Deinogalerix koenigswaldi nov. gen., nov. spec., a giant insectivore from the Neogene of Italy

M. Freudenthal

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Deinogalerix koenigswaldi nov. gen., nov. spec. is the largest insectivore known so far. It is represented by an almost complete skeleton and a good number of isolated teeth and bones. These prove a considerable sexual dimorphism. It is supposed that these animals were scavengers. The time-range of *Deinogalerix* is within the Upper Miocene.

M. Freudenthal, Rijksmuseum van Geologie en Mineralogie, Hooglandse Kerkgracht 17, Leiden, The Netherlands.

Introduction

In the spring of 1969, a team of paleontologists from the Rijksmuseum van Geologie en Mineralogie discovered a highly fossiliferous fissure filling in a then deserted limestone quarry between the villages of Apricena and Poggio Imperiale (prov. Foggia, Italy); the fissure has been listed in the museum's collections under the name of San Giovannino.

One of the most remarkable fossils then recovered from his fissure filling was a fragmentary skull, bearing all the molars, some of the premolars, and two caniniform incisors. Together with this skull, a left lower mandible and a series of seven vertebrae with connected ribs were found. At the same time a sample of 100 kg of matrix was taken, which was dispatched to the Rijksmuseum at Leiden.

In that same year a second trip to Italy was made, which was financially supported by the Dutch Organisation for Pure Scientific Research, and during this trip the missing mandible and some long bones were found, which might have belonged to the same animal. This time a considerable amount of matrix was screened in the field. Care was taken to collect material from the immediate vicinity of the original site of the skull.

The washing residue of the matrix dispatched to Leiden after the first campaign yielded the greater part of the brain case and the base of the skull. In addition, careful examination of the residue allowed the restoration of the condyles, parts of the jugal arches, fragments of the snout, and most of the missing teeth. Subsequently pieces of an atlas were found which fitted the condyles of the skull, an epistropheus fitting the atlas, and the other cervical vertebrae. The size of these vertebrae proved that the series of seven thoracic vertebrae mentioned above, indeed belonged to the same species.

The washing residues of the first and the second campaigns were scrutinized at least twenty times, and little by little – each element giving an idea of what the adjoining one might look like – it was possible to restore a large part of the skeleton.

It is quite probable that the elements found do belong to a single individual, because

1. all the remains were found in a comparatively small volume of matrix, taken from the immediate surroundings of the original site of the skull,
2. with the sole exception of two distal articulations of right femora, there are no duplications, all other elements being unique, either left or right or both of them,
3. all the teeth are unworn, and the epiphyses of the bones not yet fused, indicating that all the material belongs to a young individual.

During a field campaign of two months in the same area in the summer of 1970, a second, distorted and fragmentary skull was found at the same locality, San Giovannino, and also a maxillary fragment with two teeth, indicating the presence of yet another individual. The best find, however, was an almost complete left hind foot; nearly all of its bones, even the sesamoids, were still in their natural connection. These, as well as two femora and some other remains, definitely do not belong to the skeleton mentioned before, but to two or even more additional individuals, since they were found in other corners of the fissure, and in part belong to an adult animal; finally they represent duplications as compared to the first-mentioned skeleton.

Remains of the same species, or at any rate of representatives of the same genus were also found in quite a number of other fissure fillings in the same area. During the 1971 campaign many more teeth and bones were discovered, none of these, however, forming essentially new contributions to the reconstruction of the skeleton.

The exact nature of the species to which the above mentioned fossil remains

belong was at first quite dubious: there are molars which on a superficial view might be attributed to an artiodactyl, premolars that might conceivably indicate a carnivore, and large caniniform incisors, all of them together in a skull over 20 cm long. It took quite some time to get acquainted with the idea that an insectivore might attain the size indicated by our material. Reconstruction of the skull bit by bit demonstrated that we are dealing with probably the largest insectivore ever found.

Casts made of all the skeletal elements were combined for the mount of a skeleton now displayed in the museum's exhibition (plate 6). The few parts missing in the skeleton from San Giovannino were copied from bones belonging to other individuals. The only parts lacking entirely in our material are the sacrum (or the sacral vertebrae) and some of the basicarpals.

The present publication is of a preliminary nature. A more detailed description will be given by Prof. P. M. Butler, Royal Holloway College, London, U.K.

