**Catalysis.** D. W. HORN. (*Transactions of the Wagner Free Institute of Philadelphia,* vol. viii, p. 97, July, 1917.)—Contact underlies chemistry. Bodies may influence each other at almost incredible distances, but this action is physical, not chemical. Briefly, no contact, no chemical action. In the time-honored generalizations of chemistry, its "fundamental laws," the action of pure substances upon each other was considered without reference to the effects of adjacent bodies. In some few instances, however, the effects of adjacent bodies were so striking as to compel early attention. Until recent years the multiplication of such instances has been slow. Such action or influence of an adjacent body may be covered by the term "catalysis," introduced by Berzelius, the famous Swedish chemist, in 1834.

In 1836 Berzelius compiled all cases known in which, by the presence of a foreign body, a chemical reaction is hastened without the foreign body itself being changed. These foreign bodies thus acting he called "catalysts." Historically, catalysis is not a new phenomenon. Processes of fermentation were known to the ancients, and these involve catalysts. In fermentation by yeast, the yeast plant produces the catalyst, or enzyme, as it is more frequently called. In sharp contrast with chemical reactions that, when not catalyzed, proceed at so slow a rate as to produce less than noticeable amounts of products stand the reactions that are so rapid as to be practically instantaneous. Reactions between ions are, for example, practically instantaneous. Catalysis, of course, is not concerned with such reactions.

It is not strictly true that a catalyst is found to be *unchanged* at the end of a catalyzed reaction. It is correct to say that the final products are the same as they would have been had the catalyst been absent. The catalyst may be rather unmistakably changed, not in amount, but in physical state. Thus the crystalline manganese dioxide used to generate oxygen from potassium chlorate becomes a fine powder, and changes in physical state are known to occur in iron oxide and in platinum used as catalysts in other systems. The amount of the catalyst, no matter how small, seems to remain unchanged. Catalysts themselves may be accelerated or restrained in their rapidity of action. Two catalysts usually have a greater joint effect than either would have singly. "Promoters" that increase the activity of catalysts are also known. Some substances so completely obstruct the action of catalysts that they have been called "poisons." Enzymes and toxins have their poisons and antitoxins, and the analogy to them is quite close, even in the case of metallic catalysts. Some catalysts seem specific for a given reaction, but many are capable of manifold application, and no general method is known for guidance in selecting a catalyst for a given reaction.