

**Reviews of *West Indian Green Monkeys: Problems in Historical Biogeography***

**Compiled by Woodrow W. Denham**

**1989**

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## Review 1. By Lynn Fairbanks

**Green Monkey Migration Revisited** Review of *West Indian Green Monkeys: Problems in Historical Biogeography* by Woodrow W. Denham. Basel, Karger, 1987, 78 PP. \$22.25 paper.

Published in: *American Journal of Primatology* 14 (1):97-98 (1988)  
<http://onlinelibrary.wiley.com/doi/10.1002/ajp.1350140110/abstract>

Reviewed by: Lynn Fairbanks, Department of Psychiatry and Biobehavioral Sciences, University of California, Los Angeles

African green monkeys (*Cercopithecus aethiops sabaesus*) currently populate the Caribbean islands of St. Kitts, Nevis, and Barbados. The generally accepted scenario of their migration is that 1) the green monkeys were first introduced to the West Indies from Senegal or Gambia in the mid-17th century during the slave trade, 2) the green monkey was the only primate species to become established in the West Indies, and 3) the current populations have been genetically isolated from African populations since the early 18th century.

Denham begins by challenging this prevailing view. Using historical documents, he carefully sifts through the available evidence and demonstrates that it is possible to draw several different conclusions from the same data base. The origin of the Barbados green monkeys is particularly in doubt, and Denham suggests that the migration to Barbados may have been different from that to St. Kitts both in timing and in source. He also raises the possibility that the primate reported to be a pest on Barbados in the 1670's may have been *Cebus capuchinus* from South America and not the African green monkey. Denham finishes the first section by proposing four alternative historical scenarios of the green monkey migration to the West Indies, each of which would have very different implications about the genetic relationships between the current green monkey populations.

In the second part of the book, Denham takes a similar look at changes in the green monkey population on Barbados in the past 350 years. It has been reported that green monkeys on Barbados went through a severe decline because of bounty hunting at the end of the 17th century and that the population has only recently begun to increase in population size. Again, Denham takes a close look at the original reports that led to this conclusion, supplemented with data from current Barbadian primate researchers, and shows that the same information can be interpreted as supporting several different scenarios that would have quite different implications, genetically and evolutionarily.

You do not have to be interested in the West Indian colonization of green monkeys, or even in biogeography, to profit from reading this remarkable little book. Denham has taken a situation that is typical of many scientific problems, i.e., a sparse and imprecise data base. He lays out the evidence with careful precision and illustrates how it is possible to draw three or four diametrically opposed conclusions from the same information. His approach challenges us to consider the inferences and assumptions in our own reasoning and to examine our conclusions with greater care.

To one who loves the ordered precision of a good mystery novel, this book is a delight to read. The only frustration is that at the end of this book the mystery is still unsolved, and the reader is dying for more “clues.” I would be very surprised if this book did not serve as a stimulus for more and better research on West Indian green monkeys, particularly in the area of genetics.

## Review 2. By Annie Gautier-Hion

Review of: Denham, W. W. (1987): *West Indian green monkeys: problems in historical biogeography (Die grünen Meerkatzen Westindiens: Verbreitung und Geschichte)*. Contributions to Primatology, Vol. 24. Karger, Basel. VIII ±80 pp., 6 figs., 8 tables, H/C SFr. 48,—, DM 57,—, \$ 32.00.

Reviewed by: Annie Gautier-Hion, Station Biologique de Paimpont, Univ. de Rennes.

Published in: *Ethology* 76(3):256-264, (1987)

<http://onlinelibrary.wiley.com/doi/10.1111/j.1439-0310.1987.tb00688.x/abstract>

Green monkeys (*Cercopithecus aethiops sabaesus*), arrived from Senegal or Gambia in 17<sup>th</sup> century, have evolved in isolation from the African parental stock for 300 or more years, which may be long enough for genetic differentiation. What a fascinating natural experiment for studies on evolutionary biology! - Alas, this currently accepted history of the West Indian monkey is seriously questioned by W. W. Denham. Indeed, we do not know with certainty which species was (were) introduced, when the migration took place, how long it continued, how many migrants there were and where they came from.

