

**On the Origin of the Types of *Hypsilurus godeffroyi*
(Reptilia: Squamata: Agamidae) and Early German
Contributions to the Herpetology of Palau**

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Abstract—The published sale catalogues of the Museum Godeffroy in Hamburg provide hitherto overlooked information regarding early German herpetological research in Palau. The type specimens of the agamid lizard *Hypsilurus godeffroyi* Peters, 1867 are supposedly from Palau, but have never been seen or collected there again. The Godeffroy catalogues indicate that the data provided for these specimens by the collector, Alfred Tetens, may have been inaccurate. Tetens also traveled to the Anchorite, Hermit, and Ninigo Groups off the northern New Guinea coast and we hypothesize that one of these areas is the true origin of the types of *H. godeffroyi*. The collections of Tetens and Jan Kubary, both employees of the Godeffroy firm, provided the basis for the first published lists of the herpetofauna of Palau. Among other species, these collectors of the 1860s and 1870s confirmed the occurrence of two of lizards not rediscovered until well into the 20th Century.

Introduction

One of the most problematic reptile species recorded from Palau is the agamid lizard *Hypsilurus godeffroyi* Peters 1867. Peters' (1867b) description of *Lophura (Hypsilurus) godeffroyi* was based on two specimens from the "Pelew-Inseln" [= Palau Islands] obtained by him from the Museum Godeffroy in Hamburg. One of these specimens, Zoologisches Museum zu Berlin (ZMB) 5892, was exchanged to the Field Museum of Natural History and is now catalogued as FMNH 73845 (Marx 1958). Marx (1958), in passing, referred to the Berlin spec-

imen as the lectotype, and indicated that the Field Museum specimen was a paratype [sic, paralectotype]. As has been widely remarked (e.g. Allison 1996), no specimens of this species have been seen in Palau since the time of the description, although lizards assigned this name are widespread from the Admiralty Islands and Bismarck Archipelago east to the Solomon Islands (Allison 1996; Fig. 1).

The Palau type locality of *Hypsilurus godeffroyi* has been accepted by many workers (e.g., Wermuth 1967, Moody 1980), but others have expressed doubt as to the veracity of the original locality data. The species has most recently been considered by Crombie & Pregill (1999), who documented the convoluted history of this taxon in their overview of the Palauan herpetofauna. Crombie & Pregill (1999) conceded that the type locality may be in error, and pointed to the fact that Peters' types were obtained from the Museum Godeffroy without specific locality data or name of collector. However, they believed it more likely that an agamid lizard, if not this species, did, and probably still does, live in Palau. To support this interpretation they noted both the discovery of very recent agamid skeletal remains from Ngeaur and the highly cryptic nature of *H. cf. godeffroyi* on the Solomons (McCoy 1978, 1980). Nonetheless, the specific identity of the agamid subfossils remains undetermined (G. Pregill, pers. comm.) and the systematics of *H. godeffroyi* are highly unstable (McCoy 2000). Although currently regarded as conspecific by many workers (Crombie & Pregill 1999), the secretive agamid from the Solomons (and parts of New Guinea) is probably specifically distinct from true *H. godeffroyi*, as represented by the putatively Palauan type specimens.

The zoological evidence for the occurrence of *Hypsilurus godeffroyi* in Palau remains equivocal. We do not discount the possibility that the species did or does occur in Palau and are particularly swayed by the discovery of agamid remains on Ngeaur. However, we have discovered historical evidence that sheds light on the collector of the type specimens and that could suggest an alternative geographic origin for them. We have also located early published sources on the herpetofauna of Palau that were overlooked by Crombie & Pregill (1999). Among other species, these sources demonstrate that two lizards were first reported from the region 50-100 years before generally acknowledged.

The Museum Godeffroy and its Catalogues

Peters (1867b) in his description of *Hypsilurus godeffroyi* noted only that the specimens had been obtained from the Museum Godeffroy. The Museum Godeffroy, based in Hamburg, was founded in 1860 by Johann Cesar Godeffroy VI, who presided over his family's mercantile and shipbuilding business. Godeffroy took advantage of the firm's extensive commercial network in the Pacific to build and enrich the museum's collections, which were supplied both by ship captains and traders sent out primarily for commercial purposes, and by

professional collectors hired specifically to obtain natural history and ethnographic specimens (Spoehr 1963). In addition to accumulating material itself, the Museum Godeffroy, under its custodian J. D. E. Schmeltz, offered duplicate material for sale to institutions and private collections throughout Europe.