Participants in the field campaigns of 1969 and 1970 were Miss T. D'Alessandro, Messrs. G. C. Abels, C. Beets, M. van den Bosch, R. Geesink, H. Guldemond, A. W. Janssen, A. J. van der Meulen, J. Michaux, H. J. W. G. Schalke and J. Sudre. The samples were washed by Messrs. H. Guldemond and F. Jordens and Mr. L. Cranssen assisted in picking the residues. Preparation and casting of the specimens, as well as mounting of the skeleton was carried out by Messrs. P. van Kesteren and J. van der Linden. Designs and photographs were made by Messrs. B. F. M. Collet, J. Timmers and T. Veldhuyzen. I wish to express my sincere thanks to all concerned for their enthusiastic collaboration.

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Description

Order INSECTIVORA Illiger, 1811
Family ERINACEIDAE Fischer von Waldheim, 1817
Subfamily GALERICINAE Pomel, 1848

Genus *Deinogalerix* nov. gen.

Diagnosis – Galericine of gigantic proportions, with diastems between the premolars. The frontal part of the skull is much elongated, the skull itself very long in comparison to the body. The type-species is:

Deinogalerix koenigswaldi nov. spec.

Holotype – the larger part of a skeleton, kept in the collections of the Rijksmuseum van Geologie en Mineralogie under registration number RGM 177 777 through 177 884. The skull no. RGM 177 777, regarded as the most essential part of the holotype, should get preference if and when a restriction of the type designation be necessary.

Type-locality – a fissure-filling in a limestone quarry near the farm of San Giovannino, between the villages of Apricena and Poggio Imperiale, prov. Foggia, Italy. Co-ordinates: 2°57'37"E, 41°48'08"N (zero meridian of Monte Mario, Rome). The code-name for this locality in the RGM collections is San Giovannino.

Type-level – the type-material of *Deinogalerix koenigswaldi* has been found in one of the youngest levels of the Miocene faunal complex of Gargano (see the chapter on stratigraphy).

Derivatio nominis – the name *Deinogalerix* reflects the supposedly rather close relationships to the well-known Miocene genus *Galerix,* while also expressing the extraordinary large size. It is a great pleasure to dedicate the species to my mentor, Prof. G. H. R. von Koenigswald, at the occasion of his 70th birthday.

Diagnosis – the same as for the genus; skull length over 20 cm.

DESCRIPTION OF THE HOLOTYPE-SKELETON

Skull – the overall length of the skull is 21 cm; the distance from the posterior ridge of the palate to the anterior end of the skull 12.9 cm. Consequently, the snout is much elongated as compared to the normal situation in erinaceids. The first incisors are large and protrude vertically downward. I^2 and I^3 have one root each, and are simple monocuspid teeth; the canines and P^1 and P^2 are rather similar, elongate elements, with two roots each. P^3 is a triangular tooth with one high external cusp, and two small internal ones; P^4 has a large external cusp, and three small internal ones: the shape of this element is reminiscent of that of the carnassials of carnivores. Just as in creodonts, it occludes with a large M_1 in the mandible. The molars are square and low-crowned as in most insectivores. The hypocone is slightly smaller than the protocone. M^1 is the largest molar, M^2 is smaller, and M^3 is an even smaller triangular element with three cusps only.

One of the most conspicuous features of the upper dentition is the presence of four diastems: a large one between I^3 and C, a slightly smaller one between C and P^1, and small diastems between P^1 and P^2, and between P^2 and P^3.

The snout is long and slender; in profile (plate 3) the skull appears to be quite flat. The cresta sagittalis is about one cm high and very thin. Originally it may have been higher, as its upper part appears to be damaged. The foramen infraorbitale lies above the anterior part of P^4. It is uncertain whether the jugal arches were complete or interrupted.

The skull is slightly distorted, and the upper front part of the snout has been damaged by the pick-axe.

Mandible – the formula of the lower dentition is not easily defined, because the anterior portions of both mandibles are incomplete. Counting from behind, it is certain that there are three molars and at least three premolars; P_4 is more similar to the corresponding element of *Lantanotherium* that that of *Galerix,,* since there is no trace of a paraconid. This, however, does not mean that *Deinogalerix* is descended from *Lantanotherium,* because P^1 is absent in the latter genus but present in *Deinogalerix*. P_2 is a monocuspid element with two roots. In front of P_2 occurs

a large diastem, followed by a single-rooted monocuspid element which could be P_1 or C. Another diastem separates this element from the alveole of a large fang. The remainder of the dentition and of the jaw bone are missing.

