Chapter 1

Introduction and Taxonomy

Joseph E. Wagner

I. INTRODUCTION

The importance of the guinea pig to medical research is symbolized by its synonymity with "experimental subject" in the English language. One of the earliest records in English concerning the biology of the guinea pig is that of Goldsmith (1791). Lavoisier in 1780 (Lane-Petter, 1963) is commonly credited with being one of the first to use the guinea pig in research, having used it to measure heat production.

Weir (1974) reviewed the origin of the domestic guinea pig and its interrelationships with other species of cavies. The wild guinea pig (*Cavia aperea*) is widely distributed in Argentina, Uruguay, and Brazil (Weir, 1970). Another wild ancestor, *C. cutleri,* is still found in Peru (Paterson, 1972). Cumberland (1886) stated "I do not believe that the Cavy ever existed in Brazil as a domestic animal, in the sense of being used for food, as stated by some naturalists, or that it was known there at all before the arrival of the Portuguese."

Wild guinea pigs inhabit open grassland, where they nest and make paths in taller vegetation. They feed in more open areas at dawn and dusk (Weir, 1970). They live in a small societies of from several to several dozen individuals. Waterhouse (1848) related the guinea pig's one useful property was that of banishing rats from its vicinity. The guinea pig is considered a culinary delight by the natives of the Bolivian and Peruvian high country, where the animal is killed, scalded, and scraped to remove the fur and then either roasted or fried whole and served with a hot sauce known as *picante.*

II. HISTORY AND ETYMOLOGY

The most extensive inquiry into the history of the guinea pig outside of South America is that of Cumberland (1886), and the second edition of that work by Gardner (1913). Cumberland (1886) concluded that the original importers of the cavy into Europe were probably responsible for the nomen "guinea pig." According to Cumberland (1886):

> Previous to the arrival of Europeans on the West Coast of South America, the only domestic animals which could be used as food were the llama, alpaca, Coy or Guinea Pig, and a bird called Tuya, about the size of a large duck. Under these circumstances, Cavies must have been of great importance as a food supply, and are in fact so mentioned by the early writers, who, however, generally speak of them as rabbits (Conejo), the name by which they are still called by those Peruvians and Bolivians who speak Spanish.
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> Velasco, in his "Historia de Quito," says that the Indians had great numbers of Cavies in their houses. We may fairly conclude

that they would bestow the same elaborate care in "breeding and selecting these small rodents as we know they bestowed upon the llamas and alpacas." We are told that these latter animals were kept in separate flocks of different colours; and if, by any chance, a young one was born of a wrong colour, it was immediately moved into a different flock.

If this system were applied to the Cavies, many distinct varieties would be evolved. This careful breeding of the Cavy, and a very remote period for its first domestication, are circumstances both needed to account for the extremely artificial colour and marking of the animals; and we may also reason inversely, from the permanence and obstinate irregularity of the markings, as well as from the colours, so distinct from any wild form, that the domestication took place at a very remote epoch.

We are at first puzzled to know how this little animal, which is neither a pig nor a native of Guinea, came by its absurd misnomer. This is, however, soon explained, if we consider the circumstances under which Europeans must have made its acquaintance. The Spaniards, on their first going into the Peruvian markets, would see exposed for sale, in large numbers, a little animal looking remarkably like a sucking pig, and would give it that name, to which they would add the distinctive term, "Indian," because the early navigators spoke of South America as a part of the Indies: thus, we have Porco da India, Porcella da India, Cochon d'Inde, and Topsell's term, "the Indian Little Pig Coney." The name of "Guinea Pig" is of a later date, and was, probably a further confusion of our own, caused by the circumstance that we had more traffic with the coast of Guinea than with that of South America, and also were accustomed to consider Guinea as a part of the Indies. The pig-like appearance of which I have spoken results from the mode of preparing Cavies for cooking–namely, by scalding and scraping them in the same manner as we should treat a pig.

The Guinea Pig was first described scientifically by Aldrovandus, and his contemporary, Gesner. Aldrovandus was born A.D. 1522, and died in 1607. Gesner was born in 1516, and died in 1605. The great victory of Pizarro over the Peruvians, when he seized the person of the Inca, and decided the fate of the country, was gained on 16th November, 1532, shortly after the Spaniards arrived in Peru. It is clear, therefore, that the figures of the Guinea Pig, and the descriptions of them, which still accurately represent and describe the animal, must have been done soon after its arrival in Europe. It is usual to fix this event, vaguely, as occurring about fifty years after the discovery of Peru, or about A.D. 1580.

