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SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY • NUMBER 628



# The Smithsonian Institution African Mammal Project (1961–1972)

An Annotated Gazetteer of  
Collecting Localities and Summary of  
Its Taxonomic and Geographic Scope

*David F. Schmidt, Craig A. Ludwig,  
and Michael D. Carleton*

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WASHINGTON D.C.  
2008

## ABSTRACT

Schmidt, David F., Craig A. Ludwig, and Michael D. Carleton. The Smithsonian Institution African Mammal Project (1961–1972): An Annotated Gazetteer of Collecting Localities and Summary of Its Taxonomic and Geographic Scope. *Smithsonian Contributions to Zoology*, number 628, viii + 320 pages, frontispiece + 150 figures, 20 maps, 12 tables, 2008. — Conceived and directed by Henry W. Setzer, the African Mammal Project (1961–1972) covered portions of 20 countries concentrated in the northern, western, and southern regions of Africa and generated over 63,000 specimens of mammals. The geographic foundation of this ambitious field program is documented as an annotated gazetteer that provides coordinate data for 785 cardinal collecting localities, collectors' names and dates of collection, general ecological descriptions, and mammalian genera obtained at each site. In georeferencing localities, emphasis was given to primary archival sources—original specimen labels, collectors' field journals, and contemporaneous field maps. Most localities surveyed fell within the Northern Savanna and Southern Savanna biotic zones. The Mediterranean, Sahara Desert, Guinea High Forest, and Southwest Arid zones were moderately sampled; the Southwest Cape and Afromontane zones were minimally represented.

The principal inventory method applied by field teams involved multiple transect lines of snap traps, supplemented by hunting, roost searching, mist-netting, and specimen purchasing. Total collecting effort varied immensely among countries, from 13 days (Chad) to 770 days (South Africa), and the number of specimens obtained was strongly correlated; length of dedicated site inventory mostly ranged from 3 to 8 days of collecting effort per cardinal locality. The resulting 63,213 vouchers include examples of 15 orders, 47 families, and 208 genera of African mammals; Rodentia (70%) and Chiroptera (20%) are most abundantly represented. The historical genesis of the African Mammal Project and its scientific goals as developed by H. W. Setzer are reviewed in the introduction to the gazetteer.

Cover images, left to right: Figure 140 (detail), Map 1, and Figure 144 (detail).

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Published by Smithsonian Institution Scholarly Press

P.O. Box 37012, MRC 957  
Washington, D.C. 20013-7012  
www.scholarlypress.si.edu

### Library of Congress Cataloging-in-Publication Data

Smithsonian Institution.

The Smithsonian Institution African Mammal Project (1961–1972) : an annotated gazetteer of collecting localities and summary of its taxonomic and geographic scope / David F. Schmidt, Craig A. Ludwig, and Michael D. Carleton.

p. cm. — (Smithsonian contributions to zoology ; no. 628)

Includes bibliographical references and index.

1. Mammals—Collection and preservation—Africa. 2. Mammals—Type specimens—Catalogs and collections—Washington (D.C.) 3. National Museum of Natural History (U.S.)—Catalogs. 4. Mammals—Africa—Geographical distribution. 5. Mammals—Africa—Classification. I. Schmidt, David F. II. Ludwig, Craig A. III. Carleton, Michael D. IV. Title.

QL731.A1S555 2008

599.096'074753—dc22

2008005666

ISSN: 0081-0282

∞ The paper used in this publication meets the minimum requirements of the American National Standard for Permanence of Paper for Printed Library Materials Z39.48–1992.

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**FRONTISPIECE.** Henry ('Hank') W. Setzer and field personnel (standing from left to right: Michael G. Hearst, Judy Vaden, Ralph E. Vaden, Duane A. Schlitter, Lynn W. Robbins) near Aouinet Torkoz, Morocco (photographed by Ralph E. Vaden, November 1969). Such collecting teams formed the backbone of Setzer's African Mammal Project (1961–1972), an immense biological survey program that sampled 20 countries and produced about 63,000 museum specimens. We dedicate this study to the memory of Henry Setzer (1916–1992), who instituted and coordinated the Project, and to the many AMP team members whose energy and dedication insured its success.

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# The Smithsonian Institution African Mammal Project (1961–1972): An Annotated Gazetteer of Collecting Localities and Summary of Its Taxonomic and Geographic Scope

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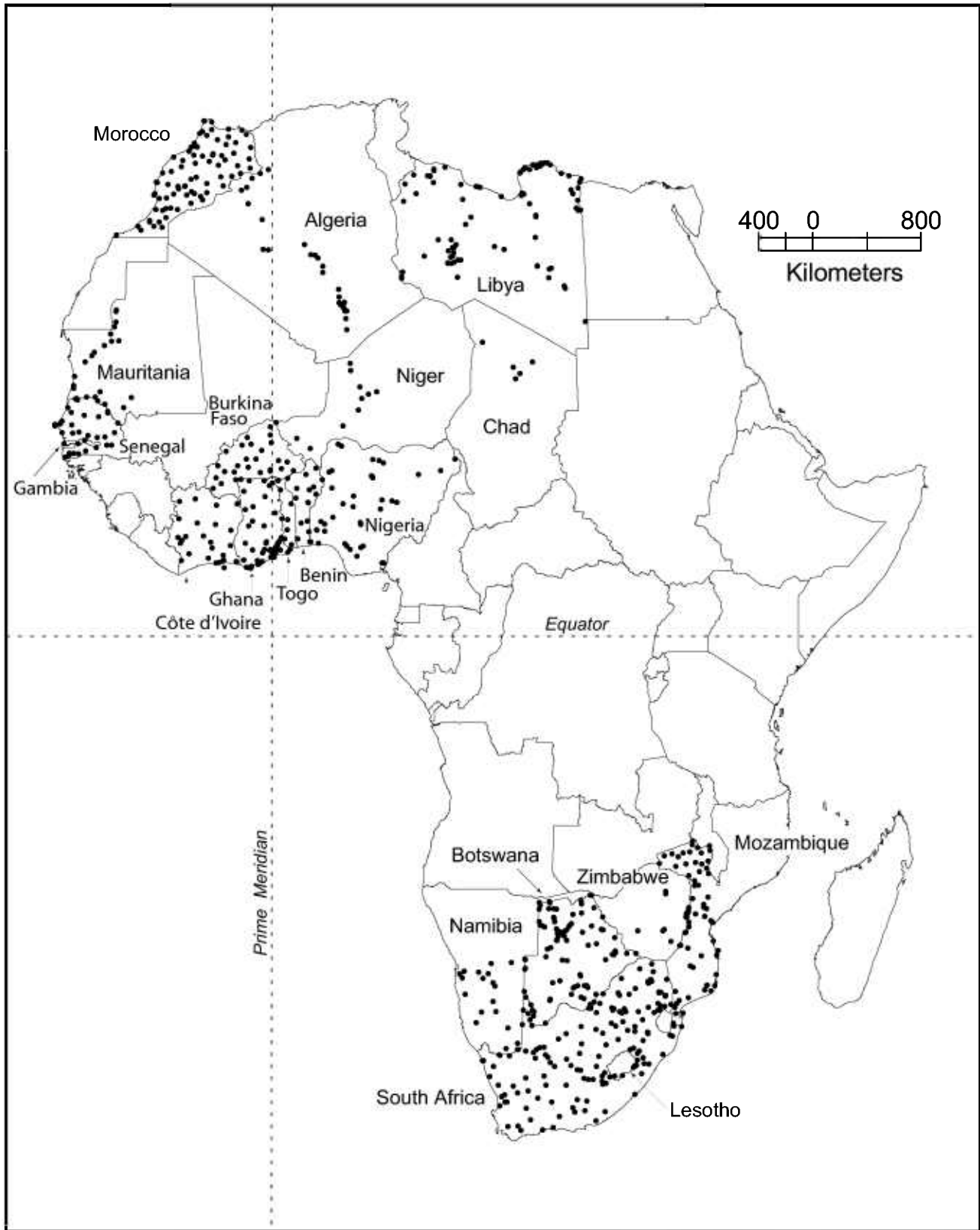
## INTRODUCTION

**F**rom March 1961 to July 1972, the Smithsonian Institution supported a series of field surveys of small mammals in Africa, collectively designated as the African Mammal Project. This ambitious field program, known inside and outside the Institution by its familiar abbreviation AMP, was conceived, coordinated, and impelled by Henry W. Setzer, curator in the Division of Mammals, U.S. National Museum of Natural History, from 1948 to 1978. By its completion, the field program had enlisted the energies of some 40 main collectors, encompassed 20 countries distributed across the northern, western, and southern sectors of the African continent, and procured over 60,000 mammal specimens from 788 major collecting localities (Map 1).

Although AMP specimens have been used incidentally in numerous faunal reports and taxonomic studies, foremost of mammals but also of the abundant ectoparasites collected from them, nowhere are the scope and results of the project itself synthesized. Our central objective is to document here the basic geographic data of the African Mammal Project in the form of a generously annotated gazetteer that includes localities surveyed as determined from specimen labels and field catalogs; coordinate data for those localities as given by collectors or georeferenced by us; names of collectors and dates of visit at each locality; general ecological descriptions, both as quoted directly from field journals and as captured in habitat photographs by AMP collectors; and lists of mammalian genera obtained at each site. Secondary goals are to provide the historical background to the African Mammal Project, its genesis and scientific purpose as originally developed by Setzer, and to address in broad terms its taxonomic and geographic results.

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MAP 1. Henry W. Setzer's African Mammal Project (1961–1972) was massive in geographic scale, as demonstrated by the 785 cardinal collecting localities distributed over 20 countries in the northern, western, and southern regions of the continent.

## MATERIALS AND METHODS

### *Data Sources and General Format of the Gazetteer*

Our guiding rationale in documenting the scope and details of AMP collecting activities was to ground the geographic information presented only on preserved museum vouchers. All localities so gazetted and mapped herein are based on approximately 63,000 specimens collected over the years 1961–1972, now registered and housed in the Division of Mammals, National Museum of Natural History (NMNH), Smithsonian Institution. Original specimen labels, as written in the field by AMP collectors, thus served as our primary information source for geographic location and, directly or indirectly, the coordinates used for mapping. Critical secondary sources included the companion field catalogs and field journals that AMP collectors regularly maintained, in varying amounts of detail according to the individual. We excluded those few places mentioned in field journals that yielded no mammal specimens or when the few specimens collected were deposited in institutions other than the NMNH. Because simultaneous screening of ectoparasites as potential disease vectors was an important objective of the AMP, we also consulted those entomological field catalogs (“bug books”) to verify or refine locality designations and dates of collection as found on skin tags and in mammal field catalogs and journals. A tertiary source of geographic information consisted of a large series of African road maps, topographic sheets, and aeronautical charts whose dates, grime, and wear and tear evidence hands-on use by AMP collectors in the field (see the Appendix). Many of these maps contain annotations of collecting sites apparently applied in the field. All of these supportive archival materials are also maintained in the Division of Mammals, NMNH, together with the cataloged specimens whose provenience they vouch.

All AMP specimens have been electronically data captured, and we heavily drew upon this NMNH computer database to generate preliminary lists of AMP localities, collectors, dates of collection, and taxa obtained. The existence of the database resulted from the efforts of many divisional and other museum staff over the years, pursuant to the larger goal to automate collections data of all NMNH mammals. The project started in 1969, one of the earliest initiatives in computerization of collections data in the NMNH and the country, and continued sporadically thereafter, using different software systems as they evolved (SELGEM, 1969–1988; INQUIRE, 1989–2003; and KE EMu, 2003 to present). Retrospective data capture

of skin-and-skull specimens was completed by 1993, but fluid preparations were not completed until 2000. In consequence of the uneven effort applied over so many years, responsibility for gathering the data fell upon always-changing teams of inventory technicians whose familiarity with specimen data and African geography varied greatly. Much entropy and outright errors entered the database. In awareness of this history, we stress that, although helpful for preliminary collation of AMP collections information, the database was ignored in determining the locality accounts presented in this gazetteer: recourse to archival sources (specimen tags, field catalogs, and field journals) served as the primary authority to underpin geographic location. Two intended curatorial dividends of our research project were to remove such inconsistency involving AMP localities from the museum database and to provide coordinates for those sites that lacked them.

Intended as a compendium of geographic information, a gazetteer may emphasize either physical location (geopolitical or regional divisions, coordinates) or alphabetically ordered place-names to orient a user to that information. In view of the large number of localities covered, we adopted a combination of those approaches. African Mammal Project localities are broadly grouped by regions, trending from the northwestern to the southeastern sectors of the continent—northern Africa, western Africa, and southern Africa. Within each region, the surveyed countries are similarly presented in a loose northwest-southeast vector according to their current formal name. Any archaic country names in use when AMP fieldwork was conducted are provided in parentheses, but we did not similarly amend intermediate geopolitical divisions (provinces, states, regions) as used by collectors. Such first-order administrative sectors have been substantially redrawn for certain countries (e.g., Ghana, Libya, and Mozambique) since the era of the AMP and can be found in recent gazetteers or through several sources via the Internet (e.g., GEONet Names Server). Each cardinal locality (see next section) is uniquely numbered, from 1 to 785, with an identifier that is applied to localities plotted on our maps (Maps 2–20) and also arranged from the northwest to southeast within a region and within a country (three of the 788 localities could not be certainly located and are not numbered and mapped). However, the gazetted localities of a particular country are themselves listed alphabetically to facilitate searching of the text for a specific place-name. Finally, an alphabetic index (Index of Geographic Names) is provided for all place-names and physical features mentioned in the locality accounts. A reader may locate any essential detail

of AMP fieldwork by means of these several avenues of access to geographic information.

Regional and country accounts contain an introductory section, called "General Remarks," that supplies information about AMP activities and personnel that broadly applies at those geographic levels. Within country accounts, we include a second subheading, "Itinerary," to summarize the composition of the collecting teams and their major itinerary as represented by those localities identified in our maps. Members of a collecting team who participated for only a short time or at a single locality are given in parentheses.

The accounts of collecting localities comprise the nucleus of our annotated gazetteer, and their arrangement and standards are explained in the next section. Throughout the text we reserve the use of square brackets ([ ]) to indicate information supplied by us, typically metric conversions of English measurements but also clarifications of statements quoted from field journals.

#### *Determination of Localities and Organization of Locality Accounts*

**CARDINAL VERSUS SATELLITE LOCALITIES.** In perusing the field journals, we soon became impressed that AMP collectors were relentlessly opportunistic about places and methods to collect small mammals and were always alert to sample different habitats. Although teams usually concentrated their collecting efforts at a base camp and its close vicinity, traplines were routinely relocated, road culverts and nearby caves were prospected for roosting bats, roadkills were opportunistically salvaged, supplementary night hunting on foot or from a vehicle was often conducted, and the purchase of mammals from local villagers was encouraged in different degrees and with varying success. As a result, skin tags and/or field catalogs contain innumerable locality combinations, many of which differ only slightly by distance or direction from some proper settlement or where specimen collection was clearly incidental and minor. In deciding which of these variants should be annotated and mapped, we made a distinction between cardinal localities and satellite localities according to the following criteria.

Cardinal localities represent the first line of each gazetted account, consisting of the geographical place-name to which the coordinates refer in bold font, followed by any supplemental modifiers and political subdivisions (all in regular font) as found on specimen labels (e.g., **Ugar Jabar**, 2 mi [3.2 km] N Jemaa, Jos Plateau, Northern Region). The boldface portion of the cardinal locality string

is usually the most geographically precise place or physiographic feature identified by AMP collectors in formulating their locality as used in the field. In general, but not always, a cardinal locality constitutes the base camp and its immediate vicinity where field efforts were concentrated and most specimens were obtained. In general, but not always, we could locate these specific place-names in gazetteers or on maps. On occasion, AMP collectors, while remaining logistically based at one locality, traveled farther away to another region that they referenced by a different place-name and where they sampled other distinctive habitats and genera. We treated such ancillary trips as cardinal localities and cross-referenced them under Remarks to the base camp being worked at the same time.

Locality information as found on original specimen labels was conventionally verified against corresponding field catalog and journal entries and judged for geographic plausibility on maps. In most cases, all data sources corroborated one another. Occasionally, a journal entry contained additional locality descriptors not written on labels or in the field catalog; infrequently, a catalog or journal contradicted the locality information on corresponding specimen labels. In cases of disparity, we selected the designation found on the majority of specimen labels for our cardinal locality and identified any variants by collectors in the Remarks section. Finally, there were rare instances, following careful examination of all corroborative data sources (catalogs, journals, gazetteers, and maps), when we concluded that the locality as represented on specimen labels was in error. Modifications of such cardinal localities are notated in brackets and discussed in the Remarks section (e.g., **Konankira**, [2 km S]). The locality is presented as spelled by the collector on specimen labels, with or without diacritical marks; where different, the preferred orthography of a place-name (including diacriticals) as found in the gazetteers produced by the U.S. Board of Geographic Names (USBGN) is provided in the Remarks section. Nonmetric indications of distance (or, infrequently, elevation) are given as indicated by the collector, with metric conversions provided in brackets.

Satellite localities are indicated in underlined font and appear only within the Remarks section under a cardinal locality (e.g., **24 km S Inhambane** and **35 km S Inhambane** under **Jangamo**, 29 km S Inhambane, Inhambane District). Such peripheral localities were visited while based at the cardinal locality, typically reference the same settlement as the cardinal locality, although specifying different distances and directions (albeit nearby), and involve similar habitats and a comparable assemblage of genera collected. Latitude and longitude may be presented for satellite lo-

calities as well, either as indicated by the collector or interpreted by us, but these places are not depicted on maps.

Some subjectivity admittedly exists in distinguishing cardinal from satellite localities. We attempted to minimize inconsistency by means of independent assessments of archival sources to determine those localities that should be recognized as cardinal or satellite. Schmidt first synthesized all locality information to generate a preliminary recognition of cardinal localities and their coordinates. Ludwig and Carleton, in different order depending upon the country, provided second and third reviews of the same data sources, ratifying or modifying Schmidt's initial collation of cardinal localities. By means of this triple-pass cross-checking, we realized a strong consensus and eventually distilled 788 cardinal locality accounts, each of which contains five standard subheadings (Coordinates, Collectors, Habitat, Remarks, and Taxa). Purpose, guidelines, assumptions, and format observed in composing each subheading follow.

**COORDINATES.** Latitude and longitude, to degree and the nearest minute, are provided for almost every cardinal locality, followed by an italicized, single-letter abbreviation to indicate their source, whether collector (*C*), the gazetteers published by the USBGN (*G*), map (*M*), or a publication (*P*). These coordinates correspond specifically to that portion of the locality designation indicated in bold font. Although one primary source is acknowledged, we routinely cross-checked it against the other possible sources of geographic information in the course of verifying accuracy of the coordinates given. In this regard, the travelogues and itineraries related within collectors' field journals proved invaluable in validating or at least localizing an AMP collecting site. A few cardinal localities could not be located precisely, but dates of collection and a team's itinerary considerably narrow the search radius within which the locality could occur.

We retrieved the collector's original field-determined coordinates (*C*) from primary archival material (specimen tags, field catalogs, and field journals). We routinely verified these against the USBGN gazetteers or faunal publications if a single place-name or judged their reasonableness on topographic maps if the locality designation was framed on distance and direction from some settlement or geographic feature. For localities where the USBGN figures differ by only 1–3 minutes from a collector's coordinates, we deferred to the collector and accepted his data as suitably accurate for Geographic Information System (GIS) plotting; in such instances, the USBGN-approved coordinates are simultaneously provided in parentheses. We accepted such variance as trivial in view of the usu-

ally wide-ranging collecting activities by AMP field teams around their base camps. If the collector's and the USBGN coordinates concord, both *C* and *G* are indicated. In only a few cases did we dismiss a collector's original coordinates, as based on persuasive circumstantial evidence and as explained in the accompanying Remarks.

For those geographic place-names that lack data provided by the collector, we obtained USBGN coordinates (*G*), relying upon both the USBGN gazetteers individually published for African countries (1954–1992; see References for individual dates of publication) and the Geographic Names Database accessible via the Internet (GEOnet Names Server [GNS]; <http://earth-info.nga.mil/gns/html/index.html>). The USBGN latitude and longitude were accepted only if the proper name could be convincingly associated with a single entry, as construed from the spatial logic of distance and compass direction, from itineraries related in field journals, and/or from inspection of period maps. African Mammal Project collectors often mentioned a smaller village in their field journal that was not used in the formal locality designation as written on skin tags and in catalogs. Instead, they employed distance and direction modifiers from some larger settlement, one usually appearing on the road maps used at the time. In these situations, we maintained the cardinal locality as specified by collectors but derived the coordinates on the basis of the smaller village as found in the USBGN gazetteers; such instances are flagged in parentheses next to the coordinates and explained in the locality Remarks. Multiple occurrences of common place-names were sometimes encountered within a restricted region, for example, provinces of South Africa, wherein a locality often contained somebody's farm as the most geographically localized place-name. Unambiguous location of some of these farms proved impossible, and we relied upon other locality modifiers as the cardinal locality in order to plot the site (typically as a map estimation).

When the cardinal locality consisted only of distance and direction indicators and lacked a collector's coordinates, latitude and longitude were interpreted from topographic maps and aeronautical charts (*M*), mostly at scales from 1:200,000 to 1:1,000,000 (see the Appendix). On specimen tags, AMP collectors rarely recorded whether their distances and directions were "straight-line" or "by-road" indicators, although this information could be occasionally surmised from field journals. Chronic omission of this critical qualifier forced the adoption of the following conventions. If no plausible road extends from the referenced place in the proper direction, we measured a straight-line azimuth and range to calculate coordinates.

On maps that depict a road oriented in the correct direction from the named place, we assumed that collectors reached their destination via this road and accordingly used a by-road measurement of distance and direction to estimate coordinates. Google Earth, the basic freeware program of land-satellite imagery (version 4.0.2093 beta; <http://earth.google.com/>), provided another highly useful perspective for visualizing distances and directions, especially in the southern African region where the majority of localities lacked original coordinates. Given the variety of sources of error in extrapolating coordinates from maps, we caution that the *M* coordinate source is best considered an approximation: that is, all such coordinates are understood to be preceded by “circa.”

Latitude and longitude were infrequently extracted from faunal or taxonomic publications (*P*), with the exception of one country, Libya. Localities of Libyan specimens lack coordinates, but Ranck (1968) supplied this data for many AMP collecting sites in his monograph on the country's Rodentia. Although we regularly checked “mammals of” books, many of these simply repeated the geographic information of NMNH specimens as contained in old database printouts and would have propagated any errors inherent therein.

Coordinates for each cardinal locality were extracted into a dBase IV file (Ashton-Tate) and converted to decimal degrees for plotting. Base maps were produced from ESRI ArcView (version 3.3), using a GIS database (World Resources Institute, 1995) and Robinson projection, and exported to Adobe Illustrator (version 9.0) for final refinement.

**COLLECTORS.** In view of the multifaceted demands of fieldwork, corresponding economies of time and labor, and, in some places, security, AMP collectors typically worked in teams of two or more persons. Composition of each collecting team and dates of survey (in parentheses) are given for each numbered and mapped locality. This information was initially derived from original specimen labels, as collated by the NMNH collections database, then cross-checked and refined against AMP field catalogs (both mammal and ectoparasite) and field journals housed in the Division of Mammals archives. Identification of the 42 principal collectors (Table 1) was partly a pragmatic judgment and includes individuals whose responsibility was basically entomological, some assistants not specifically hired under AMP funding, and one spouse. “Collectors” in this sense omits expedition cooks, locally hired field assistants, other spouses who just as meaningfully participated, and those temporary personnel on liaison from museums, universities, health agencies, or the Peace Corps who may

have incidentally collected specimens at a given place. Such ancillary collectors are often mentioned in the General Remarks or Itinerary of a country introduction or in the Remarks section of a particular locality account.

We elected to base the beginning and ending dates cited for each cardinal locality on the first and last dates when specimens were collected there. This interval thus reflects actual collecting results at a particular site and excludes the time required for teams to establish and break camp (usually amounting to only one additional day, seldom two, without active collecting at a locality). These intervals of collecting activity do not signify that every team member actually collected specimens on each day that fieldwork was conducted. Traplines were sometimes unproductive, and larger field teams frequently split duties among the participants, so that not all collectors actively maintained a field catalog at a particular field site. For a few localities, we assumed the presence of an individual who was not explicitly mentioned on specimen labels or in catalogs when that person was known to participate in collecting at localities visited immediately before and after.

**HABITAT.** The quality and quantity of environmental description contained on specimen tags and especially in field journals vary immensely between AMP collectors, depending upon individual variance in training, prior field experience, and personal curiosity about the local floras and faunas. Whether we should somehow standardize or enhance habitat descriptions across all locality accounts posed knotty issues of interpretation that would potentially introduce another layer of subjectivity. None of us is a specialist in botany or ecology, and there was no reliable means to verify plant identifications or habitat categories mentioned in field journals and on specimen labels (very little botanical material was preserved). In the end, we decided that the unvarnished, first-hand reactions by AMP collectors worked best to convey the kinds of environments they encountered in the field. Accordingly, information on habitat, soils, and sometimes geology was extracted from individual field journals and is quoted verbatim, followed by the author's initials in parentheses for attribution in the case of multiple team members (or nothing in the case of a single collector at a locality). We liberally used ellipses in these quotations because collectors sporadically interspersed their habitat observations among many other topics. African Mammal Project collectors typically recorded a capsular description of habitat on specimen labels, and we also referenced this information, especially if no habitat observations could be gleaned from journals. We were unable to locate original habitat data for only a small number of gazetted localities.



**TABLE 1.** Principal African Mammal Project collectors, their initials as used in locality accounts, and countries where they conducted fieldwork (by general chronological order; see country itineraries for specific dates).

AMP Collector	Initials	Countries
Stanley B. Akpan	SBA	Nigeria
John H. Case	JHC	Mozambique
C. G. Coetzee	CGC	Mozambique
Ron E. Cole	REC	South Africa, Zimbabwe, Namibia, Mozambique
Richard M. Davis	RMD	Mozambique, South Africa, Botswana, Senegal, The Gambia
John E. W. Dixon	JEWD	South Africa
Stephen D. Durrant	SDD	Botswana, South Africa
Julius C. Geest	JCG	Nigeria, Ghana
Piet J. Geldenhuis	PJG	South Africa
S. W. Goussard	SWG	Botswana, Mozambique, Zimbabwe
O. F. Graupner	OFG	South Africa, Namibia
A. Frank Hallett	AFH	South Africa
Alan R. Hardy	ARH	Mozambique, South Africa, Botswana
Dean E. Harvey	DEH	Senegal, The Gambia, Mauritania,
Bruce J. Hayward	BJH	Ghana
Michael G. Hearst	MGH	Morocco
Ted A. Heist	TAH	South Africa
Robert D. Hepplewhite	RDH	South Africa, Botswana, Namibia
Dorothy L. Herbert	DLH	Nigeria
H. John Herbert	HJH	Mozambique, South Africa, Botswana, Nigeria
George R. Hughes	GRH	South Africa
A. Kofi	AK	Ghana
A. V. W. Lambrechts	AVWL	Zimbabwe, South Africa, Lesotho, Namibia
James E. LeDuc	JWL	Ghana, Benin, Togo, Burkina Faso, Côte d'Ivoire
J. Carl Lingeback	JCL	Mozambique
S. J. Liversedge	SJL	South Africa
Tim N. Liversedge	TNL	South Africa, Botswana, Mozambique, Zimbabwe
Thomas J. McIntyre	TJM	Côte d'Ivoire, Ghana
Alvin L. Moore	ALM	South Africa, Namibia, Mozambique, Botswana
Wallace P. Murdoch Jr.	WPM	Ghana
Harry L. Norman	HLN	Morocco
J. J. L. Pretorius	JJLP	South Africa
Gary L. Ranck	GLR	Libya
I. L. Rautenbach	ILR	South Africa
Arthur C. Risser Jr.	ACR	South Africa, Zimbabwe, Namibia
C. Brian Robbins	CBR	Mauritania, Senegal, Ghana, Benin, Togo
Lynn W. Robbins	LWR	Ghana, Burkina Faso, Côte d'Ivoire, Morocco, Algeria, Niger
Duane A. Schlitter	DAS	Namibia, Morocco
Henry W. Setzer	HWS	Libya, Chad, South Africa, Zimbabwe, Mozambique, Senegal, Botswana, Nigeria, Mauritania, Ghana, Burkina Faso, Namibia, Morocco
James H. Shaw	JHS	Libya
Alan R. Silberstein	ARS	Namibia, South Africa
Ralph E. Vaden	REV	Ghana, Burkina Faso, Morocco

Photographic images of the vegetation found at the time a locality was surveyed allowed us another means of documenting habitat, in particular where journal notations by the collector are lacking or ecologically uninformative. Representative illustrations of habitat are provided whenever possible, but as with the written descriptions, the quality and quantity of AMP photography varied. Whenever several images existed for a given locality, we selected those that most closely matched the written habitat descriptions as provided by the collectors. Furthermore, we attempted to retain captions as worded by the collector-photographer and cited dates for photographs when known. Not surprisingly, many of the gazetted localities lack any habitat images.

Original photographic media consisted of black and white prints (most with negatives) and 35 mm color transparencies (both Agfachrome and Kodachrome). All photographic media were scanned as 24 bit color images and digitally desaturated and otherwise edited with Adobe Photoshop 6.0.

**REMARKS.** This subsection is a catchall that qualifies or amplifies information presented in any of the other subsections. Most importantly, we employed this subsection to address the accuracy or origin of coordinate data used to plot the cardinal locality. Map annotations, believed to be applied by collectors in the field, are sometimes quoted to clarify ambiguities of interpretation. Satellite localities (in underlined font), side trips to other places here recognized as cardinal localities (in bold font), and trapline placements not reflected on specimen tags may be related here. Itinerary relevant to base-camp selection and actual disposition of the campsite in relation to locality designations written on labels, as gleaned from field journals, are also mentioned. Any deviations in locality designation between specimen tags and field catalogs or among collectors working at the same locality are covered in the Remarks. Variant place-name spellings by different collectors and/or preferred orthography (including diacriticals) as found in the USBGN are similarly explained. Finally, this subsection includes any miscellaneous collectors' observations, again as extracted from field journals, that bear on the habitats sampled and specimens obtained at the site.

**TAXA.** Together with habitat quotations and photographs, the kinds of mammals obtained at a locality offer indirect evidence of the variety and quality of environments sampled at the time of the AMP survey. Genera are thus given for all AMP specimens that are cataloged and currently maintained in the NMNH Division of Mammals. With one exception, the genera are listed as

recognized in Wilson and Reeder (2005) and sequenced according to their classification hierarchy (see Table 2), with semicolons separating mammalian orders. That exception involves the discrimination of small gerbils as *Dipodillus* or *Gerbillus*. Specimens in the NMNH collection, many of them unidentified as to species, are arranged under the former broad concept of *Gerbillus* that included *Dipodillus* as a subgenus (e.g., Musser and Carleton, 1993); indication of *Gerbillus* in a list of taxa may therefore signify the presence of *Gerbillus* or *Dipodillus* or both genera as currently recognized (Musser and Carleton, 2005). The generic enumeration for a cardinal locality may not exhaustively mirror AMP field results because some specimens were left in the country or deposited in other institutions (as occasionally noted in the Remarks section). Nonetheless, donated specimens were relatively few in number, and these were considered "duplicates," such that the listing provides a reliable indication of the diversity of small terrestrial mammals present at those sites where collecting was conducted over several days. This contribution is foremost a geographic synopsis of the AMP field teams, not a systematic treatise of all mammals they collected. Verification of specific identities of some 63,000 specimens, according to the updated taxonomies contained in Wilson and Reeder (2005), was considered beyond the scope of a gazetteer and impractical for the time and effort required.

#### ACKNOWLEDGMENTS

Foremost, we acknowledge the many participants in the African Mammal Project. Their considerable and conscientious efforts in specimen preparation, record keeping, and habitat photography ensured the enduring value of the AMP collections, mammals and ectoparasites alike, and made this gazetteer possible. Several former AMP collectors—Ron E. Cole, Richard M. Davis, Julius C. Geest, Dean E. Harvey, James W. Leduc, I. L. "Naas" Rautenbach, Arthur C. Risser Jr., C. Brian Robbins, Lynn W. Robbins, and Ralph E. and Judy Vaden—reviewed portions of this manuscript, in particular the accounts of countries where they conducted their fieldwork some 40 years ago. We gratefully welcomed their comments and hands-on insights. Gary Ranck kindly gave permission to use habitat photographs that were previously published in his 1968 monograph on the rodents of Libya. Additionally, we thank Johan du Toit of the Mammal Research Institute, University of Pretoria, for providing information about the Orange River Survey. Nancy Setzer Luria and Elizabeth Setzer, daughter and wife of Henry W. Setzer,

TABLE 2. Orders, families, and genera of African mammals (taxonomy following Wilson and Reeder, 2005) represented by voucher specimens in the National Museum of Natural History and their taxonomic sequence as observed in the locality subsection Taxa.

Order	Family	Genus
Afrosoricida	Chrysochloridae	<i>Carpitalpa</i> , <i>Chrysochloris</i> , <i>Chrysospalax</i> , <i>Cryptochloris</i> , <i>Eremitalpa</i> , <i>Amblysomus</i> , <i>Calcochloris</i>
Macroscelidea	Macroscelididae	<i>Elephantulus</i> , <i>Macroscelides</i> , <i>Petrodromus</i>
Tubulidentata	Orycteropodidae	<i>Orycteropus</i>
Hyracoidea	Procaviidae	<i>Dendrohyrax</i> , <i>Heterohyrax</i> , <i>Procavia</i>
Primates	Lorisiidae	<i>Arctocebus</i> , <i>Perodicticus</i>
	Galagidae	<i>Galago</i> , <i>Otolemur</i>
	Cercopithecidae	<i>Cercocebus</i> , <i>Cercopithecus</i> , <i>Chlorocebus</i> , <i>Erythrocebus</i> , <i>Macaca</i> , <i>Papio</i> , <i>Colobus</i> , <i>Piliocolobus</i> , <i>Procolobus</i>
	Hominidae	<i>Pan</i>
Rodentia	Sciuridae	<i>Atlantoxerus</i> , <i>Xerus</i> , <i>Funisciurus</i> , <i>Heliosciurus</i> , <i>Paraxerus</i> , <i>Protoxerus</i>
	Gliridae	<i>Graphiurus</i> , <i>Eliomys</i>
	Dipodidae	<i>Jaculus</i>
	Spalacidae	<i>Spalax</i>
	Nesomyidae	<i>Cricetomys</i> , <i>Saccostomus</i> , <i>Dendromus</i> , <i>Malacothrix</i> , <i>Steatomys</i> , <i>Mystromys</i> , <i>Petromyscus</i>
	Cricetidae	<i>Microtus</i>
	Muridae	<i>Acomys</i> , <i>Lophuromys</i> , <i>Uranomys</i> , <i>Desmodilliscus</i> , <i>Desmodillus</i> , <i>Gerbilliscus</i> , <i>Gerbillurus</i> , <i>Gerbillus</i> , <sup>a</sup> <i>Meriones</i> , <i>Pachyuromys</i> , <i>Psammomys</i> , <i>Taterillus</i> , <i>Aethomys</i> , <i>Apodemus</i> , <i>Arvicanthis</i> , <i>Dasymys</i> , <i>Dephomys</i> , <i>Grammomys</i> , <i>Hybomys</i> , <i>Hylomyscus</i> , <i>Lemniscomys</i> , <i>Malacomys</i> , <i>Mastomys</i> , <i>Micaelamys</i> , <i>Mus</i> , <i>Myomyscus</i> , <i>Oenomys</i> , <i>Pelomys</i> , <i>Praomys</i> , <i>Rattus</i> , <i>Rhabdomys</i> , <i>Stochomys</i> , <i>Thallomys</i> , <i>Zelotomys</i> , <i>Myotomys</i> , <i>Otomys</i> , <i>Parotomys</i>
	Anomaluridae	<i>Anomalurus</i> , <i>Idiurus</i>
	Pedetidae	<i>Pedetes</i>
	Ctenodactylidae	<i>Ctenodactylus</i> , <i>Felovia</i> , <i>Massoutiera</i>
	Bathyergidae	<i>Bathyergus</i> , <i>Cryptomys</i> , <i>Georychus</i> , <i>Heliophobius</i>
	Hystriidae	<i>Atherurus</i> , <i>Hystrix</i>
	Petromuridae	<i>Petromus</i>
	Thryonomyidae	<i>Thryonomys</i>
Lagomorpha	Leporidae	<i>Lepus</i> , <i>Oryctolagus</i> , <i>Pronolagus</i>
Erinaceomorpha	Erinaceidae	<i>Atelerix</i> , <i>Paraechinus</i>
Soricomorpha	Soricidae	<i>Crocidura</i> , <i>Suncus</i> , <i>Myosorex</i>
Chiroptera	Pteropodidae	<i>Eidolon</i> , <i>Epomophorus</i> , <i>Epomops</i> , <i>Hypsignathus</i> , <i>Lissonycteris</i> , <i>Megaloglossus</i> , <i>Micropteropus</i> , <i>Myonycteris</i> , <i>Nanonycteris</i> , <i>Rousettus</i> , <i>Scotonycteris</i>
	Rhinolophidae	<i>Rhinolophus</i>
	Hipposideridae	<i>Asellia</i> , <i>Hipposideros</i> , <i>Triaenops</i>
	Megadermatidae	<i>Lavia</i>
	Rhinopomatidae	<i>Rhinopoma</i>
	Emballonuridae	<i>Saccolaimus</i> , <i>Taphozous</i> , <i>Coleura</i>
	Nycteridae	<i>Nycteris</i>
	Molossidae	<i>Chaerephon</i> , <i>Mops</i> , <i>Myopterus</i> , <i>Otomops</i> , <i>Sauromys</i> , <i>Tadarida</i>
	Vespertilionidae	<i>Eptesicus</i> , <i>Nycticeinops</i> , <i>Scotoecus</i> , <i>Scotophilus</i> , <i>Pipistrellus</i> , <i>Otonycteris</i> , <i>Plecotus</i> , <i>Glauconycteris</i> , <i>Hypsugo</i> , <i>Laephotis</i> , <i>Mimetillus</i> , <i>Neoromicia</i> , <i>Cistugo</i> , <i>Myotis</i> , <i>Miniopterus</i> , <i>Kerivoula</i>
Pholidota	Manidae	<i>Manis</i>
Carnivora	Felidae	<i>Caracal</i> , <i>Felis</i> , <i>Leptailurus</i> , <i>Panthera</i>
	Viverridae	<i>Civettictis</i> , <i>Genetta</i>
	Nandiniidae	<i>Nandinia</i>
	Herpestidae	<i>Atilax</i> , <i>Crossarchus</i> , <i>Cynictis</i> , <i>Galerella</i> , <i>Helogale</i> , <i>Herpestes</i> , <i>Ichneumia</i> , <i>Mungos</i> , <i>Paracynictis</i> , <i>Rhynchogale</i> , <i>Suricata</i>
	Hyaenidae	<i>Crocuta</i> , <i>Hyaena</i> , <i>Proteles</i>
	Canidae	<i>Canis</i> , <i>Lycaon</i> , <i>Otocyon</i> , <i>Vulpes</i>
	Mustelidae	<i>Hydrictis</i> , <i>Ictonyx</i> , <i>Mellivora</i> , <i>Mustela</i> , <i>Poecilogale</i>
Perissodactyla	Equidae	<i>Equus</i>
Artiodactyla	Suidae	<i>Phacochoerus</i> , <i>Potamochoerus</i> , <i>Sus</i>
	Hippopotamidae	<i>Hexaprotodon</i>
	Bovidae	<i>Aepyceros</i> , <i>Alcelaphus</i> , <i>Connochaetes</i> , <i>Damaliscus</i> , <i>Antidorcas</i> , <i>Eudorcas</i> , <i>Gazella</i> , <i>Neotragus</i> , <i>Ourebia</i> , <i>Raphicerus</i> , <i>Tragelaphus</i> , <i>Ammotragus</i> , <i>Cephalophus</i> , <i>Philantomba</i> , <i>Sylvicapra</i> , <i>Hippotragus</i> , <i>Oryx</i> , <i>Kobus</i> , <i>Pelea</i> , <i>Redunca</i>
Cetacea	Delphinidae	<i>Delphinus</i> , <i>Stenella</i> , <i>Steno</i> , <i>Tursiops</i>

<sup>a</sup> Includes *Dipodillus* (see text).

made some of their personal correspondence available to us and generally showed great interest (and patience) in the completion of this project.

Many colleagues at the NMNH, Smithsonian Institution, provided assistance at various stages in our research. Dan Cole, GIS Coordinator, NMNH Office of Information Technology, supplied the geographic database of Africa used for the preparation of maps and offered guidance in the application of ArcView. Thanks also go to Donald Hurlbert and John Steiner of the Smithsonian Photo Services, NMNH branch, for their expert advice relating to the digital processing of the habitat figures. Alfred L. Gardner (Biological Resources Division, U.S. Geological Survey), Richard W. Thorington Jr., and Don E. Wilson reviewed some or all of the introductory text, while Linda K. Gordon, James G. Mead, and Richard P. Vari provided steady encouragement. To all we extend our thanks.

We especially recognize Guy G. Musser, emeritus curator in the Department of Mammalogy, American Museum of Natural History, for his insightful review of the introductory text and engaging perspectives about Henry

Setzer and his enduring systematic contributions. James G. Mead and Peter J. Taylor courageously performed a thorough review of the entire text and earn our profound gratitude for their doggedness and the useful recommendations tendered. The final steps toward publication of any study rely on a talented editorial staff, and we count ourselves fortunate that freelance copyeditor Tshawna L. Byerly and Publications Specialist Meredith R. McQuoid of the SI Scholarly Press served to edit our manuscript into its final form.

In a personal context, Dave Schmidt extends his heartfelt thanks to the late Professor James W. Bee, his mentor and friend at the Natural History Museum (Dyche Hall), The University of Kansas. Jim's affection for the meticulous recording of natural history was inspiring, as was his warm, earthy sense of humor. Additionally, Schmidt would like to express his gratitude and deep appreciation to Karen Mudar (Archeology Program, National Park Service, Washington, DC) for the many unselfish hours she devoted to reviewing an early rendition of this manuscript and improving its general readability.

# Henry W. Setzer and the African Mammal Project

## GENESIS AND SCIENTIFIC GOALS OF THE AMP

From the latter 1960s to the middle 1980s, visitors to the Division of Mammals, NMNH, would have been greeted by a large map of Africa in the office range where the divisional office and sign-in log were located. Conspicuous because of its size and scale (1:4,000,000), the map had been divided into two parts (near the equator), mounted on 4 × 8 ft bulletin boards, and placed atop the type cases opposite NHB Room 388, the office of Dr. Henry W. Setzer (Figure 1). Hundreds of multicolor Graffco Maptacks dotted the partitioned map and formed distinct color patterns: a line of orange-headed pins (naturally) traced the Orange River that flows between Namibia and South Africa from the interior Cape Province; a lone thread of green-headed pins bisected the Sahara Desert through Algeria and Niger; and other groupings of same-colored pins identified places in various countries clustered in northern, western, and southern Africa. When one considers the coordinating efforts and collecting exertions symbolized by any one map pin, the many hundreds of localities so pinpointed bespoke an ambitious intent, immense energy, and a daunting undertaking. These pins and mounted maps served as a ready visual summary, pre-GIS software yet far more impressive than our Map 1, of the wide-ranging biological inventory that was Setzer's African Mammal Project. More impressive still were the thousands of AMP specimens then stored in green-labeled hold-up cases and intermingled throughout the office, sciurid, and rodent ranges of the Mammal Division, with smaller caches found in other secluded museum warrens. Now integrated into taxonomic order and fully data-captured, these 63,213 vouchers constitute the empirical achievement and tangible reminder of the African Mammal Project.

### *Why Africa?*

Little in Setzer's early professional experiences foretold that his enduring contributions to systematic mammalogy—the African Mammal Project (1961–1972) and its companion endeavor, *The Mammals of Africa: An Identification Manual* (Meester and Setzer, 1971–1977)—would involve the fauna of a continent far away from North America. Setzer graduated (B.A., 1942) from the



**FIGURE 1.** Henry W. Setzer, curator (1948–1978) in the Division of Mammals, National Museum of Natural History, conceived and directed the Smithsonian Institution African Mammal Project (1961–1972).

University of Utah during World War II, and following his service in the army, he returned to the University of Utah for graduate study (M.A., 1944) under the direction of Stephen D. Durrant (the student would later invite the major professor to join him for fieldwork in Botswana and South Africa). The substance of Setzer's Master's thesis concerned the species and subspecies of kangaroo rats, genus *Dipodomys*, of Utah and included identification keys, specimen-based distribution maps, diagnoses of species and subspecies, and descriptions of new subspecies (Durrant and Setzer, 1945). Fresh with this experience in alpha-level taxonomy and geographic variation and considering that Durrant was a former student of the renowned mammalogist E. Raymond Hall, it was apparent that the next step in Setzer's graduate education should be spent at the Natural History Museum, The University of Kansas (Ph.D., 1948) under the supervision of Hall himself. Building upon his work with *Dipodomys* in Utah, Setzer developed a doctoral thesis on subspeciation in a broadly distributed and highly variable species, *D. ordii*,

to determine which populations represent valid subspecies, delimit their geographic ranges, collate patterns of pelage color and cranial size and shape variation, consider selective factors influencing the formation of subspecies, and assess interspecific relationships within the genus. This was a fine study for its era. His published results (Setzer, 1949) were emblematic of much museum-based systematic research conducted over the middle 1900s and reflected the integration of the biological species concept, as then propounded foremost by Mayr (1942), with revisionary taxonomy and faunal study. Setzer's formative training in the museum and in the field, under the firm tutelage of first Durrant and then Hall, would become apparent in his direct, specimen-oriented approach to understanding African mammal species, interpreting their interpopulation variation, and documenting distributions.

Setzer's extensive background in museum and field work and prestigious credentials as one of Hall's students made him a natural fit for the U.S. NMNH, Smithsonian Institution, with its synoptic holdings of North American mammals and substantial international collections. He began employment in 1948 as an Assistant Curator, Division of Mammals (we do not know the specific circumstances of his hiring), and soon took advantage of this position to travel and collect mammals outside the United States in Costa Rica (1949), Alaska (1951), and Panama (1953). Description of a new subspecies of *Microtus* (Setzer, 1952a) emerged from the Alaska trip. He also turned to various unreported accessions in the NMNH collections and demonstrated a budding interest in Neotropical groups, evidenced by incidental reports on mammals from Panama (Setzer, 1950a) and Venezuela (Setzer, 1950b). Goodwin (1959) renamed his Oaxacan subspecies *Sigmodon planifrons minor* as *S. p. setzeri* because Setzer discovered the nomenclatural preoccupation and brought it to his attention.

Among those unstudied NMNH accessions was a series of Egyptian mammals collected by personnel of the U.S. Naval Medical Research Unit No. 3 (NAMRU-3), headquartered in Cairo, Egypt, and under the direction of its then commanding officer Harry Hoogstraal, an ectoparasitologist interested in epidemiology. Setzer's (1952b) short paper on these specimens, which were collected in 1946–1947, marks the beginning of his interest in African mammal systematics. It would launch a productive series of faunally oriented, taxonomic reviews of taxa from Egypt (Setzer, 1955, 1957a, 1957b, 1958a, 1958b, 1959a, 1959b, 1959c, 1960b, 1961a, 1961b, 1963a), the Anglo-Egyptian Sudan (Setzer, 1953a, 1953b, 1954, 1956a, 1969b), and Libya (Setzer, 1956b, 1956c, 1957c, 1960a)

based on NAMRU-3 specimens deposited in the Field Museum of Natural History, Chicago, and the NMNH. Many of these articles appeared in a local medical series, *The Journal of the Egyptian Public Health Association*. The reports on mammals from the Anglo-Egyptian Sudan and Libya culminated in the first substantive faunal summaries for those countries (Setzer, 1956a, 1957c), but a planned monograph on the mammals of Egypt was never realized (Osborn and Helmy, 1980, would later produce one, based extensively upon the same NAMRU-3 collections). Setzer expressed his indebtedness to NAMRU-3 and, in particular, Hoogstraal in his designation of certain new subspecies from these countries (*Heliosciurus gambianus hoogstraali* Setzer, 1954a; *Canis adustus namruui* Setzer, 1969b). The early papers on Libyan gerbils (Setzer, 1956b, 1956c) issued not only from examination of older museum specimens but also from Setzer's collection of new material, his first field experience in Africa (Oct–Dec 1955) on a trip sponsored by the Office of Naval Research and facilitated by Hoogstraal. In his inaugural paper on African mammals, Setzer (1952b:343) introduced the host-parasite theme that he would replay and expand upon in the funding proposals that sustained AMP fieldwork in the next decade: “Since impetus is being given study of the role wild mammals play in diseases of man, a brief diagnosis of the external characters plus comments on taxonomic problems as relating to the commoner mammals from Egypt . . . will be useful to epidemiologists working in the Nile Delta region.”

Up to the middle 1950s, Setzer had conducted more field work in North and Central America than in Africa, and the eventual geographic focus of his professional interest was suggestive but indefinite. An administrative directive in 1956, however, was decisive in restricting his area of future mammalogical research to Africa and Southwest Asia (Smithsonian Institution Archives, Record Unit 208). The internal politics and personal enmities that spawned this directive are now cloaked largely in speculation and better passed over as historical mystery, but afterward NMNH mammalogists were to align their research programs along nonoverlapping geographic realms: Charles O. Handley Jr. (1949–2000), all New World mammals; Henry W. Setzer (1948–1978), African and Southwest Asian mammals; and David H. Johnson (1941–1967), mammals of Southeast Asia, Australia, and Oceania. The restriction sowed lasting feelings of resentment in Setzer and engendered long-smoldering rancor in the Division of Mammals, but in retrospect, it proved to be a happy circumstance for African mammalogy. Thereafter, Setzer turned his attention to improving NMNH collections of

African mammals with his characteristic purpose and energy, which ultimately blossomed as the integrated series of expeditions to be known as the African Mammal Project.

Deciding the exact starting and ending dates of the AMP in order to establish geographic limits to this gazetteer poses some arbitrariness. The project evolved over several years out of Setzer's growing field program and was tailored to available funding opportunities at different stages. After Setzer's early trips to Libya (1955) and Egypt (1958), a more or less continual series of team-organized field surveys began in 1961. Setzer's reconnaissance of prospective sites in Libya and Chad (Mar–May 1961) emerged through his opportunistic participation as the lone scientist in a loosely focused adventure into the interior Sahara. Memorialized in the popular travelogue *The Great Sahara Mousehunt* (Collins and Pomeroy, 1963), Setzer identified this field excursion as the Alan C. Collins Expedition in recognition of one of the principal U.S. organizers (Smithsonian Institution, NMNH Office of the Registrar, Accession 234288) and for whom the jerboa *Jaculus jaculus collinsi* was named (Ranck, 1968). Surveying in Libya was systematically amplified later in the year to an eight-month expedition (Nov 1961 to Jun 1962), coordinated by G. L. Ranck as the principal field mammalogist. The latter fieldwork actually stemmed from a proposal entitled “Mammals and Their Ectoparasites from Ethiopia (including Eritrea),” which Setzer had submitted (Jul 1960) as a research contract to the Entomology Research Section, U.S. Army Medical Research and Development Command, Office of the Surgeon General (Smithsonian Institution Archives, Record Unit 155). Although positively received, it was not formally approved until the next year (Jul 1961), but owing to a changed political situation and in-country logistical difficulties, the arena of biological survey was pragmatically shifted from Ethiopia to Libya. The flexibility to abruptly redirect field plans from one country to another depending upon local political instability or social unrest would prove essential, especially in western Africa. The Ethiopian proposal was the conceptual antecedent to Setzer's subsequent inventory work in Africa under the expansive title “Potential Vectors and Reservoirs of Disease in Strategic Overseas Areas” and also funded through the U.S. Army Office of the Surgeon General (Smithsonian Institution Archives, Record Unit 150). This second research contract and its several extensions provided the stable funding that supported the multiple collecting teams in southern, western, and northern Africa, beginning in South Africa (Aug 1963) and ending in Morocco (Jul 1970). Two additional years of field activity transpired in Morocco (Sep 1970 to Jul 1972), but

the purpose was to study the ecology of small mammals, especially gerbilline rodents, not to conduct basic field inventory, and it was supported by PL-480 funds administered through an internal Smithsonian research award (Smithsonian Institution Archives, Record Unit 197). Two collectors who had been involved in the directed Moroccan mammal inventory (H. L. Norman and R. E. Vaden) remained through the final years of fieldwork, which sporadically included general collecting as time permitted. In summary, this gazetteer recognizes the AMP as extending from March 1961 to July 1972 because field surveys were conducted almost continuously over those years.

Neither the initiating grant proposals nor their annual extensions and summaries mentioned an African Mammal Project per se, but the name assumed cohesion within the institution and museum as much for its administrative as for its curatorial convenience. The explanation for the absence of the phrase “African Mammal Project” in these documents is straightforward: “The overall objectives of this research proposal are to ascertain the kinds of mammals and their ectoparasites and the geographic distribution of the several kinds in Africa” (Setzer, 1967 continuation request; Smithsonian Institution Archives, Record Unit 150). Mammals *and* their ectoparasites were complementary objectives of the African surveys from the inception of the AMP, and the goal to improve the taxonomic and distributional understanding of both is what attracted the army’s Office of the Surgeon General and, notably, its residing Chief of the Entomology Research Section, Robert Traub, a flea specialist. The epidemiological research interests and influential bureaucratic role of Traub, as with Hoogstraal and NAMRU-3 before him, were pivotal in advancing the African field surveys of possible mammalian hosts. Accordingly, the personnel line in Setzer’s proposals regularly budgeted entomological field assistants to accompany the field mammalogists, the tandem usually forming the main collecting team; in addition, preparators, sorters, and labelers were hired in the museum to process the undetermined thousands of ectoparasites preserved from AMP field sites for distribution to research specialists around the world.

In his justifications for enhancing systematic knowledge on both fronts, Setzer stressed two points: (1) the importance of diseases borne by certain arthropods (e.g., flies, mites, ticks, and fleas) for which mammals serve as hosts and are the usual reservoirs for transmission to humans; and (2) the influence of epidemics throughout the history of warfare, highlighting the depredations of scrub (tickborne) typhus during World War II and hemorrhagic fever during the Korean War. Setzer’s thesis resonates with the delight-

ful biography of typhus fever (*Rats, Lice and History*) by Hans Zinsser (1935) and Jared Diamond’s (1997) persuasive essay (*Guns, Germs, and Steel*) on the factors shaping the development of human societies. Zinsser’s wider subtext is captured in his chapter entitled “On the influence of epidemic diseases on political and military history, and on the relative unimportance of generals” and as more specifically stated within (Zinsser, 1935:153): “And typhus, with its brothers and sisters,—plague, cholera, typhoid, dysentery,—has decided more campaigns than Caesar, Hannibal, Napoleon and all the inspector generals of history.” Setzer’s alertness to governmental funding sources and to the appeal of this research theme was acquired early in his research career. Much of his specimen collection related to the study (Setzer, 1949) of *Dipodomys ordii* was supported by the Office of Research and Inventions, U.S. Navy, in an effort to determine the geographic ranges of suspected hosts of tularemia (deerfly fever). A contemporaneous and direct geographic connection to Setzer’s articulated goals may be found in the publications of his colleague Hoogstraal, especially that (Hoogstraal, 1956) on “Faunal Exploration as a Basic Approach for Studying Infections Common to Man and Animals,” which Setzer occasionally cited. Hoogstraal drew attention to the uniformly poor understanding of vertebrate hosts and their parasites in Africa and underscored their inadequate taxonomy as the primary need to be redressed. Nation-states, understandably, must be concerned with supplying any martial advantage to their own armed forces, and Setzer’s faunal objectives found a willing and receptive audience, one with very deep pockets, in those army and navy biomedical units charged with preventing contagious diseases. National priorities inevitably shift and budgets with them, and it is doubtful that such lavish governmental support for fundamental biological inventory, over so sweeping a geographic scale, will ever exist again.

#### Setzer’s Scientific Legacy

*The Mammals of Africa: An Identification Manual* (Meester and Setzer, 1971–1977) will remain a foremost achievement of Setzer’s African research, if second only to the AMP collections themselves. Its undertaking was organized and coedited with his friend and colleague Jurgens A. J. (“Waldo”) Meester, founder and initial director of the Mammal Research Institute, University of Pretoria. Conceived as a feature contribution to the nascent International Biological Program, the publication was partially funded by the U.S. and South African national committees of that organization and, significantly, enjoyed the



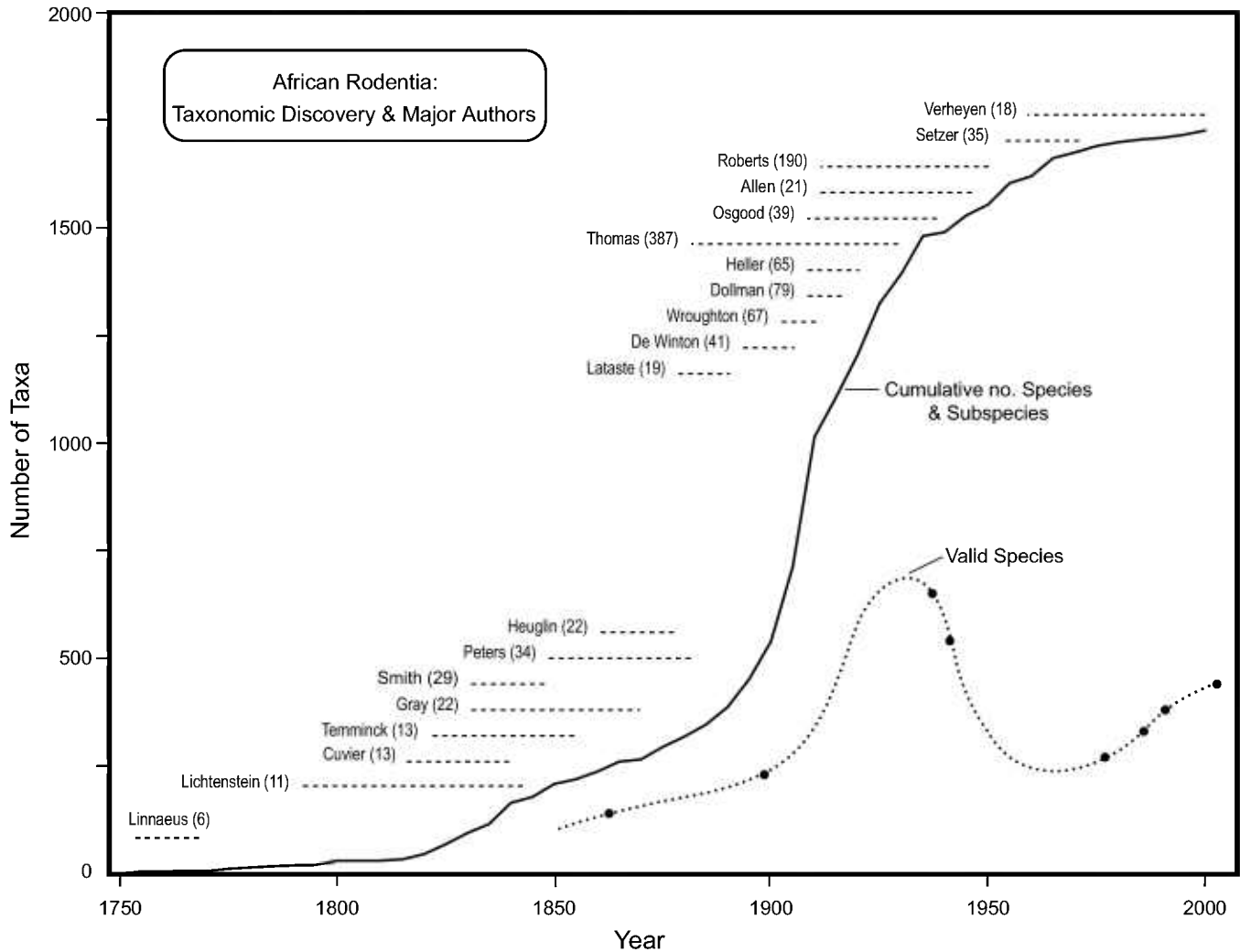
earnest backing of S. Dillon Ripley, then Secretary of the Smithsonian Institution (Smithsonian Institution Archives, Record Unit 150). Certainly, the utility and currency of the *Identification Manual* are now diminished, especially for the identification and taxonomy of the shrews, bats, and rodents whose convoluted alpha systematics have been dramatically overhauled by the multifaceted research of the past decade. The fruitful collaboration of Meester and Setzer, however, must be understood in the context of its era and original twofold purpose. At the time, the only pan-African treatment of mammals was Glover M. Allen's (1939) classic "A Checklist of African Mammals," which, as Setzer repeatedly emphasized in his AMP funding requests, was based on a literature compilation, not critical review of specimens. Of their two purposes, the first (Meester and Setzer, 1971:iii) was simply "to serve as an identification manual, for use by non-taxonomists," in particular the growing user communities of African ecologists and conservationists. Beyond this, the coeditors never pretended that the *Identification Manual* would dispel the confused state of African mammal taxonomy, notwithstanding the AMP, and achieve a definitive synthesis of valid species, synonyms, and geographic ranges. And so their second purpose—"to identify the remaining problems most urgently in need of solution"—encapsulates the enduring value of the *Identification Manual*, and those problems to be resolved are copiously mentioned by the various experts who composed the taxonomic chapters (see Meester et al., 1986:1–2, for authors and publication dates of those accounts). In this regard, Meester and Setzer's publication succeeded famously, far surpassing Allen's (1939) checklist as a window to poorly understood groups and a catalyst to future taxonomic investigation. Few systematic papers that deal with African mammals can omit citation of Meester and Setzer as a milepost of taxonomic understanding, and few researchers could hope to bequeath a greater scientific legacy.

One is still led to wonder whether Setzer had envisioned a more definitive "Mammals of Africa," modeled after *Mammals of North America*, the landmark faunal synthesis by his former thesis advisor E. Raymond Hall (Hall and Kelson, 1959; Hall, 1981), to follow the *Identification Manual*. Although the AMP quietly dissolved in 1972, Setzer's early funding proposals had identified future fieldwork by multiple teams through 1975, and he clearly intended to survey many other countries (Angola, Central African Republic, Gabon, Guinea, Liberia, Mali, Rio Muni, Sierra Leone, Sudan, and Western Sahara), including the return to Ethiopia, whose planned inventory was aborted in 1962. Hall, of course, had a much sounder framework of

taxonomic and distributional understanding to build upon in composing his seminal *Mammals of North America*. "Mammals of" faunal studies existed for numerous states by the middle 1950s, and more importantly, taxonomic revisions of most North American genera and families had been completed, many accomplished by Biological Survey staff and reported in the august series *North American Fauna*. Faunal treatments of African countries are much improved, many of them benefiting from AMP material and vouchered distributional records (e.g., Botswana, Smithers, 1968, 1971; Ghana, Grubb et al., 1998; Libya, Ranck, 1968; Mozambique, Smithers and Lobão Tello, 1976; Nigeria, Happold, 1987; the Southern African Subregion, Smithers, 1983, and Meester et al., 1986; The Gambia, Grubb et al., 1998; Zimbabwe, Smithers and Wilson, 1979). However, the gritty, collections-based revisionary studies of problematic African groups required to resurrect valid species from names long buried in synonymy remained undone within the lifetimes of Setzer and Meester. Another generation of African researchers would be required to achieve this level of understanding, even now ongoing. In retrospect, the modest accomplishments that Meester and Setzer intended for their *Identification Manual* were the appropriate and achievable aims at the time.

Aside from the AMP and the *Identification Manual*, Setzer can legitimately claim his own niche in the progress of taxonomic understanding of African Mammalia. As exemplified by Rodentia (Figure 2), the species-rich order that attracted most of his taxonomic attention, he described 35 species-group taxa, most from the northeastern region of the continent where he undertook his early research and fieldwork (Egypt, Libya, and Sudan). Knowledge of the diversity of African rodents initially grew slowly in the post-Linnaean discovery phase (ca. 1800–1860s), and an eruptive phase of natural history exploration and taxonomic description commenced in the late 1800s (ca. 1880–1930s), during which the subspecies emerged as a standard rank to nomenclaturally identify intraspecific variation. By the conclusion of this era, over 600 species of African rodents were recognized (Allen, 1939). During the middle 1900s (ca. 1940–1970s), the number of species considered to be valid dipped to less than 300 (Corbet and Hill, 1980), a decrease driven by widespread acceptance of the biological species concept and its taxonomic application as intergrading geographic races (subspecies). New subspecies continued to be named at a high rate, and many species described during the preceding eruptive phase were cursorily demoted to subspecies.

Setzer's descriptions of new African forms occurred within this last period (Figure 2), and the majority of



**FIGURE 2.** Chronological plots of African rodent taxa. Solid line: Cumulative number of species-group taxa (species and subspecies) described from Linnaeus through the year 2003 (total = 1,729); principal authors are indicated, with number of African taxa they described (in parentheses) and approximate period of their taxonomic activity (horizontal dashed line). Dotted line: Number of species considered scientifically valid (large dots correspond to species recognized by Murray, 1866; Trouessart, 1897–1898; Allen, 1939; Ellerman, 1940, 1941; Corbet and Hill, 1980, 1991; and Wilson and Reeder, 1993, 2005; the line was visually fitted). Henry W. Setzer described 6 species and 29 subspecies of African rodents over a 20-year period (1953–1972) when the biological species concept heavily influenced the treatment of interpopulation variation by systematists.

those (29 of 35) were described as subspecies. In his generic and species revisions, he also was predisposed to interpret population-level variation at the subspecific rank (e.g., *Acomys* as a genus of five polytypic species according to Setzer, 1975, compared with 19 species as currently recognized per Musser and Carleton, 1993, 2005). The prevailing acceptance of the biological species over the middle 1900s, widespread employment of polytypic species to convey geographic variation under the concept,

and Setzer's early training under Durrant and Hall tellingly molded his taxonomic approach at the species level. In the modern era (ca. 1980 to present), a foremost systematic mammalogist, Walter N. Verheyen, named 13 of his 18 new rodent discoveries as species. The revived appreciation of greater species richness in African Rodentia signaled a paradigmatic transition between the times of Setzer and Verheyen (Figure 2), a change impelled not only by new field discoveries and reinvigorated museum-

based revision but especially by improved methodologies for evaluating and taxonomically interpreting intra- and interpopulation differences. It is noteworthy that the fresh appreciation of small-mammal diversity, as exemplified by the investigations of Verheyen and his students, has been informed in no small way by the AMP collections (e.g., Van der Straeten, 1975, 1980a, 1980b, 1981, 1984; Van der Straeten and Verheyen, 1978a, 1978b, 1979a, 1979b, 1980, 1981; Verheyen and Van der Straeten, 1985; Verheyen et al., 1996, 2002, 2003). The contribution of AMP collections to this phase of systematic study is vastly greater than the aforementioned publications of Verheyen and his students but impractical to exhaustively document here (some indication may be gleaned from the recent museum-based studies of African taxa referenced in the chapters on shrews, bats, and rodents in Wilson and Reeder's, 1993, 2005, *Mammal Species of the World*). The scientific value of any museum collection accrues with its repeated use and the citation of its vouchers under a paper's "Specimens Examined." In this sense and compared with the NMNH holdings acquired by the Biological Survey in the late 1800s or the Smithsonian African expeditions of the early 1900s, the AMP collection has yet to realize its scientific potential.

A curious irony about Setzer's professional career is that the majority of his scientific publications on African mammals were based on the older NAMRU-3 collections, not the vastly greater AMP series that he helped to amass: 22 papers over the years 1952–1969 versus nine over 1969–1985 (we exclude those publications on mammal viruses [Kemp et al., 1974; Lourie et al., 1975; Monath et al., 1974] and book reviews [Setzer, 1965a,b, 1970, 1971b, 1977]). Many of the systematic investigations that issued directly from the AMP were coauthored with former collectors and students (C. B. Robbins and Setzer, 1985; L. W. Robbins and Setzer, 1979; Schlitter and Setzer, 1972; Setzer and Ranck, 1971) but not all (Setzer, 1969a, 1971a, 1975). The administrative responsibilities necessary to oversee the AMP were substantial and must partly account for the disparity in productivity. At its height in the 1960s, three field teams were simultaneously operating, and Setzer involved himself in much fieldwork in many countries (Table 1), spending time with new field teams at least at the start of a survey and inculcating the "Setzer methods" of mammal collecting. The huge and steady influx of specimens to the Division of Mammals, NMNH, created a cleaning and cataloging bottleneck, which was alleviated by the employment of museum technicians, a preparator, and a part-time secretary under the umbrella of AMP funding. Setzer himself helped to relieve AMP-

related curatorial chores, devoting much time to sorting specimens and matching skulls with skins. Computer automation was adopted in 1969, as an outgrowth of the necessity to streamline specimen cataloging and with the intention to collate data among hosts, ectoparasites, geographic distributions, and ecological preference. Setzer's institution of "machine cataloging" must represent one of the earliest initiatives in computerization of collections data in the NMNH and the country. Entomology technicians were also hired to mount and prepare the many ectoparasites collected along with their mammal hosts. And the paperwork—the funding proposals, requests for continuance, annual reports, country summaries of mammal species by field numbers (skulls not always cleaned and numbered in time for preliminary reports) needed by the Army Entomology Research Section and collaborating ectoparasitologists, hiring forms and purchase vouchers, import and collecting permits, and so on—was unrelenting, if not at times overwhelming. Such administrative and supervisory demands of the AMP occurred simultaneously with management of other large field programs in Madagascar (1962–1963; see Carleton and Schmidt, 1990, for rodent localities) and in Iran and Pakistan (1962–1965; e.g., Schlitter and Setzer, 1973) and with production of the *Identification Manual* (1965–1970).

Setzer retired in 1978, and he and his wife Elizabeth relocated in 1981 from their home of 26 years in Germantown, Maryland, to Gainesville, Florida. There he volunteered to help with curation in the Florida Museum of Natural History, University of Florida, and renewed his interest in North American mammals, their geographic variation, and subspecific classification (Humphrey and Setzer, 1989a, 1989b).

