Dr. Lessing's ideas to receive independent support. Processes have even been patented for modifying the results of coal carbonisation by means of control of the ash constituents.

In the Fuel Department of the University of Leeds, where the process of gasification of coal has been under experimental study for some years, it was soon observed that the inorganic constituents could not be ignored. They might be incombustible but were not necessarily inert. It was the availability in the West Yorkshire area of seams of coal almost free from ash which made it possible, by the controlled addition of inorganic matter, to investigate the influence of individual compounds on carbonisation. The results exceeded expectations, and it was shown by C. B. Marson and J. W. Cobb that the character of the coke produced was beneficially and extensively modified by the addition of certain substances, especially oxide of iron and sodium carbonate. Certain other oxides examined were apparently inert. Since the publication last year of this paper, further experience has only strengthened their conclusions. There is good ground for hope that a valuable control over the carbonisation process may be secured by means of the ash constituents. Indeed, it is no exaggeration to say that there is to-day no prospect in the distillation of coal more alluring than that offered by this method. Obviously, then, the subject is of great practical interest, especially in connexion with the production of smokeless fuel. It may well be that too much attention has been paid to the possibilities of varying temperatures of carbonisation, and too little to the variation of the character and quantity of the incombustible constituents. This oversight is, however, in the way of being remedied.

It is, however, a condition precedent to the most effective use of this new method of control, that the raw material, coal, shall be adequately clean to begin with. Any coke or smokeless fuel product will have to compete for popular favour with good household coal, which may in the best cases be even so low in ash as 2 per cent. It is, unfortunately for those who set out to provide smokeless fuel, only too true that the housewife is apt to think more of dirt on the hearth than of smoke leaving the chimney-pot. If the carbonised product is to contain added inorganic matter, as well as the ash originally present, it is obviously essential that the raw coal must be very clean, for the ash content of the coke produced from it will necessarily be higher. Nothing is more important to the popularisation of smokeless fuel than the supply of clean coal. The stigma which rests on coke as a fuel is largely due to a reputation for 'dirtiness,' and the smokeless fuel problem can never be regarded as solved until a product is obtained which will find favour in the drawing-room of the most fastidious householder.

It is, however, essentially a problem for the mining industry, and its solution would give a powerful fillip to the popularisation of carbonised fuel for domestic purposes. The problem implies the identification of seams of coal which lends itself to cleaning, the improvement of cleaning technique, and the installation of plant necessary to turn out a fuel of the desired standard. The consumer would have to pay more for the product, but it would be necessary and possible to demonstrate that he was not a loser. Time, study, and capital would be required to carry these ideas into effect. It is then the more depressing to see the mining industry dissipating energy and resources of all kinds in a barren struggle instead of wrestling with its own more fruitful problems.

Dr. Lessing believes that these objects will be attained, that the carbonising industries "will feel constrained to insist for their raw material on coal containing only a fraction of the proportion of mineral matter which is customary to-day," and "that the provision of such a commodity will be technically possible and commercially profitable, and that it will be of economic advantage both to supplier and user."

The three lectures are, however, not confined to the importance of ash to coal carbonisation. They also traverse the chemistry of coal ash and its origin, the technique of coal cleaning, the economic aspects, and present a valuable survey of the whole subject. H. J. HODSMAN.

Obituary.

DR. C. W. ELIOT.

AT a luncheon recently given by King's College, London, for the delegates to the Congress of the Universities of the Empire, Principal Barker introduced President Lowell as "the most distinguished permanent academic officer in the English-speaking world." The phrase was happily taken, and its substantive truth dates from Charles William Eliot, whose death on August 22, fuller of honours even than of years, removes the last survivor of the three captains who bridged the incredible gap between the primal 'college' and the contemporary university; the others were Angell (Michigan) and Gilman (Johns Hopkins). They mediated a change wherein sober fact nigh outruns imaginative fiction. Eliot, the most conspicuous, foresaw the unbelievable, and it came true.

Circumstances must conspire with men to produce significant results. Accordingly, Eliot was fortunately born (1834) from the soundest New England stock, and educated at the best New England institutions. After graduation at Harvard in 1853 he taught mathematics and chemistry in the College and the Medical School for a decade; resided two years in Europe (1863–65), observing the universities shrewdly; returned to occupy the chair of chemistry in the Massachusetts Institute of Technology, where he pioneered for four years. In 1869, after keen opposition, still the subject of piquant legend, he was elected president of Harvard, and launched upon a unique incumbency of forty years. He found the College (1636) with Medical (1782), Divinity (1816), and Law (1817) Schools of a narrow type; he left the foremost American university with a transformed College and a score of other departments.

