The Biology of Lacertid lizards. Evolutionary and Ecological Perspectives (2004). Pérez-Mellado, V., Riera, N. and Perera, A. (eds.). Institut Menorquí d'Estudis. Recerca, 8: 63-82.

THE GERMAN CONTRIBUTIONS TO MEDITERRANEAN HERPETOLOGY WITH SPECIAL REFERENCE TO THE BALEARIC ISLANDS AND THEIR LACERTID LIZARDS

BÖHME, W.[1]

Abstract: As a consequence of the general popularity of classic Greek and Roman culture in 19th century Germany, a renewed interest arose also for the Mediterranean fauna. Along with the Darwinian influence on evolutionary biology in the second half of the 19th century, Mediterranean lizards, particularly lacertids, became favoured study objects. The lizards served as model organisms for the earliest steps of speciation (formation of "varieties" or "races") and shed light on adaptations to extreme, in particular insular, environments. Together with the contemporarily emerging concept of the geographical subspecies, the number of infraspecific taxa described and names erected grew considerably. I review the relevant work of the most important zoologists from the German-speaking zone who took part in the exploration of Mediterranean amphibians and reptiles. Many of them had a much wider scope, both systematically and geographically, but nevertheless contributed significantly to Mediterranean herpetology. I lay special emphasis on the study of Balearic Island lacertids through German-speaking authors.

Key words: German Herpetology, Mediterranean, lacertid lizards, Balearic Islands.

Resumen: La contribución germana a la Herpetología mediterránea, con especial referencia a las Islas Baleares y a sus lacértidos.- Como consecuencia de la popularidad de las culturas clásicas griega y romana, en el siglo XIX apareció también un renovado interés por la fauna mediterránea. Paralelamente a la influencia darwinista en la biología evolutiva durante la segunda mitad del siglo XIX, los lagartos mediterráneos, particularmente los lacértidos, se convirtieron en objetos favoritos de estudio. Así, los lagartos sirvieron como organismos modelo de los primeros pasos del proceso de especiación (la formación de "variedades" o "razas") y arrojaron luz sobre las adaptaciones a los medios extremos, particularmente en las islas. Al mismo tiempo que se desarrollaba el concepto emergente de subespecie geográfica, el número de taxones infraespecíficos descritos y de nombres asignados creció considerablemente. Reviso aquí el trabajo más relevante de los zoólogos de habla alemana que tomaron parte en la exploración de los reptiles y anfibios mediterráneos. Muchos de ellos tenían ámbitos de interés mucho más amplios, tanto desde el punto de vista sistemático, como del geográfico. De cualquier modo, contribuyeron de modo significativo a la Herpetología mediterránea. He puesto

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un especial énfasis en el estudio de los lacértidos de las Islas Baleares llevado a cabo por dichos autores.

Palabras clave: Herpetología alemana, Mediterráneo, lacértidos, Islas Baleares.

Resum: La contribució germànica a l' Herpetologia mediterrània, amb especial referència a les Illes Balears i als seus lacèrtids.- Com a conseqüència de la popularitat de les cultures clàssiques grega i romana, en el segle XIX aparegué també un renovat interès per la fauna mediterrània. Paral·lelament a la influència darwinista en la biologia evolutiva durant la segona meitat del segle XIX, els llangardaixos mediterranis, particularment els lacèrtids, es convertiren en objectes favorits d'estudi. Així, els llangardaixos van servir com organismes models de les primeres passes del procés d'especiació (la formació de "varietats" o "races") i van aportar llum sobre les adaptacions als medis extrems, particularment a les illes. Alhora que es desenvolupava el concepte emergent de subespècie geogràfica, el nombre de tàxons infraespecífics descrits i de noms assignats va créixer considerablement. Reviso aquí el treball més rellevant dels zoòlegs de parla alemanya que van prendre part en l'exploració dels rèptils i amfibis mediterranis. Molts d'ells tenien àmbits d'interès molt més amplis, tant des del punt de vista sistemàtic com del geogràfic. De qualsevol manera, van contribuir de mode significatiu a l'Herpetologia mediterrània. He posat un especial èmfasi en l'estudi dels lacèrtids de les Illes Balears dut a terme per aquests autors.

Paraules clau: Herpetologia alemanya, Mediterrània, lacèrtids, Illes Balears

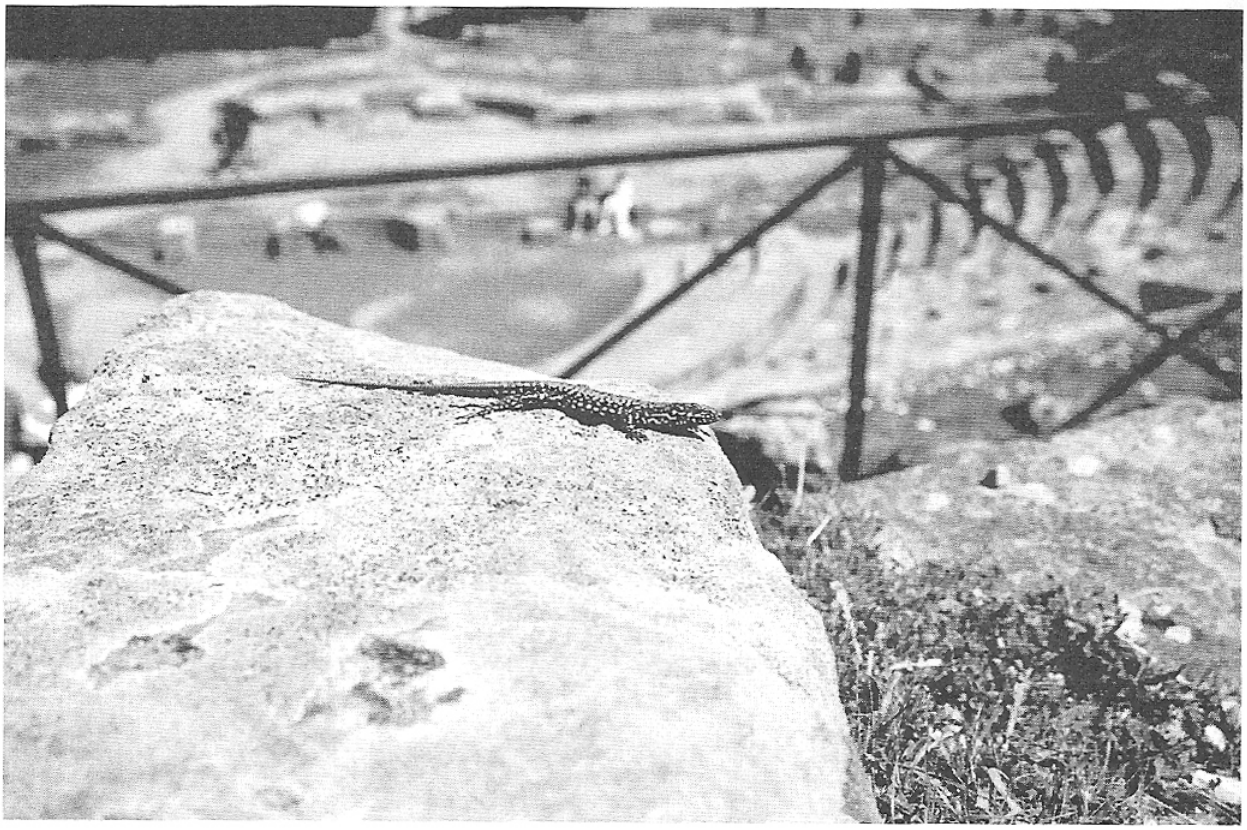


Figure 1. A male *Podarcis muralis brueggemanni* basking at the Roman amphitheater of Fiesole near Florence, Tuscany. Photo: W. BÖHME

INTRODUCTION

When the German philologist Johann Heinrich Voss (1751-1826) translated and recomposed the famous antique Greek poetical work "Odysseia" by Homer (published 1781) and the Latin "Metamorphoses" by P. Ovidius Naso (2 vols., published 1798), he opened his time a new window to the classic antiquity. What has this to do with zoology and in particular with herpetology? Through his work, Voss filled his contemporaries and the following generations in Germany with great enthusiasm for the classic Greek and Roman culture (which, by the way, had a much more positive relationship to reptiles than what we call today the Christian-occidental culture) resulting in an admiration and even glorification of everything related to the Greek and Roman Mediterranean antiquity. Interest in Mediterranean reptiles may have been stimulated by this 19th century spirit of the age, the more as just lizards are often closely connected to antique cultural sites (Figure 1).

