

ART. XXIII.—Notes on the Bones of a Species of *Sphenodon*, (*S. diversum*, Col.,) apparently distinct from the Species already known. By WILLIAM COLENZO, F.L.S., etc.

[Read before the Hawke's Bay Philosophical Institute, 14th December, 1885.]

TOWARDS the end of November, 1885, I received a small parcel of little bones from Mr. Mills, of the wood and coal depôt in this town. It was brought to me by one of his workmen, who said, "they were that morning found in the quarry, while digging, at about forty-five feet below the surface." I was not very well at the time, but on looking at them, I soon saw they had belonged to some small reptile. They were in most excellent preservation, even to their minutest parts and finest processes, and were not fossilized; but, most unfortunately, they were very few of the whole skeleton. On making further inquiry during the afternoon, I found that "the quarry" (which I had supposed to be distant, on the west side of Scinde Island and near the harbour, where the larger quarries are,) was very near me, in Town Section No. 101, and opened on to Tennyson-street South. On hearing this, I called my man, (whom I could trust on such an errand,) and, showing him the little lot of bones, sent him to the quarry to see if he could find any more. On his return, he brought me three additional bones, two of them being the pelvis bones of the skeleton.

In more closely examining them on the following day, I was pretty sure they were bones of a small lizard, and probably a species of *Sphenodon*, but whether of the more common species, *S. punctatum*, or of some other species, I could not determine.

I had Dr. Newman's interesting account of his anatomy of a species of *Sphenodon*,* (*S. guntheri*, Buller,) but that treated chiefly on its muscles; and I had no works describing clearly the osteology of the *Sphenodon*, neither were there any in the library of the Hawke's Bay Philosophical Institute, save a partial drawing of its entire skull, in a plate in the "Zoology of the *Erebus* and *Terror* Voyage," but without letterpress or description.

Finding, however, that Dr. Günther's full and able description of the anatomy of *Sphenodon punctatum* was in the library of the Colonial Museum, where also was a preserved skeleton of the animal (mentioned by Dr. Newman in his paper referred to), I wrote to the Director of the Colonial Museum, Dr. Hector, for the loan of both skeleton and book, and very recently I have received both, for which kindness I wish to thank him.

*"Transactions N.Z. Inst.," vol. x., p. 222,

Being thus aided for my task, I was enabled to go to work, and to examine and study the few bones I had obtained; and in this short paper I give you the result.

As I said at the beginning, the bones, unfortunately, were few. The total number of whole bones and pieces was but forty-three, several being small chippy portions of the skull that had separated at their sutures; fortunately the jaws with their teeth were among them, and nearly entire. Then, as regards their bulk, a wine-glass would have contained them all. Their complete list, as far as I have been able to make them out (through shortness of time), will run as follow:—

1. *Of the Head*: 6 bones, containing the teeth, viz.:—2 *maxillary*, 2 *mandibles*, and 2 *maxillary-palatal*; also 1 *splenial*, and 1 *articular* (belonging to one of the mandibles), 1 *os quadratum*, and 1, the basal portion of the skull, with *exoccipital* and other bones attached; with a few small, thin, chip-like bones and fragments.

2. *Of the Fore-limb*: 1 *humerus*, 1 *ulna* (whole), and 1 *radius* (part only).

3. *Of the Vertebrae*: 9 joints.

4. *Of the Body*: 8 ribs (some broken), and the pair of *pelvis* bones.

There was also among them what appears to be the tarsus of some small bird, but broken.

I will now give a more particular description of those bones, showing where I have observed them to differ from those of *S. punctatum*, as given by Dr. Günther.

Before, however, that I describe its teeth, I should observe that this animal, like *S. punctatum* and a few others, is a true *Acrodont*; that is, it has no proper teeth set into proper (alveolar) sockets like those of other animals; but its teeth are composed of little bony points, arising from the bone of the jaw itself,* and are of various shapes and sizes, so that it is difficult sometimes to decide whether a tooth or a projection should be considered as one or as three, from the number of its sharp,

*To this, I may be permitted to add in a note, that I was the first to point out this curious novelty; and this I did first to Dr. Dieffenbach (in 1841), from my living specimen, which I had and kept alive for several months. Dr. Dieffenbach then resided at Paihia, Bay of Islands, very near me, and visited me frequently; Dr. Dieffenbach, also, having at that time received from me the very specimen which Dr. Günther has stated in his admirable Memoir as being the *first* one taken to England, and deposited by Dr. Dieffenbach in the British Museum. (This is extracted by Dr. Günther from Dr. Dieffenbach's early work on New Zealand, vol. ii., p. 205, in which work, however, my *quondam* friend omitted to mention how and when he received it, as well as several other similar matters relating to specimens of New Zealand natural history, the Maori language, customs, etc., etc. Dr. Dieffenbach never visited the East Coast of the North Island.)

tooth-like points.* The teeth are mostly broadly conical, especially the maxillary, with their tips truncated or flattened, as if worn; and all with an apparent longitudinal flaw, or crack, extending down the centre of the tooth. At the same time, it seems to me that the structure of the substance of the teeth, from their semi-pellucid appearance, is different from that of the common bone of the jaws.

