
HISTORICAL FACSIMILES

Early Accounts of Komodo Dragons

It is doubtful that any herpetological discovery of the 20th century was met with the same level of excitement and fascination as the discovery and description of the Komodo dragon *Varanus komodoensis* by Ouwens in 1912. Despite reaching lengths of over three meters, one of the greatest shocks of its discovery was not the impressive size itself, but rather the fact that such a large and conspicuous animal could avoid detection for so long, especially with Southeast Asia and the Indo-pacific region heavily occupied by several European nations throughout the 19th and early 20th centuries. Since its discovery, *V. komodoensis* has become an important flagship species for reptile conservation and popular attraction in zoos and aquariums, and serves as the basis for various fables and tales in pop culture, including the iconic 1933 monster movie, King Kong (Morton, 2005). Given its popularity and allure as the world's largest living lizard, this issue's historical facsimiles section is dedicated to *V. komodoensis*.

We begin with a reproduction of Ouwens' original 1912 description of *V. komodoensis*. Published in the obscure and long out of print journal *Bulletin du Jardin*

Botanic Buitenzorg, most varanid enthusiasts have probably never seen this classic work. Next are two articles from the journal *Treubia* which provide some of the earliest captive accounts of *V. komodoensis* in Indonesian zoos. The first, published in 1938, describes several aspects of its reproductive biology, including reproductive behavior, egg deposition, and embryonic development at the Surabaya Botanical and Zoological Gardens (Tanzer & van Heurn, 1938). The second article documents the world's first successful breeding of *V. komodoensis* at the Batavia Zoo in 1941 (de Jong, 1944), which, as far as it can be determined, also represents the first successful breeding of any varanid lizard in captivity. Interestingly, despite *V. komodoensis* being displayed in western nations since 1929, with eggs laid as early as the 1930s at the Amsterdam and Philadelphia Zoological Gardens (Jones, 1965), it wasn't until 1992 - 51 years after Indonesia's first successful captive breeding of the species that *V. komodoensis* was successfully bred outside of its native Indonesia at the Smithsonian National Zoo in Washington D.C. (Walsh *et al.*, 1993).

-RWM

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On a Large *Varanus* Species from the Island of Komodo

P.A. OUWENS

Through the kind introduction bij Captain W.L. Einthoven, in December 1910, I entered into correspondence with Mr. J.K.H. van Steyn van Hensbroek, 1st Lietenant of Infantry, who served as Civil Administrator at Reo (Island of Flores).

The latter mentioned, that he had received information from the inhabitants of that island, that in the neighborhood of Laboean Badjo, and on the island of Komodo occurred a *Varanus* species of an unusual size. They called the animal "*Boeaja darat*" (land crocodile). His curiosity having been aroused by these reports, he resolved to collect some particulars concerning these animals and to obtain a specimen if possible, as soon as he should be on duty in the island of Komodo.

On his arrival in the island he was provided with the necessary data by Mr. Kock and Mr. Aldegon a.o., members of the pearling fleet, stationed at Komodo, and both of them keen hunters. They informed Mr. van Steyn van Hensbroek, that these animals may even attain a length of 6 to 7 meters. In the beginning of his sojourn in Komodo, Mr. Aldegon shot a few specimens of that size. Since the island has been more frequented, the animals have withdrawn to the mountains. They live, so he says, exclusively on land, where they make great holes under the stones and rocks, in which they always

remain at night. Their feet are fairly long, and in spite of their awkward build, they can move with great rapidity.

In walking, they do not touch the ground, neither with the chest nor with the belly. They walk on the balls of the feet, as may be clearly seen by the callosities on them, as well as by their footprints. The neck is rather long and extraordinarily mobile. The animal can move its head in every direction, and so it can see everything: this is of great use to the creature, as it seems to be remarkably deaf. Mr. Aldegon says, that, if only care is taken, that the animal does not see the hunter, the latter may make as much noise as he pleases, without the animal being aware of his presence. Its deafness is confirmed by the circumstance, that it only goes out in the daytime and never at night. They live either singly or in troops. Their food is exclusively of animal nature.

If Mr. Aldegon shot wild pigs or birds and left them on the ground, they were eaten by the *Boeaja darat*, which sometimes fought desperately for the prey.

The above mentioned notes are according to Mr. van Steyn van Hensbroek.

