LETTERS TO THE EDITOR.

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The January Meteors of 1918.

I WATCHED the northern sky during most of the interval between 6h. and 10h. on January 3, and recorded eleven Quadrantids. The conditions were not good; there was a slight fog, through which the stars of Ursa, Draco, etc., shone dimly, and the air was frosty, the temperature being about 26°.

The Quadrantids observed were, in the majority of cases, near their radiant at $233° + 59\frac{1}{2}°$, and moved slowly. This position is near ι Draconis, and about 6° north of that usually determined in past years. I am at a loss to explain the cause of the discordance, the data of the present year being considered quite satisfactory. In the circumstances the results recently obtained by other observers will be awaited with special interest.

W. F. DENNING.

44 Egerton Road, Bristol.

THIS evening, between 6 p.m. and 9 p.m., looking north, twenty-two meteors were observed at Sidmouth, South Devon. The most brilliant one appeared about 8.15 p.m. G.M.T., and was travelling in a south-easterly direction at a moderate speed. The meteor was of a reddish colour, and was followed by a long trail of white light. It was frosty and beautifully clear, excepting a slight haze for a short interval.

WINIFRED L. LOCKYER.

Salcombe Regis, Sidmouth, January 3.

NATIONAL MUSEUMS IN PERIL.

THE report that the Government proposed to requisition the British Museum as the headquarters of the new Air Board has resulted in a storm of protest from many men of light and leading throughout the country, and from corporate bodies concerned with the promotion of the intellectual welfare of the nation. The correspondence published in the *Times* and other journals represents only a small fraction of the budgets received, and it is evident that the Government will bring upon itself nothing but obloquy if it persists in the action contemplated. Since we referred last week to the projected dismantling of the galleries at Bloomsbury, it has been made known that the Office of Works has surveyed the Natural History Museum at South Kensington with the view of using the building for the purposes of other Government departments, and has reported in favour of doing so. The very existence of our two greatest national institutions is thus threatened, unless a united effort is made at once to convince the Cabinet of the unnecessary and ruinous proceeding to which certain administrative officials, with the usual indifference to scientific interests and inability to understand scientific values, desire to commit it.

The high-handed method adopted in the proposal to commandeer the two museums cannot be justified even by the provisions of the Defence of the Realm Act. Sir Arthur Evans states that the trustees of the British Museum were not consulted upon the matter, though they are responsible for the collections, not as Government nominees, but under an Act of Parliament. They were astounded upon receiving from the Air Board a requisition for the building to house the Board's establishment, and at once sent a strong protest to the Government against the scheme. Even an enemy invader could not adopt a more arrogant attitude towards the trustees than that shown by the representatives of the Government. The collections were regarded as so much furniture which could be packed up in a few days by workmen and conveyed in pantechnicons to convenient places of storage until after the war. As "A Londoner" writes in the *Times* of January 4 in an attempt to justify the official attitude: "It is pretty widely understood that the Air Board is willing and anxious to put its large resources in transport and labour at the service of the nation for the removal of the contents of the British Museum to places of safety which the Board has already inspected and approved."

This semi-official pronouncement reveals entire incapacity to appreciate the difficulty of the problem of dealing with the contents of the museum. The whole of the objects are considered as goods which may be removed in a few days and returned without detriment at a later period of reconstruction. Because a selected number of objects have been carefully transferred to places of security by museum officials during the past two years, as a precaution against air-raids, it is assumed that the whole may be dealt with summarily by energetic workmen under the supervision of experts. The absurdity of this view will be manifest to anyone acquainted with museum work. To make a selection of fragile objects and other national treasures, and to take measures to preserve them from damage, are very different matters from that of clearing space without reference to what it occupies. It is certain that if the indiscriminate and hurried dismantling of the museum is proceeded with, many of the objects taken away will never be worth bringing back, and it would be just as well to make a bonfire of them at once.

Only a small proportion of the contents of the museum could be removed in time for the space they occupy to be of any use to the Air Board. The library must remain, and the larger sculptures, including the more important pieces of the Elgin marbles, the Assyrian bas-reliefs, and the Egyptian statuary. The ethnographical collections cannot be disturbed without certain destruction of many objects. The glass, pottery, porcelain, and faience collections, the ancient and medieval gems, rings, and jewelry, the Greek vases, the Babylonian clay tablets, the Egyptian pottery and images, the terra-cottas, the bronzes—all these can be moved only with an infinitude of skilled handling and packing, and in a period of time which might well run into years rather than months. No, it must be clearly understood that if the museum is to be taken for the Air Board—

which needs offices quickly—the Board will have to be encamped in the middle of the collections, with all the increase of risk which such an encampment involves.