The washing residues of the first two field campaigns yielded five teeth, which almost without a doubt are incisors of the type-individual. Two of these are large caniniform elements which may be considered as the I_1 sin. and dext. The remaining three are small monocuspids, two of these evidently being mirror images of each other and presumably representing the I^2's which are missing from the skull; the fifth specimen could be either an I_2 or I_3. It is however uncertain whether this specimen belongs to the type-skeleton, considering the fact that the top of its crown bears a small wear facet, whereas all other teeth of the type show no signs of wear at all. On the other hand, this specimen differs morphologically from all the teeth present in the skull and the mandibles. Therefore, even if it does not belong to the type-individual, it represents an element not present in the type-material, thus it must be an I_2 or an I_3.

Consequently the most probable dental formula of *Deinogalerix is:*

I 3/2 or 3, C 1/1, P 4/3, M 3/3.

The processus coronoideus is rather low, the condyle is almost flush with the masticatory surface, the processus angularis is long and massive with a slightly inflated end. The foramen mentale lies under the anterior root of P_3. The symphysis is rather long, extending to halfway under the P_3.

Postcranial skeleton – The scope of this preliminary publication does not permit a detailed description of all the elements of the postcranial skeleton. Therefore, merely some general remarks are made here, and some measurements given.

The vertebrae are rather small and slightly built, considering the size of the skull. Consequently, the body-length is comparatively small. Since some of the vertebrae are lacking, the exact length of the spinal column cannot be ascertained, but, if we assume that *Deinogalerix* bore the same number of vertebrae as commonly shown by erinaceids (C 7, T 15, L 6, S 3), the spinal length of the type-specimen, exclusive of the caudal vertebrae, presumably did not exceed 38 cm. The number of caudal vertebrae is unknown, and so is consequently the length of the tail; the dimensions of the available vertebrae, however, appear to indicate a tail both long and heavy, possibly counterbalancing the weight of the head.

The ribs are slender. The claviculae are well-developed. The humerus –

Table of measurements

Humerus: maximum length		10.3 cm	
maximum width proximally		2.6 cm	
maximum width distally		3.1 cm	
Radius: maximum length	±	10.2 cm	*
maximum width proximally		1.3 cm	
Ulna: maximum length	±	12.5 cm	*
Femur: maximum length		11.4 cm	
maximum width distally		3.0 cm	
diameter of head		1.5 cm	
Tibia: maximum length		13.6 cm	
maximum width proximally		2.6 cm	
maximum width distally		2.3 cm	
Calcaneum: maximum length		4.1 cm	
Length of hind foot		10.5 cm	

* measurements not accurate, due to the missing of the epiphyses.

with a large foramen entepicondylare – and the other long bones of the legs are of a normal insectivore type, without any specializations apart from their size. Tibia and fibula are partly fused, as might be expected.

The feet are of a simple plantigrade type, with small claws. The hind foot appears to be comparatively long. The first digits of hand and foot are reduced.

MATERIAL

Remains of *Deinogalerix* have been collected at more than twenty localities – all in fissures – on the plateau between the villages of Apricena and Poggio Imperiale. The material from the type-locality, San Giovannino, represents at least four individuals; one of these is the almost complete skeleton chosen as holotype; it was collected in the course of three campaigns, viz.: first campaign: about one week in the spring of 1969, second campaign: about three weeks in the summer of the same year, third campaign: about two months, in the summer of 1970.

A fourth compaign of two months in the summer of 1971 yielded excellent specimens of *Deinogalerix* but none that might belong to the type-skeleton.

Below, a résumé will be given of the way in which the components of the type-skeleton were found. In the résumé the following abbreviations are used: WR = washing residue, S = collected in situ at the locality.

The campaigns are numbered 1, 2, 3 and 4. So, WR1 means: found in the washing residue of the first campaign; S2 means: collected in situ at the locality during the second campaign, etc.

WR1 represents a volume of about 100 kg of matrix collected immediately around the original site of the skull. WR2 is a concentrate of some 400 kg of matrix, also taken close to the site of the type-skull, or from the talus below it.

Cranium, RGM 177 777. The damaged snout with the palate and most of the dentition were collected in situ (S1). The brain case and the missing premolars were easily found in the washing residue WR1. Repeated sifting of this residue finally yielded parts of the base of the skull, the jugal arches and the condyles. An almost complete skull is available now. Its only imperfections are: interruptions in the jugal arches (which, after all, need not have been complete), the missing I^2 sin. and dext., the missing P^2 sin., and the damage caused to the upper part of the snout by the pick-axe.

