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"It will flourish, if naturalists, chemists, antiquaries, philologists, and men of science, in different parts of Asia will commit their observations to the Asiatic Society at Calcutta ; it will languish, if such communications shall be long intermitted ; and will die away, if they shall entirely cease."

SIR WM. JONES.

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VIII.—A letter to Dr. HELPER, on the Zoology of Tenasserim and the neighbouring Provinces. By Assist. Surg. J. T. PEARSON.

In compliance with the commands of the Right Honorable the Governor General, I have much pleasure in offering the following remarks upon the points to which your attention may be usefully directed during your expedition to the coast of *Tenasserim* and the neighbouring provinces. And I do this the more readily, that I am satisfied, from my own experience, the hints of a long resident in a country may almost always be of use to a new comer in the prosecution of his researches into its natural history.

The first grand problem of natural history, beyond doubt, is the discovery of a new species of man. This, however, the naturalist will be fortunate beyond all others who is enabled to offer any but negative evidence to solve. But it is not impossible, perhaps not improbable, that some variety but little known, or which we are totally ignorant of may exist among the forests of the country; in like manner as the *Papuas* of *New Guinea*, and the *Shau halla* of *Abyssinia* live wild and remote from other men*. Accurate observations upon any portion of the human race are valuable, especially upon those who are little known to their civilized brethren.

In the next order of mammalia, the *Quadrumania*, a wider field will be open before you. Many unknown species or varieties of species are probably to be found in the forests with which those coasts are covered; and the discovery of another specimen of the gigantic ape, found by Captain COMEFOOT in *Sumatra*, and described by the late Doctor ABEL in the Researches of the Asiatic Society, may be made. This animal seven feet in height, would be valuable to the naturalist, and a well preserved specimen the greatest ornament of any museum.

Among the *Cheiroptera* any species of the genera *Galeopithecus* and *Pteropus* which you may meet with, will very likely be new, and consequently well worthy of preservation, and, indeed, the chances are, that in this family the greater part of the species on the coast of *Tenasserim* are altogether unknown.

At *Malacca* there is said to be a *Hedgehog* with pendulous ears: but the species is not well authenticated. If it really exist at *Malacca*, it will also, I should think be found in *Tenasserim*.

In the order *Rodentia* the researches of the naturalist will, it is probable, be richly rewarded. An animal, somewhat between a *mole* and a *rat* in form was found by Doctor RICHARDSON, I imagine in no very

* I believe Dr. HELPER has actually done what is here pointed out, by discovering a new race in the jangals of *Tenasserim*.

great scarcity, for he mentions two specimens as having been among his collections, but which he unfortunately lost. He states that it is called *poe*, by the Burmese; that the head is large and round, like an otter's; the cutting teeth like a rat's; feet slightly webbed, somewhat resembling in appearance, though not so strong as, the *moles*, with fur exactly like the *moles* but larger in the staple, and, as he thinks, even finer; that it is little larger than an English *mole*, and burrows with great rapidity. Dr. RICHARDSON further says, that, there are two kinds of the same animal, one being longer and covered with harsher hair than the other. As the animal is probably a new one, and the two kinds he mentions distinct species, it should be sought for and described, and specimens procured. The *squirrels* of that country probably bear a resemblance of those of the Islands of the Eastern *Archipelago*, of *Arracan*, *Assam*, and the lower ranges of the mountains of continental India; but some new ones must be met with. I have lately had one pointed out to me as an inhabitant of *Assam*, by Dr. McCLELLAND. He described it, as a very large black squirrel; much larger than the *Sciurus maximus*; and he states, that it is an inhabitant of *Baugmaurea* in *Upper Assam*; from which place he has given it the specific name of *Baugmaria*. I am not sure if Dr. McCLELLAND brought a specimen with him, but I rather think he did; and I am almost sure he has described it; nevertheless the arrival of other specimens is desirable, and they may be procured, it is likely, in the countries you are about to visit: as may also various species of flying squirrels, whether of the genus *Sciuropterus* or *Pteromys*.