The book has two main issues: to retrace the history of the migration of African monkeys to the West Indies; and to interpret changes in size of the monkey population of the Barbados. It is mostly archival research, material published by scientists and non-scientists (sailors, travelers, ...) as well as from newspapers, texts of laws: a critical appraisal leads the author to propose alternative scenarios of the history of West Indies monkeys. To plagiarize an anonymous reviewer (cited by the author), the book is “a historical whodunit on a biological subject”. There is no happy end, however, since the author leaves questions unsettled, raises a lot of new ones and even suggests that all his scenarios “must be wrong”. Yet he clearly stresses the importance of being aware of the primate history and historical biogeography before undertaking further work with the W. I. monkeys or any study on an introduced primate species, especially when the study deals with species flexibility and adaptability.

While Grenada island has received *C. mona*, monkeys of St. Kitts, Nevis and Barbados are commonly considered as *C. aethiops sabaesus*. However the extreme variation of pelage color found within and between populations leads the author to suggest that, although microevolutionary processes could be invoked, interbreeding and hybridization among monkeys from several parent populations cannot be excluded. The first citation found on migration from Africa dates from 1700. It contains no information about species and origins. In fact monkeys, which mainly reached W. Indies on slave ships, could have come from anywhere on the Coast of Africa: consequently they could have belonged to *sabaesus*, *tantalus* (both present on Gold Coast), *pygerythrus* and/or *cynosurus* (present in Angola and Mozambique) subspecies. In addition, on the basis of a report from Schomburg, the author also debates whether *cebus* monkeys coexisted with green monkeys on Barbados. Even however if only *C. aethiops* were introduced, we do not know whether the animals of Barbados, St. Kitts and Nevis constituted a single population or not. Indeed, they could have been introduced simultaneously or independently to all islands, or sequentially from one to another, by the French from Senegal or Gambia and/or by the British from the Gold Coast. Although it is generally accepted that migrant numbers were small, the author considers that

thousands of monkeys could have reached the W. Indies after 1624, and migrations could have continued up to the 19th century.

In summary, it seems obvious that the simple, generally accepted account is most improbable. Clearly genetic studies are required to test the alternative hypotheses proposed by W. W. Denham, especially to find whether we are dealing with a natural experiment of genetic isolation or of interbreeding.

The second part of the book deals with the Barbados population. The literature reports that this arrived about 1650, increased rapidly, became a pest by 1682, then virtually disappeared as a result of bounty hunting. Present-day monkeys would be the descendants of this early population, corresponding to “exceptional phenotypes”. In this chapter, the author first describes historical changes of the Barbadian environment as a result of human impact, then analyses monkey population data in the context of these changes, and proposes two interpretations. The first is in agreement with the commonly accepted theory that the monkeys “passed through a narrow population bottleneck that lasted more than 250 years”. In the second, the author suggests that there was no drastic change in number but in behaviour as a result of change of habitat. This change in behaviour, which increased observation difficulties, would have induced misinterpretation of numbers. Again the two scenarios have to be tested because they imply significant differences in the selective pressure undergone by monkeys and thus in genetic consequences.

This book is not within the usual scientific tradition but it points out that, whereas we may be extremely vigilant in collecting and treating our own observational data, we swallow unverified statements. In my opinion the aim of this book will be reached if it stimulates further detailed studies on the historical biogeography of West Indies monkeys, together with genetic studies. In any case, it is presently difficult to envisage meaningful behavioural studies as long as monkey origins are not clarified.

### Review 3. By P. C. Lee

Review of: *West Indian Green Monkeys: Problems in Historical Biogeography* by Woodrow W. Denham. Contributions to Primatology, Vol. 24, Karger, Basel 1987. ISBN 3-8055-4518-5. Hardcover. Price \$26.75: pp. 80.

Reviewed by: P. C. Lee

Published in: *Primate Eye* 35:33-34, June 1988

<http://www.psgb.org/PrimateEyePDF/1988%20Vol%2035.pdf>

In the introduction to this slim volume, the author states that the monograph is offered as a stimulus to further research. He also agrees with a reviewer of the original manuscript that it is essentially an 'historical whodunit' in primate biogeography. The mysteries surrounding the presence of green monkeys (*Cercopithecus aethiops sabaesus*, or some variant) in the West Indies have yet to be solved. However, what has been taken by primatologists to be a straightforward story of introduction, population increase and then decline turns out, by the author's reckoning, to be both more complicated and far more interesting.

The green monkeys of the West Indies, on the islands of St Kitts, Barbados and Nevis, pose several fascinating problems. The first of these is how populations respond, genetically and behaviourally, to the successful invasion of a new habitat and geographical range. The second highlights the importance of human dispersal and colonization in determining the range of their mammalian camp followers. Furthermore, readers gain insights into a problem which is increasing in magnitude in some areas of Africa - that of primates as intelligent and persistent crop-raiding pests on human subsistence activities.