Mandibula sin., RGM 177 778. Found at a distance of 20 cm from the skull (S1). Missing fragments were found in WR1.

Mandibula dext., RGM 177 779. Found at a distance of about 20 cm from the original site of the skull (S2). Fragments were added from WR2.

I_1 sin. and dext., RGM 177 780 - 177 781. One specimen from WR1, the other from WR2.

I_2 ?, RGM 177 782. From WR1.

I^2 sin. and dext., RGM 177 783 and 177 784. From WR1.

Atlas, RGM 177 785. Composed of fragments picked from WR1.

Epistropeus, RGM 177 786. Two pieces of the epistropheus each composed of several fragments from WR1.

Five cervical vertebrae, RGM 177 787 - 177 791. From WR1.

Three thoracic vertebrae, RGM 177 792 - 177 794. Found in connection, at a distance of about 30 cm from the skull (S1).

Seven thoracic vertebrae, RGM 177 795 - 177 801. Found in connection with one another at a distance of about 30 cm from the skull (S1).

Twenty-two ribs or rib fragments, RGM 177 802 - 177 823. The nrs. 177 806 - 177 811 were found still connected with the previously mentioned set of seven vertebrae, and they were subsequently more or less completed with fragments from WR1. The other ribs and fragments are all from WR1.

Clavicula sin. and dext., RGM 177 824 and 177 825. Composed of fragments found in WR1.

Sternum, RGM 177 826. This is a piece of bone which might be a part of the sternum of *Deinogalerix*. Found in WR1.

Scapula sin. and dext., RGM 177 827 and 177 828. Found at distances of 30 and 40 cm from the original site of the skull (S2).

Humerus sin., RGM 177 829. Found at a distance of about 40 cm from the skull (S2), in connection with the ulna.

Humerus dext., RGM 177 830. Proximal epiphysis only. From WR2.

Radius sin. and dext., RGM 177 831 and 177 832. Composed of fragments from WR2.

Ulna sin., RGM 177 833. Found in connection with the humerus (S2).

Ulna dext., RGM 177 834. Composed of fragments found in WR2.

Three lumbar vetebrae, RGM 177 835 - 177 837. Found connected, at a distance of about 50 cm from the original site of the skull (S3).

Lumbar vertebra, RGM 177 838. From WR2.

Pelvis sin., RGM 177 839. Found at a distance of about 50 cm from the skull (S3).

Pelvis dext., RGM 177 840. Composed of fragments from WR2.

Femur sin., RGM 177 841. Found at a distance of about 50 cm from the skull (S2). This femur was found in articulation with the tibia-fibula, astragalus, calcaneum and navicular.

Femur dext., RGM 177 842. Found on the talus in front of the site of the skull, during the second campaign.

Patella sin. and dext., RGM 177 843 and 177 844. One was found in connection with the left femur (S2), the other one in WR2.

Tibia-fibula sin., RGM 177 845. Found in connection with the femur (S2).

Tibia-fibula dext., RGM 177 846. Found at a distance of about 60 cm from the original site of the skull (S2).

Astragalus sin., RGM 177 847. Found in connection with the tibia (S2).

Astragalus dext., RGM 177 848. Found in connection with the tibia (S2).

Calcaneum sin., RGM 177 849. Found in connection with the astragalus (S2).

Calcaneum dext., RGM 177 850. Found in connection with the astragalus (S2).

Navicular dext., RGM 177 851. Found in connection with the astragalus (S2).

Metatarsal V sin., RGM 177 852. From WR2.

Metatarsal III sin., RGM 177 853. From WR2.

Cuneiforme II dext., RGM 177 854 and Metatarsal II dext., RGM 177 855. Found in connection with each other, near to the site of the astragalus (S2).

Five metacarpals, RGM 177 856 - 177 860. Composed of fragments from WR1 and WR2. Most probably they are all metacarpals from the same hand, but it cannot be excluded that some are left, and others right hand elements. A reliable reconstruction of the hand was not possible due to the lacking of the distal epiphyses of radius and ulna, and of some of the basicarpals.

Five first phalanges, RGM 177 861 - 177 865. From WR1 and WR2. These are almost certainly elements of the carpus.

Three second phalanges, RGM 177 866 - 177 868, and three terminal phalanges, RGM 177 869 - 177 871. Partly picked up from the talus, partly found in WR1 and WR2. Probably all are carpal elements.