As the Harvard inscription bears, the New England College was founded "to advance learning and perpetuate it to posterity, dreading to leave an illiterate ministry to the churches"; or, as the Yale charter runs, "fitting youth for public employment, both in church and civil society." In other words, vocation, and one vocation mainly, took precedence over the

advancement of knowledge. Moreover, although Agassiz used a Charles River shed for a laboratory so early as 1848, acquaintance with the natural sciences was usually confined to little physics and less astronomy. Further, the human sciences, as now understood, enjoyed no independent recognition. While striking persons were to be found on the staffs, they were seldom specialists—Mark Hopkins (Williams) taught all subjects to all undergraduates in their final year! Modifying the clerical and bellelettrist tradition, Eliot, though but thirty-five years of age, set himself to create a new order; in addition, he proceeded to reform the meagre curricula and otiose methods of the professional schools. He agreed with his brilliant colleague Barrett Wendell that "the use of heresy is to vitalise creed." Inevitably, he drew much fire; a rare combination of courage, candour, penetration, patience, above all, aplomb, enabled him to make very rough places plain. Under his leadership Harvard rose to unchallenged primacy in twenty-five years, and the example of her chief began to affect academic policies from coast to coast. Blunders were perpetrated in his name and, being human, he added his personal quota. But in sum and substance he won universal recognition as a national asset.

Eliot's remarkable dignity of address and statement came to him by right of heritage. Democratic puritanism, bred of self-understanding, flowered in a peculiar aristocracy, secure in appeal to sense of duty. Eliot was its most conspicuous example. For, elevated far above sordid affairs, his qualities were means to spiritual ends; thus he could confront the American people as a vocal public conscience. He said his say with none to gainsay on grounds of petty interest. He blandly exposed illusions and dangerous symptoms, protesting against the mediocrity of efficient technique as a peril incident to universal education; telling his countrymen that, after all, they must apply for guidance to the select minority who know; insisting upon the equality of every subject open to sober investigation.

Hence, although the United States had passed to another phase during the period of his retirement, he could still speak forthright to the very end. He contributed to science in particular by affording ample facility and genial stimulus to inquiry. His was an exceptional life, because he rose greatly to a great opportunity. Attempting to sum it in a phrase, one might perhaps venture to say that he furnished a striking illustration of that peculiarity of American culture which most baffles other nations—"the parts are greater than the whole." R. M. WENLEY.

MR. W. FAWCETT.

WILLIAM FAWCETT, who died suddenly at his residence at Blackheath on August 14, in his seventy-sixth year, was originally a schoolmaster and graduated B.Sc. at the University of London. In 1880 he was appointed assistant in the Botanical Department of the British Museum, shortly before the collections were transferred to South Kensington. In 1881 he became a fellow of the Linnean Society, from which he withdrew in 1915, but rejoined in 1923.

On December 29, 1886, Mr. Fawcett sailed to take up his appointment as director of Public Gardens and Plantations, Jamaica, a post he retained after the amalgamation in 1903 of the Botanical Department with the Department of Agriculture until his retirement in March 1908. He edited the *Bulletin of the Botanical Department*, Jamaica, from April 1887 until 1902, and the *Bulletin of the Department of Agriculture* from 1903 until his departure in March 1908, when a new series of the latter was commenced by the Hon. H. H. Cousins, the present director. A note on this department was published in the *Kew Bulletin*, 1906, p. 68. In addition to notes in these journals, he published in 1893 "A Provisional List of the Indigenous and Naturalised Flowering Plants of Jamaica," and in the same year "An Index to Economic Products of the Vegetable Kingdom in Jamaica." He also delivered lectures, one of which, an "Introduction to the Classification of Plants," was published at Kingston in 1889. "Historical Notes on Economic Plants in Jamaica" appeared in vol. 6 of the *Bulletin of the Department of Agriculture*, and dealt largely with cigar and tobacco production. After returning to England he commenced, in collaboration with Dr. A. B. Rendle, a flora of Jamaica, the first volume of which, on Orchidaceæ, including text-figures, was published in 1910, and vol. 5 in July 1926; vol. 2 has yet to appear. Most of the work for this was done at the British Museum, but Mr. Fawcett frequently visited Kew to consult the collections there, his last visit being so recent as July 29 last.

As the titles of some of the above-mentioned papers show, Mr. Fawcett was keen on developing the applied side of botany, and in 1913 published a book entitled "The Banana: Its Cultivation, Distribution and Commercial Uses." During his residence in Jamaica he rendered valuable service in developing the vegetable resources of the island, in association with Sir Daniel Morris, the commissioner of the Imperial Agricultural Department of the British West Indies, after the threatened failure of the sugar crop. To Mr. Fawcett was also due the inception of the Imperial Exhibition in Jamaica in 1891. C. H. W.

WE regret to announce the following deaths:

Dr. J. George Adami, F.R.S., Vice-Chancellor of the University of Liverpool, on August 29, at sixty-four years of age.

Dr. R. D. Carman, president of the American Roentgen Ray Society and chief of the section of radiology of the Mayo Clinic, known for his work on the radiology of the digestive tract, on June 17, aged fifty-one years.

Mr. Charles A. Coffin, founder and former president of the General Electric Company, who was responsible for the organisation of the research laboratory at Schenectady, on July 14, aged eighty-one years.

Dr. Willis T. Lee, sometime professor of geology and biology in the University of Denver, and geologist since 1902 of the United States Geological Survey, who studied the stratigraphy of the south-western States with particular reference to ground water and coal investigations, on June 17, aged sixty-one years.

Mr. Frank M. Woodruff, for many years curator of the Academy of Sciences and Museum of Natural History in Lincoln Park, Chicago, and secretary of the ornithological section of the Chicago Academy of Sciences, on July 21, aged fifty-nine years.