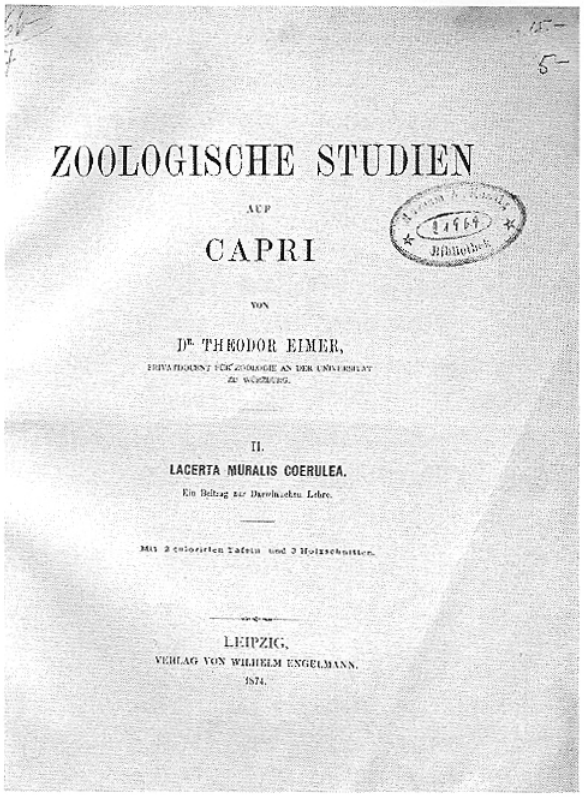
Apart from this rather indirect connection between Johann Heinrich Voss and (Mediterranean) herpetology, a second affiliation leads directly from him to a herpetologically important facet. Together with some friends, among them Heinrich Christian Boie (1744-1806), he founded an academic circle called "Göttinger Hain" (= Grove of Goettingen). Boie became later the father of two sons, Friedrich Boie (1789-1870) and Heinrich Boie (1794-1828), both subsequently most renowned in regard to SE Asian herpetology (BÖHME & BISCHOFF, 2001). A very good and important friend of the Boie family was also the famous Carsten Niebuhr (1733-1815, see SCHMIDT-TOLLGREVE, 2003), only survivor of the Danish expedition to Arabia and India, where he survived also his companion Peter Forskål, who was the author of e.g. *Uromastyx aegyptia* and *Chalcides ocellatus*. The latter species leads back to Mediterranean herpetology.

The interest in Mediterranean amphibians and reptiles focussed soon on the particularly rich and speciose fauna of lacertid lizards, especially on the wall lizards currently accomodated in the genus *Podarcis*. Due to their high intraspecific variability and the tendency to evolve distinct microinsular phenotypes on small islands and islets, they stimulated also much interest not only by herpetologists but also by general zoologists. This was a consequence of the influence of Darwin's theory on the biological thinking of that time: to consider species as dynamic, changing phenomena rather than stable, unchangeable units. Particularly the insular forms with their incredible variability among islands and islets, be it offshore islands or archipelagos, attracted the attention of more general zoologists who were primarily interested in the mechanisms of variability, speciation and evolution rather than in lizard taxonomy. In the following, I shall introduce the most important German-speaking representatives of Mediterranean herpetology and their work, relying largely upon the most recent biographical sources in the collective book by RIECK *et al.*, (2001).

The main works and key publications of these herpetologists are mentioned in the text and form also part in some illustrations, but are not included in the reference section where only secondary sources are included.

RESEARCH IN GENERAL MEDITERRANEAN HERPETOLOGY

One of the first German-speaking representatives dealing with Mediterranean lizards was Theodor Eimer (1843-1898), born in Switzerland, who studied medical and natural sciences from 1862 onwards in Tübingen, Freiburg (Breisgau), Heidelberg, and Berlin. He received his medical doctoral degree with Professor Virchow in Berlin, and worked subsequently with August Weismann (the famous founder of the "Keimbahn" theory) in Freiburg, and with Rudolf Albert von Koelliker in Würzburg (after whom the Moroccan glass lizard, *Ophisaurus koellikeri,* is named). In 1870, Theodor Eimer received his habilitation degree (the so-called "Privatdozent") in Würzburg, and in 1875, he became there a full professor of zoology. In 1874 he published his influential work "Zoologische Studien auf Capri. II. *Lacerta muralis coerulea.* Ein Beitrag zur Darwin'schen Lehre" (= Zoological studies on Capri. II. *Lacerta muralis coerulea*. A contribution to Darwinian theory-Verl. W. Engelmann, Leipzig, see Figure 2). Another work on lizards followed 1881: "Über das Variieren der Mauereidechse" (= On the variation in the wall lizard). However,


ZOOLOGISCHE STUDIEN

AUF

CAPRI

VON

Dr. THEODOR EIMER,

II.

LACERTA MURALIS COERULEA.

Ein Beitrag zur Darwin'schen Lehre.

LEIPZIG,
VERLAG VON WILHELM ENGELMANN.
1874.

Figure 2. Title page of THEODOR EIMER's famous work on the blue Faraglione lizard, *Podarcis sicula coerulea.* Repro ZFMK

the theoretical meaning of Theodor Eimer decreased because he later assumed the heritability of acquired characters which is of course *not* a contribution to Darwin's theory but rather a viewpoint of Lamarckism (JAHN *et al.*, 1982). In any case, the blue lizard of the Faraglione rock near Capri discovered and described by him (Figure 3) is still among the most famous microinsular wall lizard forms in the Mediterranean region. The specimens collected by him including those on which he based the new name *Lacerta muralis coerulea,* i.e. the types, were deposited in the Zoological Institute of the University of Tübingen and shared some decades later the fate of numerous German university collections: Due to

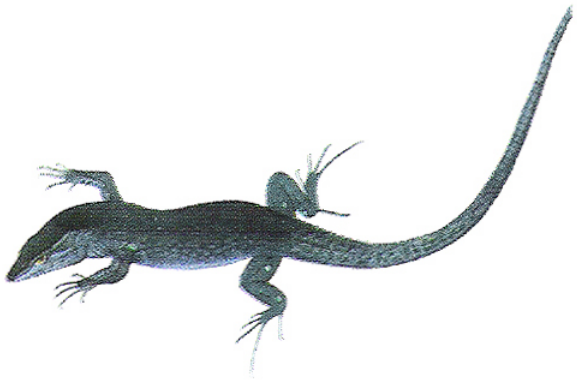


Figure 3. Colour plate from EIMER (1874) showing a male of his *P. s. coerulea.* Repro ZFMK

changing research interests of the responsible professors, the Tübingen zoological collection was, apart from some teaching material, simply thrown away in the 1950-ies, after having survived World War I and II (Mickoleit, in litt.)! Fortunately, Eimer was in contact with colleagues elsewhere, for example with Adolph Arnold Berthold (1803-1861) who built up an important herpetological collection at the Zoological Museum of the University of Göttingen (and who described - among else - *Lacerta hieroglyphica,* the Istanbul isolate of *Podarcis sicula*). To this collection, Eimer donated 2 Faraglione syntypes, which survived time until they were –again after some severe danger of being lost– transferred to the Museum Koenig in Bonn where they are now kept safe for the generations to come (BÖHME & BISCHOFF, 1984; Figure 4).

