

Normally, mutations, apart from those caused by radiation or special chemical agents, have been supposed to occur only when cells divide. This view itself seems to be changing. Some years ago, Baskett made a number of observations individually and collectively indicating that during the long delay which attends the first growth of *Bact. lactis aerogenes* on D-arbinose, there is in fact a physiological adaptation of the cytoplasm, and not the selection of mutants. Generally similar results have been found by Dean for cells initially reluctant to use lactose.

Somewhat analogous observations in a more spectacular form were reported by Akiba, and more fully by Szybalski. Bacterial strains exposed to streptomycin for a number of days in a buffer not supporting growth were found eventually, if they had survived at all, to have become resistant to the antibiotic. Szybalski, however, quotes what he calls "tentative evidence" that the changes occur in a nucleus. The conclusion, however, seems to be far from certain, since the relations found in crossing drug-resistant with sensitive organisms are usually very complex. In genetic analysis with micro-organisms the number of parameters which can be adjusted is considerable, and illusory effects of sharp segregation phenomena are sometimes produced by the process of dividing continuous variables such as rate or time of growth into arbitrary domains such as 'slow' and 'fast' or 'plus' and 'minus'. That a high percentage of non-dividing cells should suffer nuclear mutations making them resistant precisely to that drug to which they are being

exposed seems much harder to explain than the alternative of a dynamical change by which the cell as a whole reacts to the presence of the drug in an almost predictable way. The same general comments might be made about the 'spontaneous mutations' in the absence of division, to histidine-independence of a bacterial strain recently studied by Ryan.

In spite of some alarm, physico-chemical mechanisms of cell adjustment need not be in any conflict at all with valid principles of genetics. But it is a misapplication of the latter when they are used to exclude all mechanisms except selection of random mutants or of favourable gene combinations. Random mutations to drug resistance may indeed be shown by the relatively rare examples where the Lederberg technique of replica plating has given positive results. Nature, however, presents us with a vast hierarchy of systems: sub-atomic units (in a vast and confusing array), atoms and molecules, micelles, chromosomes, nuclei, cells, colonies, tissues, individuals and communities of individuals. Nobody can suppose that all phenomena have their origin at any one particular level.

The disentangling of the complicated and fascinating relationships met with in this field will demand close co-operation of the physical and biological sciences, which in other words, only means that to the highly ingenious models of structure must be added equally illuminating models of function. Whatever the answer may be to the controversial problems of today, that is what the future in one way or another will surely bring forth.

#### DARWIN CENTENNIAL EXPEDITION

THE Darwin Anniversary Committee, Inc., has announced that Charles Darwin's historic round-the-world trip, which helped him formulate his theory of evolution, will be retraced in 1958. The year 1958 was chosen because it will be the centennial of Darwin's presentation of his paper to the Linnæan Society in London outlining his theory of evolution. Julian S. Huxley, the biologist, is Honorary Co-Chairman of the Planning Committee. Lady Nora Barlow, a descendant of Darwin, is the other Co-Chairman.

Darwin sailed in the British ship *Beagle* as official naturalist on a surveying trip. The expedition, which took place between 1831 and 1836, visited islands in the Atlantic, the coast

of South America and adjacent islands, and islands of the western Pacific. The Darwin Committee plans to cover the same areas in a year's time, using a 100- to 150-foot sailing ship with auxiliary engines.

On his trip Darwin studied native people and the flora and fauna of the areas. The modern voyage will compare ecologic conditions to-day with those of 125 years ago. The 1958 trip also will seek to determine, if any, species of flora and fauna are in danger of becoming extinct. In the next few months about 20 scientists, both men and women, will be selected as Darwin fellows to sail on the expedition. Others probably will be flown to the research areas.