take place whenever possible, and proceed until one at least of the reacting phases totally disappears. Which of the four will be the first to disappear, depends obviously on the direction of the reaction and on the relative amounts of the different phases present. When the number of phases has been reduced to three, the possibility of a reaction of this nature has vanished.

The occurrence of reactions of this type, then, is the mechanism by means of which the number of phases in a three-component system is kept down to three. If it fails, the state of the system is no longer defined solely by temperature, pressure, and the masses of the components. Experimental evidence of such definition, must therefore be regarded as proof that not more than three phases are present in the (three-component) system.

The result predicted by the second theorem is effected by means of reactions of a second type, which can take place in a three-component system of three phases only if one of the three is capable of continuous variation in composition (a solution).

By dissolving more or less of the solid phases in the solution, it would be possible to construct a whole series of systems—formed of the same amounts of the same components—but differing in the composition of the solutions and in the relative quantities of the solid phases. If only one of these is found to exist in fact, the disappearance of the others must be ascribed to the occurrence of reactions of this second type, which fix the composition of the solution irrespective of the relative quantities of the three phases of which the system is composed.

### *Extension of the Method.*

The two theorems which serve to interpret the experimental results, distinguishing between mixtures and single substances, and identifying the chemical individuals in the precipitates, are thus dependent on the occurrence of reactions of two types:—the first (which does not involve change of composition of any of the phases) resulting in the disappearance of all phases in excess of three; the second (which involves change of composition of the solution) keeping the composition of the solution constant so long as it is in contact with the same pair of basic salts.

The possibility of applying the same method to the study of precipitates formed by potash in solutions of metallic salts, depends on the discovery of conditions under which a fourth component may be added to the system without interfering with the occurrence of these two classes of reactions.