Of the *Pachydermata*, the *elephant* and *rhinoceros* seem to be common in the provinces to the north and east of *Tenasserim*; and the *Malay Tapir* or that of *China* if there be such an animal, may also be met with. Of late a question has been raised as to the existence of the *Hippopotamus* in the rivers of India. Lieut. TICKELL of the 31st Regt. N. I. has stated, that while out with his regiment against the Coles, in 1833, he received intelligence of a large animal, said by the natives to be amphibious; and which from the description they gave him, he believed to be the *Hippopotamus*. If this be so, that animal may be found in our eastern Provinces; at all events, it is desirable to ascertain the existence, or probable non-existence of an Asiatic *Hippopotamus*. Reasoning from analogy the point is very doubtful; for if the *Tupir* of the east and south *America*, fill the place of the *Hippopotamus* of *Africa*, in the list of *Pachydermata*, then we have no reason to expect it here; but, on the other hand, the zoology of *Africa* is too little known to allow us to conclude, that the *Tupir* does not also exist upon

that continent : and if so, the *Hippopotamus*, or some analogous species will probably be discovered in *Asia* and *America*.

But one animal, though infinitely less in size than the *Hippopotamus*, is perhaps quite equal to it in point of importance ; and may admit of a fanciful analogy in its habits. I allude to the *mole* the well known dweller under the earth, as the *Hippopotamus* is the dweller under the waters. The *mole* in its varieties seems to be common in most parts of Europe, though it is said not to be found in Ireland, and to be scarce in Greece, while its congeners *Chrysochlorus* and *Condylurus* inhabit the *Cape*, and *North America*. But as far as I am aware, no example of it occurs in *Asia*, within the limit of the tropical rains. It is possible this ignorance may be owing to a want of research ; my own journeying in India having been confined to a small portion of *Bengal*, *Behar* and *Orissa* ; where I may almost venture to say the *mole* does not exist. But I have made many inquiries of men likely to have observed it if present ; whose marches have been extensive, and whom I have requested to inquire into the subject. Among these Ensign PHAYRE of the 7th Regiment N. I. has travelled through a great part of India from *Midnapore* to *Goruckpore*, the *Terai*, the kingdom of *Oude*, and *Assam* ; and he informs me that he never met with, or heard of this animal, or any of its affinities, though he inquired of intelligent natives of those countries, and made careful observations himself. This is also confirmed by Dr. McCLELLAND, and Lieut. TICKELL, and by Mr. BENSON of the Civil Service, whose researches into the molluscous animals of India are well known. It will therefore be an object worth inquiring into, whether or not the *mole* or its affinities, is a native of the countries you are going to visit.

The *Chlamyphorus truncatus* of *South America*, in habits somewhat analogous to the *mole*, seems to have in others an affinity to the *Armadilloes* of the same continent. If, as has been said, it take the place of the *mole* in the tropical regions of the west, it is not improbable that some animal having an analogy, or perhaps an affinity to it, may be found in the east. In like manner, as you are aware the *Pangolins* of this country take the place of the *Armadilloes* and *Ant-eaters* in that, and the animal which forms the genus *Orycteropus* at the *Cape*, where, as I before said, the place of the *mole* is filled by the genus *Chrysochlorus*.

To return however to the *Pachydermata* : Ensign PHAYRE during his residence in *Assam*, met with a single specimen of an animal which appears to unite the genera *Sus* and *Dicotyles*, possessing the incisor

teeth of the hog, and the molar teeth of the *Peccary**. It was without tail, and although a female, no mammæ were discoverable, while the vulva was so with difficulty. The hair was exceedingly coarse, much more so than that of the hog generally is; the eyes strongly resembled those of that animal, the ears more rounded than his, and deeply seated in a kind of groove in the head. The height was about $10\frac{1}{2}$ inches, and the length from the tip of the tail to the vent $22\frac{1}{2}$ inches, measured in a straight line. It is to be regretted that the feet of this animal did not accompany the skin; but, as it is, there are sufficient grounds to conjecture the existence between *Sus* and *Dicotyles*. It was shot at *Bishnath* in central *Assam*, where it was discovered among some long grass, in which it ran, and from which it could not be driven: in this respect differing altogether from the manners of the hog, when similarly hunted.

While at *Maulmain*, the same gentleman was informed of the existence of a black tiger. This may be the *Felis melas*, which has been supposed to inhabit the *Island of Java* only; and which Mr. TEMMINCK according to LESSON, for I am at present unable to consult TEMMINCK's monograph of the family†, believes to be a variety of leopard. Its discovery in a new locality is to be desired.