During the time of his stay in Komodo he was fortunate enough to obtain a specimen 2.20 M long, of which he sent me a photograph (1) and the skin.

He further informed me, that he would try to catch



Plate 1

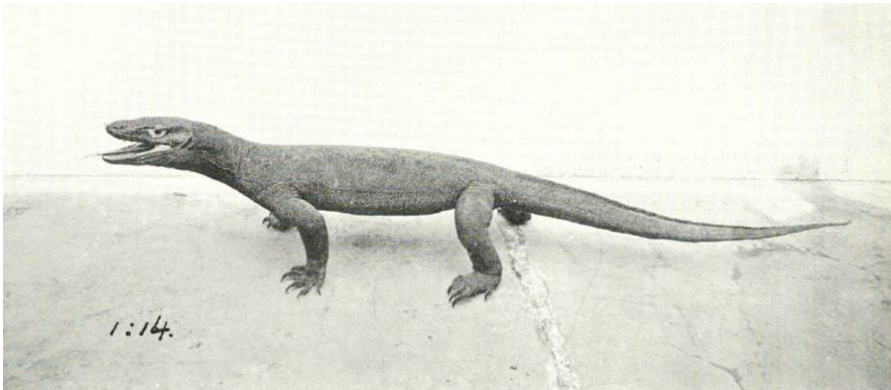


Plate 2

a living animal of larger size, but that this would not be so easy, as the inhabitants will not run the risk, for the animals not only bite, but keep the natives at a respectful distance by powerful blows with their tails.

As it was now established, that in Komodo exists a species of *Varanus* of exceptional dimensions, a native collector of the Zoological Museum here, was sent to Mr. van Steyn van Hensbroek in order to try to obtain further specimens with his assistance. As Mr. van Steyn van Hensbroek was soon transferred to Timor, the collector with the Radja Bitjara (native chief) and the necessary natives and dogs started out alone, with the result that he brought home one animal of 2.90 M, (2) one of 2.35 M, and two very young ones of about 1 M. The two young specimens are still alive.

Finally according to Mr. van Steyn van Hensbroek, another specimen of about 4 M. was shot at Komodo by

Sergeant Beker.

The collector quite confirms the observations of Mr. Aldegon, regarding deafness and other peculiarities.

Experiments made here with the young animals lead to the same conclusion.

Teeth acute, compressed. Snout short, depressed at the tip. Nostril oval, three times as far from the orbit as from the tip of the snout. Digits strong. Tail compressed, keeled above. The caudal keel with a low five-sixtoothed crest. Head- and neck-scales large and very strongly keeled 3). Abdominal scales keeled, in 97 transverse rows. Caudal scales also keeled and in 218 transverse rows. Scales on upper surface smaller than the neckscales and strongly keeled. Dark brown above. Tongue very long and yellow. Tympanum large.

If the animal is indeed a species not yet described, I propose to call it: *Varanus komodoensis*.

