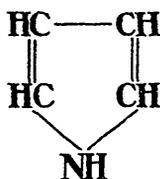
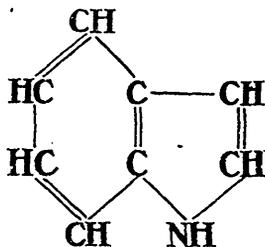


are formed in animal and vegetable life. They were somewhat familiar with many of the organic constituents of plants and animals, but believed that living matter was necessary for their production. The artificial preparation of urea in 1828 by Wöhler, and some time later, that of other substances found in living matter, led chemists to doubt this view; but with their limited knowledge of organic chemistry—the modern science of organic chemistry was then in its infancy—they were not in a position to form any definite opinion on the subject. The artificial preparation of such complex compounds as proteins seemed almost incomprehensible. However, the science of organic chemistry advanced rapidly. Thousands of organic compounds were prepared; but these belonged principally to the so-called fatty and aromatic groups. For a long time little was known of the more complex heterocyclic compounds, *i.e.*, those in which the nucleus is composed of atoms, not all of the same kind, arranged in rings, such as pyrrol,



In illustration I may mention that indol has a structural formula formed by grafting pyrrol on benzene:



Skatol is a methyl derivative of indol. Tryptophane, a compound amino acid formed by hydrolytic cleavage of most proteins, is also a derivative, formed by condensation of indol and amino propionic acid. Indol is probably liberated from tryptophane by intestinal putrefaction. The investigations of Ellinger and Gentzen, which showed that when tryptophane, given by the mouth or subcutaneously, causes no increase of the indican in the urine, whereas injected into the cæcum it causes marked indicannria, supports this view. It is also supported