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Opening address [to the vacation course Arithmetic and mathematics for today]

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OPENING ADDRESS

By

Mr. A. F. D. MAXWELL

Inspector of Schools

IN deputising for him, I bring you the apologies and best wishes of Mr. Koen, our Director of Education, and I am sure I carry back from you to him, your best wishes for a speedy restoration to complete health.

In officially welcoming you and our guest speakers, I think I should apologise to them at the outset for being rather importunate hosts. We are going to work them very hard as you have seen from the programme, and if they sometimes feel that their singing deserves a better supper, I want to assure them that that is only because we have in their absence been indulging in what Don Quixote was told was the most dangerous of activities, "singing and tribulation". You have received some details about them and will, I am sure, join me in congratulating the College authorities on having not only conceived the idea of this course, but on bringing out men as eminent in their fields and as able to assist us.

The striking part about them is the spread of their competence over the whole school range, from junior work to that of senior secondary classes. Actually, they have two things in common. They bring us the fruits of long periods of successful experimentation in the teaching of number in mathematics and they all work in the Midlands. To have expected on top of all their other qualifications that they should also hail from North of the Tweed would, I am sure you will agree, have been piling Pelion on Ossa. We are very glad to have them with us. We are grateful to them and their authorities for their coming, and hope that their visit will be as pleasant for them as it promises to be profitable for us.

I must also welcome you, the audience, and congratulate you on making this course possible by your enrolment. I don't want to make this sound too much like a mutual admiration society, but I do feel that just as the attendance of our speakers is a compliment to us, so is your attendance a compliment to yourselves. Someone once said: "It ain't what a man don't know as makes him a fool, but what he does know as ain't so" and I am sure that it is this antipathy towards the closed mind that has played a great part in bringing us together.

You are probably aware, but not perhaps as acutely as I am, of the fact that you are almost an extinct species. That the human versions of the white rhino should have collected to be found associating in such numbers (in case I unwittingly give offence, I had better say quickly that I am referring to the shortage of teachers of mathematics) I think is a great tribute to your toughness as well as the farsightedness of the organisers of our course.

You are well aware that there has, during the last few years, been a tremendous awakening of interest overseas in the teaching of mathematics and science. One of the impressively admirable features of this activity has been the group study of educational problems by teams of interested people. This has been pioneered in the United States of America, where impressive spade work has been done by the P.S.S.C., the C.B.A., Chem. Study, the B.S.C.S. and the School Mathematics Study Group and in the United Kingdom by the Nuffield Foundation, with which one of our visitors, Mr. Fletcher, is associated, as you have seen from your programme. We in this country have nothing of this nature, but by means of their literature and visits must attempt to keep up with the scientific Joneses and I must say the generosity of the Joneses helps us a great deal in this respect.

We have a tendency here, sometimes rather disconcerting, to indulge in definitions. And to define mathematics, you will agree, is rather difficult. Perhaps we might take a P.S.S.C. approach and work on an operational definition. It would go something like this—"mathematics is what mathematicians do". Now scientifically, there is nothing wrong with such a definition because we are assured on the best authority that we never get an ultimate explanation of anything anyway, and that every answer poses another question. It is, therefore, only sensible right at the beginning to cut short what promises to be an interminable process.

Mathematics has also been described as the handmaiden of the sciences. Now I am sure you will agree with me that if she is so, it is only by virtue of the generosity of her charm. She can

surely stand as mistress in her own right, for not only is it in mathematics that we break down the difficulties of communication the effrontery the Tower of Babel brought upon us, but it is in mathematics that men most nearly escape from the constrictions of their own skulls. Here we can, like Hamlet, be "bounded in a nutshell but count ourselves king of infinite space". It is one phase of human thinking that can be entirely free from anthropomorphism. Unfettered by the difficulties of experimental design and the contradictions of experimental observations, man almost escapes from himself. I say "almost" because he suspects all the time that he salts the universe for the grains of gold that he finds in it. These grains may be indications of his own omniscience but they are rather like the bond that brings the trained falcon back to the falconer's glove—a comforting reminder of security.

Such, of course, was Adams and Leverrier's calculation of the orbit of Neptune and so also, I think, was that confirmation of the theory of relativity, the experimental verification of the bending of light by a gravitational field. These tremendous achievements look, at times, like bringing us back to man's pre-Tower of Babel conceit.

If handmaidening is the term of such an activity of the human spirit, it is a great compliment to the whole of the feminine gender, not that it is in me to grudge them anything of the kind.

Many of the products of our schools consider that what a mathematician does is only of interest to a female mathematician. Others think of him as a dome-headed, naturally bald of course, comfortable, pipe-smoking gentleman with a Sherlock Holmes look. But in few popular images would the impression of strain be apparent. This is quite wrong. We have extant Newton's reply to Harry when Harry complained that he was neglecting his Theory of Gravitation. Newton wrote back to say: "It makes my head ache and keeps me awake so often that I'll think of it no more".

Our visitors have carried our headaches. They have not merely picked fruit from trees indigenous to their own clime. They have borne the heat and burden of the cultivation of those trees. The fact that the foundation of a subject is laid in the beginners' classes is as true of mathematics as it is of any other. If your emphasis there is on memorizing, it is apt to remain so. If it is on manipulation, manipulation will tend later to become an end in itself. It is vitally important to choose the right road at the beginning, and that is why we are so fortunate in having speakers who can survey the whole field of number for us.

I am glad to see that they have had some homework to do and do not reach us altogether ignorant of our problems. We do suffer very much from the tyranny of the text-book, a self-imposed tyranny perhaps, but one which makes the responsibility of the author a rather terrifying one. I feel we do emphasize manipulation at the expense of understanding.

The list of topics with which we are to be regaled during the next fortnight is a most stimulating one and you will agree that our programme is essentially bread and butter stuff. I notice that there is no reference to arithmetic as such, but I take it, it is implied in the primary school content and perhaps also embodied in the secondary school mathematics. I am sure that we shall meet the first two of the mock turtle's branches of the subject—ambition and distraction. Uglification and derision will certainly have no place.

Let us, Mr. Rector, make a beginning.