In Topsell's "Historie of Foure-footed Beastes, from Gesner and Others," 1607, which contains what I believe to be the first English reference to the Guinea Pig, it is called "the Indian Little Pig Coney." The description, which I conclude is Gesner's, is as follows: "Five claws upon a foot behind, and six before: teeth like a mouse, and no tail, and the colours variable. I have seen them all white and all yellow, and also different from both these." Topsell's "Gesner" makes a curious mistake as to the number of claws–mine certainly have only three on a foot behind, and four before. It is clear that the pure white breed existed at this early period, and was, probably, a result of Peruvian cultivation under the Incas.

Pennant, feeling, no doubt, the inappropriateness of the term "Guinea Pig," called this animal the "Restless Cavy." This name is, however, inaccurate, for Cavies, when there is no exciting cause, such as fear or hunger, are very quiet animals, and will lie side by side for hours, until one or other of these disturbing causes rouses them to activity. The date of the first edition of Pennant's "Hist. Quad." is 1781. It is evident that Pennant has followed Buffon, who, in this instance at least, is not a safe guide. He says: "Colour white, varied with orange and black in irregular blotches; no tail; inhabits Brazil; a restless, grumbling little animal, perpetually running from corner to corner; breeds when two months old, has from four to twelve young at a time; would be innumerable, but numbers of the young are eaten by cats, others killed by the males; are very tender, multitudes of them dying of cold." A great part of Pennant's description of the habits of the Guinea Pig is incorrect. There are many curious misstatements in Buffon, and these have been repeated, upon his authority, by Pennant and subsequent naturalists, evidently without any practical acquaintance with the subject.

In Peru, the Cavy seems to have been reared running loose in the kitchens of the Indian houses; and this appears to be still done in the more rural parts of the country, where the Guinea Pig still holds its own in the struggle with European cattle and poultry.

It is apparent that *Cavia cutleri* had been domesticated for some time by Andean Indians when Pizarro conquered Peru around 1530 (Sire, 1968). Up until that time little is known about the domestication of the guinea pig in Peru; however, the Incas, induced by an absence of large meat providing animals, used the guinea pig for food and sacrifices to their gods. After the Spanish conquest the domestic guinea pig became established for food and fancy in many places of the Spanish Colonial Empire. It was apparently in the sixteenth century that Dutch sailors introduced the small, easily transported guinea pig into Europe. From there the guinea pig spread rapidly to other parts of Europe and the British Isles but failed to gain widespread acceptance as a food source in the latter countries. As a result of this travel, it acquired many common names. They were bred for show and fancy and as pets in Europe for up to 300 years before they were introduced into research. Their introduction into medical research was a matter of convenience. They probably first reached the United States in the early part of the seventeenth century from Europe as pets and fancy animals. Their movement from continent to continent was sporadic and incidental to other travel. Therefore there are no accurate and reliable records of their movement.

The common name of the guinea pig, *cavy*, probably derives from its generic name, Cavia. However, the native Indian name *coüy*, is easily formed into *cavy* or *cavia* which may have influenced its initial generic name. It is interesting to note that people with a "fancy" interest in *Cavia porcellus* have adopted the more "scientific" terminology *cavy*, while the research community continues to utilize *guinea pig*, a term of obscure origin.

The origin of the name *guinea pig* is indeed obscure. Most European nationalities perceived the animal as a small pig that arrived from across the sea and adopted fitting names: *Meerschweinchen* (little sea pig); *cochon de mer* (sea pig); *lapin de*

Barbarie (Barbary rabbit). Paterson (1972) noted that the name *guinea* may have come from "Guiana" or more simply that in another era may have meant "foreign." Could it be that the guinea pig was so named because it arrived in Europe via ships from Guiana, a country in northeastern South America? There is no reference to the domestic *cavy* ever having been found there. Could it have arrived in the English speaking world by slave ships via the coast of Guinea in West Africa? Could it have been named for the coin, guinea, for which it could be purchased in England in the sixteenth and seventeenth centuries?

Sire (1968) suggested that porcellus may have resulted from comparing the animal's nails to small wooden shoes (*petits sabots*). However, porcellus is the Latin name for "little pig." Also, the guinea pig, when prepared for the table, resembles a whole roasted suckling pig.

