

## ZOO VIEW

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### The Evolution of Keeping Captive Amphibians and Reptiles

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SEVERAL OF THE LADIES IN SOUTHPORT HAVE PURCHASED PETS AMONG THEM, AND IT MAY BE THAT NO SOUTHPORT LADY WILL CONSIDER HER ESTABLISHMENT PERFECT WITHOUT A BABY ALLIGATOR TO BASK ON THE HEARTH RUG, AND GO OUT ON A WALK ON THE PROMENADE WITH HER. WHEN THE PET DEFUNCTS, HE CAN BE STUFFED, GILT, AND PUT IN THE HAT FOR AN ORNAMENT, DON'T YOU KNOW?

—Frank Buckland in *Notes and Jottings from Animal Life* in 1882

#### Nature Encased in Glass

In 1688, the French produced polished plate glass in large sizes by casting and hand polishing. Over 45 years later in the United Kingdom, Robert Lucas Chance introduced improved cylinder sheet glass using a German process to produce finer quality and larger panes. “A better system of making sheet glass, from blown cylinders, was introduced into England in 1832 by Chance Brothers and Bontemps. Although the new method, already established in Germany and France, required five types of skilled workers, it was cheaper, produced bigger sheets, and was free from the blemish in the centre... But after only seven years Chance Brothers devised a process by which the sheets could be ground and polished like plate glass... The manufacture of plate glass was introduced into England from Northern France in 1773...” (Derry and Williams 1961:594–595). This glass was used to create the first Crystal Palace in London in 1851. The process was used extensively until early in the 20<sup>th</sup> Century to make window glass. From this period onwards machines were developed to automate the production of window glass.

There is no question but that the availability of inexpensive window glass was one of the main factors for the rise of fern cases, aquaria, terraria, and vivaria in Europe. Fanciers interested in the behavior and biology of fishes, tadpoles, and newts were now able to look closely at them in an aquarium rather than peering into a pond or small bottle to catch a fleeting glimpse.

In 1829, Nathaniel Bagshaw Ward discovered that two seedlings, a grass and a fern, had *accidentally* sprouted in a closed glass bottle, containing a layer of damp soil he was using to pupate a sphinx moth chrysalis. He experimented with other closed glass containers and found that he could keep a number of ferns successfully. Glass was expensive as it was subject to a heavy excise tax (to pay for the Napoleonic wars) until 1845. After the tax was repealed, glass was affordable so Ward’s “Closely Glazed Cases” were available widely and his invention reached its full potential. Wardian Fern Cases became the rage and virtually every wealthy Victorian lady’s drawing room had fern-growing cases. Shirley Hibberd (1856) loved ferns: “Plumy emerald green pets glistening with health and beadings of warm dew.” Pteridomania, the craze for ferns, was fueled by books such as *The Ferns of Great Britain* by Anne Pratt in 1855, *Hardy Ferns: How*

*I Collected and Cultivated Them* by Nona Bellairs in 1865, and even as late as 1905 with George Schneider’s work called *Choice Ferns for Amateurs: Their Culture and Management in the Open and Under Glass*. Well-dressed Victorian women often collected wild plants and animals for their enclosures, as seen in the picture “Gathering Ferns” from *London Illustrated News* in 1871. The picture is by William Kay Blacklock and is available on

the web at <http://goldenagepaintings.blogspot.com/2009/02/william-kay-blacklock-gathering-ferns.html>. Orchids and other tropical plants were kept in fern-cases as well.

By the mid-1800s, the drawing rooms of the wealthy were often filled with a myriad of glass containers, large and small, housing plants and animals. All of these items were sometimes advertised in natural history books available during this time. One of the curious facts is that fern and aquarium crazes were almost always feminine interests during the Victorian era. “But the role of women as encouragers of natural history must not be underrated. It is unlikely that so many natural history societies, museums, zoological and botanical gardens and public aquaria would have been founded if they could not have relied on regular female support.” (Barber 1980). Charles Kingsley described the Victorian lady naturalist at home in *Glaucus* in 1855: “I have seen the young London beauty, amid all the excitement and temptation of luxury and flattery, with her heart pure and her mind occupied in a boudoir full of shells and fossils, flowers and sea-weeds, and keeping herself unspotted from the world, by considering the lilies of the field, how they grow.” Why were

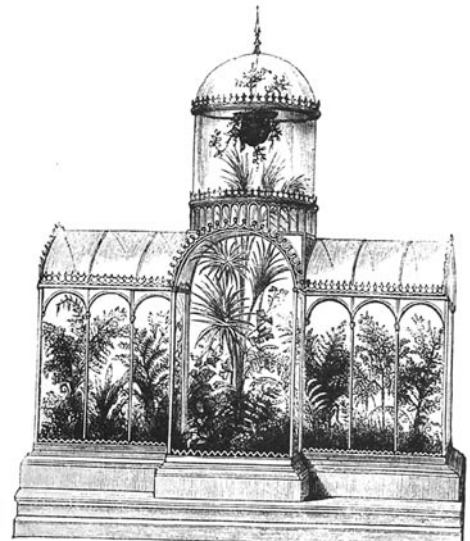


Fig. 2. Wardian Fern Cases could be very elaborate. This terrarium was modeled after the Crystal Palace of London’s Great Exhibition in 1851.