Denham does not hesitate to present the appalling nature of the database on when, how and why these West African primates arrived in the West Indies. Nonetheless, the original sources are delightful and some are extremely amusing. The poor clerk who misread his director's request for three or four monkeys and supplied 300-400 perhaps explains one reason for the prevalence of these species in the stately homes and menageries of the times.

While Denham refuses to commit himself on the source of the green monkeys, he speculates that they may have been drawn from different African populations as far apart as Liberia and Angola. In addition, the monkeys probably continued to be imported and released (or escaped) over a longer time period than had been previously contemplated. His scenario of sequential introductions from different sources can have major genetic consequences, which will only be ultimately resolved by a genetical investigation of both West Indian and West African green monkeys.

The thorny issue of changes in population size through time, at least for Barbados, is tackled with the suggestion that since green monkeys are both elusive and cautious, their presence may have gone undetected when they were not contacting humans during crop-raiding. He thus plays down a proposed population crash and bottleneck and concentrates on changes in the behaviour of the monkeys. These behavioural changes stem from deforestation and the expansion of human crops palatable to the monkeys, which periodically brought the humans and primates into closer contact and might not reflect underlying changes in monkey

densities or distributions. In comparing the St Kitts monkeys with those on Barbados, he suggests a slow but continual increase in population size on an island with much lower human population densities.

Hopefully, some of the issues raised in this book can be explored further, especially by genetic research and ultimately have a wider relevance to primate biogeographical studies. The focus of this volume is very specific to the West Indies and may be of less general interest to primatologists working with other species. I hope this is not the case and indeed those investigating problems of primate pests should find this a source of stimulating ideas.

## Review 4. By Vern Weitzel

Review of: Contributions to Primatology, Series editor F. S. Szalay. Volume 24. *West Indian Green Monkeys: Problems in Historical Biogeography* by Woodrow W. Denham. 1987 Karger, Basel. Hardcover, 79pp, US \$26.75.

Reviewed by: Vern Weitzel, Department of Prehistory and Anthropology, Australian National University Canberra, ACT 2601

Published in: *Australian Primatology* 2(3), July 1987  
<http://coombs.anu.edu.au/~vern/journal/AP2.3.1987.pdf>

Now a story about primate refugees, a topic that has become more important in the last few years as there are fewer and fewer wild ranging primates and more and more of them reside in zoos, animal colonies and reserves disconnected from the great tropical forests and woodlands of the past.

The fact is that we know relatively little about the population dynamics or genetics of primates in these artificially restricted groups. We have never investigated them in any detail because artificial primate colonies (and that includes an increasing number of forest reserves) are a very modern phenomenon, essentially a product of the last century or less.

If we are to preserve primate species (never mind the genetic variability evident in races) into an uncertain future, we must do this with some realistic knowledge about how isolates behave over time.

Okay. So where do you find a long-term study for a new phenomenon? Of course, you look for displaced primates. There exist, for example, colonies of *Macaca fascicularis* on the island of Mauritius (Sussman and Tattersall 1986). Fooden (1969) mentions a population of *Macaca nigra*, indigenous to the North tip of Sulawesi, living on a far off island - originally part of a palace menagerie - t'other side of Wallace's Line (a zoogeographic boundary which otherwise does well at separating Asian from Australasian fauna). Similarly, there are reports of isolated groups of long-coated *Macaca mulatta* as far north as Beijing where these Rhesus Macaques once squawked among the pleasure domes of Kublai Kahn.

Primates have apparently always been kept as pets, and so it is not unusual to see feral primates in all the strange places that human castaways have lodged since the Age of Exploration. Animals can get loose and they do procreate, especially in the tropics.

Though it is not generally the case today outside of Africa, monkeys of the genus *Cercopithecus* were used as pets from the Egyptian Kingdoms through to late medieval times -- the name itself is Greek, meaning 'tailed monkey', and it is a term that appears in Hellenic literature showing if nothing else the degree of African trade into the Mediterranean basin. It could also be argued that it demonstrates a certain enterprise to market a farmer's pest in another country and thus make a profit out of a problem.

So it was that before Woolly Monkeys and Capuchins became the partner of the street-corner organ grinder, primates of the genus *Cercopithecus* operated very much in the same position.

So *Cercopithecus aethiops*, the Vervet and its subspecies the Grivet and the Green Monkey of Africa spread to the New World with the traders and slave masters, bosuns and cabin boys.