Second phalange, RGM 177 872. From WR2; probably a tarsal element.

Three basicarpalia, RGM 177 873 - 177 875. From WR1 and WR2 .

Eight caudal vertebrae, RGM 177 876 - 177 883. Found in the residues of various campaigns, and at different spots in the locality itself. Quite certainly some of these vertebrae do not belong to the type-individual.

Various fragments of vertebrae, phalanges and metapods, assembled under registration number RGM 177 884. Found in the washing residues of various campaigns.

The above mentioned material is considered to belong to one single individual, unless otherwise stated. It forms the type of the species *D. koenigswaldi*. All this material was cast, and the replicas used to mount a skeleton for display. It should be stressed that the specimens mentioned represent the entire *Deinogalerix* material from San Giovannino collected during the first two field campaigns, with the exception af a distal part of a right femur, RGM 177 909, which was collected during the second campaign and which does represent a second individual.

During the third campaign, in 1970, new *Deinogalerix* material was collected in other spots of the same locality, so that by now material of at least four individuals from San Giovannino is available.

One of the best finds of the 1970 campaign was a block of matrix containing an almost complete foot, with most of the bones still in their correct position. These bones are registered under the numbers RGM 177 885 - 177 907. After cleaning every single bone the foot was reassembled and cast. This cast was also used in the mounted skeleton, even though the original certainly did not belong to the type-individual.

A few elements of other individuals from the some locality, or even bones recovered from other localities were used to complete the mounted skeleton as much as possible:

Femur dext., RGM 177 911. Proximal portion of femur found at San Giovannino (S3).

Humerus dext., RGM 177 910. Found at the locality Fina A-S (S2).

The femur of the juvenile male mentioned in the discussion on sexual dimorphism, is a right femur, RGM 177 919 (S3).

SEXUAL DIMORPHISM

It is evident that the holotype-skeleton represents a juvenile individual: the teeth are hardly worn at all, and the epiphyses of nearly all bones are not yet fused with the diaphyses. The femur belonging to this skeleton is 11.4 cm long.

A second femur, RGM 177 919, unfortunately incomplete, may have been at least 2.5 cm longer than the type femur. This femur too represents a juvenile individual, as its epiphyse is not yet fused with the diaphyse.

The third femur, RGM 177 909, even more incomplete, has the same size as the type, but it represents an adult animal, as the epiphyse is fused.

The material may be interpreted as follows: the holotype is a juvenile female; no. RGM 177 919 is the femur of a juvenile male, and no. RGM 177 909 represents an adult female. This seems to be the most logical explanation for the find of a juvenile femur which is about 20% larger than another, adult one.

Furthermore the holotype skull has a rather high but very thin cresta sagittalis. The second skull mentioned above (no. RGM 177 918) bears a crest which

is considerably higher and thicker. This skull is 1.3 cm longer than the type-skull, and its teeth are also unworn. It appears to represent a juvenile male. The femur no. RGM 177 912 might well belong to the same individual as the second skull, the more so, as they were recovered from the same corner of the fissure.

Ecology

The Miocene faunas of Gargano show some of the typical features, generally ascribed to island faunas with a sufficient physiographic isolation, namely the absence of canivores and the gigantism among rodents. These two features appear to be logically interconnected: the rodents could undergo a remarkable evolution due to the absence of natural enemies. Admittedly, a single carnivore has been found in one of the Gargano fissures, but, as it is an otter, it can hardly be considered a natural enemy of the rodents. Incidentally, this otter again is of remarkable size.

Other carnivorous animals that have been recovered are crocodiles and birds of prey. The crocodiles are not very common, and even if occasionally they did catch one of the large rodents, they presumably did not make heavy inroads on the rodent population. It is even difficult to envisage a crocodile venturing far from the water into a dry karst plateau in order to prey upon rodents. Possibly the rare crocodile remains were carried there by birds feeding on dead bodies.

Birds on the other hand are rather common in the Gargano fissure faunas, and nearly all specimens found represent birds of prey. Remarkably enough a number of these birds were considerably larger than normal (oral communication by Mr. P. Ballmann, Cologne, Germany, who is presently studying the Gargano birds). Thus, gigantism in rodents went side by side with gigantism in birds, and the latter evidently preyed on the former, though, possibly, the largest rodents were too big for them. Anyway, the influence of the birds apparently was not great enough to prevent the evolution of rodents towards gigantic proportions.

