

duce analytical errors. Changing from one stand to the other, which requires only 1 to 2 s, eliminates this source of error. Every sample is pneumatically clamped on the spark stand, so the spark gap width is very reproducible and rapid sample handling is possible.

The sensitivity of the photomultipliers can be adjusted very simply. Coarse step printed circuit boards make it possible either to select one of ten sensitivities by relocating a wire or to

choose new sensitivities for each of the five analytical programmes, thereby increasing the versatility of the system. By means of the computer, five fixed analytical programmes can be stored in the system. These, in turn, can be divided into any number of subprogrammes by means of punched paper tape. Thus, even in case of complex high-alloyed materials, examination becomes possible.

Manual operation of this system is

extremely simple. Introduction of the sample, selection of the programme and actuation of the starter button are the only operating steps which are carried out by the operator; calculations and printout of the results in per cent by weight are carried out automatically. Even for complex, high-alloy materials results are within the limit of conventional standard deviations—but are obtained within about 1 s.

WOLFGANG THOMICH

CORRESPONDENCE

Dingle's Answer

SIR,—While I accept and appreciate the apology on page 315 of this issue for the charge of dishonesty made in Professor Ziman's review¹ of my book, *Science at the Crossroads*, the circumstances are such that a further statement from me is called for so that the matter shall be rightly understood. It would, of course, be possible for me to have made false statements quite honestly, and readers of *Nature* might well infer, in the absence of comment from me, that such was the fact that had merely been expressed in the review by the wrong word. It is particularly necessary for me to remove that impression because the description of the book given by Professor Ziman, which has already been independently described in *Nature* as "admirable"², fails to make clear that its whole significance depends on the truth of its factual statements. "My purpose throughout", I wrote (page 19), "is not to indict but to inform, and let the facts bring whatever indictment is necessary." I cannot, therefore, justifiably allow any doubt to exist of the trustworthiness of those facts, for all of which I possess conclusive evidence.

This clarification is the more necessary because Ziman's opening sentence ("This is Professor Dingle's account of his attempt to persuade the scientific community that the theory of relativity is wrong and should be repudiated") must almost certainly suggest that to give such an account was the main, if not the only, purpose of the book. This would be quite false. I certainly should not have written it as a piece of autobiography, or even to try again to persuade the scientific community of anything. I wrote it, with great reluctance, only after 13 years of continuous effort in that direction had convinced me that further effort was useless, and it was because

the reason for my failure seemed to me so ominous, both for the future of science and for the effect of scientific research on public welfare generally, that I had a moral obligation to make the whole facts known, free from my interpretation of them, and to leave readers to form their own judgment of what they implied. I referred in the preface (page 9) to my inability to obtain "the one essential desideratum of the whole exercise—plain evidence, through an answer to, or acceptance of, a very simple refutation of the immeasurably important special relativity theory, that the obligation to preserve strict integrity in science continues to be honoured", and I began the summing-up at the end (page 219) by saying "The primary and inescapable purpose of this book, which Part One attempts to fulfil, is to make known, to those with an indefeasible right to the knowledge, the present state of the scientific world as revealed by its practice, and to bring it into comparison with what is generally believed, and implicitly trusted, to be its state as typically expressed by the late Sir Henry Dale. I leave the reader to judge the significance of the comparison for himself, and to estimate what the consequences are likely to be if the present degree of conformity continues." This purpose is continually stressed in the intervening pages.

To prevent further misunderstanding I must add that part 2 ("The Intellectual Issue") on which Professor Ziman does not comment, though of equal length to part 1 ("The Moral Issue"), is of relatively academic interest. It is my reading of the historical causes of the change of attitude of scientists to their work, and is, of course, open to free criticism which I have not the slightest desire to suppress. Part 1, being incontrovertibly factual, is open only to reflexion, leading to whatever action concerned readers may think it proper to take. Professor

Ziman's purported answer to my scientific "Question", which is the source and not the substance of part 1, has already been dealt with³.

Yours faithfully,

HERBERT DINGLE

Purley, Surrey

¹ Ziman, J., *Nature*, **241**, 143 (1973).

² Ellis, G. F. R., *Nature*, **242**, 143 (1973).

³ Dingle, H., *Nature*, **242**, 423 (1973).

Research Funding

SIR,—While it may appear fruitless to object to yet another cutback in federal funding for education and science, I do wish to protest very strongly about the recent reduction in a little noticed but extremely important programme—the National Science Foundation Undergraduate Research Participation programme.

Under grants from this programme, undergraduate science students conduct independent research projects during the summer months. The most gifted and dedicated students are exposed to the literature and techniques of the field, and are given the opportunity to design and execute their own projects under the aegis of an experienced professor.

This will be the fourth summer that I have supervised such a programme in the Biology Department at Massachusetts Institute of Technology. It is noteworthy that all of the students in this programme have gone on either to graduate school in the biological sciences or to medical school. Many of these students, while still undergraduates, published papers on their research or presented papers at national meetings.

My own interest in scientific research was kindled by four summers' research while in college and high school. My colleague Dr David Baltimore, a leader in cancer research and the study of