the furnace was left unchanged throughout the remainder of the experiment, and air was passed down the coke column at the rate of 50 litres an hour. The results obtained for three cokes named in the order of their reactivity to carbon dioxide—sodium carbonate coke, ‘ pure ’ coke, and beehive oven coke—indicate that the highest temperature effect in the interior of the mass has been attained with the least reactive coke for the reason explained, doubtless an important point in high-temperature melting by coke.

INDUSTRIAL AND DOMESTIC APPLICATIONS.

I should like now to say a few words on the influence of some properties of coke (particularly reactivity) when used for various purposes. The simplest case is perhaps that of the gas producer, in which coal is gasified by blowing with air or a mixture of air and steam. There is a first conversion of carbon to carbon dioxide by air quite near the grate of the producer at the bottom, but after that the gasification of the descending carbon is the result of the conversion of carbon dioxide to carbon monoxide by the reaction $C + CO_2 = 2CO$. The efficiency and rapid working of the producer depends upon this reaction, so that the coke which is more reactive to carbon dioxide is, other things being equal, the best for the process. This is a reproduction on the large scale of the laboratory experiment last described.

Another interesting example is the domestic fire, where so much depends on the relative ease of ignition and the rapid spreading of heat through the body of the fire. With a hard and unreactive coke it is difficult to carry the heat forward from piece to piece. If there is a little volatile matter left in the coke which comes away in flames, the heat transference is much more rapid. Or, if the coke for any reason is more reactive, the same advantages obtain. There are, however, limitations to the advantages obtainable in either of these ways. If the amount of volatile matter is too great, or if too much carbon monoxide is produced by excessive reactivity of the coke, there may be a twofold loss. In the first place, these gases may screen the solid coke from oxygen and so prevent that rise of temperature on the surface which is all important if a cheerful fire is to be obtained, or if the fire is to have a high radiant efficiency. The other detrimental effect is more important and depends upon the following phenomenon.

A bunsen flame burning in the open radiates only about 10 per cent. to 15 per cent. of its total heat of combustion, or rather more if the flame is luminous. If, however, the flame is used as in a modern gas-fire, to heat a solid radiating surface, the proportion radiated comes up to somewhere about 50 per cent. Consequently, in a coke fire, that portion of the combustion which is raising the temperature of the solid coke surface is being very much more efficiently utilised than in combustion of flames from the top of the fire burning in the open. Thus one may take it that if the amount of gas evolved is relatively small, so that it can burn in the fire, raising the temperature of the radiating surface of coke, it is very effective. But larger quantities of gas burning from the top of the fire are comparatively inefficient.

In experiments made at Leeds on the same fire, burning different solid fuels, this phenomenon was much in evidence on measuring the radiant efficiencies obtained from the fires. The experiments require extension, but I may say that the results were in accordance with the foregoing considerations, and agreed substantially with those of Dr. Margaret Fishenden of the Fuel Research Board, in that coke was found to give a higher radiant efficiency than coal. One striking result obtained, however, pointed to the necessity of not having present in the coal, ash of such a quantity and kind as to form a coherent coating during the burning, which thus formed a screen around the burning material and lowered its radiant efficiency.

Another very interesting point was the behaviour of a coke soaked in sodium carbonate solution, and therefore very reactive. It burned very freely, with visible flames a foot long. In appearance it was attractive. As a matter of fact, its radiant efficiency was not so high as that of the medium temperature coke, and that for the reason that I have explained. It reacted freely, generated carbon monoxide in quantity, the carbon monoxide burned with long flames at the top of the fire, and its radiant efficiency was correspondingly low—a defect due to the high reactivity of the coke.

Obituary.

PROF. A. A. LAWSON.

It is little more than a month since the formal opening of the new Botanical Department in the University of Sydney was described in NATURE, with an illustration given of the building itself (April 2, p. 509). Before those who read it were able to formulate, much less to convey to Prof. Lawson their congratulations on this tangible mark of his successful tenure of his chair, he was in his grave, in the South Head Cemetery that looks out seawards over the entrance to Sydney Harbour. His death, following closely on a serious operation from the effects of which he never rallied, took place on Mar. 26 at Sydney.

Abercrombie Anstruther Lawson was born in Fife, and entered the University of Glasgow as a medical student. After passing through the course in elementary botany, where his artistic skill had already attracted attention, for reasons of health he went to California, and entered the University of Berkeley, coming under the influence of such teachers as Setchell and Osterhout. Graduating as Master of Science in 1898, he became instructor in botany, having already entered on a career of research. He also studied later in Chicago and at Bonn, with published results which led to his appointment as lecturer in his old University of Glasgow in 1907. Having held this position for five years, he was appointed to the chair of botany in Sydney, where he not only secured the erection of a new Institute, the opening of which took place on Nov. 6, 1926, but he also built up a school of botany, with a large and growing body of students, and a highly creditable list of published researches.