Setzer's contributions to mammalian systematics are conveyed by the several taxa named in his honor, some based on collections generated through his own research (*Myomimus setzeri* Rossolimo, 1976; *Gerbillus setzeri* Schlitter, 1973; *Mus setzeri* Petter, 1978). His unique relationship to African mammalogy was touchingly and insightfully captured by his friend Waldo Meester in the dedication to his book *Classification of Southern African Mammals* (Meester et al., 1986): "To all whose work is reflected in these pages, and in particular to H. W. ('Hank') Setzer, but for whose stubborn dedication there would have been a great deal less to write about." Setzer's stubborn-mindedness must have been a useful trait in overseeing the AMP, along with the requisite ego and pertinacity that each scientist must bring to his/her research. Two other candid glimpses of his personality are drawn from the field journal of one of his AMP collectors, H. John Herbert.

The first was from Herbert's maiden collecting trip to Mozambique (11 Jul 1964): "Hank is a very good molder of men and has a winning way which compels you to get on the bandwagon." At the time of the second entry (12 Dec 1965) Herbert was an experienced field hand in Nigeria: "Setzer is in rare form, yelling & screaming & skinning mice like mad."

Many mice and other kinds of mammals were collected and preserved as the AMP ran its 12-year course. Our own individual responsibilities with those collections over many years have brought complementary perspectives to the preparation of this gazetteer: Schmidt as processor of AMP accessions and research assistant for Setzer, Ludwig in the capture and management of AMP collections data, and Carleton in the use of AMP specimens in systematic research.

#### AMP COLLECTING TOOLS, SURVEY METHODS, AND FIELD PROCEDURES

The 788 cardinal localities covered in our gazetteer are ultimately grounded on museum specimens deposited in the NMNH. We here summarize the various capture devices and inventory methods by which these specimens were procured in order to supply context to the generic lists in the Taxa subsection and background to various comments under Habitat and Remarks. The following information was gathered and collated from the collectors' field journals stored in the Division of Mammals, NMNH. We emphasize that the amount of detail mentioned by collectors about their field activities and trapping results varies immensely, and we do not intend to imply that the inventory procedures here encapsulated were practiced by every collector at each collecting site. Rather, this summary conveys our firm understanding of "typical" or "standard" field activities across all AMP teams over the 12-year course of the project, and our statements are purposefully qualified to indicate apparent frequency, preference, or normalcy of field practices and collecting equipment. Rarely could we quantify an observation.

#### Trapping

Kill trapping, by means of sustained removal transect lines, was the principal inventory method applied by AMP collectors in all regions. The wood-base, metal-bail snap traps used in regular traplines included the two standard sizes designed to catch "mice" (Woodstream Museum Special) and "rats" (Victor Four-way). Traps were conventionally dispersed in linear transects, dissecting uniform habitats

as visibly definable or following along natural or unnatural ecotones (stream beds, gallery forest, marshland edge, overgrown fence rows, stone walls, boundaries around and between agricultural fields). Many collectors recorded only how many traplines were set on a particular day without specifying how many traps were placed in each line, and when the number of traps was specified, they irregularly identified which kind (or kinds) of snap trap was used in a trapline. However, those explicit notations we gleaned from field journals make clear that the Museum Special formed the backbone of AMP traplines, with the Victor snap trap deployed less commonly and in fewer numbers. Museum Specials proved effective in capturing small terrestrial mammals that weighed from 5 to 75 g, a size range abundantly represented in Africa by soricomorph shrews (Soricidae: *Crocidura*, *Myosorex*, *Suncus*), the smaller elephant shrews (Macroscelididae: *Elephantulus*, *Macroscelides*), and a rich variety of rodents, including particular genera of the families Gliridae (*Eliomys*, *Graphiurus*) and Dipodidae (*Jaculus* sp.) and numerous genera representing Nesomyidae (Cricetomyinae [1], Dendromurinae [3], Mystromyinae [1], Petromyscinae [1]) and the ubiquitous Muridae (Deomyinae [3], Gerbillinae [9], Murinae [22]) (see Tables 2, 3). The smaller Museum Special was less trustworthy for trapping rodents above 75 g, allowing regular escape of the more robust forms of Muridae (*Gerbilliscus*, *Meriones*, *Psammomys*, *Aethomys*, *Arvicanthis*, *Otomys*). Collectors preferred the stronger Victor rat trap at localities where such species were commonplace; rat traps were either interspersed among Museum Specials within a trapline or concentrated at select microhabitats to catch particular taxa. The latter application also produced minor numbers of certain Sciuridae (*Atlantoxerus*, *Euxerus*, *Paraxerus*), Nesomyidae (*Cricetomys*), and Petromuridae (*Petromus*), although shooting and purchasing were more profitable methods for acquiring such taxa (see below). Most traps and traplines were placed in terrestrial settings, but some collectors opportunistically positioned traps in lower tree limbs within reachable heights (usually 1.5–2.5 m). In several locales, emphasis was given to such arboreal trapping, especially in fruit trees such as mangoes and figs, in order to secure certain small, habitually scansorial rodents (Gliridae: *Graphiurus*; Muridae: *Grammomys*, *Hylomyscus*). Each type of snap trap had its ardent proponents among AMP collectors, some favoring the Victor rat trap for its advantage in catching the larger murids, others preferring the Museum Special for its greater flexibility in placement, especially in arboreal stations.

During site inventory, collectors readily adapted their traplines and trap numbers to the variety of habitats present

**TABLE 3.** Number of National Museum of Natural History voucher specimens of Rodentia resulting from the African Mammal Project (AMP), as summarized by region, country, and family.

Country	Scuridae	Gliridae	Dipodidae	Spalacidae	Nesomyidae	Cricetidae	Muridae	Anomaluridae	Pedidae	Ctenodactylidae	Bathyergidae	Hystriidae	Petromuridae	Thryonomysidae	Total Rodentia
<b>Northern Africa</b>															
Algeria	0	0	40	0	0	0	314	0	0	3	0	0	0	0	357
Chad	0	0	0	0	0	0	61	0	0	0	0	0	0	0	61
Libya	0	6	161	7	0	3	1,595	0	0	29	0	0	0	0	1,801
Mauritania	11	0	94	0	0	0	1,995	0	0	31	0	1	0	0	2,132
Morocco	141	68	324	0	0	0	5,642	0	0	45	0	1	0	0	6,221
Niger	0	0	16	0	0	0	159	0	0	0	0	0	0	0	175
Regional subtotal	152	74	635	7	0	3	9,766	0	0	108	0	2	0	0	10,747
<b>Western Africa</b>															
Benin	87	11	0	0	18	0	1,702	0	0	0	0	0	0	3	1,821
Burkina Faso	79	0	0	0	78	0	2,479	0	0	0	0	1	0	0	2,637
Côte d'Ivoire	159	21	0	0	138	0	1,596	18	0	0	0	8	0	17	1,957
The Gambia	7	2	0	0	4	0	243	0	0	0	0	0	0	0	256
Ghana	234	83	0	0	74	0	3,249	21	0	0	13	3	0	1	3,678
Nigeria	161	18	0	0	225	0	2,970	7	0	0	6	2	0	4	3,393
Senegal	57	0	0	0	77	0	1,229	0	0	0	0	3	0	0	1,366
Togo	24	13	0	0	6	0	887	9	0	0	0	0	0	0	939
Regional subtotal	808	148	0	0	620	0	14,355	55	0	0	19	17	0	25	16,047
<b>Southern Africa</b>															
Botswana	277	27	0	0	284	0	3,558	0	125	0	122	5	0	0	4,398
Lesotho	0	0	0	0	0	0	84	0	0	0	0	0	0	0	84
Mozambique	19	4	0	0	161	0	2,038	0	6	0	39	0	0	4	2,271
Namibia	11	0	0	0	69	0	812	0	3	0	0	0	13	0	908
South Africa	72	42	0	0	634	0	7,962	0	93	0	335	8	30	2	9,178
Zimbabwe	5	0	0	0	67	0	1,233	0	0	0	23	0	0	1	1,329
Regional subtotal	384	73	0	0	1,215	0	15,687	0	227	0	519	13	43	7	18,168
<b>AMP total</b>	<b>1,344</b>	<b>295</b>	<b>635</b>	<b>7</b>	<b>1,835</b>	<b>3</b>	<b>39,808</b>	<b>55</b>	<b>227</b>	<b>108</b>	<b>538</b>	<b>32</b>	<b>43</b>	<b>32</b>	<b>44,962</b>

and according to their productivity in terms of trap success, extending or moving initial lines and laying new transects as appropriate. Because a team usually arrived at a site in the late afternoon, initial traplines tended to be shorter (50–100 traps) and simply radiated from the base camp itself; often one member would quickly throw out a preliminary line while light remained and others pitched tents and readied the camp. Among 111 representative trapping sessions sufficiently detailed in field journals, the modal size of a trapline numbered 200 snap traps (mean = 245), and approximately 70% of the lines totaled from 200 to 400 traps (Table 4; Figure 3, top right). Whereas shorter lines could be set and maintained by an individual collector, the higher numbers clearly represent multiple lines and collective results of the AMP team, consisting of at least two principal collectors and their field assistants, over a 24-hour cycle of trapping (i.e., total trap-nights of survey effort). Whether the figures enumerated in Table 4 constitute a single collector's 24-hour trapping results or that of the team was often indefinite from the context of journal remarks.

Longer traplines could be expected to garner more specimens, all other factors being equal, as underscored by the significant regression of number of animals caught against number of traps per trapline ( $F = 32.0$ ,  $P \leq 0.001$ ; Figure 3, top left). That all other factors were not equal, however, is indicated by the substantial variance around the regression line; no significant relationship exists between percent trap success and the number of traps per trapline ( $F = 0.20$ ,  $P = 0.658$ ). Besides setting more traps, most collectors also enhanced trap returns by running their lines at least twice (Table 4)—once in the evening and again at early dawn—to remove first captures and retrigger a trap for the remaining hours of nocturnal activity. In addition to augmenting trap success, this practice was dictated by the need to save specimens and bait from the ravages of scavenging shrews, scarab beetles, palm crickets, and the ever-present, always voracious driver ants. African Mammal Project collectors experienced much variability in their trapping returns, both in number of animals caught (mostly shrews and rodents) and the percent trap success (Table 4), and counts of both of these variables were highly skewed to the right for those trapping sessions adequately documented in field journals (Figure 3, bottom). Although poor trap returns understandably frustrated collectors for the exhausting labor involved—R. D. Hepplewhite exclaimed “It’s heartbreaking!” after finding only five mice in his line of 275 traps at Brucharos Mountain, Namibia—such meager results were atypical and incidental over the course of the AMP endeavor writ large. Over half of the trap successes tallied were 10% or less (mean

= a very respectable 9.9%), but rates of 10%–20% were also commonplace (Table 4; Figure 3, bottom right). Such rates, issuing from traplines numbering 200–400 snap traps, ensured that collectors often faced a long, grueling day of specimen processing, even well into the evening.

In addition to snap traps, field workers irregularly employed four other kinds of traps—live traps, steel leg-hold traps, MacAbee gopher traps, and gin or native snare traps—albeit in much fewer numbers, in particular microhabitats, and/or for certain species. Aluminum folding box traps (Sherman traps) and wire mesh traps (National or Tomahawk live traps) were in evidence in many countries surveyed in all regions but were never relied upon as the workhorse of transect lines as were the snap traps. Sherman live traps were a major tool for capture at those few localities intended for long-term, grid-trapping studies (see below). In Côte d’Ivoire and Nigeria, Sherman traps were used wherever personnel from the Viral Research Laboratory, University of Ibadan, accompanied AMP teams to collect live animals for the removal of fresh tissues for virological investigations (e.g., see Kemp et al., 1974) and were occasionally borrowed from that lab in small numbers. In Namibia and South Africa, moderate numbers (25–60) of live traps were more regularly dispersed along with snap-trap lines, with the apparent objective of obtaining live animals for chromosomal preparations.

Steel leg-hold traps (mostly size no. 1½) were sporadically employed by most AMP teams in all regions. Usually baited with fresh mouse carcasses from the morning’s catch, they were typically deployed in small numbers (4–12), in specific situations (around fresh scat or near burrow openings), and for designated species, generally small carnivores (*Genetta*, *Cynictis*, *Herpestes*, *Canis*, *Vulpes*) or dassies (*Procavia*). In a few instances, steel traps were deliberately interspersed with snap traps where fennecs (*Vulpes zerda*) or jackals (*Canis* spp.) were running lines and poaching the trapped rodents. Our impression is that success rates using steel traps were discouragingly poor and that no unique species or unusual numbers of particular kinds were acquired by this means. The few small carnivores so trapped were more efficiently obtained with other methods, predominantly by hunting at night.

MacAbee gopher traps, or mole rat traps as termed by AMP collectors, were regularly used in southern Africa and locally in northern (Libya) and western Africa (Nigeria). These traps proved effective for obtaining fossorial rodents of the families Spalacidae (*Spalax*) and Bathyergidae (*Cryptomys*, *Georychus*, *Heliophobius*) and, infrequently, the burrowing golden moles (Chrysochloridae: *Amblysomus*, *Carpitalpa*). Traps in groups of 10–20 were

TABLE 4. Representative examples of locality trapping results, arranged by region, country, and collector.

Country (Collector) and locality	Trap-nights <sup>a</sup>	Number of specimens <sup>b</sup>	Percent success
<b>Northern Africa</b>			
Morocco (L. W. Robbins)			
Chechaouen	375	27	7.2
Essaouira, 13 km E	575		
	(2 teams)	155 (65 PM, 90 AM)	26.9
Figuig, 5 km NW	375	46 (21 PM, 25 AM)	12.2
Safi, 13 mi S	250	24	9.6
Tan-Tan, 11 km W	375	27	7.2
Tarfaya, 8 km S	475	51	10.7
Taza, 18 km S	400	54	13.5
Tiznit, 8 km S	375	42	11.2
Morocco (R. E. Vaden)			
Ain Benimathar, 10 km S	1,375		
	(4-day total)	27	2.0
Aoulouz, 16 km W	1,500		
	(5-day total)	85	5.7
Ben Slimane, 5 km N	1,000		
	(5-day total)	28	2.8
Goulimine, 20 km SW	1,515		
	(6-day total)	135	8.9
Icht, 7 km NW	1,000		
	(4-day total)	60	6.0
Taroudant, 5 km S	1,640		
	(5-day total)	79	4.8
Zagora, 10 km W	400	66 (40 PM, 26 AM)	16.5
Mauritania (C. B. Robbins)			
Tiguent	150	50	33.3
Algeria (L. W. Robbins)			
Beni-Abbes	200	59 (39 PM, 20 AM)	29.5
<b>Western Africa</b>			
Côte d'Ivoire (J. W. LeDuc)			
Diali	120	4 (1 PM, 3 AM)	3.3
Niebe	200	4 (2 PM, 2 AM)	2.0
Côte d'Ivoire (L. W. Robbins)			
Banco Forest	200	27	13.5
Jacquerville	180	38 (19 PM, 19 AM)	21.1
Yapo-Sud	200	19 (9 PM, 10 AM)	9.5
Burkina Faso (R. E. Vaden)			
Petoye	1,200		
	(3-day total)	12	1.0
Seguenege, 6 km SE	200	1	0.5
Benin (J. W. LeDuc)			
Ketou	150	24 (14 PM, 10 AM)	18.0
Zizonkame	100	6 (3 PM, 3 AM)	6.0
<b>Southern Africa</b>			
Namibia (R. D. Hepplewhite)			
Brucharos Mountain	200	7 (4 PM, 3 AM)	3.5
Lovedale Farm	200	30	15.0
Sandfontein	225	1	0.4
Skaanskolk Farm	100	16 (8 PM, 8 AM)	16.0
Sossus Vlei	200	60 (30 PM, 30 AM)	30.0
Namibia (A. C. Risser)			
Gobabeb	150	26	17.3
Hakos Mountains	200	44	22.0
Swartbank Mountain	235	39	16.6

(continued)

TABLE 4. (continued)

Country (Collector) and locality	Trap-nights <sup>a</sup>	Number of specimens <sup>b</sup>	Percent success
Southern Africa			
Botswana (T. N. Liversedge)			
Maboane, 10 mi S	235	4	1.7
Mozambique (R. E. Cole)			
Inharrime, 3 km NE	200	34	17.0
Jangamo	250	30	12.0
Panda, 6 km W	200	24	12.0
Mozambique (R. M. Davis)			
Furancungo, 30 mi NNW	170	48	28.2
Mozambique (H. J. Herbert)			
Vila Coutinho	900		
	(4-day total)	36	0.4
Zimbabwe (A. C. Risser)			
Buffalo Game Ranch	100	3	3.0
South Africa (R. D. Hepplewhite)			
Drakensberg Garden(s), 2 mi N	200	5	2.5
Klaserie	133	8 (2 PM, 6 AM)	6.0
Magoebaskloof	150	22 (10 PM, 12 AM)	14.7
Nelspruit, 4 mi E, 2 mi S	350	59 (31 PM, 28 AM)	8.8
Vlaksfontein	85	7 (1 PM, 6 AM)	8.2
Weenkop	200	9	4.5
South Africa (A. V. W. Lambrechts)			
Aliwal North, 2 mi E	400	83	20.7
Jansenville, 8 mi NE	564	11	1.9
Sterkspruit, 12 mi N	400	92	23.0
South Africa (T. N. Liversedge)			
Brakrivier	200	4	2.0
Moordrift	200	33	16.5
Rooiberg, 2 mi W	200	11	5.5

<sup>a</sup> In some cases, trap-nights are totals for a given locality.

<sup>b</sup> Where specified by a collector, the numbers of specimens captured in the evening (PM) and morning (AM) checks of traplines are indicated in parentheses.

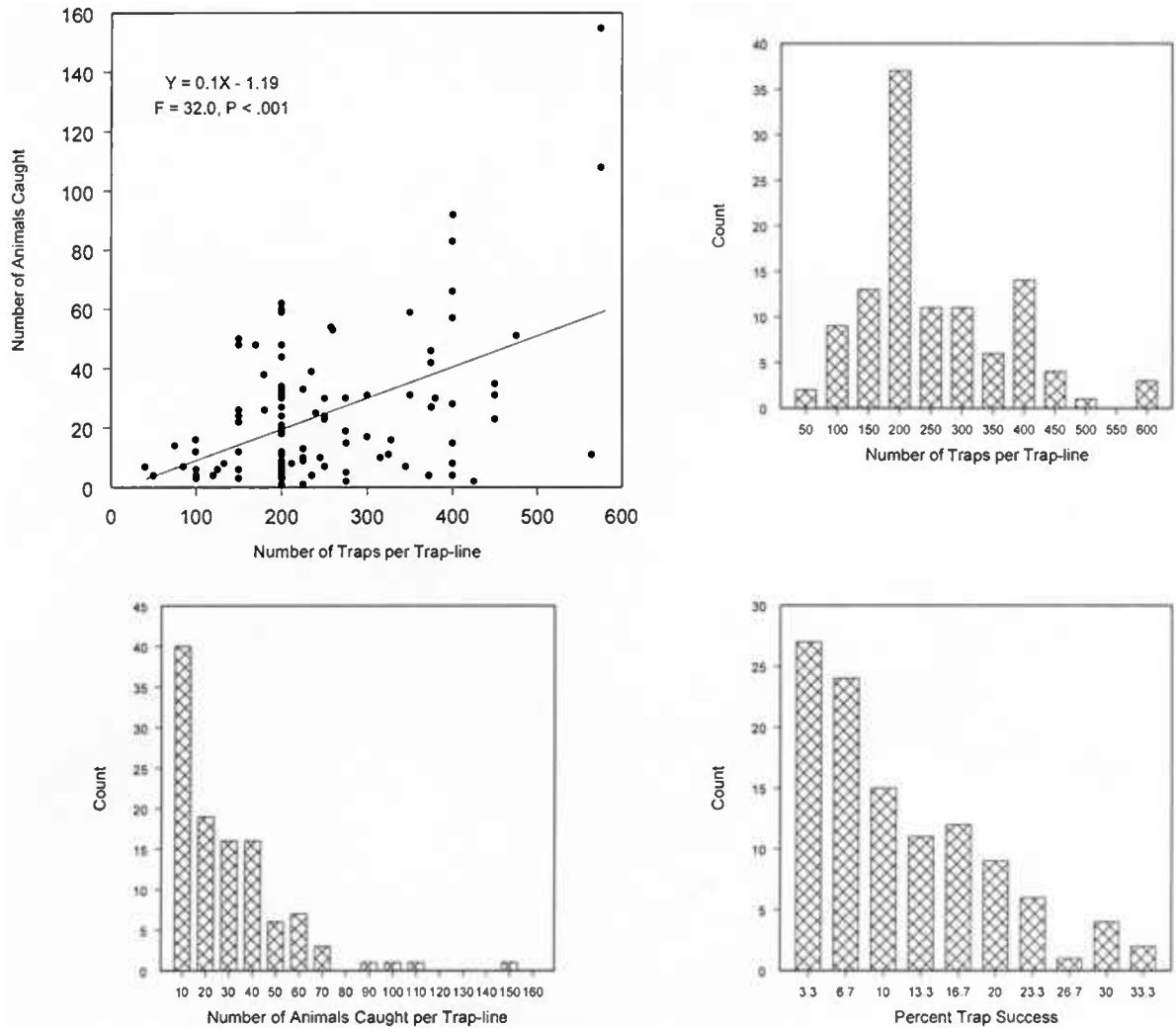
maintained in active burrow systems, and in several cases involving *Cryptomys*, an individual trap produced multiple catches over the course of a trapping period. In certain microhabitats, especially in southern Africa, the gopher or mole rat trap materially augmented the inventory of subterranean rodents and moles obtained by other capture methods (purchasing, excavating burrows).

Native snares or gin traps may have accounted for an unknown number of specimens purchased by AMP teams, but they were not an intended component of the trapping routine except for certain countries in southern Africa. In Mozambique, R. E. Cole was impressed by the utility of a native snare design and employed a local trapper to fabricate a moderate number of snares to complement the standard snap-trap lines. At Massinga, for example, Cole set 68 native snare traps in bush and 160 Museum Specials around grassy marshland. Snare traps apparently did not improve trap success by any significant measure, but

they were appreciated for securely holding a catch when sprung, for not damaging the skull as sometimes occurred with snap traps, and for the wider range in body size of specimens captured.

Compared with the standard transect trapline, disposition of traps into measured grids was attempted in only a few instances. We encountered one case (Nieman's Farm, South Africa) where the collectors laid a grid of 50 snap traps, spaced five paces apart, but such a kill-trapping layout was apparently not repeated elsewhere. Trapping grids composed of live traps, on the other hand, were implemented at one site in Nigeria and several in Morocco. In Nigerian high forest (Sapoba Forest Reserve), H. J. Herbert established a live-trapping grid 250 m<sup>2</sup> in area, which consisted of two live traps at each of 18 stations, either a pair of Sherman traps or a Sherman and homemade wooden box trap. The purpose of the grid was unclear, perhaps to determine home ranges of small forest mammals, but





**FIGURE 3.** Four graphic views of AMP snap-trapping results based on 111 well-documented, 24-hour trapping sessions as determined from collectors' field journals (excluding specimens acquired by purchasing or hunting). Top left: Regression of number of small mammals captured against number of traps deployed in a trapline. Top right: Histogram of numbers of snap traps dispensed in a trapline. Bottom left: Histogram of number of small mammals captured per trapline. Bottom right: Histogram of percent trap successes realized (number of animals trapped/number of traps in trapline  $\times$  100). Also see Table 4 and text for discussion.

sighting straight grid lines in the dense forest undergrowth proved difficult, trap success was disappointingly low, and the project lasted only a short time (28 Jun to 16 Jul 1966). In Morocco, several potential sites were explored (13 km E Essaouira, 5 km W Rissani, 10 km W Zagora), and two permanent grids (5 km NE Essaouira, 28 km SW Goulimine) were eventually erected and monitored continually and simultaneously over a 10-month period (Sep 1970 to Jun 1971) by H. L. Norman and R. E. Vaden. The latter localities, situated in desert scrub formations, were mark-and-release studies designed to understand the

microhabitat distributions of naked-footed (*Dipodillus*) and hairy-footed (*Gerbillus*) gerbils, their activity patterns, reproductive cycles, and demographic changes. Two live traps (one Sherman and one National) were emplaced at each of 100 stations, for a total of 200 traps arrayed in a grid approximately 200–225 m per side (approximately 4–5 ha); captured animals were assessed for sex, age, weight, molt, and reproductive condition, individually marked with ear tags or toe clipping, and released. Animals that died in traps from cold exposure were routinely prepared as museum vouchers, and off-site necropsy transect lines,

composed of snap traps, were also set to procure specimens at these two localities. When not chasing camels off their grid or foiling clever jackals that learned to open rear trapdoors and snatch escaping gerbils, Norman and Vaden seem to have had highly productive and biologically informative grid-trapping results, but we are unaware of any published papers.

The common attractant to both snap and live traps was the familiar bait of peanut butter and rolled oats, moistened with water to form a moldable paste. Sometimes only oats were used and different moisturizers, such as vanilla extract or palm oil, were added or substituted for water. Particularly when trap success was poor, collectors experimented with a wide variety of other ingredients as trap baits: unmacerated ground nuts or pellets of commercial mouse chow (noted as inferior to cassava as a bait by H. J. Herbert at Sapoba Forest Reserve, Nigeria); guinea corn and rice; dates, oil palm fruit, or whichever fruits were locally ripening; cassava meal instead of oatmeal; and mixtures of sunflower seeds, oats, and mixed grain or of pumpkin seeds and prunes. Some collectors systematically compared trapping results using different baits, but these analyses were short in duration and generally inconclusive. Over the 12-year course of the AMP, none of these alternatives displaced the dependable "p.b. & o." as a standard bait, although some of them enjoyed short-term usage by certain collectors.

#### *Salvage and Hand Capture*

AMP teams logged innumerable hours on the road, driving to and from localities, and were continually alert to stop and inspect the condition of road-killed animals as potential museum vouchers. Few specimens were salvaged in this manner, and most species were rodents (Dipodidae: *Jaculus*; Nesomyidae: *Cricetomys*) and small carnivores (Herpestidae: *Cynictis*; Canidae: *Otocyon*; Mustelidae: *Ictonyx*). The few dolphins (Cetacea) collected in Morocco were beach pickups of dead animals (i.e., strandings); those acquired in Côte d'Ivoire formed a small orphaned collection enthusiastically accepted by a budding marine mammalogist, Thomas J. McIntyre.

African Mammal Project collectors were always inventive and energetic in sampling the mammal fauna and exploited any opportunities for capture by hand. Logs or fallen palm fronds were overturned, cavities of hollow trees were explored, and surface nests and shallow tunnel systems were dismantled. The escaping denizens were grabbed, scooped with an insect net, or ensnared in a makeshift, mist net corral. Searching of such sites

sometimes uncovered examples of gerbilline (*Gerbillus*, *Taterillus*), murine (*Arvicanthis*, *Mastomys*, *Mus*, *Rhabdomys*), and otomyine rodents (*Myotomys*) and less often specimens of white-toothed shrews (Soricidae: *Crocidura*) and elephant shrews (Macroscelididae: *Elephantulus*). In Côte d'Ivoire, dead fan palms (*Borassus*) were felled, a tactic that yielded examples of arboreal rodents (*Heliosciurus*, *Hylomyscus*) and pangolins (*Manis*). Enterprising teams or individuals doggedly excavated deeper burrows of certain fossorial rodents to obtain examples of Muridae (*Parotomys*) and Bathyergidae (*Cryptomys*, *Heliofobius*). In open landscapes, such as desert and Sahel Savanna, driving at night and spotlighting startled jerboas (Dipodidae: *Jaculus*) and gerbils (Muridae: *Desmodilliscus*, *Gerbillus*, *Pachyuromys*) proved to be a popular and productive collecting technique. Such species would momentarily freeze in the light and allow the collector to approach closely; one field assistant in Morocco (Lahcen) became especially adept at running down jerboas. Some of the larger series of *Jaculus* in Morocco and all *Desmodilliscus* in Mauritania (as noted by Setzer, 1969b) were appreciably amplified in this manner. Hand capture was a supplementary collecting method and, except for *Desmodilliscus* in Mauritania, yielded no species that were not also obtained by trapping or hunting; however, specimens so captured were welcomed as they would make fine skin-and-skull preparations, unmarred by ant damage or fur slippage, or could be processed for karyotypes.

#### *Roost Searching and Mist-netting*

Upon establishing a base camp, teams soon afterward interviewed local villagers, farmers, and officials about nearby concentrations of bats and/or explored possible haunts for themselves, relying on sight, sound, and smell. Several of our cardinal localities originated as ancillary trips from a main campsite, made expressly to investigate suspected or reported bat roosts. Natural caves and grottoes, road culverts and abandoned mines, cisterns and dug wells, standing hollow trees and fallen hollow logs, dense vegetation and large furled leaves, and buildings of all size and function were thus checked for resting aggregations of bats.

Once a roost was discovered, various kinds of equipment and methods were employed to collect the bats. A mist net, or section cut from a mist net, was often erected at openings to caves, building attics, culverts, and hollow trees, and collectors would either await the emergent flight at dusk or excite bats from inside to depart early. Large series of *Rhinolophus* (Rhinolophidae), *Hipposideros* (Hipposideridae), *Miniopterus* (Vespertilionidae), and certain

Molossidae (*Chaerephon*, *Mops*, *Tadarida*) were captured in this manner (Table 5). In a couple of instances—a bat-infested house (*Mops*) and large bush with dense foliage (*Nycteris*)—entire bat congregations were collected by tightly encircling the roosts with mist nets. In Mozambique, while companions were busy inside a mine tunnel or cistern, one or two collectors were stationed at the entrance and used branches as a flail to knock swarming bats out of the air. Inside caves, large cisterns, and attics, long forceps and insect nets were used to hand capture bats hanging from out-of-reach ceilings or huddling in protected crev-

ices. Another reliable means to obtain bats from inaccessible areas in these same types of roost sites was shooting with fine-pellet cartridges (.22 caliber revolver loaded with “dust shot” or 16 gauge shotgun with number 9 shot or with a .32 caliber auxiliary [“aux”] insert to fire hand-loaded dust shot). Collectors regularly stopped along roads and railroad tracks to check culverts and closed aqueducts, spelunking such man-made tunnels for bats. African Mammal Project personnel in western Africa frequently sought large hollow trees, especially baobabs, as well as hollow logs and gathered roosting inhabitants by placing mist nets

TABLE 5. Number of National Museum of Natural History voucher specimens of Chiroptera resulting from the African Mammal Project (AMP), as summarized by region, country, and family.

Country	Pteropodidae	Rhinolophidae	Hipposideridae	Megadermatidae	Rhinopomatidae	Emballonuridae	Nycteridae	Molossidae	Vespertilionidae	Total Chiroptera
<b>Northern Africa</b>										
Algeria	0	0	0	0	0	0	0	1	1	2
Chad	0	0	4	0	0	0	0	0	0	4
Libya	0	0	0	0	0	0	0	0	3	3
Mauritania	0	0	47	0	78	1	177	103	16	422
Morocco	0	179	49	0	74	0	20	3	660	985
Niger	0	0	0	0	0	0	0	0	0	0
Regional subtotal	0	179	100	0	152	1	197	107	680	1,416
<b>Western Africa</b>										
Benin	160	5	30	0	0	1	148	522	137	1,003
Burkina Faso	200	16	103	37	0	32	618	88	23	1,117
Côte d'Ivoire	239	4	193	0	0	1	73	122	70	702
The Gambia	12	1	44	0	0	1	47	7	1	113
Ghana	1,343	16	273	11	0	11	538	1,060	215	3,467
Nigeria	314	72	293	2	0	65	193	369	97	1,405
Senegal	93	133	150	0	0	38	161	114	26	715
Togo	23	69	39	75	0	9	27	192	20	454
Regional subtotal	2,384	316	1,125	125	0	158	1,805	2,474	589	8,976
<b>Southern Africa</b>										
Botswana	24	138	44	0	0	0	95	107	138	546
Lesotho	0	0	0	0	0	0	0	0	17	17
Mozambique	50	60	154	0	0	3	105	446	240	1,058
Namibia	0	0	0	0	0	0	10	10	7	27
South Africa	6	274	2	0	0	1	26	136	275	720
Zimbabwe	6	7	2	0	0	0	15	0	83	113
Regional subtotal	86	479	202	0	0	4	251	699	760	2,481
<b>AMP total</b>	<b>2,470</b>	<b>974</b>	<b>1,427</b>	<b>125</b>	<b>152</b>	<b>163</b>	<b>2,253</b>	<b>3,280</b>	<b>2,029</b>	<b>12,873</b>

at their base, shooting into the interior, or smoking them out. Appreciable numbers of *Lissonycteris* (Pteropodidae), *Hipposideros* (Hipposideridae), and *Nycteris* (Nycteridae) were captured in such settings. Large furled leaves of banana trees were inspected as fertile sites for hand capture of the small vespertilionids *Neoromicia* and *Pipistrellus*, especially in Mozambique. Both shotguns and .22 caliber revolvers were standard collecting tools for roosting bats in all regions. In addition to their advantage in collecting bats from the high ceilings of interior roosts and upper reaches of hollow trees, firearms accounted for a majority of the large Pteropodidae (*Eidolon*, *Epomops*, *Hypsignathus*) that aggregated in small to large colonies, hanging high in palms and other tall trees.

Other means of securing bats included mist-netting in flyways, purchasing, and shooting free-flying individuals. Mist nets were more often positioned to block openings into roosts, where dense bat aggregations could be expected, but they were also strung in probable flight paths to obtain foraging bats. Nets were deployed, usually as singletons or occasionally in pairs, across streams and narrow fordable rivers, over water troughs and open cisterns, by ponds and impoundments, under fig trees and in banana groves, and simply between tents in camp. Our strong impression is that mist nets set in flight paths were more successful in catching many kinds of Vespertilionidae (*Glauconycteris*, *Eptesicus*, *Myotis*, *Nycticeinops*, *Scotoecus*, *Scotophilus*) and the smaller Pteropodidae (*Micropteropus*, *Myonycteris*, *Nanonycteris*) than were other means. Local peoples, predominantly in western Africa, brought forth bats to sell, though seldom in the same numbers or frequency as they did the small terrestrial mammals (see below). Species purchased in greatest abundance—*Epomophorus* (Pteropodidae), *Hipposideros* (Hipposideridae), *Nycteris* (Nycteridae), and *Chaerephon* (Molossidae)—represent those that commonly cluster underneath the roofs of thatched huts or storage sheds and so were easily accessible to villagers. Pot shooting of bats on the wing, usually with a .22 caliber revolver armed with dust shot, occurred infrequently and opportunistically, for example, bats that were hawking insects around camp (e.g., Hipposideridae: *Triaenops*; Emballonuridae: *Taphozous*; Vespertilionidae: *Nycticeinops*).

### Hunting

Hunting was conducted in all three regions by nearly all teams, whether on a routine or opportunistic basis. Shotguns (12 and 16 gauges, usually with numbers 6, 7½, or 9 shot, or an auxiliary insert to adapt the 16 gauge to .32 caliber dust-shot loads), rifles (.22, .30, and .375 H&H calibers),

and revolvers (.22, usually with dust-shot loads) were the firearms of choice, and their use entailed interminable hours spent with federal and local officials to secure gun permits, hunting licenses, and clearance to hunt in farms, parks, and reserves. Overall, AMP collectors appeared to devote less time to hunting during the day than at night. Processing the night's catch from traplines commonly occupied the morning and early afternoon, leaving the late afternoon to dusk as the usual daylight interval to hunt. Collectors often carried along a .22 rifle or shotgun when they checked and rebaited traplines, both during the day and night, and thus managed some opportunistic hunting while engaged in a trapping activity. In addition to their own hunting, AMP field crews sometimes engaged local hunters to acquire larger game in the environs of the base camp. Specimens either were purchased outright with cash, as with small mammal transactions (see below), or a trade was negotiated, bartering ammunition for specimens. Contracting or bartering with local hunters was a method employed more often by crews that operated in western Africa.

Among predominantly diurnal mammals, day hunting, usually on foot but sometimes from a vehicle, yielded many to most specimens of rock hyraxes (Procaviidae: *Procavia*), cercopithecoid Primates (*Cercopithecus*, *Chlorocebus*, *Colobus*, *Erythrocebus*, *Ptilocolobus*), gundis (Ctenodactylidae: *Ctenodactylus*, *Felovia*), Sciuridae, including both ground squirrels (*Atlantoxerus*, *Xerus*) and tree squirrels (*Funisciurus*, *Heliosciurus*, *Protoxerus*), certain large gerbils (Muridae: *Psammomys*), and dassie rats (Petromuridae: *Petromus*). Of course, some nocturnal mammals were also obtained during the day by discharging firearms into roosts and by disturbing nests and burrows to flush occupants. For example, hollow trees were a favorite source for rodents of the families Gliridae (*Graphiurus*) and Anomaluridae (*Anomalurus*, *Idiurus*) as well as numerous bats (see above), and arboreal stick nests amply yielded specimens of *Thallomys* (Muridae). Certain carnivores were also obtained more commonly during the day (Canidae: *Lycaon*; Mustelidae: *Mellivora*; Herpestidae: *Helogale*, *Mungos*, *Suricata*) as were the majority of medium-sized to large artiodactyls (Suidae: *Phacochoerus*; Bovidae: many genera).

Night hunting was typically undertaken between dusk and midnight and was also conducted on foot, outfitted with headlamps, or from the expedition trucks or Land Rovers, using headlamps and spotlights. The latter method ("jack lighting") was favored in open environments and typically required three individuals: the driver, someone controlling the spotlight to locate eyeshine, and the third literally "riding shotgun." In such landscapes,

ready access to long, unpopulated stretches of road was one factor weighed in selecting a base camp. Hunting at night secured most specimens of prosimians (Lorisidae: *Perodicticus*; Galagidae: *Galago*, *Otolemur*) and rabbits (Leporidae: *Lepus*, *Pronolagus*) as well as some elephant shrews (Macroscelididae: *Petrodromus*) and many rodents, both small (Dipodidae: *Jaculus*; Muridae: *Meriones*) and large species (Nesomyidae: *Cricetomys*; Anomaluridae: *Anomalurus*; Pedetidae: *Pedetes*; Hystricidae: *Atherurus*, *Hystrix*; Thryonomyidae: *Thryonomys*). Night hunting also accounted for a majority of small- to medium-sized carnivores (Felidae, Viverridae, Herpestidae, Hyaenidae, Canidae, Mustelidae) and of the smaller, solitary antelopes that inhabit denser vegetation (Bovidae: *Neotragus*, *Raphicerus*, *Cephalophus*, *Sylvicapra*).

Collectors rarely tallied the amount of effort devoted to hunting, so we could not develop any measure to compare its relative effectiveness at one locality versus another. Remarks in field journals are anecdotal and scant in nature, usually consisting of a brief mention of a companion's success. Some exceptions include the remarks of L. W. Robbins, who noted that 18 *Atlantoxerus* were shot over a 2 km distance when squirrel hunting from a truck (Morocco, 6 km SE Tafraoute); R. E. Vaden, who reported that 20 man-hours of hunting over three days produced no mammals in a degraded habitat (Petoye, Burkina Faso); and again R. E. Vaden, who recorded a four-day camp total of 12 specimens, resulting from 300 traps per night and 12–20 man-hours of hunting per day (30 km N Mar-koye, Burkina Faso).

#### Purchasing Specimens

Direct purchase of mammals from local residents supplied a steady source of specimens throughout the course of AMP fieldwork, and minor amounts were always budgeted for this purpose in the recurring funding proposals submitted by Setzer. Soon after camp was established, team members typically visited nearby farms and villages to spread the word that they were anxious to buy mammals of all kinds. If not always deliberately advertised, a field camp would naturally attract the curious, who observed the peculiar activities of the strangers and thereby learned their willingness to buy animals. Museum Specials and Victor rat traps were occasionally loaned to individuals, especially young boys, to catch mice in their homes, granaries, and agricultural fields, an arrangement that generally yielded mixed returns (of specimens and traps). In some areas, people were wholly disinterested in collecting animals regardless of the monetary inducement. More

often, the response proved to be so overwhelming that collectors had to quit setting traps or to declare a moratorium on new purchases in order to handle the deluge of specimens. In the latter case, the gas-powered, portable refrigerators carried by many teams were indispensable to stabilize specimens until they could be prepared.

Comments extracted from collectors' field journals convey some notion of the habit and scale of purchasing activity by AMP crews and the variety and numbers of mammals so obtained. "Locals saved the day though with another 13 *Meriones*" (R. E. Vaden, 10 Apr 1970, 20 km S Chichaoua, Morocco). "Reached the town about 9:30 [AM] and were swamped by people with jerboas [*Jaculus*] . . . we now had to buy 63 more" (R. E. Vaden, 29 Jun 1970, 3 km E Ifkern, Morocco). "All in all this has been quite a day with some fifteen *Cricetomys* brought to us plus a hedgehog [*Atelerix*] and two *Lemniscomys*" (H. W. Setzer, 29 Oct 1965, 6 km NW Tivaouane, Senegal). "People were bringing in all sorts of things [including specimens of *Cercopithecus*, *Colobus*; *Heliosciurus*, *Euxerus*; *Lepus*; *Epomophorus*, *Nycteris*; *Genetta*] . . . Needless to say it was complete chaos with trying to make sure all of the tags got on the right specimen" (R. M. Davis, 13 Jan 1966, 8 mi W Bathurst, The Gambia). "We won't need them [traps] tonight, as the locals are digging rats out faster than we are trapping them" (R. E. Vaden, 18 Nov 1968, Goden, Burkina Faso). "The villagers came through again, though—we put up 73 specimens, all but 6 of which we bought" (including specimens of *Galago*; *Gerbilliscus*, *Taterillus*, *Mus*, *Praomys*; *Lepus*; *Atelerix*) (R. E. Vaden, 5 Mar 1969, 6 km SE Seguenega, Burkina Faso). "People didn't start coming until after 2 [PM], & by the end of the day, we had 40 specimens" (including specimens of *Cricetomys*, *Steatomys*, *Gerbilliscus*, *Uranomys*, *Lemniscomys*, *Mastomys*; *Nycteris*). "Busy late and we set no traps" (L. W. Robbins, 7 Mar 1969; Tyenko, Côte d'Ivoire). "We have increased the price of mammals to see if that will stimulate larger scale collecting" (C. B. Robbins, 20 Apr 1968, Soubroukou, Benin). "We informed the people of our needs. Sit and wait . . . rats and mice are coming in now" (including specimens of *Galago*; *Xerus*, *Graphiurus*, *Cricetomys*, *Gerbilliscus*, *Tatera*, *Arvicanthis*, *Mastomys*, *Mus*; *Atelerix*; *Crocidura*; *Epomophorus*) (C. B. Robbins, 25–26 Apr 1968, Kouande, Benin). "Shortly after we spread the word we wanted animals, the *Arvicanthis* started to arrive" (J. C. Geest, 13 Jan 1967, Karaduwa, Nigeria). "[Six] natives brought in an *Ichneumia* in a bag . . . Local people bringing in 4 types of bats from their houses and nearby trees [= *Lavia*, *Taphozous*, *Nycteris*, *Glauconycteris*] . . . They also bring in *Mastomys* from the houses &

*Xerus* from the fields" (H. J. Herbert, 11 Apr 1966, 31 mi NE Dikwa, Nigeria). "Local people have kept us swamped with squirrels [*Xerus*, *Paraxerus*], mongoose [*Cynictis*, *Helogale*, *Mungos*], and the like" (A. R. Hardy, 26 Mar 1965, Tsau, Botswana). "The natives brought in 3 mole-rats (*Cryptomys*) and a *Petrodromus*" (R. M. Davis, 16 Aug 1964, 5 mi N Mungari, Mozambique). "The natives are coming from far and wide to sell us animals . . . the animals purchased formed the major part of today's catch" (including specimens of *Aethomys*, *Mastomys*, *Mus*, *Rattus*, *Rhabdomys*, *Otomys*; *Myosorex*) (R. D. Hepplewhite, 20 Oct 1966, 2 mi E Haenertsburg, South Africa).

## TAXONOMIC AND GEOGRAPHIC SUMMARY

### *Taxonomic Survey and Geographic Coverage*

Field collections generated by the African Mammal Project include representatives of 14 of Africa's 15 orders of terrestrial mammals. Rodents comprise approximately 70% of all AMP specimens (Table 6), hardly a surprising proportion in view of the predominant reliance on snap traps distributed in long transect lines, the epidemiological objectives of the AMP, and the diversity of the order in Africa (e.g., see Allen, 1939; Delany and Happold, 1979; Nowak, 1999). Within Rodentia, the taxonomically diverse and ecologically widespread Muridae (gerbils, jirds, mice, and rats) is the most conspicuously represented family (63% of AMP specimens; Table 3); the 13 other families of Rodentia, totaling about 5,000 specimens, were acquired by various means (Table 7), in particular trapping with gopher traps (Bathyergidae) and hunting (Sciuridae, Anomaluridae, Pedetidae, and other hystricognath families). Second to Rodentia in species diversity, Chiroptera was also second in abundance among AMP collections, amounting to 20% of all mammals collected and cataloged (Table 6). By far, the majority of Chiroptera were obtained by inspecting day-roost sites for resting bats. As a collecting method, roost searching is a catch-all of tools and procedures because, having once located a roost, actual capture of bats required using mist nets, firearms, insect nets, or gloved hands (see Roost Searching and Mist-netting section above). Huge series of Hipposideridae, Nycteridae, and Molossidae were gathered from cavernous roosts, whether natural (caves and hollow trees) or man-made (attics and cisterns). Higher numbers and greater diversity of Vespertilionidae may have resulted from mist-netting of free-flying foraging bats, although we cannot quantify this observation given the uneven detail imparted in collectors' journals. Inventory of bats, by all

of the above methods, was more intensively pursued by teams that worked in western Africa (Tables 5, 6).

Excluding Rodentia and Chiroptera, other mammalian orders collectively total only 8.5% of the AMP specimens obtained and none exceeds 2% (Table 6). The project's objectives, as identified in funding proposals, were loosely intended "to ascertain the kinds of mammals" without specifying any particular group or size class, but Setzer himself (1971a:259) emphasized "collecting *small* mammals and their ectoparasites" as a central goal of the AMP. Clearly, AMP field methods, especially reliance on snap traps, were not designed to thoroughly inventory large mammals, so the absence of proboscideans and the low numbers of carnivores, perissodactyls, and artiodactyls are predictable. Nonetheless, hunting of medium- to large-size mammals was an integral collecting method employed by AMP field teams, notwithstanding the rarity of documentation of the time collectors devoted to it. Hunting served as the principal means for acquiring certain groups, notably those of Primates, Carnivora, Artiodactyla, and Lagomorpha as well as certain families of Chiroptera (Pteropodidae) and Rodentia (Sciuridae, Anomaluridae, Pedetidae, Ctenodactylidae, Hystricidae, Thryonomyidae). Without using firearms, the taxonomic diversity and especially the series recovered of these orders and families would have been decidedly less (Tables 3, 5, 6); the sampling of small carnivores (Viverridae, Hesperidae, Mustelidae) and reclusive cephalophine ungulates (*Cephalophus*, *Philantomba*, *Sylvicapra*) is noteworthy. Two-thirds of ungulate and over one-half of carnivore vouchers issued from the southern African region (Table 6), where the continental distributions of many taxa are localized and where expansive open savannahs and low human population densities fostered productive hunting by AMP collectors. Of the two marine mammal orders found along Africa's littoral margins, no specimens of Sirenia were collected, and the 21 Cetacea obtained represent either happenstance beach pickups (Morocco) or T. J. McIntyre's fortuitous acquisition of an abandoned collection (Côte d'Ivoire).

The taxonomic diversity of specimens purchased was surprisingly broad wherever people were enthusiastically cooperative, nearly matching the ordinal variety derived from all other collecting methods employed at a locality (Table 7). Purchasing served as an important secondary source for many groups of mammals, in particular Rodentia, Soricomorpha, and smaller Carnivora, whereas hunting still appeared to be the far superior means for obtaining specimens of Primates, Lagomorpha, larger Carnivora, and most Artiodactyla. Time and again, purchased

**TABLE 6.** Number of National Museum of Natural History voucher specimens of Mammalia resulting from the African Mammal Project (AMP), as summarized by region, country, and order.

Country	Atroriscida	Macroscelidea	Tubulidentata	Hyracoida	Primates	Rodentia	Lagomorpha	Erinaceomorpha	Soricomorpha	Chiroptera	Pholidota	Carnivora	Perissodactyla	Artiodactyla	Cetacea	Total Mammalia
<b>Northern Africa</b>																
Algeria	0	3	0	0	0	357	0	0	0	2	0	1	0	0	0	363
Chad	0	0	0	0	0	61	4	0	0	4	0	1	0	3	0	73
Libya	0	1	0	0	0	1,801	7	0	6	3	0	10	0	7	0	1,835
Mauritania	0	0	0	24	8	2,132	13	4	15	422	0	33	0	4	0	2,655
Morocco	0	225	0	0	13	6,221	22	43	41	985	0	37	0	3	2	7,592
Niger	0	0	0	0	0	175	0	2	0	0	0	0	0	0	0	177
Regional subtotal	0	229	0	24	21	10,747	46	49	62	1,416	0	82	0	17	2	12,695
<b>Western Africa</b>																
Benin	0	0	0	0	54	1,821	5	74	79	1,003	1	7	0	15	0	3,059
Burkina Faso	0	0	0	0	138	2,637	70	52	8	1,117	0	55	0	13	0	4,090
Côte d'Ivoire	0	0	2	5	118	1,957	9	0	77	702	11	96	0	56	19	3,052
The Gambia	0	0	0	0	59	256	2	0	1	113	0	4	0	2	0	437
Ghana	0	0	0	0	56	3,678	6	15	131	3,467	4	26	0	2	0	7,385
Nigeria	0	0	0	4	41	3,393	14	61	191	1,405	3	50	0	7	0	5,169
Senegal	0	0	0	0	62	1,366	17	79	34	715	0	50	0	2	0	2,325
Togo	0	0	0	2	11	939	4	39	35	434	0	9	0	1	0	1,494
Regional subtotal	0	0	2	11	539	16,047	127	320	556	8,976	19	297	0	98	19	27,011
<b>Southern Africa</b>																
Botswana	0	112	1	12	117	4,398	86	3	105	546	0	260	1	142	0	5,783
Lesotho	0	0	0	0	0	84	0	0	0	17	0	0	0	0	0	101
Mozambique	5	73	0	2	60	2,271	57	0	67	1,058	0	41	0	66	0	3,700
Namibia	0	53	0	14	0	908	38	0	4	27	0	7	0	0	0	1,051
South Africa	39	600	0	57	25	9,178	120	3	315	720	0	151	0	16	0	11,224
Zimbabwe	1	22	1	1	23	1,329	13	0	116	113	0	19	0	10	0	1,648
Regional subtotal	45	860	2	86	225	18,168	314	6	607	2,481	0	478	1	234	0	23,507
<b>AMP total</b>	<b>45</b>	<b>1,089</b>	<b>4</b>	<b>121</b>	<b>785</b>	<b>44,962</b>	<b>487</b>	<b>375</b>	<b>1,225</b>	<b>12,873</b>	<b>19</b>	<b>857</b>	<b>1</b>	<b>349</b>	<b>21</b>	<b>63,213</b>

**TABLE 7.** Summary of collecting tools and methods employed during the African Mammal Project, graded according to effectiveness for various mammalian orders. Codes: 1 = major tool or method that generated the greatest number of specimens over the entire project; 2 = secondary tool or method that produced appreciable specimen numbers or was most effective for particular taxa (families or genera) in certain areas; 3 = tool or method that yielded specimens in low numbers or only incidentally; ? = a tool or method that was known to produce specimens, but grading its effectiveness was uncertain; a dash (-) indicates a tool or method that only rarely yielded specimens or that was never used for a given order.

Country	Snap traps	Steel traps	Gopher traps	Live traps	Snares	Hand capture	Salvage	Roost searching	Mist-netting	Hunting	Purchasing
Afrosoricida	2?	-	1	-	-	-	-	-	-	-	3?
Macroscelidea	1	-	-	-	-	3	-	-	-	3	2
Tubulidentata	-	-	-	-	-	-	-	-	-	2?	1?
Hyracoidea	-	3	-	-	-	-	-	-	-	1	2
Primates	-	-	-	-	-	-	-	-	-	1	2
Rodentia	1	-	2	2	3	3	-	-	-	2	2
Lagomorpha	-	-	-	-	3	-	3	-	-	1	2
Erinaceomorpha	2	-	-	-	-	3	-	-	-	2	1
Soricomorpha	1	-	-	-	-	3	-	-	-	-	2
Chiroptera	-	-	-	-	-	-	-	1	2	3	2
Pholidota	-	-	-	-	-	-	-	-	-	1	2
Carnivora	-	3	-	3	-	-	3	-	-	1	2
Perissodactyla	-	-	-	-	-	-	-	-	-	1	-
Artiodactyla	-	-	-	-	-	-	3	-	-	1	2
Cetacea	-	-	-	-	-	-	1	-	-	-	-

specimens substantially increased sample sizes from a locality; indeed, in many instances, the incoming specimens proved to be so steady and numerous that collectors ceased running their traplines altogether. Some average quota of specimens seemed to be expected from AMP teams, and when traplines were unproductive, collectors hoped that local people would “save the day” by appearing with small mammals for sale. On the other hand, purchasing held certain disadvantages as a method of collection. Although the variety of purchased taxa was overall broad, their numbers were strongly skewed to those coming out of huts and fields, yielding a superabundance of the indigenous semicommissals (*Arvicanthis*, *Mastomys*, certain *Praomys*) and nonnative commensals (*Mus*, *Rattus*) only from anthropogenic settings. (At Tsanchaga, Nigeria, J. C. Geest noted that the carcasses of *Mastomys* smelled like wood smoke.) In general, collectors inconsistently discriminated between animals purchased and those taken in traplines, an uncertainty that complicates a researcher’s

interest in estimating trap success, determining habitat fidelity, or inferring microsympatry (syntopy). The isolation of specimens for the uncontaminated removal of ectoparasites, a central objective of the project, was compromised by the villagers’ habit of bringing mixed species assemblages in whatever container was available (At 1 mi W Bichi, Nigeria, H. J. Herbert mentioned that three young boys brought in 31 rats—*Arvicanthis*, *Dasymys*, and *Mastomys*—all alive and jumping in a single box). Finally, as remarked by at least two AMP workers, reliance on acquisition of specimens from local peoples removed the collector from a firsthand knowledge of their habitat of origin and related ecological detail.

African Mammal Project faunal surveys were organized and directed around a geopolitical entity, the country, but the many country inventories undertaken over broad continental regions realized incidental sampling, in varying degrees, of most of Africa’s major biotic zones (Table 8). Africa’s open landscapes, its deserts and savan-



**TABLE 8.** Distribution of African Mammal Project (AMP) cardinal localities<sup>a</sup> among the major biotic zones of Africa<sup>b</sup>, summarized by region and country.

Country and statistic	Mediterranean Zone	Sahara Desert	Northern Savanna	Rainforest	Southwest Arid Zone	Southern Savanna	Southwest Cape	Afromontane
<b>Northern Africa</b>								
Algeria	-	28	-	-	-	-	-	-
Chad	-	5	-	-	-	-	-	-
Libya	22	62	-	-	-	-	-	-
Mauritania	-	8	13	-	-	-	-	-
Morocco	66	15	-	-	-	-	-	-
Niger	-	2	8	-	-	-	-	-
Regional subtotal	88	120	21	-	-	-	-	-
<b>Western Africa</b>								
Benin	-	-	14	2	-	-	-	-
Burkina Faso	-	-	27	-	-	-	-	-
Côte d'Ivoire	-	-	13	12	-	-	-	-
Ghana	-	-	45	16	-	-	-	-
Nigeria	-	-	29	11	-	-	-	-
Senegal–The Gambia	-	-	34	-	-	-	-	-
Togo	-	-	4	3	-	-	-	-
Regional subtotal	-	-	166	44	-	-	-	-
<b>Southern Africa</b>								
Botswana	-	-	-	-	29	61	-	-
Mozambique	-	-	-	-	-	56	-	2
Namibia	-	-	-	-	24	-	-	-
South Africa–Lesotho	-	-	-	-	56	78	10	9
Zimbabwe	-	-	-	-	-	17	-	3
Regional subtotal	-	-	-	-	109	212	10	14
<b>AMP total</b>	<b>88</b>	<b>120</b>	<b>187</b>	<b>44</b>	<b>109</b>	<b>212</b>	<b>10</b>	<b>14</b>
<b>Percentage</b>	<b>11.2</b>	<b>15.3</b>	<b>23.9</b>	<b>5.6</b>	<b>13.9</b>	<b>27.0</b>	<b>1.3</b>	<b>1.8</b>

<sup>a</sup> Tallies exclude one oceanic locality and three localities not georeferenced.

<sup>b</sup> Certain biotic zones are accepted in their broad sense as follows: Mediterranean includes coastal plain, the Barbarian or Maghreb Region, Atlas Mountains, and the Cyrenaica Plateau; Northern Savanna includes the Sahel, Sudan, and Guinea zones sensu Rosevear (1953, 1965); Southwest Arid Zone includes the Namib and Kalahari deserts; Southern Savanna includes the Southern Savanna Woodlands and Southern Savanna Grasslands sensu Rautenbach (1978).

nas, are conspicuously represented among AMP collecting sites (approximately 80% of the 788 cardinal localities). Xeric environments of the Sahara Desert and Southwest Arid Zone are present in moderate numbers, and more mesic habitats situated within the Northern and Southern Savanna zones that frame the continent's wet forests were densely surveyed. The abundant series of bats and of gerbilline and murine rodents obtained from these savannas

are particularly noteworthy. Although modest in number, sites from the Mediterranean Zone importantly document species that occur in refugia along Africa's northern rim (Barbarian Region, Morocco; Cyrenaica Plateau, Libya), where a prevailing temperate climate harbors faunas that exhibit Palearctic resemblances. Most AMP localities within high-canopied, lowland rainforest fall within the Guinea Rainforest province of western Africa, but the two

sites in southeastern Nigeria (15 mi N Calabar and 14 mi S Oban) originate from an area that has stronger biogeographic affinity to the larger Congo Rainforest block of central Africa (e.g., see Booth, 1958; Carleton and Robbins, 1985; Happold, 1996). Rainforest localities are relatively few in number (and collectors' remarks indicate that most were already degraded at the time of inventory), but their faunal documentation is invaluable in view of the accelerating fragmentation and disappearance of Afrotropical rainforest (e.g., Beier et al., 2002; Myers et al., 2000). We are surprised that the Southwest Cape Zone in southernmost South Africa was so meagerly inventoried (Table 8). We are not surprised by the minimal representation of the Afromontane Zone (*sensu* White, 1981) among AMP localities because these wet montane uplands are concentrated in eastern Africa (Ethiopian Highlands and rift mountains) and only marginally penetrate southern Africa (e.g., Drakensberg Mountains).

Categorization of biomes is perhaps most standardized in western Africa thanks to the timely publication of Rosevear's (1965) *Bats of West Africa*. Rosevear precisely outlined High Forest and Guinea, Sudan, and Sahel savannas (here treated as subzones of Northern Savanna) and criteria for their recognition, and many collectors mentioned his book in their field notes. Although the tallies in Table 8 suffice to convey the relative intensity of AMP survey among major biotic zones, we acknowledge some arbitrariness in classifying any individual site for reasons of geographic intermediacy, indefinite ecological characterization, or lack of habitat information altogether. In such cases, we accepted geographic location as the deciding factor in categorizing the locality. Such ambiguity sometimes confronted the AMP collectors in the field, as underscored by the complaint of H. J. Herbert in Nigeria (31 Jan 1966): "the area (according to Rosevear) is High Forest . . . yet the area where all my collecting has been done is in open fields and farmed pasture lands."

The literature on methods of biological inventory and comparative studies of collecting hardware are vastly richer than that available at the inception of the AMP in the early 1960s. Having characterized the collecting tools and field procedures employed by AMP collectors, it is instructive to consider their taxonomic results in light of certain inventory methodologies now recommended as standard for conducting a geographic inventory and assessing diversity of mammals (e.g., Wilson et al., 1996). African Mammal Project traplines predominantly consisted of snap traps placed on the ground, whereas placement of arboreal traps was, overall, sporadic and opportunistic,

mostly confined to reachable heights of 1.5–2.5 m where attempted. Prolonged, systematic efforts to trap arboreal small mammals at greater heights, such as canopy platform stations erected at 10–12 m (Malcolm, 1991; Patton et al., 2000), are not apparent. Canopy traps could have been effectively employed at the relatively few high-forest localities in western Africa but would have been an impractical method for the desert biotopes and low-canopied woodlands and savannas that form the majority of AMP localities. Although greater emphasis on trapping in trees may have improved sample sizes of certain scansorial or arboreal Rodentia (Sciuridae, Gliridae, Anomaluridae, Muridae) and loriform Primates (Lorisidae, Galagidae), we doubt that it would have expanded the taxonomic diversity of these groups as obtained by trapping, hunting, and purchasing. Mist nets were erected to catch foraging bats, but only one or two nets were typically deployed, and their use in flight paths was clearly secondary to the capture of resting bats at their diurnal roosts. Techniques such as sustained maintenance of many mist nets in staggered patterns and using rigging systems to elevate nets into canopy spaces (e.g., Kunz and Kurta, 1988; Kunz et al., 1996) are not in evidence, and the era of the AMP predates the harp trap as a popular bat-collecting device (Tuttle, 1974). Here again, adopting these devices and techniques may have substantially increased specimen numbers but would less likely have increased their familial and generic diversity. African Mammal Project collectors aggressively sought roosting sites, and their extensive collections of resting bats would seem to compensate for the lower effort devoted to mist-netting. The 1,225 specimens of Soricomorpha, obtained mainly by snap trap or purchase, represent approximately 2% of AMP collections (Table 6), a proportion that seems incommensurate with the richness and ecological ubiquity of the order in Africa (e.g., Hutterer, 2005; Hutterer et al., 1987). The AMP ended about 15–20 years before the conventional use of pitfalls to collect small mammals, although the method has a much longer history of sporadic use (see Handley and Kalko, 1993). Trapping arrays of pitfalls linked by drift fences are highly effective for capture of small terrestrial mammals and are demonstrably superior for procuring a wide variety of shrews over small rodents (Williams and Braun, 1983; Kirkland and Sheppard, 1994), including African soricomorphs (Goodman et al., 2001; O'Brien et al., 2006). In this instance, using pitfall traps would have certainly enhanced the numbers and diversity of Soricomorpha. Of course, the foregoing observations have the great advantage of hindsight, and our judgments must forever contain some element of conjecture.

### AMP and Earlier Smithsonian African Expeditions

Faunal results of the AMP invite comparison with previous African surveys conducted by Smithsonian personnel in the early 1900s. Setzer deliberately, and reasonably, developed his funding proposals to cover continental regions other than the eastern sector of Africa, whose mammalian fauna he explicitly considered well known as a result of those earlier surveys. The two largest and historically most important were the Smithsonian African Expedition (Apr 1909 to Mar 1910) and the Rainey African Expedition (Mar 1911 to Mar 1912), and Hollister (1918, 1919, 1924) carefully synthesized the mammalian findings of both. The Smithsonian African Expedition was proposed and directed by Theodore Roosevelt, 26th President of the United States (1901–1908) and a self-described hunter-naturalist (Roosevelt, 1910). The expedition included three experienced field scientists: Edmund Heller, who mainly assisted Teddy and son Kermit with the preservation of larger mammals; Edgar A. Mearns, who emphasized bird collecting but also obtained a wide variety of mammals; and J. Alden Loring, who focused on collection and preparation of small mammals. Independently wealthy, devoted to reckless adventure, and occasionally a philanthropist, Paul J. Rainey was a fervent big-game hunter who assumed all expenses for the second African expedition that bore his name. Fortunately, those expenses covered the services of Edmund Heller, who participated as the enterprise's sole naturalist and scientific collector of mammals. The itineraries of the two surveys overlapped in colonial British East Africa, but collecting efforts were concentrated in the territory equivalent to modern day Kenya, with marginal stops in Uganda, northeastern Tanzania, and southern Sudan.

The significantly longer duration of the AMP (12 years versus 2 years) naturally accounts for a much larger collection of mammals in total (~63,000 versus ~8,000), but conspicuous proportional differences are apparent among the various orders (Table 9). In concert with the overriding hunting pursuits of their principal benefactors, the African surveys of Roosevelt and Rainey obtained higher numbers for those orders that include big game (Proboscidea, Carnivora, Perissodactyla, Artiodactyla), these amounting to nearly 20% of all mammals collected compared to about 2% for the AMP. The lack of mist nets must explain, in large measure, the lower numbers of bats, absolutely and relatively, in the collections made in the early 1900s, but we are surprised by and cannot readily account for the comparatively higher success in procuring soricomorph shrews by those earlier collectors. As in the AMP, rodents are also predominant among the early eastern African col-

**TABLE 9.** Vouchered specimens of African Mammalia generated by Smithsonian field surveys.

Order or group	Smithsonian African Expedition, Rainey African Expedition (1909–1912)		African Mammal Project (1961–1972)	
	Number	Percent	Number	Percent
Afrosoricida	0	0	45	<0.1
Macroscelidea	105	1.4	1,089	1.7
Tubulidentata	0	0	4	<0.1
Hyracoidea	114	1.5	121	0.2
Proboscidea	15	0.2	0	0
Primates	207	2.7	785	1.2
Rodentia	4,613	60.2	44,962	71.1
Lagomorpha	56	0.7	487	0.7
Erinaceomorpha	13	<0.1	375	0.6
Soricomorpha	577	7.5	1,225	1.9
Chiroptera	509	6.6	12,873	20.4
Pholidota	0	0	19	<0.1
Carnivora	449	5.8	857	1.3
Perissodactyla	128	1.7	1	<0.1
Artiodactyla	891	11.6	349	0.5
Cetacea	0	0	21	<0.1
Mammalia	7,695 <sup>a</sup>		63,213	
Type specimens	165		39	

<sup>a</sup>Hollister (1918, 1919, 1924) reported a total of 7841 USNM specimens for these two expeditions. Some were subsequently traded to other institutions (e.g., the Field Museum of Natural History), but their absence does not materially alter the percentages of the orders.

lections, given their great diversity in species, abundant populations in all manner of habitats, and deployment of snap-trap lines by Heller, Loring, and Mearns. Other differences among orders are slight and unremarkable (Macroscelidea, Hyracoidea, Primates, Lagomorpha) or reflect continental patterns of endemism (absence of Afrosoricida in eastern Africa) or a lack of deliberate collecting effort (Pholidota, Cetacea). The earlier inventories (1909–1912) transpired amid a fertile period of natural history exploration and taxonomic discovery in Africa (ca. 1880–1930); consequently, many more mammals were reported as new to science, most described by the prolific Heller (e.g., 1909, 1910, 1911, 1912, 1913), who accompanied the expeditions of both Roosevelt and Rainey. The 165 new taxa included both species and subspecies (geographic races) of small, reclusive shrews and rodents (see Hollister, 1919) as well as large, diurnal mammals such as primates, antelopes, and carnivores (see Hollister, 1918, 1924). The 39 new forms so far issuing from the AMP (Table 10) are all

TABLE 10. New mammalian taxa originating from the African Mammal Project, supplemented by geographic coordinates for their type localities.