In *West Indian Green Monkeys: Problems in Historical Biogeography*, Woodrow Denham examines insular populations of the West African Green Monkey (generally referred to as *Cercopithecus aethiops sabaesus*) of St. Kitts, Nevis and St. Eustatius Islands (lying in the Caribbean near Puerto Rico) and on beautiful Barbados in the West Indies. These islands are well away from the African Coast. It is not thought likely that West African monkeys arrived on their own by rafting across the Atlantic before Columbus (who by the way discovered St. Kitts on his second voyage). Though this somewhat remote possibility was not argued in detail, nor can it be with the evidence available, Denham's quite sensible position is that the Green Monkey was most probably brought by European traders during the time of colonisation.

Denham actually has placed two short and somewhat different theses in the one volume: First he asks how and when did Green Monkeys get to the West Indies and also where in Africa did they come from? And when? This question is Sherlock Holmes style historiography with all its arm-chair excitement.

Second, looking only at the Barbados monkeys, given what is known about primate arrivals, what population fluctuations (hence what genetic bottlenecks) have occurred on that island through time? This involves as well an analysis of reports by witnesses, crop loss data (Green Monkeys remain a principal cause of damage to the Barbados cash crops) and a series of questionnaire results.

Green Monkeys may have arrived in St. Kitts as early as the 1640's with the Portuguese. While it is thought the population is principally composed of the West African Green Monkey (*C. aethiops sabaesus*), there are reports that other Vervet subspecies or the Mona Monkey (*Cercopithecus mona*) have entered the Kittitian gene pool.

If this is true, it materially affects the way we must view our biochemical and morphological comparisons between modern populations in St. Kitts and West Africa. For instance Poirier (1972) finds the St. Kitts Green Monkey to have slightly larger teeth and skull than African Green Monkeys. Is this due to evolution or to admixture? (Or is it an effect of the sample.)

The time of the latest arrival is also important. Blakeslee et al. (1985) find a sample of Barbados Green Monkeys to be negative for the STLV-III retrovirus which is similar to the virus which produces AIDS in humans. This suggests that the virus emerged de novo since the demise of the transatlantic monkey trade. This is perhaps one of the most important findings of this report, since it adds to other evidence (Dugbaza, this issue) which suggests that this category of retrovirus has evolved recently and proliferated with frightening speed.

What is frustrating both to the reader and apparently the author is that Denham cannot give us a clear answer to most of the questions he poses. Primates may have arrived at any time within two and a half centuries and although we can be assured morphologically that the St. Kitts monkey is predominantly the Green Monkey, admixture is certainly not out of the question. We may never know how mongrelized Kittitian Green Monkeys really are, at least not without a great deal more diligent biomolecular as well as historical research.

With Barbados, the problem is complicated by the possibility that New World Capuchin (*Cebus*) Monkeys might have preexisted there and have since become locally extinct. Again there is a significant lack of information, though Denham gives us the impression that he has scoured libraries and court records.

Hence, we who would like to have a test-tube environment for our biological models are facing historical uncertainty. The problem with some historical studies is that there exists a point of diminishing return for the energy investment of poking through ream after bailed ream of ancient documents.

My criticism of Denham (if indeed it can be cast as such) is this: as this is a case in which there undoubtedly exist many possible lines of evidence, Denham could well have searched still more court basements and looked into still further seaman's notes until he found one or two useful snippets. But how much evidence must one search? I am satisfied that Denham has spent a great deal of time, and it is a little sad he couldn't have come to more firm conclusions - - but that's one reason history is in the Arts not the Sciences. Also, Denham seems to have discovered a few new questions. (Isn't it always the case?) The upshot is that I am strangely unsatisfied with Denham's product, though this is largely because Denham's diligence has opened Pandora's Box, spoiling the neat last-page Agatha Christie tie up.

To briefly test my touted criticism, I examined several major 19th century taxonomic works, just to see if I could find any information about Green Monkeys in the West Indies. I drew a blank. While Green Monkeys are regularly reported from the Cape Verde Islands (where they were no doubt introduced very early on) there is no evidence in a dozen texts at hand that Victorian taxonomists knew about Vervets or Green Monkeys in the small islands of the West Indies. While mine is by no means a scientific study, it does indicate that the available useful literature is spare as Denham indicates.

*West Indian Green Monkeys* is delight to read: a historical whodunit as one reviewer put it. If you like Perry Mason, then Denham will be your cup of tea.