Perhaps more so than conventional public or royal museums of the time, the Museum Godeffroy specimens were typically accompanied by fairly detailed data regarding collector and collecting locality. Some of the information regarding specimens was actually published by the Museum itself. In addition to providing a place for specialists to publish original descriptions (*Journal des Museum Godeffroy*, 1873–1881), the museum also published sale catalogues, often augmented by additional information about the collections offered. These catalogues were distributed to potential buyers and must have been well known in museum circles at the time but, because of their ephemeral nature, few appear to have survived. *The National Union Catalogue Pre-1956 Imprints* (American Library Association 1972) lists only two American institutional libraries that possess the Museum Godeffroy catalogues, and these have only numbers 4 and 5 of at least eight published. One of us (AMB) has original copies of five of the catalogues. These publications shed some new light on the possible origin of the types of *Hypsilurus godeffroyi* and also illuminate the early history of herpetology in Palau.

Alfred Tetens and his Travels

Catalogue IV, issued in 1869 with J.D.E. Schmeltz, Jr. as the primary author, included a detailed section on the geography and zoology of the islands of the Pacific. The Museum had recently received rich collections from the region, including material collected by Dr. Eduard Gräffe (Fiji, Ellice Islands), Frau Amalie Dietrich (Queensland, Australia), and Captain Alfred Tetens (Melanesia and Micronesia). By the time this catalogue had appeared, numerous new species had been described on the basis of material derived from these collectors. Indeed, a selling point for the Museum Godeffroy was that the collections offered material (often toponymic) of rarities that had just been described, and thus provided museums with the opportunity to purchase representatives of taxa that were guaranteed to be new for their own collections. Dietrich's collections were probably the most herpetologically significant, as Wilhelm Peters described at least 22 new species from her collections from Port Bowen, Port Clinton, and Lake Elfinstone, Queensland (Bauer et al. 1995). However, Tetens' collections were also noteworthy for the crustaceans, birds, and reptiles they included, among them the types of *Hypsilurus godeffroyi* (Schmeltz 1869).

Schmeltz (1869) provided a fairly detailed overview of Tetens' travels and of the material he returned to Hamburg. According to Schmeltz's summary, Tetens visited the "Pelew- oder Palaos-Inseln" [Palau]; "Insel Yap oder Eap" [Yap] and the "Matelotas-Gruppe" [Ngulu Atoll], both in the western Caroline Islands,

Federated States of Micronesia; and several groups of islands in what is today Manus Province, Papua New Guinea: “L’Echiquier-Archipel” [Ninigo Group], “Anachorètes- oder Anchorites-Insel” [Anchorite Islands], and “Los Eremitanos- oder die Hermits-Gruppe” [Hermit Islands] (Fig. 1).

Tetens (1958) himself outlined his travels in the region more fully. Tetens first arrived in Palau as a business associate in Andrew Cheyne’s bêche-de-mer business in 1862. After an absence he returned in December 1865 as captain of the brig *Vesta* in the employ of J.C. Godeffroy & Son. On this voyage he stopped