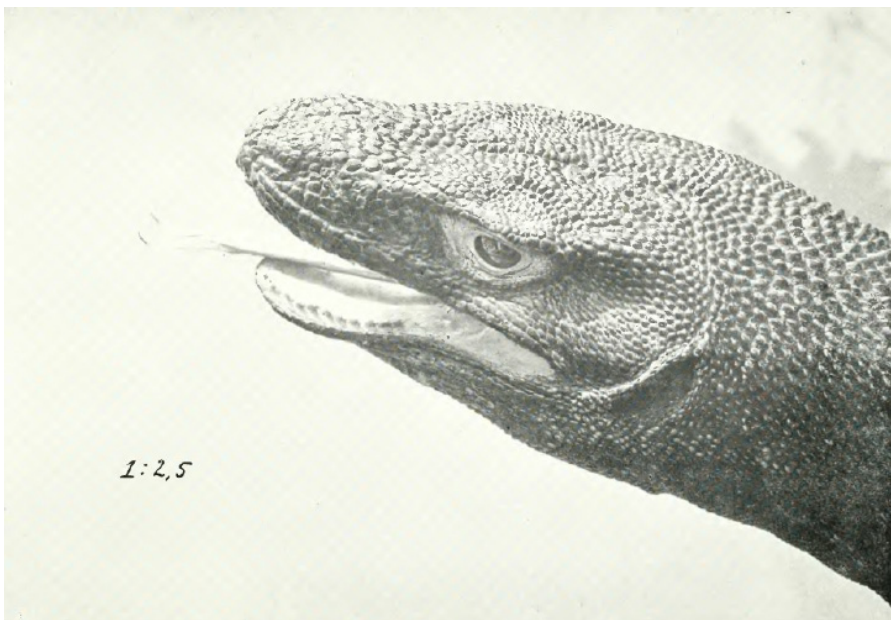


Plate 3

Tanzer, E.L. & W.C. van Heurn. 1938. Observations made by E.L. Tanzer and JHR. W.C. van Heurn with reference to the propagation of *Varanus komodoensis* Ouw. Treubia 16: 365-368.

Observations Made by E.L. Tänzer and JHR. W.C. van Heurn with References to the Propagation of the *Varanus komodoensis* Ouw.

E.L. TÄNZER & W.C. VAN HEURN

In his publication on the *Varanus komodoensis* Ouw. (Nat. Tijdschr. V. Ned. Ind., vol. 97, 1937, p. 193) Dr. J.K. de Jong had to state: "The biology of its propagation, we regret to state, as yet remains a closed book" (1). The Editor of Treubia has now received a report on observations with reference to the mating and the depositing of eggs, sent in by Mr. E.L. Tänzer, made in the Sourabaya Botanical and Zoological Gardens, and in connection therewith also with reference to the results of the examination of a few of these eggs on the part of Jhr. W.C. van Heurn. Both these gentlemen were good enough to put their notes at the disposal of the Editor who has prepared therefrom the following extract.

The Animals.

In the Sourabaya Botanical and Zoological Gardens there are 4 Komodo *Varanus*, as follows:

- 1) a large male (length 2.77 m) presented in 1927 by Mr. H.R. Rookmaaker, at that time Assistant Resident of Flores;
- 2) two specimens, both of them probably males (length 2.40 and 2.50 m, respectively), caught by members of the expedition to Komodo in the spring of 1935; this expedition was headed by Mr. F.F. Schoemakers, at that time the Director of the Gardens, now deceased;
- 3) a small female (length 1.55 m), presented also by Mr. H.R. Rookmaaker in 1927. This female, which has grown little or not at all since that time, deposited eggs twice, once about 6 years ago, and once 4 years ago, in neither instance, however, fertilized.

Copulation

On July 4th, 1937, Mr. Ch. Tänzer witnessed the copulation between the female *Varanus* and one of the two smaller males, in the Gardens since 1935.

Subsequently Mr. G. Hompes, the Manager of the Gardens, witnessed some more copulations, as communicated by him on July 10th, 1937. Such copulations were repeated several times since.

In the course of the copulation the male lies over the female, in the usual manner.

When the urge to copulate had noticeably declined, the female, on July 24, 1937, was transferred to a separate enclosure which was partly shaded.

The Depositing of the Eggs (2)

The floor of the "lying-in room" had been dug out to a depth of from 1-1 ½ metres, and had been filled in with humus and also raised by means of humus.

On one of its sides, at the foot of the hillock, an entrance was made of plates of concrete resting upon concrete corbels. The female, immediately upon being freed within its new enclosure, made use of this entrance by digging itself in there. During the greater part of the day the animal remained in its lair.

It was very rarely seen outside. It took food regularly. So as not to frighten the animal no night observations were made with lamps or lights.

On August 13, 1937, it was discovered that the animal had laid eggs. At that time two eggs had been deposited outside the actual breeding place, at about 1 ½ metres distance from the entrance to the lair. When after two days both eggs were still lying there, one of them was taken away to find out, if possible, whether it had been fecundated. The examinations made by Jhr.

van Heurn proved that the egg was entirely addled, so that it was impossible to establish the development of an embryo.

The other egg had utterly disappeared a couple of days later.

On December 14, 1937, Mr. Hompes saw the animal digging into the side of the hillock. So as not to disturb it he did not further pursue his observation. A couple of hours later he discovered that in the spot where the animal had been digging there was no hole; only the soil showed signs of having been rooted up. Upon further investigation a nest was found here. One of its eggs was extracted to be submitted to a second examination, but so as not to disturb the nest the number of eggs deposited was not ascertained.

The Eggs.