Another important name is Jacques von Bedriaga (1854-1906, Figure 5), a German of Russian origin who was born in Russia but did most of his university studies in Germany and published nearly exclusively in German. After having started at Moscow University in 1872, he soon moved to Jena and became

Figure 4. The two surviving syntypes of *P. sicula coerulea* EIMER, 1874, now ZFMK 21232-232. Photo: W. BÖHME

PhD student of the famous Professor Ernst Haeckel. Subsequently he moved to Heidelberg and did anatomical work with Professor Gegenbaur. His publication activity started in 1874. Two years later, he published a somewhat polemic article on "Die Faraglione-Eidechse und die Entstehung der Farben bei den Eidechsen" (= The Faraglione lizard and the origin of colouration in lizards –Verl. Engelmann, Leipzig) where he began a discussion on the evolution of insular melanism in Mediterranean lizards, a topic that was discussed in numerous contradictory contributions by subsequent authors (see below).

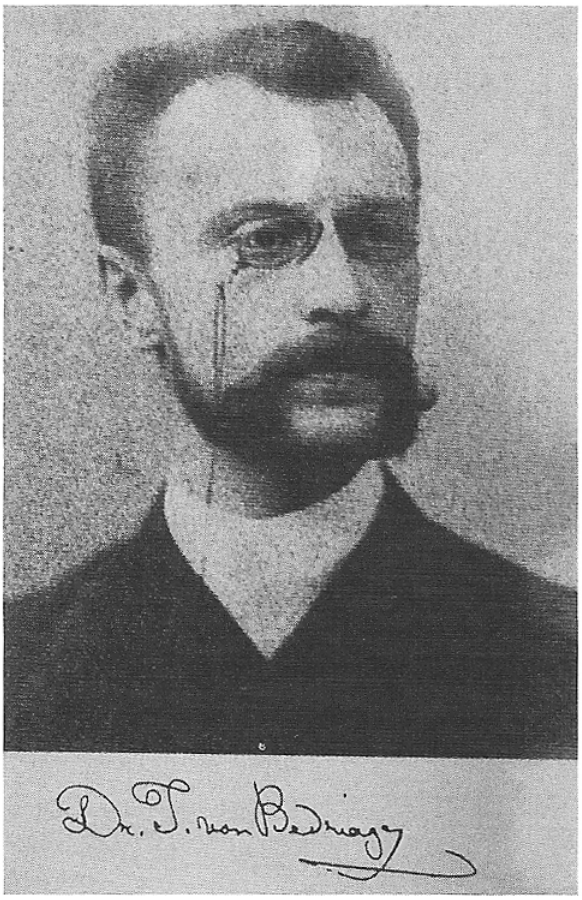


Figure 5. JACQUES VON BEDRIAGA. Repro ZFMK

His first main work was "Die Amphibien und Reptilien Griechenlands" (1881: = The amphibians and reptiles of Greece-Bull. Soc. Imp. Nat. Moscou 56) which was the first monographic treatment of the fauna of this country. In 1883, his "Beiträge zur Kenntnis der Amphibien und Reptilien von Corsica" (= Contributions to the knowledge of the amphibians and reptiles of Corsica – Arch. Naturgesch., Berlin, 49) followed. With his monumental work "Beiträge zur Kenntnis der Lacerti-denfamilie (*Lacerta, Algiroides, Tropidosaura, Zerzumia* und *Bettaia*)" (1886: = Contributions to the knowledge of the family Lacertidae – Abh. senck. naturf. Ges., Frankfurt/M., 14) he became the first significant author on the biodiversity of lacertid lizards inclu-ding those of the Mediterranean region. Von Bedriaga wrote several other outstanding works: From 1889 to 1897 he published a five-part treatment of the amphibian fauna of Europe ("Die Lurchfauna Europas"), and from 1898 onwards, his treatment of the amphibians and reptiles acquired by the Central Asia expediton of N. M. Przewalski started to appear. A. Nikolskij provided a Russian translation, so that the work could appear bilingually in four parts, under the title "Wissenschaftliche Ergebnisse der von N. M. Przewalski nach Central-Asien unternommenen Reisen" (= Scientific results of the travels to Central Asia carried out by N. M. Przewalski). The last of these parts was published in 1912, i.e. six years after J. v. Bedriaga's death.

Because of some health problems, Bedriaga spent the last two decades of his life in Nizza to enjoy the mild Mediterranean climate and used the opportunity to visit several Mediterranean places and to collect amphibians and reptiles. Towards the end of his life he moved to Florence, where he died in 1906 following a lung disease. There are only few informations as to the fate of the material collected by him (see BISCHOFF & BÖHME, 2001).

Apart from Franz Werner and Otto von Wettstein-Westersheimb, whose merits will be appreciated below, the most important German-speaking herpetologist was doubtlessly Robert Mertens (1894-1975, Figure 6), who had also an outstanding influence on Mediterranean herpetology. Born in St.

ROBERT MERTENS
zur Zeit seiner Berufung zum Direktor des Senckenberg-Museums (1946).

Figure 6. ROBERT MERTENS. Repro ZFMK

Petersburg, Russia, he received his doctoral degree in 1915 at the University of Leipzig with a dissertation entitled "Untersuchungen über die Variabilität der italienischen Mauerei-dechsen (*Lacerta muralis* Laur. und *Lacerta sicula* Raf.)" (= Investigations on the variability of the Italian wall lizards). The work appeared as a book in 1916 under the title "Studien zur Systematik der Lacertiden" (= Studies on the systematics of the Lacertidae – Verl. R. Friedländer, Berlin). He was certainly the most prolific German herpetologist, and one of the most prolific herpetologists in the world. Among his 795 (!) scientific publications, many are dealing with the Mediterranean region, e.g. the series "Unterlagen zu einer Herpetofauna Tyrrhenica". His extensive and encyclopedic knowledge resulted in his habilitation thesis (published in 1935) "Inselreptilien, ihre Ausbreitung, Variation und Artbildung" (Insular reptiles, their dispersal, variation and speciation – Zoologica 84, Stuttgart). This work has a world-wide scope but is nevertheless still an important source for Mediterranean island herpetology.

In this context it is necessary to mention Mertens' cooperation with Gustav Kramer who worked at the famous Marine Biological Station at Naples, and who gave much ecological input in their joint works on Mediterranean lacertids. Kramer (who later became the academic supervisor of Federico Medem), had many important ideas on island ecology and biogeography, extinction models etc., so that he can actually be considered as a precursor of island biogeographers like MacArthur & Wilson. Kramer died much too early by a field accident.

Robert Mertens himself died 1975, at the age of 81 years, after a bite of the African deadly poisonous rear-fanged colubrid *Thelotornis kirtlandii* which he had kept at his home (BÖHME, 2001b).

An earlier representative of major importance in European herpetology had his primary geographical focus on Dalmatia and its numerous islands but extended his classic work finally to Europe as a whole. It was Egid Schreiber (1836-1913, Figure 7). Born in the Styrian capital Graz (Austria), he moved with his parents to Görz which lies today at the Italian/ Slovenian border being named Gorizia on the Italian, and Nova Gorica on the Slovenian side. Apart from his university studies in

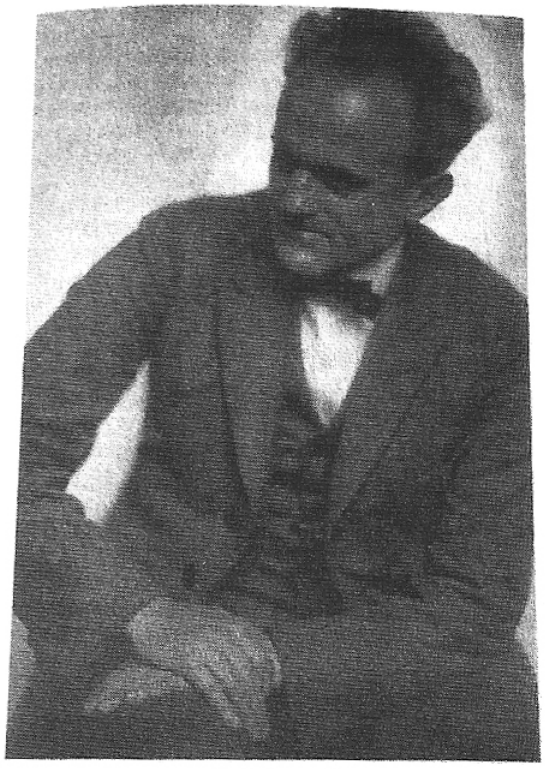
Egid Schreiber

Figure 7. EGID SCHREIBER. Repro ZFMK

Vienna and Salzburg, Schreiber spent his entire life at Görz, from where he undertook numerous excursions to the Dalmatian realm. His most important work is his "Herpetologia Europaea" which appeared first in 1875 (Verl. Viehweg, Braunschweig). The famous second edition from 1912 (Verl. G. Fischer, Jena) was a new book rather than just a second edition, where the author laid also particular emphasis on the biology of the species and where he summarized the knowledge of his time. This work remained the most important bibliographic source for European herpetology for many decades (BISCHOFF, 2001a).

