

(9) Food-preservation, adulterants, etc.; (10) Epidemiological and Statistical; (11) Educational; and (12) Administrative. Anything less than this is inadequate and wasteful. An illustration will suffice to make this evident. No single investigator can in his own person be a finished experimenter, a pathologist, a cytologist, a bio-chemist, a physicist, a tissue-culturist, an epidemiologist and a statistician; yet if problems of Nutrition are to be efficiently investigated they must be considered from the points of view of each of these experts. The animal experimented upon has some claim on the consideration of the experimenter and that claim is not morally or scientifically discharged so long as every fact—clinical, pathological, bio-chemical, bio-physical, etc.,—that its body has to reveal, is not ascertained and recorded. The failure to record every such fact is frequent and this failure is wasteful as well as unscientific. An imperfectly organized Institute is, therefore, a crippled and inadequate instrument of research, however competent the individual members of its staff may be. The work of the Experimental Pathologist, for example, must ultimately come under the scrutiny of the Bio-chemist or the Bio-physicist and that of them all under the scrutiny of the Statistician. This is best done at one and the same time and not piece-meal and following vain repetitions.

It may be asked why an organization, seemingly so elaborate, is needed for the study of the relatively new Science of Nutrition. The answer is that the efficient study of Nutrition is the very foundation of Medical Science. Medicine is still enamoured of the "specific causes" of diseases and, perhaps, too little mindful of the factors—often more controllable than the specific causes themselves—that admit of the operation of these causes. Of these factors faulty nutrition is one of the chief; and in the study of the Science of Nutrition lies the greatest hope for the future of Medicine.

We understand that the Council of the Indian Institute of Science, Bangalore, at their meeting held on 18-7-1932 have elected Sir C. V. Raman, Kt., M.A., D.Sc., LL.D., F.R.S., N.L., as Director. He is to succeed Dr. M. O. Forster, D.Sc., F.R.S., in April, 1933.

## The Developmental History of the Primates.

THE subject of the Croonian Lecture by Professor J.P. Hill,\* is a classic memoir expounding the developmental features of the Primates. Our knowledge of the classification of this order of mammals has, within recent years, undergone great vicissitudes. In his lectures delivered at Princeton University, Hubrecht propounded the amazing view that *Tarsius* is not a lemur and that its position, "lies somewhere between an unknown type of insectivore and our modern monkeys and man", and accordingly suggested the restriction of the name of Primates to the inclusion of *Tarsius* and *Simia*, the lemurs being thus excluded. Hæckel in the subsequent year put forward the theory that the Primates form a natural monophyletic group descended from a common ancestral stock which he designated *Lemuravida* and he recognized five stages in the evolution of man, viz., *Prosimia*, *Simia* descended from the latter and including the *Platyrrhina* and *Catarrhina*, the *Catarrhine Cercopithecia*, the *Catarrhine Anthropoida* and finally *Pithecanthropi* leading to man. In systematic zoology, the classification based on Max Weber's "Die Säugethiere" which recognizes a tripartite division of the order into *Lemuroidea*, *Tarsioidea* and *Anthropoidea*, is generally followed. As the outcome of his studies on the Primate Brain and on embryological grounds, Elliot Smith and Hill supported this view. Now as the result of his extensive investigations on the developmental features of the several sub-divisions of the order, Hill recognizes four clearly defined developmental stages which he calls the *Lemuroid*, the *Tarsioid*, the *Pithecoid* and the *Anthropoid*. The comprehensive evidence which he adduces in the body of the Lecture in support of these developmental stages, leads him to recognize that they practically represent the phyletic stages in the evolution of the Primates. Hitherto systematic zoologists for the purposes of a scientific classification relied on the morphological features of

\* J. P. Hill—Croonian Lecture—Phil. Trans., Series B, 221, 45, 1932.



the embryos and the view of Hubrecht that the leading features of the segmentation and the blastocyst have a taxonomic value, is, after a wider review of the development of placentation by Hill, established as a fundamental point in the scheme of classification within the group of Primates. He recognizes four types of placenta, the generalized or Lemuroid, the transitional or the Tarsioid, the annectant or Pithecoid and the terminal or Anthropoid. The Lemuroid placenta is diffuse, non-deciduate, epithelio-chorial in type and represents a primitive or generalized form, being the inheritance from the non-deciduate ancestors of the primitive stock and there is not much evidence for considering it as a secondarily simplified placenta derived from the deciduate hæmo-chorial type. The Tarsioid placenta combines characteristics peculiar to Lemuriformes and others, partly anticipatory of the Pithecoid and partly specialized and peculiar to itself. This is precisely a combination of features in the developmental history of Primates which would represent as the transitional stage between the Lemurs and the Pithecii, the gap between which would not otherwise be bridged. The Tarsioids are therefore regarded as taking origin from the basal Lemuroid stock and giving origin to the Pithecoid grade. The fundamental agreements of the placental history of the Platyrrhine and Catarrhine monkeys lead Hill to discard the theory of the diphyletic origin of these two groups from Lorisiform and Lemuriform ancestors, and to postulate a common ancestral stock from which they have evolved along two divergent lines of descent. The Platyrrhines would seem to be the direct derivatives occupying a somewhat lower developmental plane; but the Catarrhines represent the more progressive branch and as a result of modifications of their placental features, some one or other member of this group gave origin to the Anthropoid grade in the Primate evolution which includes Apes and Man. Whether morphological, palæontological and other evidences would lend support to the complex and large question of the phylogeny of the Primates as sketched by Hill on consideration of the placenta of the

several sub-divisions, would be the most fascinating and fruitful field of study. At present the balance of evidence lends a fair measure of support to the monophyletic view which Hill has adopted in his paper.

### Letters to the Editor.

[*The Board of Editors do not hold themselves responsible for opinions expressed by correspondents. No notice is taken of anonymous communications.*]

### Disturbance of Pressure at the Bed of a Deep Sea.

THE determination of the disturbance of pressure at the bed of a deep sea is of fundamental importance in the theory of microseisms. The ordinary hydrodynamical theory of *irrotational* gravity waves on the surface of a *perfect* fluid indicates that there is no pressure disturbance at the bed of a deep sea. But the sea-water is viscous and the sea-waves are generally rotational; the theory is therefore inapplicable. When the "eddy-viscosity" and the rotational character of the sea-waves are taken into consideration, it is found that the motion is mostly confined to a superficial layer. For the conduction of pressure disturbance, this layer behaves almost in the same way as a shallow sea, and a definite disturbance of pressure therefore exists at the bottom of the deep sea.\*

Direct experimental verification of the disturbance of pressure at the bottom of a deep sea is, of course, out of the question, but we can imitate the conditions in a large experimental tank and take measurements. The essential requirement is that the surface waves should have very small wave-length compared with the depth. We therefore took a strong galvanized iron tank of dimensions 162 cm. × 132 cm. × 82 cm., filled it to a depth of 80 cm., and mounted it over loose packings so that the vibrations of the ground due to the movements of the observer and other causes might not be communicated into the water in the tank. Waves of any wave-length from 2.5 cm. to 10 cm. were generated by an electrically maintained

\*Banerji, Phil. Trans. Roy. Soc., 229A, 287, 1930.