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A BASIS FOR A SECONDARY MATHEMATICS SYLLABUS

BY

HAROLD FLETCHER

THE syllabus should be arranged in such a way that a stream of pupils are working to capacity on the lines that will serve them well in their future careers at university. But consideration should be given when any scheme, but especially that for secondary education, is under discussion, to the need for a child's course at school to fit him for citizenship in the broadest sense of the word. As far as mathematics is concerned, his education should enable him not only to apply his mathematics to practical affairs, but also to develop some appreciation of those greater problems of the world, the solution of which depends on mathematics and science. I consider that the utilitarian aspect and the application of mathematics should receive due attention.

There is a place in any scheme and also in the application of that scheme for calculation in the secondary school. It is pointless for people to go to university unless they are able efficiently to carry out the computation and the techniques that are required.

We must also see the subject as an integrated whole. I am not therefore in favour of schemes where mathematics is cut up into compartments. Of course you can write any scheme you wish. It is up to the teacher to know how to interpret that scheme. It is the presentation of the material in relationship to that scheme which is important. The best scheme in the world will fail if the teachers do not show the vision that is necessary for its application. Many text-book writers and compilers of syllabuses have been unjustly criticised for the failure of their books and schemes, which was in fact due to poor teaching. If teachers present the material adequately, the text-books and schemes will be successful.

Not only should we have an integrated scheme, but I think that such subjects as trigonometry, mechanics and calculus should begin much earlier than they do, and develop through the greater part of a child's school career, so as to give him time to assimilate them more thoroughly and to enable him to cover more rapidly at a later stage the higher parts of arithmetic, algebra and geometry. In many schemes these subjects are omitted altogether. The scheme for secondary mathematics should be such that no child should leave school entirely ignorant of applied mathematics, mechanics, electricity, surveying, statistics and probability.

I would like to see in every scheme reference to the lives and investigations of the great mathematicians. These references should be made frequently by the teacher in his lessons, some explanation being given of the effect of mathematical discoveries on the progress of civilisation.

There should be a different scheme for different ability ranges of pupils. I think it is wrong to have a scheme for A stream pupils, and the same scheme watered down for B stream and still further watered down for C stream pupils. There are some children who cannot take mathematics in full strength. Such children should have topics, and out of the topics should come the mathematics that is appropriate to them. Such children will not matriculate. The extent of the mathematics that they will need in their lives will be very small, but I would rather have a topic syllabus that would allow them to tackle branches and ideas of mathematics they would never have met at all if topics had not been introduced.

I am always annoyed when I hear people talking about elementary fractions, because the study of fractions can involve a deep study of mathematics. Probably one of the greatest changes that has taken place in mathematics teaching in England is that sets and the understanding of sets, which was once the prerogative of the university, is now being introduced into the infants' schools. Many of the topics formerly dealt with in the secondary schools are being introduced into the primary schools. This will help the secondary teachers enormously when these primary school children move up into the secondary school.

Primary and secondary work in mathematics must be seen as complementing each other. It would be regrettable if the primary and secondary schemes were worked out by different people, because it is impossible to say where primary ends and secondary begins.

I would like children to understand more fully what they are doing, even though they do not cover so much ground. Whenever we make a syllabus, we ought to feel that there is an opportunity of allowing the teacher to get the children to understand through discussion. The teacher should not be hindered by the inclusion of so much material that he finds it impossible to develop it to the full. Otherwise we shall not get the mathematical thinking and the understanding of what is being done.

It would be an interesting exercise for all the secondary teachers here today to write a scheme and present it to the powers that be. You would probably get some more rigorous than the present one, but I doubt whether you would get a common factor, on which a decision could be taken, unless all the teachers were to meet and discuss the scheme beforehand, when there would be a large measure of agreement. It is a good thing for teachers of mathematics to write a syllabus and then submit it to the authorities.

Regarding the syllabus which you submitted to me, and which I enjoyed reading, I would say that I would like to see more on inequalities.

I should like to reiterate certain points which should be taken into consideration when any syllabus is being prepared.

Get advice from the mathematicians who have to teach it. How do they feel?

Is the syllabus overloaded? What points do not receive as much attention as they ought?

If we can get teachers happy with a syllabus, then the standard of mathematics will improve.

What does the university expect of our children?

In all you do in your mathematics teaching, keep this in mind: it is the child that matters.

Books by

L. G. W. SEALEY

Adviser for Junior Schools, Leicestershire

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