Also a Dalmatinian focus, particularly on island herpetology, was laid by Paul Kammerer (1880-1926, Figure 8). In a basic work he dealt with the problem of speciation processes on islands: "Der Artenwandel auf Inseln und seine Ursachen, ermittelt durch Vergleich und Versuch an den Eidechsen der dalmatinischen Eilande" (= The change of species and its causes, investigated by comparison and experiments on the lizards of Dalmatian islands – Verl. Deuticke, Vienna). This work has an addendum by Otto Wettstein von Westersheimb (see below).

Paul Kammerer was certainly the most excentric person in the European zoological scene of Europe in his time.



Paul Kammerer

Figure 8. PAUL KAMMERER. Repro ZFMK

After his studies at Vienna University he became a private assistent at the "Biologische Versuchsanstalt" of Prof. Przibram in Vienna. Particularly in the presence of younger women, he displayed some strange habits (e.g. kissing live toads, eating mealworms etc.) which added to his fame as an excentric person. Among the women he tried to court was also Alma Mahler, widow of the world-famous composer Gustav Mahler.

Scientifically, he belonged to the vanishing group of biologists believing in Lamarckism and he carried out several experiments, mostly with salamanders and midwife toads *(Alytes),* to find proofs: in the latter nuptial pads to be developed by males which were forced to breed in water. The case of *Alytes,* finally, brought a tragic turning-point in his life. One of his voucher specimens was reinvestigated by the great American herpetologist G.K. Noble who found injections of ink instead of a nuptial pad wherefore Kammerer was suspected of having faked his experimental results. It is not sure whether from this reason alone he committed suicide (SCHUSTER, 1997).

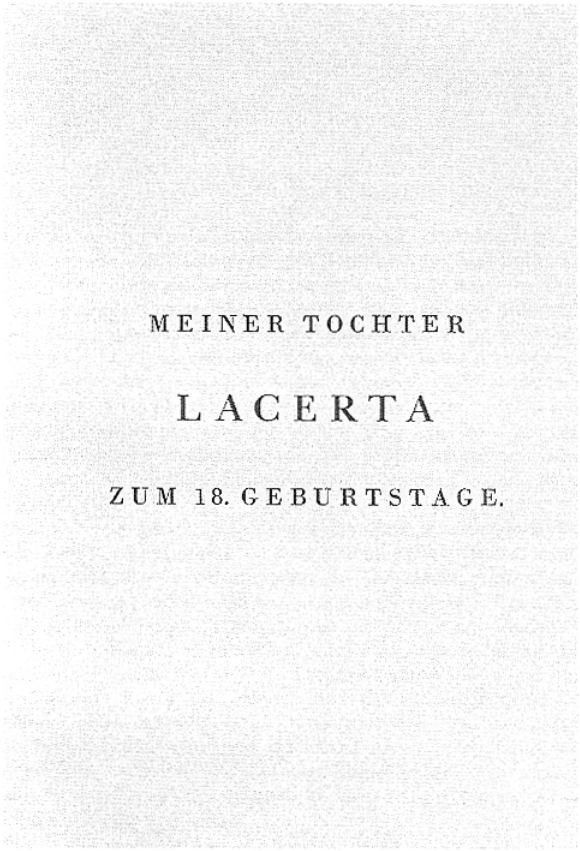
In any case, Paul Kammerer's book "Der Artenwandel auf Inseln" is still an important reference for Mediterranean herpetology and still useful despite the lamarckistic viewpoints of this author. His emotional connexion with the Mediterranean region and particularly with its lacertid lizards can be seen from the –again excentric– fact that he named his daughter, his sole child, Lacerta (Figure 9)! Kammerer dedicated his book "Der Artenwandel auf Inseln"

Figure 9. LACERTA KAMMERER, daughter of PAUL KAMMERER. Repro ZFMK

to her at the occasion of her eighteenth birthday (Figure 10).

The annexe of this book, written by Otto Wettstein von Westersheimb (1892-1967, Figure 11), deals with taxonomic questions and contains 8 beautiful colour plates (Figure 12 gives an example) which were mostly done by the painter-artist and herpetologist Lorenz Müller, who himself contributed also considerably to Mediterranean herpetology (see below).

Wettstein's own work on Mediterranean herpetology concentrated on the Aegean region and resulted in the monumental monograph "Herpetologia Aegaea" (1953 – S.-ber. Österr. Akad. Wiss., math.-Naturw. Kl.,


MEINER TOCHTER

LACERTA

ZUM 18. GEBURTSTAGE.

Figure 10. Dedication of PAUL KAMMERER's book "Der Artenwandel auf Inseln" to his daughter Lacerta at the occasion of her 18th birthday. Repro ZFMK

Figure 11. OTTO WETTSTEIN VON WESTERSHEIMB. Repro ZFMK

162); additions to this work ("Nachträge zu meiner 'Herpetologia aegaea'") were published in 1957. Wettstein, son of the famous botanist Richard Wettstein von Westersheimb, dealt, apart from amphibians and reptiles, also with birds and first of all with mammals, and was a universal vertebrate zoologist. Famous are his classic and exhaustive treatments of rhynchocephalian and crocodilian reptiles in the series "Handbuch der Zoologie" (1931/54: = Treatise of zoology – Verl. de Gruyter, Berlin).

At the Natural History Museum of Vienna, Wettstein became the successor of Friedrich Siebenrock as a curator of herpetology. His first obligation there was to incorporate and to catalogue the important Egid Schreiber collection (see above). In the next decades he developed the Viennea herpetological collection to one of the biggest in Europe (EISELT, 1967, BISCHOFF, 2001c).

The Aegean islands and mainland Greece had been studied before by another famous Viennese herpetologist, who was also one of Wettstein's university teachers: Franz Werner (1867-1939, Figure 13). Due to some personal animosities between him and the director of the Vienna Natural History Museum (NMW) of that time, Franz Steindachner, Werner distributed his material over a variety of European collections so that only a minor part