The weight of the egg taken out of this nest on December 14th amounted to 136 grammes. Its colour was evenly white, with a circlet of purplish red spots round one of the poles. The egg shell was parchment-like, and with the circlet of spots mentioned it was softer and less elastic than was the remainder of the shell. The egg was not a perfect ellipsoid, and exhibited a few dents that need not be attributed to decay but could very well have been caused by the evaporation of water. It was opaque. Upon being opened a caked layer of fairly thick substance, of a rose to creamish yellow colour, was found deposited on the inside of the shell, with which layer, surrounded by a disorganized creamish mass, a dead embryo was discovered. Though data are lacking that might suggest the age of the egg, it is nevertheless surmised that it may have developed for two or three months, whilst the embryo probably had died about a month prior to the egg having been opened.

Although, therefore, this egg contained a dead embryo, the nest was not exposed until January 10, 1938, when it proved to contain 14 dessicated egg shells.

In the course of the exposure of this nest a second nest with eggs was discovered close to the first one. It had been made at a greater depth (+- 45 cm) and contained 10 eggs, one of which was empty and dessicated. One of the 9 undamaged eggs was taken away and examined. It weighed 176 grammes. Its colour was a dirty white with an admixture of a somewhat rusty tint. The shell was leathery, the length of the empty egg shell being +- 92 mm, and its transverse section 60 mm. The shell weighed 6 grammes. Upon being opened it was found to contain a living embryo which had not become immersed in the mass of the light yellow yolk, as Jhr. van Heurn had very

often found in the case of snake eggs. The white of the egg was clear and looked somewhat like the fresh white of a hen's egg. The area vasculosa, situated against the egg shell, was less definitely developed than in the case of a hatching birds' eggs, and upon incision exhibited but slight bleeding. As had been done with the preceding embryo, so also this one was fixed in alcohol-formaline according to Apathy.

On February 18 the nest was once again laid open.

The eight remaining eggs at that time were all of them more or less dented and shriveled.

The examination of these eggs resulted in the following:

Colour of an uneven rustiness with but a few small purple spots. Of the 8 eggs 6 were perforated, one was torn across, and only one had remained intact.

In two of the eggs there was no embryo, their contents being dessicated and disorganized.

The remaining 6 eggs contained embryos in various stages of development, and in various stages of decomposition. The egg that had remained intact contained the largest embryo, measuring 12 cm from snout to anus, and 27 cm from snout to the tip of the tail. The umbilical cord and the membranes of the yolk mass still were almost intact. It must have died after the last but one egg examination on July 10, 1938: the other 5 embryos prior to that time.

Also in these eggs the embryo in all cases was found to lie outside along the yolk mass. The yolks were all of them but little consumed, and in weight and in volume were several times larger than the embryo pertaining to each.

Also these six embryos, like the previous two, were fixed with alcohol-formaline according to Apathy.

The embryonic material, together with 25 egg shells, was placed at the disposal of the Zoological Museum at Buitenzorg, where it is to be submitted to a closer anatomical examination.

Final Remarks.

It is clear that the embryos had died at a comparatively early stage of their development, whilst death had ensued at various periods. In view of the fact that one of the last eight eggs was still undamaged the cause of death cannot have been violence. It is not likely that rats were the cause, nor were any larvae of flies found anywhere, whilst if they had been damaged by the nails of the mother animal the eggs, on account of its great weight, would have been damaged more severely.

The primary cause, therefore, of the failure of these

two nests will most probably have to be looked for in the inappropriate soil. This was too close, and perhaps also too moist, so that there was insufficient air for the embryos to breathe, impairing their development and finally resulting in their death.

Also in other animals in the course of the years too great value has sometimes been attached to the warmth required for incubating in the humus within which the eggs are deposited.

Very often the eggs themselves are warmer than their surroundings, so that the heat seems to emanate rather from the embryo in the course of its development than from the hatching nest material

It is hoped that before long it may again be possible to induce a *Varanus komodoensis* to procreate, in which case there may be a better chance of the outcome being favourable in view of the experience now gained.

de Jong, J.K. 1944. Newly hatched *Varanus komodoensis*. Treubia 18: 143-145.