The question is now whether *Deinogalerix* was a predator, which would mean that it were a natural enemy of the rodents. It seems improbable that such a large animal with strongly developed incisors should have had a diet conifed to insects, unless insects too had reached gigantic dimensions. The construction of its legs seems to prove that *Deinogalerix* was not a fast-moving animal capable of catching a prey like a rat or a rabbit. At a guess therefore, it probably fed on the corpses of dead animals, i.c. the rodents, and used its large incisors to tear their remains apart. Thus *Deinogalerix,* supposedly being a scavenger was not a natural enemy of the rodents and, therefore, it does not interfere with the idea that gigantism in rodents results among other things from the absence of natural enemies. The gigantism of *Deinogalerix* itself may be explained by this same argument.

Stratigraphy

As Freudenthal (1971) pointed out, the entire assemblage of fossiliferous Miocene fissure fillings found in Gargano to date, represents a series of some ten biozones which can be defined by the degree of evolution of the Muridae. This definition will be set out in a forthcoming paper by Messrs. J. Michaux and R. Geesink and the present author. For the time being, however, I may state that the majority of specimens of *Deinogalerix* were recovered from localities which are assigned to the highest three or four biozones. Among the material from these zones considerable differences in size have been noted, but there are no evident relationships between age and size. This may be due to the supposed sexual dimorphism in *Deinogalerix* together with the relatively small number of individuals represented in our material.

Some isolated molars, premolars and milk molars of *Deinogalerix* have been recovered from a locality assigned to the oldest biozone of the Gargano faunal complex. Although this material is rather poor, it is evident that it represents a form which is considerably smaller than *D. koenigswaldi* and which may be regarded as a separate species, probably ancestral to the genotype. These specimens are smaller than the lowest variation limit shown by the material from the higher biozones, rendering it probable that *Deinogalerix* increased in size during its evolution on Gargano, which was an island at that time.

It is very peculiar that to date not a single specimen of *Deinogalerix* has been recovered from fissure fillings assigned to the intermediate biozones. Consequently, when attempting to reconstruct an evolutionary lineage of *Deinogalerix*, one is faced with a considerable hiatus between the older and the younger occurrences.

All localities known so far have yielded specimens of another insectivore, one of normal size, and quite comparable to *Galerix*, though considerably smaller than *G. exilis* (M_1-M_3 measure about 6 mm). This form shows a P_4 with a degree of development about intermediate between *Galerix* and *Lantanotherium*. It appears that both *Deinogalerix* and the small galericine may well be descended from some unknown species of *Galerix* that one would expext to be smaller than *G. exilis*.

The statigraphic range of *Deinogalerix*, according to standards of vertebrate paleontology, is considered to be Upper Vallesian and Turolian; that is older than the Serravallian of marine stratigraphy (see Freudenthal, 1971).

Riassunto

Deinogalerix koenigswaldi nov. gen., nov. spec. (Mammalia, Insectivora, Erinaceidae), trovato in un riempimento de fessura miocenico in Gargano (prov. Foggia) e senza dubbio il insettivoro piú grande conosciuto. Le sue grande proporzione possono essere spiegato del fatto che Gargano era una isola, e che non c'era un scambiamento faunistico con il continento. Il materiale disponibile esiste di un scheletro quasi completo e tanti elementi staccati. Il scheletro probabilmente a appartenuto a une femmina non adulta. Ammettato e che il *Deinogalerix* era un mangiatore di cadavere.

References

Butler, P. M., 1948. On the evolution of the skull and teeth in the Erinaceidae, with special reference to fossil material in the British Museum. — Proc. Zool. Soc. London, 118: 446 - 500.

Freudenthal, M., 1971. Neogene vertebrates from the Gargano Peninsula, Italy. – Scripta Geol., 3: 1 - 10.

Thenius, E., 1949. Zur Revision der Insektivoren des steirischen Tertiärs. – Sitz. Ber. Akad. Wiss. Wien, Abt. 1, 158: 671 - 693, 5 figs.

Viret, J., 1940. Etude sur quelques Erinacéidés fossiles. Genres Plesiosorex, Lanthanotherium. – Trav. Lab. Géol. Lyon, 39 (28,2): 33 - 65, 20 figs., 1 pl.

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Explication of plates

All figures except plate 6 and 7 are at natural size. All figured material pertains to the holotype-skeleton of *Deinogalerix koenigswaldi,* loc. San Giovannino.