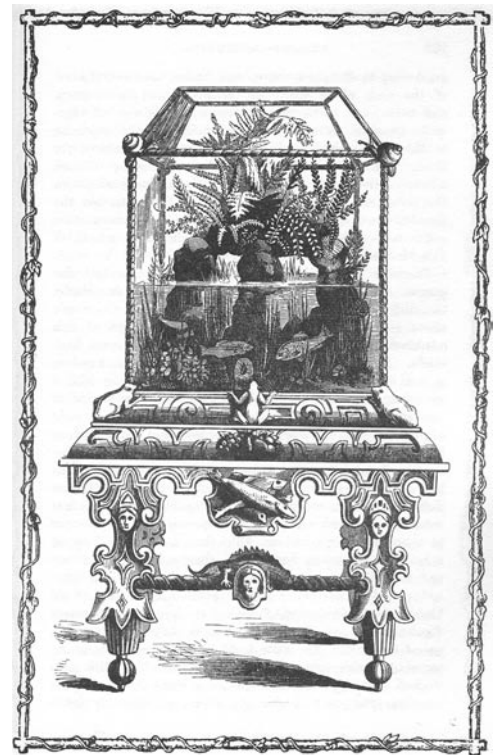


Fig. 3. In 1856, Shirley Hibberd published *Rustic Adornments for Homes of Taste*. Pictured here is Aquarium combined with Fernery. Note frogs at base.

so many natural history books and periodicals published during this period? Victorians believed that it was slightly common to obtain animals and plants for parlors and drawing rooms simply for amusement; if flora and fauna were to be shown, there had to be an educational component attached to their passion for collecting. George Brettingham Sowerby the Second in *Popular History of the Aquarium* put it this way in 1857: "Nor is it only for amusement that such parlour oceans and lakes are prepared and stocked; they are invaluable as a means of instruction."

In 1856, the pioneer naturalist Shirley Hibberd published *Rustic Adornments for Homes of Taste and Recreations for Town Folk in the Study and Imitation of Nature*. This is the most complete book published during the Victorian era covering fern cases, marine and freshwater aquaria, aviaries, apiaries, and outdoor gardens and it is one of the most beautiful with elaborate drawings and colored floral borders on each page. Hibberd wrote in the Preface, "Whatever serves to heighten the enjoyments of home, and add fresh graces to the domestic hearth, must be worthy of encouragement and culture."

But there was a downside to the fern craze: "The poor Ferns, like the wolves in olden times, have a price set upon their heads, and they in like manner will soon disappear. We must have 'Fern laws,' and preserve them like game"

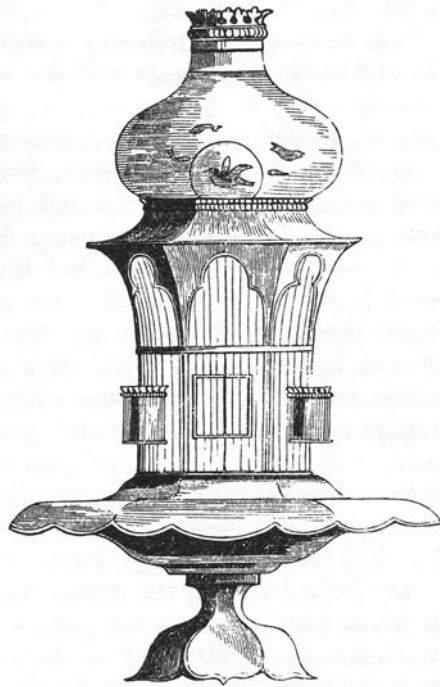


Fig. 4. Combination aquarium and bird cage from *Rustic Adornments for Homes of Taste*. At top of enclosure are two bowls. Birds had access (from lower wire cage) to smaller bowl within the larger one where they were juxtaposed to fishes swimming around them. This was a popular Victorian design feature.

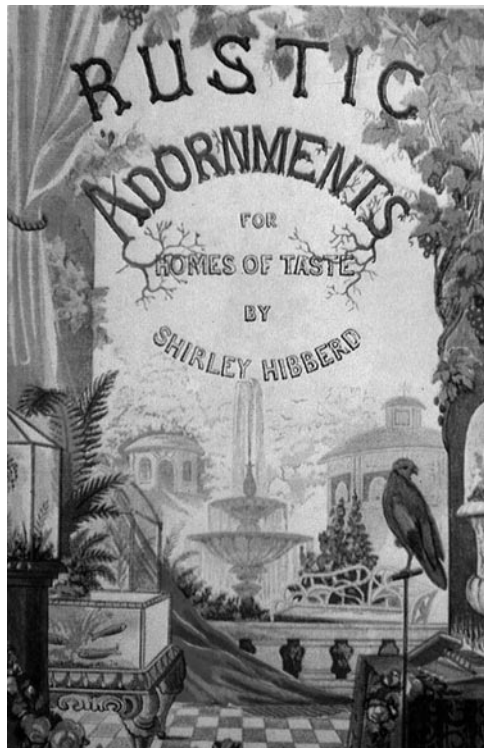


Fig. 5. Cover from *Rustic Adornments for Homes of Taste*.

(Bellairs 1865). Another problem which surfaced was that ferns quickly died in the polluted London air. As interest in ferns began to wane in England, the development of aquaria filled the void. "When every drawing-room contained a fern case, they began to seem a little dull, or even—horrid thought!—a little vulgar." (Barber 1980.).

#### From Land to Water

The keeping of goldfish substantially predates the aquarium craze, dating back to at least 1000 AD in China. The Chinese exported goldfish breeding to Japan and Korea around 1500 AD. Goldfish reached Europe around the beginning of the 17<sup>th</sup> Century and the US in 1876. These fishes were bred to be seen from above in shallow porcelain bowls.

In 1850, Robert Warington kept two small goldfish and a *Valisneria spiralis* plant in a twelve-gallon tank for almost a year without changing the water. He is credited with discovering the "Balanced Aquarium." During the same period, Philip Henry Gosse was independently pursuing the same experiments. Gosse published *A Naturalist's Rambles on the Devonshire Coast* which described his somewhat unsuccessful adventures at aquarium-keeping. In 1853, he said "Let the word AQUARIUM then be the one selected to indicate these interesting collections of aquatic animals and plants."