Taxon, author, date:page no. (type specimen no.)	Type locality	Coordinates
<b>Rodentia</b>		
<i>Eliomys quercinus denticulatus</i> <sup>a</sup> Ranck, 1968:216 (USNM 322757)	Libya, El Gatrun	24°57'N, 14°39'E P
<i>Jaculus deserti fuscipes</i> <sup>b</sup> Ranck, 1968:226 (USNM 322761)	Libya, 7 km S El Gheddahia	31°23'N, 15°12'E P
<i>Jaculus deserti rarus</i> <sup>b</sup> Ranck, 1968:228 (USNM 319781)	Libya, Gebel Uweinat, Ain Zueia	21°53'N, 24°50'E P
<i>Jaculus deserti vastus</i> <sup>b</sup> Ranck, 1968:230 (USNM 325837)	Libya, Wadi er Rueis, 340 km WNW Tazerbo <sup>c</sup>	26°52'N, 18°31'E P
<i>Jaculus jaculus arenaceus</i> Ranck, 1968:234 (USNM 322812)	Libya, Edri	27°32'N, 13°12'E P
<i>Jaculus jaculus collinsi</i> Ranck, 1968:236 (USNM 325797)	Libya, Tazerbo Oasis	25°45'N, 21°09'E P
<i>Jaculus jaculus cufrensis</i> Ranck, 1968:238 (USNM 325785)	Libya, Cufra Oasis, El Giof	24°11'N, 23°19'E P
<i>Jaculus jaculus tripolitanicus</i> Ranck, 1968:240 (USNM 325773)	Libya, 25 km N Gharian	32°25'N, 13°03'E P
<i>Jaculus jaculus whitchurchi</i> Ranck, 1968:242 (USNM 325807)	Libya, 10 km S Agedabia	30°42'N, 20°19'E P
<i>Steatomys caurinus roseveari</i> Swanepoel and Schlitter, 1978:73 (USNM 467496)	Côte d'Ivoire, Yama	09°36'N, 06°18'W C
<i>Dipodillus maghrebi</i> Schlitter and Setzer, 1972:387 (USNM 472714)	Morocco, 15 km WSW Taounate	34°29'N, 04°48'W C <sup>d</sup>
<i>Gerbillus setzeri</i> <sup>e</sup> Schlitter, 1973:13 (USNM 342253)	Namibia, Gobabeb, 1 mi E Namib Desert Research Station	23°33'S, 15°02'E G
<i>Gerbillus aureus nalutensis</i> <sup>f</sup> Ranck, 1968:90 (USNM 321816)	Libya, 40 km ENE Nalut	32°01'N, 11°22'E P
<i>Gerbillus eatoni inflatus</i> <sup>g</sup> Ranck, 1968:97 (USNM 325527)	Libya, 10 km SW Fort Capuzzo	31°31'N, 24°59'E P
<i>Gerbillus eatoni versicolor</i> <sup>g</sup> Ranck, 1968:98 (USNM 325298)	Libya, 2 km N Coefia	32°14'N, 20°11'E P
<i>Gerbillus gerbillus aeruginosus</i> Ranck, 1968:103 (USNM 325146)	Libya, Cufra Oasis, El Giof	24°11'N, 23°19'E P
<i>Gerbillus gerbillus discolor</i> Ranck, 1968:106 (USNM 322461)	Libya, Ghat	24°58'N, 10°11'E G <sup>h</sup>
<i>Gerbillus gerbillus psammophilous</i> Ranck, 1968:112 (USNM 325078)	Libya, Gialo Oasis	29°15'N, 21°14'E P
<i>Gerbillus pyramidum hamadensis</i> <sup>i</sup> Ranck, 1968:118 (USNM 321827)	Libya, 5 km E Derg	30°12'N, 10°29'E P
<i>Gerbillus pyramidum tibesti</i> <sup>i</sup> Setzer and Ranck, 1971:55 (USNM 319721)	Chad, Zouar	20°27'N, 16°32'E G <sup>h</sup>
<i>Meriones caudatus amplus</i> <sup>j</sup> Ranck, 1968:165 (USNM 322681)	Libya, El Gatrun	24°57'N, 14°39'E P
<i>Meriones caudatus luridus</i> <sup>j</sup> Ranck, 1968:173 (USNM 325597)	Libya, Bahr el Tubat, 21 km ESE Giarabub	29°36'N, 24°53'E P
<i>Taterillus arenarius</i> Robbins, 1974:397 (USNM 401919)	Mauritania, Tiguent	17°16'N, 16°01'W C
<i>Mus setzeri</i> Petter, 1978:377 (USNM 428742)	Botswana, 55 mi W Mohembo <sup>k</sup>	18°20'S, 21°00'E M
<b>Soricomorpha</b>		
<i>Crocidura agadiri</i> <sup>l</sup> Vesmanis and Vesmanis, 1980:67 (USNM 470588)	Morocco, 15 km NE Tiznit <sup>m</sup>	29°49'N, 09°39'W C
<i>Crocidura alexandrisi</i> Vesmanis, 1977:3 (USNM 325010)	Libya, 5 km W Tocra	32°31'N, 20°32'E M
<i>Crocidura bolivari tamrinensis</i> <sup>n</sup> Vesmanis and Vesmanis, 1980:41 (USNM 476091)	Morocco, 10 km N Tamri	30°46'N, 09°50'W M <sup>o</sup>
<i>Crocidura chaouiensis</i> <sup>p</sup> Vesmanis and Vesmanis, 1980:64 (USNM 476081)	Morocco, 3 km N Settat	33°02'N, 07°37'W M <sup>q</sup>
<i>Crocidura essaouiranensis</i> <sup>r</sup> Vesmanis and Vesmanis, 1980:61 (USNM 485839)	Morocco, 5 km NE Essaouira	31°31'N, 09°46'W C
<i>Crocidura gouliminensis</i> <sup>l</sup> Vesmanis and Vesmanis, 1980:52 (USNM 482864)	Morocco, 28 km SW Goulimine	28°46'N, 10°14'W C
<i>Crocidura heljanensis safii</i> <sup>p</sup> Vesmanis and Vesmanis, 1980:49 (USNM 476078)	Morocco, 13 km S Safi	32°11'N, 09°15'W C
<i>Crocidura longipes</i> Hutterer and Happold, 1983:53 (USNM 402309)	Nigeria, Dada	11°34'N, 04°29'E C
<i>Crocidura mesatanensis</i> <sup>r</sup> Vesmanis and Vesmanis, 1980:69 (USNM 476088)	Morocco, 10 km S Oued Zem	32°46'N, 06°35'W M
<i>Crocidura tarfayaensis</i> Vesmanis and Vesmanis, 1980:47 (USNM 470590)	Morocco, 8 km S Tarfaya	27°53'N, 12°52'W M <sup>s</sup>
<i>Crocidura tiznitensis</i> <sup>l</sup> Vesmanis and Vesmanis, 1980:54 (USNM 470589)	Morocco, 15 km NE Tiznit	29°49'N, 09°39'W C
<i>Crocidura zaianensis</i> <sup>r</sup> Vesmanis and Vesmanis, 1980:62 (USNM 476071)	Morocco, 5 km N Ben Slimane	33°39'N, 07°08'W C

(continued)

TABLE 10. (continued)

Taxon, author, date:page no. (type specimen no.)	Type locality	Coordinates
	Chiroptera	
<i>Scotophilus nucella</i> Robbins, 1983:19 (USNM 412141)	Ghana, 1 mi N Nkawkaw	06°33'N, 00°44'W C
<i>Laephotis botswanae</i> Setzer, 1971a:260 (USNM 425349)	Botswana, 50 mi W, 12 mi S Shakawe	18°32'S, 21°05'E M <sup>h</sup>
<i>Laephotis namibensis</i> Setzer, 1971a:259 (USNM 342152)	Namibia, Gobabeb, Namib Desert Research Station	23°33'S, 15°02'E G <sup>h</sup>

<sup>a</sup> A junior synonym of *Eliomys munbyanus* according to Holden (2005).

<sup>b</sup> A junior synonym of *Jaculus jaculus* according to Harrison (1978).

<sup>c</sup> Published type locality also included "Gebel el Harug el Asued," a modifier that does not appear on the type specimen label.

<sup>d</sup> Published type locality included erroneous coordinates (= 34°29'N, 40°48'W).

<sup>e</sup> A species of *Gerbillurus* as reviewed by Musser and Carleton (2005).

<sup>f</sup> A junior synonym of *Gerbillus latastei* according to Cockrum (1977).

<sup>g</sup> A junior synonym of *G. andersoni* according to Cockrum et al. (1976).

<sup>h</sup> Published type locality did not include coordinates.

<sup>i</sup> A junior synonym of *G. tarabuli* according to Lay (1983).

<sup>j</sup> A junior synonym of *Meriones libycus* according to Lay and Nadler (1969).

<sup>k</sup> Published type locality given as "82 km W Mohembo."

<sup>l</sup> A junior synonym of *Crocidura tarfayensis* according to Hutterer (1987).

<sup>m</sup> Published type locality given as "15 km N Tiznit."

<sup>n</sup> A junior synonym of *C. viaria* according to Hutterer (1984).

<sup>o</sup> Published type locality included erroneous coordinates (= 30°21'N, 09°49'W).

<sup>p</sup> A junior synonym of *C. russula yebalensis* according to Genoud and Hutterer (1990).

<sup>q</sup> Published type locality included erroneous coordinates (= 33°02'N, 07°46'W).

<sup>r</sup> A junior synonym of *C. whitakeri* according to Hutterer (1987, 1991).

<sup>s</sup> Published type locality included erroneous coordinates (= 27°50'N, 12°30'W).

confined to small mammals—the shrews, bats, and rodents whose taxonomy is still poorly understood and that remain the focus of current revisionary research (e.g., see Hutterer, 2005; Musser and Carleton, 2005; Simmons, 2005).

#### Sampling Effort and Voucher Preservation

The amount of collecting effort devoted per country covered herein is highly uneven, ranging from as few as 13 days of survey (Chad) to 770 days (South Africa). Setzer's early visit to Chad was only an exploratory survey to identify possible areas for future work (Libya was eventually selected as the primary focus); L. W. Robbins' fieldwork in Algeria and Niger was designed as a transect across the Sahara, not as broadscale inventory of those countries; LeDuc's and C. B. Robbins' efforts in Togo were curtailed by bureaucratic hurdles; and activities in The Gambia and Lesotho were little more than side excursions by AMP teams working in their larger neighbors (Senegal and South Africa, respectively). Collecting effort in each of the 14 remaining countries totaled at least 80 days of survey (Table 11) and may be expected to provide better documentation of their small mammals. A strong association logically exists between the total collecting effort (in days) and the number of specimens obtained per country (Figure 4). Teams active in Ghana and Morocco

realized extremely productive results for the total number of days spent collecting, as indicated by the large, positive residuals relative to the regression line.

Collecting activities at a cardinal locality ranged anywhere from 1 to 16 days (weighted mean = 4.0 days). Slightly more than 25% of the localities were visited on a single day (Table 11), and nearly all of these involved opportunistic acquisitions, such as side trips to bat haunts, pickups of roadkills, and purchasing or shooting specimens while traveling between localities. In three countries, the length of survey effort was necessarily constrained to mostly one-day stops: G. L. Ranck in Libya logistically relied upon army convoys for much of his fieldwork, especially into the interior; collecting by L. W. Robbins in Algeria and Niger was essentially a one-way, by-road transect across the middle Sahara, accomplished in about 10 weeks. Most two-day stays appear to represent localities where collectors abruptly terminated their inventory because of unpromising initial trapping results. Approximately 60% of the localities encompass 3–8 days of faunal inventory (Table 11), and only a few were longer (surveys of 9–16 days total < 5%). We regard the 3–16 day range of collecting periods to represent dedicated site inventory, that is, localities where AMP field teams employed a variety of survey methods and equipment, applied them in a sustained manner, and obtained a representative mixture

TABLE 11. Length of collecting effort, in days, at cardinal localities, summarized by region and country. <sup>a</sup>

Country and statistic	Number of days											Weighted total <sup>b</sup>
	1	2	3	4	5	6	7	8	9	10	11–16	
<b>Northern Africa</b>												
Morocco	16	9	6	12	32	10	0	1	0	0	0	328
Mauritania	7	2	2	2	5	0	4	2	0	0	0	94
Algeria	21	6	0	1	0	0	0	0	0	0	0	37
Niger	9	0	0	1	0	0	0	0	0	0	0	25
Libya	57	16	5	6	3	1	0	0	0	0	0	149
Chad	3	0	1	0	0	0	1	0	0	0	0	13
Regional total	113	33	14	22	40	11	5	3	0	0	0	646
Regional percent <sup>c</sup>	46.9	13.7	5.8	9.1	16.6	4.6	2.1	1.2	0.0	0.0	0.0	–
<b>Western Africa</b>												
Senegal–The Gambia	3	2	1	3	7	11	2	1	0	1	1	188
Côte d'Ivoire	3	2	1	1	7	5	4	2	0	0	0	123
Burkina Faso	0	2	2	2	5	13	0	2	0	0	0	137
Ghana	26	3	2	2	3	7	5	8	1	2	1	235
Togo	0	1	0	2	3	1	0	0	0	0	0	31
Benin	2	0	1	2	6	3	0	1	2	0	0	87
Nigeria	2	4	0	1	4	4	12	7	0	4	2	258
Regional total	36	14	7	13	35	44	23	21	3	7	4	1,059
Regional percent <sup>c</sup>	17.4	6.8	3.4	6.3	16.9	21.3	11.1	10.1	1.4	3.4	1.9	–
<b>Southern Africa</b>												
Namibia	6	0	6	4	5	2	1	0	0	1	1	105
Botswana	38	2	12	11	14	6	4	5	1	2	5	385
Zimbabwe	3	2	4	2	0	3	2	0	0	0	4	104
Mozambique	7	5	17	14	9	3	2	1	2	0	0	227
South Africa–Lesotho	18	10	26	44	46	12	6	6	2	2	4	770
Regional total	72	19	65	75	74	26	15	12	5	5	14	1,591
Regional percent <sup>c</sup>	18.8	5.0	17.0	19.6	19.4	6.8	3.9	3.1	1.3	1.3	3.7	–
Grand total	221	66	86	110	149	81	43	36	8	12	18	3,296
Grand percent <sup>d</sup>	26.6	7.9	10.4	13.3	18.0	9.7	5.2	4.3	1.0	1.4	2.2	–

<sup>a</sup> Country totals may exceed number of cardinal localities (see Table 12) because different African Mammal Project teams visited the same locality at different times or the same team worked the same locality multiple times. We distinguished these separate visits as individual collecting periods.

<sup>b</sup> Weighted totals =  $\sum$  locality counts  $\times$  number of days spent at locality.

<sup>c</sup> Regional percent = locality counts per number of days  $\div$  unweighted  $\sum$  of regional totals.

<sup>d</sup> Grand percent = locality counts per number of days  $\div$  unweighted  $\sum$  of grand totals.

of mammals. Within this 3–16 day subset, 5 days of collecting effort per locality forms the weak mode, and 5.4 days is the weighted mean.

Jones et al. (1996) advised that a biological inventory devote a minimum of 500 trap-nights for preliminary sampling of small-mammal diversity in any particular habitat. Given a preponderance of 3–8 days of collecting per locality (Table 11) and an average number of 245 snap traps

dispensed per trapline (see above), an AMP team typically exceeded this standard by a large margin. Such trapping levels, together with other collecting methods, produced taxonomic results sufficient to reflect real biogeographic differences and regional trends in African biodiversity. In western Africa, for example, a significant negative association exists between the number of genera documented per AMP locality and degrees north latitude (Figure 5).

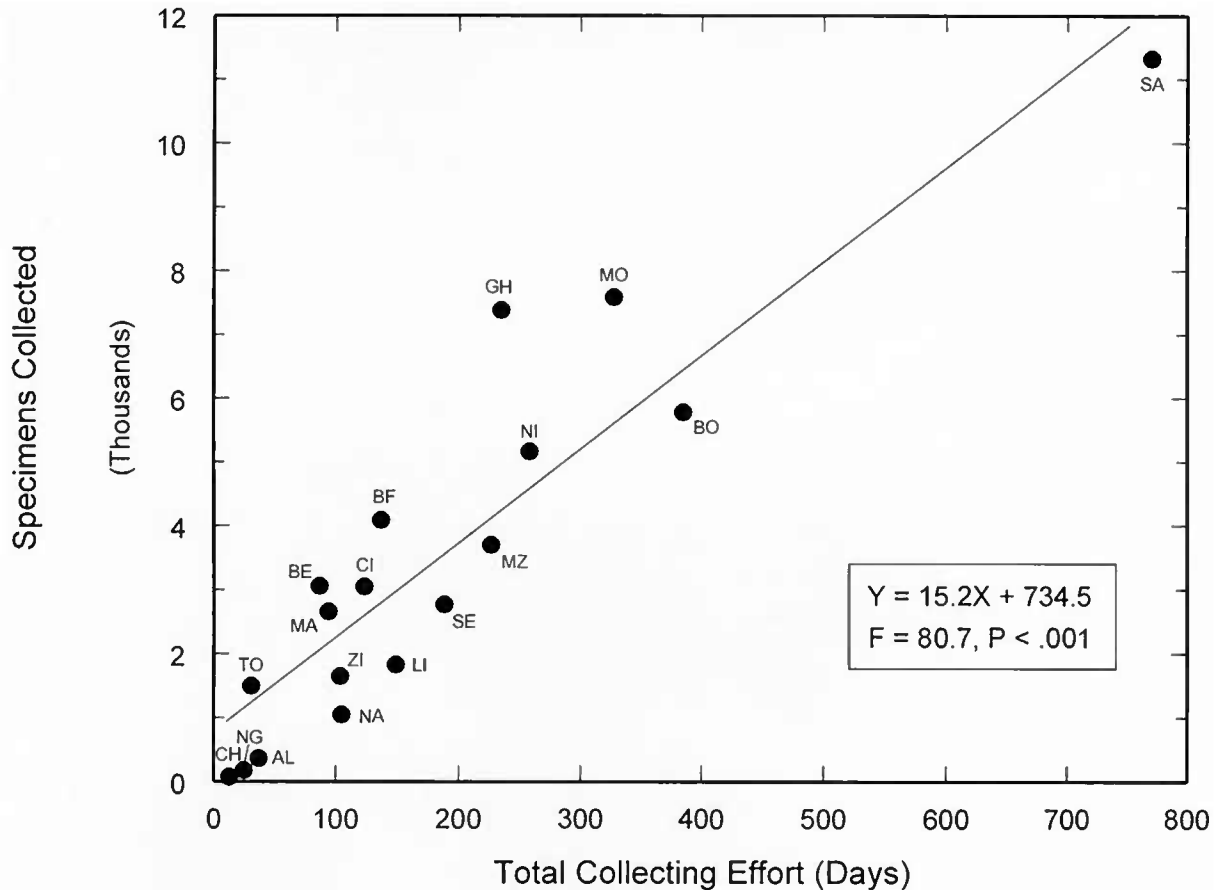
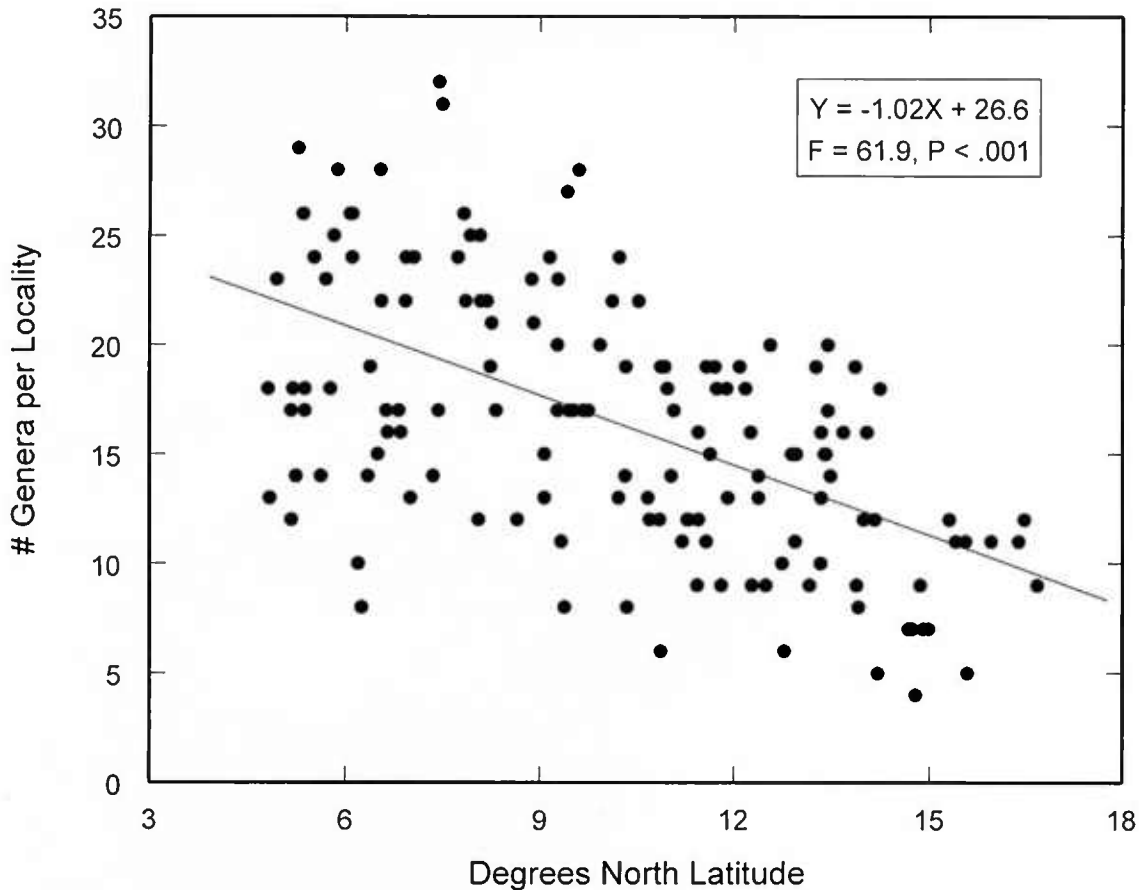


FIGURE 4. Association between the total numbers of specimens collected per country and total collecting effort, by all methods, in days. Country abbreviations: AL, Algeria; BE, Benin; BF, Burkina Faso; BO, Botswana; CH, Chad; CI, Côte d'Ivoire; GH, Ghana; LI, Libya; MA, Mauritania; MO, Morocco; MZ, Mozambique; NA, Namibia; NG, Niger; NI, Nigeria; SA, South Africa (and Lesotho); SE, Senegal (and The Gambia); TO, Togo; ZI, Zimbabwe.

Habitats noted on specimens collected at lower latitudes ( $5^{\circ}$ – $9^{\circ}$ N) frequently mention High Forest or Guinea Savanna; those on specimens obtained from higher latitudes ( $12^{\circ}$ – $16^{\circ}$ N) indicate capture in Sudan or Sahel zones. "Degrees north latitude" thus serves as a coarse index of major biomes in western Africa, where moist High Forest gives way to progressively dryer zones of Guinea, Sudan, and Sahel savannas, distributed in more or less parallel and continuous bands from the Gulf of Guinea (south) toward the Sahara Desert (north). On a smaller regional scale, Happold (1987) recorded a similar stepped decrease in mammalian species richness among those same biomes within Nigeria. The scatter around the regression line is broad, but so is the variation among AMP workers in the collecting techniques applied, the days spent at a locality (3–16), and the quality of the environments surveyed. The

significance level attained by the regression ( $P < 0.001$ ) is all the more remarkable because we used the genus rank to assay diversity instead of the prescribed unit of biodiversity discussion, the species.

Although generating taxonomic results that track broad ecological and biogeographic gradients, the typical span of AMP dedicated site inventories was probably inadequate to fully document the small-mammal community at any particular locality. The brevity of most locality fieldwork, a three- to eight-day collecting period, must temper inferences about species richness given the stochastic interplay of seasonal patterns in rainfall, corresponding responses in habitat productivity and population densities, and differences in collecting probability between species. Only the Orange River Survey in southern Africa, coordinated by A. V. W. Lambrechts, was purposefully designed to collect



**FIGURE 5.** Association between the numbers of genera documented per dedicated site inventory (3–16 days of survey effort) locality, by all collecting methods, and degrees north latitude in western Africa (including 146 localities in Benin, Burkina Faso, Côte d'Ivoire, The Gambia, Ghana, Mauritania, Nigeria, Senegal, and Togo; see Map 7). The significant negative regression tracks the decrease in species richness with increase in prevailing aridity and corresponding biotic zones across this region (High Forest through Sahel Savanna).

twice at each locality, separated by about six months, but both visits together seldom exceeded 10–12 days of inventory. The shortness of the AMP site inventory is highlighted by comparisons between those western African localities set in Afrotropical wet forests and places in Neotropical lowland rainforest. Faunal syntheses of the few Neotropical lowland sites that have received extended inventory (by a variety of methods) fail to demonstrate a clear asymptote of species richness after 100–175 person-days of collecting effort (number of collectors  $\times$  field days); such intensive and multifaceted site studies are thought to substantiate only 50% of the expected mammalian fauna (Voss and Emmons, 1996). Taxa recovered from most AMP dedicated site surveys issued from 9 to at best 24 person-days of collecting effort, given that collectors worked in teams of two

or sometimes three principal collectors. Unknown factors that may elevate these levels of effort in places include independent collecting by miscellaneous assistants and specimen purchasing from local peoples; it is impossible to meaningfully integrate these variables in view of the incomplete and inconsistent documentation of these specimen sources in field journals. In view of the lower biodiversity that typifies Africa's savannas and deserts, shorter inventory periods may suffice to adequately substantiate the kinds of mammals present. We are not aware of any study, however, that systematically examines collecting techniques, amount of sampling effort, and cumulative success in documenting species richness in such structurally simpler environments compared with high-canopied rainforest. We stress that the foregoing remarks about locality collecting effort and



success in representing diversity were not predicated on the preferred common denominator of biodiversity, the species. There are many AMP localities, however, where detailed examination of collectors' field books and refined taxonomic identification could be used to generate species accumulation curves, assessed by trap-nights or person-days of collecting effort, and thereby reveal a firm glimpse of asymptotic levels of mammal diversity and faunal completeness (at least for small mammals).

Precautions about uneven inventory effort and reliability of species estimates in no sense tarnish the enduring contribution of the AMP: the empirical documentation of mammals that were definitely known to occur at a particular place at a given time. As argued by Setzer in his funding proposals, the majority of countries that were to become the geographic foci of the AMP then lacked any coordinated and sustained biological survey for understanding indigenous species and their distributions. Thanks to the AMP, knowledge of mammalian faunas that occur over a broad swath of African landscapes was significantly and dramatically increased, undergirded by concrete and ample museum-based evidence. These thousands of specimens, coupled with collectors' ecological observations and contemporaneous habitat photographs, form an invaluable foundation for future monitoring of changes in biodiversity and environmental quality. Select AMP localities, exemplary of the major African biomes, should be identified for long-term site inventory, with the intent of applying a broader and standardized array of collecting methodologies to develop exhaustive documentation of species richness. Such follow-up surveys, conducted 35–45 years since localities were last visited by the AMP, would be highly informative for systematists, ecologists, and conservationists alike.

African Mammal Project mammal specimens were by and large preserved, and their data were recorded according to standard field practices employed in the middle 1900s. Setzer's (1963b) own instructional leaflet on "Directions for Preserving Mammals for Museum Study" closely observes the methods of his graduate mentor E. Raymond Hall (Hall, 1962). Specimens were thus saved as the standard round skin-plus-skull preparation, as whole carcasses preserved in fluid, or as full skeletons. The skin-plus-skeleton preparation had not yet gained acceptance as the preferred museum study specimen (Hafner et al., 1984; Reynolds et al., 1996). Skin-and-skull preparations total a staggering 92% of all AMP vouchers, whereas fluids (4,331) and skeletons (478) respectively constitute only 6.9% and <1.0% of preserved material. By contrast, specimen preparations saved during the earlier

Smithsonian African expeditions (1909–1912) were apportioned approximately as 75% skins and skulls, 20% fluids, and 5% full skeletons. Setzer (1963b:17) was not a proponent of formalin fixation for scientific study of museum specimens, as underscored by his comments on fluid preservation—"Specimens that have spoiled or have been damaged in some manner may be preserved as 'alcoholics'"—and he seemingly instilled this attitude in his field teams. Spoiled and damaged specimens make poor, if not useless, candidates for preservation in fluid, and given the impossibility of ever again conducting a survey on so grand a scale, it is regretful that freshly captured specimens were not preferentially fixed in fluid and more of them. In addition to the standard external measurements (total length, length of tail vertebrae, length of hind foot, length of ear), most AMP specimens contain a fresh weight in grams. The AMP occurred before efficient chromosomal techniques (Patton, 1967) and tissues preserved for genetic analyses (Yates, 1996) emerged to become standard specimen preparations in mammalian field studies. In Benin, Nigeria, and Togo, internal organs (liver, spleen, kidney, heart, and lung) and occasionally blood were extracted and cryogenically saved by staff of the Viral Research Laboratory, University of Ibadan, Nigeria, but those tissues were used immediately for ongoing virologic assays (e.g., see Kemp et al., 1974; Lourie et al., 1975), not long-term storage. Besides mammals, AMP field crews remained alert to collect other vertebrates whenever opportunities were presented (6,826 amphibians and reptiles, about 300 birds, and undetermined numbers of freshwater fish) as well as miscellaneous insects, spiders, and plants. Collection of ectoparasites (predominantly fleas, mites, and ticks) from their mammalian hosts was a coequal objective of the AMP from its inception and throughout its existence and generated huge but unknown numbers of specimens. These were promptly distributed to medical entomologists (K. C. Emerson, R. Traub, and K. E. Zumpt, among others) and their collaborators for identification and revisionary research and are now widely disseminated in museum collections. Synthesis of the AMP ectoparasite data and collation with the vouchered mammal hosts would be an immensely useful but daunting undertaking.

#### *Sources and Standards of Geographic Documentation*

In georeferencing cardinal localities, we depended upon four sources, namely, the collector's original field-determined coordinates (*C*) and those latitudes and longitudes obtained from secondary sources such as gazetteers (*G*), map estimations (*M*), or publications (*P*). Among the

788 cardinal localities covered below, nearly 40% of the coordinates can be attributed to the collectors, as usually found on specimen tags or infrequently in their field catalogs and journals, and about 60% were based on gazetteers, cartographic estimates, or faunal publications (Table 12). However, there are distinct regional differences in the relative utility of these sources, which mirrors a chronological trend in the adoption of locality coordinates by AMP collectors. That is, collectors who worked during the later phase (1966–1972) of the AMP tended to include geographic coordinates as part of the locality designation with greater regularity than those who worked during the earlier years (1961–1965). Correspondingly, most countries where fieldwork was inaugurated later, particularly in northern and western Africa, contain a higher proportion of localities with original coordinates (Table 12).

African Mammal Project collectors appear to have determined their field coordinates from topographic maps, as explicitly remarked by several collectors in their field journals. In addition, we discovered telltale pencil marks on many AMP-era maps in the position of a locality whose collector's coordinates we were verifying (e.g., see 3 km SE Nayoure, Burkina Faso, or Efeipo Krom, Ghana). Reliance on maps is indirectly suggested by the few instances where we rejected the collector's original coordinates: they were off by some improbable multiple of minutes for the distance or place indicated and so intimated a map-reading error (e.g., see 3 km E Ifkern, Morocco, or Tyenko, Côte d'Ivoire). Somewhat under half (44%) of the 149 collectors' coordinates for place-names alone (i.e., cardinal localities that lack distance and direction modifiers) match the USBGN latitude and longitude for those same names; the remainder (56%) differ by only 1–3 minutes, which we regard as trivial in view of the wide-ranging collecting activities around a base camp (see below). The agreement is remarkable because many USBGN gazetteers of the African countries surveyed by the AMP were published contemporaneously with the project or after its termination (see USBGN references) and thus would have been unavailable for field determination of coordinates. Where a specific locality was based on distance and direction from some village or geographic feature (149 instances), we were regularly impressed by how closely the collectors' coordinates jibed with our own by-road calculations derived from map plots or land-satellite imagery (Google Earth). The provision of field-determined latitude and longitude by the collector is strongly recommended as an integral component of a specimen's geographic documentation (McDiarmid and Wilson, 1996; McLaren et al., 1996), a standard now more readily fulfilled with the advent of the affordable

**TABLE 12.** Sources of coordinate data, by region and country, for the 788 African Mammal Project cardinal localities gazetted herein. Abbreviations: C, collector; G, gazetteer; M, map; P, publication; NL, not located (see “Materials and Methods” for explanation of coordinate sources).

Country (number of localities) and statistic	Source				
	C	G	M	P	NL
<b>Northern Africa</b>					
Morocco (81)	66	4	11	0	0
Mauritania (21)	14	2	5	0	0
Algeria (28)	26	1	1	0	0
Niger (10)	10	0	0	0	0
Libya (84)	0	6	13	65	0
Chad (5)	1	3	1	0	0
Regional subtotal (229)	117	16	31	65	0
Regional percent	51.1	7.0	13.5	28.4	0.0
<b>Western Africa</b>					
Senegal–The Gambia (34)	1	23	10	0	0
Côte d'Ivoire (26)	25	1	0	0	0
Burkina Faso (27)	26	1	0	0	0
Ghana (61)	58	0	3	0	0
Togo (7)	7	0	0	0	0
Benin (16)	15	1	0	0	0
Nigeria (40)	14	13	13	0	0
Regional subtotal (211)	146	39	26	0	0
Regional percent	69.2	18.5	12.3	0.0	0.0
<b>Southern Africa</b>					
Namibia (24)	2	15	7	0	0
Botswana (92)	1	25	57	7	2
Zimbabwe (20)	0	16	4	0	0
Mozambique (58)	31	10	17	0	0
South Africa–Lesotho (154)	1	72	77	3	1
Regional subtotal (348)	35	138	162	10	3
Regional percent	10.1	39.6	46.5	2.9	0.9
Grand total (788)	298	193	219	75	3
Percent	37.8	24.5	27.8	9.5	0.4

and portable Global Positioning Systems (GPS) that came into prominent field use in the 1990s. That so many AMP specimens possess original collectors' coordinates is a progressive characteristic of Setzer's field program.

Map estimation and gazetteers constituted the second and third sources, respectively, in frequency of utility for georeferencing cardinal localities. Together they accounted for the majority of coordinates obtained for collecting sites in southern Africa (Table 12). We regularly consulted the

large collection of road and topographic maps dating from the period of the AMP to aid our extrapolations of coordinates based on distance and direction from some other feature or place-name. Many maps bore evidence of use in the field, containing hatch marks, penciled indications of river courses, and inscriptions of place-names that increased our confidence in the coordinates so estimated (e.g., see 14 mi ESE Chioa, Botswana, or 22 mi NNW Lichtenburg, South Africa). Remarks on itinerary, as related in the collector's field journal, repeatedly proved invaluable in judging routes taken, identifying landmarks or small villages not recorded on specimen labels, and ultimately deriving credible map estimates (e.g., see 5 mi S Zaria, Nigeria, or Gansfontein, South Africa). In this context, we renewed our appreciation for the practice of maintaining tandem field books—the collector's field catalog and his/her field journal—a worthy tradition of museum-based research handed down from Merriam and Grinnell to Hall to Setzer and his AMP collectors. We suspect that the accuracy of our map-estimated coordinates decreases as the distance from the referenced town or other named feature increases. Realistically, there is some variance in real-world accuracy of the various topographic maps used to derive map-based coordinates, and further ambiguity is introduced when attempting to graft the collectors' road miles and direction onto such a reduced and stylized scale. Latitude and longitude extracted for place-names listed in the USBGN gazetteers (and its Internet presence, GEOnet Names Server) were used only if we could convincingly relate them to the specific locality intended by the collector. Here again, field journals proved critical in selecting among USBGN entries with the same or similar spellings. Also, such referential evidence was often inherent in the construct of AMP collecting localities, which typically consist of several terms of increasingly specific geographic location, including a province or state, a locality modifier (or reference point and reference point modifier in the parlance of McLaren et al., 1996), and the specific locality.

Faunal publications were infrequently consulted for sources of latitude and longitude (<10% of cardinal localities). The majority of those involve Libyan localities, all of which lack collector's coordinate data (Table 12), and the most frequently cited publication is Ranck's (1968) monograph on the rodents of Libya. Because Ranck was also the principal collector of most Libyan specimens, we regard this literature source as comparable to a collector's original coordinates. We could not determine plausible coordinates for only 3 of the 788 cardinal localities, two in Botswana and one in South Africa. One of those localities is inexplicitly framed (Camp 4, Botswana), and two are common place-names that lacked other reference-point

modifiers that might supply locational clues (Pink Pan, Botswana, and Groenkloof, South Africa).

The American Society of Mammalogists' (ASM) Committee on Information Retrieval (McLaren et al., 1996) developed a coordinate precision index to convey the "reliability of the coordinates that have been applied to a given collecting locality." Among the nine grades of coordinate origin defined, the highest reliability (1.1–1.3) is accorded to those derived directly from the original collector. Indeed, we considered the AMP collectors' coordinates (C), as substantiated by cross-checking to gazetteers, field journals, maps, and/or satellite imagery, to have the highest authenticity and greatest accuracy of our four sources. This class of coordinate data most closely corresponds to the ASM 1.3 category, or data as provided by the collector, accurate to within  $\pm 1$  km, and derived from medium-scale topographic maps (1:200,000–1:1,000,000 in this case). We consider the supplementary information gleaned from field journals and original maps to adequately compensate for the lack of finer map scales. We extracted approximately 25% of our coordinates from the USBGN gazetteers (G), and these equate to ASM category 2, or coordinates obtained from tables of place-names and accurate to  $\pm 5$  km. This reliability grade could be subdivided to identify reliance on primary archival material that corroborates the selection of a particular place-name among multiple homonyms or one spelling among phonetic alternatives. Our map-based interpretations of latitude and longitude (M) do not strictly match any of the ASM reliability indices as defined. Their category 3 accommodates coordinates derived from relative distance and direction but stipulates computerized interpolations. We regard our map-based estimations, drawing upon original collectors' journals, contemporaneous field maps, and satellite imagery, as more accurate than such straight-line computerized calculations. Georeferencing research that utilizes such primary archival sources more closely approaches the intent of category 1, given its dependence upon the original collectors if not literal coordinate data provided by them. Finally, the relatively few coordinates that we supplied from publications (P) nominally meets the ASM category 2, data extracted from tables of place-names. Reliability among tables can differ, however, and attention must be given to their sources and the nature of their use (corroborative research versus simple extraction). We judge the coordinates based on the field activities of the original collector in the major publication we consulted (Ranck, 1968) to be more rigorous than values extracted from generic tables. Given the proliferation of online, open-access collections data, a coordinate precision index would usefully serve to caution users about

coordinate data sources and confidence in their geographic precision. Refinement of category definitions and criteria would enhance its utility.

Given the nature and conduct of much biological field inventory, particularly as exemplified by the AMP, ultimate exactitude of geographic coordinates can be an impractical goal and a misleadingly precise datum. At a locality, collectors always strove to broadly sample the small mammals present and accordingly dispersed traplines in all manner of biotopes, as conveyed by the environmental descriptions extensively quoted in the locality accounts. Our locality Remarks collectively demonstrate that field workers roamed broadly around the base camp, on foot or in vehicles, seeking “better habitat” that promised improved trapping results and novel species. Some of these peripheral sites were individually discriminated by different locality designations (our underlined satellite localities); others received the same provenience as the base camp. In consequence of the AMP collectors’ propensity to range widely,

our cardinal locality coordinates at best define the center point of a circle of field activity whose conventional radius may approximate 2–5 km (potentially 40–250 km<sup>2</sup> of area inventoried). Within such a potential area of collecting, density of inventory would tend to be higher in the vicinity of the base camp and sparser toward the periphery. Rather than exact accuracy (ideally obtained by the collector from GPS readings in the field), reasonable precision of coordinate data is a more attainable objective under such circumstances. We are confident that the coordinates presented below robustly meet requirements to depict mammalian distributions and similar GIS applications.

Each one of us emerged from the preparation of this gazetteer with high regard for the AMP collectors and their documentation of field activities for posterity, especially in view of the challenging field conditions they often faced and the pre-GPS period when they undertook their incomparable survey.

# Annotated Gazetteer of the African Mammal Project

Countries are arranged under the subheadings northern Africa, western Africa, and southern Africa. These regional associations correspond to the densities of AMP field activity (Map 1), and principal collectors, with some exceptions, tended to operate within a single region (Table 1). In his funding proposals, Setzer had targeted northern Africa and western Africa as continental regions in conspicuous need of basic biological survey, but at the time, mammals in southern Africa were comparatively well understood on the basis of the faunal syntheses of Roberts (1951) and Ellerman et al. (1953). Nonetheless, the collegial partnership of Setzer and Meester supplied an obvious logistical framework for expanded inventory in that region too, and considerable survey effort was eventually devoted to southern Africa by the conclusion of the AMP (e.g., Tables 6, 10). The three regional groupings more roughly identify major biogeographic divisions within the African continent. Northern Africa includes the Mediterranean littoral and great Sahara Desert, zones that share many taxa with European and Asian biotas. Western Africa and southern Africa, sub-Saharan in geography and mostly tropical in climate, comprise major sectors of the classical Ethiopian Region, where so many animals display such high degrees of endemism (e.g., Darlington, 1957). Western Africa acquired much zoogeographic cohesion through Rosevear's influential synopses of bats (Rosevear, 1965), rodents (Rosevear, 1969), and carnivores (Rosevear, 1974) of "West" Africa. For the region's northern limits, Rosevear (1965:viii) settled upon 18°N latitude, which parallel approximately marks the boundary between Sahel Savanna and the Sahara Desert. By this criterion, the southern areas of Mauritania and Niger also could be considered as part of western Africa, but we elected not to divide coverage of countries and procedurally maintained both within northern Africa. Southern Africa, as circumscribed here, is largely congruent with the Southern African Subregion as recognized by previous authors for those landscapes that lie south of the Zambezi–Cunene rivers (e.g., Smithers, 1983; Meester et al., 1986). Only those AMP localities in northernmost Mozambique, north of the Zambezi River, strictly fall outside the Southern African Subregion.

Map series and navigational charts frequently referenced in the subsequent gazetteer are abbreviated as follows: AM, Atlas de Moçambique; AMS, Army Map Service; BCG, Brigada de Cartografia Geológica; CAO, Carte de l'Afrique

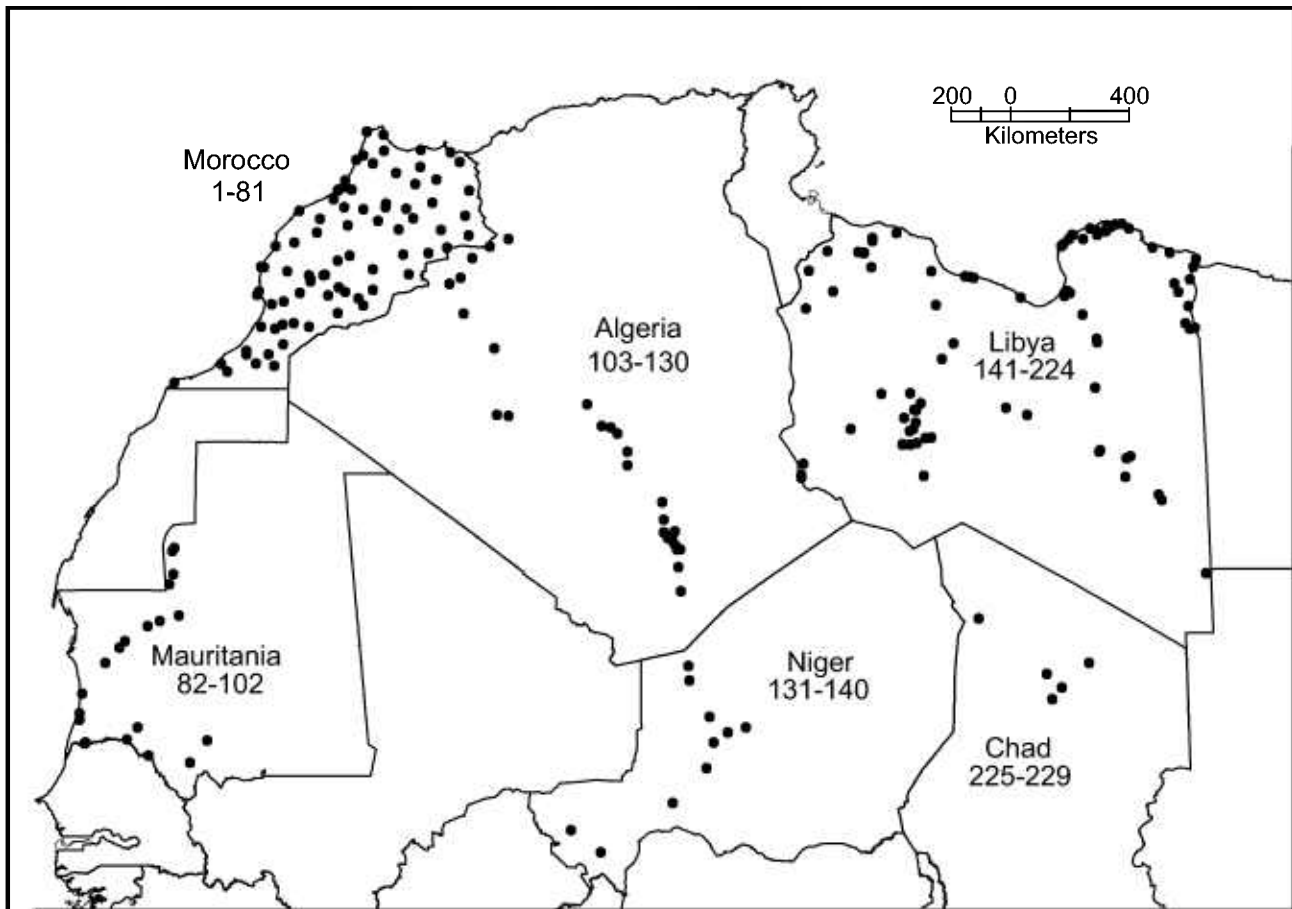
de l'Ouest; CDSM, Chief Directorate, Surveys and Mapping; CGM, Carte Général du Moroc; IGC, Instituto Geográfico e Cadastral; ITM, International Travel Maps; LIGN, L'Institut Géographique National; ONC, Operational Navigation Chart; TPC, Tactical Pilotage Chart; WAC, World Aeronautical Chart (see the Appendix for sheets referenced, scales, and publication dates).

## NORTHERN AFRICA

**GENERAL REMARKS.** Localities in northern Africa embrace the beginning (Libya, 1961–1962) and ending phases (Morocco, 1969–1972) of AMP field activities as we recognize the chronological limits of Setzer's program (see above discussion). With only 10 principal collectors active (Table 1), the amount of collecting effort expended and numbers of specimens collected are concomitantly lower for northern Africa compared to the

two sub-Saharan regions (Tables 6, 10). The density of sampling and collecting effort are greatest for Libya and Morocco, less so for Mauritania (Map 2, Table 10). Collecting trips into Algeria, Niger, and Chad were never designed to accomplish wide-scale biological inventory of those countries. In view of the many dry scrub and arid desert formations surveyed, fine series of jerboas (*Dipodidae*) and gerbil rodents (*Muridae*: *Gerbillinae*) were obtained (Table 3); also noteworthy are the examples of mammalian families (*Ctenodactylidae*, *Rodentia*; *Rhinopomatidae*, *Chiroptera*) endemic to the northern sector of the continent (Tables 3, 5).

Certain Arabic words for geographic features often form components of compound locality names or were commonly used by collectors in their habitat descriptions, as follows: bahr, lake or intermittent lake; bir, cistern or well; gebel or jebel, hill, mountain, or mountainous area; hamada, desert composed of barren, hard, rocky plateaus, with little top soil; oued, wadi or stream; wadi, a dry river-



MAP 2. African Mammal Project cardinal collecting localities 1–229 in northern Africa.

bed or watercourse that contains water only following a heavy rain.

## MOROCCO

**GENERAL REMARKS.** Among the six northern African countries, Morocco was most thoroughly surveyed, as reflected by the remarkably even density of sites inventoried (Map 3), total collecting effort (Table 10), and the number of mammals obtained (Table 6). The efficiency of the Moroccan survey undoubtedly benefited from the considerable experience of the two principal field mammalogists, L. W. Robbins and R. E. Vaden, who arrived immediately after their AMP tours of duty in western Africa. Judy Vaden again accompanied Ralph and participated in every aspect of fieldwork and camp routine, including picking specimens for ectoparasites (son Lyle was born in Rabat, 14 Apr 1971, and occasionally served only as an observer from a parent's backpack). Besides mammals and ectoparasites, some general collecting of insects (by M. G. Hearst) and plants (by H. L. Norman) was also conducted. Various locally hired field assistants, especially Lahcen and Mohammed, ably helped the main teams and gradually assumed more responsibility in checking and setting traplines. By the beginning of fieldwork in Morocco (Oct 1969), Ranck's (1968) Libyan monograph had been recently published and was regularly consulted to help with rodent field identifications.

The itineraries do not mention each visit to **5 km NE Essaouira** and **28 km SW Goulimine**, localities where a capture-and-release, live-trapping study was conducted over a prolonged but discontinuous period (Nov 1970–Jul 1972).

**ITINERARIES.** M. G. Hearst, L. W. Robbins, and R. E. Vaden (D. A. Schlitter and H. W. Setzer): **3 km SW Sidi Sibara**, 12 Oct 1969; **17 km SW Rabat**, 14–15 Oct 1969; **Imlil**, 16–20 Oct 1969; **Refuge Louis Neltner**, 19 Oct 1969; **2 km N Asni**, 20 Oct 1969; **11 km E Rabat**, 20–23 Oct 1969; **Grottes of Hercules**, 24–25 Oct 1969; **Aouinet Torkoz**, 2–9 Nov 1969; **Assa**, 5 Nov 1969; **13 km E Essaouira**, 21–24 Nov 1969.

M. G. Hearst and L. W. Robbins: **11 km W Tan-Tan**, 28 Nov–1 Dec 1969; **8 km S Tarfaya**, 3–7 Dec 1969; **Tuisgui-Remz**, 10–15 Dec 1969; **8 km S Tiznit**, 17–20 Dec 1969; **6 km SW Ksar-es-Souk**, 28 Jan–1 Feb 1970; **30 km NE Bouanane**, 3–7 Feb 1970; **5 km NW Figuig**, 8–13 Feb 1970; **15 km W Tandrara**, 15–17 Feb 1970; **9 km SE Ouarzazate**, 23–28 Feb 1970; **3 km NW Tazarine**, 1–5 Mar 1970; **4 km S Foum Zguid**, 7–11 Mar 1970; **7 km NW Tazenakht**, 11 Mar 1970; **15 km S Tata**, 13–17 Mar 1970; **Tizgui-Ida-Ou-Ballou**, 19 Mar 1970; **6 km SE Tafraoute**, 19–20 Mar

1970; **27 km SW Tafraoute**, 21 Mar 1970; **8 km N Tamri**, 9–13 Apr 1970; **13 km S Safi**, 15–19 Apr 1970; **3 km N Settat**, 21–24 Apr 1970; **11 km SE Mechra Benabbou**, 22 Apr 1970; **5 km S Oued Zem**, 26–30 Apr 1970; **18 km NW Tiflet**, 2–6 May 1970; **20 km SE Larache**, 8–11 May 1970; **Grottes of Hercules**, 13–14 May 1970; **3 km S Cap Spartel**, 13–17 May 1970; **Chechaouen**, 21–25 May 1970; **9 km SE Al Hoceima**, 27–31 May 1970; **3 km NE Tatoralt**, 2–6 Jun 1970; **18 km S Taza**, 15–19 Jun 1970; **6 km SE Azrou**, 21–24 Jun 1970; **16 km W Missouri**, 26 Jun–1 Jul 1970; **Anoual**, 2–4 Jul 1970; **18 km S Oulmes**, 8–9 Jul 1970; **6 km SE Demnate**, 13–15 Jul 1970; **13 km W Telouet**, 17–18 Jul 1970; **9 km SE Ouarzazate**, 18–19 Jul 1970.

R. E. Vaden: **40 km N Meseied**, 28–30 Nov 1969; **7 km NW Icht**, 2–7 Dec 1969; **20 km SW Goulimine**, 9–14 Dec 1969; **15 km E Agadir**, 16–20 Dec 1969; **15 km SW Rabat**, 21 Jan 1970; **Rissani**, 27 Jan–1 Feb 1970; **5 km E Boudenib**, 2–7 Feb 1970; **9 km SW Bouarfa**, 9–13 Feb 1970; **10 km S Ain Benimathar**, 15–18 Feb 1970; **Irherm-n-Ougdjal**, 21 Feb 1970; **11 km SW Tinerhir**, 24–27 Feb 1970; **Tizi-n-Tiniffit**, 1 Mar 1970; **Tinezouline**, 1 Mar 1970; **10 km W Zagora**, 1–5 Mar 1970; **7 km NW Tazenakht**, 7–11 Mar 1970; **16 km W Aoulouz**, 13–17 Mar 1970; **5 km S Taroudant**, 19–23 Mar 1970; **20 km S Chichaoua**, 9–13 Apr 1970; **5 km NW Youssoufia**, 16–19 Apr 1970; **6 km E El Jadida**, 20–24 Apr 1970; **5 km N Ben Slimane**, 26–30 Apr 1970; **11 km W Kenitra**, 2–6 May 1970; **15 km WSW Taounate**, 8–12 May 1970; **13 km N Tetouan**, 13–16 May 1970; **20 km SE Nador**, 22–26 May 1970; **Aknoul**, 28–29 May 1970; **10 km W Ouezzane**, 1–5 Jun 1970; **10 km E Guercif**, 15–19 Jun 1970; **5 km W Bouloutane**, 20–25 Jun 1970; **3 km E Ifkern**, 26–29 Jun 1970; **7 km E Midelt**, 1–5 Jul 1970; **22 km E Khenifra**, 7–11 Jul 1970; **Ait Mohammed**, 14–16 Jul 1970; **Imlil**, 18–20 Jul 1970.

H. L. Norman and R. E. Vaden: **13 km E Essaouira**, 24–27 Sep 1970; **Rissani**, 29–30 Sep 1970; **Mischlifien**, 30 Sep 1970; **6 km SW Ksar-es-Souk**, 18–19 Oct 1970; **10 km W Zagora**, 23 Nov–6 Dec 1970; **Moulay-Bousselham**, 12–13 Jan 1971; **20 km SW Goulimine**, 20–21 Feb 1971.

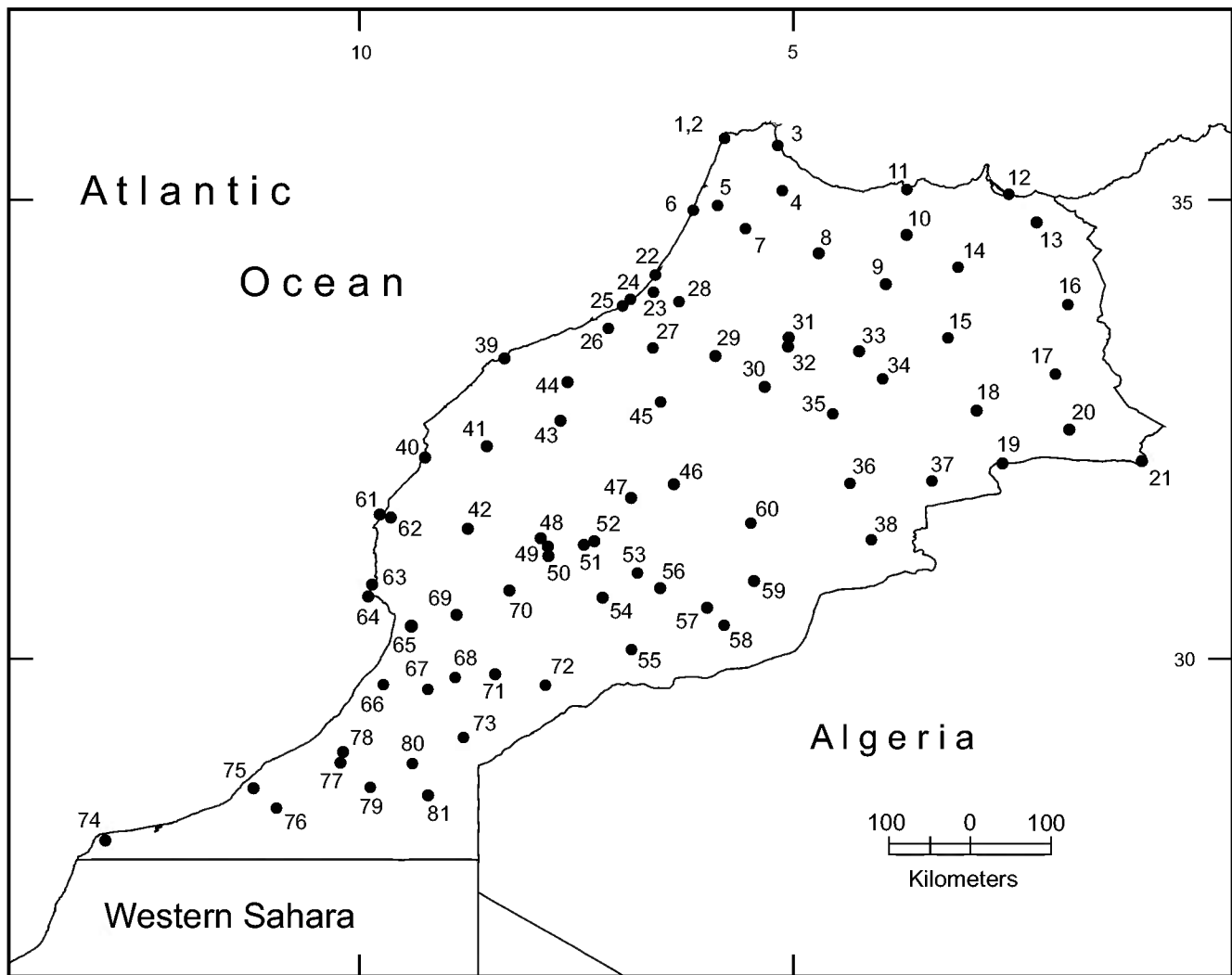
H. L. Norman and L. W. Robbins: **35 km N Agadir**, 16 Dec 1970; **20 km SW Goulimine**, 17 Dec 1970; **28 km SW Goulimine**, 17, 19 Dec 1970; **5 km NE Essaouira**, 24 Dec 1970, 24 Jan 1971.

**Agadir, 15 km E**, Agadir Province (Map 3: 65).

Coordinates: 30°24'N, 09°28'W C.

Collectors: R. E. Vaden (16–20 Dec 1969); L. W. Robbins (16 Dec 1970).

Habitat: "Dominant vegetation is argon 'trees' about 6–8 feet [1.8–2.4 m] high, with a lot of grass and smaller



MAP 3. African Mammal Project cardinal collecting localities 1–81 in Morocco.

- |                             |                           |                               |                          |
|-----------------------------|---------------------------|-------------------------------|--------------------------|
| 1. Grottes of Hercules      | 22. Kenitra, 11 km W      | 43. Mechra Benabbou, 11 km SE | 64. Agadir, 35 km N      |
| 2. Cap Spartel, 3 km S      | 23. Rabat, 11 km E        | 44. Settat, 3 km N            | 65. Agadir, 15 km E      |
| 3. Tetouan, 13 km N         | 24. Rabat, 15 km SW       | 45. Oued Zem, 5 km S          | 66. Tiznit, 8 km S       |
| 4. Chechaouen               | 25. Rabat, 17 km SW       | 46. Ait Mehammed              | 67. Tafraoute, 27 km SW  |
| 5. Larache, 20 km SE        | 26. Ben Slimane, 5 km N   | 47. Demnate, 6 km SE          | 68. Tafraoute, 6 km SE   |
| 6. Moulay-Bousselham        | 27. Sidi Sibara, 3 km SW  | 48. Asni, 2 km N              | 69. Taroudant, 5 km S    |
| 7. Ouezzane, 10 km W        | 28. Tiflet, 18 km NW      | 49. Imlil                     | 70. Aoulouz, 16 km W     |
| 8. Taounate, 15 km WSW      | 29. Oulmes, 18 km S       | 50. Refuge Louis Neltner      | 71. Tizgui-Ida-Ou-Ballou |
| 9. Taza, 18 km S            | 30. Khenifra, 22 km E     | 51. Irherm-n-Ougdjal          | 72. Tata, 15 km S        |
| 10. Aknoul                  | 31. Mischliffen           | 52. Telouet, 13 km W          | 73. Icht, 7 km NW        |
| 11. Al Hoceima, 9 km SE     | 32. Azrou, 6 km SE        | 53. Ouarzazate, 9 km SE       | 74. Tarfaya, 8 km S      |
| 12. Nador, 20 km SE         | 33. Ifkern, 3 km E        | 54. Tazenakht, 7 km E         | 75. Tan-Tan, 11 km W     |
| 13. Taforalt, 3 km NE       | 34. Missour, 16 km W      | 55. Foun Zguid, 4 km S        | 76. Meseied, 40 km N     |
| 14. Guercif, 10 km E        | 35. Midelt, 7 km E        | 56. Tizi-n-Tiniffit           | 77. Goulimine, 28 km SW  |
| 15. Bouloutane, 5 km W      | 36. Ksar-es-Souk, 6 km SW | 57. Tinezouline               | 78. Goulimine, 20 km SW  |
| 16. Ain Benimathar, 10 km S | 37. Boudenib, 5 km E      | 58. Zagora, 10 km W           | 79. Aouinet Torkoz       |
| 17. Tendirra, 15 km W       | 38. Rissani               | 59. Tazarine, 3 km NW         | 80. Assa                 |
| 18. Anoual                  | 39. El Jadida, 6 km E     | 60. Tinerhir, 11 km SW        | 81. Tuisgui-Remz         |
| 19. Bouanane, 30 km NE      | 40. Safi, 13 km S         | 61. Essaouira, 5 km NE        |                          |
| 20. Bouarfa, 9 km W         | 41. Youssoufia, 5 km NW   | 62. Essaouira, 13 km E        |                          |
| 21. Figuig, 5 km NW         | 42. Chichaoua, 20 km S    | 63. Tamri, 8 km N             |                          |



shrubs. Soil is heavy silty-clay very hard on the surface. I'm not absolutely sure about the argons—may be acacias instead . . . I'm calling it 'Argon savanna,' using 'savanna' to mean 'grassy woodland' . . . along the edge of the 'bush' where it borders onto old fields . . . maze of small interconnected canyons . . . hills" (REV).

Remarks: In his journal, Vaden placed this locality about 5 km above Oued Sous and just below the foothills of the High Atlas Mountains. A map plot of the collectors' coordinates (CGM, *Marrakech*, 1:500,000) places this locality within 2 km of Oued Sous.

Taxa: *Gerbillus*, *Meriones*, *Lemniscomys*, *Mastomys*.

**Agadir, 35 km N**, Agadir Province (Map 3: 64).

Coordinates: 30°38'N, 09°54'W G (for Cap Rhir; see Remarks).

Collectors: H. L. Norman and L. W. Robbins (16 Dec 1970).

Habitat: "Argon and Euphorb on a coastal rocky ridge" (HLN).

Remarks: This site was prospected as a potential capture-and-release site, but only three *Mastomys* specimens were preserved and prepared (by Robbins). In his journal, Norman indicated that this locality was 1 km S Cap Rhir, a feature that is actually northwest (as opposed to north) of Agadir and whose coordinates we adopted for the field site.

Taxon: *Mastomys*.

**Ain Benimathar, 10 km S**, Oujda Province (Map 3: 16).

Coordinates: 33°55'N, 02°02'W C.

Collector: R. E. Vaden (15–18 Feb 1970).

Habitat: "Habitat is the same as we saw to the west—a loose clay soil, pretty well baked with a cover of small rocks ranging from coarse sand to 4 or 5 inches [10.2–12.7 cm] across. Vegetation is of four types—large clumps of wire-like grass about 15 inches [38.1 cm] high, low juniper-like shrubs about 4 inches [10.2 cm] high and 6 inches [15.2 cm] across, small very woody shrubs about the same size . . . and a fine carpet of very small leafy herbs . . . rocky [hills] . . . total change in elevation isn't more than 30 or 40 feet [9.1–12.2 m] . . . Tonight's traps extend through a more open, rocky area of the smaller vegetation . . . Most of the area we've seen within 35 km of town has the wire-grass as the dominant vegetation and doesn't seem to support any populations of rodents. (Even the donkeys don't eat it!)"

Remarks: From Ain Benimathar (Berguent G), the Vadens first drove west 36 km to explore for a good site, then returned to town and drove 10 km south where they

established camp on the southern slope of a low hill. The elevation given is greater than 1,000 m. On 16 Feb, they also trapped at a culvert ("flat desert") under the railroad, located 3 km south of the main camp.

Taxa: *Elephantulus*; *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*.

**Ait Mehammed**, Beni-Mellal Province (Map 3: 46).

Coordinates: 31°53'N, 06°28'W C, G (as Ait Mehammed).

Collector: R. E. Vaden (14–16 Jul 1970).

Habitat: "The area near camp is mainly overgrazed rocky hills with scattered thorny scrub (acacia?); there are scattered oak trees in some areas but mostly in farmland and never very dense . . . thorn bush—planted pine . . . rock-lined creek."

Remarks: Vaden scouted a number of potential collecting localities on 12 and 13 Jul, all deemed unsuitable, before establishing camp on the east side of Ait Mehammed.

Taxa: *Gerbillus*, *Apodemus*; *Atelerix*.

**Aknoul**, Taza Province (Map 3: 10).

Coordinates: 34°40'N, 03°53'W C (34°39'N, 03°52'W G).

Collector: R. E. Vaden (28–29 May 1970).

Habitat: "Planted forest of Aleppo pines and a few cedars [Figure 6]. There's not much undergrowth but some low scrub in the larger clearings . . . total lack of native vegetation in the whole area. The areas not planted to forest are being farmed."

Remarks: Camp was established at a forestry post situated 2 km NW Aknoul. According to the foresters, the forest was planted starting in 1935 and, insofar as known, the trees were intended to represent the same species that originally grew there centuries ago.

Taxa: *Gerbillus*, *Apodemus*, *Mus*.

**Al Hoceima, 9 km SE**, Al Hoceima Province (Map 3: 11).

Coordinates: 35°12'N, 03°53'W C.

Collectors: M. G. Hearst and L. W. Robbins (27–31 May 1970).

Habitat: "Hilly but completely cultivated or solid rock . . . Some bushes along the sand, an acacia forest backing up to the beach and behind the forest—a swampy area and some bushy area bordering farms" (LWR). 12 km SE Al Hoceima: "Grain fields and rocky hillsides—the grain has already been [harvested]" (LWR).

Remarks: Hearst and Robbins had considerable difficulty finding a campsite in the Al Hoceima area but finally settled on the beach 9 km to the southeast. On 28 May, they drove inland to collect from a rocky hillside 12 km SE Al Hoceima. On 29 May, they went



FIGURE 6. Morocco, Aknoul: *Apodemus* (photograph by R. E. Vaden, 29 May 1970).

bat hunting in caves along the beach at Al Hoceima (35°16'N, 03°56'W C; 35°15'N, 03°56'W G), where they collected *Miniopterus* and *Myotis*.

Taxa: *Eliomys*, *Gerbillus*, *Meriones*, *Mus*; *Atelerix*; *Rhinolophus*, *Myotis*, *Miniopterus*; *Mustela*.

**Anoual**, Ksar-es-Souk Province (Map 3: 18).

Coordinates: 32°41'N, 03°05'W C (32°40'N, 03°06'W G).

Collectors: M. G. Hearst and L. W. Robbins (2–4 Jul 1970).

Habitat: “Rocky sandy hillside . . . on the flat—a few big bushes . . . wash—some very sandy areas” (LWR).

Remarks: The field team intended to camp somewhere north of Anoual but decided to stay near town because of the availability of water and vegetation.

Taxa: *Elephantulus*; *Atlantoxerus*, *Eliomys*, *Jaculus*, *Gerbillus*, *Meriones*, *Mus*, *Ctenodactylus*; *Lepus*; *Atelerix*, *Paraechinus*; *Pipistrellus*; *Vulpes*.

**Aouinet Torkoz**, Agadir Province (Map 3: 79).

Coordinates: 28°29'N, 09°52'W C, G.

Collectors: M. G. Hearst, L. W. Robbins, D. A. Schlitter, H. W. Setzer, and R. E. Vaden (2–9 Nov 1969).

Habitat: “Very arid-pebble desert with scattered low shrubs cut through with rocky washes . . . rocky wash with scattered thorn shrubs just west of the station” (REV).

Remarks: The team established camp at the Institut Scientifique research station, which Hearst recorded in his journal as 2 km SE Aouinet Torkoz and “at the edge of the Sahara.” They collected extensively on the grounds of the institute and made short journeys to various places around Aouinet Torkoz, mostly to the west and southwest. On 3 Nov, traps were set 12 km S Aouinet Torkoz (28°22'N, 09°52'W C) in the bed of the Oued-Drâa, and collecting was conducted the next day at 8 km W Aouinet Torkoz (28°29'N, 09°55'W C). The field team made a side trip to Assa on 5 Nov to collect bats. Also that day, Robbins collected a *Jaculus* 15 km W Aouinet Torkoz. On the 6th, Robbins, Hearst, and Setzer traveled 20 km N Aouinet Torkoz to a palm grove and there collected *Atlantoxerus*. Schlitter and



FIGURE 7. Morocco, Aoulouz, 16 km W (photograph by R. E. Vaden, Mar 1970).

Vaden collected, according to Vaden, “on a sandy plain dotted with vegetation” at a locality 22 km W Aouinet Torkoz. On 8 Nov, traps were set in washes 5 km southwest of town, but the four *Elephantulus* collected there are labeled as Aouinet Torkoz. On 9 Nov, a sandy, hummocky area was trapped 22 km SW Aouinet Torkoz (28°29'N, 10°12'W C).

Taxa: *Elephantulus*; *Atlantoxerus*, *Jaculus*, *Acomys*, *Gerbillus*, *Meriones*, *Pachyuromys*; *Lepus*; *Paraechinus*; *Canis*, *Vulpes*.

**Aoulouz, 16 km W**, Agadir Province (Map 3: 70).

Coordinates: 30°42'N, 08°18'W C.

Collector: R. E. Vaden (13–17 Mar 1970).

Habitat: “Coastal type of vegetation and most of the land is cultivated (some kind of grass). Vegetation is predominantly argon trees and grass . . . clumps, up to 25 or 30 feet [7.6–9.1 m] in diameter of assorted shrubs from sage through thorn-bushes (acacia?) up to small argons, maximum of about 6 feet [1.8 m] in height [Figure 7]. In

between it's grassy but grazed down to about 2 inches [5.1 cm] in height; various annual herbs are present.”

Remarks: Vaden, searching for a campsite, remarked that “suitable habitat was hard to find.” It should be noted that collecting was also done 2 km to the west in habitat similar to that closer to camp but “possibly a little more over-grazed.”

Taxa: *Elephantulus*; *Gerbillus*, *Meriones*, *Lemniscomys*, *Mastomys*, *Mus*; *Atelerix*.

**Asni, 2 km N**, Marrakech Province (Map 3: 48).

Coordinates: 31°16'N, 07°59'W M (CGM, *Marrakech*, 1:500,000).

Collectors: M. G. Hearst, L. W. Robbins, D. A. Schlitter, H. W. Setzer, and R. E. Vaden (20 Oct 1969).

Habitat: Cave.

Remarks: After leaving **Imlil**, the field team stopped at a cave near Asni (31°15'N, 07°59'W G), where Robbins collected a hibernating bat.

Taxon: *Rhinolophus*.

**Assa**, Agadir Province (Map 3: 80).

Coordinates: 28°37'N, 09°25'W G.

Collectors: M. G. Hearst, L. W. Robbins, D. A. Schlitter, H. W. Setzer, and R. E. Vaden (5 Nov 1969).

Habitat: "Underground aqueduct" (REV).

Remarks: Specimen labels simply read Assa, but Vaden and Hearst indicated in their journals that this locality was 50 (or 55) km east of **Aouinet Torkoz**. Because coordinates on specimen labels and in catalogs (28°46'N, 09°25'W C) plot approximately 20 km to the north of Assa, we have elected to use the USBGN coordinates.

Taxon: *Asellia*.

**Azrou**, 6 km SE, Meknès Province (Map 3: 32).

Coordinates: 33°24'N, 05°10'W C.

Collectors: M. G. Hearst and L. W. Robbins (21–24 Jun 1970).

Habitat: "Cedar forest . . . edge of an open area with some rocks and small vegetation—the forest is all cedars with some rocky areas" (LWR). 5 km S Azrou: "Beautiful cedar and oak forest . . . tall cedars" (LWR).

Remarks: The team drove southeast from Azrou and camped. They learned that monkeys were seen "near a dirt road going to Aïn-Leuh" (33°17'N, 05°23'W G) and drove along this road until they encountered some *Macaca* "in tall cedars" at 5 km S Azrou (33°24'N, 05°13'W C). On 22 Jun, they obtained more macaques at 18 km S Azrou (33°16'N, 05°12'W C) in a cedar-oak forest; Robbins and Hearst identified this collecting site as Aïn Kahla (33°15'N, 05°13'W G) in their journals but not on specimen labels. On this same date, they returned to 5 km S Azrou and set a trapline in cedar-oak forest with rocky outcrops. On 24 Jun, Hearst collected a single *Jaculus* at 12 km SE Azrou.