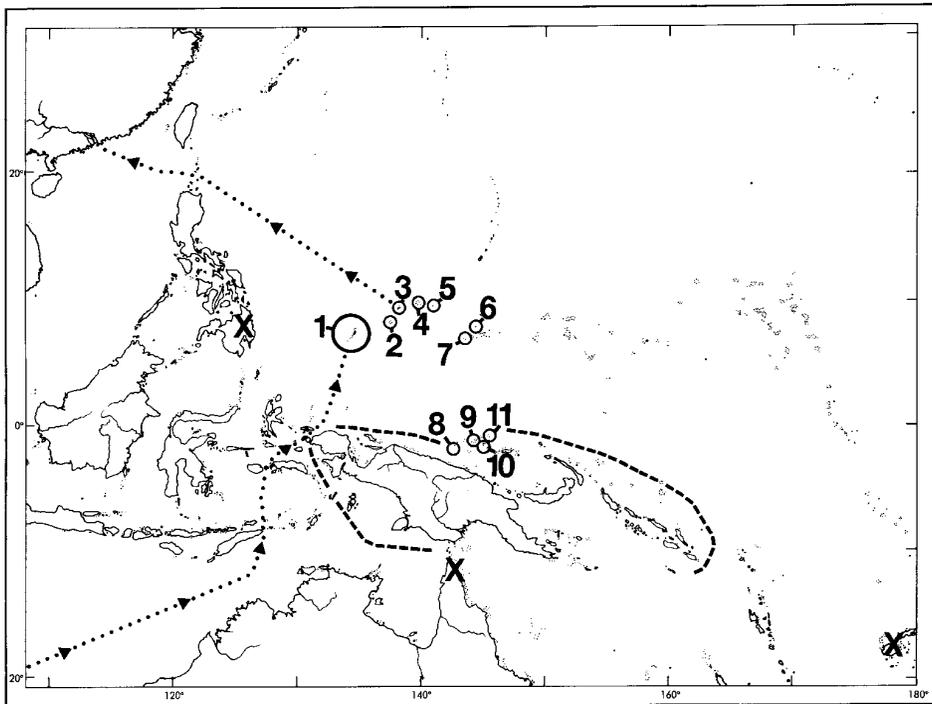


Figure 1. Map of the western Pacific illustrating Alfred Tetens' travels in the region and the distribution of *Hypsilurus godeffroyi*. The approximate course of Tetens' first trip to and from the region in the employ of J. C. Godeffroy & Son is indicated as a dotted line. Tetens arrived in Palau (1) from the Cape of Good Hope in late 1865 and, after visiting Ngulu (2), Mogmog (4), Fais (5), Faroulep (6), Woleai (7), and the Ninigo Group (9), sailed via Yap (2) with his cargo to Hong Kong. Tetens' second trip, later in 1866, also included the Hermit Islands (10) and the Anchorite Islands (11). The types of *H. godeffroyi* were collected on one (or both) of these two trips. The dashed line indicates the approximate northern distribution limits of the genus *Hypsilurus* and encompasses the area from which *H. godeffroyi* sensu lato has been reliably recorded (distribution in Irian Jaya is poorly known; the species occurring in the east of the range should probably be regarded as specifically distinct). No specimens of *Hypsilurus* have yet been recorded from the Hermit, Ninigo, or Anchorite groups, but the genus is present on Wuvulu Island (8). Erroneous literature reports for *H. godeffroyi* in the Philippines, north Queensland, and Fiji are each indicated by an "X."

for provisions at Sonsorol and continued on to Koror, but because he could not obtain enough bêche-de-mer and tortoiseshell in Palau he also visited Yap, Matelotas [Ngulu], Fais, Falalop [Faroulep], Mogmog (in Ulithi Atoll), and Ulie [Woleai], all in the modern state of Yap, as well as the Echequier Islands [Ninigo Group] off the coast of New Guinea. Returning northward via Sonsorol and Yap, Tetens passed north of Palau and through the Balintang Channel into the South China Sea en route to Hong Kong (Fig. 1). Here he arranged to ship goods and scientific collections to Hamburg. In 1866 Tetens returned from Hong Kong to Koror and went to the Hermit Islands (and possibly the Anchorites) off the coast of New Guinea before returning to the Caroline Islands and Koror, and thence again to Hong Kong. In 1867 he left Hong Kong for a final trip, travelling to many islands in the Palau group, as well as Truk [Chuuk], and islands in the Mortlock [Nomoi] group, including Losap and Nimma [Nama].