Warington and Gosse were important figures in contributing to the new aquarium craze in Victorian England. In 1856, Gosse wrote the first book on the marine aquarium entitled *A Handbook to the Marine Aquarium . . .* and it contained an advertisement by W. Alford Lloyd: For Sale—15,000



Fig. 6. Some aquarium presentations were stunning. Illustration from *Cassell's Household Guide* in 1869?–1871?.

specimens comprising over 200 genera in 50 large glass aquaria. Other authors published books on aquarium keeping: *Ocean Gardens: The History of the Marine Aquarium, and the Best Methods Now Adopted for its Establishment and Preservation* by H. Noel Humphreys in 1857; *The Marine Aquarium: Directions for its Preparation and Management* by R. M. Stark in 1857; *Common Objects of the Sea-Shore* by Reverend John G. Wood in 1857; *The Family Aquarium; or, Aqua Vivarium ... Being a Familiar and Complete Instructor upon the Subject of the Construction, Fitting-up, Stocking, and Maintenance of the Fluvial and Marine Aquaria* by Henry D. Butler in 1858; *Cassell's Household Guide* in 1869?–1871?; *The Student's Aquarium (Marine and Fresh Water): How to Make and Manage* by S. Jacob in 1886; *The Amateur Aquarist* by Mark Samuel in 1894; and *Das süßwasser-aquarium. Geschichte, flora und fauna des süßwasser-aquariums, seine anlage und pflege* by Ernst Bade in 1898. Some of these books offered instructions for collecting animals and plants at the seashore and early pictures again show Victorian women with billowing dresses, buckets, and long-handled dip nets searching the tide-pools (see Bedell 2009).

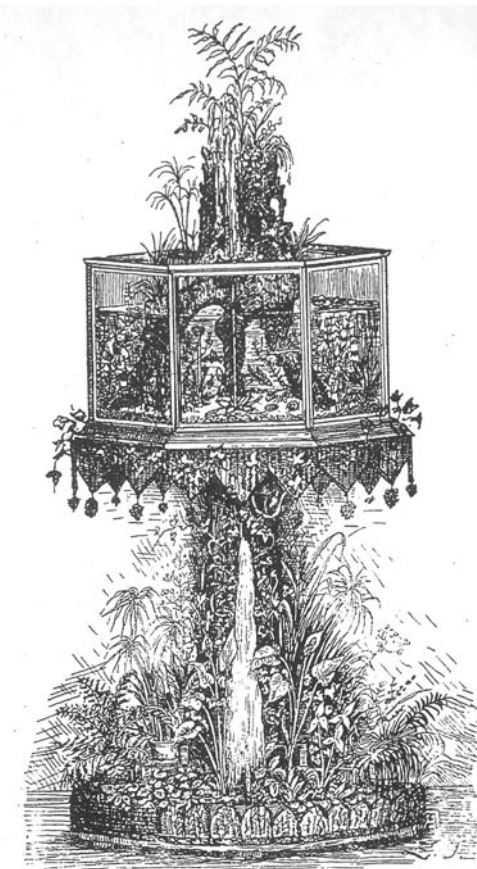


Fig. 7. Beautiful aquarium from *Das süßwasser-aquarium. Geschichte, flora und fauna des süßwasser-aquariums, seine anlage und pflege* by Ernst Bade in 1898.

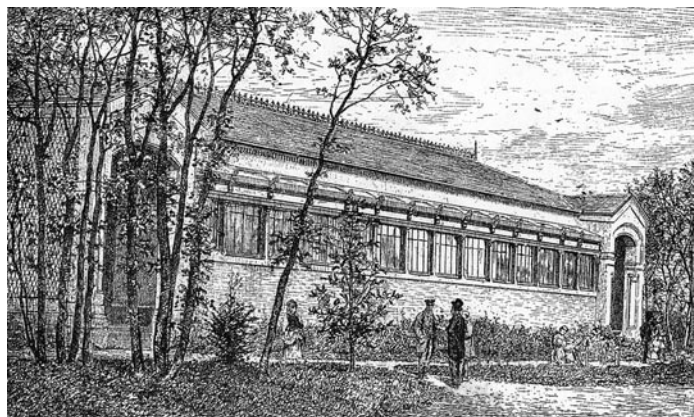


Fig. 8. Illustration of public aquarium in Jardin Zoologique d'Acclimation in Paris from *Le Jardin d'acclimation illustré: Animaux et plantes / par Pierre-Amédée Pichot ... Avec une préface par M. Albert Geoffroy-Saint-Hilaire ...* Imprint: Paris, Hachette et cie [etc.] 1873. Credit: Courtesy of Polly Lasker, Smithsonian National Zoological Park.

Public interest in aquatic organisms gave rise to three public aquariums in Europe: *Natura Artis Magistra* in Amsterdam in 1838, London Zoo in 1858, and *Jardin d'Acclimation* in France in 1873.

But then interest in aquaria began to slow down as well. "Some years ago, a complete aquarium mania ran through the country. . . The fashionable lady had magnificent glass-plated aquaria in her drawing room, and the schoolboy managed to keep an aquarium of lesser pretensions in his study. . . So, in due course of time, nine out of every ten aquaria were abandoned; many of the shops were given up, because there was no longer any custom; and to all appearance the aquarium fever had run its course, never again to appear, like hundreds of similar epidemics." (Wood 1859).

#### Reptiles and Amphibians Are Added to the Mix

Johann Matthaeus Bechstein wrote the first book on captive care of domestic animals and pets in 1797. This intriguing volume was called *Naturgeschichte; oder, Anleitung zur Kenntniss und Wartung der Säugethiere, Amphibien, Fische, Insecten und Würmer, welche man in der Stube halten kann* (Natural History; or, Guide to the Knowledge and Care of Mammals, Amphibians, Fish, Insects and Worms Which Can Be Kept in the Home). His book dealt with five herp species: European Pond Turtle (*Testudo orbicularis*, now *Emys orbicularis*), Common Treefrog (*Rana arborea*, now *Hyla arborea*), sand lizard (*Lacerta agilis*), Great Crested Newt (*Lacerta palustris* and *lacustris*, now *Triturus cristatus*) and European Grass Snake (*Coluber Natrix*, now *Natrix natrix*). The terms aquarium, terrarium, or vivarium had not yet arrived and plate glass was not widely available, so Bechstein used descriptors like little boxes, buckets, sugar glasses, containers made of porcelain, stoneware and so on (Heichler and Murphy 2004).



Fig. 9. Engraved title page and printed page of *Naturgeschichte; oder, Anleitung zur Kenntniss und Wartung der Säugethiere, Amphibien, Fische, Insecten und Würmer, welche man in der Stube halten kann* by Johann Matthaeus Bechstein in 1797. Published in color in *Herpetological Review* 2004, 35(1):8–13.

Nathaniel Ward discovered a robin trapped in his fern-house—it lived and thrived for six months until escaping. This episode gave him the idea of developing the vivarium. He described this idea in an article called "On vivaria" in the *Garden Chronicle* in 1855.