The wild cow is also a native of *Tenasserim*. The species may be the same as the *Bos frontalis* of *Sylhet*. Of other *Ruminantia*, deer are met with in great numbers, and probably new species, of their kind, and of the antelope may be discovered. Mr. PHAYRE was also told of a goat with one horn, resembling the celebrated unicorn (it may be of fable); a hint worth following up, for should there after all be no such animal, yet it is very likely some species will be discovered whose peculiarities gave rise to the story.

Of herbivorous *Cetacea*, the *Halicore* or *Dugong* is known to be a native of the seas of our southeastern provinces: and specimens of this animal would be valuable in a museum. Of piscivorous *Cetacea*, various species are also inhabitants of those seas, and probably new ones may be discovered, should you have the means of searching after them. The *Chinese, dubious, and black Dolphins* (*Delphinus Simen-*

* After this letter was written and sent to Dr. HELPER I have been able to examine minutely the dental system of this specimen; and find that the last molars are present in the jaw though yet undeveloped, thus making the molars the same in number as those of the hog. The specimen may nevertheless be a distinct species though it cannot form a separate genus.

† I have since seen this monograph as given in the *Zoological Journal*, according to which M. TEMMINCK states, that young have been found in the leopard's lair, one black and the other of the usual color.

sis, *dubius et niger*), are possibly there, if any where; as is also the *Oxypterus Rhinoceros*, a species, like them, not well authenticated.

The *Birds of Tenasserim* appear in some respects to resemble those of the *Islands*, and of the continent of *India*. But the *Dodo*, called by SWAINSON the rasorial type of the *Vulture* family, and supposed by him to belong to the African races, may possibly be found there: and, if so, I need not point out the honour which will belong to the discoverer of this long contested species. The *Vultures* and *Eagles* of that country are but little known so that researches after them must be rewarded by the discovery of new or rare species. Birds of the genus *Buceros* are there in perfection: the *Rhinoceros Hornbill* the most striking; and the *Concave Hornbill* (*Buceros Homrai* of HODGSON) the largest, being natives of the country. The *Cassowary* (*Casuarus Emu*, of some authors, the *Struthio Casuaricus* of LINNÆUS) may perhaps be met with. Among the *Psittacidæ* are many species; some perhaps, intermediate between those of New Holland and *India*. *Gallicinaceous* birds abound in southern *Asia*, and in the *Islands*, and many rare, and no doubt some new species will be brought to light by a diligent inquiry after them. Among these the beautiful *Columba Zoæ*, an inhabitant of New Guinea, may extend to the coast of *Tenasserim*; the magnificent *Argus Pheasant* is supposed to be found there; and the same may be expected of many other species in this, the most important to us of all the families of the feathered race. Wild poultry should be particularly sought after, and living specimens of them and of the various species of *Pheasants* procured.

As objects of curiosity the *Esculent swallow*, its nest, eggs, and young should be sought after. Mr. PHAYRE presented to the Asiatic Society, nests which he brought from *Tenasserim*. He also heard that the breeding of adjutants takes place there: a fact it would be well to ascertain as well as its manner: and various species of that beautiful family the *Crimyrides* the humming birds of the east, are there to be met with.

The other *Vertebrata*, reptiles, and fishes, of that country are so little known as to give a fair promise of almost all that are caught being new species. Of the *Saurian Reptiles* the *flying lizard* (*Draco volans* of LINNÆUS) was brought from thence by Mr. PHAYRE, and presented to the Asiatic Society, and Col. BURNKY, Political Resident in *Ava*, presented me with several specimens he brought from *Pegu*. To the latter gentleman I am also indebted for a curious species of *Chelonian reptile*, a tortoise with a tail, as long, or longer than the body, which

seems to be new. But, as I before said, almost every reptile and fish of the *Tenasserim* coast must necessarily be so.

In the *Invertebrata*, a still wider field opens before the enterprising naturalist, in the seas, and on the coasts you are about to visit. The *Cephalopodous* and *Pteropodous Mollusca* may be said to be unknown. The terrestrial and fluviatile *Acephalous*, and *Gasteropodous* sections of the same class are equally so. So extreme is the ignorance of naturalists of the Indian animals of this class, that one of the most eminent English writers in a late work expresses his surprise that the rivers of the east should have produced but six or seven species of shells, while those of *America* are known to contain upwards of 150. In my cabinet there are not less than 28 species of fluviatile shells, 20 of which I have found in the tanks and nullahs in the neighbourhood of Calcutta, and in the river *Hoogly*, a fact sufficient to prove the fault is not in nature.