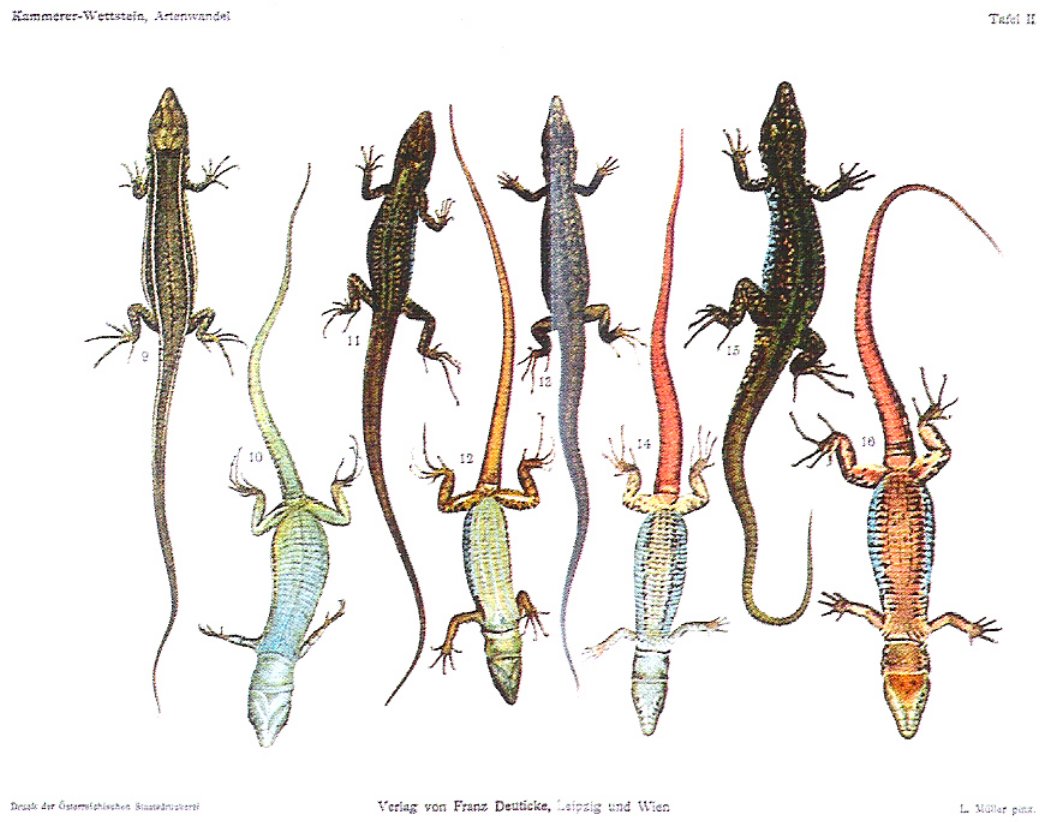


Figure 12. Colour plate II of PAUL KAMMERER's book (with an appendix by O. WETTSTEIN VON WESTERSHEIMB) painted by LORENZ MÜLLER and showing *Podarcis melisellenesis* from south Dalmatian islands. 9 & 10: juvenile (enlarged) from Busi Id., 11 & 12: male from Busi Id. (*lissana*), 13 & 14: male from Veli Vlasnik, 15 & 16: male from Vela Sestrica. Repro ZFMK

reached the NMW after his death (see BISCHOFF, 2001b). Werner worked world-wide and was a very prolific all-round herpetologist who felt also responsible for popularizing scientific herpetology for a more general readership. His work consisted of more than 500 titles and contained also significant contributions on orthopterans and scorpions. His first major work on Mediterranean herpetology was his rather early monograph "Die Reptilien und Amphibien Österreich-Ungarns und der Occupationsländer" (1897: = The reptiles and amphibians of Austria-Hungary and the occupied

Figure 13. FRANZ WERNER. Repro ZFMK

countries – Verl. Pichler, Vienna) the Mediterranean relevance of which is of course due to the latter areas. The second monumental work on Mediterranean herpetology appeared one year before his death: "Die Amphibien und Reptilien Griechenlands" (1938: The reptiles and amphibians of Greece – Verl. Schweizerbarth, Stuttgart), which is still today a major reference for Greek herpetology. Lacertid lizards and their taxonomy play a significant role in this work, and also Werner used the fine paintings of Lorenz Müller to illustrate this book (Figure 14).

HERPETOLOGISTS OF PARTICULAR IMPORTANCE FOR THE BALEARIC ISLANDS

Although also Lorenz Müller (1868-1953, Figure 15) was an all-round herpetologist working with amphibians and reptiles from all continents, he was particularly important for the herpetology of Europe. This was due to the close connection to Robert Mertens who regarded him as his teacher, and who closely cooperated with him, e.g. by compiling the first two checklists of the amphibians and reptiles of Europe (1928: Abh. senck. naturf. Ges. 41;

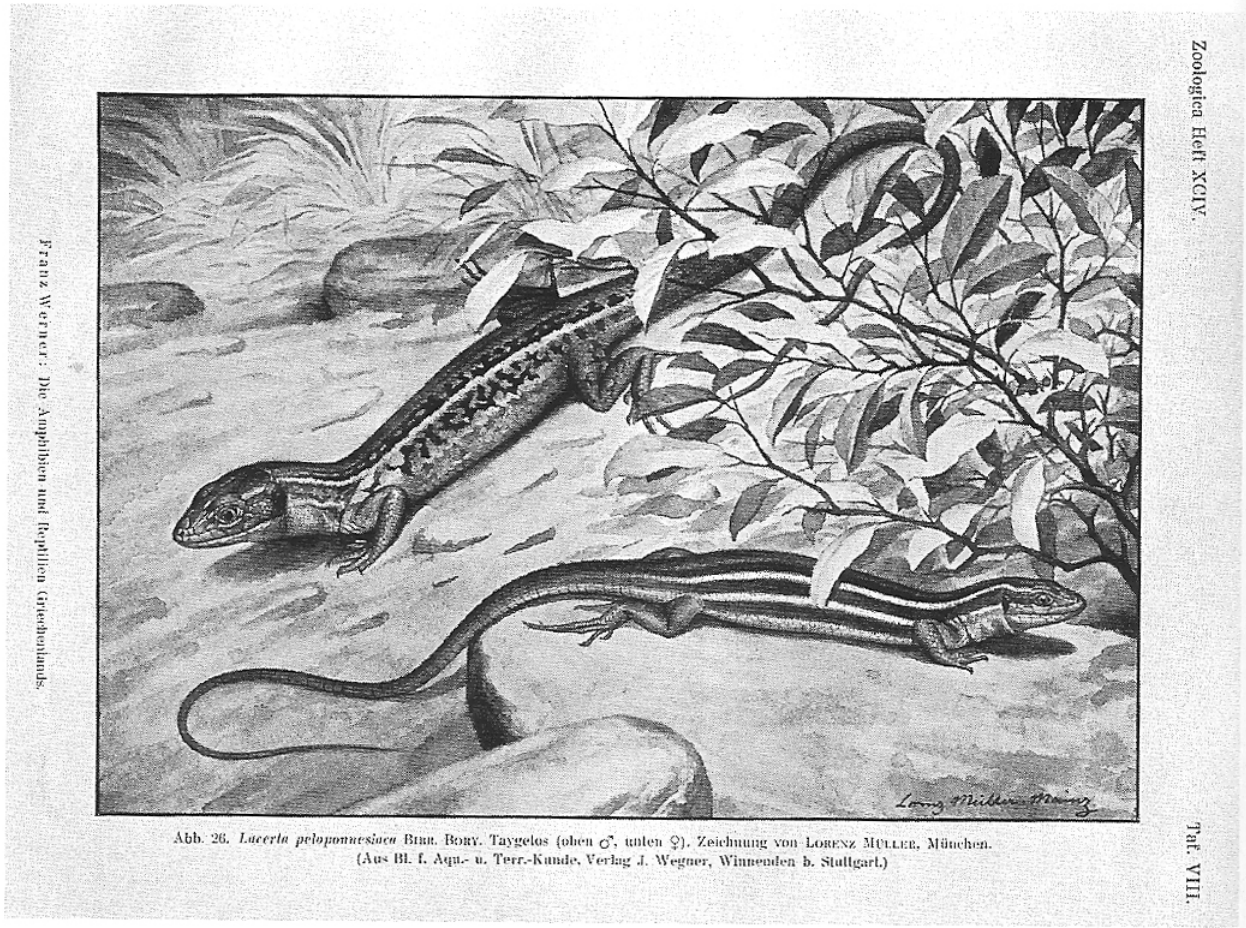


Figure 14. Couple of *Podarcis peloponnesiaca*, as illustrated in FRANZ WERNER's book "Die Amphibien und Reptilien Griechenlands"; painting by LORENZ MÜLLER. Repro ZFMK

1940: Abh. senck. naturf. Ges. 451, Frankfurt/M.).

Born in Mainz, Lorenz Müller first studied Fine Arts in Munich, Paris and Antverp, and became a painter-artist in Munich. With herpetology, he started autodidactically, and extended his interests soon to paleontology and biogeography. Due to his self-acquired qualifications he was employed at the Zoological State Collection in Munich (ZSM) and increased the herpetological holdings considerably. Because he invested also much emotional relationship in the Munich collection, it was very hard for him to see that huge parts of this collection were destroyed by allied bombs towards the end of World War II.