When the reptile building opened at the London Zoo in 1849 and the collection needed to be expanded, zoo employees exchanged herps with private fanciers to fill in the gaps (Keeling 1992). One such example was C. R. Walker at the establishment called "The Vivarium" who sent twenty-five assorted skinks, geckos (possibly *Nautinus*?) from New

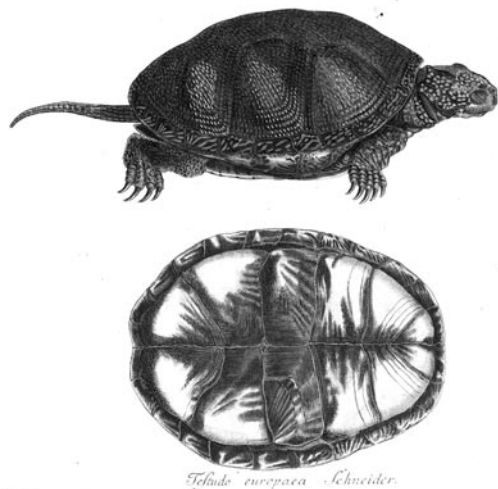


Fig. 10. Johann Matthäus Bechstein on the Commendable Characteristics of the European Pond Turtle (translated from German): "It cannot be said that their movements are varied or beautiful, or that these animals may be counted among those which are entertaining; however, their very rarity, and the desire to have something alive also from this class of animals under one's care and supervision makes them attractive to the amateur. They can also be fattened up so as to make use of their tasty (even though hard to digest) meat, once the eyes have been satisfied by their sight. Already clever experiments have been made with these animals: Mr. Merz in Paris shut the mouth of one with wire and closed up the nostrils with sealing wax; nevertheless the animal lived another 30 days without food or breathing. This reveals the tenacious vitality which these animals possess."

Illustration from *Ioannis Davidis Schoepff Historia testudinum iconibus illustrata* by Johann David Schöpfung, 1792 [–1801].

Credit: Collections of Ernst Mayr Library, Museum of Comparative Zoology, Harvard University.

Zealand, and treefrogs. In addition to the exchanges, many private parties generously donated rare and unusual amphibians and reptiles to the Zoo, such as Long-Nosed Crocodiles, Radiated Tortoises, and a variety of cobras, African Rock Pythons, Emerald Tree Boas, and a multitude of European taxa.

The Exeter Exchange in London was a famous menagerie, beginning in the 1770s and lasting until 1829, which specialized in the sale of exotic reptiles. In 1810, the menagerie was acquired by Edward Cross, who renamed the operation the "Royal Grand National Menagerie" and developed a thriving commercial supply company with customers in Europe and the US. Another well-known dealer in London was a Mr. Kendrick who assured his clients that every reptile for sale came from "Brazil," including Red-eared Sliders, Painted Turtles, and Chameleons (Coote 2001).

In 1884, Johann von Fischer from Vienna, known by many as the founder of modern herpetoculture, published *Das Terrarium, seine Bepflanzung und Bevölkering*, with recommendations for aquaria and terraria design, plants suitable for the terrarium, food and feeding, and detailed descriptions of the husbandry requirements for a wide array of

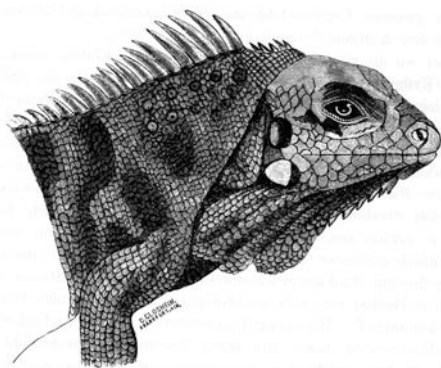


Fig. 11. In 1884 Johann von Fischer published *Das Terrarium, seine Bepflanzung und Bevölkering*. Shown here is Tuberculated Iguana (*Iguana tuberculata*, now *Iguana iguana*).

amphibians and reptiles; his book is accompanied by many drawings. In addition to his book, Johann von Fischer published detailed descriptions on the maintenance and behavior of other captive herpetofauna, many of which were published in the journal *Der zoologische Garten* (see Murphy, 2005 for list). In his book (1884), Johann von Fischer listed his recommendations for amphibian and reptile combinations in various mixed-species terrariums. His lists were long and varied, and filled with rare taxa. What seems true is that there were many sources throughout the world for obtaining herps to be sold in Europe. One example should suffice: taxa which can be kept in the "Chamaeleonshaus" with the Common Chameleon (*Chamaeleo chamaeleon*): *Platydictylus*, *Hemidactylus*, *Ptyodactylus*, *Phyllodactylus*, *Spaeriodactylus*, *Gymnodactylus*, *Stenodactylus*, various *Phrynosoma*, *Ecphymotes torquatus*, *Stellio vulgaris*, *S. cyanogaster*, *Tropidosaura algira*, *Psammosaurus Edwardsii*, young *Scuicicus officinalis* and *Gongylus ocellatus*, *Seps chalcides*, *Heteromeles mauritanicus*, *Ophiomorus miliaris*, and *Tylops vermicularis* (nomenclature follows J. v. Fischer).

The first book on herpetoculture in English was the Reverend Gregory Climenson Bateman's *The Vivarium*, published in 1897. There were many advertisements for animals, plants, and supplies in his book. According to Bateman, a broad range of live reptiles and amphibians were obtainable in London in 1897. In addition to the common European species, a number of rarer exotic types were offered for sale: Small Monitor Lizards, Common and Red Tegus, Bearded Dragons, young American Alligators and Crocodiles, Diamond Pythons, African Rock Pythons approximately 4 feet long, Ball Pythons, Anacondas, Horned Frogs, Giant Salamanders, and Olms. Remarkably, Tuataras were accessible, described by Bateman: "Some time ago, I was looking at the various animals in a very large dealer's establishment, when I made a remark about a fine pair of Tuateras which I saw in a big cage. The assistant who was with me immediately opened the door of the den and seized one of the reptiles by the tail, and I shall not readily forget the ominous sound made by the animal's closing jaws as he just missed the man's fingers, at which he had just snapped. I at once mentally resolved never to catch a Tuatera by the tail. As I congratulated the man upon his escape, he said, 'I am a bit lucky this time, for I have just come out of the 'orspital, where I have been laid up with blood-poisoning through the bite of one of them pythons.'"

