of the samples, as determined by the Fiske and Subbarow method, was found to fall rapidly and steadily and rise again in 30–60 minutes nearly to, but sometimes above, the original level; while glucose (Folin's blood sugar method) showed a fall at the beginning, then a rise and next a rapid and steady fall from a point where all the esterified phosphate was beginning to be liberated. This result has been repeatedly and consistently obtained with extracts from several varieties of peas, not from ground peas alone. When efforts were made to measure the carbon dioxide output in response to phosphate in a differential manometer, the large amount of colloidal protein present as impurity in the extract interfered by holding large quantities of the gas.

This demonstration of phosphate esterification brings the higher plant (pea) fully in line with yeast and animal muscle in this respect. But it is to be expected that when the new problems confronted in these cell-free extracts are fully investigated, the course of respiratory sugar breakdown in higher plants may have its own individual peculiarities, as in fact further new results I have obtained seem to hint. Detailed results, and the method of preparing the extracts, are to be published shortly elsewhere.

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[1] *Proc. Chem. Soc.*, **21**, 189; 1905; and onwards.
[2] *Biochem. Z.*, **183**, 176; 1927.
[3] *Biochem. Z.*, **165**, 1; 1925.
[4] *Biochem. Z.*, **219**, 364; 1930.

Application of Microchemical Tests in Assessing the Quality of Ash Timber

DURING the last few years, attention has been given in this laboratory to the study of the anatomical structure of ash timber in relation to the maximum crushing strength in compression parallel to grain. Consignments of trees from seven localities have been studied, and each site had a distinctive strength specific gravity regression. Variations in the amount of wood substance per unit volume, therefore, do not account completely for variations in strength, and it has been shown that the arrangement of the wood substance in the annual ring also influences the mechanical properties[1]. The fact, however, that specimens of equal specific gravity and closely similar anatomical structure sometimes differ by more than 30 per cent in maximum crushing strength suggests that still other factors are involved and that probably the physical and/or chemical nature of the wood substance is of great importance in determining strength.

Several methods of examination were tried in comparing pairs of specimens of strong and weak types of timber, the individuals of each pair being matched in respect of specific gravity and gross anatomical features, but differing considerably in strength. It was discovered that a phloroglucin-hydrochloric acid solution could be used to distinguish between the members of each pair. In strong specimens, the whole of the fibre-walls stained red, and in the weakest type the middle lamella region stained a faint pink, the secondary walls remaining unstained. All intermediate types of staining were observed.

So far, the method has been applied with success to timber tested in compression parallel to the grain. It has also indicated excessive weakness in a number of defective hockey sticks, and it is intended in the immediate future to investigate the toughness of ash by the same method.

With regard to the nature of the chemical reactions involved, it is not at present possible to do more than direct attention to the fact that of the so-called standard lignin reagents, phloroglucin-hydrochloric acid is apparently the only one capable of differentiating between strong and abnormally weak types of timber.

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[1] Clarke, S. H., *Forestry*, **7**, 26; 1933.

The Classification of Coals

FROM a chemical point of view may I dissent from much that is said about the Stopes nomenclature for the visible ingredients of bituminous coals in Dr. Lessing's article in NATURE of April 27.

In the first place, there seems to me to be nothing particularly new or advantageous in it. Every observant person knows that bituminous coal is usually composed of bright and dull layers; and for a century or more these have been distinguished as the 'bright coal' ('Glanzkohle') and 'dull coal' ('Mattkohle') respectively. It has also been long known that between such layers there is an amorphous powdery substance that blackens the hands, and commonly called 'mineral charcoal', or by miners the 'dant'. I have never been able to see any sufficient reason for substituting such terms (imported from France) as 'vitrain' and 'clarain' for the 'bright coal', 'durain' for the 'dull coal' and 'fusain' for the 'mineral charcoal' or 'dant', unless indeed for consistency 'charbon' be also substituted for 'coal' in naming the main substance. Inasmuch as such substitutions have tended to mystify people, and to make believe that somehow or other coal is better explained thereby, I deprecate the further elaboration of them referred to in Dr. Lessing's article.

Secondly, I think the article misleading in saying that "the subdivision of coal into the four visible Stopes ingredients has been widely accepted in Great Britain and in most European countries" without indicating that, outside the exclusive circle of the 'Coal Research Club', it has been much criticised and by no means generally adopted.

Throughout the systematic researches into the chemical constitution of coals and their maturing which for years past have been carried out in my laboratories here, and which have comprised coals from all parts of the world and representative of all stages in the peat → brown coal → lignite → bituminous coal → anthracite series, the Stopes nomenclature has been of little assistance, and I venture to think it has no chemical significance. Our experience does not support Dr. Lessing's statement that its four isolated components are "different and typical in their chemical composition . . . associated with mineral matter in characteristic amount and composition . . . [and] contain groups of organic