Taxa: *Macaca*; *Eliomys*, *Jaculus*, *Apodemus*; *Vulpes*.

**Ben Slimane**, 5 km N, Settat Province (Map 3: 26).

Coordinates: 33°39'N, 07°08'W C.

Collector: R. E. Vaden (26–30 Apr 1970).

Habitat: "Cork-oak forest . . . The oaks are fairly dense, with considerable undergrowth consisting of small-to-large woody shrubs, smaller non-woody shrubs and grass in the clearings. Soil is clay or possibly silty-clay and is baked fairly hard on top with cracks. Low spots are somewhat muddy . . . large pond about 50 meters to the east" (Figure 8).

Remarks: After some scouting for a suitable collecting site, the Vadens traveled north of Ben Slimane about 5 km

and then east another 0.5 km into the forest and established their camp in a small clearing.

Taxa: *Apodemus*; *Crocidura*.

**Bouanane**, 30 km NE, Ksar-es-Souk Province

(Map 3: 19).

Coordinates: 32°07'N, 02°51'W C.

Collectors: M. G. Hearst and L. W. Robbins (3–7 Feb 1970).

Habitat: "A small dry wash, some bushes on hummocks and a lot of flat gravel-pebble 'small' vegetated areas—also some sandy areas . . . mud flats . . . pebble area with sandy substrate" (LWR). 20 km NE: "Rocky mountains near by . . . very rocky and steep" (LWR).

Remarks: The field team drove 60 km northeast of Bouanane (Bou Anane; 32°02'N, 03°03'W G), but "the area looked bad," so they returned to 30 km northeast ("not much better looking") to establish camp. They conducted daily side trips to 20 km NE Bouanane and successfully hunted *Ctenodactylus* in steep, rocky mountains.

Taxa: *Elephantulus*; *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*, *Psammomys*, *Ctenodactylus*.

**Bouarfa**, 9 km SW, Oujda Province (Map 3: 20).

Coordinates: 32°30'N, 02°03'W C.

Collector: R. E. Vaden (9–13 Feb 1970).

Habitat: "The soil is very sandy with dunes in places; some small areas of more clay than sand. Vegetation is mostly small shrubs (juniper?) with some grasses in clumps—no thorn bushes that I've seen. Parts of the area have been cultivated, some fairly recently (last year?), although no crop plants are seen . . . dunes . . . mud flats (still basically sandy soil)" (Figure 9).

Remarks: Unable to find suitable habitat north of town, the Vadens returned and set up camp "where the sand begins" southwest of Bouarfa (Bou Arfa G). On 11 Feb, they trapped approximately 2 km southwest of camp in "an open, sandy area," and about 4 km southwest of Bouarfa a dead *Jaculus* was salvaged. These variant distances are not indicated on specimen labels.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*, *Psammomys*.

**Boudenib**, 5 km E, Ksar-es-Souk Province (Map 3: 37).

Coordinates: 31°57'N, 03°33'W C.

Collector: R. E. Vaden (2–7 Feb 1970).

Habitat: "The country is relatively flat . . . The soil is fairly sandy with an overlay of gravel and rocks. Vegetation is sparse, concentrated in the washes, which are fairly shallow . . . thorn bushes of the geometric



FIGURE 8. Morocco, Ben Slimane, 5 km N (photograph by R. E. Vaden, 28 Apr 1970).

type (. . . each branch comes off at about  $60^\circ$  from the axis of the stem) . . . a river with some water, apparently standing. Beyond that is a mountain range with considerable sand at its base . . . hamada to the north . . . sand dunes . . . sandy soil, shrub-covered plain.”

Remarks: Vaden noted that this locality was in the “northern reaches of the Hamada du Guir.”

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*.

**Bouloutane, 5 km W, Taza Province (Map 3: 15).**

Coordinates:  $33^\circ 32'N$ ,  $03^\circ 25'W$  C.

Collector: R. E. Vaden (20–25 Jun 1970).

Habitat: “The vegetation in the river valley is fairly dense, the hills are covered by clumps of the ‘wire grass’ we had at Ain Benimather. The whole area is extremely rocky . . . river bed vegetation.”

Remarks: According to Vaden, Bouloutane appeared to comprise the remains of just a few houses, and he

mentioned a Zerouiet (“supposed to be a fort but we found only cross roads”) in the vicinity. They “returned to the western slope of the mountains, and set up camp in the valley of the Oued Taquit.”

Taxa: *Elephantulus*; *Jaculus*, *Gerbillus*, *Meriones*, *Psammomys*, *Ctenodactylus*; *Lepus*.

**Cap Spartel, 3 km S, Tanger Province (Map 3: 2).**

Coordinates:  $35^\circ 46'N$ ,  $05^\circ 55'W$  C.

Collectors: M. G. Hearst and L. W. Robbins (13–17 May 1970).

Habitat: “Large hill with much natural vegetation and a lot of rocks” (LWR).

Remarks: Cap Spartel is located north of the **Grottes of Hercules**, where the field team also collected on 13 and 14 May. On 15 May, traps were also set 1 km S Cap Spartel.

Taxa: *Eliomys*, *Gerbillus*, *Apodemus*, *Lemniscomys*, *Mus*.



FIGURE 9. Morocco, Bouarfa, 9 km SW (photograph by R. E. Vaden, Feb 1970).

**Chechaouen**, Tétouan Province (Map 3: 4).

Coordinates: 35°10'N, 05°16'W G.

Collectors: M. G. Hearst and L. W. Robbins (21–25 May 1970).

Habitat: “Rocky vegetated mountainside” (LWR).

Remarks: A house in Chechaouen served as base of operations for Hearst and Robbins. On 21 and 24 May, they collected bats in a cave behind town, and on 23 and 24 May, traps were set at 4 km W Chechaouen (35°10'N, 05°18'W M) in an oak forest with low scrub. The collectors' original coordinates for the village (35°19'N, 05°16'W) must represent an errant reading of latitude in view of the USBGN values (as cited) as well as the maps we consulted.

Taxa: *Eliomys*, *Apodemus*, *Mus*; *Crocidura*; *Rhinolophus*, *Hypsugo*, *Myotis*, *Miniopterus*.

**Chichaoua**, 20 km S, Marrakech Province (Map 3: 42).

Coordinates: 31°23'N, 08°48'W C.

Collector: R. E. Vaden (9–13 Apr 1970).

Habitat: “The area [around camp?] is only about 25 acres [10.1 ha] (estimated) and is bordered on the east by a dry river bed and on the other sides by fields. There are scattered eucalyptus trees, some large, fairly dense growths of shrubs and extensive old-field areas of grain (oats?) growing wild. Soil is good silt with a fair number of rocks up to about 6 inches [15.2 cm] in diameter.”

Remarks: The Vadens established their campsite in a small old-field area, 20 km south of Chichaoua. Because a local official indicated that all local farm lands had been treated with rat poison, most trapping was conducted at distances far enough from camp to preclude night checks of the traplines (including 5 km west of camp on 10 Apr and 1 km east of camp on 11 Apr across a river bed, both in cultivated fields). Specimen labels do not indicate these variant distances. Local inhabitants brought in many specimens to compensate for an otherwise meager collecting success.

Taxa: *Elephantulus*; *Gerbillus*, *Meriones*; *Rhinolophus*, *Nycteris*, *Myotis*; *Vulpes*.

**Demnate, 6 km SE**, Marrakech Province (Map 3: 47).

Coordinates: 31°43'N, 06°56'W C.

Collectors: M. G. Hearst and L. W. Robbins (13–15 Jul 1970).

Habitat: “Juniper scrub area—hilly . . . old fields are bordering the scrub area and they probably poisoned here also . . . rocky hillside covered by cactus-like euphorb and a few junipers and other plants . . . a lot of other shrubs” (LWR).

Remarks: On 13 Jul, Hearst and Robbins looked for caves with bats near a natural bridge located close to camp, but without success, and later set traps in this same area. The trap success was overall very low, but Robbins remarked that the habitat looked good. The standardized USBGN spelling of Demnate is Demnat.

Taxa: *Eliomys*, *Gerbillus*, *Apodemus*, *Mus*.

**El Jadida, 6 km E**, El Jadida Province (Map 3: 39).

Coordinates: 33°17'N, 08°24'W C.

Collector: R. E. Vaden (20–24 Apr 1970).

Habitat: “The area to the south and west of El Jadida is all under cultivation but a forested area starts about 5 km east along the coast. The area is all sandy [Figure 10], densely vegetated by native shrubs and dominated by planted eucalyptus. There are other plantings, mostly conifers, but these are in small areas some distance from camp . . . native shrubs on the border of the forest.”

Taxa: *Gerbillus*, *Mus*.

**Essaouira, 5 km NE**, Safi Province (Map 3: 61).

Coordinates: 31°31'N, 09°46'W C.

Collectors: H. L. Norman and R. E. Vaden (numerous dates in 1970, 1971, and 1972); H. L. Norman and L. W. Robbins (24 Dec 1970 and 24 Jan 1971).

Habitat: “Coastal dunes . . . low scrub on sand dunes to juniper scrub on stabilized dunes” (REV).



FIGURE 10. Morocco, El Jadida, 6 km E (photograph by R. E. Vaden, 24 Apr 1970).

Remarks: This locality served as both a live-trapping grid and a general collecting site. Capture-and-release studies were also conducted at **28 km SW Goulimine** and **10 km W Zagora**.

Taxa: *Eliomys*, *Gerbillus*, *Lemniscomys*, *Mus*; *Crocidura*; *Delphinus*.

**Essaouira, 13 km E**, Safi Province (Map 3: 62).

Coordinates: 31°30'N, 09°40'W M (CGM, Marrakech, 1:500,000).

Collectors: M. G. Hearst, L. W. Robbins, and R. E. Vaden (21–24 Nov 1969); H. L. Norman and R. E. Vaden (24–27 Sep 1970).

Habitat: “Camp in a cleared area in a juniper(?) scrub habitat. Soil is sandy with plenty of rocks up to about a foot [0.3 m] in diameter. Vegetation is very thick: the juniper is about 8 to 10 feet [2.4–3.0 m] tall and relatively dense; many scattered smaller shrubs and grasses. We decided the habitat is ‘juniper scrub’” (REV).

Remarks: The collectors’ original latitude, 35°30'N as recorded on specimen labels and in field catalogs, places the site some 450 km north of Essaouira (31°31'N, 09°46'W G) in the Atlantic Ocean. This surely represents an errant reading of their map that we have accordingly corrected.

Taxa: *Elephantulus*; *Eliomys*, *Gerbillus*, *Lemniscomys*, *Mastomys*, *Mus*.

**Figuiq, 5 km NW**, Oujda Province (Map 3: 21).

Coordinates: 32°09'N, 01°15'W C.

Collectors: M. G. Hearst and L. W. Robbins (8–13 Feb 1970).

Habitat: “The area is mostly sandy with some areas with a lot of rocks, some rocky mountains [hills] and some sand dunes . . . flat rocky-sandy areas . . . sand dunes with vegetation tufts” (LWR).

Remarks: While en route to this camp, Robbins collected a *Psammomys* from under a rock at **41 km NW Figuiq**.

Taxa: *Elephantulus*; *Eliomys*, *Jaculus*, *Gerbillus*, *Meriones*, *Psammomys*, *Ctenodactylus*.

**Foum Zguid, 4 km S**, Ouarzazate Province (Map 3: 55).

Coordinates: 30°04'N, 06°53'W C.

Collectors: M. G. Hearst and L. W. Robbins (7–11 Mar 1970).

Habitat: “On the edge of the oasis—on the edge of palm trees and sand and acacias and pebble desert [Figure 11] . . . sandy palm area on the edge of town . . . rocky hillsides” (LWR).

Remarks: Hearst indicated that the camp was about 5 km south at the “end of a sandy finger of a palm grove.” On 7 Mar, he set traps just north of Foum Zguid in a sandy oasis with a rocky hillside.

Taxa: *Elephantulus*; *Atlantoxerus*, *Jaculus*, *Acomys*, *Gerbillus*, *Meriones*, *Mus*, *Rattus*; *Lepus*; *Atelerix*, *Paraechinus*; *Tadarida*, *Pipistrellus*; *Ictonyx*.

**Goulimine, 20 km SW**, Agadir Province (Map 3: 78).

Coordinates: 28°53'N, 10°14'W C.

Collectors: R. E. Vaden (9–14 Dec 1969); H. L. Norman and L. W. Robbins (17 Dec 1970); H. L. Norman and R. E. Vaden (20–21 Feb 1971).

Habitat: “Scrub—mostly euphorbs including ‘cactus’ with some small juniper-like flowering shrubs. Soil is just plain dirt! There’s a little gravel on the surface and some pebble areas but few large rocks . . . lower ‘flat’ area . . . [Hillside] gets steeper as you near the top (the last 30 feet [9.1 m] or so is almost straight up!) and becomes shaly, then rocky. Vegetation is the same as . . . on the lower slopes, with the addition of a small, organpipe-like succulent (not an euphorb) and one acacia ‘bush’ about 4 feet [1.2 m] high” (REV).

Remarks: When Norman and Vaden visited this locality in Feb 1971, they were searching for future capture-and-release study sites and collected no specimens. The earlier visits by Vaden and by Norman and Robbins were collecting surveys.

Taxa: *Elephantulus*; *Eliomys*, *Gerbillus*, *Meriones*, *Pachyuromys*, *Psammomys*.

**Goulimine, 28 km SW**, Agadir Province (Map 3: 77).

Coordinates: 28°46'N, 10°14'W C.

Collectors: H. L. Norman and L. W. Robbins (17, 19 Dec 1970); H. L. Norman (numerous dates in 1971); R. E. Vaden (numerous dates in 1971 and 1972).

Habitat: “Desert scrub on a sandy-silt soil, with shrubs up to about 2 feet [0.6 m] high and 3–4 feet [0.9–1.2 m] in diameter. Some hummocks in the area” (REV).

Remarks: While this locality was a major site for a capture-and-release study associated with the AMP, many specimens that expired in the live traps were preserved for the NMNH collection. Live-trapping grids at 28 km SW Goulimine were run concurrently with those at **5 km NE Essaouira**. An AMP field assistant obtained a *Gazella* from Bedouins who captured it nearby on Jbel Iskou (28°42'N, 10°30'W G, as Jbel Isko), although this provenience is not mentioned on the specimen label. Two *Jaculus* were collected at **30 km SW Goulimine**, but they were not shipped to the





FIGURE 11. Morocco, Foug Zguid, 4 km S (11 Mar 1970).

collection at NMNH. On 17 Dec 1970, Robbins collected a specimen of *Atlantoxerus* from 38 km SW Goulimine along with three *Psammomys* that were donated to the University of Arizona, the University of Michigan, and L'Institut français de recherche scientifique pour le développement en coopération (ORSTOM).

Taxa: *Elephantulus*; *Atlantoxerus*, *Jaculus*, *Gerbillus*, *Meriones*, *Psammomys*, *Hystrix*; *Lepus*; *Atelerix*, *Paraechinus*; *Crocidura*; *Canis*; *Gazella*.

**Grottes of Hercules**, 13 km W Tanger, Tanger Province (Map 3: 1).

Coordinates: 35°46'N, 05°56'W C, G (as Grottes d'Hercules).

Collectors: M. G. Hearst, L. W. Robbins, D. A. Schlitter, and R. E. Vaden (24–25 Oct 1969); M. G. Hearst and L. W. Robbins (13–14 May 1970).

Habitat: "Sea cave down a cliff" (LWR).

Remarks: Most bats were collected on the second visit, by Hearst and Robbins, and these specimens are labeled Grottes of Hercules. Specimens taken on the first visit were instead labeled as 13 km W Tanger, although Hearst did mention "caves of Hercules" in his field catalog.

Taxa: *Rhinolophus*, *Myotis*, *Miniopterus*.

**Guercif, 10 km E**, Taza Province (Map 3: 14).

Coordinates: 34°16'N, 03°17'W C.

Collector: R. E. Vaden (15–19 Jun 1970).

Habitat: "Soil is slightly sandy but basically silt. Vegetation on the flats is primarily low scrub (up to about 8 inches [20.3 cm] high) with scattered grain-field stubble—this is pretty limited though—and a few hummocks of larger shrubs. Wadis occur every kilometer or so and are vegetated more heavily" (Figure 12).



FIGURE 12. Morocco, Guercif, 10 km E (photograph by R. E. Vaden, Jun 1970).

Remarks: Camp was located 10 km east and slightly north of Guercif. On 16 Jun, Vaden drove into the mountains looking for caves but had no luck.

Taxa: *Jaculus*, *Meriones*.

**Icht, 7 km NW, Agadir Province (Map 3: 73).**

Coordinates: 29°05'N, 08°53'W C.

Collector: R. E. Vaden (2–7 Dec 1969).

Habitat: “Kind of a sandy-silt soil with plenty of small rocks; vegetation mostly of small shrubs with scattered larger thorn bushes [Figure 13]. There are a lot of mountains around with plenty of rocky outcroppings . . . nomad camps nearby so there are camels and goats . . . flat plain to the north. Soil is sandy all over, but except in the washes is covered by pebbles and small (to 10 inches [25.4 cm]) rocks. I’m calling

it a ‘vegetated sandy plain’ but I’m not sure this is a really accurate name—perhaps ‘sandy pebble desert’ would be better for the rest of the camp.”

Remarks: After canvassing the area around Foum-el-Hassane (29°02'N, 08°55'W G), the Vadens determined that it “didn’t look good” and hence established their camp northwest of Icht. On 3 Dec, because of poor trap success, they drove southeast 4 km to 3 km NW Icht (29°04'N, 08°52'W C), a “vegetated sandy plain that extends part way up a range of large steep rocky hills.” On 5 Dec, traps were set 2 km northwest of camp in what Vaden described as “sandy-silt, sometimes gravelly area where shrubs grow rather densely on hillocks.” Side trips were taken to Icht and to the cliffs north of Foum-el-Hassane in search of bats but without success.

Taxa: *Jaculus*, *Acomys*, *Gerbillus*, *Meriones*, *Mus*.



FIGURE 13. Morocco, Icht, 7 km NW: *Meriones* habitat (photograph by R. E. Vaden, Dec 1969).

**Ifkern, 3 km E, Fès Province (Map 3: 33).**

Coordinates: 33°21'N, 04°24'W M (CGM, Rabat, 1:500,000).

Collector: R. E. Vaden (26–29 Jun 1970).

Habitat: “This is rolling hill country surrounded by higher mountains. Vegetation is almost nonexistent—badly overgrazed. Small clumps of sage (?—I’m not sure about it) and a few areas of the same wire-grass. Very rocky. Mountains just to the east of us are covered with what looks like scrub oak from a distance. [Upon closer examination, these mountains are vegetated with] small oak trees instead of scrub [oak] and are absolutely barren underneath.”

Remarks: Because of the high populations of both people and livestock around Ifkern (33°20'N, 04°26'W G), Vaden did not night hunt or set steel traps. The local

populace swamped the Vadens with *Jaculus* during their short stay here to make up for their rather meager trapping results. The coordinates provided by Vaden (33°31'N, 04°24'W) are improbably too far north, by about 10 minutes, for a 3 km distance according to our maps; our coordinates reflect that correction.

Taxa: *Elephantulus*; *Jaculus*, *Gerbillus*, *Meriones*, *Apodemus*.

**Imlil, 1,740 m, Marrakech Province (Map 3: 49).**

Coordinates: 31°09'N, 07°56'W C (31°08'N, 07°55'W G).

Collectors: M. G. Hearst, L. W. Robbins, D. A. Schlitter, H. W. Setzer, and R. E. Vaden (16–20 Oct 1969); R. E. Vaden (18–20 Jul 1970).

Habitat: “In a canyon with rocky brushy sides, some walnut trees, a rocky river bottom with some cultivation

around . . . rock walls and grass fields and near ‘a stream’” (LWR). “Rocky and grassy river bed north of the village . . . fields on the mountainside west of the Kasbah . . . blackberry-rock wall area” (REV, 1969). “Rocky river-wash behind the building” (REV, 1970).

Remarks: On 16 Oct 1969, the field team “drove southwest then south through Marrakech to Asni, then followed a track southward through the mountains to the village of Imlil, where the Alpine Club has a rest house.” Collections were also made at the **Refuge Louis Neltner** on 19 Oct 1969. The Vadens revisited Imlil in Jul 1970 and set up camp at the Alpine Club. Although trapping effort was made elsewhere in the vicinity, they had no success because of the heavy poisoning campaign in the area. There is no indication that specimens were collected anywhere but around camp.

Taxa: *Elephantulus*; *Atlantoxerus*, *Eliomys*, *Apodemus*, *Mus*, *Rattus*; *Crocidura*.

**Irherm-n-Ougdai**, 1,970 m, Ouarzazate Province (Map 3: 51).

Coordinates: 31°15'N, 07°26'W C.

Collector: R. E. Vaden (21 Feb 1970).

Habitat: “Rocky mountain slopes.”

Remarks: While traveling to the next camp at **11 km SW Tinerhir**, Vaden stopped to purchase an *Atlantoxerus* at this locality, just south of the pass at Tizi n'Tichka (31°17'N, 07°21'W G).

Taxon: *Atlantoxerus*.

**Kenitra, 11 km W**, Kenitra Province (Map 3: 22).

Coordinates: 34°14'N, 06°42'W C.

Collector: R. E. Vaden (2–6 May 1970).

Habitat: “We’re separated from the ocean by a high hill of sand covered by very dense shrubs, the hill is several km long and is actually more of a dune than anything else. Vegetation consists of a few trees (cedars?), plenty of woody shrubs (flowering and juniper) smaller non woody shrubs and grasses. Shrubs are extremely dense over most of the area. Soil is sandy to sandy-silt, mostly very soft.”

Remarks: Kenitra was surrounded by farmland and planted eucalyptus forest. Camp was 11 km west of town, near the coast.

Taxa: *Eliomys*, *Apodemus*, *Mus*.

**Khenifra, 22 km E**, 1,600 m, Meknès Province (Map 3: 30).

Coordinates: 32°58'N, 05°27'W C.

Collector: R. E. Vaden (7–11 Jul 1970).

Habitat: “Clear lake . . . oak-cedar forest . . . forest on a steep mountain side” (Figure 14).

Remarks: The Vadens drove east from Khenifra, stopping briefly at a forestry station where they were told of the presence of many monkeys in the area. They continued on to Aguelmane Azigza (32°58'N, 05°26'W G) according to Vaden’s journal. There is no mention of Aguelmane Azigza on specimen labels, however.

Taxa: *Macaca*; *Eliomys*, *Apodemus*, *Mus*; *Crocidura*.

**Ksar-es-Souk, 6 km SW**, Ksar-es-Souk Province (Map 3: 36).

Coordinates: 31°54'N, 04°29'W C.

Collectors: M. G. Hearst and L. W. Robbins (28 Jan–1 Feb 1970); H. L. Norman and R. E. Vaden (18–19 Oct 1970).

Habitat: “[Camp] . . . in a hummock area with bushes on the hummocks—not much other vegetation in the area—in fact for this area we find very little sign of life . . . flat . . . rocky hillside. [Town] dump” (LWR). 2.5 km SW Ksar-es-Souk: “Sandy area with vegetated hummocks and flat areas with large pebbles with a sandy substrate . . . some small dunes—much small vegetation and some flat sandy areas with small rocks and vegetation” (LWR). 2.0 km SW Ksar-es-Souk: “Area very similar to where our camp is—vegetated hummocks and rocky ground—only there are more outcroppings here and a wash” (LWR). “Sandy hummocks . . . higher pebble covered sand” (REV).

Remarks: Although Hearst and Robbins established their main camp at 6 km SW Ksar-es-Souk, they set traplines at two satellite localities at 2.5 km SW Ksar-es-Souk (31°50'N, 04°35'W C) on 28 Jan and at 2.0 km SW Ksar-es-Souk on 29 Jan. On the way back to camp, on the evening of 31 Jan, Jan Hearst shot a *Canis aureus*.

Norman and Vaden revisited the area southwest of Ksar-es-Souk in Oct 1970, presumably to reconnoiter for future grid sites for livetrapping. No specimens were collected at that time.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*; *Lepus*; *Canis*.

**Larache, 20 km SE**, Tétouan Province (Map 3: 5).

Coordinates: 35°02'N, 06°03'W C.

Collectors: M. G. Hearst and L. W. Robbins (8–11 May 1970).

Habitat: “More natural oak forest” (LWR). 3 km NE Larache: “Much low brush around the old stone walls



FIGURE 14. Morocco, Khenifra, 22 km E (photograph by R. E. Vaden, May 1970).

and rocky hillsides” (LWR). 1 km N Larache: “A sandy area with a lot of vegetation” (LWR).

Remarks: After noting that the oak and eucalyptus forest near Larache appeared “too barren,” Hearst and Robbins moved 20 km SE to set up camp “in a more natural oak forest.” On 9 May, they ventured to the salt works at the Roman ruins of Lixus (Ruines de Lixus; 35°12’N, 06°06’W G) at 3 km NE Larache (35°12’N, 06°07’W C); Lixus is not mentioned on specimen labels, however. The next day they sampled a heavily vegetated coastal dune area at 1 km N Larache.

Taxa: *Gerbillus*, *Apodemus*, *Mus*, *Rattus*; *Atelerix*; *Crocidura*; *Myotis*; *Mustela*.

**Mechra Benabbou, 11 km SE, Settat Province**  
(Map 3: 43).

Coordinates: 32°36’N, 07°43’W C.

Collectors: M. G. Hearst and L. W. Robbins (22 Apr 1970).  
Habitat: “Large natural cave down in the rocks—large with big chambers” (LWR).

Remarks: To collect bats at this cave, Hearst and Robbins made a one-day side trip while encamped at **3 km N Settat** (21–24 Apr).

Taxa: *Rhinolophus*, *Miniopterus*.

**Meseied, 40 km N, Tarfaya Province** (Map 3: 76).

Coordinates: 28°13’N, 10°55’W C.

Collector: R. E. Vaden (28–30 Nov 1969).

Habitat: “Mountainous and very rocky vegetated with (I think) euphorbs, ‘cactus’ and low thorny shrubs. Soil seems to be basically silt—it’s mostly muddy right now! . . . Low shrubs on hillocks.”

Remarks: The Vadens headed toward Meseied (Messeied G), which is 85 km south-southeast of Tan-Tan, “down about 10 km” from Tilemsen (Tilemsoun;



FIGURE 15. Morocco, Midelt, 7 km E (photograph by R. E. Vaden, Jul 1970).

28°18'N, 10°54'W G). The weather they found there was foul, and the trap success was poor.

Taxa: *Gerbillus*, *Meriones*.

**Midelt, 7 km E**, 1,488 m, Ksar-es-Souk Province (Map 3: 35).

Coordinates: 32°42'N, 04°40'W C.

Collector: R. E. Vaden (1–5 Jul 1970).

Habitat: “Rocky flats and hills south of camp . . . Habitat same as [Ifkern]—rocky soil (very red in color here), clumps of wire grass dominant with smaller areas of sage (?) in formerly cleared areas and a few small patches of open ground” (Figure 15).

Remarks: After several aborted attempts to find a campsite where tent pegs could be securely driven, Vaden traveled east of Midelt (32°41'N, 04°45'W G) to an old field.

Taxa: *Elephantulus*; *Gerbillus*, *Apodemus*, *Mus*.

**Mischliffen**, Meknès Province (Map 3: 31).

Coordinates: 33°30'N, 05°09'W C (33°25'N, 05°07'W G, as Michlifene).

Collectors: H. L. Norman and R. E. Vaden (30 Sep 1970).

Habitat: “Oak-cedar forest on rocky mountainside” (REV).

Remarks: Mischliffen (1,900 m per Vaden’s journal) was explored as a possible grid-trapping study site, and although *Apodemus* were trapped alive and released here, no specimens reside in the NMMH. On 1 Oct, the party, consisting of H. L. Norman, the Vadens, E. Hooper, and R.W. Thorington, departed Mischliffen and drove toward Ifrane, where they photographed and observed a troop of *Macaca*.

**Missour, 16 km W**, Fès Province (Map 3: 34).

Coordinates: 33°03'N, 04°07'W C.

Collectors: M. G. Hearst and L. W. Robbins (26 Jun–1 Jul 1970).

Habitat: “Undulating rocky-variable desert near a river—some mud mounds with holes in them and some vegetation near the river . . . rocky hills nearby” (LWR). 15 km SW Missouri: “There is a series of washes with some large bushes in this area—also a few rocks . . . bushy wash area” (LWR).

Remarks: Robbins and Hearst at first traveled south of Missouri, but upon finding “just flat rocky desert,” they returned to town and finally settled into a campsite to the west. After setting up camp, they went hunting at 8 km S Missouri, as indicated on specimen labels. On 26 Jun, they hunted *Ctenodactylus* in washes with large bushes on nearby Mt. Missouri (Jebel Missouri; 33°00'N, 04°12'W G), labeled as 15 km SW Missouri; trapped around camp; and later hunted and trapped along the road to Midelt (also 15 km SW Missouri according to specimen labels). Both localities were hunted and trapped on subsequent dates.

Taxa: *Elephantulus*; *Jaculus*, *Gerbillus*, *Meriones*, *Psammomys*, *Apodemus*, *Ctenodactylus*; *Lepus*; *Atelerix*; *Pipistrellus*; *Canis*, *Vulpes*.

**Moulay-Bousselham**, Kenitra Province (Map 3: 6).

Coordinates: 34°53'N, 06°18'W C, G (as Moulay Bou Selham).

Collectors: H. L. Norman and R. E. Vaden (12–13 Jan 1971).

Habitat: “Coastal dunes and rocky outcrops on opposite sides of a farm” (REV).

Remarks: Vaden and Norman set up camp less than a kilometer north of Moulay-Bousselham, but poor weather and lack of sufficient equipment resulted in poor trap success.

Taxon: *Gerbillus*.

**Nador, 20 km SE**, Nador Province (Map 3: 12).

Coordinates: 35°07'N, 02°45'W C.

Collector: R. E. Vaden (22–26 May 1970).

Habitat: “Nowhere else [in the vicinity of Nador] was there any native vegetation and I suspect this area has been planted. Habitat is planted hardwood trees (some eucalyptus) but none above 10 or 12 feet [3.0 or 3.7 m]. Very little undergrowth. Soil ranges from fairly hard packed sandy-silt to actual dunes (we're only a hundred meters or so from the coast) . . . Beyond the dunes the land is flat—might have been salt marsh . . . and probably still subject to flooding

from the sea.” On 24 May: “Different habitat—low coastal scrub on dunes instead of planted forest of before.”

Remarks: Camp was established at the base of a spit into the Mediterranean Sea about 100 m from the coast.

Taxa: *Gerbillus*, *Meriones*, *Mus*, *Rattus*; *Crocidura*; *Pipistrellus*.

**Ouarzazate, 9 km SE**, Ouarzazate Province (Map 3: 53).

Coordinates: 30°52'N, 06°52'W C.

Collectors: M. G. Hearst and L. W. Robbins (23–28 Feb 1970, 18–19 Jul 1970).

Habitat: “Sandy wash with rocky hillsides with little vegetation. Town dump . . . small stream” (LWR). 7 km E Ouarzazate: “Sandy area with rocky hills” (LWR).

Remarks: On 23 Feb, Hearst and Robbins set up camp in a wide river wash southeast of Ouarzazate. Several nearby sites were visited. The team collected *Plecotus* during a side trip to a mesa at 6 km N Ouarzazate with cliff dwellings said locally to be 2,700 years old. They stopped at the Ouarzazate town dump (which they did numerous times on subsequent collecting trips in the area) and collected a *Meriones*. They explored old mines at 5 km S Ouarzazate as well as 5 km SE and 5 km SW and collected bats and a squirrel along the way. Traps were set in sandy and rocky hills at 7 km E Ouarzazate. On 18 Jul, Hearst and Robbins returned to the abandoned mines at 5 km S Ouarzazate and abandoned cliff dwellings 19 km E Ouarzazate to collect bats. These visits were conducted to contrast winter (Feb) and summer (Jul) populations of bats in the area of Ouarzazate.

Taxa: *Elephantulus*; *Atlantoxerus*, *Eliomys*, *Gerbillus*, *Meriones*, *Mus*; *Lepus*; *Rhinolophus*, *Rhinopoma*, *Pipistrellus*, *Plecotus*, *Myotis*; *Canis*, *Vulpes*.

**Oued Zem, 5 km S**, Khouribga Province (Map 3: 45).

Coordinates: 32°49'N, 06°35'W C.

Collectors: M. G. Hearst and L. W. Robbins (26–30 Apr 1970).

Habitat: “Area of planted pine trees but what I believe is natural vegetation is growing between them. There are also large areas near by of planted cactus—beaver tail type” (LWR). 10 km S Oued Zem: “A more open scrub area—more rocky areas and [fewer] big shrubs, no trees, and a lot of open space—some larger rocks on hillside” (LWR).

Remarks: On 29 Apr, traps were set in an open scrub area 10 km S Oued Zem.

Taxa: *Gerbillus*, *Meriones*, *Lemmiscomys*, *Mus*; *Crocidura*.

**Ouezzane, 10 km W**, Kenitra Province (Map 3: 7).

Coordinates: 34°46'N, 05°41'W C.

Collector: R. E. Vaden (1–5 Jun 1970).

Habitat: "Habitat is woody-scrub on rolling hills; soil is baked clay . . . farm land all around but we have some chaparral-type vegetation right around camp and a little more further west . . . a stream—shrubs along the stream includes oleanders (?) and smaller woody shrubs . . . wheat field on a moderately steep slope south of camp . . . low palmetto-scrub-old field on another slope."

Taxa: *Apodemus*, *Mus*; *Crocidura*; *Rhinolophus*.**Oulmes, 18 km S**, Kenitra Province (Map 3: 29).

Coordinates: 33°20'N, 06°00'W C.

Collectors: M. G. Hearst and L. W. Robbins (8–9 Jul 1970).

Habitat: "Camped in a sandy wash with some low scrub in the bottom land and oak forest and some rocky areas on the hillsides . . . brush fence row . . . sandy wash . . . some low scrub . . . rocky oak hillside on the north side of the river . . . shale-type rocks and . . . large boulders and cliff-type rocks—both [gerbils and *Apodemus*] were on steep hillsides with oak" (LWR).

Remarks: Arriving at Oulmes, Hearst and Robbins headed west but eventually set up camp to the south in a small valley and along a river (probably the Aguenour as found on their field map; CGM, *Rabat*, 1:500,000). They broke camp the next day because they felt they had "used up" the habitat and were not having much success.

Taxa: *Gerbillus*, *Meriones*, *Apodemus*.**Rabat, 11 km E**, Rabat Province (Map 3: 23).Coordinates: 34°02'N, 06°43'W M (CGM, *Rabat*, 1:500,000).

Collectors: M. G. Hearst, L. W. Robbins, D. A. Schlitter, H. W. Setzer, and R. E. Vaden (20–23 Oct 1969).

Habitat: "Open oak forest" (LWR).

Remarks: The field team stayed in Rabat (34°02'N, 06°50'W G) while they collected at this locality. Robbins' habitat description is likely a reference to the Forêt de Mamora, which lies to the east of Rabat.

Taxa: *Gerbillus*, *Apodemus*, *Mus*, *Rattus*.**Rabat, 15 km SW**, Rabat Province (Map 3: 24).

Coordinates: 33°57'N, 06°57'W C.

Collector: R. E. Vaden (21 Jan 1970).

Habitat: "Coastal scrub" (specimen labels).

Remarks: We identified this locality from specimens and from Vaden's field catalog; nothing about this locality was entered in his field journal.

Taxa: *Lemniscomys*, *Mus*; *Crocidura*.**Rabat, 17 km SW**, Rabat Province (Map 3: 25).

Coordinates: 33°55'N, 06°59'W C.

Collectors: M. G. Hearst, L. W. Robbins, D. A. Schlitter, H. W. Setzer, and R. E. Vaden (14–15 Oct 1969).

Habitat: "Rocky area . . . flat around bushes . . . sandy areas" (LWR). "Rocky outcrop in coastal dunes. Vegetation occurs in clumps . . . all shrubs and grasses. The area is surrounded by fields, which we did not trap in" (REV).

Taxa: *Gerbillus*, *Lemniscomys*, *Mus*, *Rattus*; *Crocidura*.**Refuge Louis Neltner**, Marrakech Province (Map 3: 50).Coordinates: 31°04'N, 07°56'W M (CGM, *Marrakech*, 1:500,000).

Collectors: M. G. Hearst, L. W. Robbins, D. A. Schlitter, H. W. Setzer, and R. E. Vaden (19 Oct 1969).

Habitat: "Rocks . . . Some short vegetation was in evidence and on the level areas it looked like tundra—thick, very short vegetation" (LWR).

Remarks: The field team made a side trip from *Imlil* (16–20 Oct) to collect in the alpine zone at Refuge Louis Neltner, an "alpine club refuge . . . seven miles [11.3 km] up" Jebel Toubkal (31°03'N, 07°55'W G). In his journal, Hearst indicated that "Chalet Louis Neltner [is at] 3,200 m on Toubkal."

Taxa: *Eliomys*, *Apodemus*, *Mus*.**Rissani**, Ksar-es-Souk Province (Map 3: 38).

Coordinates: 31°17'N, 04°16'W C (31°17'N, 04°17'W G).

Collectors: R. E. Vaden (27 Jan–1 Feb 1970); H. L. Norman and R. E. Vaden (29–30 Sep 1970).

Habitat: "Camp on a dried mud flat. Soil is variable—sandy-silt on the flats, sand in the washes . . . quite a bit of sand blown up around shrubs and on the sides of mountains. Vegetation is limited to the sandy washes and is very low; a few clumps of grass, a very few thorn bushes and junipers (?) and several shrubs with small succulent leaves . . . sandy-rocky mountainside (actually a very rugged hill of about 100 feet [30.5 m] in height) . . . hummocky-washy area of clay with considerable vegetation and standing water in places. A few palm trees, some grasses and a lot of shrubs make up the vegetation. The soil is sandy-clay with a thin crust of dried mud over most of the area . . . sandy-baked clay area SW of camp. Vegetation is relatively



heavy—one shrub every 5 or 6 yards [4.6 or 5.5 m] on the average. The region is basically a place with some hummocks and a few washes . . . Area is SE of camp, a sandy plain with hummocks of cedars as well as the other regular plants. At the southern end of the lines is an area of low dunes up to about 6 or 7 feet [1.8 or 2.1 m] high on the steep side. The dunes are without vegetation” (REV).

Remarks: In his journal entries for Jan, Vaden wrote that camp was situated 3 km west of Rissani. On 29 Sep, Vaden and Norman headed west of Rissani to an area near a sandstone outcrop “where we had previously had good trapping success.” They set live traps, and on the 30th they departed to look for other possible live-trapping sites. No specimens from this second visit are preserved in the NMNH collection.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*.

**Safi, 13 km S**, Safi Province (Map 3: 40).

Coordinates: 32°11'N, 09°15'W C.

Collectors: M. G. Hearst and L. W. Robbins (15–19 Apr 1970).

Habitat: “Near the coast—some natural scrubby bush on hillsides and some vegetated sandy areas on the flat . . . partially full cistern . . . sand area is very isolated along the coast and [found] only here—rocky coasts are both north and south of us for quite a ways and farm land inland . . . went out looking for places to trap but the area looks barren for miles around” (LWR).

Remarks: Most of the land around Safi was plowed, but Hearst and Robbins sited their camp 13 km south, on the coast. On 16 Apr, Hearst and Robbins again looked for another locality to collect but only confirmed their first impressions that the area was heavily farmed and learned that there was an extensive rat-poisoning campaign in the region as well. On the 18th, the crew set traps to the north of camp “above the beach.” They shot or netted a number of *Myotis* and *Rhinolophus* from a cistern.

Taxa: *Gerbillus*, *Mastomys*, *Mus*, *Rattus*; *Crocidura*; *Rhinolophus*, *Myotis*.

**Settat, 3 km N**, Settat Province (Map 3: 44).

Coordinates: 33°02'N, 07°37'W M (CGM, Rabat, 1:500,000).

Collectors: M. G. Hearst and L. W. Robbins (21–24 Apr 1970).

Habitat: “Arrived in Settat . . . went north to the only place with any vegetation—a planted forest—there is

some underbrush . . . traps set in the forest and near some neighboring farms” (LWR).

Remarks: The collectors' coordinates (33°02'N, 07°46'W) plot an improbable 15 km WNW Settat, conflicting with the distance and direction traveled from Settat as recorded on tags and in journals (33°00'N, 07°37'W G). We accordingly adjusted the coordinates for 3 km N (by road). While at this camp, the team also visited a cave at **11 km SE Mechra Benabbou** to look for bats.

Taxa: *Gerbillus*, *Mus*, *Rattus*; *Oryctolagus*; *Crocidura*.

**Sidi Sibara, 3 km SW**, Kinetra Province (Map 3: 27).

Coordinates: 33°23'N, 06°46'W M (CGM, Rabat, 1:500,000).

Collectors: M. G. Hearst, L. W. Robbins, D. A. Schlitter, H. W. Setzer, and R. E. Vaden (12 Oct 1969).

Habitat: Abandoned copper mines.

Remarks: The AMP team left Rabat to collect bats at a series of abandoned copper mines southwest of Sidi Sibara.

Taxon: *Rhinolophus*.

**Taforalt, 3 km NE**, Oujda Province (Map 3: 13).

Coordinates: 34°49'N, 02°24'W C.

Collectors: M. G. Hearst and L. W. Robbins (2–6 Jun 1970).

Habitat: “We are in a mountain forest with rocky outcrops on the hillsides and the main tree is juniper . . . mountain scrub-rock hillside” (Figure 16) (LWR). 3 km S Taforalt: “Farm land—flat plain down the mountain but returned to the mountain [habitat] south of town—juniper scrub” (LWR).

Remarks: The field team made two visits to a large cave, cited by Hearst as Cave of the Camel, 9 km NE Taforalt (34°50'N, 02°22'W C), where they collected *Rhinolophus*, *Miniopterus*, and *Myotis*. On 5 Jun, they also collected on a mountain 3 km S Taforalt (Taforalt G).

Taxa: *Elephantulus*; *Eliomys*, *Gerbillus*, *Apodemus*, *Mus*, *Rattus*; *Oryctolagus*; *Atelerix*; *Crocidura*; *Rhinolophus*, *Myotis*, *Miniopterus*; *Sus*.

**Tafraoute, 6 km SE**, Agadir Province (Map 3: 68).

Coordinates: 29°42'N, 08°55'W M (CGM, Marrakech, 1:500,000).

Collectors: M. G. Hearst and L. W. Robbins (19–20 Mar 1970).

Habitat: “[Camped] in a valley with many granite boulders and many argon trees and a small intermittent stream . . . rocky hillside” (LWR).



FIGURE 16. Morocco, Taforalt, 3 km NE (6 Jun 1970).

Remarks: The coordinates provided by Hearst and Robbins (30°12'N, 08°57'W) are incorrect because of a map-reading error. The section of their field map is clearly marked at the approximate coordinates cited above. According to Robbins' field catalog, three specimens of *Atlantoxerus* collected at 5 km E Tafraoute (Tafraout G) were donated to the University of Arizona, ORSTOM, and the University of Michigan.

Taxa: *Elephantulus*; *Atlantoxerus*, *Meriones*.

**Tafraoute, 27 km SW**, Agadir Province (Map 3: 67).

Coordinates: 29°35'N, 09°12'W M (CGM, *Marrakech*, 1:500,000).

Collectors: M. G. Hearst and L. W. Robbins (21 Mar 1970).

Habitat: No information available.

Remarks: Robbins picked up a *Canis aureus* at this locality after leaving Tafraoute en route to Agadir.

Taxon: *Canis*.

**Tamri, 8 km N**, Agadir Province (Map 3: 63).

Coordinates: 30°45'N, 09°50'W M (CGM, *Marrakech*, 1:500,000).

Collectors: M. G. Hearst and L. W. Robbins (9–13 Apr 1970).

Habitat: "Area immediately around camp I am calling coastal scrub-mixed bushes and some sandy soil . . . to the north, across a gully is an area of sand dunes, some just bare sand and others with some low vegetation on them" (LWR). 10 km N Tamri: "Near by mountain is what would be called argon woodland or scrub" (LWR).

Remarks: Hearst and Robbins set up camp on a narrow coastal plain. Their own coordinates (30°20'N, 09°50'W) place this locality in the sea, but their field map bears a mark at the approximate coordinates indicated above. On 10 Apr, Hearst set traps at 10 km N Tamri.

Taxa: *Elephantulus*; *Atlantoxerus*, *Gerbillus*, *Meriones*, *Apodemus*, *Lemniscomys*, *Mastomys*, *Mus*; *Atelerix*; *Crocidura*; *Vulpes*.

**Tan-Tan, 11 km W**, Tarfaya Province (Map 3: 75).

Coordinates: 28°28'N, 11°09'W C.

Collectors: M. G. Hearst and L. W. Robbins (28 Nov–1 Dec 1969); H. L. Norman (17 Dec 1970).

Habitat: “Sandy desert . . . with a fair amount of vegetation . . . rocky slope with rocky outcropping near by” (LWR). 4 km W Tan-Tan: “Sandy hummock area—more sandy than our camp area . . . non-sandy plateau—quite a bit of vegetation—a lot of euphorbs (cactus-type)” (LWR).

Remarks: On 29 Nov, *Gerbillus* and *Jaculus* were collected 4 km W Tan-Tan (28°28'N, 11°04'W C). Norman's journal referred to John (John Gruwell), who was collecting insects, and Lynn (Robbins) as collectors at 10 km W Tan-Tan on 17 Dec 1970, although no specimens from this site were accessioned into the NMNH. Norman mentioned that live specimens

went to the University of Michigan and the National Zoological Park (Smithsonian Institution, Washington, DC).

Taxa: *Elephantulus*; *Eliomys*, *Jaculus*, *Gerbillus*, *Meriones*.

**Taounate, 15 km WSW**, Fès Province (Map 3: 8).

Coordinates: 34°29'N, 04°48'W C.

Collector: R. E. Vaden (8–12 May 1970).

Habitat: “Habitat is old-field for the most part, the rest being new field [Figure 17] . . . Soil is basically clay not rocky. Plants are nonwoody shrubs and grasses (grain field left overs).”

Remarks: The Vadens established camp in a flower field about 200 m south of the Oued Ouerrha, at an elevation of 350 m.

Taxa: *Gerbillus*, *Mus*; *Pipistrellus*; *Vulpes*.



FIGURE 17. Morocco, Taounate, 15 km WSW: Habitat where *Mus* was collected (photograph by R. E. Vaden, 11 May 1970).

**Tarfaya, 8 km S**, Tarfaya Province (Map 3: 74).

Coordinates: 27°53'N, 12°52'W M (ONC, Sheet H-1, 1:1,000,000).

Collectors: M. G. Hearst and L. W. Robbins (3–7 Dec 1969).

Habitat: West: “Sandy with small clumps of vegetation with small dunes behind them and leading into large dunes” (LWR). East: “Flat rocky (small) desert—non-sandy with a fair amount of vegetation, bushes and euphorbs (cactus-type)” (LWR).

Taxa: *Elephantulus*; *Eliomys*, *Jaculus*, *Gerbillus*, *Meriones*, *Psammomys*; *Atelerix*; *Crocidura*.

**Taroudant, 5 km S**, Agadir Province (Map 3: 69).

Coordinates: 30°26'N, 08°54'W C.

Collector: R. E. Vaden (19–23 Mar 1970).

Habitat: “Heavily vegetated sandy dune area. Soil is more sand than not, but is fairly hard packed and solid under the surface. The ‘dunes’ are old and pretty well

packed under the vegetation; perhaps ‘hummocks’ is a better term. Dominant shrubs are the same thorny bushes we’ve had all along . . . some sage . . . Plenty of grass . . . under the shrubs and out in the few small open areas. Except for the absence of junipers, it reminds me of Essaouira.”

Remarks: The Vadens found a suitable campsite along the south side of the Sous River.

Taxa: *Gerbillus*, *Meriones*, *Lemniscomys*, *Mus*; *Atelerix*.

**Tata, 15 km S**, Agadir Province (Map 3: 72).

Coordinates: 29°38'N, 07°57'W C.

Collectors: M. G. Hearst and L. W. Robbins (13–17 Mar 1970).

Habitat: “Palm trees, some sand, some vegetated flat [Figure 18] and some rocky hills with sand on the sides” (LWR). 8 km N Tata: “Natural caves” (LWR). 4 km S Tata: “Rocky-hilly area” (LWR).



FIGURE 18. Morocco, Tata, 15 km S (17 Mar 1970).

Remarks: On 15 Mar, Hearst and Robbins drove to 8 km N Taza to some caves, used as homes in the past, and collected a number of *Rhinopoma*. On the same day, they also collected at 4 km S Taza.

Taxa: *Elephantulus*; *Jaculus*, *Acomys*, *Gerbillus*, *Meriones*; *Rhinopoma*, *Pipistrellus*; *Felis*.

**Taza, 18 km S**, Taza Province (Map 3: 9).

Coordinates: 34°08'N, 04°04'W C.

Collectors: M. G. Hearst and L. W. Robbins (15–19 Jun 1970).

Habitat: “Oak forest in between two mountain ridges with rocky sides” (Figure 19) (LWR). 23 km S Taza: “Oak scrub area, some rocky areas—quite dense” (LWR). 16 km S Taza: “Scrub oak and other small shrubs on a somewhat rocky hillside” (LWR).

Remarks: Hearst and Robbins established a campsite to the south of Taza (34°13'N, 04°01'W). A couple of small caves near Ras El Oued (34°09'N, 4°00'W G),

at 13 km S Taza, were visited to collect *Plecotus*. They also set traplines at 23 km S Taza and at 28 km S Taza (34°06'N, 04°05'W C). The team traveled south in hopes of finding bats at the Grottes of Chiker but were unsuccessful. Hearst and Robbins also went squirrel hunting at 16 km S Taza and afterward set a trapline in the same area.

Taxa: *Atlantoxerus*, *Eliomys*, *Apodemus*, *Plecotus*.

**Tazarine, 3 km NW**, Ouarzazate Province (Map 3: 59).

Coordinates: 30°48'N, 05°36'W C.

Collectors: M. G. Hearst and L. W. Robbins (1–5 Mar 1970).

Habitat: “We drove out NW of town along the river to a sandy area—many palm trees and such—an oasis . . . sand dune area, near oasis . . . rocky hillside” (LWR). 10 km SE Tazarine: “Savanna area—lots of acacias and pretty flat, some very shallow washes with vegetation and some sand but mostly flat rock—pebble area” (LWR).



FIGURE 19. Morocco, Taza, 18 km S (19 Jun 1970).

Remarks: From Tazarine (30°48'N, 05°34'W G, as Assif Tazarine), Hearst and Robbins drove northwest along a river (perhaps the Asif Amred or a tributary thereof) to locate a campsite. On 3 Mar, they visited mines and a nearby well and collected two *Plecotus*. Specimen labels identify this locality simply as Tazarine. The next day they set traps at 10 km SE Tazarine.

Taxa: *Elephantulus*; *Atlantoxerus*, *Jaculus*, *Acomys*, *Gerbillus*, *Meriones*, *Pachyuromys*, *Mus*; *Paraechinus*; *Pipistrellus*, *Plecotus*.

**Tazenakht, 7 km NW**, Ouarzazate Province (Map 3: 54).  
Coordinates: 30°37'N, 07°15'W C.

Collectors: R. E. Vaden (7–11 Mar 1970); M. G. Hearst (11 Mar 1970).

Habitat: “Hamada hills and hummocks in a riverbed. Vegetation is sparse and very scrubby” (REV).

Remarks: From Tazenakht (30°35'N, 07°12'W G), the Vadens drove 5 km into the mountains where they collected squirrels and set traps in the “vegetated rocky washes and on the hillside”; these specimens were labeled as 7 km NW Tazenakht. On 9 Mar, specimens were collected at 17 km NNW Tazenakht (30°43'N, 07°17'W C) in hills above a river bed, in fairly thick vegetation composed of thorn bushes and small, woody shrubs. Following his stay at **4 km S Fom Zguid** (7–11 Mar), Hearst collected a *Vulpes* at 7 km SE Tazenakht.

Taxa: *Elephantulus*; *Atlantoxerus*, *Eliomys*, *Gerbillus*, *Meriones*; *Vulpes*.

**Telouet, 13 km W**, Ouarzazate Province (Map 3: 52).  
Coordinates: 31°16'N, 07°23'W C.

Collectors: M. G. Hearst and L. W. Robbins (17–18 Jul 1970).

Habitat: “We are in a small valley or big gully—juniper is dominant, rocky hillsides and brushy bottom land” (Figure 20) (LWR).

Remarks: On 18 Jul, the crew took a side trip to **9 km SE Ouarzazate** to collect bats from some caves that they had visited earlier in the year.

Taxa: *Elephantulus*; *Atlantoxerus*, *Eliomys*, *Gerbillus*, *Apodemus*.

**Tendrara, 15 km W**, Oujda Province (Map 3: 17).  
Coordinates: 33°08'N, 02°10'W C.

Collectors: M. G. Hearst and L. W. Robbins (15–17 Feb 1970).

Habitat: “Area around Tendrara . . . is kind of a high plain with a few higher peaks, no trees and a very ho-

mogeneous plant community—tufts of grass and not much else” (LWR).

Remarks: According to Hearst, the campsite was reached by driving “about 1 km north of Tendrara, [where] we turned northwest on a dirt road and continued 15 km.” He also indicated that a trapline was set 2 km closer to town, and on 15 Feb, another site was visited a couple of miles from their camp, in habitat that appeared similar to that around the 15-km-W camp. Robbins decided to use the base-camp locality to designate these peripheral collecting areas.

Taxa: *Elephantulus*; *Jaculus*, *Meriones*; *Lepus*; *Atelerix*.

**Tetouan, 13 km N**, Tétouan Province (Map 3: 3).  
Coordinates: 35°41'N, 05°18'W C.

Collector: R. E. Vaden (13–16 May 1970).

Habitat: “Habitat is scrub—I’ll call it Mediterranean chaparral—mostly low, woody shrubs, some larger ones. Terrain is hilly; soil is silty-clay.”

Remarks: From Tetouan (35°34'N, 05°22'W G), the Vadens continued north to the Cabo (Cap) Negro turn-off and established camp about 1 km off the road to Ceuta.

Taxa: *Apodemus*, *Mus*; *Crocidura*.

**Tiflet, 18 km NW**, Kenitra Province (Map 3: 28).  
Coordinates: 33°57'N, 06°27'W C.

Collectors: M. G. Hearst and L. W. Robbins (2–6 May 1970).

Habitat: “Cork oak forest with a fair amount of under brush” (LWR).

Remarks: Robbins and Hearst established camp to the northwest of Tiflet in a region of heavy farming. On 3 May, they drove to a brushy hillside surrounded by grain fields at 10 km NW Tiflet and set traps. On 4 May, they found a cave at 21 km W Tiflet and collected specimens of *Nycteris* and *Rhinolophus*. Two days later, they obtained more *Rhinolophus* as well as *Myotis* in an extensive network of mines at 15 km W Tiflet, where they also collected *Apodemus* and *Eliomys*.

Taxa: *Eliomys*, *Gerbillus*, *Apodemus*, *Mus*, *Rattus*; *Rhinolophus*, *Nycteris*, *Myotis*; *Mustela*.

**Tinerhir, 11 km SW**, Ouarzazate Province (Map 3: 60).  
Coordinates: 31°27'N, 05°36'W C.

Collector: R. E. Vaden (22–27 Feb 1970).

Habitat: “Habitat is mostly small, scattered evergreen shrubs and very scattered thorn bushes, now in bloom . . . Soil is basically sandy, but the only real sandy areas are the washes. The soil is overlaid with



FIGURE 20. Morocco, Telouet, 13 km W (20 Jul 1970).

pebbles and small rocks (to about 8 inches [20.3 cm] in diameter). We're in a valley between two rugged but not very high mountain ranges; the slopes are cut by numerous washes . . . rocky outcrop at the base of the mountains."

Remarks: The Vadens set up camp about 50 yards [45.7 m] north of Oued Todra (Oued Todrha G) and southwest of Tinerhir. On 24 Feb, they drove another 5 or 6 km southwest of camp to set traps "in a sandy area near the riverbed" with thorn bushes on sandy hummocks.

Taxa: *Elephantulus*; *Jaculus*, *Gerbillus*, *Meriones*, *Psammomys*, *Mus*.

**Tinezouline**, Ouarzazate Province (Map 3: 57).

Coordinates: 30°31'N, 06°07'W C (30°31'N, 06°05'W G, as Rbate Tinezouline).

Collector: R. E. Vaden (1 Mar 1970).

Habitat: "Vegetated rocky desert" (specimen label).

Remarks: Vaden was on his way to 10 km W Zagora when he collected an *Atelerix* at Tinezouline.

Taxon: *Atelerix*.

**Tizgui-Ida-Ou-Baloul**, Agadir Province (Map 3: 71).

Coordinates: 29°45'N, 08°29'W G (as Tizgui Ida Ou Baloul).

Collectors: M. G. Hearst and L. W. Robbins (19 Mar 1970).

Habitat: "Rocky hillside" (specimen label).

Remarks: En route to 6 km SE Tafraoute, Robbins collected an *Atlantoxerus*.

Taxon: *Atlantoxerus*.

**Tizi-n-Tiniffit**, 1,660 m, Ouarzazate Province (Map 3: 56).

Coordinates: 30°44'N, 06°37'W C.

Collector: R. E. Vaden (1 Mar 1970).

Habitat: "Steep rocky mountains" (specimen label).

Remarks: Vaden was on his way to **10 km W Zagora** when he collected at this pass in the Anti-Atlas Mountains.  
Taxon: *Atlantoxerus*.

**Tiznit, 8 km S**, Agadir Province (Map 3: 66).

Coordinates: 29°38'N, 09°43'W C.

Collectors: M. G. Hearst and L. W. Robbins (17–20 Dec 1969).

Habitat: “We are on a rocky plain with very little vegetation . . . large bush . . . flat” (LWR). **18 km S Tiznit**: “Base of the mountains . . . bottom farm land (very rocky soil) with rock walls and occasional large bushes. As you . . . go up the mountain the vegetation gets thicker with more euphorbs (cactus-type) and a few shrubs. Farther up some small trees are in evidence. The whole mountain side is rocky” (LWR). **15 km NE Tiznit**: “Recently planted eucalyptus grove—much smaller vegetation on sandy soil” (LWR).

Remarks: On 18 Dec, Robbins and Hearst drove to the foot of the mountains and set traps at **18 km S Tiznit** (29°32'N, 09°43'W C), and on the next day, they collected at **15 km NE Tiznit** (29°49'N, 09°39'W C).

Taxa: *Elephantulus*; *Eliomys*, *Gerbillus*, *Meriones*, *Lemniscomys*, *Mastomys*; *Crocidura*.

**Tuisgui-Remz**, Tarfaya Province (Map 3: 81).

Coordinates: 28°24'N, 09°12'W C (28°25'N, 09°13'W G, as Tizgui Remt).

Collectors: M. G. Hearst and L. W. Robbins (10–15 Dec 1969).

Habitat: “Towards town there is much open water and palm trees, poplars and reeds. The hillsides are rocky. Our camp is on the edge of a . . . rocky area with sand between the rocks—it was a hillside” (LWR). **5 km N Tuisgui-Remz**: “A small valley wash with gravel soil and some vegetation surrounded by small rocky hills—rocks were small and covered well” (LWR). **10 km S Tuisgui-Remz**: “Pebble desert area—in some areas were shrubs . . . in a valley” (LWR). **22 km S Tuisgui-Remz**: “A large pebble plain—the area had some small vegetation but mostly nothing” (LWR).

Remarks: Robbins and Hearst made camp about 1 mi [1.6 km] south of Tuisgui-Remz, on the edge of a wash, and opportunistically inventoried surrounding habitats reachable by vehicle, including **5 km N**, **14 km S** (*Atlantoxerus*), a pebble plain with sandy washes at **10 km S**, and a large pebble plain with “a few fingers of vegetated sandy soil” at **22 km S**.

Taxa: *Atlantoxerus*, *Jaculus*, *Acomys*, *Gerbillus*, *Meriones*, *Pachyuromys*; *Lepus*; *Paraechinus*.

**Yousoufia, 5 km NW**, Safi Province (Map 3: 41).

Coordinates: 32°17'N, 08°33'W C.

Collector: R. E. Vaden (16–19 Apr 1970).

Habitat: “Trees include eucalyptus, other hardwoods and some conifers (cedars?). Undergrowth is mainly grain (oats?) with some flowering herbs as well. The rest of the area is farm land, although the field adjacent to the forest is not ‘active’—probably last year’s, but now used for sheep grazing . . . phosphate mines—no shafts or tunnels.”

Remarks: The USBGN equates Yousoufia with Louis Gentil, a place-name that is found on Vaden’s field map (CGM, *El-Jadida*, 1:500,000) near the above coordinates. From Yousoufia (32°15'N, 08°32'W G), the Vadens drove northwest and pitched their camp on the edge of a “planted forest.” Local inhabitants indicated that the rodents in the area had been poisoned.

Taxa: *Gerbillus*, *Meriones*, *Mus*.

**Zagora, 10 km W**, Ouarzazate Province (Map 3: 58).

Coordinates: 30°18'N, 05°56'W C.

Collectors: R. E. Vaden (1–5 Mar 1970); H. L. Norman and R. E. Vaden (23 Nov–6 Dec 1970).

Habitat: “Soil is more or less sandy, more so in the many little gullies, with pebble and rock covered areas predominant. Vegetation is variable, ranging from small evergreen shrubs to scattered acacias (very scrubby) . . . thorn bushes [and an unidentified shrub] 24–30 inches [61.0–76.2 cm] high, 3 to 4 feet [0.9–1.2 m] in diameter and grows in the sandy washes. Vegetation is fairly dense in the gullies and somewhat scattered in the rocky areas between washes” (REV).

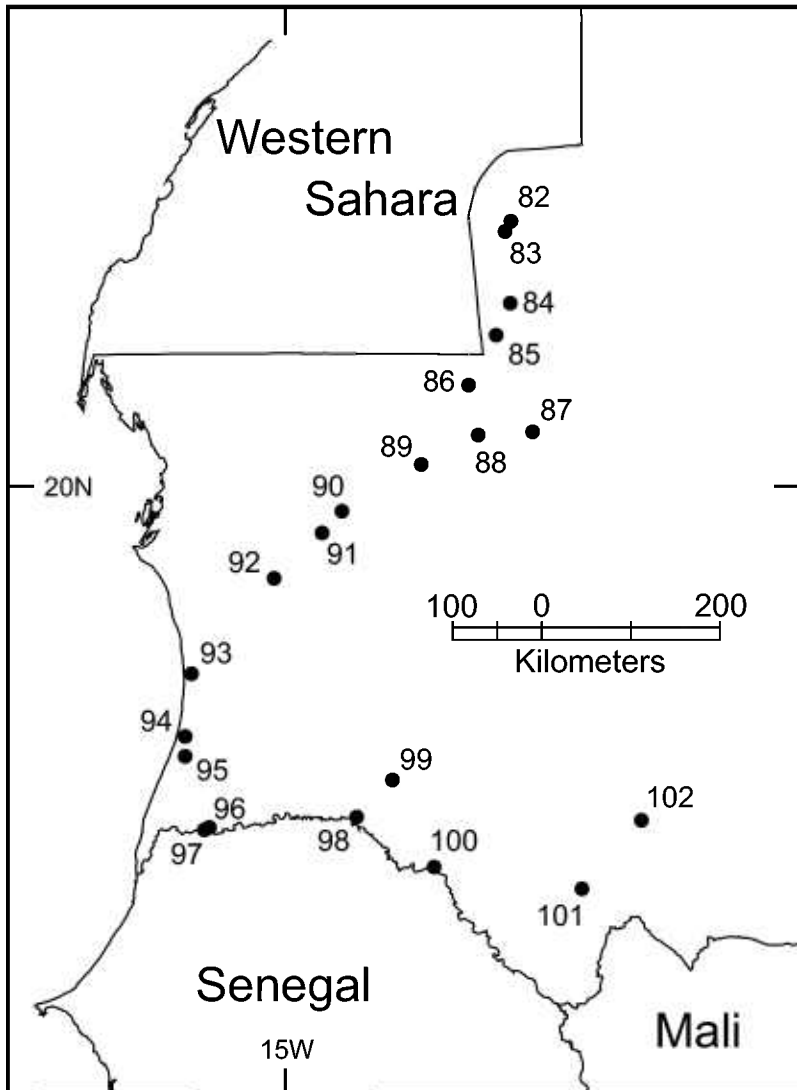
Remarks: While traveling toward Zagora (30°19'N, 05°50'W G) on 1 Mar, Vaden made opportunistic collections at **Tinezouline** and **Tizi-n-Tiniffit**. From the base camp, the Vadens drove 3 km toward town and south 1 km to set a trapline on a vegetated, sandy plain with small dunes around the larger shrubs. On 2 Mar, they drove about 2 km south from camp and set another line in similar habitat. Specimens obtained from both traplines bear the same locality as those taken from around camp. Norman and Vaden conducted capture-and-release studies during the second period at this locality (23 Nov–6 Dec).

Taxa: *Elephantulus*; *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*.

#### MAURITANIA

GENERAL REMARKS. Dean E. Harvey was accompanied on his first trip by Meke Samerjian and San





MAP 4. African Mammal Project cardinal collecting localities 82–102 in Mauritania.

- 82. Fort Gouraud
- 83. Fort Gouraud, 12.8 km SW
- 84. Char, 40 km N
- 85. Char
- 86. Agui, 19 km S
- 87. Chinguetti, 20 km NW
- 88. Atar
- 89. Atar, 70 km SW
- 90. Mogreine Copper Mine
- 91. Akjoujt, 35 km SW
- 92. Zbeyat
- 93. Nouakchott, 6 km E
- 94. Nouakchott, 78 km S
- 95. Tiguent
- 96. Garak
- 97. Rosso
- 98. Boghe, 8 km N
- 99. Aleg, 3 km S
- 100. Kaedi
- 101. Passe de Soufa
- 102. Kiffa

Wo, field assistants, and Mamadou, the expedition's cook. "M. Samerjian" appears as collector on a number of specimen labels, using his own field numbers. Harvey was later joined by C. Brian Robbins, and together they performed the bulk of collecting in the country (Map 4). Inventory efforts in Mauritania were interrupted by permit delays and truck repairs, which occasioned extended layovers in Nouakchott and Fort Gouraud.

**ITINERARIES.** D. E. Harvey: 6 km E Nouakchott, 15 Oct–15 Nov 1966; Mogreine Copper Mine, 18–24 Nov 1966; Atar, 26 Nov–2 Dec 1966; 12.8 km SW Fort Gouraud, 5 Dec 1966; Fort Gouraud, 24 Dec 1966–19 Jan 1967.

D. E. Harvey and H. W. Setzer: 40 km N Char, 4 Feb 1967; Char, 5–6 Feb 1967; 70 km SW Atar, 7–9 Feb 1967.

D. E. Harvey and C. B. Robbins: 6 km E Nouakchott, 26 Feb–2 Mar 1967 (including satellite localities); Fort Gouraud, 7 Mar 1967; Char, 9–12 Mar 1967; 19 km S Agui, 13–15 Mar 1967; Atar, 16 Mar 1967; 20 km NW Chinguetti, 17–23 Mar 1967; 35 km SW Akjoujt, 25 Mar 1967; Zbeyat, 25–29 Mar 1967; 78 km S Nouakchott, 6 Apr 1967; Tiguent, 7–13 Apr 1967; Garak, 16–20 Apr 1967; Rosso, 28 Apr 1967; Garak, 29 Apr–2 May 1967; 8 km N Boghe, 4–8 May 1967; 3 km S Aleg, 10–19 May 1967; Kaedi, 19–23 May 1967; Passe de Soufa, 26 May–2 Jun 1967; Kiffa, 4–5 Jun 1967.

**Agui, 19 km S (Map 4: 86).**

Coordinates: 21°01'N, 13°09'W C.

Collectors: D. E. Harvey and C. B. Robbins (13–15 Mar 1967).

Habitat: "Sahel savanna. There are hard sandy areas—bare of plants, surrounded by bushy areas with numerous acacia and grasses. There are also rock outcroppings in the area" (CBR). "Sahel savanna . . . isolated acacia trees . . . hard sandy flat area . . . close to rock outcroppings . . . small bushes. Geologist called area 'rubble desert' and I think this best describes it" (DEH).

Remarks: Harvey's field catalog contains several reptiles that were collected 11.7 km S Agui (Agui = 21°11'N, 13°07'W G) on 12 Mar.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*; *Lepus*.

**Akjoujt, 35 km SW** (Map 4: 91).

Coordinates: 19°35'N, 14°37'W M (AMS, *St. Louis*, 1:1,000,000).

Collectors: D. E. Harvey and C. B. Robbins (25 Mar 1967).

Habitat: "Sparse vegetation, flat rubble or pebble desert. Acacias few, some wadis" (D. E. Harvey, personal communication).

Remarks: On the way to **Zbeyat**, Harvey and Robbins collected a *Gazella* at 35 km SW Akjoujt, as recorded on specimen tags and in the field catalog; however, Robbins indicated this locality as 35 km "S" Akjoujt in his journal, presumably a lapsus for SW.

Taxon: *Gazella*.

**Aleg, 3 km S** (Map 4: 99).

Coordinates: 17°02'N, 13°55'W C.

Collectors: D. E. Harvey and C. B. Robbins (10–19 May 1967).

Habitat: "Quite sandy with dead clinging burrs lying on top. Acacia dominant tree. Many cattle, sheep, goats and few camels around . . . along river . . . flood plain [Figure 21]. Trees and bushes generally situated on small hillocks. Hillocks probably caused by water erosion. The ground was generally hard with dust layer on top. Cow dung everywhere . . . acacia and few scattered baobabs" (DEH). "Sahel savanna [Figure 22]. There are also dense bushes along the wadi and only scattered *Acacia* [on] the sandy flats. *Acacia* is not the only dominant but seems to occupy about 90% of the plant population . . . isolated, flat, semi-hard ground area (scattered bushes)" (CBR).

