

PHILOSOPHY AND FUN OF ALGEBRA

CHAPTER 1: FROM ARITHMETIC TO ALGEBRA

Arithmetic means dealing logically with facts which we know (about questions of number).

“Logically”; that is to say, in accordance with the “Logos” or hidden wisdom, i.e. the laws of normal action of the human mind.

For instance, you are asked what will have to be paid for six pounds of sugar at 3d. a pound. You multiply the six by the three. That is not because of any property of sugar, or of the copper of which the pennies are made. You would have done the same if the thing bought had been starch or apples. You would have done just the same if the material had been tea at 3s. a pound. Moreover, you would have done just the same kind of action if you had been asked the price of seven pounds of tea at 2s. a pound. You do what you do under direction of the Logos or hidden wisdom. And this law of the Logos is made not by any King or Parliament, but by whoever or whatever created the human mind. Suppose that any Parliament passed an act that all the children in the kingdom were to divide the price by the number of pounds; the Parliament could not make the answer come right. The only result of a foolish Act of Parliament like that would be that everybody’s sums would come wrong, and everybody’s accounts be in confusion, and everybody would wonder why the trade of the country was going to the bad.

In former times there were kings and emperors quite stupid enough to pass Acts like that, but governments have grown wiser by experience and found out that, as far as arithmetic goes, there is no use in ordering people to go contrary to the laws of the Logos, because the Logos has the whip hand, and knows its own business, and is master of the situation. Therefore children now are allowed to study the laws of the Logos, whenever the business on hand is finding out how much they are to pay in a shop.

Sometimes your teachers set you more complicated problems than:—What is the price of six pounds of sugar? For instance:—In what proportion must one mix tea bought at 1s. 4d. a pound with tea bought at 1s. 10d. a pound so as to make 5 per cent. profit by selling the mixture at 1s. 9d. a pound? Arithmetic, then, means dealing logically with certain facts that we know, about number, with a view to arriving at knowledge which as yet we do not possess.



When people had only arithmetic and not algebra, they found out a surprising amount of things about numbers and quantities. But there remained problems which they very much needed to solve and could not. They had to guess the answer; and, of course, they usually guessed wrong. And I am inclined to think they disagreed. Each person, of course, thought his own guess was nearest to the truth. Probably they quarrelled, and got nervous and overstrained and miserable, and said things which hurt the feelings of their friends, and which they saw afterwards they had better not have said—things which threw no light on the problem, and only upset everybody's mind more than ever. I was not there, so I cannot tell you exactly what happened; but quarrelling and disagreeing and nerve-strain always do go on in such cases.

At last (at least I should suppose this is what happened) some man, or perhaps some woman, suddenly said: "How stupid we've all been! We have been dealing logically with all the facts we knew about this problem, except the most important fact of all, the fact of our own ignorance. Let us include that among the facts we have to be logical about, and see where we get to then. In this problem, besides the numbers which we do know, there is one which we do not know, and which we want to know. Instead of guessing whether we are to call it nine, or seven, or a hundred and twenty, or a thousand and fifty, let us agree to call it x , and let us always remember that x stands for the Unknown. Let us write x in among all our other numbers, and deal logically with it according to exactly the same laws as we deal with six, or nine, or a hundred, or a thousand."

As soon as this method was adopted, many difficulties which had been puzzling everybody fell to pieces like a Rupert's drop when you nip its tail, or disappeared like bats when the sun rises. Nobody knew where they had gone to, and I should think that nobody cared. The main fact was that they were no longer there to puzzle people.

A little girl was once saying the Evening Hymn to me, "May no ill dreams disturb my rest, No powers of darkness me molest." I asked if she knew what Powers of Darkness meant. She said, "The wolves which I cannot help fancying are under my bed when all the time I know they are not there. They must be the Powers of Darkness, because they go away when the light comes." Now that is exactly what happened when people left off disputing about what they did not know, and began to deal logically with the fact of their own ignorance. This method of solving problems by honest confession of one's ignorance is called Algebra.

The name Algebra is made up of two Arabic words.

The science of Algebra came into Europe through Arabs, and therefore is called by its Arabic name. But it is believed to have been known in India before the Arabs got hold of it.



Any fact which we know or have been told about our problem is called a datum. The number of pounds of sugar we are to buy is one datum; the price per pound is another.

The plural of datum is data. It is a good plan to write all one's data on one column or page of the paper and work one's sum on the other. This leaves the first column clear for adding to one's data if one finds out any fresh one.