*West Indian Green Monkeys* is not your standard primatology fare; it is however a refreshing work in a genre that admittedly few scientists have dabbled at. Clearly more of us should be aware of the historical basis of the populations we study. With this particularly in mind, this sort of historical research (though it may not receive the level of funding of experimental research) is all the same just as important. It is a mandatory prerequisite. In summary, *West Indian Green Monkeys* is not a long book and it is worth the reading.

Thirteen years ago, when *Contributions to Primatology* took over as a series from *Bibliotheca Primatologica*, the first volume in the new series was a behavioural study entitled *The St. Kitts Vervets* by Michael McGuire. That book was paperbound and because of this economy, it foxed and tore easily, annoying librarians. Aside from that, the pages were a comfortable off-white (not the glossy pictorial white of *Folia Primatologica*) and the text and tables were typeset in a pleasant serif face. *West Indian Green Monkeys* is thankfully hardbound - but open the cover ... and the text is in courier - typewriter - print! It looks as though the secretary tapped it off on the office Royal. Now I am sure that Karger can afford more impressive typesetting gear these days when even desktoppers can manage a stylish script. Certainly Dr. Denham's material merits a spiffier finish.

## References

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## Review 5. By Warren G. Kinzey

Review of: *West Indian Green Monkeys: Problems in Historical Biogeography* by Woodrow W. Denham. Contributions to Primatology, Vol. 24. New York: Karger, 1987. 88 pp, \$22.25: cloth.

Reviewed by: Warren G. Kinzey, City College and The Graduate Center, CUNY

Published in: *American Anthropologist* 90(1):172-173, March 1988.

<http://onlinelibrary.wiley.com/doi/10.1525/aa.1988.90.1.02a00270/abstract>

If one looks about the Caribbean islands, despite having learned in Introductory Anthropology that the Western hemisphere is the home of platyrrhine monkeys, one finds a considerable number of free-ranging catarrhines! Continental drift occurred much too long ago to account for these errant distributions. Some monkeys were transplanted relatively recently for research purposes (and usually provisioned) including rhesus macaques on the Puerto Rican islands of Santiago (since 1938), La Cueva and Guayacan (since 1961), and Desecheo (since 1966); patas monkeys on La Cueva (since 1974); and (from 1970-78) gibbons on Hall's island, Bermuda. A more complex history is required to account for *Cercopithecus mona* (if a 1911 report is accurate) on Grenada and green monkeys (*Cercopithecus aethiops*) on St. Kitts, Nevis, and Barbados. The latter were initially brought with early settlers, and Denham's book deals with possible scenarios leading to current distribution on these islands, especially on Barbados.

Most of the book consists of two long chapters that are extensive revisions of articles Denham previously published in the *Journal of the Barbados Museum and Historical Society*, 1981- 82. A 16-page appendix of quotations from historical sources is useful since many references are difficult to obtain, and this allows the reader to verify Denham's conclusions. The bibliography is extensive but ends in the early 1980s, evidence that the book has been a long time "in press."

Few books provide such a complete and thorough statement of a problem: "The work delineates but fails to answer questions concerning two major issues: migration of African monkeys to the West Indies . . . and cyclic changes in the size of the monkey population [on Barbados] between 1627 and 1986" (p. vii). Denham raises more questions than he answers. It is not clear, for example, whether pelage differences among green monkeys on Barbados are the result of polymorphism within the subspecies, or whether they represent two or more migrations from different parts of West Africa. "Hence, the monograph is offered as a stimulus and guide for further research, not as a definitive history of these animals" (p. 6).

The classic scenario is that green monkeys became established on Barbados, St. Kitts, and Nevis soon after 1650, since massive importation of slaves from Africa did not begin until establishment of the sugar plantation economy in the 1640s, and their migration from Africa probably ended soon after 1700. The monkeys were brought either as trade goods, as pets, or a combination of both, but the number that migrated is not known - it could have been few, or thousands. Denham provides extensive discussion of the origin and distribution of monkeys on Barbados. Many plausible scenarios are given for their probably complex origin: they may have originated from one or more places in West Africa and / or the Cape Verde Islands. One

intriguing scenario, based on a statement in Schomburgk's classic (1848) history of Barbados, is that the early monkey pest on that island was *Cebus* not *Cercopithecus*! No single scenario can account for the distribution on both Barbados and St. Kitts (those on St. Kitts came primarily from Senegal), for Denham cautions that differences in both natural and social histories are incompatible with the idea that "the primate populations that live on those islands constitute some kind of unified whole" (p. 56). Depending on which scenario is correct, the animals may have been genetically isolated from African stock for anywhere from 300 to 500 years; they may represent more than one subspecies of *C. aethiops*, in which case their genetic separation may be greater than 500 years; or, if there were repeated migrations as late as the 19th century, their genetic isolation may be much less than 300 years. Thus conclusions, such as that of Ashton and Zuckerman (1951) that reduced dental variability in St. Kitts monkeys reflects a long period of isolation from Africa, may have to be reexamined.