Remarks: This camp was located 1 km south of a water well (and water trough) where Harvey and Robbins collected many bats. They set traps on 12 May in a hedgerow 1 km north of camp but without success. After leaving camp, they collected *Desmodilliscus* at 6.2 km S Aleg (16°58'N, 13°56'W C) and at 26.7 km

S Aleg (16°48'N, 13°53'W C) on 19 May. These coordinates appear in pencil in Robbins' field catalog but do not seem to be written by his hand nor are they inscribed on specimen labels.

Taxa: *Xerus*, *Jaculus*, *Desmodilliscus*, *Gerbilliscus*, *Gerbillus*, *Taterillus*, *Arvicanthis*, *Mastomys*; *Lepus*; *Asellia*, *Nycticeinops*, *Scotophilus*; *Felis*, *Genetta*, *Ictonyx*.

**Atar** (Map 4: 88).

Coordinates: 20°31'N, 13°03'W C, G.

Collectors: D. E. Harvey (26 Nov–2 Dec 1966); D. E. Harvey and C. B. Robbins (16 Mar 1967).

Habitat: "Relative[ly] rocky area . . . sand . . . hard rocky ground around bushes and on rocky hillside . . . in sand dunes and in and around houses . . . larger rocks predominate (rock escarpment) . . . large grain sandy area (wash)" (DEH).

Remarks: Harvey set up camp on the edge of town and collected in and around buildings as well as in the surrounding countryside. Robbins also purchased a *Paraechinus* on 16 Mar 1967 while passing through town.

Taxa: *Jaculus*, *Acomys*, *Gerbillus*, *Mus*; *Paraechinus*.

**Atar, 70 km SW** (Map 4: 89).

Coordinates: 20°13'N, 13°38'W M (AMS, *Port-Étienne*, 1:1,000,000).

Collectors: D. E. Harvey and H. W. Setzer (7–9 Feb 1967).

Habitat: "Many acacia trees. Habitat sahel savanna. Ground fairly soft. Bushes and trees usually on small hillocks . . . trees and small grass stands" (DEH).

Remarks: Map coordinates are a by-road estimate from Atar.

Taxa: *Jaculus*, *Gerbillus*.

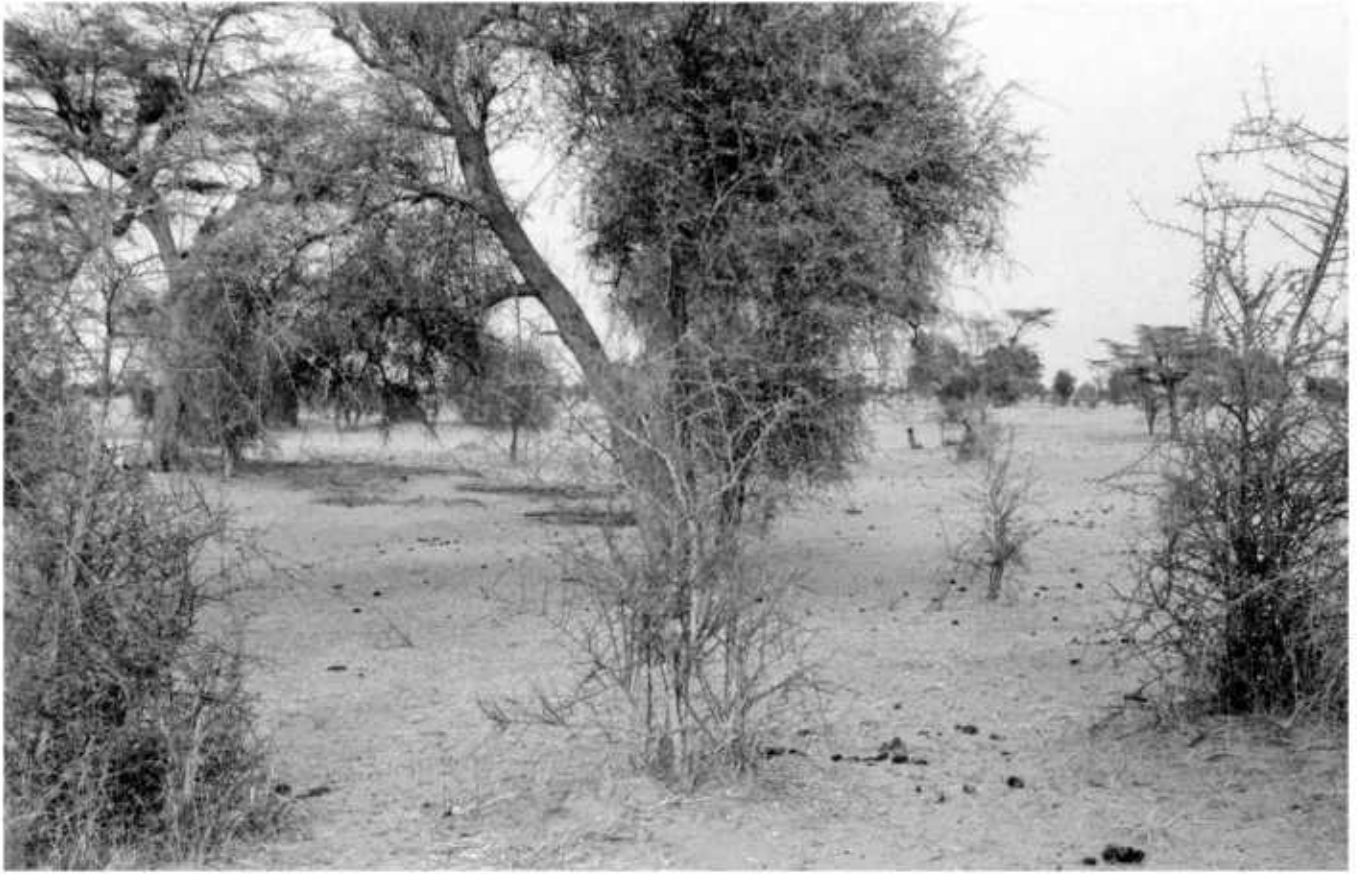
**Boghe, 8 km N** (Map 4: 98).

Coordinates: 16°39'N, 14°17'W C.

Collectors: D. E. Harvey and C. B. Robbins (4–8 May 1967).

Habitat: "Area sahel savanna. Millet and rice two main crops. Crops planted in flood plain. Area around same is sandy with less grass and many acacia trees. (Sand soft orange) . . . grassy area close to millet crop . . . sand hills . . . hedgerow . . . bushes . . . acacia barrier" (DEH). "Hedgerow . . . sandy area" (CBR).

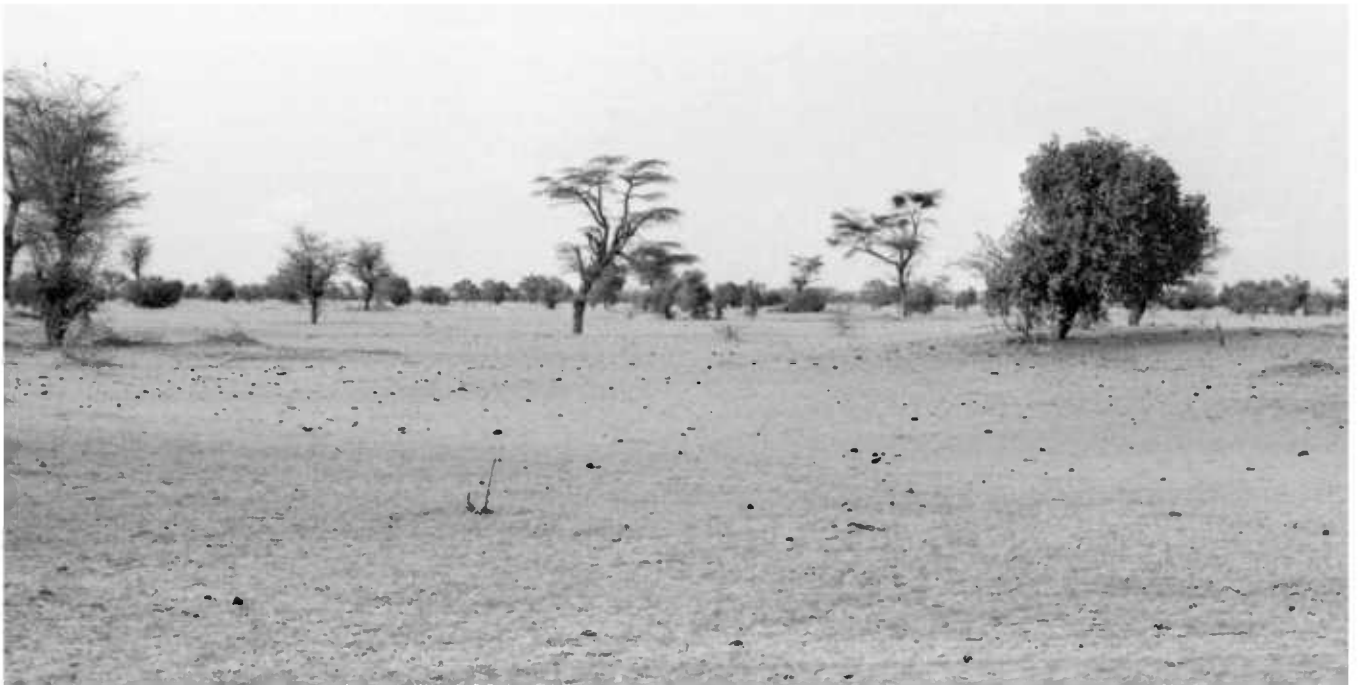
Remarks: The village name was spelled as "Bogue" (16°35'N, 14°16'W G, as Bogué) for specimens collected on 4 May, whereas "Boghe" is used for those prepared afterward, as reflected on tags and in



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FIGURE 21. Mauritania, Aleg, 3 km S (photograph by D. E. Harvey, 17 May 1967).

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FIGURE 22. Mauritania, Aleg, 3 km S (photograph by D. E. Harvey, 17 May 1967).

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field catalogs (Boghé being an archaic form per the USBGN). Robbins recorded that he and Harvey set traps 2 km east of camp on 7 May, but this repositioning is not reflected on specimen labels.

Taxa: *Xerus*, *Gerbillus*, *Arvicanthis*, *Mus*; *Lepus*; *Taphozous*, *Nycticeinops*; *Felis*, *Canis*, *Vulpes*.

**Char** (Map 4: 85).

Coordinates: 21°32'N, 12°52'W C (21°31'N, 12°51'W G).

Collectors: D. E. Harvey and H. W. Setzer (5–6 Feb 1967); D. E. Harvey and C. B. Robbins (9–12 Mar 1967).

Habitat: “In large rocky area and in and around palm trees in oasis . . . a few goats, sheep and camel herders camped just below the oasis . . . small stands of grass . . . rocky area escarpment” (DEH, Feb). “Rocky rubble area. Soil sandy and loose . . . oasis . . . escarpment . . . sandy area in and around bushes” (DEH, Mar). “Extreme rocky hillside, sand dune areas and semi-rock and sand with scattered plants. An oasis is near by . . . [where] vegetation is denser and the bushes are larger . . . palm trees in the oasis . . . fringe bushes around the oasis . . . rocky-sandy area . . . rock cliff” (CBR).

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Felovia*; *Vulpes*.

**Char, 40 km N** (Map 4: 84).

Coordinates: 21°51'N, 12°44'W M (AMS, *Port-Étienne*, 1:1,000,000).

Collectors: D. E. Harvey and H. W. Setzer (4 Feb 1967).

Habitat: “Pebble desert . . . rocky outcropping. Most of the trees seem to be dead acacias” (DEH).

Remarks: Harvey remarked that the “area looked pretty devoid of animal life,” but his five traps set in an outcrop yielded a single *Gerbillus*.

Taxon: *Gerbillus*.

**Chinguetti, 20 km NW** (Map 4: 87).

Coordinates: 20°33'N, 12°30'W C.

Collectors: D. E. Harvey and C. B. Robbins (17–23 Mar 1967).

Habitat: “Habitat: sahel savanna? One area sandy with low lying acacia and grass clumps, this is surrounded by flat rocky area (large rocks but not sticking up to any great height). Acacia also in rocky area but very scattered . . . sandy area on hillocks, in and around grass stands and bushes . . . flat stretches of pebble (small grain) desert . . . bushes on small hillocks” (DEH). “A sandy wash. This area is bordered by harder sand. Acacia is the dominant plant (tree?). These sandy areas are surrounded by what is almost solid rock. The rocky area in this area is about 85%

of the surface area. This varies from scattered pebbles to extreme rock (mostly flat). Acacia is also scattered throughout the rocks . . . escarpment” (CBR).

Remarks: On 19 and 20 Mar, Robbins collected a *Felovia* “1.5 miles [2.4 km] west of camp” in a rock outcrop. On 20 and 21 Mar, they collected 2 km west of camp, an area described as flat and rocky but with some sand in areas. Field catalogs or specimen labels do not distinguish between this locality and the main campsite.

Taxa: *Jaculus*, *Acomys*, *Gerbillus*, *Meriones*, *Felovia*.

**Fort Gouraud** (Map 4: 82).

Coordinates: 22°41'N, 12°43'W G.

Collectors: D. E. Harvey (24 Dec 1966–19 Jan 1967); D. E. Harvey and C. B. Robbins (7 Mar 1967).

Habitat: “Rocky area and flat hard surface gravelly area. Acacia is the only tree around and they are widely scattered [Figure 23]. There are some small clumps of dried grass and a couple of small bushes I am not familiar with . . . large rock outcropping . . . occasional clump of dry grass on small hillock . . . flat gravelly area fairly devoid of vegetation . . . gravelly with little soft sand . . . wadi” (DEH).

Remarks: Harvey devoted a month to inventory in and around Fort Gouraud, an extended layover while awaiting truck parts that were being shipped from Washington, DC, to the embassy in Nouakchott. On 29 Dec, he collected in a gravelly area with little vegetation 2 km north of Fort Gouraud, but this site is not specified in his field catalog or on skin labels. By 2 Jan, he had “set traps almost completely around Fort Gouraud.” Traps were also set along the airport runway on 18 Jan. Harvey and Robbins collected a few reptiles but no mammals on 7 Mar while waiting for the final repairs to their truck.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*, *Mus*; *Vulpes*.

**Fort Gouraud, 12.8 km SW** (Map 4: 83).

Coordinates: 22°35'N, 12°47'W M (CAO, *Fort Gouraud*, 1:200,000).

Collector: D. E. Harvey (5 Dec 1966).

Habitat: “Area here is desert. Few acacia in isolated areas and some dry grass. Grass coming out of hillocks.”

Remarks: The axle of Harvey’s truck snapped while at this locality, and the broken-down truck remained in **Fort Gouraud** for three months until parts arrived from the United States. Map coordinates were estimated by azimuth and range from Fort Gouraud.

Taxa: *Gerbillus*, *Pachyuromys*.



FIGURE 23. Mauritania, Fort Gouraud: Pebble desert, *Acacia* tree in foreground (photograph by D. E. Harvey, 3 Dec 1966–21 Jan 1967).

**Garak** (Map 4: 96).

Coordinates: 16°33'N, 15°46'W C, G.

Collectors: D. E. Harvey and C. B. Robbins (16–20 Apr, 29 Apr–2 May 1967).

Habitat: South side of river: “Hard clay cracked now (the dry season). The natives say the area we are in is almost entirely submerged during the wet season. There are trees and bushes along the river and a few bushes on the flood plain . . . *Acacia* and strangler figs are the only two trees I recognize. Some grass . . . mostly around bushes.” North side: “Millet [inside acacia barriers] and there is much more grass and other vegetation . . . mud walls and grass roofs [bats found here] . . . sandy hill-sides” (DEH). “Hedgerows and in the heavy brush near the river . . . man-made brush fences, used to protect crops . . . heavy brush area . . . Again the habitat is classified as sahel savanna but due to the Senegal River the [vegetation] is much more dense and varied . . . The *Acacia* is present as well as other larger trees. The un-

derbrush is grasses and smaller thorny plants. The immediate area near the river apparently is flooded during the rainy season . . . tall grass and hedgerow surrounding an[d] in a field of millet” (CBR).

Remarks: Harvey and Robbins camped near Garak in a “tidal flood basin” on the south side of a tributary to the Senegal River. They collected *Nycteris* and *Hipposideros* in grass houses in town on 16 Apr. Robbins traveled by canoe to the other side of the river to collect, as the ground was “very hard” at their camp and there was no evidence of mice. On 18 Apr, Harvey collected a *Cercopithecus* in a “heavily wooded area” about 5.4 km east of camp. A villager took them to a “grassy-swampy area,” where Harvey shot a *Phacochoerus* in “deep swamp.” They returned to this area on 29 Apr to trap for mice because it also included “sandy hills with dense vegetation” and “tall vegetation” and collected here almost daily from thereon. Bats were also collected in Rosso on 28 Apr.

Taxa: *Cercopithecus*; *Gerbilliscus*, *Gerbillus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*, *Hystrix*; *Lepus*; *Crocidura*; *Hipposideros*, *Nycteris*, *Pipistrellus*; *Phacochoerus*, *Potamochoerus*.

**Kaedi** (Map 4: 100).

Coordinates: 16°09'N, 13°30'W C, G (as Kaédi).

Collectors: D. E. Harvey and C. B. Robbins (19–23 May 1967).

Habitat: “Sahel savanna [Figure 24]. Some millet being planted and dead now. Sand soft . . . rocky area north of town. This area looks similar to Bakel (Senegal) from distance but the sand here is softer. As you move from the river [a reference to the Senegal River] inland (north) you go from a fringing forest (bare in some places) with grass up to 3 feet [0.9 m], across a flood plain, where they grow most of their crops, onto a sandy plain with some rolling hills and rock outcrops. There is millet planted in the sandy area also.

The grass of this sandy area and around rock outcrops is of a feathery nature and there are many clinging burrs (dry now). Peanuts . . . millet” (DEH). “Sandy area—sahel savanna . . . rock outcropping. Millet and peanuts are grown in the area” (CBR).

Remarks: Harvey and Robbins camped in the yard of a “Peace Corps House” [hostel]. Harvey mentioned collecting north of town, and Robbins indicated that this collecting locality was 5 km northwest of Kaedi. On 21 May, Harvey set a trapline 5 km west of town. None of these variants is mentioned on specimen labels or in field catalogs.

Taxa: *Gerbilliscus*, *Gerbillus*, *Taterillus*, *Mastomys*; *Canis*, *Vulpes*.

**Kiffa** (Map 4: 102).

Coordinates: 16°37'N, 11°24'W C, G.

Collectors: D. E. Harvey and C. B. Robbins (4–5 Jun 1967).

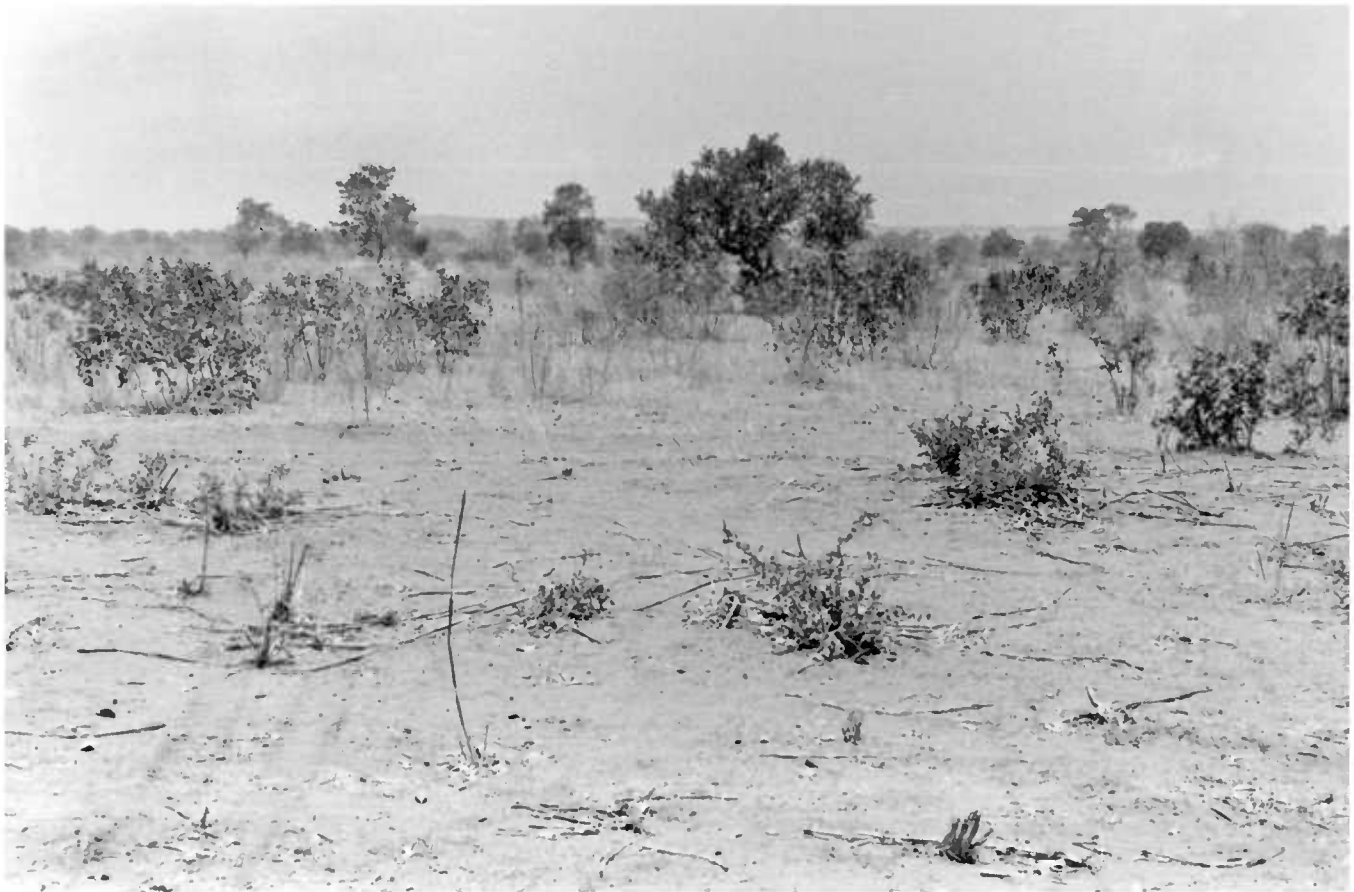


FIGURE 24. Mauritania, Kaedi (photograph by D. E. Harvey, 18–23 May 1967).

Habitat: "Palm grove . . . hedgerow . . . soft sand with broken rocky areas. Trees [represented are] acacia and palm. The grass is fairly dried up" (DEH). "Camp in a palm tree oasis . . . sandy area . . . many sand dunes in the area although the usual *Acacia* is still present" (CBR).

Remarks: Camp was set up in a palm grove 20 yards [18.3 m] from a well just outside of town.

Taxa: *Gerbillus*; *Lepus*; *Paraechinus*; *Canis*.

**Mogreine Copper Mine**, [6 km W] Akjoujt (Map 4: 90).

Coordinates: 19°45'N, 14°26'W M (AMS, *St. Louis*, 1:1,000,000).

Collector: D. E. Harvey (18–24 Nov 1966).

Habitat: "Area very rocky. Looks like volcanic rock (lava). Copper mining here (copper is mixed with iron ore). Pockets of sand are dispersed between rocky areas. Small mountains scattered through area but generally the country is very flat . . . small lake about 1/4 km from camp to the north . . . many canals around Akjoujt."

Remarks: Harvey recorded that camp was established next to the Mogreine Copper Mine, located 6 km west of Akjoujt (19°45'N, 14°23'W G), where he collected *Rhinopoma* in an abandoned mine shaft and trapped in its vicinity. Our coordinates are estimated for the mine. Many specimen labels and Harvey's field catalog designate this locality as "Akjoujt, Mogreine Copper Mine," although a number of labels do not specifically refer to the mine.

Taxa: *Gerbillus*; *Lepus*; *Rhinopoma*.

**Nouakchott, 6 km E** (Map 4: 93).

Coordinates: 18°05'N, 15°55'W M (AMS, *St. Louis*, 1:1,000,000).

Collectors: D. E. Harvey (15 Oct–15 Nov 1966); D. E. Harvey and C. B. Robbins (26 Feb–2 Mar 1967).

Habitat: "Ground is very sandy (mostly soft orange sand). Area looks like transition between sahel savanna and subsaharan [Figure 25]. There is grass

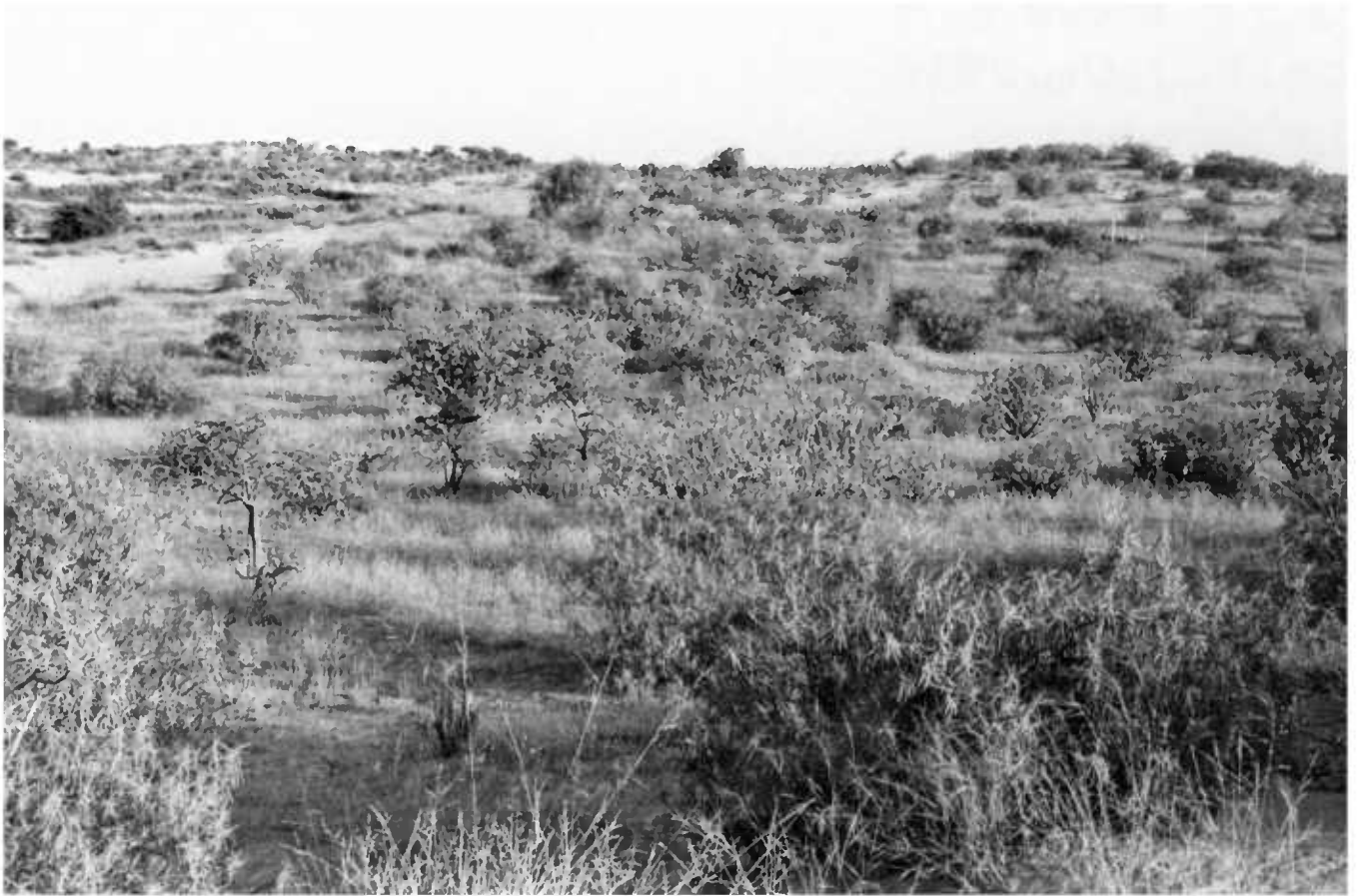


FIGURE 25. Mauritania, Nouakchott, 6 km E (photograph by D. E. Harvey, 15 Oct–17 Nov 1966).

mostly short. Many clinging [burrs] from grass. There are also a few low lying trees around area . . . sand dunes . . . bushes planted around park (plant nursery) . . . flat grassy areas" (DEH). 6 km W Nouakchott: "Close to beach . . . sand dunes in and around bushes and some salt flats behind dunes. Sahel savanna" (DEH). "Coastal sand dunes with scattered large bushes . . . dunes and . . . sahel savanna. This area is sort of a salt-flat habitat but the main habitat is sahel savanna" (CBR).

7 km E Nouakchott: "Some grass here and area varying from hard flat sandy soil to soft sandy hills. Sahel savanna" (DEH). "The plants here are larger and more abundant. Acacia trees and other low thorny bushes . . . also sand dunes" (CBR).

11 km N Nouakchott: "Many salt flats in area also low lying trees in area. Some grass present. Ground mostly hard but sandy" (DEH). "The vegetation varies from dense bushes bordering a river bed which is filled with short green plants to semi-sandy desert-pavement type. The vegetation is scattered" (CBR).

Remarks: While awaiting collecting permits in Nouakchott, Harvey and his African assistants were given permission to collect on the grounds of the Water and Forest Department [Eaux et Forêt] 6 km east of town. Collecting was also conducted by Meke ("M. Samerjian" on some of the specimen labels) and Mamadou from 15 Oct to 15 Nov 1966. Robbins and Harvey stayed in a hotel in Nouakchott from 22 Feb to 4 Mar 1967 while waiting for truck parts to repair their vehicle, which was incapacitated in Fort Gouraud. Collections were incidentally made 6 km W on 26 Feb, 7 km E on 27 Feb, and 11 km N Nouakchott on 2 Mar.

Taxa: *Xerus*, *Jaculus*, *Gerbillus*, *Taterillus*; *Lepus*; *Crocidura*.

**Nouakchott, 78 km S** (Map 4: 94).

Coordinates: 17°28'N, 16°01'W C.

Collectors: D. E. Harvey and C. B. Robbins (6 Apr 1967).

Habitat: "Sahel savannah" (specimen labels).

Remarks: While traveling toward **Tiguent**, Harvey and Robbins opportunistically collected two gerbils at this locality.

Taxon: *Gerbillus*.

**Passe de Soufa** (Map 4: 101).

Coordinates: 15°56'N, 12°00'W C (15°56'N, 12°01'W G).

Collectors: D. E. Harvey and C. B. Robbins (26 May–2 Jun 1967).

Habitat: "Area with rocks. Surrounding grassy area. Palm trees, *Acacia* and baobab trees here plus others. Grass large stem blue and short feathery type. Some burrs also. Surface soil rather hard and cracked in dried up pan . . . water hole . . . trees and . . . bushes along temporary river (some small stagnant ponds is all that is left of river now)" (DEH). "Area is great. Large rock hills, grassy plains, palm trees, *Acacia*, baobab trees, plus other trees . . . grasses in this area are long-stemmed blue, feathery and [burrs]. The soil is hard pan—cracked in the flood areas. Sandy soil with some clay in other areas" (CBR).

Remarks: Harvey and Robbins camped close to a well and a small pan at Passe de Soufa, about 61 km (by road) east of M'Bout. Robbins set a trapline 2 km from camp on 30 May, and on the next day, traps were set adjacent to ponds 1 km north of camp. He later referred to this locality as "the canyon area" in his journal and, apparently, did a considerable amount of collecting there, especially for hyrax. These variants are not indicated on specimen labels or in field catalogs.

Taxa: *Heterohyrax*; *Erythrocebus*, *Papio*; *Gerbilliscus*, *Gerbillus*, *Taterillus*, *Mastomys*, *Mus*, *Praomys*, *Felovia*; *Crocidura*; *Nycticeinops*; *Canis*; *Phacochoerus*.

**Rosso** (Map 4: 97).

Coordinates: 16°31'N, 15°49'W C (16°30'N, 15°49'W G).

Collectors: D. E. Harvey and C. B. Robbins (28 Apr 1967).

Habitat: "Attic of building . . . sides of walls and on rafters" (DEH).

Remarks: While camped at **Garak** (29 Apr–2 May), Harvey and Robbins collected over 100 bats that were roosting in a single building on a military post in Rosso.

Taxon: *Mops*.

**Tiguent** (Map 4: 95).

Coordinates: 17°16'N, 16°01'W C (17°15'N, 16°00'W G).

Collectors: D. E. Harvey and C. B. Robbins (7–13 Apr 1967).

Habitat: "Area sahel savanna [Figure 26]. Many acacia trees, closer together than at previous camps. Ground fairly hard (clay?). Surface with black (brown) dust layer on top. Many cows and goats around [and a] few camels . . . Well close by. Some other bushes around and grass stands on hills surrounding camp. Hills have a much softer orange sandy surface than the valley. There are several places where water had



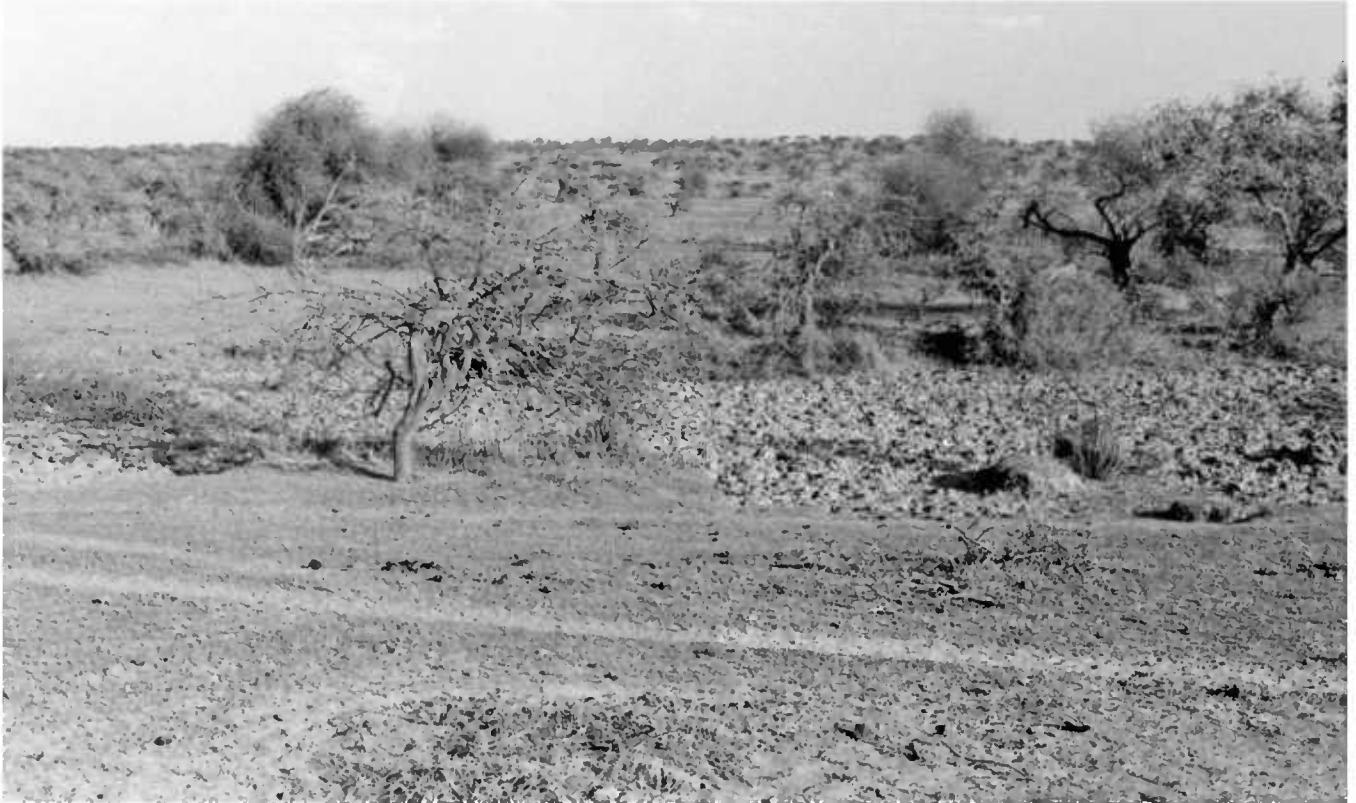


FIGURE 26. Mauritania, Tiguent (photograph by D. E. Harvey, 13 Apr 1967).

been in small ponds but these are dried up now . . . acacia barriers . . . basin with wet clay bottom. It appears to be a semi-permanent pond or temporary pond” (DEH). “Scattered acacia bushes with other thorny bushes and also the large tree-like bush with more or less straight branches. The area is only semi-sandy . . . dry wadi . . . numerous wells. . . water isn’t fit to drink . . . acacia fences used by goat herders . . . large wet mud flats with large brush areas scattered through out . . . soil is clay in the flats. The soil in the bush areas is much drier. The vegetation is very dense . . . camp habitat . . . sahel savanna. The area isn’t as flat as other camps, there are gentle hills—where the soil is more sandy. In the lower valleys the soil is harder with a surface layer of darker dirt—very soft in texture. Acacia is dominant but is more prominent [sic] than usual. Also another large bush is *Cammiphora*” (CBR).

Remarks: Harvey and Robbins actually established their campsite 2 km north of Tiguent, about 88 km south of Nouakchott, although the locality is simply standardized as “Tiguent.” On 11 Apr, traplines were set

2 km west (Robbins indicated the direction as SW) of town in “very dense vegetation” of what appeared to be an intermittent pond. A *Xerus* and two *Nycticeinops* were collected “near the well” on 13 Apr. These variant localities are not reflected on specimen labels or in field catalogs.

Taxa: *Xerus*, *Jaculus*, *Gerbillus*, *Taterillus*; *Lepus*; *Crocidura*; *Nycticeinops*; *Canis*.

**Zbeyat** (Map 4: 92).

Coordinates: 19°04’N, 15°07’W C.

Collectors: D. E. Harvey and C. B. Robbins (25–29 Mar 1967).

Habitat: “Sahel savanna. Few acacia trees and some grass clumps in area. Several other bushes . . . but not familiar. Soil sandy and soft. Some cows, goats and camels here. Well close to tent on road. No trees, and grass clumps and islands are separated by flat hard ground with small pebbles on surface” (Figure 27) (DEH). “Sahel savanna. Again *Acacia* is the dominant plant. There are grassy areas and pebble flats . . . grassy clumps among the flats . . . less gravelly areas, in the

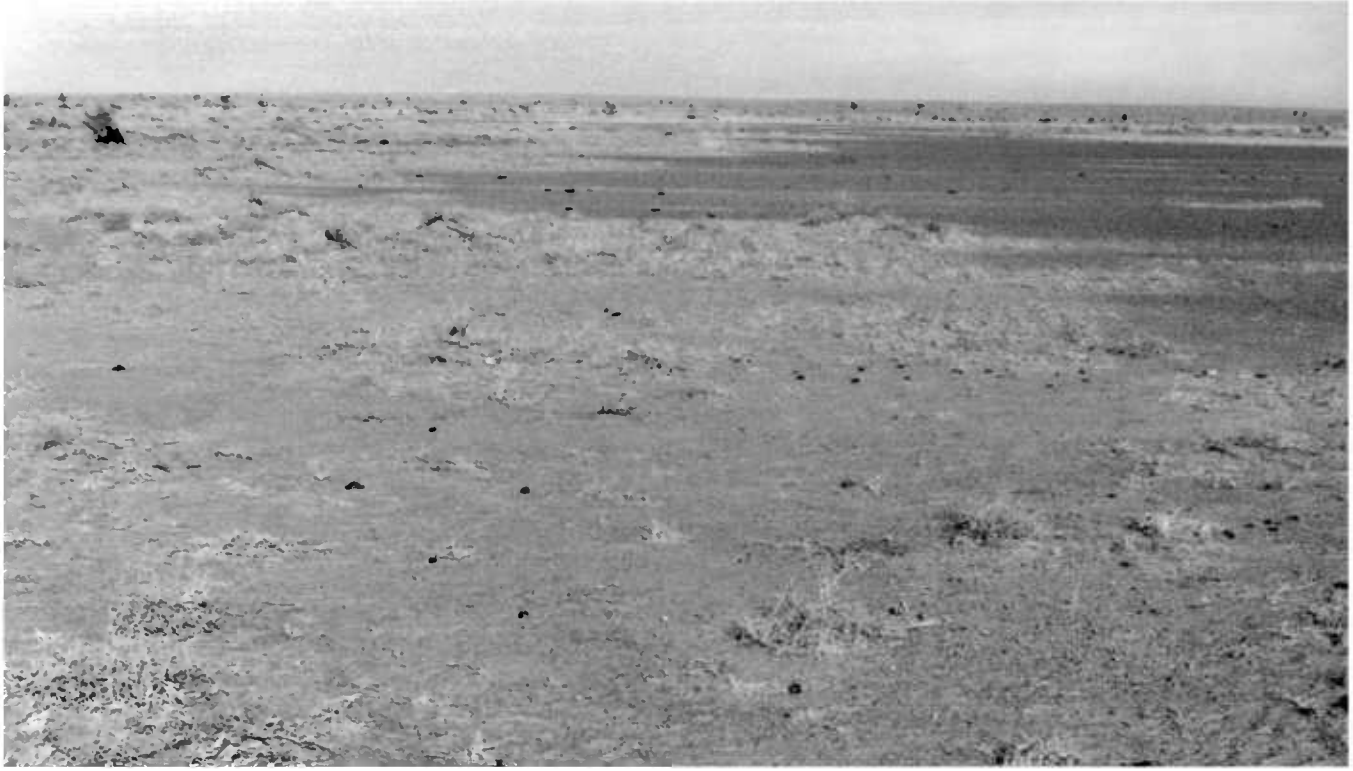


FIGURE 27. Mauritania, Zbeyat (photograph by D. E. Harvey, 29 Mar 1967).

flats. *Acacia* is very wide spread . . . flat, no vegetation areas—usually closely associated with the softer soil rather than the more abundant pebbly flats. The general habitat around camp which we are calling sahel savanna has as its dominant plants *Acacia* and two other large bush type trees. One has definite leaves and the other is a stick-like tent shaped bush—some as tall as 15 feet [4.6 m]. There are also numerous small plants—thorny, stickers, etc. as well as a few grasses—usually aggregated in clumps. The soil varies to semi crusted to very sandy. Rocks seem to be isolated in flats with only small stones in other areas” (CBR).

Remarks: On 27 Mar, Robbins mentioned setting traps in a “new area and habitat. There are grassy areas and pebble flats.” This “new area” is not differentiated from Zbeyat on specimen labels or in field catalogs. They apparently trapped there the next day as well. While hunting 7 mi [11.3 km] north of Zbeyat on 28 Mar, they caught a number of *Jaculus*, although this locality variant also is not differentiated on specimen labels or field catalogs. Examination of our 1:200,000 maps and

the USBGN gazetteer did not reveal any locality called Zbeyat. However, the coordinates supplied by the collectors approximate those of Bou Rjeimat (19°04'N, 15°08' W G) as located on one map (L'Institut Géographique National, *Nouamrhar*, 1:200,000). Robbins indicated in his journal that Zbeyat was approximately 120 km south[west] of Akjoujt.

Taxa: *Jaculus*, *Gerbillus*.

#### ALGERIA

GENERAL REMARKS. Lynn W. Robbins was the sole mammal collector for all Algerian localities (Map 5) and was accompanied on this first leg of the trans-Saharan trip by John Gruwell, who collected aquatic beetles under the employment of Paul Spangler, NMNH Department of Entomology (C. B. Robbins, personal communication). Only “John” is mentioned in Robbins’ field notes. Robbins recorded that his locality coordinates were all based on straight-line distances, as interpreted from Michelin North and West Africa maps. No editions or scales were given.

**ITINERARY.** L. W. Robbins: 30 km S Ain-Sefra, 17–18 Feb 1971; 57 km NE Bechar, 20 Feb 1971; 53 km S Bechar, 21–22 Feb 1971; 100 km SW Bechar, 24 Feb 1971; Beni-Abbes, 25–28 Feb 1971; 72 km SE Kerzaz, 2 Mar 1971; 40 km NE Reggane, 4 Mar 1971; 80 km NE Reggane, 5 Mar 1971; 100 km SE In Salah, 7 Mar 1971; 120 km SE In Salah, 8–9 Mar 1971; 30 km N Arak, 10 Mar 1971; 110 km NW Tamanrasset, 12 Mar 1971; 8 km S Tamanrasset, 13 Mar 1971; 16 km SE Tamanrasset, 14–15 Mar 1971; 28 km NW Tamanrasset, 16 Mar 1971; 44 km NNW Tamanrasset, 17 Mar 1971; 55 km N Tamanrasset, 18–19 Mar 1971; 40 km NNW Tamanrasset, 22 Mar 1971; 33 km NW Tamanrasset, 23 Mar 1971; Tamanrasset, 24 Mar 1971; 40 km NW Tamanrasset, 25 Mar 1971; 70 km NW Tamanrasset, 26 Mar 1971; 170 km NW Tamanrasset, 27 Mar 1971; 7 km W Arak, 28 Mar 1971; 112 km N Arak, 29 Mar 1971; In Salah, 31 Mar 1971; 75 km S Tamanrasset, 4 Apr 1971; 160 km S Tamanrasset, 5–6 Apr 1971.

**Ain-Sefra, 30 km S,** Saïda Department (Map 5: 105).

Coordinates: 32°24'N, 00°33'W C.

Collector: L. W. Robbins (17–18 Feb 1971).

Habitat: "Edge of wash around hummocks and in sandy areas . . . rocky hillside . . . sand . . . hamada."

Remarks: During their stay, the team went gundi hunting a couple of times. The USBGN standardized spelling for Ain-Sefra is Ain-Sefra.

Taxa: *Elephantulus*; *Jaculus*, *Gerbillus*, *Meriones*, *Massoutiera*.

**Arak, 7 km W,** Oasis Department (Map 5: 116).

Coordinates: 25°17'N, 03°49'E C.

Collector: L. W. Robbins (28 Mar 1971).

Habitat: "Sandy wash with large hummocks with tamarisk on them."

Remarks: Coordinates of a "Fort Arak" are 25°18'N, 03°45'E G.

Taxon: *Gerbillus*.

**Arak, 30 km N,** Oasis Department (Map 5: 114).

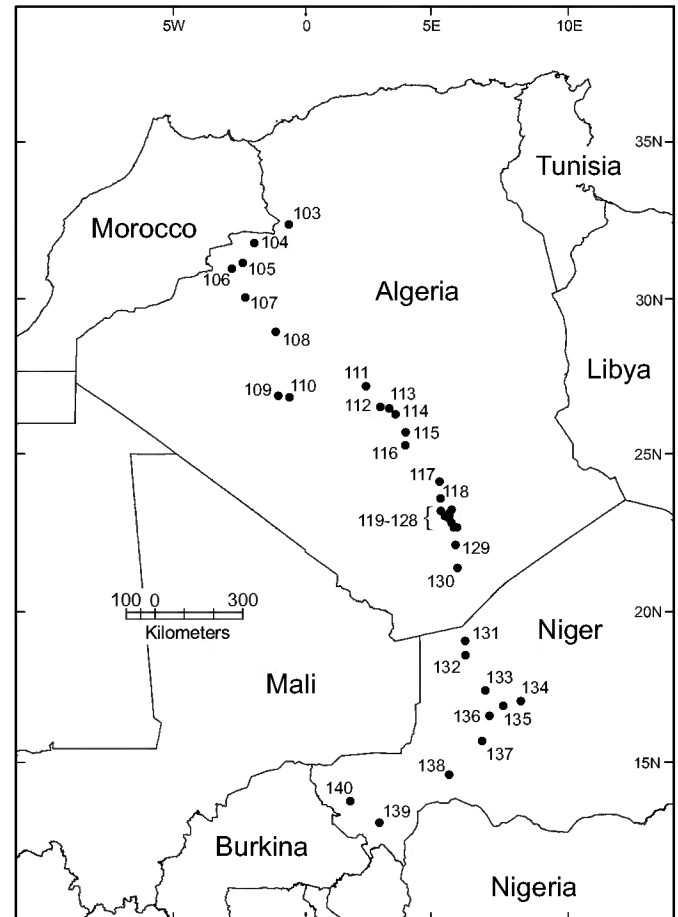
Coordinates: 25°42'N, 03°49'E C.

Collector: L. W. Robbins (10 Mar 1971).

Habitat: "Sandy bushy wash."

Remarks: After leaving this locality, Robbins set traps at a locality "about 100 km SE of Arak . . . in a sandy wash" but had no luck.

Taxon: *Gerbillus*.



**MAP 5.** African Mammal Project cardinal collecting localities 103–140 in Algeria and Niger.

- |                             |                             |
|-----------------------------|-----------------------------|
| 103. Bechar, 100 km SW      | 122. Tamanrasset, 40 km NNW |
| 104. Bechar, 57 km NE       | 123. Tamanrasset, 40 km NW  |
| 105. Ain-Sefra, 30 km S     | 124. Tamanrasset, 33 km NW  |
| 106. Bechar, 53 km S        | 125. Tamanrasset, 28 km NW  |
| 107. Beni-Abbes             | 126. Tamanrasset            |
| 108. Kerzaz, 72 km SE       | 127. Tamanrasset, 8 km S    |
| 109. Reggane, 80 km NE      | 128. Tamanrasset, 16 km SE  |
| 110. Reggane, 40 km NE      | 129. Tamanrasset, 75 km S   |
| 111. In Salah               | 130. Tamanrasset, 160 km S  |
| 112. In Salah, 100 km SE    | 131. Assamaka, 48 km SE     |
| 113. In Salah, 120 km SE    | 132. Assamaka, 80 km SE     |
| 114. Arak, 30 km N          | 133. Agadez, 140 km NW      |
| 115. Arak, 112 km N         | 134. Agadez, 5 km NE        |
| 116. Arak, 7 km W           | 135. Agadez, 70 km W        |
| 117. Tamanrasset, 110 km NW | 136. In-Gall, 30 km S       |
| 118. Tamanrasset, 170 km NW | 137. In-Gall, 120 km S      |
| 119. Tamanrasset, 70 km NW  | 138. Tahoua, 25 km S        |
| 120. Tamanrasset, 55 km N   | 139. Niamey, 90 km SE       |
| 121. Tamanrasset, 44 km NNW | 140. Niamey, 45 km NW       |

**Arak, 112 km N**, Oasis Department (Map 5: 115).

Coordinates: 26°17'N, 03°27'E C.

Collector: L. W. Robbins (29 Mar 1971).

Habitat: "Thick vegetation along a hillside . . . water coming out of a hill in various places and sedges growing all around . . . wash near by with some small bushes."

Taxon: *Gerbillus*.

**Bechar, 53 km S**, Saoura Department (Map 5: 106).

Coordinates: 31°10'N, 02°20'W C.

Collector: L. W. Robbins (21–22 Feb 1971).

Habitat: "Palms in a canyon . . . sand around palms or in sand along edge of canyon . . . rocky hillside."

Remarks: Fort Menouarar (31°10'N, 02°16'W G) is located 53 km south of Bechar, just east of the main north-south highway (AMS, *Colomb-Béchar*, 1:1,000,000), as was described by Robbins for his campsite.

Taxon: *Gerbillus*.

**Bechar, 57 km NE**, Saoura Department (Map 5: 104).

Coordinates: 31°48'N, 01°54'W C.

Collector: L. W. Robbins (20 Feb 1971).

Habitat: "Rocky nothing . . . some water."

Taxa: *Elephantulus*; *Gerbillus*.

**Bechar, 100 km SW**, Saoura Department (Map 5: 103).

Coordinates: 30°59'N, 02°45'W M (AMS, *Colomb-Béchar*, 1:1,000,000).

Collector: L. W. Robbins (24 Feb 1971).

Habitat: "Sandy area with some vegetation—intermittant [sic] stream."

Remarks: Robbins stopped at an abandoned fort just before a storm hit and established camp. This abandoned fort may have been Ksar (fort) Douimeniat (30°59'N, 02°45'W G) or, possibly, Ksar Oulad Aïd (30°56'N, 02°45'W G).

Taxon: *Gerbillus*.

**Beni-Abbes**, Saoura Department (Map 5: 107).

Coordinates: 30°03'N, 02°13'W C (30°08'N, 02°10'W G, as Beni-Abbès).

Collector: L. W. Robbins (25–28 Feb 1971).

Habitat: "Airport . . . plateau or plain surrounded by sand dunes on three sides and the river valley on the west—some vegetation in low areas . . . sandy area around palm trees . . . rock pile next to camp . . . rocky hillsides."

Remarks: Robbins set up base camp on the west side of Beni-Abbes, across the river (presumably the Oued Saoura) and against some hills.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*, *Psammomys*.

**In Salah**, Oasis Department (Map 5: 111).

Coordinates: 27°12'N, 02°21'E C (27°13'N, 02°28'E G, as I-n-Salah).

Collector: L. W. Robbins (31 Mar 1971).

Habitat: "Dunes around palms . . . at the edge of town."

Taxon: *Gerbillus*.

**In Salah, 100 km SE**, Oasis Department (Map 5: 112).

Coordinates: 26°31'N, 02°53'E C.

Collector: L. W. Robbins (7 Mar 1971).

Habitat: "Wash with some bushes."

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Psammomys*.

**In Salah, 120 km SE**, Oasis Department (Map 5: 113).

Coordinates: 26°28'N, 03°13'E C.

Collector: L. W. Robbins (8–9 Mar 1971).

Habitat: "A large wash with many kinds of bushes and a few acacia trees—partially sandy . . . rocky hillside."

Remarks: Robbins left the camp at 100 km SE In Salah and "found some more bushes 40 km farther down the road." However, specimen labels and the field journal cite the distance as 120 km SE. This apparent discrepancy may result from Robbins' usage of straight-line rather than by-road distances.

Taxa: *Jaculus*, *Gerbillus*.

**Kerzaz, 72 km SE**, Saoura Department (Map 5: 108).

Coordinates: 28°57'N, 01°04'W C.

Collector: L. W. Robbins (2 Mar 1971).

Habitat: "Sandy vegetated wash—large flat sandy area with some small bushes—the end of a dry lake."

Taxa: *Gerbillus*, *Meriones*.

**Reggane, 40 km NE**, Oasis Department (Map 5: 110).

Coordinates: 26°50'N, 00°33'W C.

Collector: L. W. Robbins (4 Mar 1971).

Habitat: "Some vegetation—scattered through rocky areas and sand."

Taxon: *Gerbillus*.

**Reggane, 80 km NE**, Oasis Department (Map 5: 109).

Coordinates: 26°52'N, 00°58'W C.

Collector: L. W. Robbins (5 Mar 1971).

Habitat: "Fair number of small bushes in sand."

Remarks: Robbins remarked that "If the other [previous] area was desolate, this is more so. How do you get less than nothing[?]"

Taxon: *Jaculus*.

**Tamanrasset**, Oasis Department (Map 5: 126).

Coordinates: 22°47'N, 05°31'E G.

Collector: L. W. Robbins (24 Mar 1971).

Habitat: No information available.

Remarks: Robbins stayed in a campground on the west side of town. The colonial name for Tamanrasset is Fort Laperrine.

Taxa: *Gerbillus*, *Mus*.

**Tamanrasset, 8 km S**, Oasis Department (Map 5: 127).

Coordinates: 22°38'N, 05°36'E C.

Collector: L. W. Robbins (13 Mar 1971).

Habitat: "Some vegetation in wash surrounded by rocky hillsides."

Taxa: *Acomys*, *Gerbillus*, *Meriones*.

**Tamanrasset, 16 km SE**, Oasis Department (Map 5: 128).

Coordinates: 22°38'N, 05°44'E C.

Collector: L. W. Robbins (14–15 Mar 1971).

Habitat: "Bushy area."

Taxa: *Jaculus*, *Acomys*, *Gerbillus*, *Meriones*, *Psammomys*.

**Tamanrasset, 28 km NW**, Oasis Department (Map 5: 125).

Coordinates: 22°56'N, 05°25'E C.

Collector: L. W. Robbins (16 Mar 1971).

Habitat: "Sandy wash with many bushes and some rocky areas with sand and bushes around them."

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*.

**Tamanrasset, 33 km NW**, Oasis Department (Map 5: 124).

Coordinates: 22°58'N, 05°25'E C.

Collector: L. W. Robbins (23 Mar 1971).

Habitat: "Flat sandy wash on one side and a deeper rocky wash on the other—both had a fair amount of plants and trees."

Taxa: *Acomys*, *Gerbillus*.

**Tamanrasset, 40 km NNW**, Oasis Department (Map 5: 122).

Coordinates: 23°01'N, 05°25'E C.

Collector: L. W. Robbins (22 Mar 1971).

Habitat: "A sandy wash with a fair amount of small bushes and a few acacia trees."

Taxa: *Acomys*, *Gerbillus*, *Meriones*, *Psammomys*.

**Tamanrasset, 40 km NW**, Oasis Department (Map 5: 123).

Coordinates: 23°00'N, 05°16'E C.

Collector: L. W. Robbins (25 Mar 1971).

Habitat: "Vegetated wash."

Taxa: *Acomys*, *Gerbillus*, *Meriones*, *Pachyuromys*.

**Tamanrasset, 44 km NNW**, Oasis Department (Map 5: 121).

Coordinates: 23°06'N, 05°27'E C.

Collector: L. W. Robbins (17 Mar 1971).

Habitat: "Rocky area with a dry wash with vegetation."

Taxa: *Acomys*, *Gerbillus*, *Meriones*.

**Tamanrasset, 55 km N**, Oasis Department (Map 5: 120).

Coordinates: 23°12'N, 05°32'E C.

Collector: L. W. Robbins (18–19 Mar 1971).

Habitat: "Stream running through it and a fair amount of vegetation between the rocky mountain sides of the canyon . . . old farm area . . . brush on hillside."

Taxa: *Acomys*, *Gerbillus*, *Meriones*, *Massoutiera*; *Tadarida*.

**Tamanrasset, 70 km NW**, Oasis Department (Map 5: 119).

Coordinates: 23°10'N, 05°07'E C.

Collector: L. W. Robbins (26 Mar 1971).

Habitat: "Sandy wash."

Taxa: *Jaculus*, *Gerbillus*, *Pachyuromys*.

**Tamanrasset, 75 km S**, Oasis Department (Map 5: 129).

Coordinates: 22°04'N, 05°39'E C.

Collector: L. W. Robbins (4 Apr 1971).

Habitat: "A wash area with some bushes along sandy sides."

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*.

**Tamanrasset, 110 km NW**, Oasis Department (Map 5: 117).

Coordinates: 23°34'N, 05°07'E C.

Collector: L. W. Robbins (12 Mar 1971).

Habitat: "Vegetated wash."

Taxa: *Jaculus*, *Gerbillus*; *Pipistrellus*.

**Tamanrasset, 160 km S**, Oasis Department (Map 5: 130).

Coordinates: 21°19'N, 05°43'E C.

Collector: L. W. Robbins (5–6 Apr 1971).

Habitat: "Sparsely vegetated area."

Remarks: The team found a dead *Vulpes* at 200 km S Tamanrasset as they approached Niger to conduct field work in that country.

Taxa: *Jaculus*, *Gerbillus*; *Vulpes*.

**Tamanrasset, 170 km NW**, Oasis Department (Map 5: 118).

Coordinates: 24°07'N, 05°05'E C.

Collector: L. W. Robbins (27 Mar 1971).

Habitat: "Brushy wash . . . hummocks."

Taxa: *Gerbillus*, *Meriones*.

## NIGER

**GENERAL REMARKS.** Lynn W. Robbins was the mammal collector for all localities in Niger (Map 5) and was again joined by John Gruwell, who collected insects. Gruwell is not listed as a collector of any mammal specimens. Niger was the second country (after Algeria) in the so-called trans-Saharan collecting trip.

**ITINERARY.** L. W. Robbins: **48 km SE Assamaka**, 8 Apr 1971; **80 km SE Assamaka**, 9 Apr 1971; **140 km NW Agadez**, 10 Apr 1971; **5 km NE Agadez**, 12–15 Apr 1971; **70 km W Agadez**, 20 Apr 1971; **30 km S In-Gall**, 21 Apr 1971; **120 km S In-Gall**, 22 Apr 1971; **25 km S Tahoua**, 23 Apr 1971; **45 km NW Niamey**, 1 May 1971; **90 km SE Niamey**, 4 May 1971.

**Agadez, 5 km NE** (Map 5: 134).

Coordinates: 17°02'N, 08°02'E C.

Collector: L. W. Robbins (12–15 Apr 1971).

Habitat: "Many palm trees (two kinds) bordering a dry wash—sandy—but in our area it is off and on under cultivation with mango and citrus trees and some vegetable crops . . . rocky area near by . . . sandy area . . . open dirt area—some larger bushes."

Remarks: Camp was established at the local swimming pool, which was 7 km by road outside Agadez.

Taxa: *Acomys*, *Gerbillus*, *Taterillus*, *Arvicanthis*; *Paracichnus*.

**Agadez, 70 km W** (Map 5: 135).

Coordinates: 16°52'N, 07°23'E C.

Collector: L. W. Robbins (20 Apr 1971).

Habitat: "Slightly hilly area with a wash near by with a fair amount of vegetation (grasses, acacia and some other bushes) mostly sandy—very dark sand . . . rocky area near by."

Remarks: The collector's coordinates fall near Assaouas (16°52'N, 07°27'E G) according to a map consulted (AMS, *Agades*, 1:1,000,000).

Taxa: *Acomys*, *Gerbillus*.

**Agadez, 140 km NW** (Map 5: 133).

Coordinates: 17°22'N, 06°43'E C.

Collector: L. W. Robbins (10 Apr 1971).

Habitat: "An acacia area with bushes (grazed) in lower areas . . . a different ecological zone. The ground is sandy but there is a lot of acacia and grasses."

Remarks: This camp was located about 10 km SE "Tegguiddan-Tessoun" (Teguidda I-n-Tessoun; 17°26'N, 06°39'E G; also as Tedjidda-Tesemt on AMS, *Agades*, 1:1,000,000).

Taxa: *Jaculus*, *Gerbillus*.

**Assamaka, 48 km SE** (Map 5: 131).

Coordinates: 18°58'N, 05°58'E C.

Collector: L. W. Robbins (8 Apr 1971).

Habitat: "Some bushes."

Remarks: According to Robbins' journal, this camp was located "about 30 miles [48 km] SE of the border" with Algeria. The standardized USBGN spelling for Assamaka is Assamakka.

Taxa: *Jaculus*, *Gerbillus*.

**Assamaka, 80 km SE** (Map 5: 132).

Coordinates: 18°30'N, 06°00'E C.

Collector: L. W. Robbins (9 Apr 1971).

Habitat: "Some bushes."

Taxon: *Gerbillus*.

**In-Gall, 30 km S** (Map 5: 136).

Coordinates: 16°33'N, 06°52'E C.

Collector: L. W. Robbins (21 Apr 1971).

Habitat: "Savanna-like . . . varied area . . . some rocks, sandy area, flat—almost hamada area and a bushy non-sandy area with some trees."

Remarks: The standardized USBGN spelling for In-Gall is I-n-Gall.

Taxa: *Jaculus*, *Desmodilliscus*, *Gerbillus*, *Taterillus*.

**In-Gall, 120 km S** (Map 5: 137).

Coordinates: 15°45'N, 06°36'E C.

Collector: L. W. Robbins (22 Apr 1971).

Habitat: "A homogeneous savanna area—not much sand and areas of dense bush and grass—areas of open flats."

Taxa: *Jaculus*, *Gerbillus*, *Taterillus*, *Arvicanthis*.

**Niamey, 45 km NW** (Map 5: 140).

Coordinates: 13°48'N, 01°43'E C.

Collector: L. W. Robbins (1 May 1971).

Habitat: "Savanna without much variety."

Remarks: Robbins headed northwest from Niamey along the Niger River to reach this site.

Taxa: *Acomys*, *Desmodilliscus*, *Taterillus*, *Mus*.

**Niamey, 90 km SE** (Map 5: 139).

Coordinates: 13°06'N, 02°47'E C.

Collector: L. W. Robbins (4 May 1971).

Habitat: "A sandy area—some trees—palm bushes?"

Remarks: The AMP trans-Saharan collecting trip terminated at this locality.

Taxa: *Gerbillus*, *Mastomys*.

**Tahoua, 25 km S** (Map 5: 138).

Coordinates: 14°39'N, 05°22'E C.

Collector: L. W. Robbins (23 Apr 1971).

Habitat: "Old farm land, some trees and spaced bushes and a sandy hill with some vegetation."

Taxa: *Acomys*, *Desmodilliscus*, *Gerbillus*, *Taterillus*, *Mastomys*.

#### LIBYA

**GENERAL REMARKS.** The 84 cardinal localities in Libya (Map 6) document the field efforts of Setzer and Gary L. Ranck. Setzer alone undertook a short trip to Libya (Mar–May 1961) and briefly accompanied Ranck at the start of his 8-month expedition in the country (Nov 1961 to Jun 1962). The success of Ranck's fieldwork was materially and logistically dependent upon the assistance of the U.S. Army, based at Wheelus Air Force Base near Tripoli, as well as the U.S. Operations Mission (USOM, Department of State) based at Sebha and the British Army. The army was conducting a mapping project in Libya at the time of Ranck's survey, and he took advantage of the routes that convoys used during the course of their mapping project. This assistance facilitated an expedition into the interior desert that would have been otherwise impossible, and on more than one instance, an army convoy dramatically arrived to replenish dwindling supplies and alleviated concerned minds. Aiad Ali Elwinsi ("Ali" per Ranck's field journal) served as Ranck's field assistant for most of the Libyan survey (Nov 1961 to May 1962), and James H. Shaw later accompanied him to the Cyrenaican Plateau and environs in northeastern Libya (May–June 1962).

Coordinates referenced with a *P* are extracted from Ranck (1968) and are given as originally published.

**ITINERARIES.** H. W. Setzer: **Gasr es Sahabi**, 15 Mar 1961; **Bir el Harash**, 18 Mar 1961; **El Hauuari**, 20 Mar 1961; **El Giof**, 21–22 Mar 1961; **Ain Zueia**, 25–26 Mar 1961; **7 km SW Sebha**, 22 Apr 1961; **35 km W Messa**, 30 Apr 1961; **Cyrene**, 1 May 1961; **10 km SW El Faidia**, 3 May 1961; **7 km NE Slonta**, 4 May 1961; **11 km SW Susa**, 6 May 1961; **7 km E Maraua**, 7 May 1961; **10 km N Gerdes**, 8 May 1961; **2 km W Tocra**, 9 May 1961.

G. L. Ranck and H. W. Setzer: **3 km W Rumia**, 11 Nov 1961; **40 km ENE Nalut**, 12 Nov 1961; **40 km N Sinauen**, 13 Nov 1961; **5 km E Derg**, 14 Nov 1961; **55 km SW Bir Allagh**, 15 Nov 1961; **5 km N Mizda**, 16 Nov 1961; **20 km N Gharian**, 17 Nov 1961.

G. L. Ranck: **7 km S El Gheddahia**, 3 Dec 1961; **30 km S Bu Ngem**, 4 Dec 1961; **2 km SW Hun**, 5–6 Dec 1961; **Temenhint Oasis**, 8–10 Dec 1961; **El Abiad Oasis**, 12–15 Dec 1961; **75 km W Ubari**, 16 Dec 1961; **55 km SSW Serdeles**, 17 Dec 1961; **Ghat**, 18 Dec 1961; **El Barcat**, 19 Dec 1961; **Ghat**, 21–25 Dec 1961; **28 km E Murzuch**, 4 Jan 1962; **El Gatrun**, 6–11 Jan 1962; **Meseguín Oasis**, 13–15 Jan 1962; **Umm el Araneb**, 16 Jan 1962; **Traghen**, 17–18 Jan 1962; **6 km N Murzuch**, 19–20 Jan 1962; **Murzuch**, 21 Jan 1962; **Goddua**, 22–23 Jan 1962; **Wadi en Nesciua**, 23 Jan 1962; **26 km N Goddua**, 25 Jan 1962; **Sebha**, 30 Jan–3 Feb 1962; **Brach**, 5–8 Feb 1962; **Edri**, 9–10 Feb 1962; **Gebel Soda**, 12 Feb 1962; **20 km E Rumia**, 2–4 Mar 1962; **12 km S Chicla**, 5 Mar 1962; **25 km N Gharian**, 6 Mar 1962; **5 km E Sirte**, 12 Mar 1962; **4 km S Agedabia**, 13 Mar 1962; **Augila**, 14 Mar 1962; **Gialo Oasis**, 15–18 Mar 1962; **150 km S Gialo**, 19 Mar 1962; **Bir Bu Seregha**, 21–22 Mar 1962; **Bir el Harash**, 28–29 Mar 1962; **El Giof**, 31 Mar–3 Apr 1962; **El Hauuari**, 3–6 Apr 1962; **Bir el Harash**, 7–9 Apr 1962; **Tazerbo Oasis**, 11–15 Apr 1962; **El Gezira**, 16–17 Apr 1962; **Bzema Oasis**, 20 Apr 1962; **Bir Bu Seregha**, 29 Apr 1962; **Wadi er Rucis**, 29 Apr 1962; **Gebel el Harug el Asued**, 29 Apr–2 May 1962.

