suck blood to their satisfaction, for if they do so they will immediately die. This process is repeated every fortnight until they grow old enough for the purpose for which they are reared. Then this new batch of leeches is divided into two lots, (1) that which is to be used for medicine and (2) that which is reserved for breeding. The latter are called 'seed leeches' and are kept in water which is regularly changed at intervals until the next breeding season sets in, during this period no blood is given to them. They are never used for money-making, for leeches once used for such a purpose are believed to lose their power of breeding.

Whenever the leeches are prescribed for medicine the *Chohra* (breeder) is sent for. He brings with him only those leeches that have not been used for two or three weeks and applies some of them to the intended part. The leeches at once begin to suck in blood with avidity, but if the blood has become mixed with pus they will immediately drop down. If it is not they will suck on till they fall down filled with impure blood, when they seem to lose all energy and look very dull and inactive. The breeder then takes these leeches one by one and pricks it with a needle just near the mouth on the middle line on the back and slowly squeezes out the blood commencing from the tail to the opening made by the needle. This, however, does not kill the leeches. When the trial is over the leeches are thoroughly rubbed by the hands which probably relieves them to some extent of the strain caused by squeezing, and restored to the water for future use.

The breeders are of opinion that the wild leeches do not breed in captivity until perhaps long used to it and it is even difficult to confine them unless they are carefully packed. Their bite when used for medicine is unbearable to the patient. This is not the case with the domesticated ones, the bite of which is comparatively less painful, much like that of an ant.

The leeches can be kept alive for many years if the water in which they are kept is occasionally changed, but those that have been used for medicine can hardly live for more than a year.

M. MOHSIN KHAN.

INSECTS.

THE HABITS OF SOME TIGER-BEETLES FROM ORISSA.—Many species of tiger-beetles, though they may have a wide geographical distribution, are curiously particular in their choice of habitat. A well-known instance of this is *Cicindela biramosa*, Fabr., which lives only on the seashore, a fact sufficiently noticeable at such a place as Puri on the Orissa coast, but much more so near Balyghai, a few miles further north. Here the sandy beach on which alone this species lives slopes sharply up for a distance of perhaps twenty or thirty yards and then ends abruptly in a low wall of sand evidently produced by the action of high tides.[1] This wall forms the outer-

[1] I have only visited the place once as yet; this was towards the end of August 1911.

most rampart of a double or treble line of sand-hills running parallel to the sea, and behind these is a flat expanse of sand extending inland to a distance of about two miles and bounded on its inner side by the Sur Lake. With the exception of the green vegetation on the shores of the lake, and of some trees round a small temple on one of the sand-hills, *Spinifex* is the only plant rising above the surface of the sand, and this does not grow luxuriantly. The vegetation is principally composed of small plants lying close on the surface of the ground; except on the beach these occur more or less abundantly over the whole sandy area not affected by the lake. There is nothing resembling the long grass which is of such importance in the well-known Southport sand-hills in England during the early stages of their formation. In spite of this, the Balyghai sand-hills present a much greater appearance of stability than do those at Southport (an appearance in keeping with the nature of the vegetation), the sand being much firmer, probably on account of greater "binding" power. The shore therefore, though sharply marked off from the country out of reach of the tide, differs but little from it in character, and the way in which the darkly coloured and consequently conspicuous *Cicindela biramosa* confines itself absolutely to the former becomes peculiarly striking and suggests that the cause of its restriction must lie either in a restriction of its food to the area between tide-marks or in some effect of the sea on the climate of this particular area. I do not remember to have seen any tiger-beetles on the sand-hills; but there are some curious long-legged heteropterous bugs living there whose appearance and mode of progression is very like that of a tiger-beetle. On the sand further inland *Cicindela cancellata*, Dej., *C. albina*, Wdm., and *C. agnata*, Flt., occur, their markings blending with the general colour of the sand in such a way as to render them almost invisible. All three species may occur together, but their relative abundance differs greatly in different places; the last-named I found particularly plentiful on bare sand not far from the shores of the Sur Lake.[1]

Extensive floods occurred at about the time of leaving Balyghai and consequently the return journey to Calcutta was much impeded, and a night was spent at Cuttack on the way. By this time the floods had subsided again to a considerable extent, and among the bushes on the bank of the Mahanaddi (a big river crossed by the railway not far from Cuttack station) there were exposed at intervals little patches of firm sandy soil of not more than a few square yards extent each. On this dull soil numbers of tiger-beetles were assembled, and on more than one occasion I saw a specimen dig his jaws into the ground, from which I presume that he drew forth some food though I was unable to obtain confirmation of this. With the exception of one brightly marked

[1] Concerning the habits of the above four species see also Annandale in "Annotated list of the Asiatic Beetles in the Collection of the Indian Museum," Pt. I, pp. 13 and 28—30 (Calcutta, 1909).

specimen of *Cicindela venosa*, Koll.,[1] which was collected in the evening after dusk, the only species found in this situation were *C. angulata*, Fabr.,[2] *C. sumatrensis*, Herbst,[3] and *C. agnata*, Flt.[4], and it is perhaps noteworthy that every specimen caught was of a variety with dulled markings, whereas in the longer series of the last named species collected near Balyghai most were of the brightly marked variety. Whether or not these colour differences really depend on the environment I cannot definitely say; but most of the specimens from Balyghai were certainly collected on cleaner, dryer sand of a pale colour, and a beetle of this species collected on clean yellow sand on the bank of a stream near Chakardharpur in Chota Nagpur was of the most brilliant type; whilst two specimens of *C. sumatrensis* collected at the same place were both more brightly marked than those from the muddier sand by the river at Cuttack. Above the bank of the river at Cuttack there was an open grassy area on which the floods had deposited a thin layer of slimy mud. Although continuous with the more sandy river-bank it was inhabited only by two species of tiger-beetles neither of which were to be found there. These species were *C. cognata*, Wdm., and *C. minuta*, Oliv. The latter being a small dark brown species was very inconspicuous on the mud, and evidently chooses mud-banks as its home, for on that part of the bank of the stream near Chakardharpur where the sand on which *C. agnata* and *C. sumatrensis* occurred was replaced by mud, these latter species were replaced by *C. minuta*. *C. cognata*, on the other hand, although dark coloured and not very large, was rendered conspicuous on the mud by its bluish colour, and I suspect that it normally inhabits grassy land such as this had been and would soon be again; for on such land its colour would blend excellently with its surroundings.

In conclusion I have to thank Dr. Horn for the identification of the beetles collected. Dr. Horn informs me that the tiger-beetles of Orissa are as yet but imperfectly known and suggests that all the species I collected there should be mentioned in this note. To those already referred to I have only to add *Collyris distincta*, Chd. var., on the label attached to which Dr. Horn inserts the note "palp. lab. ex parte rufis, ect." This form was abundant in a clump of trees close to the dak bungalow at Balyghai on the shores of the Sur Lake.

F. H. GRAVELY.

Schizodactylus monstrosus AS BAIT FOR BIRDS.—Perhaps the bait most commonly used by Indian bird-catchers and falconers for snaring insect-loving birds like the Roller, etc. is the mole-

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[1] See Annandale, loc. cit., p. 13.

[2] See Annandale, loc. cit., p. 15.

[3] See Annandale, loc. cit., p. 14, where it is noticed that this species replaces *C. btramosa* at a short distance from the sea at Trivandrum just as *C. cancellata*, *C. albina* and *C. agnata* do at Balyghai.

[4] See Annandale, loc. cit., p. 13.