pothesis; that is to say, it is sufficient that the hypothesis be true for the thesis to be true; while it is necessary that the thesis be true for the hypothesis to be true also. When a theorem and its reciprocal are true we say that its hypothesis is the necessary and sufficient condition of the thesis; that is to say, that it is at the same time both cause and consequence.

5. Principle of Identity.—The first principle or axiom of the algebra of logic is the *principle of identity*, which is formulated thus:

(Ax. I) $$a < a,$$

whatever the term a may be.

C. I.: "All a's are a's", i. e., any class whatsoever is contained in itself.

P. I.: "a implies a", i. e., any proposition whatsoever implies itself.

This is the primitive formula of the principle of identity. By means of the definition of equality, we may deduce from it another formula which is often wrongly taken as the expression of this principle:

$$a = a,$$

whatever a may be; for when we have

$$a < a, \quad a < a,$$

we have as a direct result,

$$a = a.$$

C. I.: The class a is identical with itself.

P. I.: The proposition a is equivalent to itself.

6. Principle of the Syllogism.—Another principle of the algebra of logic is the principle of the *syllogism*, which may be formulated as follows:

(Ax. II) $$(a < b) \quad (b < c) < (a < c).$$

C. I.: "If all a's are b's, and if all b's are c's, then all a's are c's". This is the principle of the *categorical syllogism.*

P. I.: "If a implies b, and if b implies c, a implies c." This is the principle of the *hypothetical syllogism.*