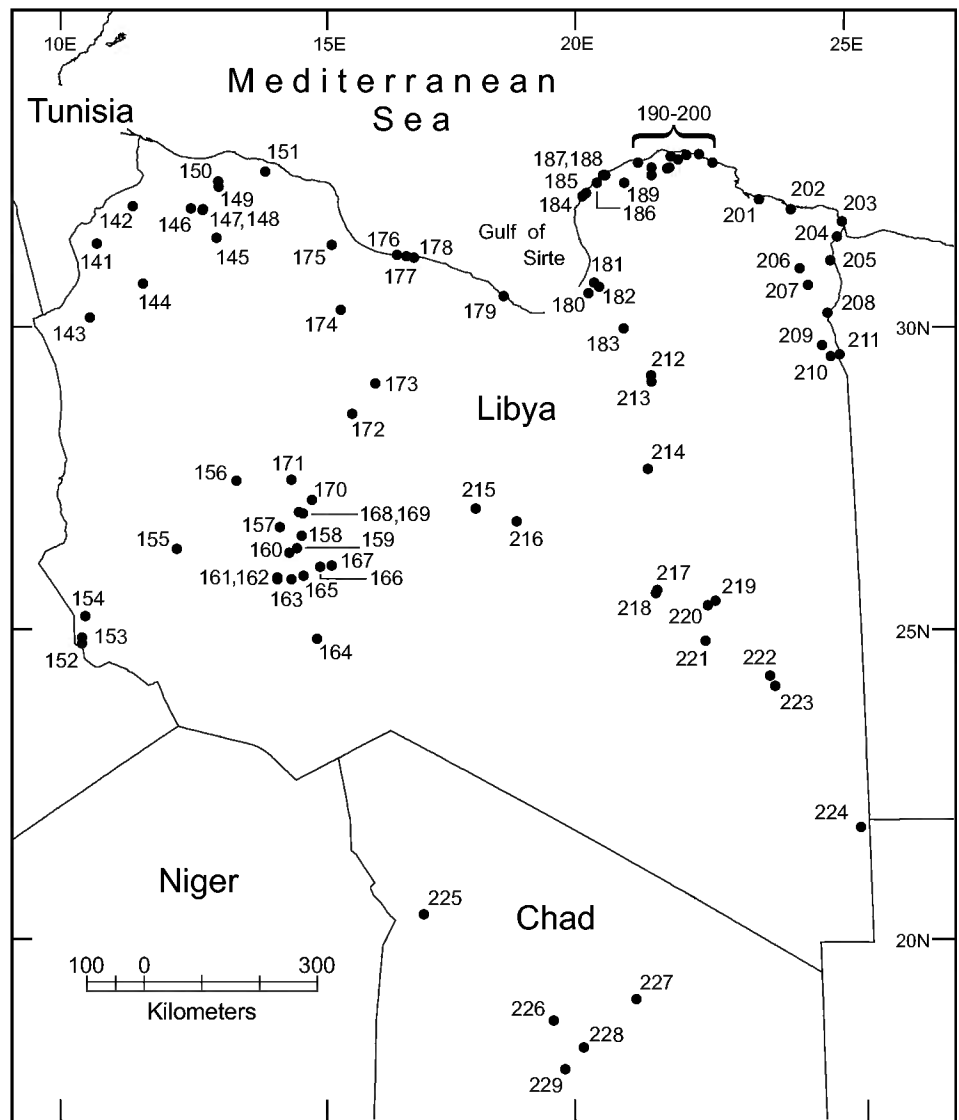
G. L. Ranck and J. H. Shaw: **Gulf of Sirte**, 20 May 1962; **20 km SW Agedabia**, 21 May 1962; **8 km N Benghazi**, 22 May 1962; **20 km SW Tocra**, 23 May 1962; **5 km NW Labrag**, 24 May 1962; **11 km E Ain el Gazala**, 25 May 1962; **60 km S Bir el Gobi**, 26 May 1962; **120 km N Giarabub**, 26 May 1962; **Giarabub**, 27 May 1962; **24 km SSE Giarabub**, 28 May 1962; **Bahr el Tubat**, 29 May 1962; **62 km N Giarabub**, 30 May 1962; **60 km S[SW] Fort Capuzzo**, 1 Jun 1962; **10 km SW Fort Capuzzo**, 1 Jun 1962; **5 km W Bardia**, 1–2 Jun 1962; **20 km E Tobruch**, 3–4 Jun 1962; **3 km E Derna**, 5 Jun 1962; **27 km E Apollonia**, 6–7 Jun 1962; **5 km NW Labrag**, 8–9 Jun 1962; **12 km NW Gubba**, 10 Jun 1962; **Wadi el Kuf**, 11 Jun 1962; **5 km W Tocra**, 12–14 Jun 1962; **2 km N Coefia**, 15–16 Jun 1962; **10 km S Agedabia**, 18–19 Jun 1962; **15 km WNW Marble Arch**, 20 Jun 1962; **12 km W Sirte**, 21 Jun 1962; **5 km W Cussabat**, 22–23 Jun 1962.

**Agedabia, 4 km S**, Cyrenaica Province (Map 6: 181).

Coordinates: 30°44'N, 20°14'E M (AMS, *Bengāsi-Āugila*, 1:1,000,000).

MAP 6. African Mammal Project cardinal collecting localities 141–229 in Libya and Chad.

- 141. Sinauen, 40 km N
- 142. Nalut, 40 km ENE
- 143. Derg, 5 km E
- 144. Bir Allagh, 55 km SW
- 145. Mizda, 5 km N
- 146. Rumia, 3 km W
- 147. Chicla, 12 km S
- 148. Rumia, 20 km E
- 149. Gharian, 20 km N
- 150. Gharian, 25 km N
- 151. Cussabat, 5 km W
- 152. El Barcat
- 153. Ghat
- 154. Serdeles, 55 km SSW
- 155. Ubari, 75 km W
- 156. Edri
- 157. El Abiad Oasis
- 158. Goddua, 26 km N
- 159. Goddua
- 160. Wadi en Nesciua
- 161. Murzuch, 6 km N
- 162. Murzuch
- 163. Murzuch, 28 km E
- 164. El Gatrun
- 165. Traghen
- 166. Umm el Araneb
- 167. Mesequin Oasis
- 168. Sebha
- 169. Sebha, 7 km SW
- 170. Temenhint Oasis
- 171. Brach
- 172. Gebel Soda
- 173. Hun, 2 km SW
- 174. Bu Ngem, 30 km S
- 175. El Gheddahia, 7 km S
- 176. Sirte, 12 km W
- 177. Sirte, 5 km E
- 178. Gulf of Sirte
- 179. Marble Arch, 15 km WNW
- 180. Agedabia, 20 km SW
- 181. Agedabia, 4 km S
- 182. Agedabia, 10 km S
- 183. Gasr es Sahabi
- 184. Benghazi, 8 km N
- 185. Coefia, 2 km N
- 186. Tocra, 20 km SW
- 187. Tocra, 2 km W
- 188. Tocra, 5 km W
- 189. Gerdes, 10 km N



- 190. Messa, 35 km W
- 191. Wadi el Kuf
- 192. Maraua, 7 km E
- 193. Slonta, 7 km NE
- 194. El Faidia, 10 km SW
- 195. Cyrene
- 196. Susa, 11 km SW
- 197. Labrag, 5 km NW
- 198. Gubba, 12 km NW
- 199. Apollonia, 27 km E
- 200. Derna, 3 km E
- 201. Ain el Gazala, 11 km E
- 202. Tobruch, 20 km E
- 203. Bardia, 5 km W
- 204. Fort Capuzzo, 10 km SW
- 205. Fort Capuzzo, 60 km S[SW]
- 206. Bir el Gobi, 60 km S
- 207. Giarabub, 120 km N
- 208. Giarabub, 62 km N
- 209. Giarabub
- 210. Giarabub, 24 km SSE
- 211. Bahr el Tubat
- 212. Augila
- 213. Gialo Oasis
- 214. Gialo, 150 km S
- 215. Gebel el Harug el Asued
- 216. Wadi er Rueis
- 217. Tazerbo Oasis
- 218. El Gezira
- 219. Bir Bu Seregha
- 220. Bir el Harash
- 221. Bzema Oasis
- 222. El Hauuari
- 223. El Giof
- 224. Ain Zueia
- 225. Zouar
- 226. Largeau, 95 km NW
- 227. Ounianga Kebir
- 228. Faya, 34 mi NE
- 229. Faya (Largeau)



Collector: G. L. Ranck (13 Mar 1962).  
 Habitat: "Heavily vegetated (with liliaceous species and other perennials) coastal plain . . . rich and varied flora of the coastal plain. Soil is alluvial."  
 Taxon: *Spalax*.

**Agedabia, 10 km S**, Cyrenaica Province (Map 6: 182).  
 Coordinates: 30°42'N, 20°19'E P.  
 Collectors: G. L. Ranck and J. H. Shaw (18–19 Jun 1962).  
 Habitat: "Sparsely vegetated area in region of encroaching sand. *Eucalyptus*, large grass and some clumpy perennials" (GLR).  
 Remarks: On 18 Jun, two specimens of *Jaculus* were collected 10 km SW Agedabia according to their specimen labels, although this was not indicated in Ranck's field catalog.  
 Taxa: *Jaculus*, *Gerbillus*, *Psammomys*.

**Agedabia, 20 km SW**, Cyrenaica Province (Map 6: 180).  
 Coordinates: 30°36'N, 20°07'E P.  
 Collectors: G. L. Ranck and J. H. Shaw (21 May 1962).  
 Habitat: "Vegetated hummocks and barren slopes of roadside—the substrate here was extremely hard and in many places cracks and fissures were present. Fleshy chenopods, several species of dry annuals and *Triticum* sp." (GLR).  
 Remarks: Ranck reported seeing several mole rat mounds a short distance from camp.  
 Taxa: *Spalax*, *Psammomys*.

**Ain el Gazala, 11 km E**, Cyrenaica Province (Map 6: 201).  
 Coordinates: 32°08'N, 23°31'E P.  
 Collectors: G. L. Ranck and J. H. Shaw (25 May 1962).  
 Habitat: "Very large hummocks supporting a species of thorn bush" (GLR).  
 Remarks: Ranck and Shaw encamped on the coast highway, about 8 km south of the Mediterranean and 89 km west of Tóbruch.  
 Taxa: *Gerbillus*, *Meriones*.

**Ain Zucia**, Gebel Uweinat, Cyrenaica Province (Map 6: 224).  
 Coordinates: 21°53'N, 24°50'E P (21°52'N, 24°50'E G, as 'Ayn Zuwayyah).  
 Collector: H. W. Setzer (25–26 Mar 1961).  
 Habitat: No information available.  
 Taxa: *Jaculus*, *Gazella*.

**Apollonia, 27 km E**, Cyrenaica Province (Map 6: 199).  
 Coordinates: 32°52'N, 22°25'E M (AMS, *Beda Littoria*, 1:250,000).  
 Collectors: G. L. Ranck and J. H. Shaw (6–7 Jun 1962).  
 Habitat: "Mesic niche near coastline. The source of this moisture is a sizable spring which exudes from a large wadi on the coastal escarpment . . . *Phragmites*, emergent grasses, date palms, large bushes (several species), and plantains (*Plantago*) . . . sedges, *Pinus* a species reminiscent of *Juniperus* (possibly *Cypressus*) several different species of evergreen shrubs . . . a habitat that is rocky in character and supports several species of evergreen trees and shrubs" (GLR).  
 Remarks: Ranck and Shaw camped at an "Italian Mission located near an impressive agricultural area known as 'viedi' [sic]," in close proximity to the source of a number of springs. This mesic area yielded their first shrew collected in Libya, a specimen of *Crocidura aleksandrisi* that according to the specimen label, originated from 20 km E Apollonia. They also collected their first *Rattus rattus* in this same lush environment. Apollonia is an archaic name for what is now Sūsah.

Taxa: *Gerbillus*, *Mus*, *Rattus*; *Crocidura*.

**Augila**, Gialo Oasis, Cyrenaica Province (Map 6: 212).  
 Coordinates: 29°09'N, 21°14'E P (29°06'N, 21°17'E G, as Awjilah).  
 Collector: G. L. Ranck (14 Mar 1962).  
 Habitat: "Debris-ridden sand at bases of date palms . . . sparsely vegetated dunes in midst of barren hamada . . . unidentified perennial and date palms . . . sandy areas at bases of date palms."  
 Remarks: Augila is the northernmost oasis of the Gialo complex. Ranck was forced to prepare specimens in his vehicle because of a raging sandstorm.  
 Taxon: *Gerbillus*.

**Bahr el Tubat**, 21 km ESE Giarabub, Cyrenaica Province (Map 6: 211).  
 Coordinates: 29°36'N, 24°53'E P (29°37'N, 24°51'E G, as Bahr al Tūbāt).  
 Collectors: G. L. Ranck and J. H. Shaw (29 May 1962).  
 Habitat: "Large vegetated hummocks and 'clumpy' vegetation in localized depression. Large woody perennial on hummocks, smaller, spiny perennial throughout depression . . . encrusted area supporting *Phragmites*. Plants—as before, plus *Phragmites* and occasional date palms" (GLR).

Remarks: Bahr el Tubat was described as a saline lake containing "crystalline clear" water in Ranck's journal. Ranck and Shaw collected two *Otonycteris* in their trapline among tall reeds.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*; *Otonycteris*.

**Bardia, 5 km W**, Cyrenaica Province (Map 6: 203).

Coordinates: 31°46'N, 25°06'E P.

Collectors: G. L. Ranck and J. H. Shaw (1–2 Jun 1962).

Habitat: "Large, flood resistant elevations of the wadi near the bottom of a large wadi. A thorny bushy perennial." (GLR).

Taxa: *Gerbillus*, *Psammomys*.

**Benghazi, 8 km N**, Cyrenaica Province (Map 6: 184).

Coordinates: 32°11'N, 20°06'E P.

Collectors: G. L. Ranck and J. H. Shaw (22 May 1962).

Habitat: "Hummocky areas of coastal plain about 1 km from the sea. Several species of succulent perennials" (Figure 28) (GLR).

Remarks: The team established camp on the outskirts of Benghazi on the road to Barce (Al Marj G) and Tocra.

Taxa: *Jaculus*, *Spalax*, *Gerbillus*, *Meriones*.

**Bir Allagh, 55 km SW**, Tripolitania Province (Map 6: 144).

Coordinates: 30°45'N, 11°31'E P.

Collectors: G. L. Ranck and H. W. Setzer (15 Nov 1961).

Habitat: "Very large hummocks supporting a species of thornbush" (GLR).

Remarks: The locality on two specimens is labeled as 55 km W Bir Allagh (Bi'r Allāq G).

Taxa: *Jaculus*, *Meriones*, *Pachyuromys*.



FIGURE 28. Libya, Benghazi, 8 km N: Coastal plain (photograph by G. L. Ranck, Mar 1962).

**Bir Bu Seregha**, Cyrenaica Province (Map 6: 219).

Coordinates: 25°34'N, 22°15'E G (as Bir Bu Zurayyiq; see Remarks).

Collector: G. L. Ranck (21–22 Mar, 29 Apr 1962).

Habitat: “The flora consists of only five trees—three date palms, one Eucalyptus, and one small castor bean tree [Figure 29]. Emergent grasses and annual or small perennial plants are totally lacking . . . in midst of barren hamada . . . by digging a very shallow hole in the base of the sand dune near camp, water could be readily obtained.”

Remarks: In his field catalog, Ranck referred to this locality as Bir Bu Zereigh, but he labeled his specimens as Bir Bu Seregha. The USBGN contains an entry for Bir Bu Zerreigh and gives its standardized spelling as Bir Bu Zurayyiq. Ranck camped in the midst of a “very small seep known as Bir Bu Seregha,” about 470

km south of Gialo. He described the bir as a “little mesic niche in the interior of this tremendous desert [that] is truly inviting.” Ranck’s trap success at this locality dropped to zero on 22 Mar, leading him to suppose that he had collected “most if not all of the active adults in this restricted habitat.” Later on the same date, Ranck set traps roughly 20 km N Bir Bu Seregha at a locality he described as “sparsely vegetated dunes in otherwise barren hamada” but without success. Ranck apparently passed through Bir Bu Seregha again on 29 Apr, collecting a single lizard (GLR 2114).

Taxa: *Jaculus*, *Gerbillus*.

**Bir el Gobi, 60 km S**, Cyrenaica Province (Map 6: 206).

Coordinates: 31°N, 24°13'E P.

Collectors: G. L. Ranck and J. H. Shaw (26 May 1962).



FIGURE 29. Libya, Bir Bu Seregha (Mar–Apr 1962).

Habitat: "Vegetation occupying the bottom of a shallow wadi. Shrubs, small clumpy perennials and a species of grass" (GLR).

Taxon: *Meriones*.

**Bir el Harash**, Cyrenaica Province (Map 6: 220).

Coordinates: 25°30'N, 22°06'E P, G.

Collectors: H. W. Setzer (18 Mar 1961); G. L. Ranck (28–29 Mar, 7–9 Apr 1962).

Habitat: "Large date palm . . . doubtlessly of great age. The traps were set among the debris and fallen fronds of several palm trees, all of which are old" (GLR).

Remarks: Ranck camped at an army base camp, located 16 km southwest of Bir el Harash. He noted that "this 'bir' is much more extensive than Bir Bu Seregha and the opportunities for trapping are vastly improved." He found poor trapping success on his first visit and

no success on his second visit. Tags on specimens collected by Setzer are labeled "Bir el Harash," while Ranck's are spelled "Bir el Harasc."

Taxa: *Jaculus*, *Gerbillus*.

**Brach**, Fezzan Province (Map 6: 171).

Coordinates: 27°33'N, 14°15'E P (27°32'N, 14°17'E G, as Birāk).

Collector: G. L. Ranck (5–8 Feb 1962).

Habitat: "Marshy area along flowing spring—emergent grasses and sedges . . . *Phragmites* [Figure 30] . . . clover (*Trifolium*) . . . debris and fallen palm fronds at bases of date palms . . . agricultural area (garden) . . . sandy area among isolated date palms . . . barren hamada."

Remarks: Ranck set up camp about 4 km west of what he referred to as the oasis headquarters. The area around Brach was so heavily populated that he had some



FIGURE 30. Libya, Brach: *Phragmites* growing near Brach, probably the most "lush" of all the Fezzanese oases (photograph by G. L. Ranck, Feb 1962).

difficulty in finding a camp site free of gardens. On 5 Feb, Ranck set traps in a large concentration of *Phragmites* “about 2 km from the campsite.”

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Mus*.

**Bu Ngem, 30 km S**, Tripolitania Province (Map 6: 174).

Coordinates: 30°19'N, 15°19'E P.

Collector: G. L. Ranck (4 Dec 1961).

Habitat: “Concentrations of sand dunes that support an occasional bush of *Calligonum*.”

Remarks: This camp was at the Wadi Ber el Chaib. To the west were “some prodigious dunes almost mountainous in character, that rise probably 500 feet [150 m].”

Taxon: *Gerbillus*.

**Bzema Oasis**, Cyrenaica Province (Map 6: 221).

Coordinates: 24°55'N, 22°02'E P, G.

Collector: G. L. Ranck (20 Apr 1962).

Habitat: “Date palms and sedge-like grass . . . extensive alkaline bog.”

Remarks: Bzema Oasis is located about 80 km southwest of Bir Bu Seregha in the Sand Sea of Rebiana (Ramlat Rabyānah G). Ranck was impressed with the isolation of the oasis and also its position within the “confines of the great sand sea.”

Taxon: *Gerbillus*.

**Chicla, 12 km S**, Tripolitania Province (Map 6: 147).

Coordinates: 31°57'N, 12°43'E M (AMS, *Tripoli-Socna*, 1:1,000,000).

Collector: G. L. Ranck (5 Mar 1962).

Habitat: “Clumps of grass associated with smaller emergent grasses—transient dunes and barren rocky areas are interspersed throughout the trap line . . . occasional liliaceous species.”

Remarks: Ranck unsuccessfully attempted to collect gundis south of Chicla (32°05'N, 12°42'E G, as Kiklah).

Taxa: *Gerbillus*, *Pachyuromys*, *Mus*.

**Coefia, 2 km N**, Cyrenaica Province (Map 6: 185).

Coordinates: 32°14'N, 20°11'E P.

Collectors: G. L. Ranck and J. H. Shaw (15–16 Jun 1962).

Habitat: “Vegetated hillocks interspersed with barren clay—sand patches . . . thorny annual, fleshy perennial reminiscent of *Salicornia* . . . Sandy area near coastline supporting *Vitrus*, *Ficus*, and *Calligonum*, sandy area bordering an extensive region of sedges and hillocks” (GLR).

Remarks: This site was situated between extensive coastal dunes and heavily vegetated dry lake beds. Ranck

and Shaw set a trapline in the coastal dunes and then another line in a patch of sedges about 1 km east of camp. They had their first success using steel traps and their first specimen of a sand fox when they collected a *Vulpes vulpes* in an elevated portion of the coastal plain. Trapping in the vegetated hillocks was also quite successful. The standardized USBGN spelling for Coefia is Al Kuwayfiah.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*; *Lepus*; *Vulpes*.

**Cussabat, 5 km W**, Tripolitania Province (Map 6: 151).

Coordinates: 32°35'N, 13°58'E P.

Collectors: G. L. Ranck and J. H. Shaw (22–23 Jun 1962).

Habitat: “Rocky outcroppings and sparsely vegetated slopes of large wadi. An occasional date palm, a small, narrow-leaved perennial being far more abundant . . . same as previous but confined entirely to cliffs and rocky outcroppings [Figure 31]. Narrow leafed perennial” (GLR).

Remarks: Ranck and Shaw camped in a large wadi to the west of Cussabat. Here they collected a good series of *Ctenodactylus*, and to Ranck’s great surprise, they also collected an *Elephantulus rozeti*, which he termed the most “valuable mammal taken to date.”

Taxa: *Elephantulus*; *Gerbillus*, *Mus*, *Ctenodactylus*.

**Cyrene**, Cyrenaica Province (Map 6: 195).

Coordinates: 32°50'N, 21°52'E G (as Shahhāt; see Remarks).

Collector: H. W. Setzer (1 May 1961).

Habitat: No information available.

Remarks: Shahhāt has replaced Cyrene as the name for this locality.

Taxon: *Mus*.

**Derg, 5 km E**, Tripolitania Province (Map 6: 143).

Coordinates: 30°12'N, 10°29'E P.

Collectors: G. L. Ranck and H. W. Setzer (14 Nov 1961).

Habitat: “Shallow ‘wadi’ bearing a few hillocks of sand and other areas of denuded, heterogeneous rocks and boulders . . . *Calligonum* sp. crowned sandy hummocks” (GLR).

Remarks: According to Ranck’s field journal, he and Setzer drove generally north from Derg, which direction disagrees with specimen labels for this locality.

Taxa: *Gerbillus*, *Meriones*, *Pachyuromys*; *Gazella*.

**Derna, 3 km E**, Cyrenaica Province (Map 6: 200).

Coordinates: 32°44'N, 22°40'E P.

Collectors: G. L. Ranck and J. H. Shaw (5 Jun 1962).



FIGURE 31. Libya, Cussabat, 5 km W (photograph by G. L. Ranck, Jun 1962).

Habitat: "Hard, rocky coastal plain bearing a scanty vegetative cover. Several species of clumpy perennials . . . sparsely growing wheat fields" (GLR).

Remarks: Ranck and Shaw selected a "denuded coastal plain to the east of town" for a campsite. In spite of the barrenness of the terrain, Ranck was surprised by the excellent trapping success. The standardized USBGN spelling for Derna is Darnah. In his publication, Ranck (1968) gave the locality modifier as "5 km SE," although all specimen labels site the locality as "3 km E." The former locality was visited by Setzer in 1955.

Taxa: *Gerbillus*, *Meriones*, *Mus*.

**Edri**, Fezzan Province (Map 6: 156).

Coordinates: 27°32'N, 13°12'E P (27°30'N, 13°16'E G, as Adirī).

Collector: G. L. Ranck (9–10 Feb 1962).

Habitat: "Sandy debris and fallen palm fronds, barren hamada, date palms . . . vegetated dunes, sandy de-

pression at bases of date palms in area of encroaching sand, barren hamada with scanty hillocks of *Tamarix* and unidentified perennial."

Remarks: In his journal, Ranck located the camp at Wadi esc Sciati (27°30'N, 13°15'E G), although specimen labels do not mention this name. A trapline was set about 1 km west of camp in some vegetated dunes, and another was set in some isolated *Tamarix* closer to camp.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*.

**El Abiad Oasis**, 60 km SW Sebha, Fezzan Province (Map 6: 157).

Coordinates: 26°46'N, 14°00'E P (26°45'N, 14°01'E G, as Al Abyad).

Collector: G. L. Ranck (12–15 Dec 1961).

Habitat: "Sandy soil associated with debris and fallen palm fronds at bases of date palms (*P. dactylifera*) [Figure 32] . . . *Tamarix* . . . localized rock strewn area surrounded by barren sandy plain . . . Isolated dunes bearing scanty vegetation."



FIGURE 32. Libya, El Abiad Oasis (photograph by G. L. Ranck, Dec 1961).

Remarks: On 12 Dec, Ranck secured the aid of a Bedouin to guide them to a location frequented by fennecs; they had no luck in trapping or smoking them out.

Taxa: *Jaculus*, *Gerbillus*.

**El Barcat**, Fezzan Province (Map 6: 152).

Coordinates: 24°53'N, 10°11'E G.

Collector: G. L. Ranck (19, 25 Dec 1961).

Habitat: "Vegetated dunes. Unknown grass, date palms, *Tamarix*, and *Calotropus* (milkweed-tree-like)."

Remarks: Ranck made collections at El Barcat while camped at **Ghat** (18–25 Dec). On 20 Dec, he and Ali hired a local resident to guide them into the interior of the gebel to collect Barbary sheep (*Ammotragus lervia*), but they had no success. Ranck purchased a *Canis aureus* at Ghat that was collected at El Barcat by a local resident on 25 Dec.

Taxa: *Acomys*, *Gerbillus*; *Canis*.

**El Faidia, 10 km SW**, Cyrenaica Province (Map 6: 194).

Coordinates: 32°39'N, 21°50'E M (AMS, *Bengāsi*, 1:1,000,000).

Collector: H. W. Setzer (3 May 1961).

Habitat: No information available.

Remarks: Coordinates for El Faidia are 32°41'N, 21°54'E G (as Al Fā'idīyah).

Taxon: *Mus*.

**El Gatrun**, Fezzan Province (Map 6: 164).

Coordinates: 24°57'N, 14°39'E P (24°56'N, 14°38'E G, as Al Qaṭrūn).

Collector: G. L. Ranck (6–11 Jan 1962).

Habitat: "Sand and fallen fronds at bases of date palms . . . vegetated dunes . . . large dunes supporting date palms [Figure 33] . . . clumps of *Tamarix*."

Remarks: Ranck described the difficult approach to El Gatrun: "Throughout the entire course of this vast



FIGURE 33. Libya, El Gatrun (photograph by G. L. Ranck, Jan 1962).

sand sea (150 km) there is not even the slightest irregularity in the landscape.” Camp was situated 4 km south of the village near the oasis. During their stay they drove to several trapping sites up to 2 km from camp, although the locality of all specimens is designated El Gatrun. Half of their trapping success can be attributed to the specimens provided by one of the townsmen.

Taxa: *Eliomys*, *Jaculus*, *Gerbillus*, *Meriones*; *Canis*.

**El Gezira**, Tazerbo Oasis, Cyrenaica Province  
(Map 6: 218).

Coordinates: 25°42'N, 21°07'E G.

Collector: G. L. Ranck (16–17 Apr 1962).

Habitat: “Undulating, sandy plain supporting a yellowish brown grass in form of stubble . . . debris ridden sandy areas at bases of date palms.”

Remarks: On 15 Apr, Ranck and Ali located El Gezira, “the largest and best known oasis in the Tazerbo system,” which was situated deep in the interior of

Tazerbo Oasis. They made camp there and set out a trapline among the litter and debris associated with some dense concentrations of palms.

Taxa: *Jaculus*, *Gerbillus*.

**El Gheddahia**, 7 km S, Tripolitania Province  
(Map 6: 175).

Coordinates: 31°23'N, 15°12'E P.

Collector: G. L. Ranck (3 Dec 1961).

Habitat: “Semi-denuded wadi with sporadic clumps of vegetation . . . *Calligonum* sp., thornbush, fleshy chenopod . . . and other woody chenopods.”

Remarks: The standardized USBGN spelling for El Gheddahia is Al Qaddāhiyah.

Taxa: *Jaculus*, *Pachyuromys*, *Mus*.

**El Giof**, Cufra Oasis, Cyrenaica Province (Map 6: 223).

Coordinates: 24°11'N, 23°19'E P (24°12'N, 23°18'E G, as Al Jawf).



Collectors: H. W. Setzer (21–22 Mar 1961); G. L. Ranck (31 Mar–3 Apr 1962).

Habitat: “An extensive area of marsh and bog . . . marshy area near open water . . . sparsely vegetated plain and litter associated with date palms . . . species of grass . . . sandy area associated with date palms, marshy area at margins of slough . . . rushes and sedges” (GLR).

Remarks: The USBGN spelling for Cufra Oasis is Al Kufrah.

Taxa: *Jaculus*, *Acomys*, *Gerbillus*, *Mus*.

**El Hauuari**, Cufra Oasis, Cyrenaica Province (Map 6: 222).

Coordinates: 24°21'N, 23°14'E P (24°19'N, 23°10'E G, as Al Hawwārī).

Collectors: H. W. Setzer (20 Mar 1961); G. L. Ranck (3–6 Apr 1962).

Habitat: “Sandy areas at bases of palm trees, sparsely vegetated dunes . . . date palms, small dried perennials, mesic area near marsh with sedges or rushes” (GLR).

Remarks: Promptly upon arriving at El Hauuari, Ranck collected a fennec near the western margin of the oasis, close to where they camped and where the palms gave way to the open desert. On the evening of the 5 Apr 1962, Ranck drove to the interior of the oasis to set a trapline among the vegetation near the marsh.

Taxa: *Jaculus*, *Gerbillus*, *Mus*; *Vulpes*.

**Fort Capuzzo, 10 km SW**, Cyrenaica Province (Map 6: 204).

Coordinates: 31°31'N, 24°59'E P.

Collectors: G. L. Ranck and J. H. Shaw (1 Jun 1962).

Habitat: “Sandy depression in tablelands near the coast—transition desert . . . shrub-like perennials. The soil here, unlike that of the surrounding tablelands, is of a sandy character” (GLR).

Remarks: The AMP party camped “abreast the tablelands that abut upon the coastal plain a few kilometers to the north.” Fort Capuzzo (31°35'N, 25°03'E G 1958, as Ridotta Capuzzo) has been replaced by the settlement now known as Musā'id (31°36'N, 25°03'E G).

Taxa: *Jaculus*, *Gerbillus*, *Meriones*.

**Fort Capuzzo, 60 km S[SW]**, Cyrenaica Province (Map 6: 205).

Coordinates: 31°08'N, 24°49'E M (WAC, *Libyan Plateau*, 1:1,000,000).

Collectors: G. L. Ranck and J. H. Shaw (1 Jun 1962).

Habitat: No information available.

Remarks: This locality should be properly indicated as SSW of Fort Capuzzo (Ridotta Capuzzo on WAC); 60 km due south places the locality in Egypt.

Taxon: *Lepus*.

**Gasr es Sahabi**, Cyrenaica Province (Map 6: 183).

Coordinates: 30°01'N, 20°45'E P (30°01'N, 20°48'E G, as Hisn as Sahābī).

Collector: H. W. Setzer (15 Mar 1961).

Habitat: No information available.

Taxon: *Gerbillus*.

**Gebel el Harug el Asued**, 200 km SE Zella, Cyrenaica Province (Map 6: 215).

Coordinates: 27°05'N, 17°45'E P (27°00'N, 17°10'E G).

Collector: G. L. Ranck (29 Apr–2 May 1962).

Habitat: “A sparsely vegetated wadi [with a] hard packed substrate . . . *Acacia* and a species of very dry grass.”

Remarks: Ranck's field catalog and labels for the *Ammotragus* and *Gazella* specimens include the additional locality modifier Wadi Bel Hed An, although this place-name is not indicated on the *Gerbillus* labels.

Taxa: *Gerbillus*; *Gazella*, *Ammotragus*.

**Gebel Soda**, 60 km S Socna, Tripolitania Province (Map 6: 172).

Coordinates: 28°37'N, 15°28'E P (28°40'N, 15°30'E G, as Jabal as Sawdā').

Collector: G. L. Ranck (12 Feb 1962).

Habitat: “Small wadi in midst of barren rocks . . . sporadic distribution of *Acacia* and other small perennials.”

Remarks: In his field journal, Ranck placed his camp at the “southern ramparts of the Gebel es Soda.”

Taxon: *Gerbillus*.

**Gerdes, 10 km N**, Cyrenaica Province (Map 6: 189).

Coordinates: 32°24'N, 20°56'E P.

Collector: H. W. Setzer (8 May 1961).

Habitat: No information available.

Remarks: The standardized USBGN spelling for Gerdes is Gerdes el-Abīd.

Taxa: *Gerbillus*; *Lepus*.

**Gharian, 20 km N**, Tripolitania Province (Map 6: 149).

Coordinates: 32°20'N, 13°03'E M (AMS, *Tripoli-Socna*, 1:1,000,000).

Collectors: G. L. Ranck and H. W. Setzer (17 Nov 1961).

Habitat: “Thornbush associated with wadi” (GLR).

Remarks: Coordinates for Gharian are 32°10'N, 13°01'E G (as Gharyān).

Taxon: *Gerbillus*.

**Gharian, 25 km N**, Tripolitania Province (Map 6: 150).

Coordinates: 32°25'N, 13°03'E P.

Collector: G. L. Ranck (6 Mar 1962).

Habitat: "Vegetated dunes, large grass."

Remarks: Ranck descended the escarpment at Jefren and camped near the base of the escarpment north of Gharian, on the coastal lowlands. Specimen labels from this locality are misspelled as "Garian."

Taxa: *Jaculus*, *Gerbillus*.

**Ghat**, Fezzan Province (Map 6: 153).

Coordinates: 24°58'N, 10°11'E G.

Collector: G. L. Ranck (18, 21–25 Dec 1961).

Habitat: "Sandy areas at bases of palm trees and *Tamarix* . . . vegetated dunes, debris strewn depressions at bases of date palms and *Tamarix* . . . sandy areas at bases of *Acacia* trees . . . sandy areas with rocky outcrops."

Remarks: Most specimens were taken in the immediate vicinity of Ghat. On 24 Dec, a few were collected at 20 km N Ghat (25°08'N, 10°11'E P) according to specimen labels; this locality is not mentioned in Ranck's catalog or journal. On 25 Dec, collections were made 12 km N Ghat in "vegetated dunes in a small wadi with *Acacia* and an unidentified grass." Ranck's field catalog for 18 Dec contains an interrupted sequence for locality series: field numbers 1,065–1,079 and 1,116–1,124 refer to specimens taken at Ghat, whereas numbers 1,080–1,115 were assigned to those obtained on 16 and 17 Dec at **75 km W Ubari** and **55 km SSW Serdeles**, respectively.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*.

**Gialo Oasis**, Cyrenaica Province (Map 6: 213).

Coordinates: 29°15'N, 21°14'E P (29°02'N, 21°33'E G, as Jālū).

Collector: G. L. Ranck (15–18 Mar 1962).

Habitat: "Debris-ridden sand at bases of date palms . . . sparsely vegetated dunes in midst of barren hamada . . . unidentified perennial."

Remarks: Ranck and Ali camped near some *Tamarix* and date palms in the central part of the oasis. A raging sandstorm had little effect upon their trapping success as they collected a large series of rodents. On the evening of 15 Mar, they trapped in the dunes and palms

close to camp and in the dunes at the periphery of the oasis.

Taxa: *Jaculus*, *Gerbillus*.

**Gialo, 150 km S**, Cyrenaica Province (Map 6: 214).

Coordinates: 27°43'N, 21°05'E P.

Collector: G. L. Ranck (19 Mar 1962).

Habitat: "Barren hamada . . . vegetation: none."

Remarks: This camp was located "in the interior of the Serir of Calanscio" (Sarīr Kalanshiyū G) along the main Cufra track.

Taxon: *Gerbillus*.

**Giarabub**, Cyrenaica Province (Map 6: 209).

Coordinates: 29°45'N, 24°33'E P (29°45'N, 24°31'E G, as Al Jaghbūb).

Collectors: G. L. Ranck and J. H. Shaw (27 May 1962).

Habitat: "Sandy areas at bases of isolated date palms . . . *Tamarix* and a fleshy succulent perennial—probably a chenopod" (GLR).

Remarks: Ranck and Shaw set up camp in a sandy depression near the oasis.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Mus*.

**Giarabub, 24 km SSE**, Cyrenaica Province (Map 6: 210).

Coordinates: 29°34'N, 24°42'E P.

Collectors: G. L. Ranck and J. H. Shaw (28 May 1962).

Habitat: "Large vegetated hummocks and 'clumpy' vegetation in localized depression . . . large woody perennial on hummocks, smaller, spiny perennial throughout depression" (GLR).

Taxa: *Jaculus*, *Gerbillus*, *Meriones*.

**Giarabub, 62 km N**, Cyrenaica Province (Map 6: 208).

Coordinates: 30°17'N, 24°29'E M (WAC, *Libyan Plateau*, 1:1,000,000).

Collectors: G. L. Ranck and J. H. Shaw (30 May 1962).

Habitat: No information available.

Taxon: *Gazella*.

**Giarabub, 120 km N**, Cyrenaica Province (Map 6: 207).

Coordinates: 30°47'N, 24°18'E M (WAC, *Libyan Plateau*, 1:1,000,000).

Collectors: G. L. Ranck and J. H. Shaw (26 May 1962).

Habitat: No information available.

Taxon: *Gazella*.

**Goddua**, Fezzan Province (Map 6: 159).

Coordinates: 26°25'N, 14°19'E P (26°26'N, 14°18'E G, as Ghaddūwah).

Collector: G. L. Ranck (22–23 Jan 1962).  
 Habitat: “Large dunes supporting heavy growths of date palms.”  
 Taxa: *Eliomys*, *Gerbillus*, *Mus*; *Vulpes*.

**Goddua, 26 km N**, Fezzan Province (Map 6: 158).  
 Coordinates: 26°38'N, 14°25'E P.  
 Collector: G. L. Ranck (25 Jan 1962).  
 Habitat: No information available.  
 Taxon: *Meriones*.

**Gubba, 12 km NW**, Cyrenaica Province (Map 6: 198).  
 Coordinates: 32°51'N, 22°10'E P.  
 Collectors: G. L. Ranck and J. H. Shaw (10 Jun 1962).  
 Habitat: “Numerous aquatic types of plants including *Typha* sedges and emergent grasses . . . on wadi slopes a bushy species . . . mesophytic vegetation associated with flowing stream and vegetated slopes of same wadi” (GLR).  
 Remarks: Ranck and Shaw trapped here at a large wadi that penetrated the coastal scarp. The archaic name for Gubba is Giovanni Berta and the Arabic name is Al Qubbah.  
 Taxa: *Jaculus*, *Gerbillus*, *Mus*, *Rattus*; *Lepus*.

**Gulf of Sirte, 20 km E Sirte**, Tripolitania Province (Map 6: 178).  
 Coordinates: 31°11'N, 16°47'E P.  
 Collectors: G. L. Ranck and J. H. Shaw (20 May 1962).  
 Habitat: “Sandy areas adjacent to beach . . . date palms, *Vitis* (wild grapes), a species of sedge, and a succulent plant” (GLR).  
 Remarks: The standardized USBGN spelling of Sirte is Surt.  
 Taxon: *Mus*.

**Hun, 2 km SW**, Tripolitania Province (Map 6: 173).  
 Coordinates: 29°07'N, 15°55'E P.  
 Collector: G. L. Ranck (5–6 Dec 1961).  
 Habitat: “Large hillocks of sand (8–10 feet [2.4–3.0 m] high) supporting dense growths of an unidentified woody perennial (averaging 2 feet [0.6 m] in height) [Figure 34]—vegetated dunes . . . pure stand of *Tamarix* [on one of the hillocks] . . . isolated date palms, *Phoenix dactylifera*.”  
 Remarks: Ranck noted that Hun was at the northern ramparts of the **Gebel Soda**. Because of the “rich yield” from the first night’s trapline, he decided to remain at this site another evening.  
 Taxa: *Jaculus*, *Gerbillus*, *Meriones*; *Vulpes*.

**Labrag, 5 km NW**, Cyrenaica Province (Map 6: 197).  
 Coordinates: 32°49'N, 21°57'E M (WAC, *Kriti (West)*, 1:1,000,000).  
 Collectors: G. L. Ranck and J. H. Shaw (24 May, 8–9 Jun 1962).  
 Habitat: “Vegetated plain—hard impervious soil . . . clumpy perennials . . . localized seep in bottom of large wadi and densely vegetated slopes of same wadi near seep—species similar to watercress on slopes . . . several bushy species, one resembling manzanita . . . vegetated uplands in region containing ruins of the ancient Greek civilizations—Cirene . . . large thistle and a thorny-bush-like perennial” (GLR).  
 Remarks: The single *Gerbillus* specimen taken on the 24 May visit was labeled as 4 km W Labrag (Al Abraç G), and a *Pipistrellus pipistrellus* taken on 8 Jun was labeled 5 km SW Labrag. The locality on all other specimens appears as “5 km NW Labrag.” We estimated our coordinates relative to the map point identified by the USBGN coordinates given for Labrag (32°47'N, 22°00'E G, as Al Abraç).  
 Taxa: *Jaculus*, *Spalax*, *Gerbillus*, *Mus*; *Lepus*; *Pipistrellus*; *Vulpes*.

**Maraua, 7 km E**, Cyrenaica Province (Map 6: 192).  
 Coordinates: 32°31'N, 21°28'E P.  
 Collector: H. W. Setzer (7 May 1961).  
 Habitat: No information available.  
 Remarks: The standardized USBGN spelling for Maraua is Marāwah.  
 Taxa: *Meriones*, *Mus*.

**Marble Arch, 15 km WNW**, Tripolitania Province (Map 6: 179).  
 Coordinates: 30°33'N, 18°28'E P.  
 Collectors: G. L. Ranck and J. H. Shaw (20 Jun 1962).  
 Habitat: “Bottom and slopes of large wadi—large, conspicuous vegetated hillocks of sandy-clay composition in wadi proper—this vegetative pattern transforms on the margins of the wadi to a more close-growing type supported on small mounds of sandy-clay. In one section of the trapline numerous small rocks are scattered throughout the area and loose, uncompacted sand is present . . . thorny perennial (large hummocks), *Calligonum* (small mounds), other woody perennials” (GLR).  
 Remarks: The AMP crew selected a large wadi near the point where it emerged onto the coastal plain to set up their camp. The Marble Arch is referred to in Arabic as Al Qaws.  
 Taxa: *Jaculus*, *Gerbillus*, *Meriones*, *Pachyuromys*; *Vulpes*.



FIGURE 34. Libya, Hun, 2 km SW: Vegetated “hummock”—thorny perennial, burrows abundant; traps yield *G. gerbillus* and *Meriones* (photograph by G. L. Ranck, Dec 1961).

**Meseguín Oasis**, Fezzan Province (Map 6: 167).  
 Coordinates: 26°09'N, 14°58'E *P* (26°08'N, 14°58'E *G*,  
 as Meseqwīn).  
 Collector: G. L. Ranck (13–15 Jan 1962).  
 Habitat: “Sand and fallen palm fronds . . . scantily veg-  
 etated sand hillocks . . . date palms and unidentified  
 perennial . . . thorny perennial.”  
 Remarks: The camp at Meseguín Oasis was located about  
 15 km west of Zuila (26°10'N, 15°07'E *G*).  
 Taxa: *Gerbillus*, *Meriones*, *Mus*.

**Messa, 35 km W**, Cyrenaica Province (Map 6: 190).  
 Coordinates: 32°44'N, 21°13'E *P*.  
 Collector: H. W. Setzer (30 Apr 1961).  
 Habitat: No information available.  
 Remarks: The standardized USBGN spelling of Messa is  
 Massah.  
 Taxon: *Mus*.

**Mizda, 5 km N**, Tripolitania Province (Map 6: 145).  
 Coordinates: 31°30'N, 12°59'E *P*.  
 Collectors: G. L. Ranck and H. W. Setzer (16 Nov 1961).  
 Habitat: “Large eroded wadi, occasional large hummocks  
 . . . two species of thornbush” (GLR).  
 Remarks: The standardized USBGN spelling of Mizda is  
 Mizdah.  
 Taxa: *Gerbillus*, *Meriones*.

**Murzuch**, Fezzan Province (Map 6: 162).  
 Coordinates: 25°55'N, 13°55'E *P* (25°54'N, 13°54'E *G*,  
 as Murzuq).  
 Collector: G. L. Ranck (21 Jan 1962).  
 Habitat: “Sandy areas associated with date palms . . .  
 actually a date orchard.”  
 Remarks: More than half of the specimens obtained at this  
 locality were given to Ranck by local residents.  
 Taxa: *Jaculus*, *Gerbillus*, *Mus*.

**Murzuch, 6 km N**, Fezzan Province (Map 6: 161).

Coordinates: 25°57'N, 13°55'E M (AMS, *Sebha*, 1:1,000,000).

Collector: G. L. Ranck (19–20 Jan 1962).

Habitat: “Sandy-clay hillocks and debris beneath date palms . . . unidentified perennial . . . *Tamarix* and miscellaneous other woody shrubs. [This oasis featured a] type of ‘playa’ lake similar to those of the American west—salt crystals are abundant . . . ‘open’ water.”

Taxa: *Gerbillus*; *Lepus*.

**Murzuch, 28 km E**, Fezzan Province (Map 6: 163).

Coordinates: 25°55'N, 14°12'E P.

Collector: G. L. Ranck (4 Jan 1962).

Habitat: “Hillocks supporting date palms.”

Taxa: *Eliomys*, *Gerbillus*, *Meriones*, *Mus*.

**Nalut, 40 km ENE**, Tripolitania Province (Map 6: 142).

Coordinates: 32°01'N, 11°22'E P.

Collectors: G. L. Ranck and H. W. Setzer (12 Nov 1961).

Habitat: “Sandy with numerous hummocks . . . *Calligonum* sp.” (GLR).

Taxa: *Jaculus*, *Gerbillus*, *Meriones*.

**Rumia, 3 km W**, Tripolitania Province (Map 6: 146).

Coordinates: 31°59'N, 12°30'E P.

Collectors: G. L. Ranck and H. W. Setzer (11 Nov 1961).

Habitat: “Clay . . . rocky areas containing scanty vegetation . . . transient dunes . . . woody chenopods, a distinct liliaceous species confined largely to the dunes, small ephemerals” (GLR).

Remarks: Camp was established “near the brink of the escarpment” that separated the coastal plain from the interior plateau. The standardized USBGN spelling for Rumia is Ar Rūmīyah.

Taxa: *Gerbillus*, *Pachyuromys*.

**Rumia, 20 km E**, Tripolitania Province (Map 6: 148).

Coordinates: 31°58'N, 12°44'E P.

Collector: G. L. Ranck (2–4 Mar 1962).

Habitat: “Rocky outcrops on sides of small wadi with occasional patches of shifting sand . . . boulder strewn habitat . . . occasional emergent grasses . . . liliaceous species [Figure 35], grasses, woody perennials.”

Remarks: Ranck camped “at the brink of the Gebel Jefren,” an area that provided favorable habitat for gundis. He thus devoted considerable effort to hunting and trapping for them and ultimately collected his first series here.

Taxa: *Jaculus*, *Gerbillus*, *Pachyuromys*, *Ctenodactylus*.

**Sebha, Fezzan Province** (Map 6: 168).

Coordinates: 27°00'N, 14°27'E P (27°02'N, 14°26'E G, as Sabhā).

Collector: G. L. Ranck (30 Jan–3 Feb 1962).

Habitat: “Sandy area associated with date palms . . . rock strewn mound . . . sandy hillocks supporting *Tamarix*.”

Remarks: On 2 Feb, traps were set about 3 km NW Sebha of the “oasis proper” in “sandy areas associated with date palms” and “sand encroaching upon ‘junk’ and other refuse.” The following day, a trapline was set 4 km N Sebha in a similar habitat, but the date palms here were larger and the sand was “of a much more suitable character.” Both locality variants are indicated on specimen labels.

Taxa: *Jaculus*, *Gerbillus*, *Mus*.

**Sebha, 7 km SW**, Fezzan Province (Map 6: 169).

Coordinates: 27°01'N, 14°22'E M (AMS, *Sebha*, 1:1,000,000).

Collector: H. W. Setzer (22 Apr 1961).

Habitat: No information available.

Taxa: *Jaculus*, *Gerbillus*.

**Serdeles, 55 km SSW**, Fezzan Province (Map 6: 154).

Coordinates: 25°19'N, 10°15'E P.

Collector: G. L. Ranck (17 Dec 1961).

Habitat: “Small dunes supporting grass.”

Remarks: The standardized USBGN spelling for Serdeles is Al 'Uwaynāt.

Taxa: *Jaculus*, *Gerbillus*, *Meriones*.

**Sinauen, 40 km N**, Tripolitania Province (Map 6: 141).

Coordinates: 31°24'N, 10°39'E P.

Collectors: G. L. Ranck and H. W. Setzer (13 Nov 1961).

Habitat: “Wind swept dunes interspersed with hard-packed pebbles . . . woody chenopods” (GLR).

Taxon: *Gerbillus*.

**Sirte, 5 km E**, Tripolitania Province (Map 6: 177).

Coordinates: 31°12'N, 16°38'E P.

Collector: G. L. Ranck (12 Mar 1962).

Habitat: “Compositae, leguminosae, etc.—large perennials . . . showy flowers.”

Remarks: The standardized USBGN spelling for Sirte is Surt.

Taxa: *Gerbillus*, *Pachyuromys*, *Mus*.

**Sirte, 12 km W**, Tripolitania Province (Map 6: 176).

Coordinates: 31°13'N, 16°27'E P.

Collectors: G. L. Ranck and J. H. Shaw (21 Jun 1962).

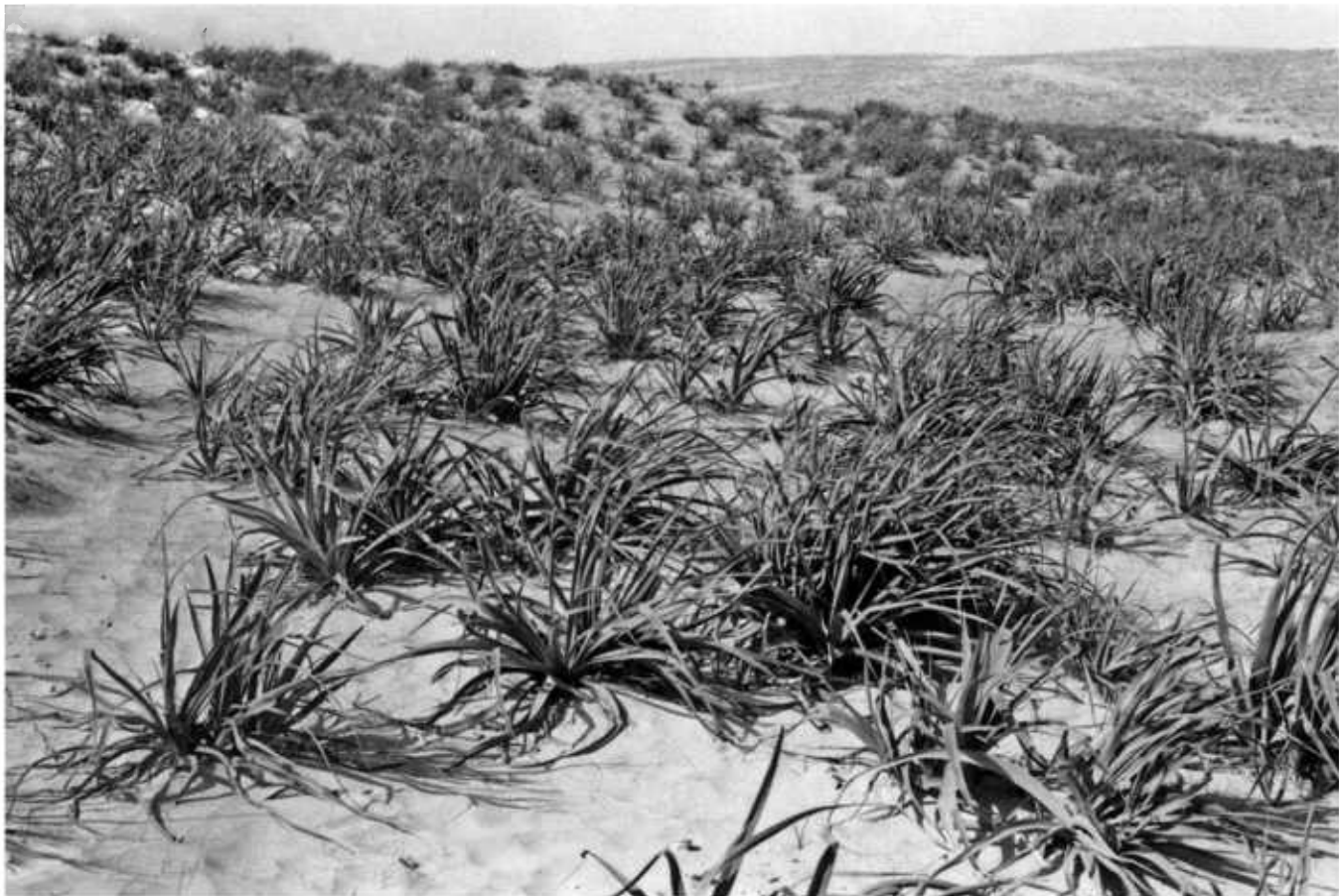


FIGURE 35. Libya, Rumia, 20 km E: Habitat demonstrating a single lilaceous species as the vegetative cover (photograph by G. L. Ranck, Mar 1962).

Habitat: "Depressed area near roadside containing small hillocks of clay-like material supporting perennial plants . . . *Calligonum*, woody perennial resembling *Atriplex*" (GLR).

Remarks: A trapline was set throughout the vegetated mounds close to camp.

Taxa: *Jaculus*, *Gerbillus*.

**Slonta, 7 km NE**, Cyrenaica Province (Map 6: 193).

Coordinates: 32°38'N, 21°47'E M (AMS, *Bengāsi-Āugila*, 1:1,000,000).

Collector: H. W. Setzer (4 May 1961).

Habitat: No information available.

Remarks: The standardized USBGN spelling for Slonta is Suluntah.

Taxon: *Gerbillus*.

**Susa, 11 km SW**, Cyrenaica Province (Map 6: 196).

Coordinates: 32°50'N, 21°52'E P.

Collector: H. W. Setzer (6 May 1961).

Habitat: No information available.

Remarks: The standardized USBGN spelling for Susa is Sūсах.

Taxa: *Gerbillus*, *Mus*.

**Tazerbo Oasis**, Cyrenaica Province (Map 6: 217).

Coordinates: 25°45'N, 21°09'E P.

Collector: G. L. Ranck (11–15 Apr 1962).

Habitat: "Date palms and a species of grass . . . debris laden sand at bases of date palms . . . densely packed grass in slightly mesic area . . . barren sand and vegetated dunes [Figure 36] . . . *Calligonum*, *Tamarix* and a species of woody perennial . . . mesic area adjacent



FIGURE 36. Libya, Tazerbo Oasis: *Acacia* and *Calligonum* (photograph by G. L. Ranck, Apr 1962).

to open water . . . sandy plain bearing a sparse vegetative cover . . . grassy stubble . . . sandy hillocks a short distance removed from the oasis proper . . . acacia and date palms near the camp . . . deep grass adjacent to some open pockets of water . . . a sparsely vegetated section of the plain a short distance from the oasis.”

Remarks: Ranck was initially uncertain about the location of his camp because of the absence of inhabitants, wondering whether he was located “on an outlying subsidiary of the main Tazerbo complex.” Ranck’s doubts were confirmed on 14 Apr: “El Gezira, the oasis headquarters, was easily located by driving in a northeasterly direction for about 15 miles [24 km]. Our present position on the extreme southwestern portion of the Tazerbo system is now quite clear” (center of this large oasis = 25°45’N, 21°00’E G).

Taxa: *Jaculus*, *Gerbillus*.

**Temenhint Oasis**, 30 km NE Sebha, Fezzan Province (Map 6: 170).

Coordinates: 27°13’N, 14°38’E P (27°13’N, 14°37’E G, as Tamanhint).

Collector: G. L. Ranck (8–10 Dec 1961).

Habitat: “Permanent sand dunes with date palms and *Tamarix*” (Figure 37).

Taxa: *Eliomys*, *Jaculus*, *Gerbillus*.

**Tobruch**, 20 km E, Cyrenaica Province (Map 6: 202).

Coordinates: 31°58’N, 24°08’E P.

Collectors: G. L. Ranck and J. H. Shaw (3–4 Jun 1962).

Habitat: “Scantily vegetated coastal plain with two species of ‘clumpy’ perennial are dominant” (Figure 38) (GLR).

Remarks: The first evening Ranck and Shaw collected three *Gerbillus henleyi*, which Ranck regarded of



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FIGURE 37. Libya, Temenhint Oasis: *Tamarix* and *Phoenix* (photograph by G. L. Ranck, Dec 1961).

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FIGURE 38. Libya, Tobruh, 20 km E: Coastal plain (photograph by G. L. Ranck, Jun 1962).

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considerable taxonomic and zoogeographical significance. Because of the rarity of this species, they decided to spend another night collecting at this locality. Shaw spelled the town as “Tobruk” (Ṭobruq G) on his specimen labels.

Taxa: *Gerbillus*, *Meriones*, *Psammomys*; *Lepus*; *Vulpes*.

**Tocra, 2 km W**, Cyrenaica Province (Map 6: 187).

Coordinates: 32°31'N, 20°34'E P.

Collector: H. W. Setzer (9 May 1961).

Habitat: No information available.

Remarks: The standardized USBGN spelling for Tocra is Tūkrah.

Taxon: *Jaculus*.

**Tocra, 5 km W**, Cyrenaica Province (Map 6: 188).

Coordinates: 32°31'N, 20°32'E M (AMS, *Bengāsi-Āugila*, 1:1,000,000).

Collectors: G. L. Ranck and J. H. Shaw (12–14 Jun 1962).

Habitat: “Densely vegetated coastal plain . . . *Tamarix*, a sedge and a large bushy perennial [Figure 39]” (GLR).

Remarks: Ranck and Shaw enjoyed unusually good trapping success at this locality, which included three specimens of a new shrew species (*Crocidura aleksandrisi* Vesmanis, 1977). The following day they collected three *Microtus*, which they had not collected previously. One *Mus* specimen collected on 12 Jun is labeled 12 km W Tocra, although Ranck’s field catalog indicates its locality as the same as the base camp.

Taxa: *Microtus*, *Gerbillus*, *Mus*; *Crocidura*.

**Tocra, 20 km SW**, Cyrenaica Province (Map 6: 186).

Coordinates: 32°24'N, 20°24'E P.

Collectors: G. L. Ranck and J. H. Shaw (23 May 1962).

Habitat: “Localized area of heterogeneous composition . . . reddish sand, boulders and hummocks. This rather narrow belt is bordered on the seaward side by alkaline lakes and halophytic plants. Inland it is continuous with the vast coastal plain composed of a hard, almost impervious clay. Vegetation: species reminiscent of *Salicornia*, some large shrubs and a dry



FIGURE 39. Libya, Tocra, 5 km W: Habitat consisting of dense growths of sedges, grasses, and *Tamarix* (photograph by G. L. Ranck, May 1962).

grass . . . large bushes, apparently only one species, are widespread over the entire area" (GLR).

Taxa: *Gerbillus*, *Mus*.

**Traghen**, Fezzan Province (Map 6: 165).

Coordinates: 25°59'N, 14°26'E P, G.

Collector: G. L. Ranck (17–18 Jan 1962).

Habitat: "Sandy areas at bases of date palms and *Tamarix* . . . debris beneath *Tamarix*."

Remarks: Ranck established camp 3 km west of the oasis proper and set a trapline 1 km from camp. Two nights of trapping yielded disappointing success.

Taxa: *Gerbillus*, *Meriones*, *Mus*.

**Ubari, 75 km W**, Fezzan Province (Map 6: 155).

Coordinates: 26°25'N, 12°02'E P.

Collector: G. L. Ranck (16 Dec 1961).

Habitat: "Wadi in midst of extensive barren hamada with *Hilaria* and *Acacia*."

Taxa: *Jaculus*, *Gerbillus*, *Meriones*.

**Umm el Araneb**, Fezzan Province (Map 6: 166).

Coordinates: 26°08'N, 14°45'E P, G.

Collector: G. L. Ranck (16 Jan 1962).

Habitat: "Sand . . . extensive concentrations of 'solitary' date palms."

Remarks: Ranck compared the habitat of Umm el Araneb to that of **Meseguïn Oasis**. Because of the marginal nature of the habitat, Ranck stayed here but a single night; trapping success, however, was greater than expected.

Taxon: *Gerbillus*.

**Wadi el Kuf**, 13 km WSW Messa, Cyrenaica Province (Map 6: 191).

Coordinates: 32°39'N, 21°29'E P (32°43'N, 21°36'E G).

Collectors: G. L. Ranck and J. H. Shaw (11 Jun 1962).

Habitat: "Chaparral vegetation on wadi slopes . . . *Cupressus*" (GLR).

Remarks: Specimens prepared by Ranck do not mention Wadi el Kuf but are instead labeled 13 km WSW Messa (32°45'N, 21°38'E G, as Massah). However, he did identify the locality as Wadi el Kuf in both his field catalog and his 1968 publication, and Shaw used this designation on his specimen labels.

Taxa: *Spalax*, *Gerbillus*.

**Wadi en Nesciua**, 20 km SW Goddua, Fezzan Province (Map 6: 160).

Coordinates: 26°21'N, 14°11'E G.

Collector: G. L. Ranck (23 Jan 1962).

Habitat: No information available.

Remarks: The standardized USBGN spelling for Goddua is Ghaddūwah.

Taxon: *Gazella*.

**Wadi er Rueis**, 340 km WNW Tazerbo, Cyrenaica Province (Map 6: 216).

Coordinates: 26°52'N, 18°31'E P (27°06'N, 19°24'E G).

Collector: G. L. Ranck (29 Apr 1962).

Habitat: "Wadi supporting sparse vegetative cover (acacia and a species of woody perennial) . . . substrate . . . hard impervious material."

Remarks: Ranck presumed that he was camped at Wadi er Rueis, draining north-northeast from the **Gebel el Harug el Asued**. The gebel was nowhere visible from his campsite, however.

Taxa: *Jaculus*, *Gerbillus*, *Pachyuromys*.

## CHAD

**GENERAL REMARKS.** Setzer collected briefly in Chad during a side excursion from his early work in Libya (Mar–May 1961). He apparently did not maintain a journal for this period, so the five localities visited (Map 6) are derived from specimen tags and his field catalog.

**ITINERARY.** H. W. Setzer: **Ounianga Kebir**, 30 Mar–1 Apr 1961; **34 mi NE Faya**, 3 Apr 1961; **Faya (Largeau)**, 5 Apr 1961; **95 km NW Largeau**, 6 Apr 1961; **Zouar**, 9–15 Apr 1961.

**Faya (Largeau)** (Map 6: 229).

Coordinates: 17°55'N, 19°07'E G (as Faya-Largeau).

Collector: H. W. Setzer (5 Apr 1961).

Habitat: No information available.

Remarks: Specimen labels indicate this locality as "Faya (Largeau)," whereas Setzer entered the locality as "Largeau (Faya)" in his field catalog.

Taxa: *Acomys*, *Gerbillus*.

**Faya, 34 mi [55 km] NE** (Map 6: 228).

Coordinates: 18°17'N, 19°28'E C.

Collector: H. W. Setzer (3 Apr 1961).

Habitat: No information available.

Remarks: According to his field catalog, Setzer collected a *Gazella* at 30 km NE Largeau on the same date, but the specimen was never cataloged into NMNH.

Taxon: *Gerbillus*.

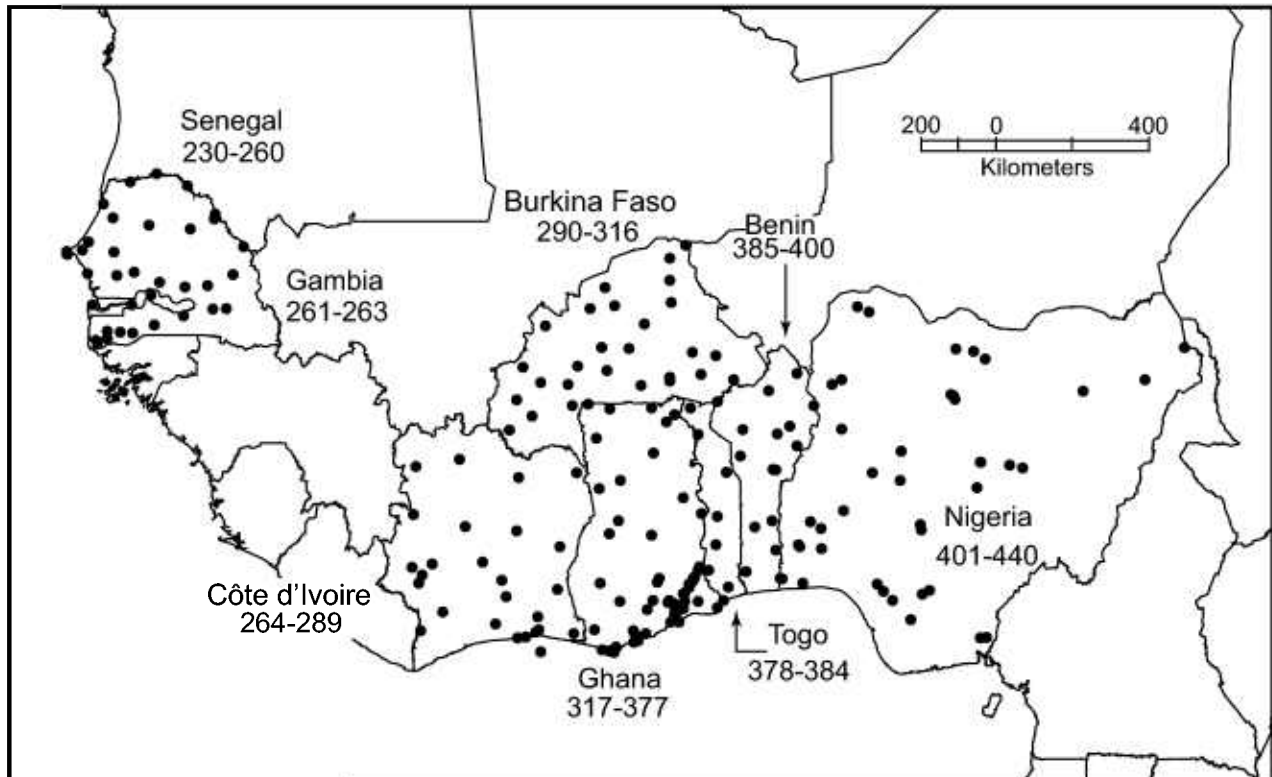
Largeau, 95 km NW (Map 6: 226).  
 Coordinates: 18°43'N, 18°56'E M (AMS, Darfur,  
 1:2,000,000).  
 Collector: H. W. Setzer (6 Apr 1961).  
 Habitat: No information available.  
 Taxon: *Gazella*.

Ounianga Kebir (Map 6: 227).  
 Coordinates: 19°04'N, 20°29'E G.  
 Collector: H. W. Setzer (30 Mar–1 Apr 1961).  
 Habitat: No information available.  
 Taxa: *Acomys*, *Gerbillus*; *Asellia*.

Zouar (Map 6: 225).  
 Coordinates: 20°27'N, 16°32'E G.  
 Collector: H. W. Setzer (9–15 Apr 1961).  
 Habitat: No information available.  
 Remarks: On 11 Apr, a *Papio* (USNM 319631) was col-  
 lected at 18 km NE Zouar, but it cannot be found in  
 the collection. Setzer also collected 10 km NW Zouar  
 on 14 Apr.  
 Taxa: *Papio*; *Gerbillus*; *Lepus*; *Vulpes*; *Gazella*.

## WESTERN AFRICA

**GENERAL REMARKS.** Mammal inventory in western Africa was surprisingly broad (Map 7) and immensely successful (Table 6) owing to the intense efforts of 15 major collectors (Table 1) over the relatively short span of four years (Oct 1965 to Jul 1969). For whatever reason, field workers in western Africa devoted greater emphasis to collection of bats, and the abundance of Chiroptera mainly accounts for differences in specimen totals among regions (Tables 5, 6). Rosevear's (1965) *Bats of West Africa* is specifically mentioned by several collectors in their field journals, particularly in the context of describing habitats and designating biomes for their collecting area (e.g., R. M. Davis, J. C. Geest, H. J. Herbert, J. W. LeDuc, and C. B. Robbins). As a result, a majority of cardinal localities in western Africa are characterized using Rosevear's terminology of High Forest and Guinea, Sudan, and Sahel savannas (or woodlands) for the more or less distinctive vegetation belts that stretch across the region. Another contemporaneous book carried in the field and valued for its field-guide format was Booth's (1960)



MAP 7. African Mammal Project cardinal collecting localities 230–440 in western Africa.

*Small Mammals of West Africa*. Journal remarks by collectors sometimes indicated awareness of their collecting site in relation to type localities and the intention to obtain topotypes.

Three French scientific organizations provided field accommodations or personnel assistance and are commonly mentioned in journal accounts, usually by their abbreviations as follows: CTFT, Centre Technique Forestier Tropical; ORSTOM, L'Institut français de recherche scientifique pour le développement en coopération (French Overseas Aid and Development Organization); SODEPALM, Société pour le Développement et l'Exploitation du Palmier à Huile. Two regional terms regularly encountered in habitat descriptions are fadama (any irrigable land, flood plain, or low-lying land susceptible to seasonal flooding) and juju forest (slang for remnant high forest thought to be avoided and left undisturbed as a sacred grove).

#### SENEGAL AND THE GAMBIA

**GENERAL REMARKS.** We combined coverage of Senegal and The Gambia because the principal field team, composed of Richard M. Davis and Dean E. Harvey, traveled between the two countries in making their single itinerary. More time and effort were understandably devoted to survey in geographically larger Senegal (31 cardinal localities—Map 8); only three localities are recorded for The Gambia. Although Harvey did set traps and collected mammals during the Oct 1965 to Jul 1966 trip, Davis maintained the field catalog, and only his name is listed as collector on mammal specimens taken during that time. In his field journal, Harvey emphasized the “picking” of ectoparasites among his other activities as well as general collecting of insects and herps.

