the "History" forward a further stage, and in recent years, although