Bateman also published on aquarium construction, captive husbandry of plants, weeds, fishes, mollusks, insects, etc. and management of freshwater and marine aquaria. Murphy (2007) provided a list of amphibians and reptiles with prices which were available in London during the time.

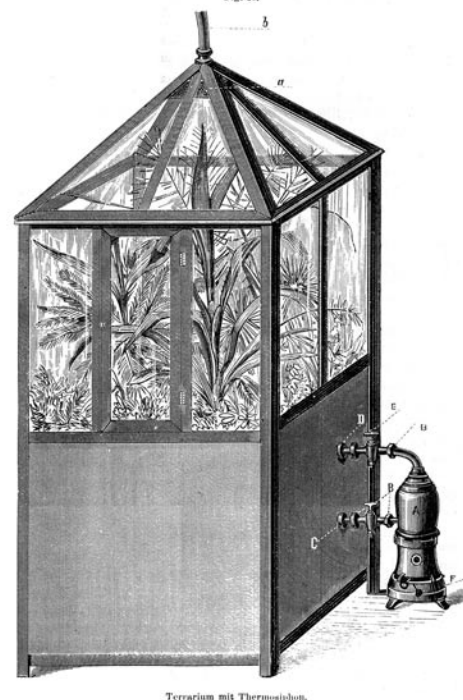


Fig. 12. Illustration of Terrarium with "Thermosiphon" for temperature control from *Das Terrarium, seine Bepflanzung und Bevölkering*.

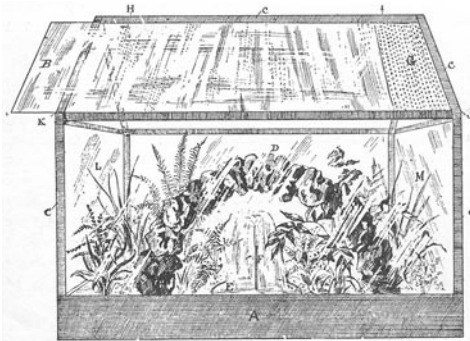


FIG. 9.—FERNERY, WITH FOUNTAIN AND ARCH, VERY SUITABLE FOR SOME REPTILES AND BATRACHIANS.

# James L. Willson,

Live Stock Provider,

6 & 8, Goodge St., London, W.

(Two doors from Tottenham Court Road).

IMPORTER AND EXPORTER OF

Every Description of Wild or Domestic Animal,

ALSO

REPTILES, Cold Water GOLDFISH,  
and BIRDS.

## Aquaria & Vivaria

SUPPLIED AND STOCKED.

Every Appliance and Requisite. Ants' Eggs, Mealworms, and Fish Food to value remitted, sent by return.

Choice Singing Canaries.

AVIARIES, CAGES, AND SPECIAL SEEDS.

Dogs and Live Stock Boarded or Sold on Commission.

Bankers: LONDON AND COUNTY.

STATE WANTS. LIST POST FREE.

Telegrams: "Highbred, London."

## ERNEST CLIFTON & CO.,

43, Oxford Street, & 1, Saville Street,  
MANCHESTER.

Aquarium, Vivarium, & Fern Case  
Manufacturers, Rockworkers, &c.

THE rapid and general appreciation of the Vivarium in the last few years has caused us to largely import and cater for the stocking of same. We have now collectors in Algeria, Cairo, Alexandria (Africa), Bologna, Rome (Italy), Berlin, Vienna, Buda Pesth, Sydney, Paris, &c. and never cease to write to us for our list from time to time. When we say that the Professors of Owen's College (Manchester), University College (Liverpool), University (Edinburgh), Royal College of Science (Dublin), Queen's College (Cork), &c. patronise us largely, and solely rely on us for special reptiles, &c. it speaks for itself. In the Manufacturing Department we are able to compare most favourably with others, and in addition to our sixteen-page Illustrated Catalogue we will send a sketch and price of any new idea that our patrons wish carried out. As proof of the soundness of our work, Mr. Walsley, Manager, Blackpool Aquarium, has engaged our Mr. Clifton to make sixty Vivaria (various sizes) for the next season.

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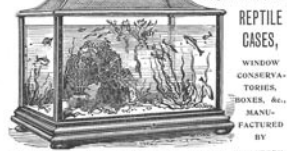
Dear Sir.—Permit me to give you a perfectly satisfied testimonial, not only as to the value of your wares, but also as to the less value of yourself. I have done business with you for years, and every transaction I have had with you has been executed with a completeness and promptitude beyond compare. The specimens sent to me by yourself and the prices charged for them compare most favourably with those charged by the best London, Parisian, and Continental wholesale dealers, with whom I am frequently in contact.

Faithfully yours,  
HARRY J. BARBER.

MR. ERNEST CLIFTON.

## AQUARIUM & FERN CASES

Of Every Description for Cabinets, Dining Rooms, Halls, Reception Rooms, &c.



EADE & SON, 43, HIGH HOLBORN, LONDON, W.C.

## A. GREEN,

Taxidermist and Dealer in British Reptiles, and British and Foreign Birds.

4, CUMNOR TERRACE, BOURNEMOUTH.

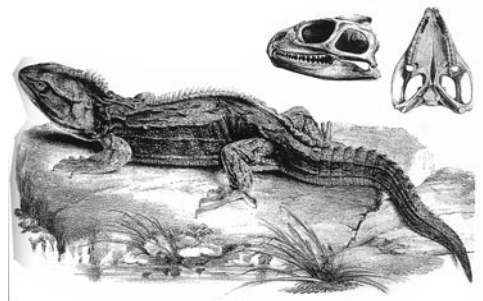
GENUINE SPECIMENS of the CORONELLA often ON HAND. ESTABLISHED 1878.

## EDWARD GERRARD & SONS,

Naturalists, Taxidermists, & Osteologists,  
61, College Place, Camden Town, LONDON.

