molecules from the surrounding medium. They presumably do this by acting as a templet on which the amino acids and other constituents are adsorbed and then bound together through primary bonds, under present conditions with the aid of other enzymes. When the forming molecule has grown to the limits of the templet it is eventually desorbed, and starts its independent existence. There is always the possibility that a first molecule acts as a hand to which a glove is fitted, e. g., in certain immune reactions (Pauling (25)). In the cases of enzymes, viruses, and genes, a glove apparently usually gives rise directly to another glove. This mechanism of fitting molecules to a templet is the only known way of exactly reproducing a molecule which lacks thermodynamic stability and comes into existence only when similar molecules have been added to the medium, to give kinetic stability. It is the mechanism of maintaining structural identity in the repeated synthesis or complex molecules, such as those of a given gene, and makes possible the orderliness of reactions in living systems. As Schroedinger (28) particularly has emphasized, life processes hinge on essentially individual complex molecules, but it seems necessary to go much further and conclude that the origin of life itself hinged on a very few molecules, possibly a single one.

The interesting point in connection with the experiments reported above and earlier is that a templet can serve as a pattern only when it is spread out. Moreover, it seems highly probable that the templet is completely unfolded at one time, with the forming molecule adsorbed to it. Otherwise, a particular part of the pattern might become left out or repeated in the forming molecule.

It would thus appear that globular genes, viruses, etc., must unfold in the reproductive process, and one predicts that pressure will exert the same profound retarding effects on such processes as have already been observed in a variety of phenomena, including the unfolding of bacterial luciferase in luminescence. The fairly complex changes in chromosomal material accompanying mitotic cell division perhaps arise in part from a necessity of the constituent protein to assume an intermediate fibrous form in the activated complex during the process of reproduction.

SUMMARY

The influence of hydrostatic pressures up to 680 atm. (10,000 [illegible] square inch) on the rate of hydrolysis of 10 per cent sucrose by yeast invertase has been studied in relation to temperature and pH.

At 30°C. and pH 7.04, the rate is proportional to the concentration of invertase, diluted to 1 per cent or less of the commercial solution, and is uniformly increased about 33 per cent under 476 atm. pressure.

The effect of pressure at 30°C. varies with pH. At pH 4.75 the rate under normal pressure is at a maximum, and increases slightly, about 5 per cent, under 476 atm. The same pressure causes greater increases at more alkaline and more acid pH: 58 per cent increase at pH 7.5, and 38 per cent at pH 1.5. No decrease in rate under the influence of pressures up to 680 atm. was observed under the conditions studied.

At pH 4.5 the apparent activation energy is approximately 11,900 cal. at