Palauan Amphibians and Reptiles Collected for the Museum Godeffroy

Schmeltz (1869) provided a list of “Amphibia” obtained by Tetens from Micronesia and Melanesia. Sixteen species were included [current or probable current names in brackets], *Hydrosaurus marmoratus* [*Varanus salvator*; sic, *V. indicus*] from Yap, and the following species from the “Pelew-Inslen:” *Platydactylus bivittatus* [*Gekko* cf. *vittatus*], *Lophura (Hypsilurus) Godeffroyi* [*Hypsilurus godeffroyi*], *Euprepes carinatus* [*Mabuya* cf. *multicarinata* ?], *Euprepes multicarinatus* [*Mabuya* cf. *multicarinata*], *Eumeces Oppelii* [*Eugongylus* cf. *rufescens*], *Eumeces rufescens* [*Eugongylus* cf. *rufescens*], *Eumeces cyanurus* [*Emoia caeruleocauda* or *E. impar*], *Lygosoma smaragdinum* [*Lamprolepis smaragdina*], *Lygosoma scutatum* [*Sphenomorphus scutatus*], *Cryptoblepharus Boutonii* [*Cryptoblepharus* cf. *poecilopleurus*], *Engyrus superciliosus* [*Candoia* cf. *carinata*], *Dendrophis striolatus* [*Dendrelaphis* cf. *punctulatus*], *Cerberus boaeformis* [*Cerberus rynchops*], *Platurus fasciatus* [*Laticauda colubrina*], and *Platurus scutatus* [*Laticauda colubrina*]. Native names were provided for most of these, with “Tusaul” being applied to *Hypsilurus godeffroyi*.

The catalogue offered *Lophura godeffroyi* for 360 Silbergroschen (about 36 British shillings at the time), one of the highest prices asked for any of the available lizards. Wilhelm Peters, then director of the Zoological Museum in Berlin, as a preferred customer, had obtained and described the two type specimens (now ZMB 5892 and FMNH 73845) prior to the preparation of Catalogue IV. The number of specimens remaining for sale was not stated by Schmeltz (1869) but, because a range was provided for the size of the specimens offered, at least two specimens of *Lophura Godeffroyi* were still available for purchase in 1869. These specimens were from the same Tetens collection that had yielded Peters’ types, but were not part of the actual type series described by Peters (1867b). One of these specimens now appears to be NMW 21049, which was listed as a syntype

by Tiedemann & Häupl (1980) and Tiedemann et al. (1994). Both Bauer et al. (1995) and Denzer et al. (1997) listed this specimen as part of the type series on the basis of its inclusion in the Vienna type catalogues, but it is clear that this specimen is not a paralectotype. Indeed, it was donated to the Naturhistorisches Museum in 1869, two years after the description and the same year as the additional Palau specimens appeared in the Museum Godeffroy sale catalogue. The whereabouts of additional Palauan *H. godeffroyi* (if any) collected by Alfred Tetens remains unknown.

Catalogue V of the Museum Godeffroy (Schmeltz 1874) also featured material from the Pacific. Most notable were the collections of J. Kubary who had visited Samoa, the Boston Islands [Ebon, Marshall Islands], Yap, and Palau in the years 1869–1873 (he continued collecting for Godeffroy in the Pacific until 1879). His collections included 13 reptiles and amphibians from Palau: *Chelonia imbricata* [*Erytmochelys imbricata*], *Platydactylus bivittatus* [*Gekko* cf. *vittatus*], *Gecko moestus* [*Lepidodactylus moestus*], *Euprepes carinatus* [*Mabuya* cf. *multicarinata*], *Eumeces rufescens* [*Eugongylus* cf. *rufescens*], *Eumeces cyanura* [*Emoia caeruleocauda* or *E. impar*], *Lygosoma smaragdinum* [*Lamprolepis smaragdina*], *Engyrus sperciliosus* [*Candoia* cf. *carinata*], *Dendrophis striolatus* [*Dendrelaphis* cf. *punctulatus*], *Cerberus boaeformis* [*Cerberus rynchops*], *Platurus fasciatus* [*Laticauda colubrina*] and *Platymantis corrugata* var. *Pelewensis* [*Platymantis pelewensis*]. Schmeltz (1874) noted the absence of some of the species reported by Tetens and suggested that it was for the future to decide if Kubary had been unable to find *Lophura Godeffroyi*, *Eumeces Oppellii*, *Lygosoma scutatum* and *Cryptoblepharus Boutonii* or if they simply did not occur in Palau. He went on to say “Wir sind übrigens geneigt, uns der letzteren Annahme zuzuneigen, da schon mehrere andere der Tetens’schen Angaben sich nicht als stichhaltig erwiesen. [We are, incidentally, inclined to accept the latter view, because several other bits of information provided by Tetens have been proven not to be valid].”