In marine *Mollusca* the rarest, and most beautiful, genera are natives of our Indian "narrow seas" as well as of the Indian ocean. The genera *Conus*, *Voluta*, *Harpa*, *Scalaria*, *Dolium*, *Venus*, *Isocardia* and many others are to be found there, rich in species, which require only a careful collector to bring them to notice. Many species of the genus *Patella* and its congeners from the coast of *Arracan*, were presented to me by Mrs. HALHED. And, not to dwell upon this part of the subject, we may venture to say, that by a careful dredging for marine, a diligent search for terrestrial and fluviatile shells, and by hanging out a tow line on your voyage for Pelagic mollusca, you will be able to make a splendid collection of new genera, and new species in this most beautiful branch of natural history.

Of the *Crustacea*, *Arachnida*, *Insects*, and *Zoophytes* upon our coasts, our ignorance is more than equal to what it is of the *Mollusca*, while to attempt to enumerate even the genera you will meet with, would extend this paper beyond all reasonable limits. Besides, my remarks must be for the most part merely conjectural, and you will, of course, gather all you meet with, and particularly inquire after any curious in themselves, or useful in medicine and the arts. Among the former the phosphorescent *Pennatulæ* are natives of the Straits of *Malacca*; but whether of the European species or not, I am not informed. Of the latter, some species of *Cantharidæ* are met with, in numbers sufficient to be used in blistering; and other insects may be known to the natives of real, or fancied, specific virtues: if so, such should be inquired after: I may also mention the *Cochineal insect* (*Coccus cacti*, LINN.) which some think may after all be found in India, though from its place

being apparently filled by another species* of the same genus, I have little hope of your discovering it.

With regard to the internal parts of animals; those of *Vertebrata* should be preserved, as well as the animals themselves of those *Invertebrata* which are provided with a shell. Of the importance of these in systematic classification you are well aware.

The little time I can command must be my apology for not entering here upon the subject of the preservation of your specimens. All I know, however, about it is fully detailed in a paper I published last year in the *Journal of the Asiatic Society*; a copy of which I have the pleasure to annex. In that paper you will find the method I have been induced, by the experience of several years in this climate, to recommend, and which has been practised in my own cabinet, and in the museum of the *Asiatic Society*, with the most perfect success.

In conclusion, permit me to congratulate you upon an appointment which promises so fair an opportunity of distinction to yourself; and such great advantage to zoological science.

IX.—*Mode of Manufacture of the Salumba salt of Upper-India, extracted from a Report by C. GUBBINS, Esq. C. S.*

The *Noh Mehl* situated below and to the east of the *Mewat* hills, and between two jheels, that of *Kotela* to the south and that of *Chundainee* to the north, comprizes 12 villages,

<i>Chundainees,</i>	<i>Bacc,</i>	<i>Bas,</i>
<i>Noh,</i>	<i>Selumbah,</i>	<i>Boutika,</i>
<i>Khairlah,</i>	<i>Salaheree,</i>	<i>Eldbur,</i>
<i>Mulub,</i>	<i>Ferozpoore,</i>	<i>Murara.</i>

The area of these villages is about $39\frac{1}{2}$ square miles.

The salt is made by solar evaporation from well water, exposed in pukka vats or reservoirs of an average of $3\frac{1}{2}$ cubits deep, 70 cubits long and 40 cubits broad. These reservoirs are built in sets of six, and are filled from wells, one of them is chosen which is always kept full from the remaining five, while these again are refilled from the well as often as they empty.

Two years is the usual time for the first collection of salt (this is however often retarded or accelerated by a heavy or scanty fall of rain, during the wet months): when a red scum begins to appear on the surface of the water fresh bushes are thrown in, chiefly of thorny plants, such as the Keeker, Jhoud, Joankur and the Joasa plants, and by the

* Further reflection has led me to think the *Sylvestre*, or *C. Tomentosus* is a variety of and not a distinct species from the *C. cacti*.