Large Collection of Reptiles in Spirit.  
For sale. Lists sent on application.  
Skins Dressed and Mounted for Museums or Decoration.

Carl Hagenbeck Senior is a name known by virtually every zoo and aquarium professional for in 1907 he developed one of the finest zoos in the world in Hamburg, Germany: Carl Hagenbeck's Tierpark at Stellingen. He built the first exhibits without bars for zoos and served as a design consultant for zoos throughout the world. From 1841 until 1863, he ran a small pet shop featuring exotic animals, including



reptiles such as boas and pythons. Later in 1866, his son Carl Junior took over the reins and built the operation into a major animal supplier, sending reptiles to dealers and zoos throughout the world (Coote 2001). Oskar Boettger described a unique herpetological cooperative arrangement in his paper *Bericht über die Leistungen* in 1890: "Regarding the purpose and setup of the Laboratoire d'Erpetologie in Montpellier [France], a trading and buying organization, one finds information in Humboldt (Dammer), Volume 8, pages 34–35." [translated from German in *Archiv für Naturgeschichte* on p. 160.]. This paper in Humboldt is here loosely translated with some comments in parentheses to clarify how the text was interpreted: "The Laboratoire d'Erpetologie in Montpellier is an organization that exchanges and sells under the direction of our worthy colleague, the well-known herpetologist Dr. J. v. Fischer. The Laboratoire, in which salesmen (researchers would be a better word) can offer living wares, encompasses 147 members throughout Europe and 203 in other parts of the world. The purpose of the organization is to offer reptiles and amphibians of all sorts to members at cost and to make the study of these animals easier. The excess (surplus animals) are released and the profits are divided among members. Donated animals are not sold. Each member is obligated annually to publish two articles in a domestic or foreign publication. The honorarium for

Fig. 14. At the end of the 19<sup>th</sup> Century, Tuataras were offered for sale by London animal dealers. Reverend Bateman purchased a pair from the London Zoo for £2.00 (\$3.00 US). John Edward Gray had described the "Tuatera" from New Zealand in his *The Zoological Miscellany* in 1842, naming it *Hatteria punctata* and placing the taxon in the lizard family Agamidae. Today it is called Tuatara (*Sphenodon punctatus*) and placed in the Suborder Rhynchocephalia. This lovely plate (#20) is from *The Lizards of Australia and New Zealand in the Collection of the British Museum* by Gray, 1867.

Fig. 17. Advertisement from Hugo Kukhoff's *Das Terrarium und seine Bewohner: ein kurzer illustrierter Ratgeber für Terrarienfreunde* around 1903.

**Direkter Import**  
VON  
**Aquarien- und Terrarien-Tieren.**  
Seltenheiten stets auf Lager.  
Alleiniger Vertreter der Firma Otto Eggeling-New-York.  
**Es kommen nur gesunde gut fressende Tiere zum Versand.**  
**Hans Stüve, Hamburg 19**  
Eimsbüttler Chaussee 55.

**Arthur Mühlner**  
Nürnbergerstrasse 24 **Leipzig** Nürnbergerstrasse 24  
Spezialgeschäft für Aquarien- und Terrarien-Artikel  
empfehlend  
**Aquarien und Terrarien**  
in einfacher und besserer Ausführung.  
Aquarien- und Terrariertiere und -Pflanzen in grösster Auswahl,  
sowie sämtliche Hilfsapparate. — Preisliste frei.

**Heinrich Henkel** Gross. Hess. Hofbouquetlieferant,  
Kaiserlich Russischer Hoflieferant.  
Neuwiese Glasberg, Hofflieferant weiland Ihrer  
Darmstadt. Majestät der Königin Victoria  
von England.

**Permanente Aquarium-Ausstellung.**  
Nymphaen, Flor März bis Oktober; Nelumbium, Flor Juni, Juli,  
August. Vorzüglichste Neuheiten in Pflanzen und Fischen durch eigene  
Sammler. — Cataloge auf Anfrage frei. — Besuch jederzeit gestattet.

Advertisements for animals and equipment from Reverend Gregory Climenson Bateman's *The Vivarium*, published in 1897. Bateman offered sage advice for the herpetoculturist in 1897. "In the construction of Vivaria, all chance of the captive's escape should be avoided as far as possible. For it is rather mortifying to realise the loss of a valuable Snake, or a favourite lizard; nor does one get much encouragement in a hobby of this kind should he be often obliged to ask the ladies or servants of his home if they may happen to have seen anything of the missing Reptiles."

Fig. 17. Advertisement from Hugo Kukhoff's *Das Terrarium und seine Bewohner: ein kurzer illustrierter Ratgeber für Terrarienfreunde* around 1903.

each publication is given to the organization and at the end of the fiscal year is allotted equally. In addition, these colleagues take charge of distributing the excess animals and disposing of dead animals and retain 50% of the profit. The Laboratoire has a fund donated by members to encourage young people to go to unexplored provinces or regions of the world to collect and learn. In addition, for the best collectors there are prizes, which include a microscope from Zeiss in Jena, books, or further travel. Anyone can become a member as long as he demonstrates that he works in this field. Members must prove that they give any uncommon animals to appropriate institutions at no cost if they (the institution) promise to publish accounts of the animals. They keep the honorarium. Eventually a society journal will appear. Each violation—so far there have been none—will result in ejection from the society. The personal word of honor is the only guarantee other than the signature of the member. No hearing will be held, but his name will be circulated as ‘manquant a sa parole’ (a breaker of his word). The institute up to this point makes a profit of about 1000–1200 francs. The director holds sole responsibility for leadership and is only assisted by a book keeper.”

Strolling on the promenade in 19<sup>th</sup> Century Paris with a live turtle was all the rage, as described by Walter Benjamin in his essay: “Around 1840, it was briefly fashionable to take turtles for a walk in the arcades. The *flâneurs* [idlers] like to have the turtles set the pace for them. If they had had their way, progress would have been obliged to accommodate itself to this pace . . . this attitude did not prevail.”

