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Pheno - barbital - sodium for
complete anaesthetization
of *Ambyl rhynchus cristatus*

ÁREA HISTÓRICA
DEL CENTRO DE INFORMACIÓN INTEGRAL

Experiments in the use of Pheno-barbital-sodium for complete anaesthetization of *Ambylrhynchus cristatus*

One of the most common features of the lava-strewn shores of the Galapagos Islands are the immense colonies of the Marine-Iguana, *Ambylrhynchus cristatus*, whose sole diet is that of sea-algae.

Although there is a considerable variation of the species throughout the entire archipelago, of the Marine-iguana, save for certain variances in length, their biology is the same. Its eggs are buried in the sand, near the sea; upon hatching the small iguana takes to the rocks and its immediate diet of sea-algae. Its growth is accompanied by constant skin-moult. and at almost all the stages of this growth the iguana is seen in various stages of skin-moult. When small they are of blackness to fully merit Charles Darwin's term little imps of darkness! When mature this iguana takes on a dirty yellow flecked with orange colourings and about the hind portions the legs are a greyish black. Also during the mating season the spines of the head become white. When full grown, they will reach a length (overall) of as much as 56 inches. They are, undoubtedly fairly long lived for reptiles reaching an age of about 15 years.

When eating (which is done when the sea recedes at full ebbtide leaving uncovered the sea-algae on the rocks), the Iguana enters the water voluntarily and swims to its algae-perch. Otherwise they scarcely will ever enter the water forcibly, and when thrown in will almost always return

by the shortest distance to land. Rather than enter the water when pursued they take refuge in the crannies of the rocks, where having gained an entrance they fill themselves with air, hold on with claws, and resist the stoutest efforts to dislodge them. Should a desired specimen take refuge in the rocks, one might as well take one's defeat philosophically, and look elsewhere for a specimen. It was from this situation that occurred often during my stay at the Galapagos, that I then decided to extend my experiments on the use of *Pheno-barbital-sodium* (*Nembutal-Abbotts*) to the reptilian group.

The use of Phenobarbital-sodium was tried on the marine iguana on numerous occasions with repeated success. An intramuscular injection of $\frac{1}{2}$ cc to the fivepound weight resulted in a most effective method of securing the reptile without mortality and also permitted me to observe the effects of a vegetable sedative on the nervous system of a coldblooded animal. Observing the animal, living, and under a narcotic had its advantage, as it allowed the examination of the unusual genera of *Ixodidae* (ticks) that adhered to its skin of the *Ambyrhynchus cristatus*.

There exists in the literature on this particular Nembutal-sedative no statistics on the response of 'wild' animals to its influences, but it is used constantly, nonetheless, and moreover successfully on domesticated animals, i. e., dogs; cats and horses. Thus data, even more or less tentative, on the response of animals to this narcotic is not out of place in reaction to the organism of reptiles.

The first difficulty in injecting the iguana is the determining of weight, in this respect Nembutal in the slightest overdose is fatal. This determination can only be made through trial and error, and the use of a scale to assist in determining the weight that one might conjecture the animal to have.

In this particular experiment I selected an iguana weighing about four pounds. Into the righthind-leg I injected intramuscularly $\frac{4}{5}$ of a cc of NEMBUTAL on the basis of $\frac{1}{2}$ cc to the five pounds. The case history, so to speak, is as follows:

- 10: 17 A. M. Injection of $\frac{4}{5}$ cc Nembutal right hind leg.
- 10: 38 Rather quiescent; still tenaciously held to position.

10: 41 Withdrew from rock, almost entire lack of response to escape.

10: 47 Closing of eyes.

11: 00 On violent stimuli opens eyes slowly, pupils well dilated. Holds self in quasi-sitting position. The hind legs, however are not assisting in the position, they being spread out rather uselessly in back.

11: 05 Complete anaesthetized.

11: 11 Collapses from sitting position. Turned on back, eyes opened slowly; close. Respiration regular four to the minute.

11: 30 Breathing again normal; respiration nine to the minute. Peculiar throat movements common to reptiles, now once more prominent.

1: P. M. Upon violent handling, opening of eyes, eyes again close; lapses into semi-consciousness.

2: 20 P. M. Recovers from narcotic, moves slowly away. Although fully conscious after the injection has lost its force the sea-reptile does not seem to be able to throw off the effects of the sedative like a warm-blooded animal, this might be caused not only by the condition of the blood but also by the peculiar ganglion distribution in the family of iguanas.

However, this response gives a definite impetus to a zoological difficulty that has existed as respects the Galapagos sea-iguana. No one has ever succeeded until this discovery in keeping a sea-iguana alive in captivity. The sea-iguana will not eat, and any attempt at forced feeding is stopped at the outset, for it will not open its mouth. A forced attempt at opening its jaws has only resulted in the breaking of the teeth, of the iguana.

It will be seen in the accompanying illustrations that through the adium of the injection of NEMBUTAL that the jaw muscles relax at once, and the mouth may be opened and forced feeding resorted to. Chopped sea-weed can be given once a week to the Iguana while under narcotic, and I had many iguanas in captivity under this treatment during my entire five months stay at the Galapagos,

ILLUSTRATIONS TO ACCOMPANY

Experiments in the use of Pheno-barbital sodium for complete anæsthetication of *Ambylryncus cristatus*.

1. The author with a paralyzed sea iguana from the effects of an injection of Pheno-barbital-sodium.

2. The Galapagos sea-iguana (*Ambylryncus cristatus*) after an injection of 4/5 cc of nembutal intramuscularly.

3. The rare *Conolophus pullidus* of Barrington Island in the first stages following an injection of *Nembutal*. Notice that even after the passing of the first stages of the effect of the sedative, that the animal still holds itself erect on its fore-legs.

4. The pliability of the mouth of the Galapagos sea-iguana, four minutes after an injection of *Nembutal*. By this means the animal can be forcedly fed, and thus allowed to live in captivity.

5. The *Conolophus subcristatus* from *Seymour Island* after the injection. The peculiar expression to the face is that last stage of consciousness.

6. A young Galapagos sea-iguana, completely anaesthetized with Pheno-barbital sodium and lying open for a living study of its anatomy, by this means an entire view of the heart action was obtained. The reptile lived for some time after the incision.

All photographs by Wolfgang von Hagen Ph. d.