**ITINERARIES (INCLUSIVE OF SENEGAL AND THE GAMBIA).** R. M. Davis and D. E. Harvey: **Dakar**, 29 Oct 1965; **6 km NW Tivaouane**, 29 Oct–2 Nov 1965; **N'doulo**, 8–13 Nov 1965; **6 km E Kaolack**, 15–20 Nov 1965; **15 km N Kaffrine**, 22 Nov–1 Dec 1965; **Koungheul**, 2–8 Dec 1965; **Koussanar**, 9–14 Dec 1965; **Kotiare Naoude**, 16–21 Dec 1965; **8 mi W Bathurst** (The Gambia), 8–13 Jan 1966; **Guerina**, 17–22 Jan 1966; **Ousouye**, 24–29 Jan 1966; **Ziguinchor**, 28 Jan 1966; **Sedhiou**, 1–6 Feb 1966; **15 km SE Marssassoum**, 3 Feb 1966; **5 km N Kolda**, 9–13 Feb 1966; **Kudang** (The Gambia), 15–22 Feb 1966; **Velingara**, 24–27 Feb 1966; **Richard Toll**, 14–19 Mar 1966; **Podor**, 21–25 Mar 1966; **Cascas**, 28 Mar–2 Apr 1966; **Ogo**, 4–7 Apr 1966; **Matam**, 8–9 Apr 1966; **5 km S Bakel**, 13–17 Apr 1966; **Goudiry**, 19–20 Apr 1966; **Dialakoto**, 5–7 May 1966; **Gamon**, 10–14

May 1966; **Linguere**, 17–27 May 1966; **Toniataba** (The Gambia), 7–14 Jun 1966; **4 km N Joal**, 17–21 Jun 1966; **Dakar**, 28 Jun–4 Jul 1966; **10 km SE St. Louis**, 7–12 Jul 1966; **8 km E Louga**, 14–18 Jul 1966; **10 km W Thies**, 21–24 Jul 1966.

D. E. Harvey and C. B. Robbins: **Ranerou**, 23–30 Jun 1967.

C. B. Robbins: **13.7 km N Dakar**, 27 Apr 1967.

**Bakel, 5 km S**, Oriental Region (Map 8: 251).

Coordinates: 14°52'N, 12°27'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).

Collectors: R. M. Davis and D. E. Harvey (13–17 Apr 1966).

Habitat: “Tree savanna. Acacia and some baobab . . . Ground fairly soft. Peanuts and millet . . . earlier in the year . . . rocky hills on all sides. What grass that is still standing is yellow and dry” (DEH). “Peanuts. Habitat is mostly small scattered bushes with rather wide spread low trees and the remnants of savanna . . . many low hills around which present some rock outcrops . . . baobab tree” (RMD).

Remarks: The AMP team camped south of Bakel, just off the main road to Tambacounda. During their stay, they apparently collected widely in the area as they became lost on several occasions. Rosevear (1965) classified this area as “Sahel Woodland.”

Taxa: *Desmodilliscus*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*; *Rhinolophus*; *Felis*; *Phacochoerus*.

**Bathurst, 8 mi [12.9 km] W** [The Gambia] (Map 8: 261).

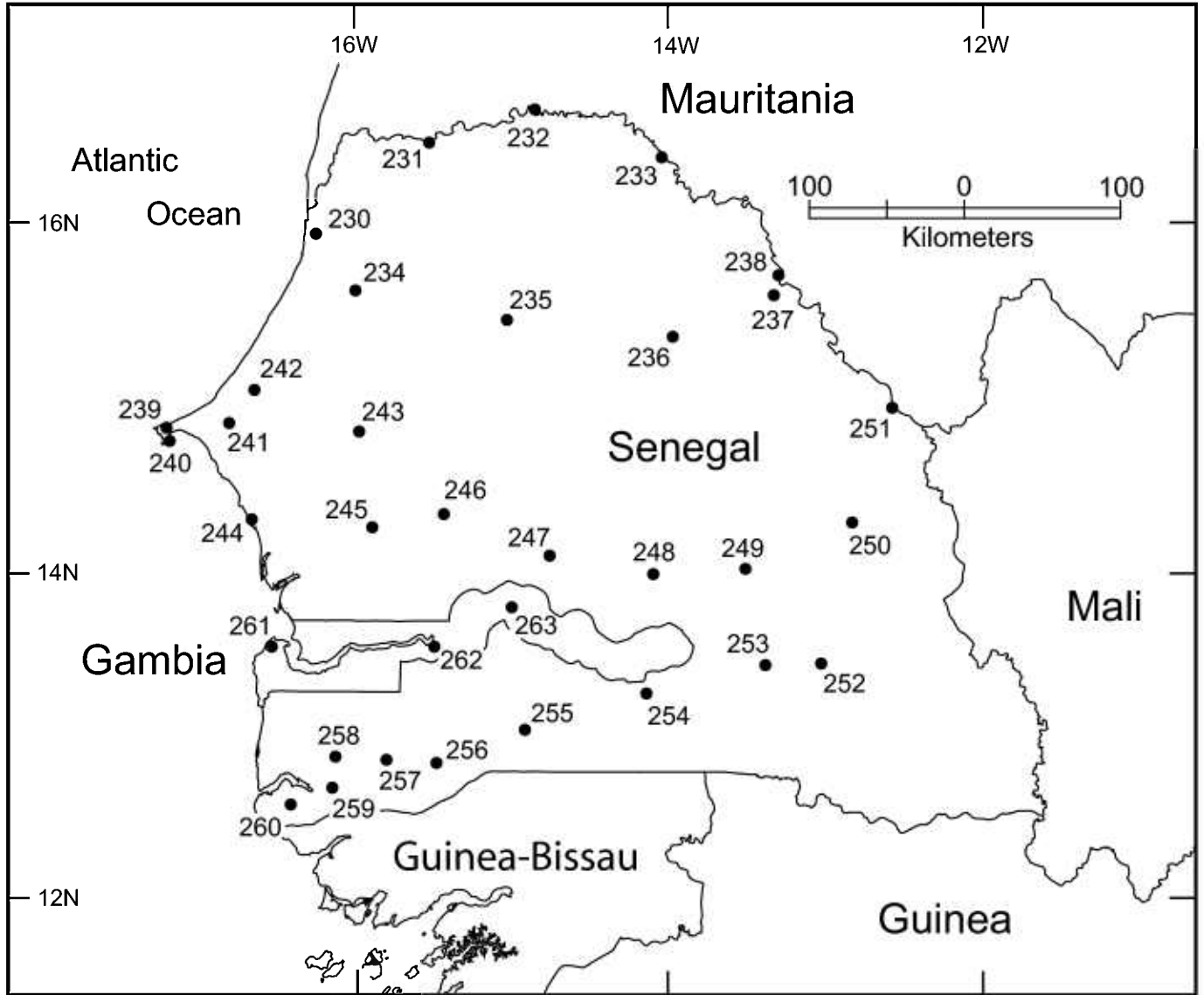
Coordinates: 13°26'N, 16°42'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).

Collectors: R. M. Davis and D. E. Harvey (8–13 Jan 1966).

Habitat: “Edge of tropical forest [Figure 40]. High grass in and around forest, ground sandy, millet, and peanuts being cultivated. Lots of palm trees . . . termite mounds” (DEH). “There is a real thick tropical looking forest with lots of palm trees wherever there isn't cultivation . . . millet and peanut fields with savanna grasses surrounding these and then the forest . . . felled hollow palm logs” (RMD).

Remarks: Davis and Harvey established this camp about 1 mi [1.6 km] north of Sukuta (13°25'N, 16°42'W G) and south of Serekunda. The habitat around Bathurst is considered “Guinea Woodland” according to Rosevear (1965).

Taxa: *Chlorocebus*, *Erythrocebus*, *Piliocolobus*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Gerbilliscus*, *Arvicanthis*,



MAP 8. African Mammal Project cardinal collecting localities 230–263 in Senegal and The Gambia.

- |                          |                         |                     |                                    |
|--------------------------|-------------------------|---------------------|------------------------------------|
| 230. St. Louis, 10 km SE | 239. Dakar, 13.7 km N   | 248. Koussanar      | 257. Marssassoum, 15 km SE         |
| 231. Richard Toll        | 240. Dakar              | 249. Kotiare Naoude | 258. Guerina                       |
| 232. Podor               | 241. Thies, 10 km W     | 250. Goudiry        | 259. Ziguinchor                    |
| 233. Cascas              | 242. Tivaouane, 6 km NW | 251. Bakel, 5 km S  | 260. Oussouye                      |
| 234. Louga, 8 km E       | 243. N'doulo            | 252. Gamon          | 261. Bathurst, 8 mi W [The Gambia] |
| 235. Linguere            | 244. Joal, 4 km N       | 253. Dialakoto      | 262. Toniataba [The Gambia]        |
| 236. Ranerou             | 245. Kaolack, 6 km E    | 254. Velingara      | 263. Kudang [The Gambia]           |
| 237. Ogo                 | 246. Kaffrine, 15 km N  | 255. Kolda, 5 km N  |                                    |
| 238. Matam               | 247. Kounqheul          | 256. Sedhiou        |                                    |

*Mastomys, Praomys; Lepus; Crocidura; Epomophorus, Micropteropus, Hipposideros, Nycteris; Genetta.*

Cascas, River Region (Map 8: 233).  
Coordinates: 16°23'N, 14°04'W G (as Kaskas).

Collectors: R. M. Davis and D. E. Harvey (28 Mar–2 Apr 1966).

Habitat: “Scrub *Acacia* and other thorn bush . . . Ground is sandy but very hard. The bushes . . . are set up on mounds (where dirt has been eroded away from sides



FIGURE 40. The Gambia, Bathurst, 8 mi W (photograph by D. E. Harvey, 6–16 Jan 1966).

of bush) . . . many goats . . . Barricades of acacia branches . . . millet fields (. . . close to river, on high banks)” (DEH). “Very arid looking with only small bushes, looking much like our California desert in many respects . . . river . . . sandy area . . . bit of acacia forest . . . acacia branch fence row next to a corn field . . . open acacia bush” (RMD).

Remarks: The field camp at Cascas was established about 350 m from the Senegal River. Davis traveled west of Cascas on 28 Mar and hunted in a “bit of acacia forest,” collecting a *Genetta* and three *Galago*. Harvey’s journal indicated that the hunting took place “in forest” at 8 km N Cascas. They hunted in forest along the river on 30 Mar at approximately the same locality and collected six *Galago* and two *Ichneumia*. Neither the field catalog nor specimen labels discriminate these variants.

Taxa: *Galago*; *Taterillus*, *Arvicanthis*, *Mastomys*; *Lepus*; *Atelerix*; *Crocidura*; *Taphozous*; *Genetta*, *Ichneumia*, *Canis*.

Dakar, Cape Verde Region (Map 8: 240).

Coordinates: 14°40’N, 17°26’W G.

Collectors: R. M. Davis and D. E. Harvey (29 Oct 1965, 28 Jun–4 Jul 1966).

Habitat: “Very deep soft sand, many bushes, and very widely scattered trees . . . Some cultivation . . . but no sizable crops at this time . . . rock area near Plage de Ouakum” (DEH). “Sand dunes that were covered by bushes, some of them appeared to be some sort of euphorbia and another with thorns” (RMD).

Remarks: Dakar was the point of departure for all AMP field trips throughout The Gambia and Senegal, so the field team stayed there on many occasions. A single

*Atelerix* was collected at Hann Park (Hann; 14°43'N, 17°26'W G) on 29 Oct 1965; otherwise, collecting in the Dakar area was confined to the period of 28 Jun–4 Jul 1966. Davis and Harvey set traps in the dunes near Yoff Airport (14°46'N, 17°28'W G, as Yof). They also placed traps around a rocky outcrop (“where there is also a little agriculture”) between Plage de Ouakum (14°44'N, 17°29'W G) and the lighthouse on a hill called Les Mammels. Bats were collected in the office buildings of the director of Ministère des Eaux et Forêt and from a palm tree on the grounds of Hann Park. Rosevear (1965) determined the habitat around Dakar to be “Guinea Woodland.”

Taxa: *Gerbilliscus*, *Taterillus*, *Mastomys*; *Atelerix*; *Crocridura*; *Eidolon*, *Scotophilus*.

**Dakar, 13.7 km N**, Cape Verde Region (Map 8: 239).

Coordinates: 14°45'N, 17°27'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).

Collector: C. B. Robbins (27 Apr 1967).

Habitat: “Guinea savannah” (specimen label).

Remarks: Robbins opportunistically collected an *Atelerix* at this locality while en route from **Dakar** to **Garak**, Mauritania.

Taxon: *Atelerix*.

**Dialakoto**, Oriental Region (Map 8: 253).

Coordinates: 13°19'N, 13°18'W G.

Collectors: R. M. Davis and D. E. Harvey (5–7 May 1966).

Habitat: “Millet and peanuts earlier in year . . . tree savanna. Some fallen trees . . . Bombax tree . . . mango” (DEH). “Lot of large trees, some of the bombax family, and there’s a lot of . . . peanuts” (RMD).

Remarks: From Tambacounda, Davis and Harvey headed southeast about 35 mi [56.3 km] and established camp at Dialakoto. Local people procured many specimens, as was frequently the case with AMP collecting methods, and they seemed to outdo themselves at this locality, bringing in bats and a primate (*Chlorocebus*) as well as the usual assortment of rodents. Rosevear (1965) typified the habitat as “Sudan Woodland.”

Taxa: *Chlorocebus*, *Papio*; *Heliosciurus*, *Arvicanthis*, *Mastomys*, *Mus*, *Praomys*; *Epomophorus*, *Nycteris*, *Chaerephon*.

**Gamon**, Oriental Region (Map 8: 252).

Coordinates: 13°20'N, 12°55'W G.

Collectors: R. M. Davis and D. E. Harvey (10–14 May 1966).

Habitat: “Dry grass between old millet-peanut field and dried up river . . . tree savanna. Monkey bread trees . . . bush” (DEH). “Grass along side some peanut fields” (RMD).

Remarks: On 13 May, Harvey collected a juvenile *Phacochoerus* in the bush approximately 2 km from camp; it was never accessioned into the NMNH because it was consumed for that evening’s dinner (RMD, in litt.). Rosevear (1965) categorized the habitat around Gamon as “Sudan Woodland.”

Taxa: *Galago*, *Papio*; *Xerus*, *Gerbilliscus*, *Mastomys*, *Mus*, *Praomys*, *Hystrix*; *Crocridura*; *Epomophorus*, *Hipposideros*, *Nycteris*, *Neoromicia*; *Genetta*, *Ichneumia*; *Neotragus*.

**Goudiry**, Oriental Region (Map 8: 250).

Coordinates: 14°11'N, 12°43'W G (as Goudiri).

Collectors: R. M. Davis and D. E. Harvey (19–20 Apr 1966).

Habitat: “Generally pretty flat, few trees and some hills. Hills north of camp about 400 m . . . grass . . . in old millet field . . . caves in hillside . . . very large burrows in hillside . . . (almost big enough to walk into) . . . laterite hills” (DEH).

Remarks: The bats were collected from burrows in the hills north of camp.

Taxa: *Taterillus*, *Mastomys*, *Mus*; *Hipposideros*, *Nycteris*.

**Guérina**, 5 km S Bignona, Casamance Region (Map 8: 258).

Coordinates: 12°46'N, 16°15'W G (as Guérina).

Collectors: R. M. Davis and D. E. Harvey (17–22 Jan 1966).

Habitat: “Each [crop] field has high grass around it . . . peanuts, rice (millet small amounts). Palm trees . . . quite a lot of water. There are a number of fallen trees in and around fields . . . forest close to camp [Figures 41, 42]” (DEH). “Cultivated land . . . with just small bushes and grasses . . . real tall and rather thick grass . . . a real jungly place adjoining a big rice field. There was lots of water, mud . . . savanna” (RMD).

Remarks: Davis and Harvey stayed on the grounds of a house occupied by two Peace Corps volunteers.

Taxa: *Uranomys*, *Gerbilliscus*, *Mastomys*, *Mus*, *Praomys*; *Crocridura*.

**Joal, 4 km N**, Thiès Region (Map 8: 244).

Coordinates: 14°12'N, 16°51'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).



FIGURE 41. Senegal, Guerina: Bignona (photograph by D. E. Harvey, 22 Jan 1966).

Collectors: R. M. Davis and D. E. Harvey (17–21 Jun 1966).

Habitat: “Acacia forest (scrub acacia). Baobab trees scattered . . . some palm trees. Termite mounds [Figure 43]” (DEH). “Acacia forest . . . Saline water . . . baobab trees . . . old cattle corrals made with thorn branches and overgrown with grass” (RMD).

Remarks: Davis and Harvey traveled a few kilometers north of Joal (14°10'N, 16°51'W G, as Joal-Fadiout) and pitched their camp about 0.5 mi [0.8 km] from the coast.

Taxa: *Heliosciurus*, *Gerbilliscus*, *Mastomys*; *Rhinolophus*, *Nycteris*.

**Kaffrine, 15 km N**, Sine-Saloum Region (Map 8: 246).

Coordinates: 14°14'N, 15°32'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).

Collectors: R. M. Davis and D. E. Harvey (22 Nov–1 Dec 1965).

Habitat: “Very high grass . . . millet, peanuts, and squash . . . Trees . . . closer together than [previous] camps. Baobab . . . the soil is sandy but quite hard packed . . . grass fields surrounding cultivated fields. Kassas forest. Many trees . . . and high grass broken up occasionally by a peanut field or millet field [Figure 44]” (DEH). “Peanut fields and in tall grass . . . baobab trees . . . corn fields” (RMD).

Remarks: The team left Kaffrine (14°07'N, 15°42'W G) and proceeded north (actually more northeasterly), passing through forest (Forêt Classée de Kassas), to their campsite. Harvey indicated that they hunted 5 mi [8.0 km] north of camp “in Kassas forest” and also at a location 10 mi [16.1 km] east of Boulél (14°18'N, 15°32'W G), “which is close to our camp.” None of these locality variants is indicated on specimen labels or in the field catalog.

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Steatomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*,






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FIGURE 42. Senegal, Guerina: Bignona  
(photograph by D. E. Harvey, 22 Jan 1966).

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*Mus; Lepus; Atelerix; Crocidura; Rhinolophus, Nycteris, Mops, Myopterus; Genetta.*

**Kaolack, 6 km E, Sine-Saloum Region (Map 8: 245).**

Coordinates: 14°09'N, 16°01'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).

Collectors: R. M. Davis and D. E. Harvey (15–20 Nov 1965).

Habitat: “Trees are scattered non-uniformly . . . Baobab is . . . present. Millet is the major crop, also peanuts. Peanuts are piled . . . in fields to dry. High grass and rows of bushes surrounds most of the fields . . . I trapped most mammals in open grassy areas. Dick [Davis] got most animals under bushes scattered throughout grassy areas. The soil was sandy but hard packed [Figure 45]” (DEH). “Millet and peanut fields completely surrounding us



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FIGURE 43. Senegal, Joal, 4 km N (Jun 1966).

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FIGURE 44. Senegal, Kaffrine, 15 km N (photograph by D. E. Harvey, 21 Nov-1 Dec 1965).

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FIGURE 45. Senegal, Kaolack, 6 km E (Nov 1965).

... baobab trees ...” (RMD). “Tree savanna (cultivated)” (specimen labels).

Remarks: From Kaolack (14°11'N, 16°15'W G), Davis and Harvey traveled east and set up camp just to the east of Kahone (14°09'N, 16°02'W G) according to their field map.

Taxa: *Steatomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Crocidura*; *Taphozous*; *Ichneumia*.

**Kolda, 5 km N**, Casamance Region (Map 8: 255).

Coordinates: 12°56'N, 14°57'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).

Collectors: R. M. Davis and D. E. Harvey (9–13 Feb 1966).

Habitat: “Peanut field ... tree savanna. Soil hard but sandy. Few palm trees around and other large trees ... high stand of grass ... stream ... rice field” (DEH). “Just a short ways from camp is lots of water

and old rice fields and all around camp is peanut fields and grass” (RMD).

Remarks: Along the way to Kolda (12°53'N, 14°57'W G), Davis collected an *Erythrocebus* at **40 km W Kolda** (12°52'N, 15°15'W M). Harvey referred to a forest with many small trees and bamboo, approximately 8 km north of camp where Davis collected four *Galago*; labels and the field catalog indicate the locality for these specimens as the main campsite.

Taxa: *Galago*, *Erythrocebus*; *Gerbilliscus*, *Taterillus*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Crocidura*; *Genetta*, *Ichneumia*.

**Kotiare Naoude, 27 km NE** Tambacounda, Oriental Region (Map 8: 249).

Coordinates: 13°54'N, 13°27'W G (as Kotiari).

Collectors: R. M. Davis and D. E. Harvey (16–21 Dec 1965).

Habitat: "High grass which there is a lot of . . . Big stem grass about 6–7 feet [1.8–2.1 m] tall. Trees spaced about every 100–150 yards [91–137 m], some are closer. Millet and peanuts . . . Ground very hard . . . and sandy" (DEH).

Remarks: The USBGN standard is simply Kotiari, with variant spellings given as Kotiari Naoudé or Cotiari-Naoudé.

Taxa: *Xerus*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Herpestes*.

**Koungheul**, Sine-Saloum Region (Map 8: 247).

Coordinates: 13°59'N, 14°48'W G.

Collectors: R. M. Davis and D. E. Harvey (2–8 Dec 1965).

Habitat: "Dry river bed faced on all sides by bushes and fairly high grass. Trees are scattered through out the countryside. Scrub acacia, baobab . . . edge of river bed in bushes going from river bed to peanut field. Ground is sandy but very hard . . . peanut and millet fields . . . edge of high grass surrounding peanut field" (DEH). "It's all cultivation . . . with scattered tree savanna . . . peanut field . . . grasses" (RMD).

Remarks: The AMP crew camped in a dry stream bed on the eastern outskirts of town.

Taxa: *Galago*; *Heliosciurus*, *Steatomys*, *Gerbilliscus*, *Taterillus*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Crocidura*; *Genetta*.

**Koussanar**, Oriental Region (Map 8: 248).

Coordinates: 13°52'N, 14°05'W G.

Collectors: R. M. Davis and D. E. Harvey (9–14 Dec 1965).

Habitat: "Peanut field . . . bush at edge of peanut field . . . millet and peanut fields. Some bamboo . . . Scrub acacia, few baobab trees. Forest . . . Millet and peanut fields similar to previous camps but millet has been cut down. Thick grass surrounding [millet field]. Grass is thick and about 6–8 feet [1.8–2.4 m] tall in places" (DEH).

Remarks: Davis and Harvey actually made camp "a mile or two" [1.6–3.2 km] north of Koussanar in a millet field. Later they went hunting 5 mi [8.0 km] north of camp "close to Saré Sambourou" (13°55'N, 14°03'W G). On 14 Dec, they went hunting 20 mi [32.2 km] north of camp "as far as Boulél" (14°14'N, 13°55'W G) but apparently collected no mammals.

Taxa: *Galago*; *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Genetta*, *Ichneumia*.

**Kudang** [The Gambia] (Map 8: 263).

Coordinates: 13°40'N, 15°03'W G.

Collectors: R. M. Davis and D. E. Harvey (15–22 Feb 1966).

Habitat: "Tree savanna . . . about 3/4 km from closest peanut field . . . mango trees . . . banana . . . hick brush . . . stands of grass" (DEH). "Quite a number of leafless, scraggly bushes, and occasionally large trees" (RMD).

Remarks: This campsite was located between Kudang and "Wharftown" on the Gambia River. Rosevear (1965) described the habitat in the Kudang area as "Guinea Woodland."

Taxa: *Chlorocebus*, *Papio*, *Piliocolobus*; *Xerus*, *Heliosciurus*, *Graphiurus*, *Gerbilliscus*, *Taterillus*, *Mastomys*, *Praomys*; *Epomophorus*, *Hipposideros*, *Nycteris*, *Chaerephon*, *Mops*; *Phacochoerus*.

**Linguere**, Diourbel Region (Map 8: 235).

Coordinates: 15°24'N, 15°07'W G (as Linguère).

Collectors: R. M. Davis and D. E. Harvey (17–27 May 1966).

Habitat: "Not much vegetation . . . Many goats . . . Scrub acacia seems to be dominant tree [Figure 46]" (DEH). "Really barren looking with scattered small acacia trees and lots of cow dung and sand" (RMD).

Remarks: This camp was established at the eastern periphery of Linguere.

Taxa: *Desmodilliscus*, *Taterillus*, *Arvicanthis*, *Mus*; *Atelerix*; *Crocidura*; *Rhinolophus*, *Hipposideros*, *Scotophilus*; *Genetta*, *Ichneumia*.

**Louga, 8 km E**, River Region (Map 8: 234).

Coordinates: 15°35'N, 16°10'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).

Collectors: R. M. Davis and D. E. Harvey (14–18 Jul 1966).

Habitat: "Scrub acacia and acacia [Figure 47], no grass at this time. Peanuts and millet are being planted now . . . hedge row (acacia barricade)" (DEH). "Bushes and on the boundary between sort of an acacia forest and a cultivated field. There are lots of scattered acacia trees with a couple of near by rather thin forests . . . baobab trees" (RMD).

Taxa: *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*; *Nycteris*.

**Marsassoum, 15 km SE**, Casamance Region (Map 8: 257).

Coordinates: 12°45'N, 15°54'W G (for Niassene; see Remarks).

Collectors: R. M. Davis and D. E. Harvey (3 Feb 1966).

Habitat: "Tree savanna" (specimen label).



FIGURE 46. Senegal, Linguere (photograph by D. E. Harvey, 16–28 May 1966).

Remarks: While camped at **Sedhiou** (1–6 Feb), Davis and Harvey visited the Marssassoum area to assist villagers in hunting a rogue lion that had killed a number of cattle. They drove about 15 km southeast to a village named Niassene and there collected a single *Chlorocebus* (but no lion).

Taxon: *Chlorocebus*.

**Matam**, River Region (Map 8: 238).

Coordinates: 15°40'N, 13°15'W G.

Collectors: R. M. Davis and D. E. Harvey (8–9 Apr 1966).

Habitat: “Foundation of building” (DEH). “Under the roof of a building” (RMD).

Remarks: Davis and Harvey incidentally collected here while camped at **Ogo** (4–7 Apr).

Taxa: *Galago*; *Mops*.

**N’doulo**, 17 km NE Diourbel, Diourbel Region (Map 8: 243).

Coordinates: 14°44'N, 16°07'W G (as Ndoulo).

Collectors: R. M. Davis and D. E. Harvey (8–13 Nov 1965).

Habitat: “The soil is very sandy . . . tree savanna (highly cultivated). Some of the . . . crops are peanuts, manioc, and . . . tomato. Trees . . . are baobab and what looks like acacia. There are . . . 9 to 12 foot [2.7–3.7 m] tall piles of peanut plants. The majority of mammals were taken from along rows of bushes surrounding millet fields” (DEH). “Peanut and millet fields” (RMD). “Tree savanna (cultivated)” (specimen labels).

Remarks: In their field journals, both Davis and Harvey placed this campsite about 2 mi [3.2 km] north, via a dirt road, of N’doulo (14°45'N, 16°07'W M), but specimen labels and the field catalog notate only the town.

Taxa: *Steatomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Praomys*; *Atelerix*; *Crocidura*.

**Ogo**, 13 km SW Matam, River Region (Map 8: 237).

Coordinates: 15°33'N, 13°17'W G.



FIGURE 47. Senegal, Louga, 8 km E (Jul 1966).

Collectors: R. M. Davis and D. E. Harvey (4–7 Apr 1966).

Habitat: “Habitat tree savanna (scrub acacia and big stem grass). Most of the grass is gone or dried up, but there are some stands around. Ground is hard and sandy . . . many goats and a few cattle . . . clusters of bushes and grass stands” (DEH). “Thorn branch fence rows” (RMD).

Remarks: Davis and Harvey set up camp in a storage building behind the home of two Peace Corps volunteers in Ogo. While night hunting around 10 km SW Ogo, they collected four *Desmodilliscus* in the soft sand along the road, and on 6 Apr, they hunted southwest of camp in approximately the same area. The origin of all of these specimens is labeled Ogo. On 8 and 9 Apr, while still camped at Ogo, they went to **Matam** to obtain bats and ceased collecting around Ogo proper.

Taxa: *Galago*; *Desmodilliscus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*; *Lepus*; *Atelerix*; *Canis*, *Vulpes*.

**Oussouye**, Casamance Region (Map 8: 260).

Coordinates: 12°29'N, 16°33'W G.

Collectors: R. M. Davis and D. E. Harvey (24–29 Jan 1966).

Habitat: “Rice fields and forest at edge of rice fields. High grass all around (big stem blue). Lots of palm trees . . . water in some of the rice fields [Figure 48]. Habitat tree savanna. Some mango trees . . . Peanuts . . . not nearly so extensive as in previous camps . . . high grass” (DEH). “Mostly savanna with lots of palm trees and rice fields . . . grass around some peanut fields” (RMD).

Remarks: Davis and Harvey situated their camp near a large rice field a mile or two [1.6–3.2 km] north of




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FIGURE 48. Senegal, Oussouye (photograph by D. E. Harvey, 30 Jan 1966).

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Oussouye on the road to Mlomp. While based at this camp, they visited **Ziguinchor** to collect bats.

Taxa: *Xerus*, *Heliosciurus*, *Cricetomys*, *Uranomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Genetta*.

**Podor**, River Region (Map 8: 232).

Coordinates: 16°40'N, 14°57'W G.

Collectors: R. M. Davis and D. E. Harvey (21–25 Mar 1966).

Habitat: “Many acacia trees . . . scrub acacia . . . (millet, tomatoes, and squash) . . . bush . . . was very dense” (DEH). “The trees are nearly all large acacias. Near by are several corn fields . . . acacia branch fence . . . thick acacia forest . . . tremendous number of goats and cattle here” (RMD). “Acacia forest” (specimen labels).

Remarks: The AMP crew drove north of Podor across the airport runway and, according to Davis, set up camp “just beyond the river.” Elsewhere, Harvey noted that

their camp was positioned “between the airport and the [Senegal] river,” a site clearly within Senegal. On 23 Mar, they went into town to collect *Mops*, and the next day they collected *Nycteris* in “dense bush” close to camp. Rosevear (1965) characterized the habitat as “Sahel Woodland.”

Taxa: *Chlorocebus*; *Desmodilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*; *Lepus*; *Nycteris*, *Mops*; *Genetta*.

**Ranerou**, River Region (Map 8: 236).

Coordinates: 15°18'N, 13°58'W C, G (as Ranérou).

Collectors: D. E. Harvey and C. B. Robbins (23–30 Jun 1967).

Habitat: “We came into savannah woodland [Figure 49] . . . Although trees are absent from area around village, we are surrounded by forest . . . baobab, *Acacia seyal* . . . the tall grass is dried up . . . there is some short grass coming up now” (DEH). “Hedge row, in trees and bushes. Flood plain areas with very few

scattered bushes and hard soil. Rosevear [1953], in ‘Checklist and Atlas of Nigerian Mammals,’ calls this type of area a ‘fako’ or ‘kobe’ [sic]. The area is apparently flooded during the rainy season and no grass ever grows in this type of area. The habitat is classified as sahel savannah . . . very different than the sahel savannah found in Mauritania. *Acacia radiana* is not present. *Acacia seyal* takes its place but is not a dominant (most numerous) plant. The dominant tree is called ‘Arbol medicinal’ by the natives. Occasional baobab trees . . . three definite habitats: . . . [1] cleared millet and peanut fields, [2] the dense forest, and [3] the flood plains (fako) areas . . . intermediate areas of grassy, rolling ground fringing and within the forest areas . . . [grass] is at most 1–2 inches [2.5–5.1 cm] high due to recent light rains. [Two] terms have been used as synonyms. Sahel savannah, sahel woodland—in literature. If a distinction is possible then this [Ranerou] should be called sahel woodland due to the



FIGURE 49. Senegal, Ranerou (photograph by D. E. Harvey, Jun 1967).



presence of many large trees (10–20 feet [3.0–6.1 m] high and more—up to 100 feet [30.5 m]). Sahel savannah would be in more desert regions with a more numerous *Acacia*, widely scattered and less dense vegetation” (CBR).

Remarks: On 25 May, Harvey and Robbins collected *Asellia* and *Nycteris* from a well in a village located 13 km NW Ranerou. The following day they set nets by a well in a village at 7 km SE Ranerou and collected *Asellia* there. On 27 May, they ventured 2 km east of camp to set traps in a “deep forest area” but without success. However, a few specimens were collected in nearby brush. During the evening of 29 May, they hunted and collected *Desmodilliscus* on a nearby flood plain with very hard soil and a few scattered bushes.

Taxa: *Xerus*, *Desmodilliscus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*; *Atelexis*; *Crocidura*; *Asellia*, *Nycteris*, *Nycticeinops*.

**Richard Toll**, River Region (Map 8: 231).

Coordinates: 16°28'N, 15°41'W G.

Collectors: R. M. Davis and D. E. Harvey (14–19 Mar 1966).

Habitat: “Long rows of acacia that have been chopped and put around fields (millet and rice) as barricades . . . south of camp . . . dry and sandy . . . very little grass growing anywhere. Dominant tree acacia. Some *Opuntia* growing in large clusters but this is sporadic. Many goats, sheep, and cattle . . . grass . . . short or lacking. Dick says area looks like Bechuanaland, very flat, grassland with scattered acacia trees . . . bushes” (DEH). “Very barren with hardly a hint of grass and some scraggly acacia trees scattered around . . . fence . . . near camp made from branches from acacia trees . . . rice agriculture project . . . along the irrigation canals” (RMD). “Acacia tree savanna” (specimen labels).

Remarks: Davis and Harvey camped a “mile or two” [1.6–3.2 km] east of Richard Toll. Harvey’s journal entry for 14 Mar indicates that Davis hunted to the southwest of camp as far as Guier Lake (Lac de Guier; 16°15'N, 15°50'W G) and obtained *Lepus* and two *Genetta*. Neither Davis’ field catalog nor specimen labels acknowledge this variant locality. The next day, they collected in an area that Davis referred to as “the big agricultural project.” On 17 Mar, Davis set a trapline on the west side of Richard Toll along some irrigation canals. Rosevear (1965) characterized the habitat around Richard Toll as “Sahel Woodland.”

Taxa: *Xerus*, *Desmodilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*; *Lepus*; *Felis*, *Civettictis*, *Genetta*, *Ichneumia*, *Vulpes*, *Ictonyx*.

**St. Louis, 10 km SE**, River Region (Map 8: 230).

Coordinates: 15°57'N, 16°27'W G (for Ngaye Ngaye; see Remarks).

Collectors: R. M. Davis and D. E. Harvey (7–12 Jul 1966).

Habitat: “Trees . . . peanut fields . . . loose sand and scattered bushes with few trees (Baobab and acacia trees) . . . close to dried up salt marsh . . . row of bushes surrounding peanut field . . . deep drifting sand; scattered bushes . . . (thorn bush of some sort . . .) . . . sand dunes” (DEH). “Pretty barren looking with lots of sand and scattered thorn bushes and some short trees [Figure 50] with an occasional baobab tree. Near by are some now dried up salt marshes and everywhere there are many seashells . . . this place is covered with fences (euphorbias) . . . barren sand dunes . . . baobab tree . . . deep sand dunes” (RMD). “Sand and bush” (specimen labels).

Remarks: After much searching for potential habitat around St. Louis (16°02'N, 16°37'W G), the team camped near a village named Ngai-gai, “or something like that.” Although the village does not appear on their field map (LIGN, *Afrique de l’Ouest, République du Sénégal*, 1:500,000), the USBGN (1965) coordinates for Ngaye Ngaye closely match those that we would extrapolate from that map relative to St. Louis (15°55'N, 16°27'W M). Rosevear (1965) called the habitat in the St. Louis area “Sahel Woodland.”

Taxa: *Cricetomys*, *Gerbilliscus*, *Gerbillus*, *Taterillus*, *Arvicanthis*, *Mastomys*; *Lepus*; *Eidolon*, *Chaerephon*; *Genetta*, *Ichneumia*.

**Sedhiou**, Casamance Region (Map 8: 256).

Coordinates: 12°44'N, 15°33'W G (as Sédhiou).

Collectors: R. M. Davis and D. E. Harvey (1–6 Feb 1966).

Habitat: “Tree savanna. Palm trees . . . High blue stem grass and other trees. Millet and peanuts and rice” (DEH). “This area is mostly peanut fields with scattered savanna and a fair number of trees, especially palm trees . . . tall grass between an old rice field and a peanut field” (RMD).

Remarks: Camp was established about a mile [1.6 km] south of town. A specimen of *Chlorocebus* was collected “a few miles northwest of Sedhiou” according to Davis’ journal, although the field catalog and specimen label indicate only Sedhiou. On the way to a lion



FIGURE 50. Senegal, St. Louis, 10 km SE: Sand dunes (photograph by D. E. Harvey, 12 Jul 1966).

hunt at 15 km SE Marssassoum, four *Piliocolobus* were collected outside Sedhiou.

Taxa: *Galago*, *Chlorocebus*, *Piliocolobus*; *Xerus*, *Heliosciurus*, *Mastomys*, *Mus*, *Praomys*; *Crocidura*; *Mops*.

**Thies, 10 km W**, Thiès Region (Map 8: 241).

Coordinates: 14°47'N, 17°01'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).

Collectors: R. M. Davis and D. E. Harvey (21–24 Jul 1966).

Habitat: “Scrub acacia forest. Many baobab [Figure 51] . . . some evidence of cultivation . . . at other time of year but not now. (Millet.) . . . the acacia forest is so thick that it is hard to see or shoot anything” (DEH). “The vegetation here is large bushes and small scrub acacia trees, some places very thick. There are quite a few baobab trees scattered throughout the forest . . . bushes nearby . . . The bushes were always too thick” (RMD).

Remarks: Camp was positioned along the “old original road into Thies [14°47'N, 16°58'W G, as Thiès Nones] and just a ways west of the base of the escarpment.” Harvey collected *Eidolon* from a *Bombax* (silkworm) tree on 21 Jul in Pout (14°46'N, 17°04'W G), 13 km W Thies. Skin labels of specimens for this locality nonetheless carry only their base camp designation (10 km W Thies). Rosevear (1965) considered the habitat in the vicinity of Thies to be “Guinea Woodland.”

Taxa: *Heliosciurus*, *Taterillus*, *Mastomys*; *Eidolon*.

**Tivaouane, 6 km NW**, Thiès Region (Map 8: 242).

Coordinates: 14°59'N, 16°51'W M (LIGN, *Afrique de l'Ouest, République du Sénégal*, 1:500,000).

Collectors: R. M. Davis, D. E. Harvey, and H. W. Setzer (29 Oct–2 Nov 1965).

Habitat: “Tree savanna type habitat. Cultivation in area seems to be rather disorganized, crops consisting of



FIGURE 51. Senegal, Thies, 10 km W (Jul 1966).

millet, manioc, and some peanuts. Baobab trees were present but few in number” (DEH). “Mostly cultivated . . . millet, manioc, peanuts, etc. It might be called a tree savanna I suppose” (RMD).

Taxa: *Xerus*, *Cricetomys*, *Gerbilliscus*, *Arvicanthis*, *Mastomys*; *Aterix*; *Crocidura*.

**Toniataba** [The Gambia] (Map 8: 262).

Coordinates: 13°26'N, 15°35'W G.

Collectors: R. M. Davis and D. E. Harvey (7–14 Jun 1966).

Habitat: “Termite mounds . . . Baobab and mango trees seem to be dominant . . . palm tree . . . peanut field . . . vlei close to camp” (DEH). “Many scattered trees . . . The land is getting ready for the planting of peanuts and rice . . . bushes and some scattered patches of grass . . . baobab tree . . . big vlei” (RMD).

Taxa: *Chlorocebus*, *Erythrocebus*, *Piliocolobus*; *Heliosciurus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*, *Praomys*; *Epomophorus*, *Rhinolophus*, *Asel-*

*lia*, *Hipposideros*, *Taphozous*, *Nycteris*, *Scotophilus*; *Civettictis*, *Genetta*, *Ichneumia*.

**Velingara**, Casamance Region (Map 8: 254).

Coordinates: 13°09'N, 14°07'W G (as Vélingara).

Collectors: R. M. Davis and D. E. Harvey (24–27 Feb 1966).

Habitat: “Tree savanna . . . sandy . . . tall grass stands” (DEH). “Very dry, quite a few trees which are in the process of being cut down” (RMD).

Remarks: According to Harvey’s journal, the team collected a *Galago*, a *Felis*, and two *Genetta* during a nocturnal hunt at 8 km SW Velingara; this location is not recorded on specimen labels or the field catalog.

Taxa: *Galago*, *Chlorocebus*; *Heliosciurus*, *Gerbilliscus*, *Mastomys*, *Praomys*; *Crocidura*; *Felis*, *Genetta*.

**Ziguinchor**, Casamance Region (Map 8: 259).

Coordinates: 12°35'N, 16°16'W G.

Collectors: R. M. Davis and D. E. Harvey (28 Jan 1966).  
Habitat: "Attic of Peace Corps house" (DEH). "Palm trees in front of the hospital" (RMD).

Remarks: Davis and Harvey made a side trip to Ziguinchor to collect bats while camped at **Oussouye** (24–29 Jan).

Taxa: *Eidolon*, *Chaerephon*, *Mops*.

#### CÔTE D'IVOIRE (IVORY COAST)

**GENERAL REMARKS.** Survey in the Côte d'Ivoire (Map 9) was completed in about eight months (Nov 1968 to Jul 1969) and performed largely by J. W. LeDuc, T. J. McIntyre, and L. W. Robbins. Representative specimens were deposited with ORSTOM through Louis Bellier, who provided significant logistical support in that country, and ORSTOM personnel accompanied AMP teams to many collecting localities. Specimen labels all read "Ivory Coast," the anglicized version of Côte d'Ivoire.

**ITINERARIES.** J. W. LeDuc and L. W. Robbins: **Banco Forest**, 27–30 Nov 1968; **Adiopodoume**, 3–6 Dec 1968; **Yapo-Sud**, 10–16 Dec 1968; **Jacqueville**, 18–23, 31 Dec 1968, 3 Jan 1969; **Anda**, 19 Dec 1968; **Ehania**, 7–14 Jan 1969; **Blekoum**, 18–23 Jan 1969; **Adiopodoume**, 25 Jan 1969; **Lamto**, 29–31 Jan 1969; **Zaakro**, 30 Jan 1969; **Adiopodoume**, 5, 8 Feb 1969; **Diali**, 11–17 Feb 1969; **Sassandra River**, 17–22 Feb 1969; **Niebe**, 23–28 Feb 1969; **Kahin**, 1–5 Mar 1969; **Guiglo**, 2 Mar 1969; **Duekoue**, 3–4 Mar 1969; **Tyenko**, 7–11 Mar 1969; **Siensou**, 13–17 Mar 1969; **Yama**, 19–25 Mar 1969; **Adiopodoume**, 11–28 Apr 1969; **Tule**, 9–13 May 1969; **Kong**, 15–19 May 1969.

T. J. McIntyre and L. W. Robbins (and J. W. LeDuc, 29 May 1969): **Banco Forest**, 29–30 May 1969; **Guitri**, 5–9 Jun 1969; **10 mi WNW Soubre**, 11–16 Jun 1969; **Yabrasso**, 22–27 Jun 1969; **Bouna**, 1–5 Jul 1969; **Fetekro**, 14–19 Jul 1969; **Yabrasso**, 22 Jul 1969.

T. J. McIntyre: **4–24 mi S Abidjan**, Jul 1969.

**Abidjan, 4–24 mi** [6.4–38.6 km] S (Map 9: 289).

Coordinates: 04°50'N, 04°00'W C.

Collector: T. J. McIntyre (Jul 1969).

Habitat: No information available.

Remarks: The coordinates provided by McIntyre for the marine mammal specimens obtained actually plot about 33 mi [54 km] S Abidjan in the Gulf of Guinea.

Taxa: *Delphinus*, *Stenella*, *Steno*, *Tursiops*.

**Adiopodoume** (Map 9: 284).

Coordinates: 05°19'N, 04°08'W C (05°20'N, 04°08'W G, as Adiapo-Doumé).

Collectors: J. W. LeDuc and L. W. Robbins (3–6 Dec 1968, 25 Jan, 5, 8 Feb, 11–28 Apr 1969).

Habitat: "Cultivated agricultural research plot . . . hollow tree" (JWL). "House attic" (LWR).

Remarks: The field team stayed and collected at the French research station ORSTOM, located near Adiopo-doume, using it as a base of operations while in Côte d'Ivoire. Louis Bellier and some of his employees contributed specimens to the AMP team from this locality and other localities in Côte d'Ivoire.

Taxa: *Dendrohyrax*; *Graphiurus*, *Cricetomys*, *Lophuromys*, *Hybomys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Rattus*; *Crocidura*; *Nycteris*, *Mops*, *Neoromicia*, *Kerivoula*; *Civettictis*.

**Anda** (Map 9: 282).

Coordinates: 05°10'N, 04°39'W C.

Collectors: J. W. LeDuc and L. W. Robbins (19 Dec 1968).

Habitat: "Roof of the chief's house" (JWL).

Remarks: While camped at **Jacqueville** (18–23 Dec), the field team traveled a few miles west to Anda, where they collected bats.

Taxon: *Chaerephon*.

**Banco Forest** (Map 9: 285).

Coordinates: 05°23'N, 04°03'W C, G (as Parc National du Banco).

Collectors: J. W. LeDuc and L. W. Robbins (27–30 Nov 1968); J. W. LeDuc, T. J. McIntyre, and L. W. Robbins (29–30 May 1969).

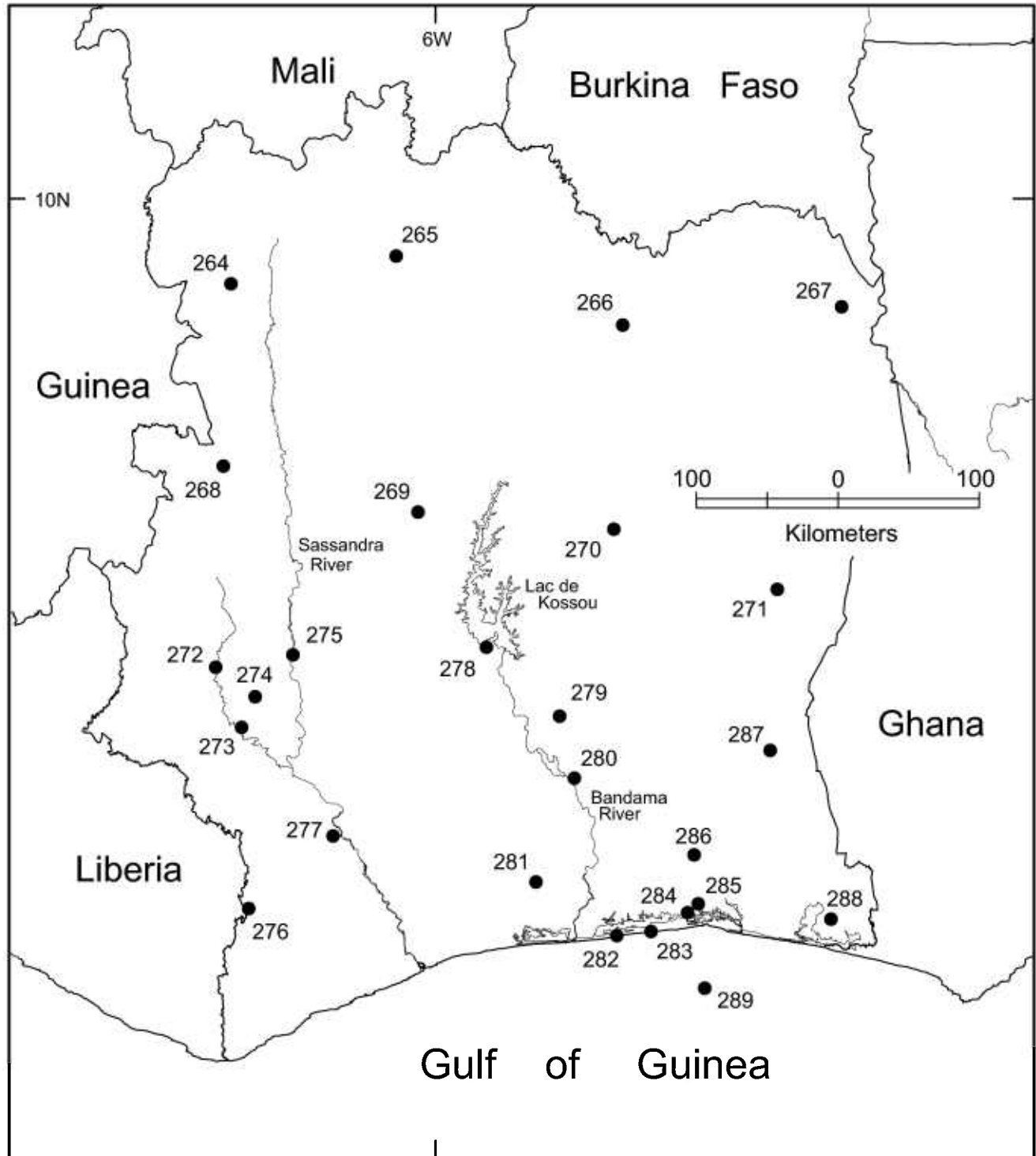
Habitat: "The flora is theoretically undisturbed and therefore primary high forest . . . mist net was set across the dam that creates a large pool near the center of the forest" (JWL). "Primary forest near Abidjan [and Adiopo-doume]—completely protected . . . stream" (LWR).

Remarks: Traps were set along the road that parallels the west bank of the Banco River. According to LeDuc, the Banco Forest is, or was, ". . . totally protected . . . no hunting is allowed."

Taxa: *Lophuromys*, *Hylomyscus*, *Malacomys*, *Praomys*; *Crocidura*; *Epomops*, *Hypsignathus*, *Megaloglossus*, *Myonycteris*, *Scotoonycteris*, *Hipposideros*, *Mops*, *Scotophilus*, *Glauconycteris*, *Hypsugo*, *Mimetillus*, *Neoromicia*.

**Blekoum** (Map 9: 287).

Coordinates: 06°23'N, 03°31'W C (06°23'N, 03°32'W G, as Blékoum).



MAP 9. African Mammal Project cardinal collecting localities 264–289 in Côte d'Ivoire (Ivory Coast).

264. Sienso	268. Tyenko	272. Kahin	276. Niebe	279. Zaakro	283. Jacquville	287. Blekoum
265. Yama	269. Tule	273. Guiglo	277. Soubre, 10 mi WNW	280. Lamto	284. Adiopodoume	288. Ehania
266. Kong	270. Fetekro	274. Duekoue	278. Diali	281. Guitri	285. Banco Forest	289. Abidjan, 4–24 mi S
267. Bouna	271. Yabrasso	275. Sassandra River		282. Anda	286. Yapo-Sud	

Collectors: J. W. LeDuc and L. W. Robbins (18–23 Jan 1969).

Habitat: “The habitat surrounding Blekoum is well within the high forest definition [Figure 52] . . . large plots of land that have been cleared, save the large trees, most of which are dead and stand naked like match sticks in sand, and planted with bananas or okra . . . miles and miles of cultivated forests, most of which are still quite young. This area has fairly dense undergrowth among the trees. Along the banks of the river—where not cleared—and on the small inlets from the river stand a very dense yet unique type of forest. This has many trees that appear to be deciduous and are surrounded by vines, etc., giving a ‘brush’ effect. The general color is more brown as opposed to the normal green of the forest. It almost appears like guinea savanna. Other crops . . . cocoa, coffee, yams, pineapple, and oil palms . . . riverine forest . . . also along forest fringe” (JWL). “The camp is located . . . in an

area where there has been logging and is cultivated. We set out traps in a forest area east of camp . . . cocoa tree” (LWR).

Remarks: The Blekoum field camp was located at the Forestry Equatorial Plantation on the bank of the Komoe River. As with other localities in Côte d’Ivoire, ORSTOM personnel accompanied the AMP crew.

Taxa: *Perodicticus*, *Galago*, *Cercopithecus*; *Funisciurus*, *Heliosciurus*, *Paraxerus*, *Protoxerus*, *Lophuromys*, *Hybomys*, *Hylomyscus*, *Malacomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*; *Crocidura*; *Epomops*, *Hipposideros*, *Nycteris*.

**Bouna** (Map 9: 267).

Coordinates: 09°16’N, 03°00’W C, G.

Collectors: T. J. McIntyre and L. W. Robbins (1–5 Jul 1969).

Habitat: “Sudan savanna. Grassland without many large trees . . . mango” (LWR).



FIGURE 52. Côte d’Ivoire, Blekoum (Jan 1969).

Taxa: *Galago*; *Heliosciurus*, *Graphiurus*, *Cricetomys*, *Steatomys*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Epomophorus*, *Lissonycteris*, *Micropteropus*, *Nanonycteris*, *Hipposideros*, *Nycteris*, *Scotophilus*; *Genetta*.

**Diali** (Map 9: 278).

Coordinates: 07°03'N, 05°37'W C, G.

Collectors: J. W. LeDuc and L. W. Robbins (11–17 Feb 1969).

Habitat: “Ecotonal high forest-guinea savanna [Figure 53]. Generally the area gives the appearance of guinea savanna with a lot of grass and many savanna trees but in a few areas cocoa and coffee are planted and . . . bananas. Nevertheless . . . the area is predominately savanna and we’re calling it thus . . . pond . . . this area has quite thick vegetation, very dense, and in the center of a riverine forest” (JWL). “The habitat here is strange. Part of the area has been burned, very dry, many thorny bushes—savanna, yet there are some for-

est trees and the people are growing coffee and cocoa—as well as cotton and peanuts” (LWR).

Taxa: *Perodicticus*, *Galago*; *Heliosciurus*, *Protoxerus*, *Graphiurus*, *Cricetomys*, *Steatomys*, *Lophuromys*, *Uranomys*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Atherurus*, *Thryonomys*; *Crocidura*; *Epomops*; *Genetta*, *Crossarchus*; *Neotragus*, *Tragelaphus*, *Cephalophus*.

**Duekoue** (Map 9: 274).

Coordinates: 06°44'N, 07°20'W C (06°44'N, 07°21'W G, as Duékoué).

Collectors: J. W. LeDuc and L. W. Robbins (3–4 Mar 1969).

Habitat: “Huge granite outcropping . . . filled with caves created by huge boulders leaning against each other” (JWL).

Remarks: While camped at **Kahin**, LeDuc, Robbins, and Bellier drove to Duekoue in search of caves and bats and located them on the outskirts of town, along the



FIGURE 53. Côte d'Ivoire, Diali (Feb 1969).

road to Man. LeDuc described what they saw: “When shining my flashlight towards the ceiling, the eye shine appeared like New York at night.”

Taxa: *Lissonycteris*, *Rousettus*.

**Ehania** (Map 9: 288).

Coordinates: 05°17'N, 03°04'W C.

Collectors: J. W. LeDuc and L. W. Robbins (7–14 Jan 1969).

Habitat: “Only oil palms and is not completely planted yet . . . about 1/3 [of the plantation] remains as forest, currently being cut [Figure 54]. Previously this area was a ‘Forêt Classée’ and many large forest animals occurred here. Today the forest consists of several large trees and a very dense, vine-like floor covering. The bush on the floor often reaches 6–8 feet [1.8–2.4 m] and is extremely difficult to pass through . . . small stream in a clearing in the forest” (JWL). “Forest . . . small river” (LWR).

Remarks: LeDuc, Robbins, and ORSTOM personnel drove to the SODEPALM Plantation in the Ehania Forest, located south of Aboissa and “before Mafere” and set up camp near the houses of the plantation supervisors.

Taxa: *Dendrohyrax*; *Perodicticus*, *Galago*, *Cercopithecus*, *Colobus*; *Funisciurus*, *Heliosciurus*, *Cricetomys*, *Lophuromys*, *Hybomys*, *Lemniscomys*, *Malacomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*, *Atherurus*; *Crocidura*; *Hipposideros*, *Mops*, *Eptesicus*, *Scotophilus*, *Mimetillus*, *Neoromicia*; *Manis*; *Genetta*, *Nandinia*, *Crossarchus*, *Herpestes*.

**Fetekro** (Map 9: 270).

Coordinates: 07°49'N, 04°41'W C, G (as Fétékro).

Collectors: T. J. McIntyre and L. W. Robbins (14–19 Jul 1969).

Habitat: “The terrain is an undulating plain with small creeks . . . broken rocks and tilted large rock slabs.



FIGURE 54. Côte d'Ivoire, Ehania (photograph by L. W. Robbins, Jan 1969).



Several large areas of 8–10 feet [2.4–3.0 m] razor grass . . . along the roadside . . . clump grass under trees and large shrubs. The trees were 40 feet [12.2 m] at their highest. A few full grown Borrassas [*Borassus*] Palms . . . large number of young palms . . . hillside of clump grass and rock piles . . . creek bed. Riverine forest . . . to a tree about two miles [3.2 km] from camp in the savanna proper. The area was a mixture of 15–20 feet [4.6–6.1 m] trees, 2–4 feet [0.6–1.2 m] high grasses and shrubby plants, but generally open” (TJM). “Very much guinea savanna with *Borassus* palms and high grass and many trees . . . some small rocky hills nearby . . . riverine forest” (LWR).

Remarks: Camp was established at the north end of a soccer field, about 200 yards [183 m] south of the village. Fetekro is located on the Nzi River.

Taxa: *Galago*, *Cercopithecus*; *Funisciurus*, *Heliosciurus*, *Protoxerus*, *Cricetomys*, *Uranomys*, *Gerbilliscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Thryonomys*; *Crocidura*; *Epomophorus*, *Lissonycteris*, *Microptero-*  
*pus*, *Rhinolophus*, *Hipposideros*, *Nycteris*, *Scotophilus*, *Neoromicia*; *Manis*; *Genetta*; *Sylvicapra*, *Kobus*.

**Guiglo** (Map 9: 273).

Coordinates: 06°32'N, 07°26'W C (06°32'N, 07°29'W G).

Collector: J. W. LeDuc (2 Mar 1969).

Habitat: “Degraded high forest” (specimen label).

Remarks: The single specimen of *Crocidura* was a gift from Louis Bellier (ORSTOM), collected on his way to **Kahin**.

Taxon: *Crocidura*.

**Guitri** (Map 9: 281).

Coordinates: 05°31'N, 05°15'W C (05°31'N, 05°14'W G).

Collectors: T. J. McIntyre and L. W. Robbins (5–9 Jun 1969).

Habitat: “Low secondary growth with good stands of forest in the near distance . . . cocoa trees . . . palm trees” (LWR).

Remarks: Camp was established near a small government building just south of Guitri.

Taxa: *Perodicticus*, *Cercopithecus*; *Funisciurus*, *Heliosciurus*, *Paraxerus*, *Protoxerus*, *Graphiurus*, *Cricetomys*, *Lophuromys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Atherurus*, *Thryonomys*; *Crocidura*; *Epomops*, *Hipposideros*, *Neoromicia*; *Manis*; *Genetta*, *Nandinia*.

**Jacqueville** (Map 9: 283).

Coordinates: 05°12'N, 04°24'W C (05°12'N, 04°25'W G).

Collectors: J. W. LeDuc and L. W. Robbins (18–23, 31 Dec 1968, 3 Jan 1969).

Habitat: “Small strip of forest between a lagoon [Figure 55] and a recently cleared area to be planted with oil palms . . . very dense secondary regrowth scattered with occasional oil palms, fallen logs, etc. I’m calling the area ‘degraded high forest’ [Figure 56]. I don’t feel that it has enough natural growth to be termed ‘secondary high forest’ . . . coconut palms” (JWL). “Degraded high forest . . . bordered on the northwest by lagoon and on the southeast by cut down forest . . . traps in an area about a mile [1.6 km] walk from camp. Some high forest and some brushy area” (LWR).

Remarks: Bellier made arrangements for LeDuc and Robbins to collect on SODEPALM plantation land and camp on the beach. On 19 Dec, a number of bats were collected in **Anda**, while they were based in Jacqueville.

Taxa: *Perodicticus*, *Cercopithecus*; *Funisciurus*, *Heliosciurus*, *Graphiurus*, *Lophuromys*, *Dephomys*, *Hybomys*, *Hylomyscus*, *Mus*, *Praomys*, *Rattus*; *Crocidura*; *Taphozous*, *Neoromicia*; *Genetta*, *Nandinia*; *Cephalophus*.

**Kahin** (Map 9: 272).

Coordinates: 06°55'N, 07°37'W C (06°55'N, 07°38'W G).

Collectors: J. W. LeDuc and L. W. Robbins (1–5 Mar 1969).

Habitat: “The habitat surrounding Kahin has been thoroughly logged and most of the land is now cultivated . . . crops . . . oil palms, cocoa and bananas . . . small juju forest . . . Many areas around Kahin are swamps caused by dead-end inlets from the river [Figure 57] or lowlands filled by the rains. The vegetation is mainly dense thickets and few really big trees remain” (JWL). “Degraded forest” (LWR).

Remarks: LeDuc indicated that Kahin is located along a small tributary of the Cavally River, but the village is actually located on the Nzi River, which is part of the Sassandra watershed. Caves near **Duekoue** were visited on 3–4 Mar to collect bats.

Taxa: *Perodicticus*, *Cercopithecus*, *Colobus*, *Procolobus*; *Xerus*, *Funisciurus*, *Heliosciurus*, *Protoxerus*, *Graphiurus*, *Cricetomys*, *Dephomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Crocidura*; *Rousettus*, *Hipposideros*, *Nycteris*, *Neoromicia*; *Genetta*; *Cephalophus*.

**Kong** (Map 9: 266).

Coordinates: 09°09'N, 04°37'W C, G.

Collectors: J. W. LeDuc and L. W. Robbins (15–19 May 1969).



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FIGURE 55. Côte d'Ivoire, Jacqueville (Dec 1968).

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FIGURE 56. Côte d'Ivoire, Jacqueville (Dec 1968).

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FIGURE 57. Côte d'Ivoire, Kahin (Mar 1969).

Habitat: "Basically sudan savanna. Almost no tall forest trees occur in the area and most of the land is covered by short grasses and savanna trees. Even the areas around water are not forested" (JWL).

Remarks: Kong is a village close to the Bouna Reserve (Réserve Totale de Fauna de Bouna, also referred to as Parc National de Bouna).

Taxa: *Chlorocebus*; *Xerus*, *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Thryonomys*; *Lepus*; *Crocidura*; *Epomophorus*, *Nanonycteris*, *Hipposideros*, *Nycteris*, *Chaerephon*, *Mops*; *Genetta*, *Herpestes*, *Mungos*; *Cephalophus*, *Kobus*.

Lamto (Map 9: 280).

Coordinates: 06°12'N, 04°58'W C.

Collectors: J. W. LeDuc and L. W. Robbins (29–31 Jan 1969).

Habitat: "Over small pool connected to the Bandama River . . . small pond in dry stream bed. The habi-

tat around both [mist net] sets is riverine forest . . . guinea savanna surrounding fingers of riverine forest from the Bandama and small streams leading to it. The savanna areas are generally grasslands with few trees but many *Borassia* [*Borassus*] palms. Occasionally . . . outcroppings of smooth granite rocks" (JWL). "Guinea savanna with much riverine forest" (LWR).

Remarks: Lamto is the location of a research station (Centre Nationale de Recherche Scientifique) located near the Bandama River. We did not find the locality on French maps (1:200,000 scale), but the coordinates provided by the collectors do plot closely to the Bandama River. Some *Mastomys* specimens were obtained from **Zaakro** during the time that the field team camped at Lamto.

Taxa: *Orycteropus*; *Heliosciurus*, *Graphiurus*, *Cricetomys*, *Hylomyscus*; *Epomops*, *Lissonycteris*, *Hipposideros*, *Scotophilus*; *Manis*.

Niebe (Map 9: 276).

Coordinates: 05°21'N, 07°22'W C (05°22'N, 07°18'W G, as Niébé).

Collectors: J. W. LeDuc and L. W. Robbins (23–28 Feb 1969).

Habitat: “Habitat surrounding camp is of three basic categories: [1] close to the banks of the Hana River . . . an area of dense thickets with a few oil palm trees interspersed . . . probably flooded every year during the rains. [2] . . . directly surrounding the village and the road that has been cultivated or otherwise altered and is now secondary forest [Figure 58]. [3] . . . farther away from the road there is more mature high forest (although lacking the typical large trees that have been logged out) of varying degree . . . secondary forest behind the village . . . isn't very high as compared to more mature forest, has many vines, etc., and many umbrella trees [*Musanga cecropioides*]. Many oil palms . . . small open pond” (JWL). “Bank of the river where a small stream joins it . . . forest area—

gallery type . . . old oil palm plantation . . . semi-swamp area” (LWR).

Remarks: At Niebe, the field team camped nearby the Hana River.

Taxa: *Galago*, *Cercocebus*, *Cercopithecus*, *Colobus*, *Procolobus*, *Pan*; *Funisciurus*, *Heliosciurus*, *Protoxerus*, *Graphiurus*, *Lophuromys*, *Hybomys*, *Hylomyscus*, *Malacomys*, *Mus*, *Praomys*, *Anomalurus*; *Crocidura*; *Epomops*, *Scotonycteris*, *Hipposideros*, *Nycteris*, *Myotis*; *Atilax*; *Hexaprotodon*, *Cephalophus*.

Sassandra River (Map 9: 275).

Coordinates: 07°00'N, 07°03'W C.

Collectors: J. W. LeDuc and L. W. Robbins (17–22 Feb 1969).

Habitat: “The habitat is probably as close as we will ever come to being primary forest. Most of the really big trees have been logged out but usually so recently that no secondary growth has begun [Figure 59]. The habitat along the river [Figure 60] is slightly different from



FIGURE 58. Côte d'Ivoire, Niebe (Feb 1969).



FIGURE 59. Côte d'Ivoire, Sassandra River (Feb 1969).

that of the inland forests, especially lacking in many tall trees and generally more dense . . . the area is just recently a Forêt Classée . . . small stream" (JWL). "Forest area" (LWR).

Remarks: Field camp was established at a logging operation along the Sassandra River, about 40 km NW Gregbeu (06°48'N, 06°43'W G). Bellier, under the auspices of ORSTOM, participated in collecting at this camp.

Taxa: *Galago*; *Cricetomys*, *Hybomys*, *Mus*, *Praomys*, *Anomalurus*; *Hypsignathus*, *Rhinolophus*, *Hipposideros*; *Genetta*, *Nandinia*, *Atilax*; *Cephalophus*.

Siensso (Map 9: 264).

Coordinates: 09°25'N, 07°31'W C, G (as Odienné-Siensso).

Collectors: J. W. LeDuc and L. W. Robbins (13–17 Mar 1969).

Habitat: "Basically savanna surrounding a small riverine forest [Figure 61] that follows the path of several

ponds. The riverine forest is rarely more than a few hundred yards wide at any one place but it follows a linear path and extends for several miles . . . Oil palm trees are quite prevalent inside the forest. The savannas are fairly heavily forest[ed] with trees (especially *I[soberlina]. doka*) from 20–40 feet [6–12 m] tall . . . a lot of grass remaining in the areas that have not yet been burned. Crops in the savanna areas are mainly yams" (JWL). "Guinea savanna but much drier here . . . dense forest type growth . . . grassy area and in the riverine forest" (LWR).

Taxa: *Galago*; *Funisciurus*, *Heliosciurus*, *Protoxerus*, *Cricetomys*, *Steatomys*, *Uranomys*, *Gerbilliscus*, *Taterillus*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Anomalurus*, *Thryonomys*; *Crocidura*; *Hypsignathus*, *Scotophilus*; *Genetta*, *Nandinia*, *Crossarchus*, *Galerella*, *Mungos*; *Phacochoerus*, *Tragelaphus*, *Cephalophus*.



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FIGURE 60. Côte d'Ivoire, Sassandra River (Feb 1969).

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FIGURE 61. Côte d'Ivoire, Sienso (Mar 1969).

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**Soubre, 10 mi [16.1 km] WNW** (Map 9: 277).

Coordinates: 05°49'N, 06°45'W C.

Collectors: T. J. McIntyre and L. W. Robbins (11–16 Jun 1969).

Habitat: “Many roadside farms . . . but forest is quite mature” (LWR).

Remarks: A number of specimens were brought in by local hunters from the area of Soubre (Soubre G), but all of these were labeled with the main camp designation of 10 mi WNW Soubre.

Taxa: *Galago*, *Cercocebus*, *Cercopithecus*, *Piliocolobus*, *Procolobus*; *Protoxerus*, *Deptomys*, *Grammomys*, *Hybomys*, *Hylomyscus*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Thryonomys*; *Crocidura*; *Epomops*, *Hypsignathus*, *Myonycteris*, *Nycteris*; *Civettictis*, *Genetta*; *Neotragus*, *Cephalophus*.

**Tule** (Map 9: 269).

Coordinates: 07°56'N, 06°08'W C, G (as Tulé).

Collectors: J. W. LeDuc and L. W. Robbins (9–13 May 1969).

Habitat: “Camp in a tek [teak?] forest next to village . . . typical guinea savanna. There are a few very tall trees left in isolated forest patches but even here the bottom areas are thickly covered with shrubs and thorn bushes [Figure 62]. The savanna areas are covered by grass 2–4 feet [0.6–1.2 m] tall and scattered with trees. Crops . . . include corn, coffee, pineapple, yams, cotton, and ground nuts” (JWL). “More or less guinea savanna . . . corn and yam farms and areas where there are quite a few trees—high, but not high forest type. There are strips of riverine forest near by” (LWR).

Remarks: LeDuc did not make daily journal entries while collecting at Tule but apparently wrote them after the team had departed.

Taxa: *Procavia*; *Galago*, *Cercopithecus*, *Chlorocebus*; *Funisciurus*, *Heliosciurus*, *Protoxerus*, *Graphiurus*, *Cricetomys*, *Uranomys*, *Gerbilliscus*, *Hylomyscus*,



FIGURE 62. Côte d'Ivoire, Tule (May 1969).

*Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Crocidura*, *Suncus*; *Micropteropus*, *Rhinolophus*, *Hipposideros*, *Nycteris*; *Genetta*, *Nandinia*, *Crossarchus*, *Galerella*.

**Tyenko** (Map 9: 268).

Coordinates: 08°14'N, 07°34'W G.

Collectors: J. W. LeDuc and L. W. Robbins (7–11 Mar 1969).

Habitat: “Basically guinea savanna. A small riverine forest surrounds a pond near the village but after that all the land is savanna. A huge cliff of rocks rises behind Tyenko [which runs east-west; Figure 63] along the road between Touba and Seguela. Many other smaller outcroppings . . . cotton and tobacco (I think) . . . vegetables are grown near the pond and plots of yams are near the village” (JWL). “Guinea savanna . . . traps in a rocky area nearby” (LWR).