Plate 1
Skull, RGM 177 777, ventral view.
Mandibula sin., RGM 177 778, occlusal view.

Plate 2
Skull, RGM 177 777, dorsal view.
Mandibula sin., RGM 177 778, lingual view.

Plate 3
Skull, RGM 177 777, lateral view.
Mandibula dext., RGM 177 779, labial view.

Plate 4
1. Humerus sin., RGM 177 829, posterior view.
2. Humerus sin., RGM 177 829, anterior view.
3. Radius sin., RGM 177 831, posterior view.
4. Ulna sin., RGM 177 833, anterior view.

Plate 5
1. Skull, RGM 177 777, posterior view.
2. Femur sin., RGM 177 841, posterior view.
3. Tibia-fibula sin., RGM 177 845, posterior view.
4. Femur sin., RGM 177 841, anterior view.

Plate 6
1. Reconstruction of the holotype-skeleton
2. Detail from reconstructed skeleton.

Plate 7
Restoration of *Deinogalerix koenigswaldi,* drawn from the holotype-skeleton.

PLATE 1

PLATE 2

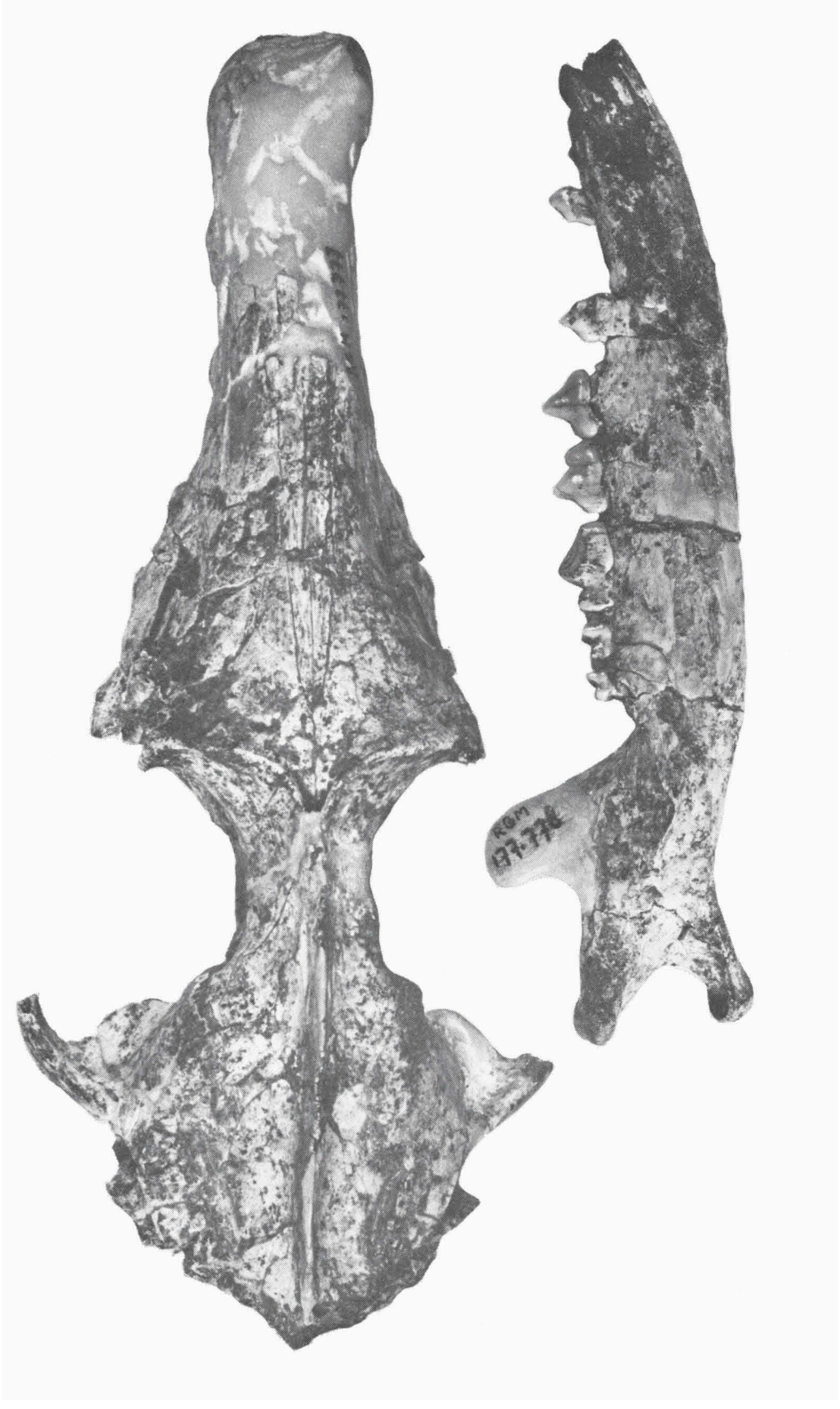
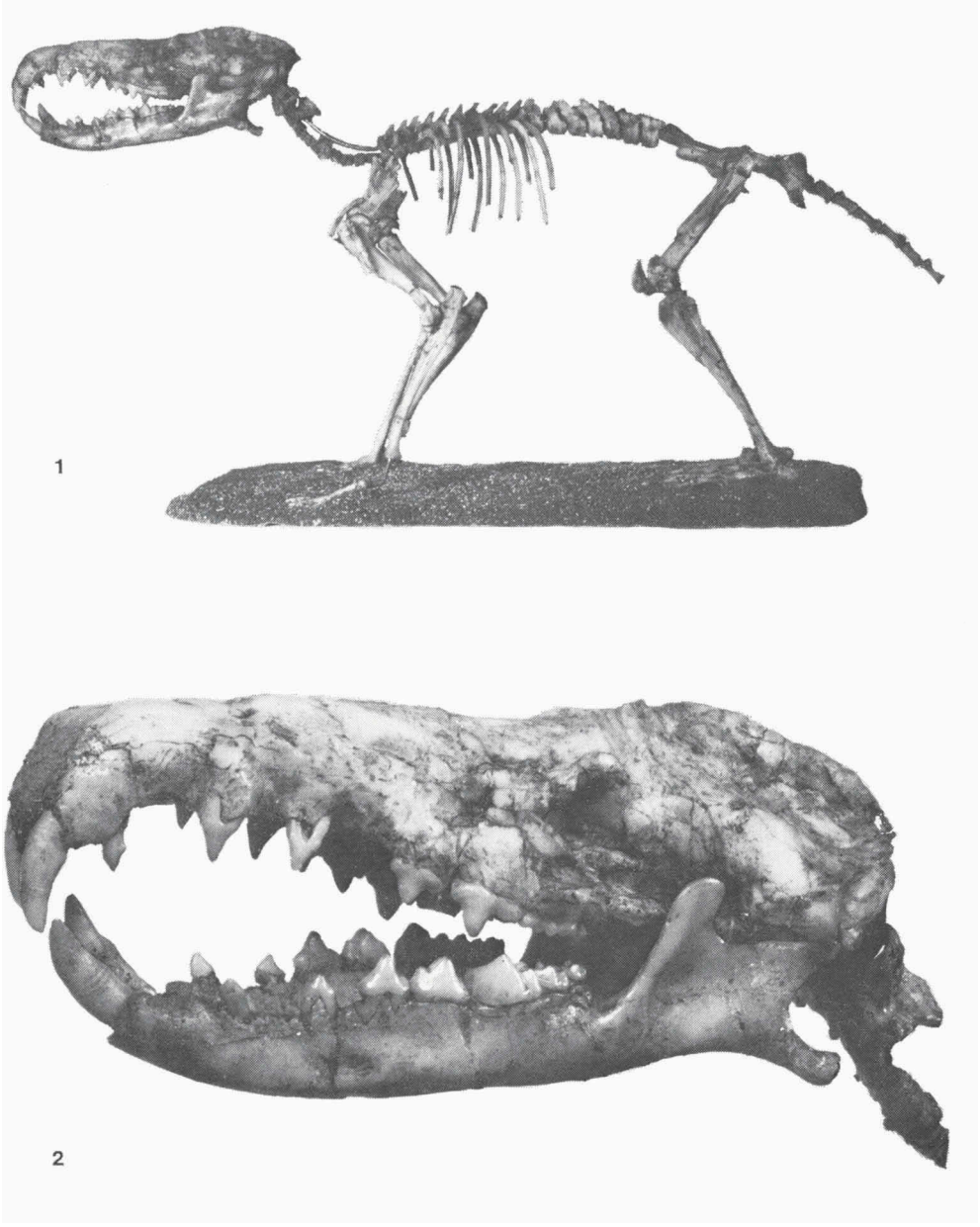


PLATE 3

PLATE 4

PLATE 5

PLATE 6



1

2

PLATE 7