A major subject among his first herpetological activities were the lizards of the Balearic Islands. He deposited a rather rich material in the ZSM and described several insular forms of *Podarcis lilfordi* and *P. pityusensis* as new (also of this material including types, war-related destructions were to be lamented). In this time, he became involved in a kind of competition with another zoologist, who worked at the Berlin Museum (ZMB), viz.

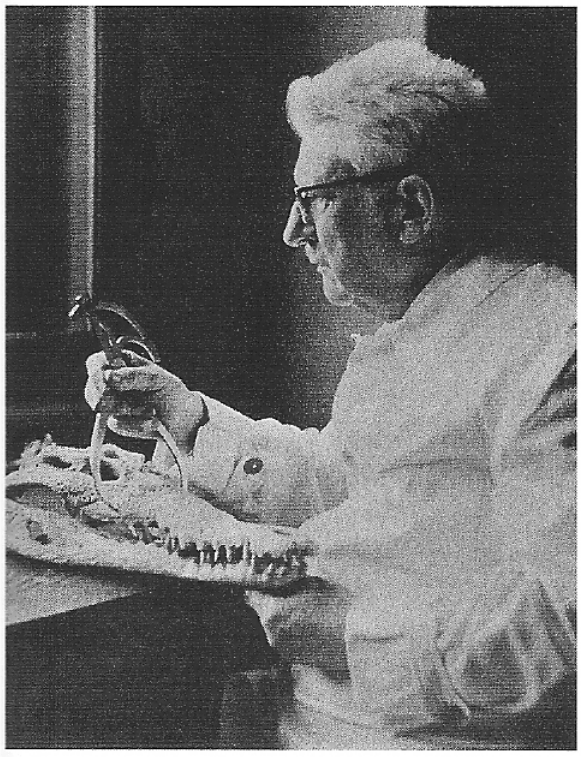


Figure 15. LORENZ MÜLLER. Repro ZFMK

Martin Eisentraut (1902-1994, Figure 16) who in the late 20-ies also had tried to bind names on distinctive insular lizard populations. He admitted 50 years later freely to me –with a smile on his face– that he had also tried to outcompete Lorenz Müller as to the priority of the publication date. That is why several of his early descriptions appeared in amateur magazines such as "Wochenschrift für Aquarien- und Terrarienkunde" which was a weekly magazin (the standards of which in terms of scientific articles, however, were considerably higher than those of similar current products in Germany).

Eisentraut was, however, also important for the zoology of the Balearic Islands in general, because he collected also rich materials of insects (Hymenoptera, Diptera, Lepidoptera, Rhynchota, Siphonaptera), arachnids (spiders and ticks) and molluscs (gastropods) on the archipelago. All this material entered ZMB where he was scientific assistant at that time, in September 1928 and was subsequently studied by the responsible curators and professors Arndt, Bischoff, Enderlein, Hering, Hesse, Ramme and Rensch from the Berlin University and Museum. Detailed lists of these materials are still available and may be of

Figure 16. MARTIN EISENTRAUT. Repro ZFMK

some interest for current autochthonous researchers. Interestingly, no detailed list exists in ZMB for Eisentraut's lizard collections of these years, likely because he did not collect them for other colleagues but for himself. But the type material at least is still completely in existence and publicly documented by BAUER & GÜNTHER (1995).

Eisentraut's biography (see BÖHME, 1994, 2001a, BÖHME & HUTTERER, 1999) took him away from the Balearics in a very direct manner. When he was just working on Ibiza, he received an invitation to immediately take part in a Gran Chaco expedition which was carried out in 1930. He studied mainly the Chacoan mammal and bird fauna, but published also on frogs. Among else, he met the problem of insular melanism also in the New World, viz. in the teiid genus *Cnemidophorus*. Another expedition brought him to Cameroon in 1938, which remained his focal point of interest for many decades of his scientific life. He was impressed by "mainland islands" in Cameroon, i.e. isolated mountain forest patches in savanna-like environments harbouring endemics to a similar extent as it is the case with islands surrounded by sea. This interest in island biology goes certainly back to his scientific roots which were in fact Balearic. After World War II he published his important monograph "Die Eidechsen der spanischen Mittelmeerinseln und ihre Rassenaufspaltung im Lichte der Evolution" (= The lacertid lizards of the Spanish Mediterranean islands and their raciation in the light of evolution - Mitt. Zool. Mus. Berlin 26) in 1949. In this monograph he summarized all his experience with these lizards and tried to address also problems of general zoological importance. By doing this, he did not persist in a purely descriptive approach as did some of his predecessors (or competitors) but he tried to analyse and explain the phenomena he described. This approach had led him already earlier (in the 1920-ies) to carry out some translocation experiments with Balearic lacertids, which turned out to be interesting even decades later (see e.g. BÖHME & EISENTRAUT, 1981, ZAWADZKI & KRONIGER, 2002 and MAYOL, this volume).

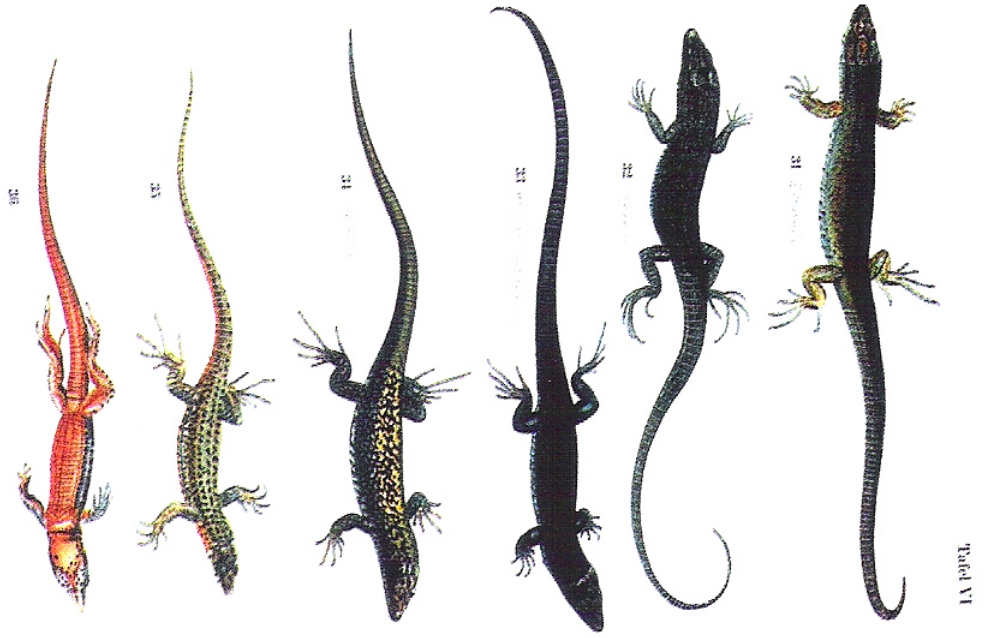


Figure 17. Colour plate from M. EISENTRAUT's book "Die Eidechsen der spanischen Mittelmeerinseln und ihre Rassenaufspaltung im Lichte der Evolution". 31: *Podarcis pityusensis zenonis,* 32: *P. p. gorrae,* 33: *P. p. maluquerorum,* 34: *P. p. vedrae,* 35 & 36: *P. atrata columbretensis.* Repro ZFMK

In regard of the high between-insular variability which was documented also in his 1949 monograph in nice colour plates (see e.g. Figure 17), Eisentraut asked for the causality of this variation, particularly of the origin and possible selective advantages of insular melanism. Among else, he even did a histological approach and tried also to correlate the colour pattern with data on the nutrition of these animals (i.e. insectivorous *versus* herbivorous). He argued that the dietary shift could also have affected the colour pattern by depositing different metabolic end products in the skin. Eisentraut's opinion on island melanism as a selectively more or less neutral consequence of a physiological (dietary) shift was heavily contradicted by the geneticist Max Hartmann (1876-1962, Figure 18), at that time professor at the