The Geographic Origin of *Hypsilurus godeffroyi*

Clearly Schmeltz considered the type locality of *Hypsilurus godeffroyi* suspect. Although no further information is provided as to Tetens’ apparent errors, it is likely that these involved demonstrably incorrect locality data. Although the other species questioned by Schmeltz (1874) actually do occur in Palau (although not necessarily correctly identified by these names; Crombie & Pregill 1999), no further records of *Hypsilurus godeffroyi* from Palau exist. As currently construed, *Hypsilurus godeffroyi* occurs in Palau, Papua New Guinea and adjacent island groups, and in the Solomon Islands as far south as Santa Ana (Crombie & Pregill 1999; McCoy 2000). Specimens from the Solomons differ conspicuously from the types of *H. godeffroyi* and should perhaps be regarded as specifically distinct. The name *Hypsilurus macrolepis* (Peters, 1872) is available for this population.

Mainland New Guinea specimens more closely match the types of *H. godeffroyi*, but are nonetheless distinguishable by a number of characteristics (Watkins-Colwell, unpublished).

Although clearly not definitive, we believe that Schmeltz's suspicions may have been justified and that the "Palau" *H. godeffroyi* may have been obtained in one of the island groups west of Manus Island. Records of *H. godeffroyi* from the Admiralty Islands are few, although the range has been definitively stated to include this group (Allison 1996). Indeed *H. godeffroyi* remained fairly poorly known anywhere in its range until well into the 20th Century. The only specific published insular locality record west of New Ireland seems to be that of Hediger (1933) from Massau (Mussau) Island in the St. Mattias Group, still 270 km east of Manus and minimally 450 km from the islands visited by Tetens. Unfortunately the Hermit Islands, Ninigo Group and Anchorite Islands have never been sampled herpetologically. Very little work has been published on the herpetofauna of Manus Province in general. Kisokau (1974) reported seven reptiles and two frogs from Rambusto Island and three reptiles from Plot Island, but no agamids were among these. Verification of the presence of *Hypsilurus godeffroyi* from these islands would strengthen our argument regarding the probable origin of the types. The only specimen of *Hypsilurus* we have been able to locate from the region is University of Papua New Guinea reptile collection specimen UP 8532 from Wuvulu Island, approximately 425 km east of Manus and 135 km east of the Ninigo Group (Fig. 1). This specimen does resemble *H. godeffroyi*, but a more comprehensive revision of the New Guinean *Hypsilurus* is required before its specific identity can be verified.

Early Records of Reptiles from Palau

Regardless of Tetens' locality data for *Hypsilurus*, some of his records are clearly genuine as they refer to endemic Palauan forms (e.g. *Sphenomorphus scutatus*). The list of his Palauan material (Schmeltz 1869) and that of Kubary (Schmeltz 1874), therefore, constitute the first species lists of the herpetofauna of Palau. Neither Crombie and Pregill (1999) nor earlier authors concerned with the herpetofauna of Palau seem to have identified that the first lists of the vertebrate fauna had appeared so early. Included in these early lists were species that were not reported on again for decades, or even a century. Crombie & Pregill (1999) attribute the first Palauan record of *Mabuya* cf. *multicarinata* from Palau to Sternfeld (1920). Likewise they credit Dryden & Taylor (1969) with first reporting the occurrence of a *Eugongylus* from the group (as *E. mentovarius*). In fact, both had been reported in the catalogues of the Museum Godeffroy

The lists of Schmeltz (1869, 1874) might also provide some insight into the "native" herpetofauna of Palau. Crombie & Pregill (1999) include 39 terrestrial and seven marine species in the local herpetofauna. They have signaled some of these as possible recent introductions. Although negative evidence is not compelling, it should be noted that these early collections did not include

Hemidactylus frenatus, *Lepidodactylus lugubris*, *Carlia* cf. *fusca*, or *Varanus* cf. *indicus*, although at least in the last case much earlier reports verify the species' occurrence in parts of Palau (Chamisso 1821).

Crombie & Pregill (1999) in their historical resumé of herpetological exploration of the group noted that the primary German contribution to the herpetology of Palau was a series of species descriptions by Wilhelm Peters (Peters 1867a,b, 1874, 1877, 1879). Among collectors, they highlighted the contributions of Carl Semper, who had collected some of the material described by Peters (Table 1). Semper travelled to Palau in 1862 with the ship the *Lady Leigh*, captained by Edward Woodin, an arch rival of Cheyne, Tetens' early business partner. Semper and Tetens apparently met briefly before the former left Palau in 1863 (Hezel 1983). Both men collected specimens that ended up in Berlin, but Semper's material was obtained directly from the traveler himself, whereas Tetens' material was obtained by the Berlin Museum via the Museum Godeffroy. At the time of publication of Peters' (1867a) first paper on the Palauan herpetofauna only Semper's specimens were on hand in Berlin. Tetens' first specimens were those shipped to Hamburg from Hong Kong in 1866; these would have reached Europe only sometime in 1867. Peters' subsequent papers were published after the first shipments of the Museum Godeffroy's next Micronesian collector, Jan Kubary, had arrived in Germany and it is clear that material from all three men served as the basis for these later descriptions (Table 1).