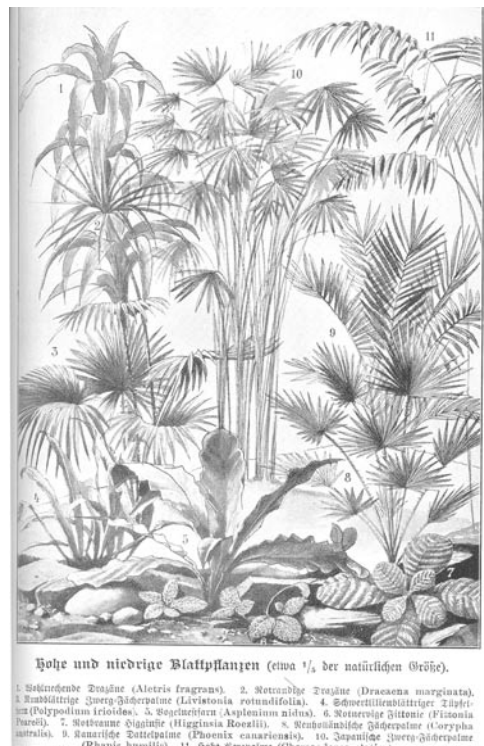
A number of books and articles on herpetoculture began to appear after the Bateman volume. Hugo Kukhoff’s *Das Terrarium und seine Bewohner: ein kurzer illustrierter Ratgeber für Terrarienfrende* was written around 1903. Five years later, Paul Krefft wrote a seminal guide to terrarium science called *Das Terrarium*. Dr. Ernst Bade published *Praxis der Terrarienkunde*, a slim volume filled with pictures of terraria and suitable inhabitants for the enclosures. *The Freshwater Aquarium and its Inhabitants; A Guide for the Amateur Aquarist with Many Illustrations from Nature* by Otto Eggeling and Frederick Ehrenberg, written in 1908, had many references to captive herps.

There were books that combined the amateur literature on herp keeping with professional literature, such as Robert Snedigar’s *Our Small Native Animals: Their Habits and Care* (1939) and Vinson Brown’s *How to Make a Miniature Zoo* (1956). Raymond L. Ditmars of the Bronx Zoo popularized captive herps in his many books during the early part of the 20<sup>th</sup> Century although he did not write a specific guide to herp keeping.

During the second half of the 20<sup>th</sup> Century, books and papers on captive amphibians and



Kletter- und Ampelpflanzen (ungefähr 1/4 der natürlichen Größe).  
 1. Hochstamm Gießkannenpflanze (Passiflora coerulea). 2. Schöne Schwebelilie (Aeschynanthus pulcheri).  
 3. Corystolobus Zillenschne (Tillandsia [= Vriesea] splendens). 4. Netzflechte (Ficus stipitata).  
 5. Hängendherabhangende Eranthis (Pothos colobocaulis). 6. Kletternde Harle bei Blauschillernden  
 Siphon (Schlagastilbe caesia [= macinata] var. arborea). 7. Netzblattige Gießkannenpflanze  
 (Passiflora menziesii). 8. Dreieckige Gießkannenpflanze (Passiflora trifasciata). 9. Netznartige  
 Lilie (Tillandsia dianthoides). 10. Große Gattine (Castroja citrina). 11. Weiss Blühende  
 (Ceropegia Woodii). 12. Samenblattige Baumrind (Philodendron melanochrysum).  
 13. Spinnwebpflanze (Phalaenopsis sp.).



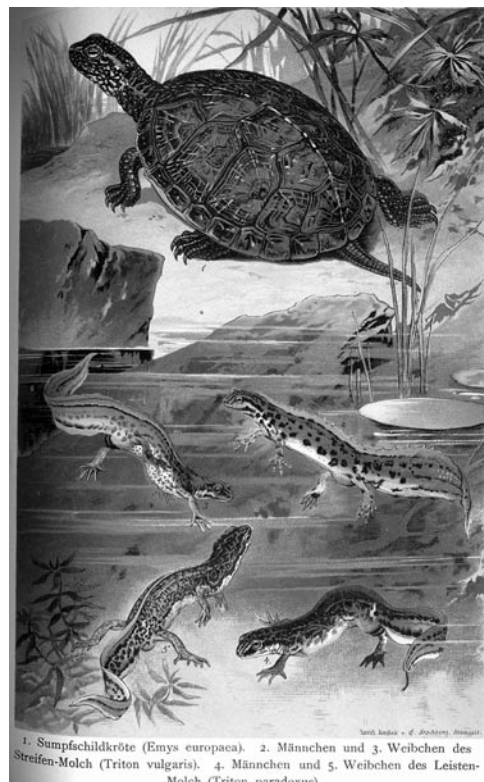
Hohe und niedrige Blattpflanzen (etwa 1/4 der natürlichen Größe).  
 1. Kletternde Zwillinge (Alocasia fragrans). 2. Netzartige Zwillinge (Dracaena marginata).  
 3. Farnblattige Zwerg-Palme (Livistonia rotundifolia). 4. Schwebelilieblattiger Zyperus  
 (Polypodium trioides). 5. Spindelröhre (Asplenium nidus). 6. Kletternde Blätter (Pilea  
 parviflora). 7. Netzartige Blätter (Higginia Koenigii). 8. Schwebelilieblattige Zwillinge (Corypha  
 australis). 9. Kanarische Dattelpalme (Phoenix canariensis). 10. Japanische Zwerg-Palme  
 (Rhapiz humilis). 11. Hohe Zwillinge (Chamaedorea elatior).

Figs. 18a, 18b. Paul Krefft wrote a major guide to terrarium science in 1908 called *Das Terrarium* with many illustrations of aquaria and terraria. Pictured here are living plants suitable for the terrarium.

reptiles exploded on to the scene. In 1955, Wilhelm Klingelhöffer, a German medical doctor, compiled an extraordinary treatment of reptiles and amphibians in captivity called *Terrarienkunde*. This four volume work was the “bible” for European zoo workers and herpetoculturists. Six years



Kreuzottern (Vipera berus).  
 1. Weibchen, 2. Männchen, 3. Schwarze Spielart.



1. Sumpfschildkröte (Emys europaea). 2. Männchen und 3. Weibchen des  
 Streifen-Molch (Triton vulgaris). 4. Männchen und 5. Weibchen des Leisten-  
 Molch (Triton paradoxus).