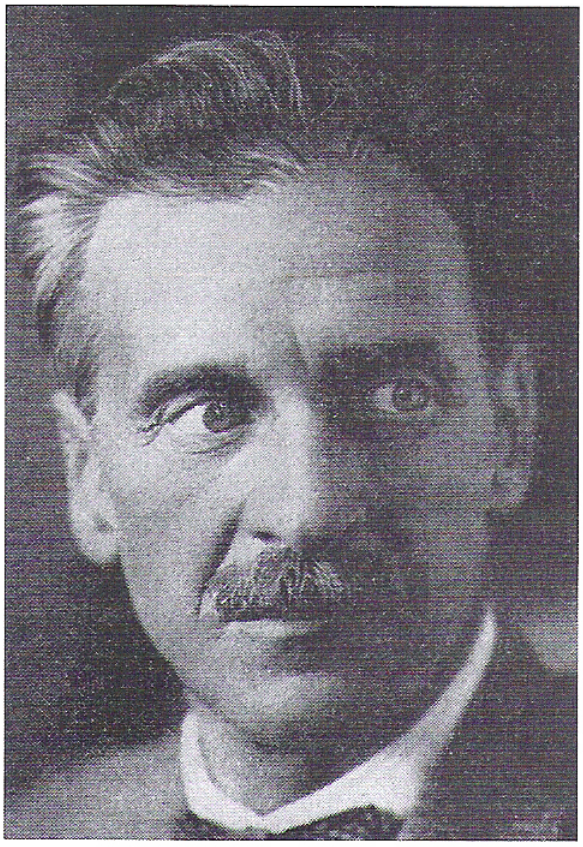


Figure 18. MAX HARTMANN. Repro ZFMK

University of Tübingen. In his paper "Die Rassenaufspaltung der Balearischen Inseleidechsen" (1953: The raciation of the Balearic insular lacertids – Zool. Jb. allg. Zool. Physiol. 64, Jena) he argued that island melanism would be due to founder individuals representing already this character as part of the gene pool of their ancestral population. He used this opportunity of dealing with Balearic lacertids also for describing two new microinsular taxa (*P. p. toronis* and *P. p. isletasi*), but he generally stimulated an intensive discussion on island melanism as such in which also Gustav Kramer and Robert Mertens took part. The latter summarized the discussion in a general article in 1963: "Wie entstand das dunkle Farbkleid der Inseleidechsen?" (= How did the dark colour pattern of insular lizard originate? – Umschau Wiss. Techn. 1963, no. 6), where more original references can be found.

The last German herpetologist who has to be mentioned in the context of Balearic herpetology is Karl F. Buchholz (1911-1967, Figure 19) who was curator of herpetology at the Museum A. Koenig (ZFMK) in Bonn (and thus my first predecessor). He had entered ZFMK in 1949 as a volunteer and specialist for dragonfly biology, but was employed as the first curator of a newly created herpetology department in 1951. He increased the rather small collection that was present before his employment by collecting trips to Spain, Greece, and particularly the Aegean Islands. Especially in the latter, he collected extremely large series per island or islet where he used a dust-shot pistol,

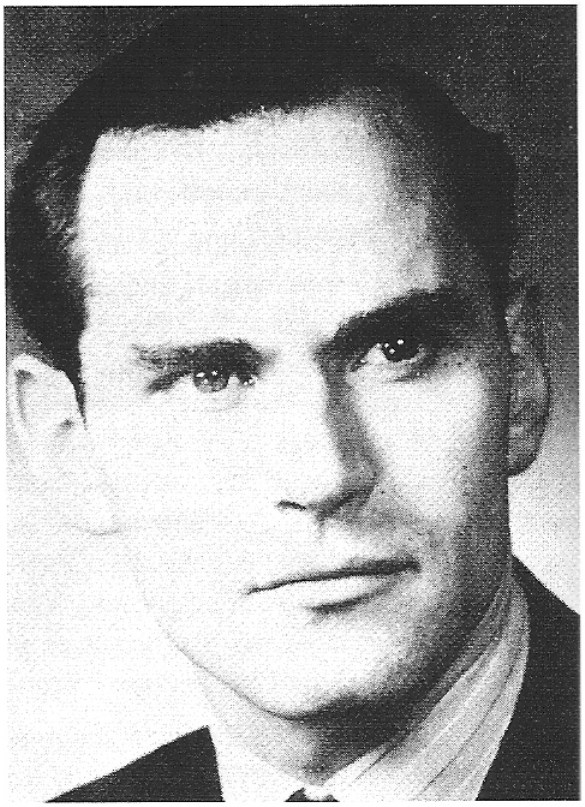


Figure 19. KARL F. BUCHHOLZ. ZFMK archives

a method employed by him even to shoot anisopteran dragonflies during flight! The damage of specimens was relatively low and they were still useful for study. Among his major discoveries was the Aegean snake *Hierophis gyarosensis* which is obviously endemic to Gyaros Island. He died before his description (planned as a subspecies of *H. jugularis)* was completed, so that it was Robert Mertens who described Buchholz's material (by the way, as a subspecies of *H. gemonensis).* SCHÄTTI (1980) transferred it from *Coluber* to *Hierophis* and gave it full species status. To my knowledge, it has never been collected again which makes it the rarest and most endangered snake species in Europe.

Buchholz started his herpetological work with Spanish reptiles. A remarkable taxon described by him was the grey jewelled lizard from southeastern Spain, *Lacerta lepida nevadensis* (currently *Timon l. nevadensis,* Figure 20). From the Balearic Islands which he never visited himself, Buchholz had a rather rich material of lacertids at his disposal in the ZFMK collection which had been acquired before from 2 amateur (commercial?) collectors, named Walter Jokisch and Herrmann Grün. The latter was resident in Spain (Salamanca) and delivered specimens with good locality data to various museums in Germany, next to the ZFMK (and other museums?) also to ZSM: Lorenz Müller named a subspecies of *P. lilfordi (P. l. grueni)* after him already in 1928; I was unable to find biographical data about Herrmann Grün, but had some correspondance with him when I was still a student. With his and Jokisch's material, Buchholz contributed to the taxonomy of Balearic lacertids by describing 8 new microinsular subspecies of *Podarcis pityusensis* (1954).

Figure 20. Adult male of *Timon lepidus nevadensi* BUCHHOLZ. Phot. W. BÖHME

CONCLUSION

Most of the German-speaking authors who have contributed to Mediterranean herpetology provided basically taxonomic, faunistic and zoogeographical information. I shall exemplify the taxonomic input by means of the two dominating Balearic lacertids. In *P. lilfordi,* 15 nominal or available (i.e. regardless their validity) taxa have been described by German authors, 7 by Spanish authors and one (*lilfordi* itself) by an emigrated German (Albert Günther). In *P. pityusensis,* 40 available names have been erected by German authors, and 3 by Spanish authors (among them *P. pityusensis* itself, by Boscá). Figure 21 provides an overview of the situation for both species, together with *Podarcis atrata* from the Columbrete Islands, covering the period from 1874 to 1980.

Questions of biological, ecological or evolutionary importance were only exceptionally addressed. As outlined above, the following researchers were among these exceptions: Theodor Eimer, Egid Schreiber, Paul Kammerer, Robert Mertens, Max Hartmann and Martin Eisentraut.

