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short division is reserved for the 7th and 8th school years when simplification and rationalization can be made. In general, we teach no mathematical operation that is beyond a genuine understanding and rationalization by the pupils, and we teach this mathematics by building a structure, based on the laws of number, and by abstracting from physical models. In the later years, grades 8 and 9, we produce models in which the ordinary arithmetic and geometry do not hold up, so that the pupils will understand there is other mathematics than that which they have learned, and that this other mathematics is useful.

The geometry of the 5th to 9th grades is entirely informal and intuitive and covers the ordinary study of shape, size, and position. The one really significant change that is occurring is in the 9th school year (age 15 years). Here the entire year will be devoted to developing elementary algebra from a modern point of view. The concepts, language, and symbolism of sets (Mengen, Ensembles) is introduced at the very start of the study. A variable is conceived as a symbol which may be replaced by any element (number) of its domain. We stress that we must always know the domain in which we are working. We talk of expressions, set-builders, and also refer to the roots of equations as the solution set. We are convinced that through this approach, using the five fundamental laws for a *Ring* (but not the word Ring), the algebra will achieve unity, clarity, meaning, and challenge to the intellect, that it never had before. Our approach to *function* from the start will be a mapping exhibited by a set of ordered pairs of numbers, and defined by a relation, that makes it single-valued. With these ideas we can introduce elementary methods of proof in algebra comparable to those heretofore reserved for geometry alone. We believe our experiment is well worth watching by all countries.

## Conclusion.

Previously, it has been said, that all reports indicate a trend towards teaching for meaning. But meaning has different connotations to the different reporters. This report closes on a note of the necessity, because of our world culture today, of

teaching all our mathematics, from the very first formal lessons, through the use of thinking. This does not mean the teaching of a rigorous mathematical structure, but that all learning should be through the use of cognitive intelligence, and not other mental abilities.

More and more the only services which human beings can offer to society and which society will need will be intellectual. The age of automation which appears immediately in front of us, and the expanding application of mathematics to other areas of knowledge than Physics, will demand from society not only greater but more brain power. Hence it depends upon the schools of the world to develop intellectual power, not only that which occurs in the top notch brains, but the power of each and every individual to the capacity that he has this power. The power to think to solve problems, to apply knowledge to practical situations, and to create, is present in all normal persons, though of course not to the same extent. Mathematics, both as liberal education for all pupils, and as special education for career people, offers a type of cognitive intellectual development so necessary for modern culture. But mathematics instruction will achieve its goal only if the teaching builds a structure of knowledge through the organization of concepts and relations of number and space and facility in the use of this structure, so as to give the learner a genuine insight into what mathematics is like in the twentieth century, and what it does.

Will the youth learn mathematics in this manner ? They will, and further, many who now desert their study of mathematics at their first opportunity, will not do so under cognitive learning. They will learn, and continue their study, because children are first of all motivated by intellectual curiosity and not by use or monetary values. They will continue their study because all of us like to do that which we understand, that which challenges us, and that which offers us a reasonable chance of success in the outcome.