Obviously the origin and name of the guinea pig as well as the history of its introduction into Europe has been the subject of much curiosity. The names by which the common domestic guinea pig, *Cavia porcellus* Linn., is known throughout the world include:

English	Indian Little Pig Coney (Topsell's "Gresner," 1607), restless cavy (Pennant), Domestic cavy (Cumberland), cavy, guinea pig
French	Cobaye, cochon d'Inde, cochon d'Inde d'Angora (Peruvian)
Spanish	Conejillo de Indias
Italian	Procella de India, porchita da India
Portuguese	Porquinho da India
German	Meeerschwein
Dutch	Indianach varken
Spanish Peruvian	Conejo, cuis, curso
Peruvian Indian or Quichua	Colli, couy
Russian	Morskaya svinka

Just as the matter of nomenclature is unsettled so is the matter of from which wild species of *Cavia* was *Cavia porcellus* descended. Based primarily on morphological features, Waterhouse (1848) held that *Cavia cobaya* or *porcellus, C. aperea,* and *C. cuteri* might all be placed in the same species. Darwin (quoted by Detlefsen, 1914) held that *C. aperea* was not an ancestor of the domestic guinea pig because a distinct genus of lice infested each form. Detlefsen (1914) suggested that *C. aperea* was more closely related to the domestic guinea pig than *C. rufescens* because the latter gave sterile male offspring in a cross with the tame guinea pig. Male offspring from *C. aperea* were fertile. Thomas (1917) discussed 12 species and subspecies of the genus *Cavia.* Ellermen (1940) reviewed the family *Caviidae.* He referenced and listed 17 "named forms" or species in the genus *Cavia.*

Landry (1957) and Patterson and Pascual (1972) have reviewed the paleontology of the South American hystricomorph rodents. While caviomorphs are descendents of African Phiomorpha of the Oligocene epoch, Caviidae first appeared in South America in the Late Miocene (26 to 7 million years ago) or a later period. More recently Lavocat (1974) reviewed many of the osteological features and other characters of the histricomorphous rodents and discussed the use of the word "hystricomorph." At the same symposium Wood (1974) also discussed the evolution of the Old and New World histricomorphs, the sciurognathous hystricomorphs and hystricognaths. He also discussed the distribution among rodents of features supposed to characterize the "hystricomorpha."

Much of the cultivation of the guinea pig as a fancy may be attributed to the excellent publication of Cumberland (1886) who predicted cultivation of the cavy as a fancy because a wire-haired breed, inappropriately named the Abyssinian, had appeared in England. Also a long silky-haired cavy had appeared in Paris, which was later named *Peruvian* by T. L. Sclater, Esq., of the Zoological Society of London. Daubigny (quoted by Cumberland, 1886) stated that "the Cobaye has been remarkably modified by cultivation," and "cultivation has greatly increased its size." House (1906) expounds at length on the very active fancy cavy industry in England before 1906.

Many laboratory guinea pigs derive from a strain established by Dunkin and Hartley in 1926 (1930). During a life time of genetic studies Sewell Wright (1960) founded a number of inbred strains of guinea pigs. The genetics of the guinea pig are covered in Chapter 8 of this treatise.

Many North American sources of guinea pigs for research, testing, and teaching are listed in a handbook "Animals for Research" compiled and edited by the Institute for Laboratory Animal Resources (Joseph Henry Building, 2100 Pennsylvania Avenue, N.W., Washington D.C.), National Research Council, National Academy of Sciences. Today most of the guinea pigs raised in the United States are for laboratory use; however, guinea pigs raised for fancy and companion uses are also popular. While the path of the guinea pig from barren floor of the earthen hut of the Andean native to the research laboratory cannot be traced with accuracy, we fully appreciate that this path has involved its use as a staple food, a fancy show species, and a pet or companion animal.

III. TAXONOMY

Taxonomic Outline (after Simpson, 1945)

Kingdom–Animal
- Phylum–Chordata: Animals with notochord and gills
  - Subphylum–Craniata (Vertebrata): Chordates with organized head region
    - Class–Mammalia: Warm-blooded craniates with hair coat. Young nourished from mammary glands

Subclass–Theira: Viviparous mammals
Infraclass–Eutheria: Placental mammals (as compared with marsupials–Metatheria and egg layers–Protheria)
Order–Rodentia
Suborder–Hystricomorpha: This group includes chinchillas, porcupines, and others, distinguished by a zygomatic arch in which the jugal bone forms the center block. These are "porcupine"-like animals compared with squirrel-like (Sciuromorpha) or rat-like (Myomorpha) animals
Superfamily–Cavioidae
Family–Caviidae: More or less tailless South American rodents that have one pair of mammae, four digits on the forefoot and three on the hindfoot. Six genera are generally listed in this family
Subfamily–Caviinae:
Genus–*Cavia*, Pallas (1766) Misc. Zool. p. 30
Type Species–*Cavia cobaya*, Pallas = *Mus porcellus* Linnaeus

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