The same classification is also helpful in studying the chemical changes of the animal body.

In this paper I shall limit my remarks to the fourth division, *i.e.*, double decompositions.

Double Decompositions.

The term double decompositions is applied in chemistry to a chemical change when two substances react to form two new substances. The double decomposition may be complete or incomplete. It is complete when the reacting substances, mixed in equivalent proportion, are completely decomposed and two new substances formed. The question is, When does this take place? In test tube experiments it occurs in the following:

(*a*) Neutralization of acid by base and vice versa when neither the acid nor the base is weak.

$$KOH + HCl = KCl + H_2O$$

(*b*) When one of the substances formed is taken out of the sphere of action by vaporization, precipitation or crystallization.

$$BaCl_2 + H_2SO_4 = BaSO_4 + 2HCl$$

These conditions are uncommon in the animal body.

In incomplete double decompositions there are four substances in the reacting medium, two reacting constituents and two formed by double decompositions.

$$C_2H_5OH + CH_3COOH = CH_3COOC_2H_5 + H_2O$$

This is called a balanced action. The mass of each substance formed in the change varies with the concentration of each substance present in the solvent.

This type of change would be very common in the animal body if it were not for special conditions not usually available in the chemical laboratory, to render the double decomposition complete. Nature's method of rendering the chemical change complete is to remove one of the substances formed by absorption or filtration through cell membranes. Thus when pepsine acts upon proteid it is probable that the change would be a balance done if the products of hydrolysis were not continually propelled into the duodenum. Again in the intestine the continuous absorption of glucose, galactose, amino acids, etc., renders the hydrolysis produced by the ferments of the juices complete.

With regard to the double decompositions which take place