AN ABSTRACT OF
A NUMBER SYSTEM
BASED
ON TWELVE

A THESIS

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The origin of our number system based on ten (the decimal system) has a physiological basis. Man has ten fingers. He, therefore, originally learned to count up to ten and then based his number system on series of tens. It should be noted, however, that there have been other number systems developed. For example, a system to the base six is known as a senary system, one to the base eight as an octonary system, one to the base twelve as a duodecimal system, etc.

There is some question as to whether ten is really the best base for a number system. The main complication arises from the fact that we do have a partial duodecimal system. For example, our measuring scale is based on a twelve inch foot, our commodity system is based on dozens, and our time devices are based on multiples of twelve. It is apparent that we have a divided system of counting which presents many handicaps to the learner as well as to the user.

The number twelve is found to be the best base for a number system mainly because of its superior divisibility. It has the greatest possible number of common factors. Its multiples occur more often in everyday use than any other series. It has not too many symbols. It can express the rational numbers with greater accuracy and the larger integers with fewer symbols. In this duodecimal system the numeral 10 would mean one twelve and no

units, rather than one ten and no units. The numerals of the twelve system are the following:

1 2 3 4 5 6 7 8 9 X Ɛ 10

The new symbols for 9+1 and for 9+2 are pronounced "dek" and "el" respectively.

Decimals are greatly simplified under the twelve base. The ten system has more of the endlessly repeating decimals than does the twelve. There are two cases among the common decimals (one fourth and one eighth) where it requires an additional figure to express the same fraction. The duodecimal system is therefore more practical for expressing the common fractions and can express more of them with greater accuracy. An ordinary decimal carried out to two places expresses a quantity to the nearest hundredth part; in the twelve system the accuracy is increased by expressing the same decimal to the nearest 144th part. The probability of accuracy increases with the length of the decimal.

Percentage also enjoys an advantage in the duodecimal system. One-third becomes 40 per cent, and two-thirds 80 per cent, one-quarter is 30 per cent and three-quarters is 90 per cent; one-sixth is 20 per cent; one-eighth is 16 per cent; one-ninth is 14 per cent; and one-twelfth is 10 per cent.

In schools duodecimals should at first be introduced in the middle grades. They should continue to coexist with the ten base through the upper grades and into sec-

ondary school. Methods and activities would follow patterns already established. For a time students would ~~by~~ be in a sense bi-numeral as inhabitants of certain countries are bi-lingual but this would be only a temporary condition.

Even if counting in dozens is superior to counting in tens tradition is strong in opposing change. In order for the duodecimal method of figuring to ever be used on any appreciable scale, the schools would have to cooperate to the extent of at least giving it a sustained trial on equal footing with the "decimal" system; the government would have to support the plan through participation, at least on an experimental basis; recognized leaders in the field of education would have to have the courage to speak out publicly in favor of the idea; and business leaders would have to be willing to cooperate with both schools and governmental agencies to bring about this next great step forward in the field of mathematics; the adoption of an efficient number system suited to our times.