I. Of the Teeth:—

1. The *maxillary*, or upper jaws: One contains 16, and one 17 teeth, of which the central ones are the largest; in this respect differing largely from *Sphenodon punctatum* (Günther's).

2. The *mandible, dentary*, or lower jaws: One contains 16 teeth, and a canine one at the anterior end of the jaw, with no space between them; and one contains 13 teeth with the canine one, and a space between them. These dentary teeth are alternately large and small.

3. The *palatine* teeth also vary in number. In the one, there are 8, and in the other 10, teeth, the anterior tooth being the largest. This one agrees with *S. punctatum* (Günther's).

4. The *intermaxillary* teeth (if there ever were any) are missing.

Here, I may observe, that Dr. Günther says of the teeth of *Sphenodon punctatum*:—"There are originally about 18 in each maxillary, and 11 in each palatine. However, those of the anterior half of the maxillary appear to be soon ground down to the alveolar edge. . . . The first palatine tooth is much stronger than, and separated by a short interspace from, the succeeding. . . . The alveolar edge of the mandible is polished, bearing about 16 teeth as long as the number is complete; but (as in the maxillary) the teeth are gradually lost from the front backwards." Dr. Günther has also given several drawings of the teeth and jaws of *Sphenodon punctatum*, of both old and young specimens, but none of them agree with these of this specimen.

II. Of the Dental Bones:—

1. The upper jaw contains 10 *foramina maxima superiora*: of these, Dr. Günther merely says that "they are present as in other lizards."

2. The lower jaw contains 6 to 7 *foramina mentalia*: in *S.*

*As an apt illustration of this, I may here quote what Dr. Newman incidentally mentions in his paper above referred to:—"Drs. Günther and Knox disagree in the number of teeth assigned to each maxilla and palate, but this arises from the fact that Dr. Knox considers several of them complex teeth, while Dr. Günther counts each cone as a distinct tooth. Günther says there are about eighteen teeth in each maxilla, which Knox counts as six. I counted sixteen in mine, and thirteen on each palate."—(*l. c.*, p. 232.)

punctatum these latter "vary in number from 2 to 4, and are small." The additional large *foramen* between the dentary and articular bones, mentioned by Dr. Günther as being large in *Sphenodon punctatum*, is also found here in this specimen, and is very large. This lower jaw has lost its *coronoid*, which separated at the suture; the very small and splintery *splénial*, and *articular*, were also separated at their sutures, but these two were with the bones.

3. The *palatine*, with its additional row of bony teeth, is a highly curious bone; when this is fixed in its natural situation in the roof of the mouth, forming an extra line of teeth parallel with those of the upper jaw, the teeth of the lower jaw are so situated as to fall in, or close up, between those two lines.

III. Of the Remaining Bones of the Skull:—

1. The inner basal portion, with the *exoccipital* bones, is complete; these are, however, much smaller than those of *Sphenodon punctatum*, yet the occipital hole (*foramen magnum*) is considerably larger. There is a most peculiar isolated internal bone, arising centrally from above the anterior *hypapophysis* of *basis-phenoid*, and also the *pterygoid*; it is not thicker than a bristle, and about 4 lines long; it is semi-cylindrical, and curved upwards, and wonderfully preserved! There is no such a bone shown in Dr. Günther's careful and able dissections of the skull of *Sphenodon punctatum*;* but it exists, though smaller and stouter and scarcely seen, in the Wellington specimen (which is badly preserved).

2. The *os quadratum* (1 only) is much broader at the end than that of *Sphenodon punctatum*, as shown in Dr. Günther's plate; besides, the suture joining it to the *pterygoid* is of a different shape; it is also different from that of the Wellington specimen.

3. There are also a few other very small, thin bones, mere chips, separated at their sutures, and not yet ascertained.

IV. Of the Fore-limb:—

Of this, there are 1 *humerus*, 1 *ulna*, and 1 *radius*; the two former are whole, the latter broken. The *humerus* is very stout, and is a beautiful piece of mechanism. Dr. Günther gives no drawing of these bones (though he does of the adjoining *scapula* and *coracoid*), and says very little about them, save that "they are similar in form to those of other known genera of this family." These three bones resemble those of the Wellington skeleton as far as those can be seen.