Denham is well aware of his limitations. He has not attempted to explore the enormous volume of unpublished material such as ships' logs, plantation records, deeds, and government documents. He makes many specific suggestions for future research, such as studies of genetic similarities and differences among West Indian populations and between West Indian and African populations. A beginning has already been made in this direction—for example, Linda Fedigan et al.'s (1984) demographic model for colonization by vervets of a single hill on St. Kitts, and Jean Baulu and Julia Horrocks's establishment of the Barbados Primate Research Centre and Barbados Wildlife Reserve on that island in 1985.

## Review 6. By Peter Andrews

**History rather than biogeography.** Review of: W. W. Denham. 1987. *West Indian Green Monkeys: Problems in Historical Biogeography, Contributions to Primatology*, Vol. 24. Basel: Karger. vii+80pp., 6 fig., 8 tables. Hardcover: Price £18.20. ISBN 3-8055-4518-5.

Reviewed by: Peter Andrews, Department of Palaeontology, British Museum (Natural History)

Published in: *Journal of Biogeography* 15(2), 1988.

In the West Indian islands of Barbados, St Kitts and Nevis there are populations of the green monkey. This is a species of the genus *Cercopithecus* which is otherwise restricted in its geographical range to the continent of Africa. It might therefore appear to be an interesting biogeographic problem, but in fact the main issues are historical rather than biogeographical. The monkeys were brought to the islands by man, and the relevant questions are by whom were they brought, when did they arrive, and from where did they come. This is therefore a special problem not related in the normal sense to biogeographical problems, and it is tackled in this book by the detailed and comprehensive study of published records from the seventeenth to the twentieth centuries, some of which are reproduced in an appendix to the book.

It is generally thought that green monkeys brought to the New World came from the subspecies *Cercopithecus aethiops sabaesus*. This subspecies lives today in Senegal or Gambia, and it was long thought that the monkeys were brought to the West Indies aboard French slave ships during the mid-seventeenth century. Numbers were thought to have been small, and once on the islands the emerging populations would have been isolated from each other. If these opinions, and they are no better than that, could be substantiated, the monkeys could be useful subjects for evolutionary studies, but the absence of historical records and lack of adequate genetic work on the monkeys give rise to many uncertainties.

For example, some of the monkeys on Barbados and St Kitts show resemblances to another subspecies, *C. a. tantalus*. This could indicate mixture of subspecies, extreme polymorphism within single subspecies, or founder effect leading to incipient subspeciation. If the founder populations were as small as has been claimed in the past, founder effect could have produced rapid change. But the evidence assembled in this book based on the introduction and maintenance of bounty laws during the seventeenth to the nineteenth centuries gives the impression of long-term and large-scale migrations of monkeys. In this case it is more than likely that more than one subspecies could have been brought over, so that the first of the above possibilities is indicated.

The monkeys were evidently a serious agricultural pest, as indicated by the bounties offered for their capture, but unfortunately the bounty laws were not specific as to the exact identity of the monkey. An alternative claim has been that the monkeys on Barbados during the nineteenth century were in fact a species of South American monkey, *Cebus capucinus*. There is no record of them occurring on the island any earlier than this, and they must have died out by the end of the century. If this were true, the cebus monkeys must have coexisted

with the green monkeys. But there is no record of two species of monkey at any time, so that this claim is not likely to be true.

It may be seen from these two examples that where this book set out to solve the problem of the origin of the monkeys on the West Indian islands, it actually brought to light many additional problems and very few answers. The author ends on an optimistic note that the additional study of unpublished records may provide some of the answers, but in view of the apparent confusion and lack of precision in the published records on which he based his work, I am not sure that I would be quite so optimistic.

## Review 7. By Trudy J. Turner

Review of: *West Indian Green Monkeys: Problems in Historical Biogeography*, W. W. Denham. Basel: Karger, 1987. *Contributions to Primatology*, Vol. 24. vii+79pp., figures, tables, appendix, index. \$22.25 (cloth).