But the role of lacertids –and other herps– as part of their often most vulnerable and endangered Mediterranean ecosystems has subsequently been studied with much success by autochthonous researchers and working groups from Portugal, Spain, France, Italy, Slovenia, Croatia, Serbia and Greece, not to forget the recent Turkish

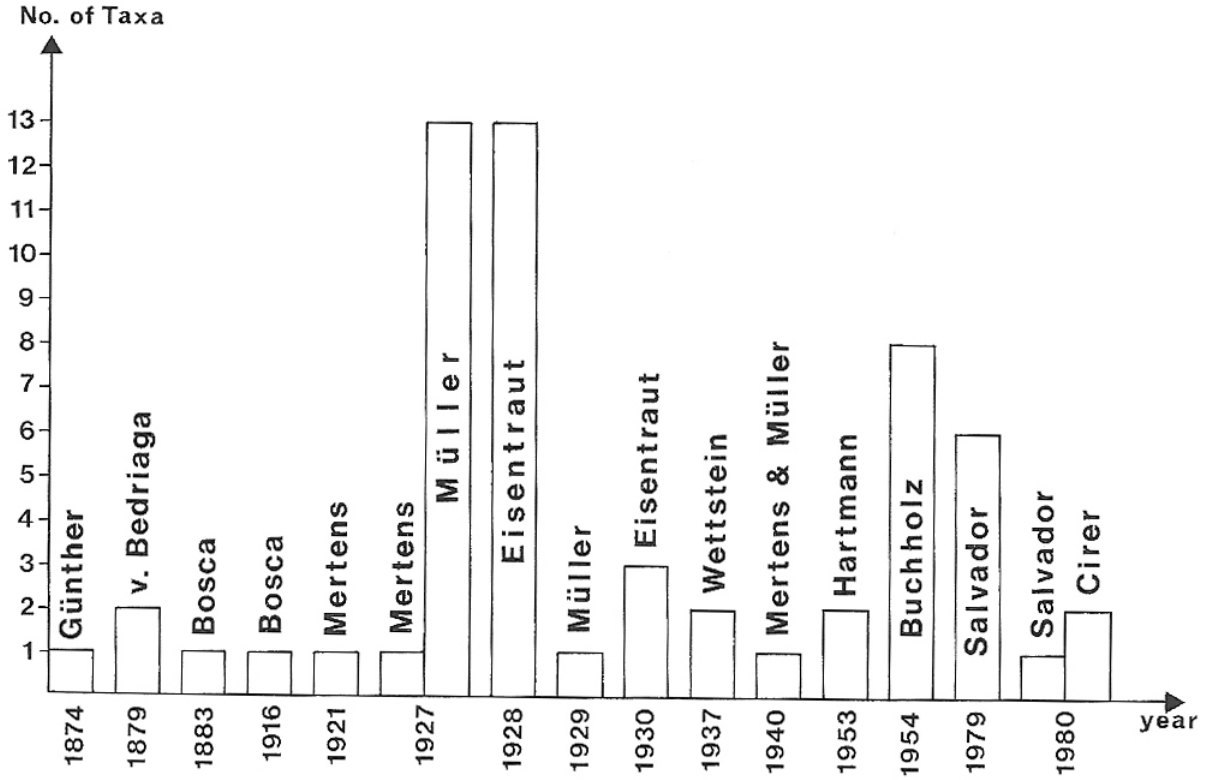


Figure 21. Authors of Balearic lacertid lizard names *(P. atrata, P. lilfordi, P. pityusensis)* and number of taxa described by them per year, between 1874 and 1980

contributions to Mediterranean herpetology. Some of them were even able to use the rich preserved taxonomic voucher material which had been assembled by the former German herpetologists, for the acquisition of ecological (dietary, reproductive) data, by examining gonads and stomach contents –a kind of synthesis between taxonomy and ecology happening in a museum collection.

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REFERENCES

BAUER, A.M. & GÜNTHER, R. (1995): An annotated type catalogue of the lacertids (Reptilia: Lacertidae) in the Zoological Museum, Berlin. *Mitt. zool. Mus. Berlin*, 71 (1): 37-62.

BISCHOFF, W. (2001a): Biographien deutschsprachiger Herpetologen und Terrarienkundler LXXXVI. Egid

Schreiber (1836-1913), *in*: Rieck, W., Hallmann, G. & W. Bischoff (eds.): Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum. *Mertensiella* 12: 586-589.

— (2001b): Biographien deutschsprachiger Herpetologen und Terrarienkundler CVII. Franz Werner (1867-1939), *in*: Rieck, W., Hallmann, G. & W. Bischoff (eds.) : Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum. *Mertensiella* 12: 640-643.

— (2001c): Biographien deutschsprachiger Herpetologen und Terrarienkundler CVIII. Otto von Wettstein-Westersheimb (1892-1967), *in*: Rieck, W. Hallmann, G. & W. Bischoff (eds.): Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum. *Mertensiella* 12: 644-646.

BISCHOFF, W. & BÖHME, W. (2001): Biographien deutschsprachiger Herpetologen und Terrarienkundler IV. Jacques von Bedriaga (1854-1906), *in*: Rieck, W., Hallmann, G. & W. Bischoff (eds.): Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum. *Mertensiella* 12: 418-421.

BÖHME, W. (1994): In memoriam Prof. Dr. Martin Eisentraut (1902-1994) – lacertidenkundliche Aspekte seines zoologischen Werkes. *Eidechse*, 5 (13): 1-3.

— (2001a): Biographien deutschsprachiger Herpetologen und Terrarienkundler XIV. Martin Eisentraut (1902-1994), *in*: Rieck, W., Hallmann, G. & W. Bischoff (eds.): Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum. *Mertensiella* 12: 440-442.

— (2001b): Biographien deutschsprachiger Herpetologen und Terrarienkundler LVII. Robert Mertens (1894-1975), *in*: Rieck, W., Hallmann, G. & W. Bischoff (2001): Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum. *Mertensiella* 12: 525-530.

BÖHME, W. & BISCHOFF, W. (1984): Amphibien und Reptilien, *in*: Rheinwald, G. (ed.): Die Wirbeltiersammlungen des Museums Alexander Koenig. *Bonn. zool. Monogr.*, 19: 151-213.

— (2001): Biographien deutschsprachiger Herpetologen und Terrarrienkundler. VII. Friedrich Boie (1789-1870) und Heinrich Boie (1794-1827), *in*: Rieck, W., Hallmann, G. & W. Bischoff (eds.): *Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum. Mertensiella* 12: 430-432.

BÖHME, W. & EISENTRAUT, M. (1981): Vorläufiges Ergebnis eines unter natürlichen Bedingungen angesetzten Kreuzungsversuchs bei Pityusen-Eidechsen, *Podarcis pityusensis* (Boscà, 1883) (Reptilia: Lacertidae). *Bonn. zool. Beitr.*, 32 (1/2): 145-155.

BÖHME, W. & HUTTERER, R. (1999): Leben und Werk von Martin Eisentraut (1902-1904). *Bonn. zool. Beitr.*, 48 (3/4) 367-382.

EISELT, J. (1967): a.o. Universitätsprofessor Dr. phil. Otto Wettstein-Westersheimb †. *Ann. Naturhist. Mus. Wien*, 70: 1-18.

JAHN, I., LÖTHER, R. & SENGLAUB, K. (1982): *Geschichte der Biologie. Theorien, Methoden, Institutionen und Kurzbiographien*. Gustav Fischer-Verlag, Jena, 859 pp.

RIECK, W., HALLMANN, G. & BISCHOFF, W. (2001, eds.): Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum. *Mertensiella*, 12: 1-759.

SCHÄTTI, B. (1988): *Systematik und Evolution der Schlangengattung* Hierophis *Fitzinger*, 1843. PhD thesis, Zürich.

SCHMIDT-TOLLGREVE, U. (2003): "Mit Niebuhrn muß ich von Dir reden...". *Natur- u. Landesk.*, Kiel, 110 (3/4): 75-80.

SCHUSTER, G. (1997): Paul Kammerer, der Krötenküsse, *in*: Schuster, G, & P. Zöchbauer (eds.): *Haltestelle Puchberg am Schneeberg. Porträts berühmter Gäste und Gönner*. Published by the editors, Puchberg a.S., 245 pp.

ZAWADZKI, M. & KRONIGER, M. (2002): Eidechsenbeobachtungen auf Dado Grande: Ergänzende Bemerkungen zu einem unter natürlichen Bedingungen angesetzten Kreuzungsversuch bei Pityuseneidechsen *Podarcis pityusensis*. *Eidechse*, 13(2): 33-42.