

Sir Robert Robinson rightly points out that "it is inconsistent to praise our scientists for their outstanding contributions to the war effort and at the same time to suggest that they offend against our ethical code if they serve the country in a similar fashion during an uneasy peace". What ethical code would countenance freedom for all scientific workers but those in defence establishments to acquire professional qualifications? To justify the universities' attitude, it must be shown that something in the process of examining the research work and secret thesis of a defence scientific worker must inevitably so react on the university as to be an infringement upon its scientific liberty and independence. What indeed are the reactions the universities fear, and, with goodwill, can no safeguards be evolved to allay such fears?

If the realistic approach to this problem now unfortunately being followed by only one or two universities is condemned by scientific leaders, or indeed if it fails to be adopted by a wider circle of universities, it is certain to lead to an accelerated decline in the research talent of our defence laboratories and a degree of unpreparedness in defence that can only make an uneasy peace the more uneasy for us all. Before taking this responsibility on their consciences, universities should satisfy themselves that no compromise can be offered, and I would venture to suggest that the Royal Society might offer to mediate between the universities and the defence science departments in trying to work out some acceptable scheme. Any scientific worker in Great Britain should feel that he can count upon the active support of British science and British universities in alleviating so far as possible conditions which restrict his scientific freedom.

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THE assurance contained in the second paragraph of Dr. Keyston's letter is very welcome, and it will now be the fault of academic men of science and the universities themselves if the high ideal of unfettered research is not realized in practice.

The citation in the first paragraph shows that my remark about unpublishable theses was intended to apply to 'internal' students. It is clearly bound by juxtaposition and reference to the previous sentence. Thus in my opinion the refusal to accept secret theses from internal students is "a step in the right direction", because it underlines the desirability of freedom of scientific effort in the universities. Admittedly, however, the sentence, taken out of the context, would appear to cover the cases of scientific workers in defence establishments who wish to submit secret theses for higher degrees. A little earlier in the address quoted, it was recognized that such workers would not always be able to publish their results; an unfortunate consequence of the present state of world affairs. I agree that, with proper safeguards, it might be possible to devise ways and means whereby such results could be examined for a degree.

The matter is nevertheless very complex, and it is certain that a single system has little chance of general adoption. The University of London insists that all theses must be deposited in the University Library, but will examine work by suitably qualified external students. The University of Oxford, on the other hand, has accepted a certain number of secret theses during the War as an emergency measure, but

requires residence of three or six terms duration before leave is given to supplicate for the degree of B.Sc. or D.Phil. respectively. The D.Phil., for example, is not regarded merely as a certificate of technical proficiency; it normally implies that its possessor has spent two years, under approved conditions, in an Oxford school of research. Provision is made for certain equivalents (see Examination Statutes, *Statt. Tit. VI, Sect. vi, § 1, 2 and § 5, 2, 12*).

These are but two examples of the different regulations in force, and in addition the variables on the side of the defence departments are numerous and include the questions of supervision and assessment of joint work.

I am in no position to estimate the probability of changes being made in the examination statutes, still less to forecast the direction of any such changes, but in view of the very varied circumstances, feel confident that, if the door is opened, each case will still have to be considered on its merits.

Furthermore, I think that there will be a general disinclination to award the higher doctorate on the results of unpublished work. Here again there may well be a few quite exceptional cases, and sufficient elasticity to deal with them is perhaps already provided. Thus at Oxford the Board of Faculties has power to vary the regulations subject to the approval of the General Board of the Faculties.

Where so many parties, interests and principles are involved, I doubt the feasibility of the mediation suggested by Dr. Keyston, and suggest that the problem must still be attacked in detail.

Finally, it should be added that the question affects categories other than scientific men in defence departments, and these include workers in Government laboratories generally, and in industrial research laboratories. These cases are especially important from the point of view of 'external', rather than from that of 'secret' work.

R. ROBINSON

### Flash Visual Acuity

MOST published researches on visual acuity have assumed an unrestricted time of observation, but recent studies of the relations between intensity discrimination and acuity, and photo-chemical theories thereof, have indicated that the wandering of fixation plays an important part in the performance of the visual system. It appears that a study of visual acuity in relation to exposure time may throw additional light on the subject.

During the past year, we have conducted some exploratory investigations which we hope will be extended by other workers in this laboratory and published in full; in the meantime, a note on the results so far obtained may be of interest.

The objects (shown in a dark field) were of the 'double star' type represented by two small equal and adjacent apertures which could be shown alternatively with a single aperture having double the area of a single one. Exposures ranged from 700 msec. to 2 msec., and intensities over a relative range of about 50:1. The observer used an artificial pupil, and had to report after a flash exposure whether the object was single or double. Fixation was assisted by the use of a faintly illuminated ring; some measurements were also attempted for extra-foveal vision. The limiting angles of perception were estimated from a statistical analysis of this one observer's answers. Though many thousands of observations