to find out the proper amount of protein of biological value that is to be added to this diet.

The high temperature and humidity of tropical climate seems to lower the resistance of the gastro-intestinal tract and nasopharynx to bacterial infections. Possibly the sudden change that is more responsible than the climate itself.

With regard to immunological reactions under tropical conditions, more work is to be done.

In the concluding remarks of the address, attention is drawn to the salient features of the address and to the fields in which further work is to be carried to supplement the scanty information available on those topics.

Zoology and its Advancement in India.

ZOOLOGY and its advancement in India was chosen by Prof. G. Matthai as the subject of the Presidential Address before the Section of Zoology, as the Indian Science Congress celebrated its Silver Jubilee at the 1938 Session in Calcutta. The address dealt with the progress of Zoology since the foundation of the Indian Science Congress in 1914, more particularly since 1921.

Oceanographical investigation of the Indian Ocean was conducted, since the first meeting of the Indian Science Congress, mainly by R.I.M.S. '*Investigator*' (till 1926) and the John Murray Expedition (1933–34), under the direction of Lt.-Col. Seymour Sewell, F.R.S. Previously the 'Sea-lark' Expedition, under the leadership of Prof. J. Stanley Gardiner, F.R.S., had surveyed the western Indian Ocean south of the Maldives, more particularly the Islands of the Chagos Archipelago and the Mascarene region (during 1905–06 and 1908–09). The work of the 'Sea-lark' Expedition was mainly on problems relating to coral reefs and atolls and their biology, and was a continuation of a previous study of the Maldives and Laccadives. The R.I.M.S. '*Investigator*' concentrated its work in the Andaman Sea and the Bay of Bengal. The recent work of the John Murray Expedition was in the region of the Arabian Sea, not covered by the 'Sea-lark' Expedition. The study of the Deep-sea Biology of this region was assisted by physical, chemical, hydrographic and topographic investigations. The Survey of India collaborated with the John Murray Expedition in the cruise down the Maldives for making pendulum observations with a view to determining the nature of the foundations on which the Maldives and Laccadives are situated.

The work of the R.I.M.S. '*Investigator*' has extended our knowledge in regard to variation in the air temperature over the open waters of the Indian seas, in the wind force, in the amount of rainfall and in the relationship between the tempearture of the sea surface and that of the air. There is always a vertical circulation of the layers of water caused largely by differences in tempearture and salinity. A reversal of seasons is noticeable in the Indian seas at a depth of about 100 fathoms, comparable to the phenomenon that takes place in the temperate seas.

The 'Murray Ridge' discovered by the John Murray Expedition appears to be ultimately connected with the Carlsberg Ridge. The latter ridge divides the western region of the Indian Ocean into north-eastern and south-western halves. 'King Fuad Bank' is probably a submerged atoll with a distinct rim about 40 feet high and a level floor 130 fathoms deep.

Regarding the reefs of the Western Indian Ocean, Prof. J. Stanely Gardiner, F.R.S., recently pointed out that the Mascarene region differs from the Chagos Archipelago in regard to conditions of reef-growth, changes adverse to reef-growth taking place at a much faster rate than in the latter. The regression of coral reefs in the Mascarene region does not appear to be due to any biological reason such as sedentary organisms that cause destruction by boring into the reefs, since the activity of such organisms is decreased at the depths at which reefs of this region are situated, nor by sediment which cannot settle on the seaward sides of reefs and banks nor by precipitation of calcium carbonate (for such precipitation is not visible on coral polyps on the seaward sides), nor by currents whose action is less on the sides facing the sea, nor by temperature which at 50 fathoms is not lower than 61°·9 F., nor by any decrease in the amount of plankton that serve as food material to coral polyps, for it is not liable to much quantitative variation in the Indian Ocean, nor does the chemical composition of the surface water in the Indian seas show any appreciable difference. The comparative poverty of the deep sea fauna in the Chagos and Mascarene regions is perhaps due to the hardness of the sea floor and to the fact that the quantity of plankton which serve as food material to the larger organisms is less than in the Indian seas than in the temperate regions. In spite of the 'shallow and fierce conditions' of life on the reef of these regions, it is interesting to observe that the animals do not exhibit any special structural features that may be regarded as adaptations to the peculiar environmental conditions.

The Madreporarian corals collected by Prof. J. Stanley Gardiner, F.R.S., in his several expeditions to the Indian Ocean, particularly of the Astræid corals, provided material for a comparative study, of the morphological organisation of their hard and soft parts, with a view to determining, if possible, the limits of species and genera, most previous taxonomic studies on corals having been based on characters taken solely from the hard parts that are liable to considerable variation. The same material, along with others, formed the basis for a study of colony formation in Astræid corals.

The Zoological Survey of India has been engaged mainly in faunistic investigation, more especially of the brackish water of the Chilka Lake and its island (Barkuda), the estuarine fauna of Goa, the fauna of the Mutlah River, of the Inle Lake, the Indian fresh-water Molluscs and their Trematode parasites, the aquatic and terrestrial fauna of the Punjab Salt Range, the cave fauna of the Siju Cave in Assam. Particular attention has been paid to the study of the fishes of hill streams in various parts of India and their structural and other adaptations to this peculiar environment. Fisheries research, especially on *Trochus*, was conducted in the Andamans.

The address ends with a brief account of the research work carried out in the various Zoology Departments in India.