Our concern for the museum is not prompted by opposition to interference with the existence and work of the threatened institution, but by the desire to preserve national prestige and to prevent the ruin of possessions which can never be replaced. Only if reduced to the last extremity—and we are far from that condition—should a scheme be adopted which would give the enemy occasion to scoff at our willing sacrifice of the glorious heritage represented by the collections in the national museum.

"We profess to feel shame and anger," says Sir Henry H. Howorth, "and also terror for the future of our race, when we find the champions of German culture destroying Reims and Padua and Ypres. We call them Huns for their pains, and at the same time in another way, and for no urgent military purpose, ourselves put in jeopardy the noblest collections in the world of art and natural science, which neither money nor skill can replace, and which form the most valuable asset of the country if its mental and moral training are to count in this Armageddon of materialism."

The gravamen of the case against the proposed action is, indeed, that it shows a total lack of imagination and of perception of the value of intellectual studies on the part of responsible Ministers. They accept lightly, and without investigation, a proposal which, on the face of it, imperils the inestimable treasures of the British Museum. They do not consult the trustees as to the effect of their proposed action. They do not give heed to their own Minister of Education. They simply accept a scheme put forward by the First Commissioner of Works, who avowedly has not visited the museum to investigate its practicability, and whose expert advisers had on two previous occasions reported that the museum was not suitable for a public office. All this shows an indifference to things of the mind and a materialistic spirit which are of evil omen in statesmen whose business it is to maintain the ideals of the country at a high level, and thereby to hearten it to bear the strain of war. Who is to believe them in future when in their speeches they make play with Germany's crimes against civilisation, or exalt our ideals in comparison with German Kultur? They are lowering the pitch of England's endeavour, and the misfortune is that they do not realise that they are doing any harm in this action. If the members of the Government could be brought to face these facts, it is difficult to believe that they would continue to insist on a policy which is bad for the Air Board, bad for the museum, and a discredit to the country.

Though the spontaneous outbursts of indignation from all parts of the country may yet induce the Government to withhold the impious hand which the Office of Works laid upon the collections and buildings of the British Museum at Bloomsbury, the fate of the Natural History Departments at South Kensington also trembles in the balance. Yet the arguments drawn from unsuitability of structure and fragility of irreplaceable specimens are here no less strong, and they are reinforced by two others. The work in all the Natural History Departments bears directly on the material as well as on the intellectual life of the nation—indeed, on its very existence. Those who say that prosecution of the war must come first should be the first to insist on the continuance of the great help rendered by the museum to all branches of our fighting forces: we may refer them to an article in the *Times* for January 5. To stop this work for the convenience of the Registry of Friendly Societies would be a fine stroke for our enemies. Secondly, the objects in the Natural History Museum form the historical basis on which a great part of natural science rests; they are the standards to which present and future generations must continually refer. To destroy or damage them is to cut away the ladder on which we climb. The distinguished men responsible to the nation for the safety of its unique possessions—trustees, indeed, for the whole world now and to come—have already taken steps against possible attack by the enemy, while leaving the specimens available for accredited investigators. But they cannot prevent the certain destruction and widespread confusion that would result from a sudden clearance of more than half the building as though it were just a mammoth hotel. The removal from Bloomsbury took more than three years, yet, for all the care with which it was accomplished, it left damage which is not yet, and can never be entirely, repaired. When we think of the subsequent growth of the collections and the present depletion of an always insufficient staff, our imagination fails to grasp the threatened ruin. Generations could not restore it. For many a year the science of our country would be hampered.

In the early days of the war we had to fight for our national museum, and well was it that we won a partial victory. Since then the members of the staff unfit for military service have carried on, with what good results a few bald statistics will show. During the past year the Natural History Museum has been consulted by at least fourteen Government departments, as well as by numerous individuals engaged in war-work. The number of visitors, which in 1916 was more than 402,000, was increased in 1917 by 20,000; among these are soldiers receiving class-instruction in sanitary, veterinary, and other subjects. The annual number of acquisitions has decreased, because all purchases are stopped, but donations continue to flow in with a volume that seems to grow rather than diminish. Among these accessions have been thousands of specimens of the highest scientific importance. The dismantling of the museum would make the receipt of donations impossible, and the stream would be diverted elsewhere. In some cases it would never return.

"We are blamed," says the Government in

effect, "for commandeering hotels; we must leave places for our young officers to dine; do you expect us to oust another political club? We preach economy; do let us practise it for once. We can get the museum *rent-free*." Rent-free, indeed! Is the cost of structural alterations, of packing, of removal, and of restoration not to be paid for? Does the scientific help for our food-producers, our industrialists, and our fighting or wounded men weigh as nothing in the balance? Are the gifts which you reject devoid even of pecuniary value? "What should ye do, then? Should ye suppress all this flowery crop of knowledge and new light sprung up and yet springing daily in this city? Should ye set an oligarchy of twenty engrossers over it, to bring a famine upon our minds again, when we shall know nothing but what is measured to us by their bushel?"[1] "Milton!" we cry with Wordsworth:

> Milton! thou should'st be living at this hour:
> England hath need of thee.