Reviewed by: Trudy J. Turner, Department of Anthropology, University of Wisconsin, Milwaukee.

Published in: *American Journal of Physical Anthropology*, 78(1):126-127, January 1989.

The presence of an Old World monkey, *Cercopithecus aethiops*, on the islands of St. Kitts, Nevis, and Barbados in the West Indies, has produced a kind of natural evolutionary experiment. Tantalizing questions abound. When and how did the animals arrive? How large were the founding populations? Where precisely did the animals come from? Are animals on different islands or populations of animals on the same island descended from the same parental stock? Finally, how much genetic change has there been from the original African population?

Traditionally, the vervets of the Caribbean have been considered a fairly homogeneous population descended from a limited number of animals brought over by slave traders in the late 17th century. Denham, in this monograph, has done much to dispel this notion. He has examined historical records of the slave trade and histories and laws of the islands which, he argues, demonstrates a heterogeneity of origin of the founding population. Additionally, Denham has set forth several alternative hypotheses to account for the history of the animals on Barbados, despite the sketchiness of data over a 200-year period.

Those of us interested in vervet monkeys and those of us interested in this rare example of a natural evolutionary experiment are indebted to Denham for offering plausible alternatives to a previously unchallenged explanation of the origin of these populations. However, there are some areas in which this monograph could have been stronger.

Much of the book is devoted to the Barbados animals. Because most behavioral studies of vervets have been done on St. Kitts, more emphasis on the St. Kitts animals' origins and history would have been welcome. Denham argues that one of the current phenotypic variants, mottled face depigmentation, indicates heterogeneity of origin. It is unclear whether this trait is genetic and what, if any, utility it has as a population marker. Finally, as Denham himself suggests, this work seems to be premature. He has not yet explored the unpublished material such as wills and other local records that might bear on his hypothesis. As is, the book is a composite of two articles published in the *Journal of the Barbados Museum and Historical Society* plus an appendix of the 34 primary sources. Making this work more accessible is of value, but Denham could have rendered a greater service by completing and including additional work in this volume so that we might be closer to answering the important questions raised.

## Review 8. By John Gilmore

Review of: *West Indian Green Monkeys: Problems in Historical Biogeography* by Woodrow W. Denham. vii+79pp.,. *Contributions to Primatology*, Vol. 24. Karger: Basel, 1987

Reviewed by: John Gilmore.

Published in: *Journal of the Barbados Museum and Historical Society*, 1988, pp.238-240.

The African green monkey (*Cercopithecus aethiops sabaues*) is also found in Barbados, St. Kitts, Nevis, and, in smaller numbers, in Sint Eustatius. A related species, reported as *Cercopithecus mona*, also of African origin, is to be found in Grenada. The green monkey is familiar to many Barbadians as a charming creature which is occasionally to be seen crossing a road, or romping around in wooded areas, or which may be visited in semi-captivity in the Barbados Wildlife Reserve. Unfortunately, its habits include raiding cane-fields and stealing fruit and vegetables from gardens and provision grounds, a fact which makes it less than popular with cultivators of the soil. In recent years the monkey has also become one of Barbados's exports, and several thousand have been trapped and sent overseas, a lucky few to zoos, but the majority have gone to be experimented on in North American and European laboratories.

The book under review (parts of which previously appeared in the form of articles in the *JBMHS*) mentions the Grenada monkey only in passing, but surveys the extensive literature on the monkeys of Barbados and St. Kitts — it is interesting to learn that tests on a large sample of the island's simian population showed that, unlike some African green monkeys, the Barbados monkeys do not carry antibodies to AIDS-related viruses — and Denham adds some observations of his own, based on field-work in Barbados.

Like isolated animal populations elsewhere, the West Indian green monkeys are of considerable potential interest for the study of genetic change, and they do seem to differ to some extent from the African ones. Denham points out, however, that primatologists have tended to take it for granted that the monkeys reached the West Indies three hundred years ago and have remained genetically isolated from their African relatives ever since, whereas neither of these assumptions is necessarily true. Early references to monkeys do not give the sort of information which would enable the species to be identified, and evidence that monkeys were taken from Africa to the West Indies as pets does not prove that these same monkeys were able to establish viable populations in the wild. The earliest definite identification of the West Indian monkeys as cercopithecines is only a century old, and whether they reached here a hundred or three hundred years ago could make a considerable difference from a geneticist's point of view.