V. Of the Vertebra:—

1. There are only 9 joints; 4 *cervical*, of which one joint

* This bone, however, may have been referred to by Dr. Günther, in writing on the palate and its muscles, where he casually mentions "the long styliform process of the pterygoid and ectopterygoid." (*l. c.* p. 600.)

is the 2nd cervical; 3 dorsal; and 2 caudal, upper anterior. These are all much smaller, etc., than those (few) shown by Dr. Günther, especially the 2nd cervical.

VI. *Of the Remaining Bones of the Body:—*

1. There are 8 of the smaller ribs and portions of ribs, none being quite perfect. These are very much smaller than those shown of *Sphenodon punctatum*.

2. The pair complete of *pelvis* bones, which differ considerably from those of *Sphenodon punctatum* (as represented in the drawing), in wanting the "remarkably developed uncinatè process of *os pubis*, in the middle of their anterior margin, and the still more prominent *tuberositas ischii*" of the posterior angle. Those processes, however, exist in this pair of *pelvis* bones, but they are smaller, and of a different shape; while those same bones in the Wellington specimen are very much larger and stouter every way.

I regret not having had more of the bones of this little animal, especially those of the upper and fore parts of the head, with the intermaxillary teeth; more of the fore-limb, also those of the hind-limb, and more joints of the vertebral column. Of these latter alone—which joints in *Sphenodon punctatum* amount to 63, all varying exceedingly with their position in the skeleton—there are in this small lot only nine joints, or one-seventh of the complete number!

The whole of the bones of this newly-found specimen are remarkably thin, almost papery (except those three of the fore-limb), and yet generally perfect, and not worn down by friction or wasting. Their thinness, combined with the more sound and larger teeth, serve to show that this animal must have been young, or, at all events, not a very old one; and yet the teeth are very far from approaching to those of a young one, as shown by Dr. Günther. Again, there is no comparison as to general appearance between these bones and those of the Wellington specimen, which are both larger and stouter, and apparently of a different substance. These bones must have belonged to a much smaller animal than either *Sphenodon punctatum* of Dr. Günther, or that of the Wellington skeleton. At the same time, it must not be overlooked that the *dentary* bone (or lower jaw) of this specimen is quite as large as that of *Sphenodon punctatum* of Dr. Günther, and a little longer than that of the Wellington one.

These bones are not fossilized, neither are they rotten, although so very thin. The old Maoris always said that the tuatara (*Sphenodon* sps.) formerly inhabited the headlands of the New Zealand coast (as well as the islets lying off it), which the finding of this specimen proves. The place where it was found is on the east side of the outer hill forming Scinde Island (Napier),

which originally formed a steep slope to the raised beach below. The remains were discovered at a depth of about 45 feet from the surface of the slope, and about 40 feet in from the base, in apparently undisturbed sandy loam. My own opinion is—from having, thirty to forty years ago, seen remarkably large and deep new rents and fissures in the sloping sides of our Hawke's Bay hills, caused by earthquakes, many of them afterwards closing up,—that anciently this little animal, at some such a season, fell into one of those deep rents, and so perished.

In conclusion, I may observe that Dr. Newman also says:—“ Three species of *Sphenodon*, unlike in form and colour, have been discovered: 1. *Sphenodon punctatum*, black and spotted; 2. *S.* (unnamed), green and yellow; 3. *S. guntheri*, lighter. The dark form is found in the North, the intermediate at East Cape Islet, and the lighter form in the South. *S. punctatum* was the form so elaborately described by Dr. Günther. The other species have not been anatomically examined.”*

Dr. Günther also mentions the possibility of there being two species, although, from the smallness of the material before him at that time (1867,) he does not support it.

Such, however, being the case, and these (few) bones not wholly agreeing with those of *Sphenodon punctatum*, I have named this species *Sphenodon diversum*, but only provisionally, as on further examination of both this and of better specimens, and a closer comparison of them with the bones of those two other specimens mentioned by Dr. Newman, may yet show that these belong to one of those two species.

P.S.—The ordinary meeting of the Hawke's Bay Philosophical Institute, to be held this evening, being the last for this season and year, I have been very desirous of bringing this paper before you, and have only been able to finish it this day.

ART. XXIV.—*A List of the Native Birds of the Petane District, Hawke's Bay, with Notes and Observations.*

By A. HAMILTON, of Petane.

[Read before the Hawke's Bay Philosophical Institute, 1885.]

THE district over which the birds occur, enumerated in the following paper, may be defined as the country lying between the two rivers, the Tutaekuri and the Mohaka. Included between these natural boundaries will be found a great diversity of feeding ground for the various kinds of birds, the tidal flats and estuaries of the Inner Harbour of Napier, the river-beds of the