Figs. 19, 19a, 19b. Some books on keeping amphibians and reptiles in captivity had beautiful artwork. These original colored drawings are from Ernst Bade’s *Praxis der Terrarienkunde* in 1907. Also shown is a terrarium from the period.

later, Alfred Leutscher, founder and secretary of the British Herpetological Society wrote *Vivarium Life. A Manual on Amphibians, Reptiles and Cold-Water Fish*.

Around 1952 in Great Britain, there were three main suppliers: Palmers of Camden Town; South-Western Aquarists of Glenburnie Road, Balham, owned by George Boyce; and Robert Jackson from Altrincham, Cheshire. Most of the stock was from Europe: Grass Snake, Tessellated Water Snake, Aesculapian Snake, Four-lined Ratsnake, Wall Lizard, Jewelled or Eyed Lizard, Berber Skink, European Pond Turtle, Spur-Thighed and Hermann's Tortoises, and Spanish Terrapin (Keeling, 1992).

Germany was and continues to be one of the strongest centers for herpetoculture. For example, a recent catalogue by the antiquarian book dealer Chimaira in Frankfurt/Main, lists hundreds of titles in German and English dealing with captive amphibians and reptiles. In the book *Die Geschichte der Herpetologie und Terrarienkunde im deutschsprachigen Raum* (edited by Rieck, W., et al., 2001; p. 263), a contribution by Gerhard Hallman is titled as "A selection of traders that offer animals for terrariums, or terrarium technology to the society and its members through ads or price lists." Hallman wrote, "The number of specialty traders that handle reptiles is large. . . The following list, with no aspiration to being complete, attempts to demonstrate this." Then, the chapter shows names of dozens of dealers between 1950 and 2001 in a variety of countries and includes some lists of the herps available as well as their prices. People today might believe that reptile shows or expos are a recent phenomenon but in chapters written by Werner Rieck, there are three fascinating photographs of enormous shows held in Germany in the years 1896 [p. 47], 1908 [p. 50], and 1924 [p. 71].

In the UK from the mid-1960s onwards, the most important resource for the herpetoculturist was the book by Zdeněk Vogel entitled *Reptiles and Amphibians. Their Care and Behaviour* (J. Coote, pers. comm.). In 1969 and 1972, Günther Nietzke summarized much of what was known about terrarium animals in two volumes: (1) Construction, Technical Equipment, and Planning of Terraria; (2) Care and Feeding of Terrarium Animals. The set was called *Die terrarientiere: Bau, technische Einrichtung und Bepflanzung der Terrarien: Haltung, Fütterung und Pflege der Terrientiere in zwei Bänden*.

As ideas, protocols and technologies improved for keeping herps in zoos, two of the most important persons disseminating this vital information were Carl F. Kauffeld at the Staten Island Zoo, and Hans-Günter Petzold at Tierpark Berlin-Friedrichsfelde. Kauffeld deserves special mention, for in addition to his classic *Snakes: The Keeper and the Kept*, he wrote many papers on captive management. Petzold's book (1982), translated from German and published by SSAR in 2008, is the most thorough overview of captive management currently available: *Petzold's The Lives of Captive Reptiles* (see HR 2009, 40:471–472 for review). Later, other zoo workers published books on terrarium keeping: Eugène Bruins (1999) from *Natura Artis Magistra* in Amsterdam, and Sergei Kudryavtsev and associates (1991) from the Moscow Zoo.

With numbers of captive herps increasing, there was a need to address medical management. H.-H. Reichenbach-Klinke published the first book on the topic called *Krankheiten der Amphibien* in 1961 and *Krankheiten der Reptilien* two years later. An English version was available in 1965 by Reichenbach-Klinke and E. Elkan: *The Principal Diseases of Lower Vertebrates*. For a complete list of titles, consult Murphy (2007; Table 2.1).

The SSAR published two other books on captive and medical management: *Reproductive Biology and Diseases of Captive Reptiles* (Murphy and Collins, 1980) and *Captive Management and Conservation of Amphibians and Reptiles* in 1994 (Murphy et al.). It is beyond the scope of this contribution to list all of the books, serials and papers that have been valuable to our understanding of captive animals but many references have been published in the four-part series called "Updating the Bookshelves" in *Herpetological Review* during 2008–9.

The herpetoculturist of today owes much to his or her predecessors who developed the beautiful and ornate planted terrariums filled with exotic foliage, the heavily planted aquaria, the spectacular semi-aquatic vivaria

placed on pedestals in the drawing room with fishes and herps, and the arresting terrestrial terraria filled with mesic or xeric plants, truly a showcase in the home. It is not surprising that there are dealers specializing in antique aquaria and terraria to this day for these are often lovely works of art. Animal collectors and dealers filled a void: they provided specimens from exotic locales that were out of reach to the average fancier.

*Acknowledgments.*—This paper is dedicated to the late Carl Kauffeld and Harry W. Greene. When one of us (KM) wrote letters full of questions about herpetology, each took his valuable time and responded in writing to the inquiries of a fourteen-year old boy. We thank David Barker, Judith Block, David Chiszar, Jon Coote, Gary Ferguson, Rick Hudson, John Moriarty, Louis Porras, John Simmons, and Trooper Walsh for reviewing early drafts and suggesting improvements. Smithsonian Librarians Polly Lasker, Leslie Overstreet, and Daria Wingreen allowed us to examine publications under their care and arranged loans of obscure books and papers. Margie Gibson and Lucian Heichler assisted with translations. We are grateful to Emily Becker, Dana Fisher, and James Hanken from the Museum of Comparative Zoology, Harvard University for providing illustrations.

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banished them to life in separate worlds, some groups of humans and animals drew closer together than they ever had been before: the bourgeois and their pets and zoo animals. In a historical sense, these animals thus came to be seen in a new light: they served not just as a kind of ersatz nature or exotic showpieces for the Victorian bourgeoisie, but also as a means to understand the proximity of humans and animals to one another.” (p. 217). The statement on the flyleaf states that “This publication accompanies the exhibition “Endless Forms: Charles Darwin, Natural Science and the Visual Arts,” which is currently at the Yale Center for British Art.]

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