Lawson's own published work falls into three groups, relating respectively to cytology, to the gametophyte of Gymnosperms, and to that of the Psilotaceæ. The first memoir on the pollen mother-cells of Cobæa formed the thesis for his degree. Already that delicacy of pencil craft was revealed which marks all his later work. Few microscopists have combined more effectively than he did refined cytological method with artistic skill. This was the first of a series of memoirs relating chiefly to meiosis, which were continued until 1912. They are characterised rather by faithful record of detail than by the establishment of new points of view. Armed thus with exact laboratory experience, he carried through a long series of observations of the gametophyte and propagative processes in the gymnosperms. These will stand as a permanent record of patient research, by an observer of high technical skill. They opened while he was still instructor at Berkeley: they were continued during the period of office in Glasgow, and later in Australia, where they related chiefly to local genera, such as Microcachrys and Pherosphæra. The last of this series was a particularly fine memoir on Bowenia, published in 1926, with eight plates (*Trans. Roy. Soc. Edin.*, vol. 54). At the time of his death, a further memoir on Macrozamia was already well advanced. His illustrations from the earlier of his memoirs on the Gymnosperms have been very widely absorbed into Lotsy's "Stammes-Geschichte," vol. 3. No one can in the future treat the Gymnosperms generally without frequent reference to the wide observational work of Lawson.

Lawson left his mark also in a third line of inquiry: in 1917 two memoirs appeared on the gametophytes of Psilotum and Tmesipteris, so long awaiting discovery. It is true that the ground has since been covered in greater detail for the latter by Holloway, and in particular in the embryology: but that need not detract from the exact delineation and description given of their gametophytes. Lawson had also wide interest in the Algæ. He had collected with Setchell on the Aleutian Islands and on the coast of California. He made a special journey to collect them on the Jamaican coast, and he was well posted in the British marine Algæ. But he appears never to have published upon them.

While it must be conceded that Lawson's work has been detailed and analytical rather than constructive, we should bear in mind that he was still a comparatively young man, and that the last twelve years have been devoted to the establishment and consolidation of a school of botany in Sydney. As they stand, his numerous memoirs have added substantially to the sum of positive knowledge. They may not have formed new patterns in the web of the science, but they have filled many of its blanks, not only with artistic effect, but also with honest and trustworthy records. It will be a pleasure to his friends to remember that the Royal Society of Edinburgh recognised the merit of his work, so largely published in its *Transactions*, by the award of the Makdougall-Brisbane Prize. A deeper satisfaction will be felt in the fact that the inclusion of his name in the recent list of selected candidates for fellowship of the Royal Society was published in time for him to have been aware of this high distinction, and to receive the congratulations of his many friends in Australia, though his death has occurred before the date of formal election. F. O. B.

Prof. Adolf Miethe.

Photographic science has suffered a great loss in the death, on May 5, of Regierungsrat Dr. Adolf Miethe, professor at the Technische Hochschule in Berlin-Charlottenburg. Prof. Miethe was born in Potsdam on April 25, 1862, and studied physics, astronomy, and chemistry in Berlin and Göttingen. After working with Prof. Hartnack in Potsdam, and then with Schulze and Bartels in Rathenow, he became director of Voigtländer und Sohn in Braunschweig, leaving this position in 1899 to become professor at Charlottenburg as successor to H. W. Vogel, the discoverer of the sensitising action of dyes on the photographic emulsion. According to the *Photographische Industrie*, Miethe was responsible for the teaching of scientific and practical photography in all its branches, photo-mechanical methods, spectral analysis, optics, and astronomy. He was also well versed in botany, mineralogy, and other subjects.

Miethe was the first to construct anastigmats, the name of which is due to him. He improved opera and field glasses, invented, with Gaedicke, magnesium flashlight photography, and introduced the isocyanine dyes as optical sensitisers for the photographic emulsion. It was due to his efforts that great advances were made in the three-colour collotype process. During the last year or two Miethe's name has been brought more prominently into general notice by his claim to have transformed mercury into gold, a claim which, however, has not been satisfactorily substantiated.

Miethe was prolific as a writer and was very successful in presenting scientific knowledge in such a form that it was readily understood by the general reader. Several books dealing with photographic subjects came from his pen.

We regret to announce the following deaths:

Mr. J. Barnard, formerly senior mathematical master at Christ's Hospital, both in London and after its removal to Horsham, aged seventy-six years.

Sir Sidney Colvin, formerly Slade professor and director of the Fitzwilliam Museum, Cambridge, and keeper of prints and drawings at the British Museum, on May 11, aged eighty-one years.

Dr. Maurice F. FitzGerald, emeritus professor of civil engineering in Queen's College, Belfast, on May 4, aged seventy-six years.

Prof. J. S. Nicholson, until recently professor of political economy in the University of Edinburgh, on May 11, aged seventy-six years.