HIGH SCHOOL PHYSICAL SCIENCE, PART 1

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F. W. MERCHANT & C. FESSENDEN

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HIGH SCHOOL

PHYSICAL SCIENCE

PART I.

BY

F. W. MERCHANT, M.A.,

Collegiate Institute, London,

AND

C. FESSENDEN, M.A.,

Collegiate Institute, Peterboro.

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I.—General Principles of Measurement.

Experiment 1.

FIG. 1.

Mark off on the edge of a piece of paper a distance equal to the length of the line A B (Fig. 1).

Experiment 2.

Draw a line the length of the distance laid off on the edge of the paper.

Which of your senses do you use in determining the equality of the lengths?

Experiment 3.

Lay the edge of the paper with the length A B marked off on it alongside C D and by moving it along thus:

FIG. 2.

find how many times the length of C D contains that of A B.

How many times would the length of C D contain that of A B if A B were (*a*) one-half, (*b*) one-third, (*c*) three-fourths its present length?

Experiment 4.

Determine how many times the length of A contains that of B.

FIG. 3.

Experiment 5.

From Figure 4 the length of A is seen to be three times that of B with a part of A remaining; find by comparing the lines how many times the length of B contains that of the remaining part of A.

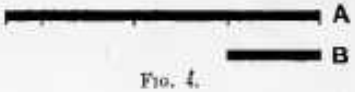

FIG. 4.

How many times then is the length of A that of B?

Experiment 6.

Find how many times the length of your desk contains that of your lead pencil.

1. **Quantity.**

That which can be expressed as so many times, or such a fraction of, another of the **same kind** is a **quantity.** For example, the length of each line in the above figures is a quantity, because the length of each is a certain number of times that of any other.

2. **Measurement.**

The measurement of a quantity consists in comparing it with another of the same kind to determine how many times the one is contained in, or how many times it must be taken to make up, one equal to the other.

3. Measure of a Quantity.

The measure of a quantity is the NUMBER expressing how many times the quantity contains another of the same kind assumed as a unit.

The complete expression of a physical quantity, therefore, consists of two parts:

(1.) The **number** indicating how many times the quantity measured contains the unit.

(2.) The **name, symbol,** or **description** of the unit with which the quantity is compared.

For example, we say a certain distance is 10 feet; a surface, 5 square inches; a volume, 8 cubic feet; and a mass, 3 pounds.

1. Give fully your expression of the length of

C D,	Experiment 3	above.	
A,	"	4	"
A,	"	5	"
The desk,	"	6	"

2. What is the **measure** of each of the above quantities?

4. Units.

Since a quantity is measured by comparing it with another of the same kind, **any one quantity** may be used as a unit quantity by which another **like quantity** is measured; but that any system of measurements may be useful for purposes of intercommunication a limited number of units, with which all who are to use them are familiar, must be chosen. Hence it is that most nations legalize systems of units for common use.