under-surface no longer whitish, but ash-coloured, with scattered blackish hairs, and the tail *not* of two colours, white below, as in the type of the species, but uniformly blackish grey."

Before discussing the pros and cons of De l'Isle's theory, it may be pointed out that he recognizes *M decumanus* as a rat of eastern origin characterized by having a tail of two colours. Its most extreme departure from type, as found in the melanotic form known as *M hibernicus*, he believes to be due to climatic environment; the minor alterations, shown mainly in the darkening of the under-surface of the tail, he credits, on the other hand, to the effects of parasitic life. Though this theory is a fascinating one, it is not to be accepted without reservations, and there are points in it to which exception may be taken, especially in view of the facts and observations recently collected. The strongest point in its favour is that what he describes as the " wild " type of coloration is almost universal in wild animals of every sort and is now well known to have great protective value. In favour of the climatic part of the theory is the fact that in Calcutta, although I have examined thousands of specimens, I have never come across one that showed a tendency to general melanosis, but have frequently noted the ashy grey belly which he quotes as an instance of the parasitic type of coloration. The strongest argument against the whole theory is that he assumes that the typical form of *M. alexandrinus* exhibits what he calls the " wild " type of coloration. This is probably far from being the case, for Liston has shown that no less than 20 per cent. of the rats of Bombay are black, while here in Calcutta, while black rats are rare, nearly half of the specimens I have collected have grey or orange-grey bellies. *Mus decumanus*, if of eastern origin, should be wild in the East, but I have come to the conclusion that it is even more strictly parasitic on the banks of the Hughli than it is on the banks of the Thames. In Bengal, and in India generally, it is hardly to be found except in seaports and, occasionally, on the banks of the great navigable rivers that debouch at these ports; in the interior of Bengal and Assam, as I learn from Capt. Gourlay, I.M.S., and others, it is practically unknown. Why should this be if it is living nearer to its original home than in Great Britain? Again, if reliance is to be placed on De l'Isle's theory of parasitic versus " wild " coloration, it might be expected that *Nesokia bengalensis*, which in Calcutta is a parasitic rat, would show a marked difference when living under purely natural conditions. So far as I know, it shows no such difference. Doubtless this is one of the points that will be taken up in the proposed survey of the rats of India. Another point worthy of investigation would be the question whether *Mus rattus* exhibits a greater tendency of " wild " coloration when living in trees than it does when living in human habitations.

W. C. HOSSACK.

COLOUR CHANGE IN *Hylobates hoolock*, HARLAN.—It is generally believed that the variation of colour to which this species is subject

is more distinctive of the female than of the male sex, and that age is the chief factor in colour change. These deductions are evidently based upon inadequate observations. Examples of black male and grey female hoolocks, or black males turning light-coloured on arriving at maturity are well known, but these facts prove nothing, as contrary cases of black female and grey male hoolocks are equally well known.

Observations on the numerous hoolocks (*H hoolock*) obtained from Assam, Sylhet, Cachar, Manipur, the Chittagong Hill Tracts, the Irrawady Valley, and Arracan, and exhibited in the Calcutta Zoological Garden during the last thirty-one years and more show that, considered in relation to the variation of colour, the species may be divided into the four following groups :—

(1) Light-coloured female hoolocks turning grey, or even white with age.

(2) Black, or grey-coloured female hoolocks, becoming lighter grey or white with age.

(3) Black female hoolocks never turning grey or white.

(4) Light-coloured, or grey males, remaining always the same colour.

The following three specific cases may be mentioned in reference to groups 2, 3 and 4 respectively :—

1. "Maria," an adult black female, which had been for some years in captivity but had enjoyed very considerable liberty, was sent to the Garden in 1902. Her colour was not so intense at the time as that of some black individuals, and she has gradually become paler since it was necessary to cage her owing to her temper. At present (July, 1907) the hair on her back, on the outside of her limbs, on her face (except the eyebrows, which remain pure white) and on the inside of the forearm and lower leg is of a very pale, brownish grey colour, while the ventral surface of her body and the inside of the upper leg and arm is of a pale but rather warm purplish brown. The hair on the hands and feet is white. The pigment of the skin has not been affected.

2. An adolescent black female hoolock came into the possession of the Garden early in 1895, and was placed in the house usually occupied by the anthropoids. Accustomed as the animal was to a life of comparative freedom, it took to pining and became seriously ill. Careful nursing and treatment having failed to bring about any change for the better, it was set at liberty. The effect was marvellous, the animal soon recovered, and, having regained its usual cheerfulness, enjoyed life for the next seven years, roaming about far and near, but always returning to the Garden at the appointed hours of feeding. It never turned grey, not even light coloured.

3. In 1878, a young male of a greyish brown colour was acquired from Assam. The late Dr. John Anderson, F.R.S., then Honorary Secretary of the Garden, was particularly interested in the animal, as he was anxious to determine whether it became black as it grew older. It lived for several years in the Garden, and

died long after arriving at maturity, but never showed any sign of changing from grey to black.

The following extracts from a letter from Mr. E. Stuart Baker may throw further light on the subject of colour-changes in hoolock gibbons :—

"Susan, a female gibbon got by me as a mature animal, was sent to Colonel Vaughan, I.M.S. Colonel Vaughan kept her for some time and then passed her on to a Captain (now Colonel) Johnstone, and he again to others, and when I saw her many years later she was still jet black. A very large adult grey ♀ belonged to a Mr. Lewis Jones in North Cachar. It was caught as a grey *butcha* (young one) and remained the same colour, in this case a dark grey, all the time I knew it. I have kept many black hoolocks, in one case from a few days old until it was seven or eight years old, and never have I seen any change of colour take place."

Mr. Stuart Baker, who has considerable experience of Assam hoolocks in their wild state, has often seen the same small community of hoolocks to contain white, brown, and black specimens, and these seemed to him always to remain the same.

The late Mr. Louis Schwendler, who will always be remembered in connexion with the establishment of the Calcutta Zoological Garden, related to me the following facts about a pet hoolock of his, a *female of a jet black colour*. She broke her arm by a fall from a tree and had to be kept in close confinement for over six weeks. During this period of enforced captivity she lost her black colour, and became almost grey. Change of hue, brought about by illness or injury, has been known to occur in other species of monkeys—particularly in *Semnopithecus pileatus*, and *Macacus arctoides*.

R. B. SANYAL, *Rai Bahadur*.

BATRACHIA.

EGGS OF *Tylototriton verrucosus*.—Mr. R. Hodgart, Zoological Collector in the Museum, while collecting Batrachia at Kurseong (5,000 feet) in the Darjiling district, recently (July, 1907) found several breeding females and eggs of this, the only Indian Urodele. Before describing the eggs I may notice a curious observation he made as regards the adult. He found that if it was grasped in the hand by the body it lashed about vigorously with its tail and drew blood from the hand. An examination of his specimens shows that the dorsal ridge is, at the base of the tail, exceedingly sharp and has a stiff and inflexible character. I have no doubt that this was the weapon used. Unfortunately the eggs, from one of which a larva is in the act of escaping, are not in a very good state of preservation, but the following particulars may be noted. They were found in small pools of rain water in an open wood and were attached together in pairs, each pair being separate from