Table 1. Palauan amphibian and reptile taxa described by Wilhelm Peters.

| Original Name | Current Name | Description | Collector |
|--|--|-------------|------------------------------|
| <i>Platymantis plicifera</i> var. <i>Pelewensis</i> | <i>Platymantis pelewensis</i> | 1867a | Semper |
| <i>Lophura</i> (<i>Hypsilurus</i>) <i>Godeffroyi</i> | <i>Hypsilurus godeffroyi</i> | 1867b | Museum Godeffroy, Tetens |
| <i>Gecko moestus</i> | <i>Lepidodactylus moestus</i> | 1867a | Semper |
| <i>Hemidactylus</i> (<i>Peropus</i>) <i>brevipalmatus</i> | <i>Gehyra brevipalmata</i> | 1874 | Semper, Kubary |
| <i>Ablepharus rutilus</i> | <i>Cryptoblepharus rutilus</i> | 1879 | Museum Godeffroy, Tetens? |
| <i>Euprepes</i> (<i>Mabuia</i>) <i>microstictus</i> | <i>Emoia atrocostata</i> | 1874 | Museum Godeffroy, Kubary? |
| <i>Lygosoma</i> (<i>Hinulia</i>) <i>scutatum</i> | <i>Sphenomorphus scutatus</i> | 1867b | Museum Godeffroy, Tetens |
| <i>Dendrophis striolatus</i> | <i>Dendrelaphis</i> <i>punctulatus striolatus</i> | 1867a | Semper |
| <i>Typhlops</i> (<i>Typhlops</i>) <i>acuticaudus</i> | <i>Ramphotyphlops</i> <i>acuticaudus</i> | 1877 | Museum Godeffroy, Kubary |

Conclusions

Reference to the Museum Godeffroy catalogues clearly identifies Alfred Tetens as the collector of the types of *Lophura (Hypsilurus) godeffroyi*. Further, the reports of reptiles collected by Tetens (Schmeltz 1869) and Kubary (Schmeltz 1874) constitute the first published herpetofaunal lists for Palau. Schmeltz's (1874) comments regarding the reliability of Tetens' data, however, call into question the Palauan record of *Hypsilurus godeffroyi*. *Hypsilurus* spp. are widely distributed in the New Guinean region, and extend southward into Australia and the Solomon Islands. Most species have relatively restricted ranges, but *H. godeffroyi* (as currently construed) has been reported from New Guinea, Australia, the Solomon Islands, Palau, Fiji, and the Philippines. The Fijian record is erroneous (Zug 1991) as is the single Australian record (Cogger 2000), and the Philippine claim (Cogger 2000) also seems without basis. Discarding these localities, neither *H. godeffroyi* nor any of its congeners has a distributional range extending to the north or west of New Guinea. On the basis of the confirmed range of the genus, and the known itinerary of Alfred Tetens in the Pacific, we suggest that the types of *Hypsilurus godeffroyi* may have been collected in the Hermit, Anchorite, or Ninigo groups off the north coast of New Guinea. Unfortunately, the taxonomic confusion associated with the species and the almost total lack of agamid material from the islands west of Manus prevent, for the time being, further investigation of this possibility. Nonetheless, this is an explicit hypothesis that can be corroborated or rejected on the basis of critical comparison of the types, or other specimens of *H. godeffroyi* sensu stricto, with new material from these island groups.

Acknowledgements

We thank Ms. Rose Singadan (UPNG), Rainer Günther (ZMB), and Harold Voris and Alan Resetar (FMNH) for the loan of material and Allen Allison and Greg Pregill for providing information about Pacific agamids. We also thank two anonymous reviewers whose comments improved the manuscript.

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Received 25 Nov. 2000, revised 3 Mar. 2001