

to the invaluable collections in the museums and in the cessation of much scientific work which is dependent upon such collections. That such action, in the opinion of this council, could not fail to bring discredit upon our nation in the eyes of all civilised peoples.

On January 7 it was resolved: That the Classical Association appeals to the Government against the proposed conversion of the buildings of the British Museum into a seat of combatant activity, both because of the inevitable injury that would be caused by removal to a multitude of objects of unique historical value, and because the change would legitimate and incite attacks from the air upon a library containing many thousands of irreplaceable books and MSS. which constitute a great part of the inheritance of the civilised world. Their safe-keeping is a trust for humanity imposed by history upon this country, and the association regards the present proposal as a declension from the high ideals with which the country and the Empire entered on the war.

Similar resolutions have been passed by the British Archaeological Association, the annual Conference of Educational Associations, the Royal Society of Antiquaries of Ireland, the Royal Asiatic Society, the Royal Numismatic Society, the Cambridge Antiquarian Society, and many other representative bodies.

SANDS FOR GLASS MANUFACTURE.¹

THE preface to this memoir refers to the great advantage which the glass industry of this country is deriving from the prescient policy of the Department of Optical Munitions and Glassware Supply of the Ministry of Munitions; and the memoir itself is an example of the department's efforts to place the industry in a sound position. A knowledge of the home resources of raw materials is of prime importance to the glass industry, and the exhaustive survey made by the author has enabled him to place on record for the first time valuable information as to the resources of suitable sands on which the glass manufacturer can rely. In pre-war days large quantities of excellent sand were imported from Belgium and France, and their cheapness was mainly due to their transport as ballast in coal-boats. Economic conditions may prevent the utilisation of many of the occurrences of sands and rocks to which the memoir refers, but much will depend on the provision of cheap transport by the adequate development of our canal systems. This is well shown by the sketch-map marking the locations of the chief resources of glass sands in relation to the glass-making areas.

A glass sand should be of uniform grain size, and the most desirable sands are those containing a high proportion of grains from 0.25 to 0.5 mm. in diameter. The presence of grains smaller than 0.1 mm. causes the formation of "seed," which is difficult to remove in the "fining" process. An even grade is also an important factor in securing homogeneity, and it is doubtful if stirring can completely eliminate heterogeneity caused by the use of badly graded, unevenly melting sands. An important conclusion to be drawn from the author's investigations is that although we have not in this

country any deposit equal in quality, uniformity, and extent to that at Fontainebleau, we have ample supplies of sands suitable for all ordinary glass-making purposes. Carefully selected sands from the soft white quartzites of Muckish Mountain contain under 0.01 per cent. of iron oxide, and this source is of great importance, as, despite its inaccessibility, it is likely to provide a home supply of the small quantities of sand required for the manufacture of optical glass. Generally speaking, although crushed rocks are largely used in the American glass industry, they cannot for economic reasons be regarded as an immediate source of supply of glass sands in this country.

Sand-pit owners are now giving greater attention to the cleansing and grading of sand by washing, and the improvement which can be effected in the quality of a sand is indicated in the tables given on p. 64 of the memoir. It would have been of interest if quantitative information as to the yield of washed sand could have been added to these tables. The washers at present in use are satisfactory for comparatively coarse sands of the Leighton Buzard type, but are much less efficient for finer-grained sands, such as those of Lynn and Aylesbury. Provided that a plentiful supply of water is available, there should be no great difficulty in designing an efficient washer for fine-grained sands, and co-operation between the glass manufacturer and the sand-pit owner is desirable if adequate washing plant is to be installed. Sands low in iron will be preferably graded by drying and sieving, instead of washing, so as to retain the alumina-rich coating which is adherent to the quartz grains. Alumina is valuable in a glass, as not only does it reduce the tendency of the molten glass to devitrify, but it also increases the toughness of the glass and enables the batch to be cheapened by increasing the proportions of sand and lime at the expense of the alkali. Felspar is being increasingly used as a source of alumina in a glass batch, and the author's survey of the resources of suitable rocks of low iron content is of value as an indication of the possibility of substituting the home for the imported material.

The uses of sand for its refractory properties are referred to only briefly, and the further memoir on our home resources of refractory sands will be awaited with interest.

Prof. Boswell has rendered a distinct service to the glass industry by this rapid completion of his survey.

ORGANISATION FOR INDUSTRIAL EXPANSION IN SOUTH AFRICA.

IN an article on "The Co-ordination of Research" which appeared in NATURE of December 6 mention was made incidentally of the issue of the *South African Journal of Industries*. Copies of the first number of this journal have now reached this country. Before alluding to the scope of the new journal it should be explained that the Scientific and Technical Committee appointed by the Department of Mines and Industries of the Union of South Africa has for its prin-

¹ "A Supplementary Memoir on British Resources of Sands and Rocks used in Glass Manufacture, with Notes on certain Refractory Materials." by Prof. G. H. Boswell and others. Pp. 92. (London: Longmans and Co., 1917.) Price 3s. net.