nexion with viruses and bacteriophages, all of which contain nucleoproteins. There has, too, been considerable speculation regarding the way in which nucleic acids may be involved in protein synthesis; it is possible to suggest a mechanism for protein synthesis by means of nucleic acid, but no evidence is as yet available to show whether it has any validity. Clearly, however, we are now at the opening of a new phase in the study of nucleic acid function, and future developments are likely to have profound repercussions in biology and medicine.

GEOGRAPHICAL DISTRIBUTION OF PAST FLORAS

BIOGEOGRAPHY in relation to geological history was the starting-point of Darwin's evolutionary studies, and the opening sentence of the introduction to the "Origin of Species" reads: "When on board H.M.S. Beagle as naturalist I was much struck with certain facts in the distribution of the organic beings inhabiting South America, and in the geological relations of the present to the past inhabitants of that continent". Thus, in his address to Section C (Geology), Mr. W. N. Edwards shows that the biogeography of the past is still worth the attention of the student. Earth-movements and erosion, mountain building and climatic change are all reflected in the altered distribution of floras and faunas over the world, and the past distribution of animals and plants is often cited in support of the conclusions reached, or the theories put forward, by geologists and geophysicists. It is therefore well occasionally to review our knowledge of the relations between faunas and floras on one hand, and continents, seas and climates on the other.

Former land and sea areas can be roughly mapped by plotting occurrences of terrestrial and marine fossils, and geological evidence of past climates can be supplemented from the biological side. Land plants, in spite of arguments adduced to the contrary, are particularly valuable in this respect, especially if one considers ecological types of vegetation rather than individual plants. A review of fossil floras from the Devonian onwards in relation to known geological changes suggests that, although in the Devonian, and to a lesser degree in the Jurassic, world vegetation was fairly uniform, latitudinal zonation is more normal. The supposed uniformity of Jurassic floras is partly illusory, and there are in fact clear indications of zonation in that period; the early Devonian floras are not yet sufficiently well known ecologically for one to say whether they were so uniform as they appear to be. The plant evidence further indicates that since the late Palæozoic there have been vegetational and climatic zones parallel to the present equator. Deviations from exact parallelism, such as the arid belt running from eastern Asia across north Algeria, are due to the past conformation of the land masses of the northern hemisphere being similar to that of the present day. The vegetational succession in the northern hemisphere does not, therefore, lend support to notions of extensive wandering of either continents or poles, at any rate since the Carboniferous. Following the orogeny and glaciation of the upper Carboniferous and Permian, the major influences on plant distribution in the Old World have been the arid belt just mentioned and the Tethys Sea. The latter, which was in existence from the upper Palæozoic to the middle of the Tertiary, must have formed an important migration route for plants, not only along its shores but also by marine currents. Transmarine distribution of land plants would have been particularly easy in a sea which ran for some six thousand miles from east to west in an equable climatic belt of much the same character throughout. Angiosperms may possibly have arisen in the Indo–Malayan region and spread first along the Tethys Sea.

IMMUNITY AND DEVELOPMENT

THE borderland between immunology and embryology, which forms the subject of the presidential address by Prof. F. W. Rogers Brambell to Section D (Zoology), has proved a fruitful field of research in recent years. The relationship of mother and young in mammals involves special immunological problems, for reactions resulting from immunological incompatibility can cause severe damage or death of the fœtuses, perhaps of the mother also. An adult mammal responds immunologically to the introduction into its system of tissues, cells or proteins from another species, or even from another individual of the same species. These reactions are an expression of the individuality of the adult organism.

The capacity to respond immunologically to the introduction of antigens into the system by the production of circulating antibodies appears relatively late in development. Circulating antibodies cannot be produced in detectable amounts by active immunization of new-born animals. The mammalian fœtus and the chick embryo can tolerate exchange of blood-forming cells of different blood group from a non-identical twin, and become permanent blood-group chimæras. Grafts, even of mammalian tissues, can be grown on the chorio-allantoic membrane of the chick embryo, without apparent reaction.

At a still earlier stage of development, the zygote nucleus comes into being in an environment of maternal protein. The cytoplasm of the egg must contain maternal proteins that would be antigenic in the adult offspring, yet it is in this medium that the zygote nucleus must function and initiate the synthesis of all those proteins which will characterize the new organism. Hence the fœtus and the young animal are tolerant of foreign proteins, cells and tissues to which they would react immunologically when adult. This immunological inactivity obviates the risk of the fœtus reacting to incompatible maternal antigens during pregnancy, but leaves it unable to protect itself against infection at birth. Temporary protection is afforded by the passive transference of antibodies from the mother.

These considerations lead to a discussion of the route by which passive immunity is transferred from mother to young, of hæmolytic disease of the new-born, of the selective passage of proteins through the entoderm and of experimental induction of tolerance to antigens. Most of the topics concern recent work which appears to advance both mammalian embryology and immunity. These studies have thrown new light on the functions of the fœtal membranes in mammals and on the causes of much pre-natal and neo-natal mortality. They have shown that the cells of the fœtal membranes can selectively transport globulin according to the species in which it was synthesized. This selectivity has some resemblance to other known immune responses, such

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