

### Letters to the Editor.

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#### The Radcliffe Observatory.

I HAVE been requested by the National Committee for Astronomy to forward the accompanying copy of a resolution adopted *nem. con.* by the Committee at a meeting held on May 9:

"In view of the large number of astronomical observatories already existing in the northern hemisphere in indifferent climates, where many important types of observational work cannot usefully be attempted;

"And in view of the great need for comprehensive investigations in the southern hemisphere with powerful equipment;

"And in view of the stations in the southern hemisphere already erected, or in course of erection, by several foreign observatories;

"And fearing the danger of British observational astronomy permanently losing its position in the front rank unless greater use is made of the best climates in the British Empire;

"The National Committee for Astronomy is of opinion that the establishment in South Africa, under English control, of a new observatory equipped with a large reflector, and adequately endowed, would not only be in the best interests of astronomy, but is almost an imperative necessity in the interests of British scientific prestige.

"Such an observatory, if established, would be able to carry out work in the southern hemisphere complementary to that of the Dominion Astrophysical Observatory in British Columbia, which has so signally justified its erection.

"Further, the Committee, being aware of the proposed transfer of the Radcliffe Observatory from its present site, is strongly of the opinion that the opportunity should be taken to move the observatory to South Africa rather than to another site in England, and that such a project would be an enterprise of national importance.

"The Committee feels confident that if this scheme were adopted, not only would new fields be opened up, but existing facilities would be greatly improved, in particular by co-operation between the Oxford University Observatory and the Radcliffe Observatory; and that this co-operation would be of much greater value to the study of astronomy in Oxford if the Radcliffe Observatory were transferred to a site in South Africa than if it remained in England."

Of the seventeen members of the Committee who were present when the vote was taken, the following voted in favour of the resolution:

A. Fowler (Chairman), Yarrow research professor of the Royal Society and professor of astrophysics in the University of London (Imperial College); A. C. D. Crommelin, president of the Royal Astronomical Society; C. R. Davidson, Royal Observatory, Greenwich; Sir Frank Dyson, Astronomer Royal; A. S. Eddington, Plumian professor of astronomy, University of Cambridge; J. Evershed, lately director, Kodaikanal and Madras Observatories; J. Jackson, chief assistant, Royal Observatory, Greenwich; H. Knox Shaw, director of the Radcliffe Observatory, Oxford; W. J. S. Lockyer, director of the Norman Lockyer Observatory, Sidmouth; E. A. Milne, professor of mathematics, University of Oxford; H. F.

Newall, lately professor of astrophysics and director of the Solar Physics Observatory, University of Cambridge; Rev. T. E. R. Phillips, lately president of the Royal Astronomical Society; Lord Rayleigh, emeritus professor of physics, Imperial College of Science and Technology; R. A. Sampson, Astronomer Royal for Scotland; F. J. M. Stratton, professor of astrophysics and director of the Solar Physics Observatory, University of Cambridge; H. H. Turner, Savilian professor of astronomy, University of Oxford.

A. FOWLER

(Chairman of National Committee for Astronomy).

Imperial College of Science and Technology,  
London, S.W.7, May 16.

#### Quantitative Analysis by X-Rays.

IN their interesting letter to NATURE of April 5, p. 524, Prof. T. H. Laby and Mr. C. E. Eddy agree with many of the statements in my address to the British Association, but dissent in some respects from my conclusions. According to their view, I was not sufficiently generous in stating the sensitiveness of the method. The sensitiveness depends on numerous factors such as the energy applied, the time of exposure, the wave-lengths to be photographed, and so on, and in a very high degree on the constitution of the sample; traces of copper present in aluminium will give an X-ray line incomparably stronger than when present in the same atomic concentration in lead. The state of aggregation of the sample is also of great importance; an alloy available in comparatively large amounts, which can be soldered massively on to the anticathode, and, on account of its high heat and electrical conductivity, can be bombarded very intensively by cathode rays, is much better than a sample of mineral possibly available in minute quantity only, which must be rubbed as a powder into the anticathode.

As the sensitiveness is to a high degree dependent on the conditions mentioned, no exact figure covering all cases can be quoted; the determination of an element present to the extent of 1 in 10,000 is possible in many cases, and in some special ones lower concentrations still can be determined. Prof. Laby and Mr. Eddy achieved much greater sensitiveness in their analyses than this, and they are to be congratulated on the excellent results they obtained in the analysis of copper or iron in zinc. I must, however, entirely disagree with their statement that the entire X-ray spectrum of an element can be obtained even at concentrations less than 0.0001 per cent. If they try to determine traces of sodium in lead they will certainly encounter very great difficulties even at so high a concentration as 1 in 10,000, and if they try to analyse most mineral samples, they will scarcely be able to attain the accuracy claimed.

As the intensity of an X-ray line is closely dependent on the constitution of the sample, it cannot be considered an exact measure of the amount of the element present; but if a suitable reference substance be added to the sample and the assumption made that the line emitted by the latter is influenced by the presence of different elements in exactly the same way as the line of the element to be determined, then a comparison of the intensities of the two lines can be employed as a method of quantitative analysis. It is only necessary to know the amount of the reference substance added and the intensity ratio of the two lines emitted by equal numbers of atoms of the two elements, which can be empirically determined.

While it is convenient to compare lines of equal intensity, partly because a microphotometer is then no longer essential and partly because some of the