Newly Hatched *Varanus komodoensis*

J.K. DE JONG
(Batavia)

In 1938, Tänzer and van Heurn published a paper (this Journal, 16, p. 365), describing the mating and depositing of the eggs of *Varanus komodoensis* Ouwens in the Soerabaia Zoological Garden. The eggs failed to hatch and only some embryonic material in more or less advanced stages of decomposition, hardly furnishing any basis for further examination, remained.

It was hoped that some following year the garden might show the hatching of the eggs of this giant lizard, but as yet no such thing has happened.

The Zoological Garden in Batavia was more lucky in this respect and on April 15, 1941 two newly hatched Komodo-lizards could be shown to the public.

As the young of *Varanus komodoensis* are as yet unknown to science and as they exhibit an interesting and unexpected colour-pattern, it may be worth while to describe them in some detail here.

The Komodo-lizards kept in the Zoological Garden of Batavia were captured in the hills round the small native village of Kenari on the west-coast of the island of Flores in June 1937. They arrived in Batavia during the first days of the month of July of the same year.

No mating was observed as in the case of the Soerabaia garden, nor any excessive digging from the part of the female.

As soon as the first young Komodo-lizard made its appearance wholly unexpectedly, the direction of the gardens had the kindness to inform me of the event.

Although they were pretty sure that the young animals were really *Varanus komodoensis*, they wanted me to identify the specimens. This was easy enough, the animals showing all the typical features of the adult lizards with only some slight deviations as regards the relative lengths of body and tail.

I wish here to express my thanks to the Direction of the "Vereeniging Planten- en Dierentuin Batavia" for the opportunity they gave me to inspect and measure the young lizards immediately after birth and especially to Mr. W. Koenders for allowing me to reproduce his photograph of a young lizard taken some days after birth.

The measurements given in the following table were taken from the live animals. They are not absolutely accurate for the young lizards objected strongly to being touched by human hands, and by no means we were going to hurt them. They are, however, accurate enough for the purpose of showing the differences with the adult animals, where the tail is only slightly if at all longer than head and body.

	mm	mm
length of head and body	210	200
length of tail	285	280
length of the head	45	44
width of the head	22	22

The animals were very aggressive, quite in contrast to the young of *Varanus salvator* Laurenti. The photo shows one of them in his unfriendly mood, displaying the gular sac in much the same way as do the adults when they meet in the field in the neighborhood of bait.

It is a well known fact that the young specimens of other *Varanus* species are much more brightly coloured than the adult ones, and the same holds true for *Varanus komodoensis*.

In the young the sides of the head are yellowish with a dark smoky horizontal streak running through the eye. There are some blackish vertical bars on the upperlip. The neck is bright yellow or yellowish green, with four or five chevron-shaped black bands on the nape, followed by more black stripes, which reach as far as the shoulder. The forelimbs are black with yellow transverse bands which are broadest near the shoulder. Most of the narrower bands on the lower arm are broken up into yellow dots, covering two or more scales. The hindlimbs are dotted with small whitish specks. The body is dark brown, dotted with numerous ocelli of a dull brick-red colour. These ocelli are arranged in crossbands. This red of the ocelli is of the same hue as the reddish colour that may sometimes be observed on the body of the younger animals.

The tail is banded with alternating narrower and broader transverse bands of a dull yellowish colour. The

narrow bands in the anterior part of the tail are broken up into ocelli. The darker brown interspaces which anteriorly are rather broad become narrower towards the tip of the tail.

Of these bright colours hardly anything remains in the adult animals. In the tails one may observe some indications of the transverse bands, exhibiting darker and lighter areas. I never saw the slightest trace of ocelli on the body but the brown brick-red colour is a rather common feature in the middle sized animals especially when they have just left the water, and are not yet covered with mud or dust. The neck in the younger specimens is always of a lighter colour than the rest of the body, sometimes it even might be called greenish-yellow, but in the smallest specimens I ever saw in the field, measuring about 125 cm in length, there was never any trace of the black chevron stripes on the nape. The sides of the head are usually of a lighter colour, even in the older males and yellow markings round the eyes may even be present in very old males.

If we review the known facts concerning the propagation of *Varanus komodoensis*, we find that the mating season falls in the month of July, and that the eggs are laid in the month of August, both facts established in the Soerbaja Zoological Garden. The eggs hatch in the month of April, as found in the Batavia garden. So the duration of the egg-stage is eight months.