The following are a few of the resolutions which have been passed by important public bodies protesting against the proposed employment of the museums for purposes other than those for which they are intended:—

At a special meeting of the British Academy on January 3 it was resolved to represent to his Majesty's Government the irreparable injury that would be done to the interests of learning and humane studies by any serious damage to the priceless collections in the British Museum, and the slur which would be cast on the good name of the country by action which will be taken as implying indifference to those collections and to the civilisation they represent. To remove any considerable portion of the collections, except with the utmost care and the expenditure of many months of skilled labour, is impossible without the certainty of injury; and to house a large combatant department in the midst of the collections themselves involves a great increase in the risk of accident and fire, quite apart from the danger of air attack from hostile aircraft, which would obviously be much increased. The Academy earnestly appeals to his Majesty's Government not to sanction action which would discredit this country in the eyes of the civilised world.

The fellows of the Linnean Society of London in extraordinary general meeting assembled on January 7 placed upon record their profound astonishment and alarm at the reported intention to dismantle the British Museum, including the Natural History Museum, in order to use it for Government offices; their emphatic protest at a procedure which must endanger priceless and irreplaceable possessions acquired at great cost and infinite labour during the last two hundred years, constituting the most splendid museum in existence, and the recognised centre of systematic scientific research; their dismay at a resolution which must paralyse scientific activities that during the past three years have been devoted to work intimately connected with the prosecution of the war; and at the expenditure of a large sum in adapting unsuitable buildings, whilst other and more suitable accommodation might be provided at much less cost; and, finally, to emphasise the disgrace which must accrue to the nation in the eyes of the whole world by the evidence thus afforded of the inability of the Government to appreciate the essential value to the nation of scientific assistance, such as the British Museum has rendered and is capable of rendering.

The Entomological Society of London has resolved: This society, founded for the advancement and practical application of entomological science, knowing that this science, especially at the present moment, plays a most important part in many questions, often of extreme urgency, affecting the health of the nation and its forces at home and abroad, its food supplies, its timber, and the raw material of its manufactures, views with the gravest concern any action that would impede work essential to the national welfare. Towards the solution of these problems the collections at the museum have in the past largely contributed, and many of them are at present under investigation. The proposed action of his Majesty's Government in reference to the Natural History Museum would have a disastrous effect upon work which demands continued reference to its enormous collections. It is obvious that to be of any practical value these must always be readily available, and, moreover, their removal would not only be a very lengthy undertaking, but could not be carried out without irreparable damage. The Entomological Society of London feels bound, therefore, to enter the strongest possible protest against such proposed action, the full consequences of which can scarcely have been realised, and in the interests of the Empire urges that the suggested interference with these important collections should be abandoned.

At a meeting of the council of the Mineralogical Society of Great Britain and Ireland, held on January 7, it was resolved: That the First Commissioner of Works and the War Cabinet be most earnestly requested to reconsider the proposal to utilise a portion or the whole of the Natural History Museum for other than its present purpose. In particular, as regards the Mineral Department, the Mineralogical Society views with alarm any proposal to render inaccessible, both to the general public and students, and also to inquirers respecting economic questions, the national collection of minerals, which has been accumulated during the past century and a half, and is now the largest and most complete in the world. This collection contains, for reference and comparison, examples of all minerals (and ores) that have been put to economic uses, representing numerous localities that have not yet been worked commercially. Direct reference to those parts of the collection not exhibited to the general public would supply a large amount of information, not available elsewhere, even in published works, respecting mineral occurrences in all parts of the world. Such information has already been utilised by the Advisory Council on Scientific and Industrial Research, by the War Office, and by the Department for the Development of Mineral Resources attached to the Ministry of Munitions of War, and could also be of use to the proposed Imperial Mineral Resources Bureau. The proposal to render such information inaccessible would seriously hamper the work of all Government departments concerned with the development of the mineral resources of the Empire.

At a special meeting of the council of the Essex Field Club, held on January 7, it was unanimously resolved: That the council of the Essex Field Club learns with amazement that the Government contemplates occupying the British Museum, including the Natural History Museum, for departmental offices, and hereby expresses an indignant protest against such action, which is certain to result in irreparable injury

[1] Milton's "Areopagitica."

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 Archæological 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 Buzzard 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.

[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.

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-