Denham has turned up a large number of early references to monkeys in the West Indies, and he looks at such questions as when and how the monkeys got to Barbados and St. Kitts; whether the monkeys present in the West Indies were always green monkeys, or whether *Cercopithecus aethiops* replaced another, possibly South American, species; for how long the influx of African monkeys continued; and whether there have been any significant changes over time in the size of the Barbadian monkey population. An appendix gives quotations at length from over two dozen historical sources that refer to monkeys in the West Indies.

The author makes very heavy weather of a number of points, such as the question of whether or not Schomburgk, the historian of the island, saw a South American cebus monkey in Barbados. It is true, as Denham says, that Schomburgk was an eminent naturalist who was not likely to make a mistake on such a point, but even if he did see one cebus monkey, this does not prove that there was a population of such monkeys in the island. The single specimen which Schomburgk mentions as having seen, apparently in the wild and, if so, presumably at a distance, might perfectly well have been an escaped pet. Similarly, much energy is expended on the possibility that the poet M. J. Chapman's early nineteenth-century reference to Barbadian monkeys as "Jacko" might help to identify a particular species. The eventual conclusion is negative, which is hardly surprising, since "Jacko" used to be considered a suitable name for a monkey irrespective of species, in the same way that "Rover" is considered a suitable name for a dog, irrespective of breed. One also wonders whether it was necessary to include a ten-page summary of the geology and history of Barbados, instead of simply referring the reader to standard works on these subjects.

When trying to establish the earliest reference to monkeys living in Barbados, the author trips over an elementary point of chronology when he talks about "An Act for Destroying Wilde Monkeys and Raccoons," dated 17 March 1679, and suggests that "It may be an incorrectly dated copy of the act that was passed on 17 March 1680." Since until the middle of the eighteenth century the official beginning of the year in England and Ireland and the British possessions abroad (though not in Scotland after 1599) was 25 March, with a double indication sometimes given for the period 1 January to 24 March, the two dates are in fact the same, that is 17 March 1679/80, or what a historian would now refer to as 17 March 1680. Denham has also been misled, by referring to a much later edition of the *History of the Earth and Animated Nature* (1774), into the belief that Oliver Goldsmith was a nineteenth-century author. There are a number of slips and inconsistencies in the references to published works: Hutton on p. 45 becomes Hutson in the bibliography, and on p. 37 Harlow's *History of Barbados* is referred to as being published in 1961, but given in the bibliography as Oxford, 1939, reprinted Negro Universities Press 1969, whereas in fact the original edition was 1926 and the reprint 1969.

When all is said and done, Denham is forced to admit that the evidence he has turned up is inconclusive and does not provide definite answers to the questions he has been asking: "Most of the answers — probably even most of the questions — remain to be found." In view of the interest the West Indian monkeys have aroused, this is doubtless worth saying, but one wonders whether it could not have been said in a short article, instead of being extended to more than eighty pages and published between hard covers.

## Review 9. By Anonymous

Review of: *West Indian Green Monkeys: Problems in Historical Biogeography* by W. W. Denham. Basel: Karger, 1987. Pp. 79. Price £18.20.

Reviewed by: Anonymous

Published in: *Animal Behaviour* 35(4), 1987.

This book is the 24th volume in the series Contributions to Primatology, edited by F. S. Szalay. It covers two main issues: the migration of African green monkeys to the West Indies and the cyclic changes in the population on Barbados between 1627 and 1986. An appendix of the original historical sources is included. The author examines the numbers, dates and routes of migration, the possibility that cebus and green monkeys coexisted on Barbados and how the populations of green monkeys have changed. The populations on Barbados and St Kitts are also compared.

**Review 10. By H. Rothe**

Review of: Denham, W. W. (1987) *West Indian Green Monkeys: Problems in Historical Biogeography*. 80 pp., Karger: Basel (DM 57).

Reviewed by: H. Rothe, Gottingen

Published in: *Homo* (2), 1987

Der Autor führt eine gründliche bibliographische Studie über 350 Jahre Geschichte von *C. aethiops* auf den Westindischen Inseln Barbados, St. Kitts und Nevis durch. Das Buch wird für diejenigen von sehr grossem Wert sein, die an den entsprechenden Orten Feldstudien an *C. aethiops* betreiben. Darüber hinaus könnte es für den Populationsgenetiker interessante Hinweise zur Genpoolzusammensetzung und veränderung von Inselpopulationen liefern.