Remarks: The collectors’ coordinates for Tyenko (08°14'N, 07°24'W C) differ from the USBGN (1965) coordinates by 10' longitude, a gap suggesting a map-reading error.

Taxa: *Procapra*; *Galago*; *Funisciurus*, *Heliosciurus*, *Protopxerus*, *Cricetomys*, *Steatomys*, *Uranomys*, *Gerbiliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Thryonomys*; *Lepus*; *Crocidura*; *Nycteris*; *Genetta*.

**Yabrasso** (Map 9: 271).

Coordinates: 07°26'N, 03°28'W C (07°26'N, 03°29'W G).

Collectors: T. J. McIntyre and L. W. Robbins (22–27 Jun, 22 Jul 1969).

Habitat: “Surrounding the village was a forest of trees in 50–80 foot [15.2–24.4 m] height range with patches of dense secondary growth within it. Through the small forest along the road was a patch of invading savanna with many *Borassus aethiopicum* (palms)

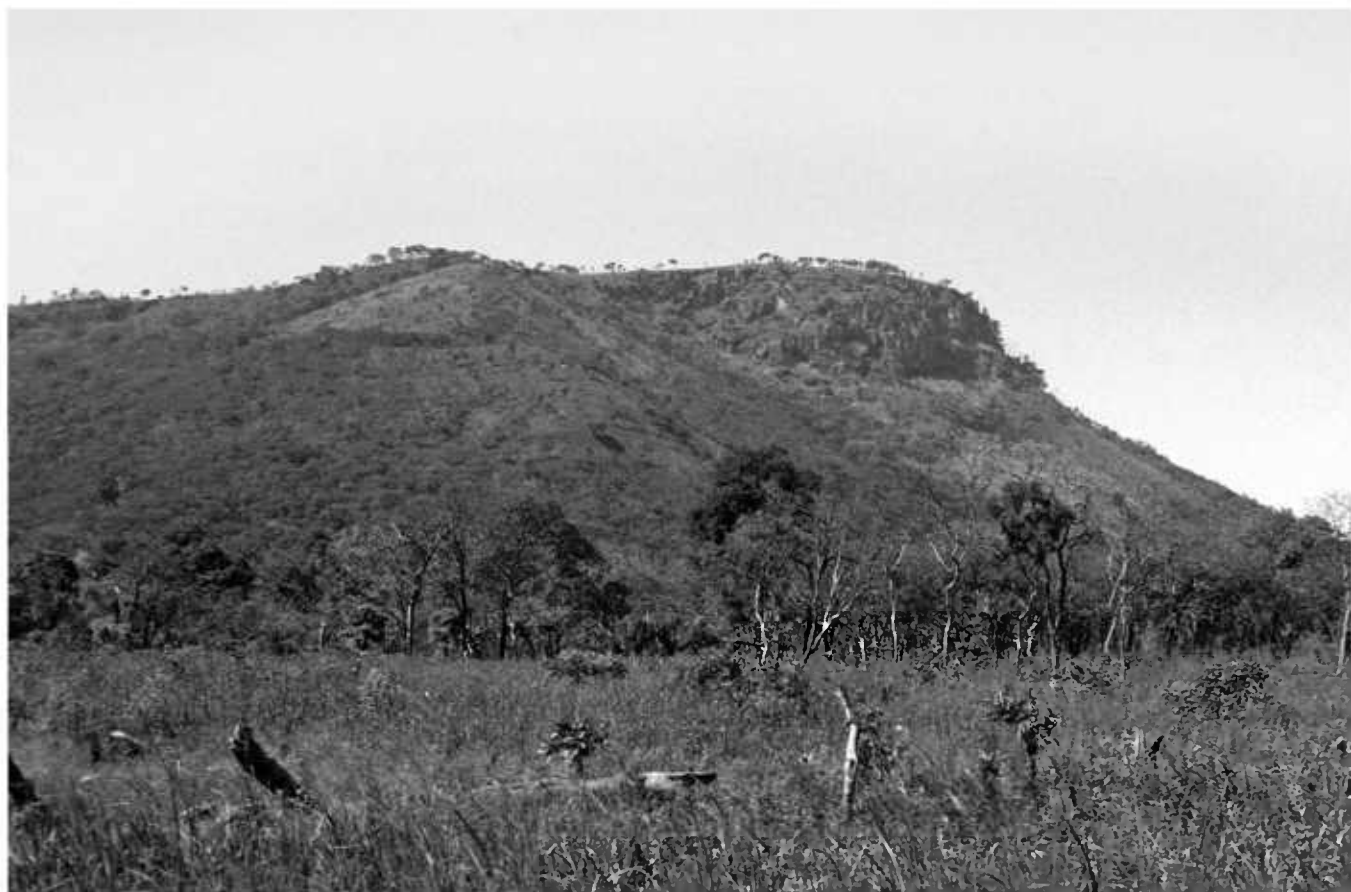


FIGURE 63. Côte d'Ivoire, Tyenko (photograph by L. W. Robbins, Mar 1969).



scattered along the edges . . . [palms] also occasionally seen growing in the forest . . . this area was a very active interdigitation of moist forest with woodland and woodland savanna . . . clump grass . . . woody shrubs” (TJM). “It could almost be called an ecotone between guinea savanna and forest . . . much farming . . . cocoa in the forest areas and corn and yams everywhere. The patches of savanna are grass areas with some low bushes and Borassas palms. The forest area is not a high-wet forest but is definitely forest . . . grassland area” (LWR).

Taxa: *Perodicticus*, *Galago*, *Cercopithecus*, *Colobus*, *Procolobus*; *Funisciurus*, *Heliosciurus*, *Protoxerus*, *Graphiurus*, *Cricetomys*, *Lophuromys*, *Gerbilliscus*, *Hybomys*, *Hylomyscus*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*, *Thryonomys*; *Crocidura*; *Eidolon*, *Hipposideros*; *Manis*; *Genetta*, *Crossarchus*, *Mungos*; *Phacochoerus*, *Neotragus*, *Cephalophus*.

**Yama** (Map 9: 265).

Coordinates: 09°36'N, 06°18'W C (09°36'N, 06°19'W G).  
Collectors: J. W. LeDuc and L. W. Robbins (19–25 Mar 1969).

Habitat: “Basically savanna surrounding small patches of riverine forest. The forests are quite small and the vegetation inside them is very dense, almost thickets. The forested areas are strictly limited to the area directly surrounding the small ponds. The savanna areas [Figure 64] are forested with trees ranging in size from about 20–60 feet [6.1–18.3 m] . . . grasses . . . mostly burned off. Crops here include rice, cotton, and yams. Many mango trees are around the village” (JWL). “Quite a few trees, many near a water course, also many open area—cattle in evidence . . . mango tree” (LWR).

Taxa: *Orycteropus*; *Galago*, *Chlorocebus*; *Xerus*, *Funisciurus*, *Heliosciurus*, *Graphiurus*, *Cricetomys*, *Steatomys*, *Uranomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*,



FIGURE 64. Côte d'Ivoire, Yama (Mar 1969).

*Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Hystrix*, *Thryonomys*; *Lissonycteris*, *Hipposideros*, *Chaerephon*; *Genetta*, *Nandinia*, *Galerella*, *Ichneumia*, *Mungos*; *Cephalophus*.

**Yapo-Sud** (Map 9: 286).

Coordinates: 05°42'N, 04°05'W C.

Collectors: J. W. LeDuc and L. W. Robbins (10–16 Dec 1968).

Habitat: “Mainly high forest. Large stands of trees . . . in every direction; however, none of the trees are very old or larger as in older forests. The forests here are undisturbed but are still young relatively speaking [Figure 65]. The vegetation beneath the trees is still fairly dense and the ground is covered by fallen leaves . . . A little of the land is under cultivation, some of the crops being cocoa and bananas . . . small pond . . . stream . . . much of the ‘forest’ in the Yapo area, especially around camp, is old forest plantations . . . grass near the station . . . along the plantation farm

. . . behind the station” (JWL). “Forest area that had been logged—small open brushy areas with forest surrounding them. Some of the areas seemed to be water-logged” (LWR).

Remarks: The field camp was located on the CTFT forestry research station south of Yapo (Yapo rail station; 05°48'N, 04°08'W G). The station was located beside a railroad track about 1 mi [1.6 km] from the road to Agboville. LeDuc indicated that his coordinates for Yapo-Sud were a “rough estimate.”

Taxa: *Perodicticus*, *Galago*; *Heliosciurus*, *Protoxerus*, *Cricetomys*, *Lophuromys*, *Dephomys*, *Lemniscomys*, *Malacomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*; *Crocidura*; *Epomops*, *Micropteropus*, *Scotonycteris*, *Hipposideros*, *Nycteris*; *Civettictis*, *Genetta*, *Nandinia*; *Neotragus*.

**Zaakro** (Map 9: 279).

Coordinates: 06°36'N, 05°05'W C (06°36'N, 05°04'W G).

Collectors: J. W. LeDuc and L. W. Robbins (30 Jan 1969).



FIGURE 65. Côte d'Ivoire, Yapo-Sud (Dec 1968).

Habitat: "Guinea savanna" (specimen labels).

Remarks: Several specimens of *Mastomys* were collected at Zaakro during the period of fieldwork at Lamto (29–31 Jan).

Taxon: *Mastomys*.

#### BURKINA FASO (UPPER VOLTA)

**GENERAL REMARKS.** Immediately following their brief stint in Ghana (Oct 1968), Ralph and Judy Vaden collected in Burkina Faso for approximately nine months (Nov 1968 to Jul 1969). The couple was accompanied by J. W. LeDuc, L. W. Robbins, and H. W. Setzer at their first field site (9 mi S Nobere), but afterward they assumed sole responsibility for all field operations in Burkina Faso (Map 10). At that first stop, distance was given in miles, but the Vadens thereafter adopted the metric system for all locality designations. Two field assistants, Alphonse and Saidou, conducted much night hunting and setting of traplines. Vaden routinely formulated his provenience as a distance from a larger village or town that appears on period maps and usually recorded the name of the smaller habitation nearest the actual field site in his journal; these place-names and coordinates are given under Remarks. Many specimens in Vaden's field catalogs are annotated, all apparently by Vaden himself, as having been kept by Louis Bellier; also listed, by field numbers (including those of JWJ, LWR, and REV), are specimens sent to ORSTOM in Paris. All field books and original specimen labels read "Upper Volta," the older name for Burkina Faso until renamed in 1984.

**ITINERARY.** R. E. Vaden: 9 mi S Nobere, 7–10 Nov 1968; Arly, 13–14 Nov 1968; Goden, 17–21 Nov 1968; Natiaboani, 7–14 Dec 1968; Ouagadougou, 15–17 Jan 1969; Tatarko, 22–27 Jan 1969; Petoye, 28–30 Jan 1969; 30 km N Markoye, 31 Jan–4 Feb 1969; 17 km E Gorgadji, 5–10 Feb 1969; 5 km N Boussouma, 11–16 Feb 1969; Dio, 19–24 Feb 1969; 9 km NE Barga, 25 Feb–2 Mar 1969; 6 km SE Seguenega, 3–8 Mar 1969; 1 km N Cella, 11–15 Mar 1969; 6 mi S Cella, 13–14 Mar 1969; 3 km SE Nayoure, 16–20 Mar 1969; Ougarou, 21–26 Mar 1969; Ouagadougou, 27 Apr 1969; Oulo, 1–4 May 1969; [2 km S] Konankira, 5–9 May 1969; 8 km NE Satiri, 10–12 May 1969; Founzan, 12–17 May 1969; 8 km S Dana, 18–23 May 1969; Fo, 9–14 Jun 1969; 27 km ENE Orodara, 15–20 Jun 1969; 5 km SW Koutoura, 21–26 Jun 1969; Sid-eradougou, 27 Jun–2 Jul 1969; Djipologo, 5–12 Jul 1969.

Arly (Map 10: 316).

Coordinates: 11°34'N, 01°26'E C (11°35'N, 01°28'E G).

Collector: R. E. Vaden (13–14 Nov 1968).

Habitat: "On a rocky hillside to the east of camp . . . along the Doudodo River to the west . . . 4–5 foot [1.2–1.5 m] grass." "Sudan Savanna" (specimen labels).

Remarks: The Vadens camped near the headquarters of the local Eaux et Forêts (probably the Réserve Totale de Faune de L'Arli; CAO, Kandi, 1:500,000) and collected mostly in the vicinity of the Doudodo River.

Taxa: *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Epomophorus*, *Hipposideros*, *Nycteris*, *Chaerephon*.

**Barga, 9 km NE (Map 10: 292).**

Coordinates: 13°51'N, 02°12'W C.

Collector: R. E. Vaden (25 Feb–2 Mar 1969).

Habitat: "Sahel Savanna, with scattered grassy areas; plenty of thorn bushes, mostly in thickets; scattered shrubs, and a few large trees. The soil is a sandy-clay, slightly red in color. Some of the shrubs appear to be Sudanian elements . . . ecotonal in appearance."

Remarks: Vaden established camp near the village of Noro, whose USBGN (1965) coordinates match his own, but he adopted the distance relative to Barga as the formal locality designation.

Taxa: *Galago*; *Heliosciurus*, *Cricetomys*, *Steatomys*, *Desmodilliscus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*, *Praomys*; *Aterix*; *Rhinolophus*, *Hipposideros*, *Taphozous*, *Nycteris*; *Felis*, *Genetta*, *Vulpes*.

**Boussouma, 5 km N (Map 10: 294).**

Coordinates: 12°57'N, 01°05'W C.

Collector: R. E. Vaden (11–16 Feb 1969).

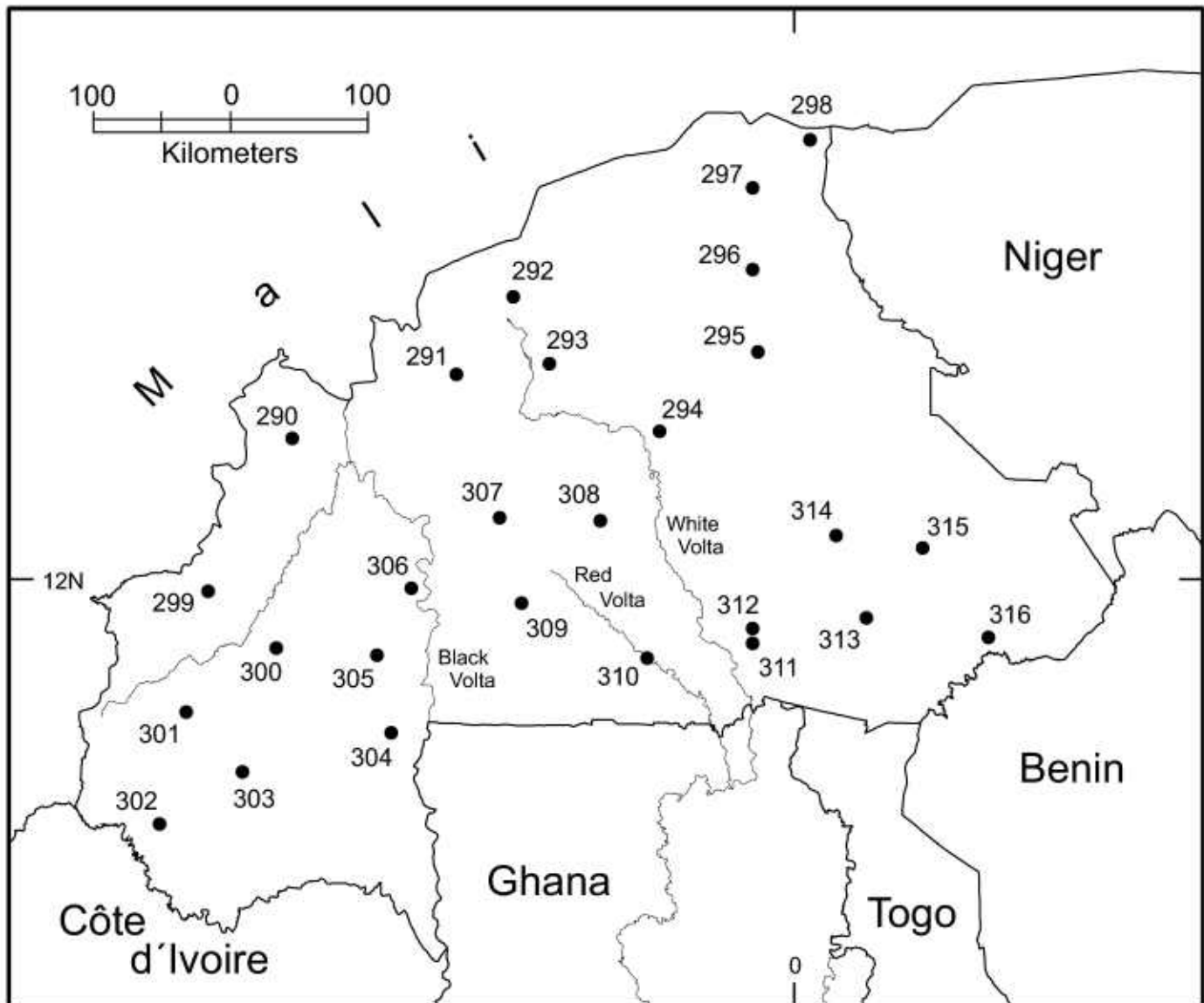
Habitat: "Habitat is 'typical' Sudan Savanna, with large trees fairly common, and some dense stands of shrubs, many thorny. There are few large expanses of grass, but they tend to be fairly high, not over grazed . . . Soil is the usual reddish clay, but some is fairly loose, with varying amounts of sand . . . (no real sandy soil)."

Remarks: Heading south from the vicinity of 17 km E Gorgadji, Vaden traveled to the north of Boussouma and collected around Toyssé (Toysé G), coordinates of which match his own. Vaden reported that their camp was 1.5 mi [2.4 km] west of a seasonal stream, probably a tributary of the White Volta.

Taxa: *Galago*; *Xerus*, *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Aterix*; *Epomophorus*; *Felis*, *Genetta*.

**Cella, 1 km N (Map 10: 312).**

Coordinates: 11°38'N, 00°22'W C.



MAP 10. African Mammal Project cardinal collecting localities 290–316 in Burkina Faso (Upper Volta).

290. Konankira, [2km S]	296. Gorgadji, 17 km E	302. Koutoura, 5 km SW	308. Ouagadougou	314. Nayoure, 3 km SE
291. Dio	297. Petoye	303. Sideradougou	309. Dana, 8 km S	315. Ougarou
292. Barga, 9 km NE	298. Markoye, 30 km N	304. Djipologo	310. Nobere, 9 mi S	316. Arly
293. Seguenega, 6 km SE	299. Fo	305. Founzan	311. Cella, 6 mi S	
294. Boussouma, 5 km N	300. Satiri, 8 km NE	306. Oulo	312. Cella, 1 km N	
295. Tatarko	301. Orodara, 27 km ENE	307. Goden	313. Natiaboani	

Collector: R. E. Vaden (11–15 Mar 1969).

Habitat: "The nearby bush is a very narrow belt of savanna with [land cleared for cultivation] on the other side . . . typical Sudan Savanna—basically a shrub and grass vegetation with fairly heavy stands of brush, and a high incidence of trees, many of which are quite

large. The grass . . . forms a fairly constant ground cover, except where replaced by shrubs."

Remarks: In his field journal, Vaden placed this site near Gouni, a village that matches his coordinates, but adopted the distance from Cella for his written provenience.

Taxa: *Galago*; *Steatomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*; *Lepus*; *Atelerix*; *Epomophorus*, *Lavia*.

**Cella, 6 mi** [9.7 km] S (Map 10: 311).

Coordinates: 11°32'N, 00°22'W C.

Collector: R. E. Vaden (13–14 Mar 1969).

Habitat: “Sudan Savanna, burned over but still with plenty of grass standing, and shrubs from moderate to dense with scattered trees.”

Remarks: While maintaining the base camp at 1 km N Cella (11–15 Mar), Vaden drove 6 mi [9.7 km] south of the village and set another line in “more typical” Sudan Savanna. This locality is differentiated as such on the labels of the dozen small mammals collected there.

Taxa: *Galago*; *Taterillus*, *Lemniscomys*, *Mastomys*.

**Dana, 8 km S** (Map 10: 309).

Coordinates: 11°48'N, 02°08'W C.

Collector: R. E. Vaden (18–23 May 1969).

Habitat: “Habitat is highly varied—large trees scattered, but concentrated near riverbeds (none flowing, but some pools), medium and small trees and shrubs in dense patches, with large ‘clear’ areas of a few shrubs and grasses. There are some large areas of hard-baked clay and gravel, punctuated with a few shrubs; other areas are very grassy. The dense tree-shrub stands along the riverbed are similar to what I called ‘riverine forest’ at Founzan but . . . not nearly as extensive, occupying only a few yards on either side of the actual river bed.”

Remarks: In his journal, Vaden noted that camp was actually located at Bazilakoa, “a small Mossi settlement 8 km south of Dana.” His “8 km S” coordinates match those of the USBGN (1965) for Bazilakoa, which sits by a seasonally intermittent stream, the Koutiala.

Taxa: *Galago*; *Xerus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Praomys*; *Lepus*; *Genetta*; *Sylvicapra*.

**Dio** (Map 10: 291).

Coordinates: 13°20'N, 02°38'W C, G.

Collector: R. E. Vaden (19–24 Feb 1969).

Habitat: “Native vegetation nearby. Habitat is mainly Sudan Savanna, consisting of grassland, with thickets of medium to large shrubs and plenty of large trees [Figure 66]. Soil ranges from a sandy clay to rocky, and there are several large outcroppings of huge boulders . . . overgrown at their bases by grass and small shrubs. Some expanses of apparently Sahel

Savanna are present, particularly near the rocky areas, away from present watercourses . . . large rock outcropping about a mile [1.6 km] east of camp . . . It consists of piles of large boulders—they almost look glacial” (emphasis in original).

Taxa: *Cricetomys*, *Steatomys*, *Acomys*, *Desmodilliscus*, *Gerbilliscus*, *Taterillus*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Taphozous*, *Nycteris*.

**Djipologo** (Map 10: 304).

Coordinates: 10°56'N, 03°07'W C, G.

Collector: R. E. Vaden (5–12 Jul 1969).

Habitat: “Somewhat ecotonal, more Guinea than Sudan Savanna. Basically a grassland, the terrain is somewhat hilly, with trees scattered all over . . . The nearby hillside is very grassy, with trees in some areas; in places the slopes are rocky and pretty steep.”

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Epomophorus*, *Micropteropus*, *Rhinolophus*, *Hipposideros*, *Nycteris*, *Nycticeinops*, *Scotophilus*; *Genetta*.

**Fo** (Map 10: 299).

Coordinates: 11°53'N, 04°31'W C, G (as Fô).

Collector: R. E. Vaden (9–14 Jun 1969).

Habitat: “Highly variable. In the valley where the village is located most of the vegetation has been cleared for farming. What remains consists almost exclusively of grass . . . with scattered large trees (mango, baobab . . .). The ‘valley’ is enclosed on east and west by [fairly] steep rocky hills and small cliffs of rock. The hills are densely covered by shrubs, grasses and a few trees. At the top [of the hills the] vegetation is ‘typical’ Sudan Savanna consisting of trees, scattered clumps of shrubs and grassland. To the south the ‘valley’ drops off down ‘cliffs’ about 100 to 150 feet [30–46 m] into another similar ‘valley’ this consisting primarily of ‘tree savanna’—many trees with few shrubs but plenty of grass . . . The general habitat seems to be a tree-grassland [Figure 67], with few shrubs . . . Most of our trapping has been on the rocky slopes east of [and later west of] camp; most of the specimens brought in by the villagers come from the open flat, farming lands near the village.”

Remarks: Fo is situated on a modest plateau (400 m, according to Vaden) and is surrounded by higher elevations, with fairly steep-sided rocky hills. The *Redunca* and some *Genetta* were collected “in the valley below the Falaise de Fô (cliffs south of camp a couple of



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FIGURE 66. Burkina Faso, Dio (photograph by R. E. Vaden, Feb 1969).

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FIGURE 67. Burkina Faso, Fo (photograph by R. E. Vaden, Jun 1969).

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miles).” The valley mentioned is probably that of the Kana River.

Taxa: *Steatomys*, *Acomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Eidolon*, *Epomophorus*, *Hypsignathus*, *Micropteropus*; *Genetta*; *Ourebia*, *Sylvicapra*, *Redunca*.

**Founzan** (Map 10: 305).

Coordinates: 11°27'N, 03°14'W C, G.

Collector: R. E. Vaden (12–17 May 1969).

Habitat: Around the base camp, “the habitat is tree savanna, with high grass and scattered shrubs. The trees are mainly of medium height, 15 to 20 feet [4.6–6.1 m] . . . soil is pretty much clay . . . great deal of farming . . . tree shrub bush.” At 5 km N Founzan, “the habitat is . . . fairly dense forest (fairly tall trees) interspersed with grasslands (flood plains) and shrubby areas. The shrubs and trees are fairly thick along the river proper and above the flood plains.”

Remarks: At 5 km north of Founzan, the road crosses the Grand Balé River, a major branch of the Black Volta. All specimen labels indicate Founzan and do not distinguish the two areas of field activity by the local-

ity designation. However, individual labels contain habitat annotations, either as “tree-shrub savanna” or “riverine forest,” that appear to be consistent with the separate collecting sites described by Vaden.

Taxa: *Galago*, *Chlorocebus*, *Erythrocebus*, *Papio*; *Heliosciurus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Praomys*; *Lepus*; *Atelerix*; *Crocidura*; *Epomophorus*, *Nycteris*; *Genetta*.

**Goden** (Map 10: 307).

Coordinates: 12°22'N, 02°18'W C (12°23'N, 02°18'W G).

Collector: R. E. Vaden (17–21 Nov 1968).

Habitat: “Sudan Savanna” (Figure 68) (specimen labels).

Taxa: *Erythrocebus*; *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*, *Praomys*; *Atelerix*; *Hipposideros*, *Nycteris*, *Chaerephon*, *Nycticeinops*, *Scotophilus*.

**Gorgadji, 17 km E** (Map 10: 296).

Coordinates: 14°02'N, 00°22'W C.

Collector: R. E. Vaden (5–10 Feb 1969).

Habitat: “Sahel Savanna, not entirely degraded—much more natural than at Petoye [see below]—but still supporting far too many goats and cattle . . . few



FIGURE 68. Burkina Faso, Goden (photograph by R. E. Vaden, Nov 1968).

large trees except near the 'river,' which consists of pools of standing (stagnant) water. Shrubs, especially thorny bushes, are plentiful, but concentrated in small, dense stands. There are some fairly large grassy areas . . . grazed over to 8 to 10 inches [20–25 cm] or less. Soil ranges from loose sand to baked clay . . . dense thorny brush piles . . . open, scattered shrub . . . cut-over cornfields . . . tree-shrub stands."

Remarks: Vaden established base camp about 150 yards [137 m] outside the village of Pétéguersé, which corresponds to his coordinates, but used the distance from the larger town of Gorgadji on specimen labels. An appreciable number of mammals were collected along the river, which Vaden reckoned as "about 3 miles [4.8 km] north of the camp." This rainy-season stream is probably the Goudébo.

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Praomys*; *Lepus*; *Crocidura*; *Taphozous*, *Nycticeinops*, *Neoromicia*; *Felis*, *Genetta*, *Ictonyx*.

**Konankira, [2 km S]** (Map 10: 290).

Coordinates: 12°53'N, 03°53'W G (for Karéqui; see Remarks).

Collector: R. E. Vaden (5–9 May 1969).

Habitat: "Shrub savanna"—there are large expanses of grassland, with plenty of low to medium [height] shrubs [and] some scattered trees [Figure 69] . . . shrub-grassland near the village."

Remarks: Uncharacteristically, Vaden's adopted provenience is slightly misleading. The actual fieldwork was conducted near Karékui, which he recognized in his field journal as a Fulani village about 2 km S Konankira, but he identified the collecting locality only as Konankira. Nonetheless, the USBGN (1965) coordinates for Karéqui (12°53'N, 03°53'W) nearly equate to those used by Vaden for Konankira (12°54'N, 03°53'W).

Taxa: *Galago*; *Heliosciurus*, *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Mastomys*, *Mus*, *Rattus*; *Lepus*; *Atelerix*; *Rhinolophus*, *Hipposideros*, *Nycteris*; *Genetta*, *Galerella*.



FIGURE 69. Burkina Faso, Konankira, [2 km S] (photograph by R. E. Vaden, May 1969).



**Koutoura, 5 km SW (Map 10: 302).**

Coordinates: 10°19'N, 04°53'W C.

Collector: R. E. Vaden (21–26 Jun 1969).

Habitat: “Guinea Savanna—basically a tree-grassland, with dense shrubs in places. The grasslands are extensive, dotted with trees, including borassus palms. The soil here is surprisingly sandy: the grass is fairly thick although only 14 inches [36 cm] or so high.”

Remarks: Tents were set up southwest of Koutoura, near the small village of Diakora (10°18'N, 04°53'W G), which closely approximates the coordinates employed by Vaden.

Taxa: *Galago*; *Heliosciurus*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Eidolon*, *Epomophorus*, *Micropteropus*, *Nycteris*; *Genetta*.

**Markoye, 30 km N (Map 10: 298).**

Coordinates: 14°54'N, 00°04'E C.

Collector: R. E. Vaden (31 Jan–4 Feb 1969).

Habitat: “The habitat is difficult to describe . . . a thicket of thorn bushes and low trees . . . [close by] is an expanse of hard, baked, desert soil with practically no vegetation. If forced to, I'd call it ‘desert thorn scrub’ [Figure 70] for want of a better name—I'm sure that it's not Sahel Savanna [although ‘Sahel Savanna’ is recorded, apparently at some later time, on specimen labels for this locality]. All in all quite a varied region with vegetation very desert-like but more dense in most places than in deserts I'm used to. Few grasses, only in isolated patches never more than 14 inches [36 cm] tall. Many thorn bushes, mostly 6–10 feet [1.8–3.0 m] tall . . . Some [extensive] areas lack vegetation entirely.”

Remarks: After passing through Markoye (14°39'N, 00°02'E G) and heading north toward the Beli River, the crew lost the road and perhaps strayed into Mali before eventually locating their campsite just south of that river. Initially, Vaden indicated that his coordinates for this locality were probably “within a



FIGURE 70. Burkina Faso, Markoye, 30 km N: Sandy hill (photograph by R. E. Vaden).

couple of kilometers” of his actual position. Later he confirmed his camp’s whereabouts in relation to some barely visible cross roads about 50 yards [46 m] southwest of their camp. On 3 Feb, Vaden drove about 4.5 mi [7.2 km] north of camp to a “sandy desert hill with sparse vegetation but hundreds of rodent burrows” to set a trapline. This change in trapping venue is not reflected on the specimen labels of the two *Gerbillus* collected.

Taxa: *Xerus*, *Gerbillus*, *Mastomys*, *Praomys*; *Lepus*; *Nycticeinops*; *Genetta*.

**Natiaboani** (Map 10: 313).

Coordinates: 11°42'N, 00°30'E C, G.

Collector: R. E. Vaden (7–14 Dec 1968).

Habitat: “River bed—no running water but several pools . . . high grass.” “Sudan Savanna” (specimen labels).

Remarks: Some specimens were collected along a nearly dry river bed, but most were apparently gathered from Natiaboani and the surrounding countryside by villagers. Several seasonal streams are in the vicinity of Natiaboani, all of which are tributaries of the Otabango, Koul Péolgo, and Oualé river system (CAO, *Pama*, 1:200,000).

Taxa: *Galago*; *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Hystrix*; *Lepus*; *Epomophorus*, *Rhinolophus*, *Nycteris*, *Scotophilus*; *Felis*, *Genetta*, *Ichneumia*; *Sylvicapra*.

**Nayoure, 3 km SE** (Map 10: 314).

Coordinates: 12°15'N, 00°16'E C.

Collector: R. E. Vaden (16–20 Mar 1969).

Habitat: “Sudan Savanna, grass-brush-tree vegetation. Grass is . . . 3 or 4 feet [0.9–1.2 m] [high] in places. Shrubs are high, and fairly dense, and trees are relatively common. The soil . . . slightly sandy clay baked pretty hard.”

Remarks: Camp was pitched near a small village to the southeast of Nayoure (12°16'N, 00°15'E G). Vaden did not identify this village, although he indicated in his journal that a village was shown on his “one degree square” map where he reckoned his position. On the probable map that Vaden cited (CAO, *Fada Ngourma*, 1:200,000), the village of Oboungouni is found at the collector’s coordinates (also consistent with the USBGN, 1965).

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Steatomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*; *Lepus*; *Atelerix*; *Rhinolophus*, *Nycteris*; *Genetta*; *Sylvicapra*.

**Nobere, 9 mi [14.5 km] S** (Map 10: 310).

Coordinates: 11°26'N, 01°10'W C.

Collectors: L. W. Robbins, H. W. Setzer, and R. E. Vaden (7–10 Nov 1968).

Habitat: “Sudan Savanna with dense brush and high grass—many acacias” (LWR).

Remarks: Camp was established to the south of Nobere (11°33'N, 01°12'W G), near the Red Volta River, which forms the northern boundary of the Forêt Classée de Pô.

Taxa: *Galago*; *Taterillus*, *Lemniscomys*, *Mastomys*, *Praomys*; *Micropteropus*, *Hipposideros*, *Lavia*, *Nycteris*.

**Orodara, 27 km ENE** (Map 10: 301).

Coordinates: 11°04'N, 04°41'W C.

Collector: R. E. Vaden (15–20 Jun 1969).

Habitat: “The habitat seems to be ecotonal—basically a tree-shrub-grassland typical of Sudan Savanna, with an occasional borassus palm. Some areas are fairly open grassland with trees, others have dense shrubs; the open areas seem dominant. This is a fairly mountainous region. The riverbanks have a fairly dense vegetation, including some tropical-looking elements, but it extends only 8 or 10 feet [2.4 or 3.0 m] back up the banks, then gives way to the more open savanna. The ground is fairly hard clay with considerable rock areas, small areas of hard, graveled ‘pavement,’ extensive areas of rock just under the surface . . . and some fairly large areas of rocks . . . Three miles [4.8 km] up the road . . . Guinea (?) Savanna—several borassus palms in predominantly tree-grass habitat with occasional thickets of shrubs.”

Remarks: Vaden recorded his camp as nearby a small unnamed village (perhaps Guéna; 11°04'N, 04°44'W G) on the Black Volta River and defined its location in relation to Orodara (10°59'N, 04°55'W G). The site specified by his coordinates actually falls close to the Dienkoa River, a small upper tributary of the Black Volta, as located on a Burkina map (CAO, *Bobo-Dioulasso*, 1:500,000).

Taxa: *Galago*, *Erythrocebus*; *Funisciurus*, *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*; *Lepus*; *Atelerix*; *Hypsignathus*, *Lissonycteris*, *Rhinolophus*, *Hipposideros*, *Nycteris*; *Genetta*.

**Ouagadougou** (Map 10: 308).

Coordinates: 12°21'N, 01°32'W C (12°22'N, 01°31'W G).

Collector: R. E. Vaden (15–17 Jan, 27 Apr 1969).

Habitat: “Mango grove” (specimen labels).

Remarks: The Vadens regularly returned to Burkina Faso’s capital for supplies and vehicular repair. During such

intermittent visits, they incidentally netted bats and trapped rodents on the compound of the American Protestant Mission. Coordinates for specimens collected on 27 Apr were given as 12°21'N, 01°33'W C.

Taxa: *Praomys*; *Epomophorus*, *Scotophilus*, *Pipistrellus*.

**Ougarou** (Map 10: 315).

Coordinates: 12°10'N, 00°56'E C (12°09'N, 00°56'E G).

Collector: R. E. Vaden (21–26 Mar 1969).

Habitat: “‘Typical’ Sudan Savanna—tall grass, relatively thick, with plentiful medium-to-high shrubs and a good number of trees. Soil is again the sandy-clay type . . . Near the river [later corrected as the outflow from a man-made impoundment—see Remarks], there are several moderate hills, with small cliffs along one ridge . . . rocky outcroppings.”

Remarks: Several bats, mostly *Epomophorus*, that bear this place-name were actually mist-netted along a densely vegetated impoundment and spillway, at first described as a small “river,” a seasonal tributary of the Boubwonli, located 2 mi [3.2 km] west (approximately 12°09'N, 00°54'E M) of the Vadens' camp. Only the one locality name, “Ougarou,” is used for all specimens.

Taxa: *Xerus*, *Cricetomys*, *Acomys*, *Arvicanthus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Crocidura*; *Epomophorus*, *Hipposideros*, *Nycticeinops*, *Scotophilus*, *Neoromicia*; *Genetta*; *Eudorcas*, *Ourebia*.

**Oulo** (Map 10: 306).

Coordinates: 11°54'N, 02°58'W C (11°54'N, 02°59'W G).

Collector: R. E. Vaden (1–4 May 1969).

Habitat: Initially (1 May), Vaden recorded the habitat as “good Sudan Savanna country. The vegetation consists of relatively dense clusters of low shrubs, most under 3 feet [0.9 m] in height. Trees are common, and there is grass . . . everywhere; [although not in] extensive grassy areas.” Later (2 May), he noted that “My ‘low shrub’ habitat isn’t very accurate; many areas are covered by shrubs up to 6–7 feet [1.8–2.1 m] high. I’ll change the description to ‘shrub-grassland.’”

Remarks: Depending upon the date of collection, either of the above two habitat terms may appear on individual specimen labels.

Taxa: *Galago*; *Heliosciurus*, *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Praomys*, *Rattus*; *Lepus*; *Atelerix*; *Nycteris*; *Genetta*.

**Petoye** (Map 10: 297).

Coordinates: 14°35'N, 00°22'W C, G.

Collector: R. E. Vaden (28–30 Jan 1969).

Habitat: “The habitat is Sahel Savanna, heavily over grazed by . . . cattle and goats . . . the grass is very short and large areas are bare . . . impressive rock outcroppings . . . The soil is very sandy . . . A few shrubs . . . and a few trees (seldom over 10 feet [3.0 m] tall); all in all, it’s one of the worst cases of habitat destruction I’ve ever seen! . . . open scrub.”

Remarks: Camp was pitched just southeast of the main part of the village, but on the basis of Vaden’s observations of the degraded habitat, they soon departed for Markoye.

Taxa: *Xerus*, *Gerbilliscus*, *Taterillus*, *Arvicanthus*, *Mastomys*; *Atelerix*; *Chaerephon*, *Scotophilus*; *Ictonyx*.

**Satiri, 8 km NE** (Map 10: 300).

Coordinates: 11°30'N, 04°00'W C.

Collector: R. E. Vaden (10–12 May 1969).

Habitat: “‘Tree-shrub savanna’ . . . although the shrubs are fairly scarce. The vegetation consists mainly of high grass with a great number of trees, ranging from seedlings to heights of 25 to 30 feet [7.6–9.1 m]. Most are of medium height—10 to 15 feet [3.0–4.6 m]—and are rather skimpy in appearance. The few shrubs occur in scattered stands, occasionally getting into the ‘tree’ areas.”

Remarks: Base camp was established near a small Bobo-Mossi village, Kadonda, whose USBGN (1965) coordinates match those employed by Vaden, but the collecting site was referenced to the larger town of Satiri (11°26'N, 04°02'W G). Vaden mentioned the proximity of his campsite to a Fôret Classée (presumably the Maro Reserve) and a flowing river that formed a boundary of the Fôret Classée. On the basis of his description, this river is likely the Léyésa or perhaps the Wéré, which forms the reserve’s western boundary. Because of poor success (“natives cleared and burned [all the vegetation]”) and a water shortage, the stay at this site was brief.

Taxa: *Gerbilliscus*, *Taterillus*, *Mastomys*; *Atelerix*; *Genetta*.

**Seguenega, 6 km SE** (Map 10: 293).

Coordinates: 13°24'N, 01°55'W C.

Collector: R. E. Vaden (3–8 Mar 1969).

Habitat: “Terrain is rolling hills with broad river basins between, covered with grasses and low shrubs . . . thorn bushes . . . some large trees, generally around the village or along the river beds. Soil is slightly red, sandy-clay to clay, much of it baked hard (but not to the extent of the hardpan in the sub-desert regions to the north) . . . marginal Sudan-Sahel savanna . . . ecotonal between Sudan and Sahel Savannas . . . there

are elements of Sudan Savanna this far north whether natural . . . or introduced.”

Remarks: The Vadens passed through Seguenega and established camp near the smaller village of Tanpelga (13°25'N, 01°55'W G), the coordinates of which nearly match their own. The river beds probably refer to various seasonally intermittent branches that drain into the White Volta River, just to the west of Seguenega.

Taxa: *Galago*; *Heliosciurus*, *Cricetomys*, *Acomys*, *Desmodilliscus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Hipposideros*.

**Sideradougou** (Map 10: 303).

Coordinates: 10°40'N, 04°15'W C, G.

Collector: R. E. Vaden (27 Jun–2 Jul 1969).

Habitat: “Primarily tree savanna with perhaps a few more clusters of shrubs than before [a reference to *Koutoura*] . . . extensive farming . . . open grassland.”

Remarks: For their camp, the Vadens selected an area on the southeast outskirts of town, “so the bush isn’t far away.”

Taxa: *Galago*, *Papio*; *Heliosciurus*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Eidolon*, *Epomophorus*, *Hypsignathus*, *Nycteris*.

**Tatarko** (Map 10: 295).

Coordinates: 13°29'N, 00°20'W C (13°28'N, 00°19'W G).

Collector: R. E. Vaden (22–27 Jan 1969).

Habitat: “The habitat is quite different from that farther south—more small trees, less expanse of grasses, and the grasses are somewhat shorter; however, I don’t believe we’ve actually left Sudan Savanna. This may be marginal, an ecotone between Sudan and Sahel Savanna [Figure 71] . . . no bodies of water around . . . Baobab trees are few and far between . . . rocky cliff-like hill.” “Sudan Savanna” (specimen labels).



FIGURE 71. Burkina Faso, Tatarko (photograph by R. E. Vaden, Jan 1969).

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*; *Lepus*; *Atelerix*; *Crocidura*; *Taphozous*, *Nycteris*, *Chaerephon*; *Galerella*.

GHANA

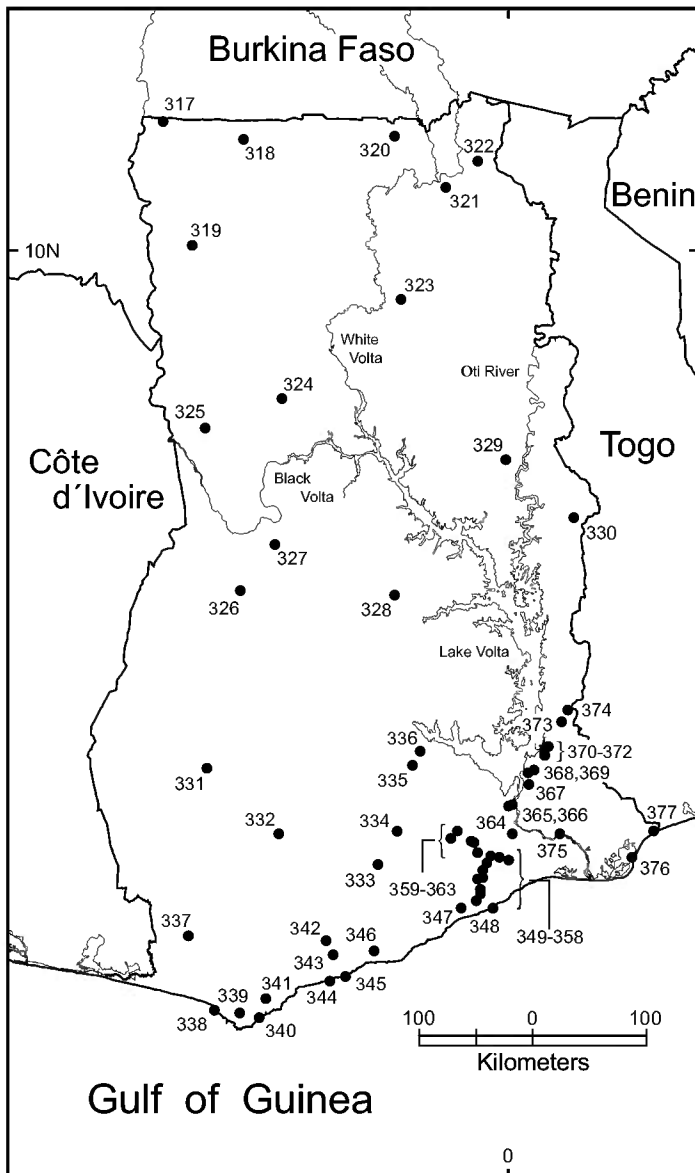
**GENERAL REMARKS.** Ghana was an important west African country in terms of the effort and personnel devoted to its survey and the number of localities visited (61; Map 11), although many were little more than opportunistic day trips into the Accra Plains of southeastern Ghana, arranged while the field teams were laying over at Legon. Dr. Leo R. Cole, Department of Zoology, the University of Ghana, accompanied Geest in 1968 at

Pra Suhien Forest Reserve and at 15 mi W Prestea. Barry Hughes, a herpetologist also from the University of Ghana (C. B. Robbins, pers. comm.), periodically accompanied Geest in 1967. Legon, the general base of operations for all field teams, and nearby Achimota were intermittently collected many times and therefore are not listed in the itineraries that follow.

**ITINERARIES.** J. C. Geest and B. J. Hayward: **Bator**, 14–16 Jul 1967; **Mankesin**, 29 Jul 1967; **Aburi Hills**, 31 Jul 1967.

J. C. Geest, B. J. Hayward, and A. Kofi: **1 mi N Nkawkaw**, 3–12 Aug 1967.

B. J. Hayward and A. Kofi: **Jukwa**, 16–21 Aug 1967; **Cape Coast**, 19 Aug 1967; **Elmina**, 20 Aug 1967; **7 mi N Prince's Town**, 22–26 Aug 1967; **Axim**, 25 Aug 1967; **Anum**, 29 Aug 1967; **7 mi S Bame**, 29 Aug 1967; **Amedzofe**, 30 Aug 1967; **Denu**, 31 Aug 1967; **Keta**, 31 Aug 1967.



MAP 11. African Mammal Project cardinal collecting localities 317–377 in Ghana.

- |                                |                       |
|--------------------------------|-----------------------|
| 317. Bangwon                   | 348. Teshi            |
| 318. Pulima                    | 349. Achimota         |
| 319. Pirisi                    | 350. Legon            |
| 320. Veya                      | 351. Medina           |
| 321. Gambaga                   | 352. Berekuso, 1 mi N |
| 322. Shishe                    | 353. Aburi Hills      |
| 323. Nabogo                    | 354. Aburi            |
| 324. Damango, [5 mi E]         | 355. Tutu             |
| 325. Sakpa                     | 356. Mamfe            |
| 326. Subinja                   | 357. Aiyikuma         |
| 327. Yabraso                   | 358. Doyum            |
| 328. Kokofu                    | 359. Suhum, 2.4 mi E  |
| 329. Wulasi                    | 360. Nankasi          |
| 330. Odomi Jongo               | 361. Okorasi          |
| 331. Ahiriso                   | 362. Tinkong, 3 mi NW |
| 332. Adamso                    | 363. Adawso           |
| 333. Oda                       | 364. Krobo Mountain   |
| 334. Kade, 6 mi NW             | 365. Akosombo         |
| 335. Nkawkaw, 1 mi N           | 366. Akwamu, 5 mi W   |
| 336. Kwahu Tafo                | 367. Asikuma, 1 mi N  |
| 337. Prestea, 32 mi W          | 368. Anum             |
| 338. Axim                      | 369. Avetile          |
| 339. Prince's Town, 7 mi N     | 370. Tsibu, 7 mi N    |
| 340. Butre                     | 371. Bame, 7 mi S     |
| 341. Efeipo Krom               | 372. Kpeve            |
| 342. Pra Suhien Forest Reserve | 373. Amedzofe         |
| 343. Jukwa                     | 374. Leklebi Agbesia  |
| 344. Elmina                    | 375. Bator            |
| 345. Cape Coast                | 376. Keta             |
| 346. Mankesin                  | 377. Denu             |
| 347. Weija                     |                       |

J. C. Geest, J. W. LeDuc, and C. B. Robbins: **Aburi**, 2, 8 Oct 1967; **1 mi N Berekuso**, 8–11, 15–16 Oct 1967; **Medina**, 16 Oct 1967; **1 mi N Berekuso**, 20–21 Oct 1967; **Aburi Hills**, 23 Oct 1967.

J. C. Geest, J. W. LeDuc, C. B. Robbins, and H. W. Setzer: **6 mi NW Kade**, 26 Oct–2 Nov 1967; **1 mi N Berekuso**, 5 Nov 1967; **Medina**, 9 Nov 1967; **Aiyikuma**, 11 Nov 1967; **Medina**, 12 Nov 1967; **Krobo Mountain**, 13 Nov 1967; **Pra Suhien Forest Reserve**, 14 Nov 1967; **Doyum**, 14–16 Nov 1967; **Krobo Mountain**, 19 Nov 1967; **Kwahu Tafo**, 20 Nov 1967; **Medina**, 20 Nov 1967; **Teshi**, 22–26 Nov 1967; **Akosombo**, 30 Nov 1967; **5 mi W Akwamu**, 2 Dec 1967; **1 mi N Asikuma**, 2 Dec 1967; **Avetile**, 2 Dec 1967; **Kpeve**, 2 Dec 1967; **7 mi N Tsiibu**, 2 Dec 1967; **Adawso**, 10 Dec 1967; **Mamfe**, 10 Dec 1967; **Nankasi**, 10 Dec 1967; **Okorasi**, 10 Dec 1967; **2.4 mi E Suhum**, 10 Dec 1967; **3 mi NW Tinkong**, 10 Dec 1967; **Tutu**, 10 Dec 1967; **Weija**, 16–17 Dec 1967.

J. C. Geest: **32 mi W Prestea**, 6–15 Jan 1968; **Butre**, 16–22 Jan 1968; **Ahiriso**, 23–31 Jan 1968; **Subinja**, 19–24 Feb 1968; **Pirisi**, 25 Feb–1 Mar 1968; **Pulima**, 2–7 Mar 1968; **Bangwon**, 8–13 Mar 1968; **Sakpa**, 14–21 Mar 1968; **6 mi NW Kade**, 26–29 Mar 1968; **Yabraso**, 6–12 Apr 1968; **Nabogo**, 12–23 Apr 1968; **Veya**, 24–30 Apr 1968; **Shishe**, 1–6 May 1968; **Gambaga**, 7–14 May 1968; **Wulasi**, 14–20 May 1968; **Kokofu**, 20–25 May 1968; **Odomi Jongo**, 16–23 Jun 1968; **Leklebi Agbesia**, 23–30 Jun 1968; **Efeipo Krom**, 8–15 Jul 1968.

J. W. LeDuc, L. W. Robbins, H. W. Setzer, and R. E. Vaden: **Oda**, 8–15 Oct 1968.

T. J. McIntyre and W. P. Murdoch Jr.: **Adamso**, 7–12 Aug 1969; **[5 mi E] Damango**, 13–19 Aug 1969.

**Aburi**, Eastern Region (Map 11: 354).

Coordinates: 05°50'N, 00°11'W C (05°51'N, 00°11'W G).  
Collectors: J. C. Geest (8 Oct 1967); C. B. Robbins (2 Oct 1967).

Habitat: "House" (JCG). "Remnant forest" (CBR).

Remarks: Invasive woodland (Rosevear, 1965).

Taxa: *Lophuromys*, *Mastomys*; *Nycteris*.

**Aburi Hills**, 10 mi [16.1 km] N Legon, 0.5 mi [0.8 km] N Aiyimensa, Eastern Region (Map 11: 353).

Coordinates: 05°47'N, 00°11'W C.

Collectors: J. C. Geest (31 Jul; 23 Oct 1967); B. J. Hayward (31 Jul 1967).

Habitat: "Mouth of a canyon which has a stream running through it" (JCG). "It had once been fine forest, but most of it was cut over, some planted to cassava, other areas growing up to very dense undergrowth. A

few isolated trees remained" (BJH). "Remnant High Forest" (specimen labels).

Remarks: The second locality modifier in the cardinal line refers to two *Lemniscomys* specimens collected by Barry Hughes near Aiyimensa (05°47'N, 00°11'W G) on 23 Oct. The specimen labels on both read "10 mi N Legon," whereas the second locality modifier on one further reads "0.5 mi N" and the other "0.5 mi NW" of Aiyimensa (a description verified by Survey of Ghana, *Accra*, 1:250,000).

Taxa: *Lophuromys*, *Lemniscomys*; *Epomops*.

**Achimota**, Eastern Region (Map 11: 349).

Coordinates: 05°37'N, 00°14'W C, G.

Collectors: J. C. Geest, A. Kofi, J. W. LeDuc, C. B. Robbins, and H. W. Setzer (various dates in Oct, Nov, Dec 1967); R. E. Vaden (17 Oct 1968).

Habitat: "Tall grasses which were on the bank of a stream" (AK). "Accra Plains" (specimen labels).

Remarks: This locality was visited on many day trips from the field headquarters at Legon. Two specimens were taken by Kofi at 2 mi [3.2 km] N Achimota according to specimen labels, although this locality is not mentioned in his field catalog.

Taxa: *Mastomys*, *Praomys*; *Epomophorus*, *Epomops*, *Micropteropus*, *Hipposideros*.

**Adamso**, Ashanti Region (Map 11: 332).

Coordinates: 06°05'N, 01°46'W C (06°04'N, 01°47'W G).

Collectors: T. J. McIntyre and W. P. Murdoch Jr. (7–12 Aug 1969).

Habitat: "The term degraded high forest best describes the area. The area immediately about the camp is a mixture of grasses, banana, and shrubby second growth. Scattered through the area are mature trees which appear to be of the genera *Triplochiton*, *Entandrophragma*, and *Khaya* and several other trees in 100–150 feet (30.5–45.7 m) range . . . cocoa and maize fields" (TJM).

Remarks: This locality is 12.9 km north of Dunkwa. Adamso is located approximately 1.6 km east northeast of the Subin Shelterbelt Forest Reserve and 3.2 km north of the Denyau Shelterbelt Forest Reserve.

Taxa: *Perodicticus*, *Cercopithecus*, *Procolobus*; *Funisciurus*, *Heliosciurus*, *Paraxerus*, *Graphiurus*, *Cricetomys*, *Lophuromys*, *Taterillus*, *Hybomys*, *Hyalomyscus*, *Lemniscomys*, *Malacomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*, *Atherurus*, *Thryonomys*; *Crocidura*; *Neoromicia*; *Manis*; *Genetta*, *Crossarchus*, *Galerella*.

**Adawso**, Eastern Region (Map 11: 363).

Coordinates: 05°57'N, 00°13'W C, G.

Collectors: J. W. LeDuc and H. W. Setzer (10 Dec 1967).

Habitat: "Road culvert" (specimen labels).

Remarks: LeDuc and Setzer collected bats from culverts in the vicinity of Adawso. Specimens were taken in the village and also at the following distances from Adawso: 1 mi [1.6 km] E (05°57'N, 00°12'W C); 1.9 mi [3.1 km] NW (05°58'N, 00°14'W C); 4.7 mi [7.7 km] E (05°57'N, 00°07'W C); and 5.7 mi [9.2 km] E (05°57'N, 00°08'W C). About half of Setzer's specimen labels contain the variant spelling Adawaso.

Taxon: *Nycteris*.

**Ahiriso**, Ashanti Region (Map 11: 331).

Coordinates: 06°32'N, 02°20'W C, G (as Ahireso).

Collector: J. C. Geest (23–31 Jan 1968).

Habitat: "Much of the land is planted in cocoa . . . The *Diffenbachia* (dumb cane) is really thick in places

. . . major cutting of the forest occurred 15 years ago . . . In the clearing of the forests many of the emergents were left [Figure 72]. The larger trees appear somewhat naked . . . There is almost no middle story or canopy left . . . a cleared area that contained banana trees." "Remnant high forest" (specimen labels).

Remarks: The camp of Ahiriso was situated on a tributary of the Tano River.

Taxa: *Perodicticus*, *Galago*; *Funisciurus*, *Heliosciurus*, *Paraxerus*, *Protoxerus*, *Graphiurus*, *Cricetomys*, *Lophuromys*, *Hylomyscus*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Rattus*, *Anomalurus*, *Idiurus*; *Crocidura*; *Epomops*, *Megaloglossus*, *Micropteropus*, *Scotonycteris*, *Rhinolophus*, *Hipposideros*, *Saccolaimus*, *Nycteris*, *Mops*; *Galerella*.

**Aiyikuma**, Eastern Region (Map 11: 357).

Coordinates: 05°55'N, 00°03'W C, G.



FIGURE 72. Ghana, Ahiriso: Bat net site, *Tadarida* [= *Mops*] (photograph by J. C. Geest, 23 Jan 1968).

Collectors: J. C. Geest, J. W. LeDuc, C. B. Robbins, and H. W. Setzer (11 Nov 1967).

Habitat: "In a nim tree [*Azadirachta*] in the middle of the village" (CBR).

Remarks: This village is near the Aburi Scarp on the Accra Plains.

Taxa: *Epomophorus*, *Micropteropus*.

**Akosombo**, Eastern Region (Map 11: 365).

Coordinates: 06°17'N, 00°03'E C (06°18'N, 00°03'E G).

Collectors: J. C. Geest, J. W. LeDuc, C. B. Robbins, and H. W. Setzer (30 Nov 1967).

Habitat: "The 'cave' was actually a series of small tunnels formed from a rock shelf outcropping on a fairly steep hill" (JWL).

Taxon: *Nycteris*.

**Akwamu**, 5 mi [8.0 km] W, Eastern Region (Map 11: 366).

Coordinates: 06°16'N, 00°01'E M (Survey of Ghana, *Ho*, 1:250,000).

Collectors: J. C. Geest, J. W. LeDuc, and H. W. Setzer (2 Dec 1967).

Habitat: "Road culvert" (specimen labels).

Remarks: The collector-provided coordinates for this locality (06°14'N, 00°07'E C) differ substantially from those estimated from the field map. Other collecting sites were given as the village of Akwamu itself (06°15'N, 00°07'E C; 06°17'N, 00°05'E G) and 1 mi [1.6 km] N Akwamu (06°16'N, 00°07'E C). The village is spelled "Akwamufe" on LeDuc's and Setzer's specimen labels.

Taxon: *Nycteris*.

**Amedzofe**, Volta Region (Map 11: 373).

Coordinates: 06°51'N, 00°26'E C, G.

Collector: B. J. Hayward (30 Aug 1967).

Habitat: "Bats were roosting in a guava tree behind the rest house . . . banana grove."

Taxa: *Epomops*, *Megaloglossus*, *Micropteropus*.

**Anum**, Eastern Region (Map 11: 368).

Coordinates: 06°30'N, 00°10'E C (06°29'N, 00°09'E G).

Collector: B. J. Hayward (29 Aug 1967).

Habitat: "The hills here are mostly wooded . . . Many mango trees and paw-paws . . . in front of rest house near a flowering Nandi flame tree . . . near the cliff face overlooking the reservoir [Figure 73]."

Remarks: Anum is located in the Togo Hills (Akwapim-Togo Ranges) near the Volta reservoir. The *Nycteris*

specimens were collected at 4 mi [6.4 km] S Anum, in a culvert.

Taxa: *Megaloglossus*, *Micropteropus*, *Nycteris*.

**Asikuma**, 1 mi [1.6 km] N, Eastern Region (Map 11: 367).

Coordinates: 06°25'N, 00°11'E C.

Collector: H. W. Setzer (2 Dec 1967).

Habitat: "Road culvert" (specimen labels).

Remarks: The culvert near Asikuma was one of several that the field team visited on its 2 Dec bat-prospecting road trip.

Taxon: *Nycteris*.

**Avetile**, Volta Region (Map 11: 369).

Coordinates: 06°31'N, 00°13'E C (06°32'N, 00°14'E G).

Collector: H. W. Setzer (2 Dec 1967).

Habitat: "Road culvert" (specimen labels).

Taxon: *Hipposideros*.

**Axim**, Western Region (Map 11: 338).

Coordinates: 04°52'N, 02°16'W C, G.

Collector: B. J. Hayward (25 Aug 1967).

Habitat: "Culverts," "San Antonio Castle" (specimen labels).

Remarks: Hayward spelled the castle as San Antonio on his specimen labels but as San Antonio (Fort San Antonio) in his journal. Rosevear (1965) recorded the general habitat to be "High Forest."

Taxa: *Rhinolophus*, *Nycteris*.

**Bame**, 7 mi [11.3 km] S, Volta Region (Map 11: 371).

Coordinates: 06°36'N, 00°18'E M (Survey of Ghana, *Ho*, 1:250,000).

Collector: B. J. Hayward (29 Aug 1967).

Habitat: "Culverts."

Remarks: Hayward's coordinates and those used by LeDuc and Setzer for **7 mi N Tsibu** are identical (06°37'N, 00°18'E), which implies that the AMP teams used different reference points for the same place. However, inspection of the relevant field journals and their field map reveal that the two AMP teams were driving on parallel roads, to the east and west side of Awudome Mountain, part of the Akwapim-Togo Ranges.

Taxon: *Nycteris*.

**Bangwon**, Upper Region (Map 11: 317).

Coordinates: 10°58'N, 02°41'W C, G.

Collector: J. C. Geest (8–13 Mar 1968).





FIGURE 73. Ghana, Anum: Walter Pople at the rest house (overlooking the Volta reservoir) (photograph by B. J. Hayward).

Habitat: “Good Sudan woodland in vegetative appearance, typical of the parkland effect . . . is situated in a valley surrounded by red volcanic bluffs that rise about 200–300 feet [61.0–91.4 m] above the valley floor . . . houses [Figure 74].”

Remarks: The Nandom Forest Reserve is situated a few kilometers to the southwest of Bangwon.

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Steatomys*, *Acomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Atelerix*; *Crocidura*; *Epomophorus*, *Micropteropus*, *Nycteris*.

**Bator**, Volta Region (Map 11: 375).

Coordinates: 06°05'N, 00°25'E C (06°04'N, 00°25'E G).

Collectors: J. C. Geest and B. J. Hayward (14–16 Jul 1967).

Habitat: “Volta River flood plain . . . grasses in this area are 3–5 feet (0.9–1.5 m) high [Figure 75] . . . growing rice and sugar cane . . . planting much cassava and toma-

toes . . . [Soil was] sandy with many clam shells mixed through it. There are small patches that are black loam (river bottom soils) . . . planted trees adjacent to a corn field and then down through the cassava patches” (JCG). “Dense vegetation in the old [river] channel” (BJH).

Taxa: *Mastomys*; *Eidolon*, *Epomophorus*, *Epomops*, *Micropteropus*, *Nanonycteris*, *Chaerephon*.

**Berekuso**, 1 mi [1.6 km] N, Eastern Region (Map 11: 352).

Coordinates: 05°46'N, 00°13'W C.

Collectors: J. C. Geest, J. W. LeDuc, and C. B. Robbins (8–11, 15–16, 20–21 Oct 1967); J. C. Geest, J. W. LeDuc, C. B. Robbins, and H. W. Setzer (5 Nov 1967).

Habitat: “Two palms are present, one an oil palm with black fruits (*Elaeis guineensis*) and the other *Raphia hookeri* . . . cocoa groves . . . cassava . . .” (JCG). “Most of the brush is dense, fairly low, secondary regrowth in remnant high forest [Figure 76] . . . Many

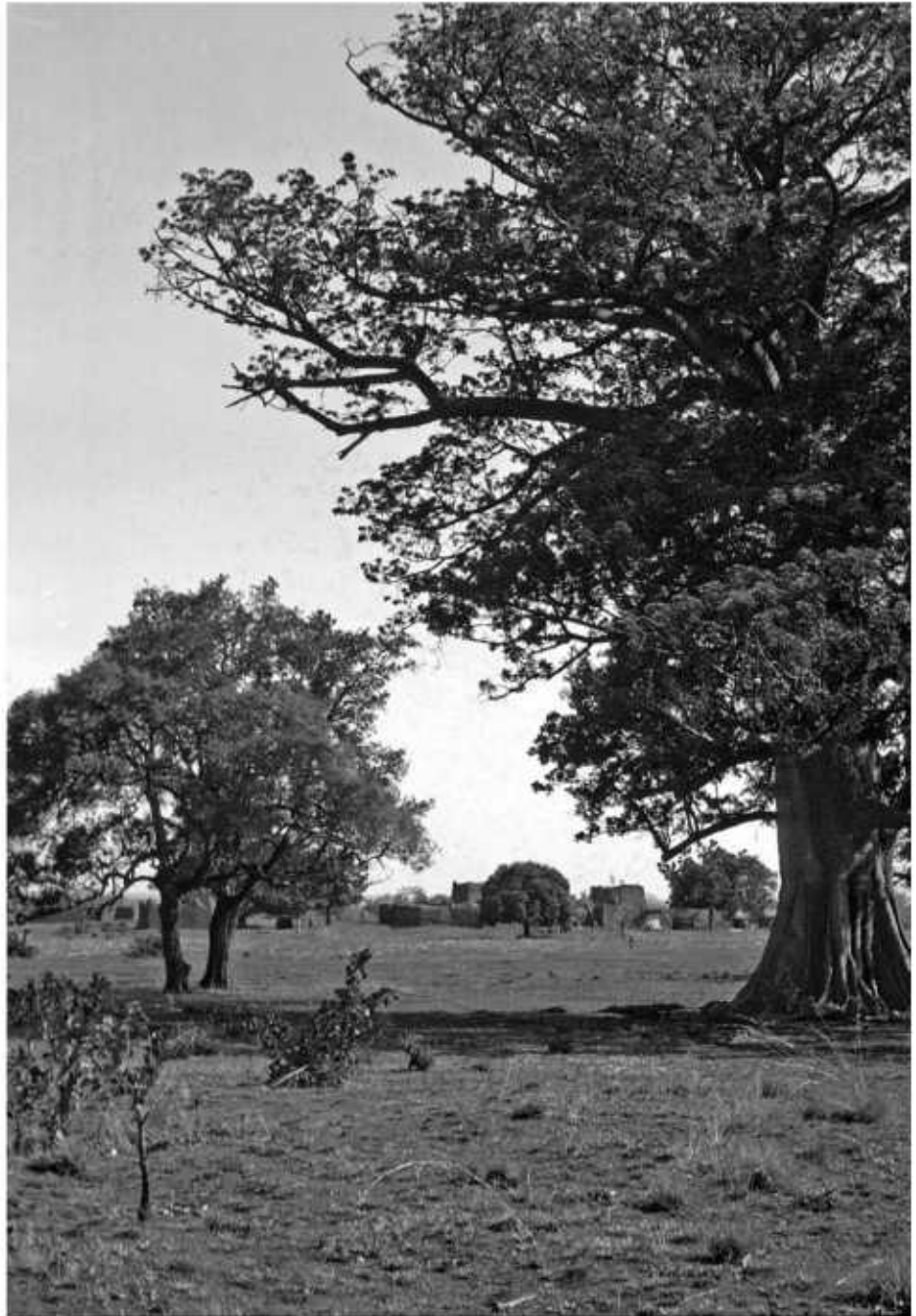


FIGURE 74. Ghana, Bangwon (photograph by J. C. Geest, 5 Mar 1968).

banana trees were noted here . . . [Trapped] along the roadside in high grass . . . cassava patch . . . muddy area . . . and burned out area” (JWL). “Dense secondary forest and thick brush . . . *Pandanus candelabrum* is prominent in the swampy area . . . yam grove” (CBR). “Remnant high forest” (specimen label).

Remarks: LeDuc’s journal mentions this locality as being 3 mi [4.8 km] south of Katasi, although this modifier is not indicated on specimen labels. A secondary collecting site was located 2–3 mi [3.2–4.8 km] N Ber-

ekuso at the Akwapim Scarp. A few specimen labels have only Berekuso as the locality.

Taxa: *Graphiurus*, *Lophuromys*, *Uranomys*, *Gerbilliscus*, *Dephomys*, *Hybomys*, *Hylomyscus*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*; *Crocidura*; *Epomops*, *Hypsignathus*, *Hipposideros*, *Nycteris*, *Glauconycteris*.

**Butre**, Western Region (Map 11: 340).  
Coordinates: 04°49’N, 01°55’W C, G.



FIGURE 75. Ghana, Bator: Accra Plains south of Bator (photograph by B. J. Hayward, Jul 1967).

Collector: J. C. Geest (16–22 Jan 1968).

Habitat: “Coconut grove . . . There are some fallow fields and scrub . . . fig trees . . . On the east side of the hill that has a remnant forest on it there is an oil palm grove (planted) . . . many *Raffia* palms . . . Mangroves line the river. The largest trees in the area are *Ceiba* and *Bombax* . . . mangroves festooned in staghorn ferns and orchids [Figure 77].”

Remarks: Butre is on the Butre River close to the Gulf of Guinea.

Taxa: *Xerus*, *Heliosciurus*, *Lophuromys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Epomops*, *Hypsignathus*, *Megaloglossus*, *Scotoonycteris*, *Hipposideros*, *Nycteris*, *Scotophilus*, *Pipistrellus*, *Glauconycteris*.

**Cape Coast**, Cape Coast Castle, Central Region  
(Map 11: 345).

Coordinates: 05°06'N, 01°15'W C, G.

Collector: B. J. Hayward (19 Aug 1967).

Habitat: “Dungeons . . . slave chambers . . . magazine [of Cape Coast Castle].”

Remarks: While at **Jukwa** (16–21 Aug), Hayward made a side trip to this locality. Rosevear (1965) characterized the habitat in the region as “Invasive Woodland.”

Taxon: *Hipposideros*.

**Damango**, [5 mi [8.0 km] E], Northern Region  
(Map 11: 324).

Coordinates: 09°04'N, 01°45'W C.

Collectors: T. J. McIntyre and W. P. Murdoch Jr. (13–19 Aug 1969).

Habitat: “Guinea woodland savanna . . . The grass was 3–4 feet [0.9–1.2 m] high with stands of a couple of species at 6–8 feet [1.8–2.4 m] . . . area of exposed rocks . . . [with] shallow caves” (TJM).

Remarks: The first entry in the field catalogs placed this locality as “5 mi E Damango,” although subsequent entries and specimen labels read only “Damango” (09°04'N, 01°49'W, as Damango G). The

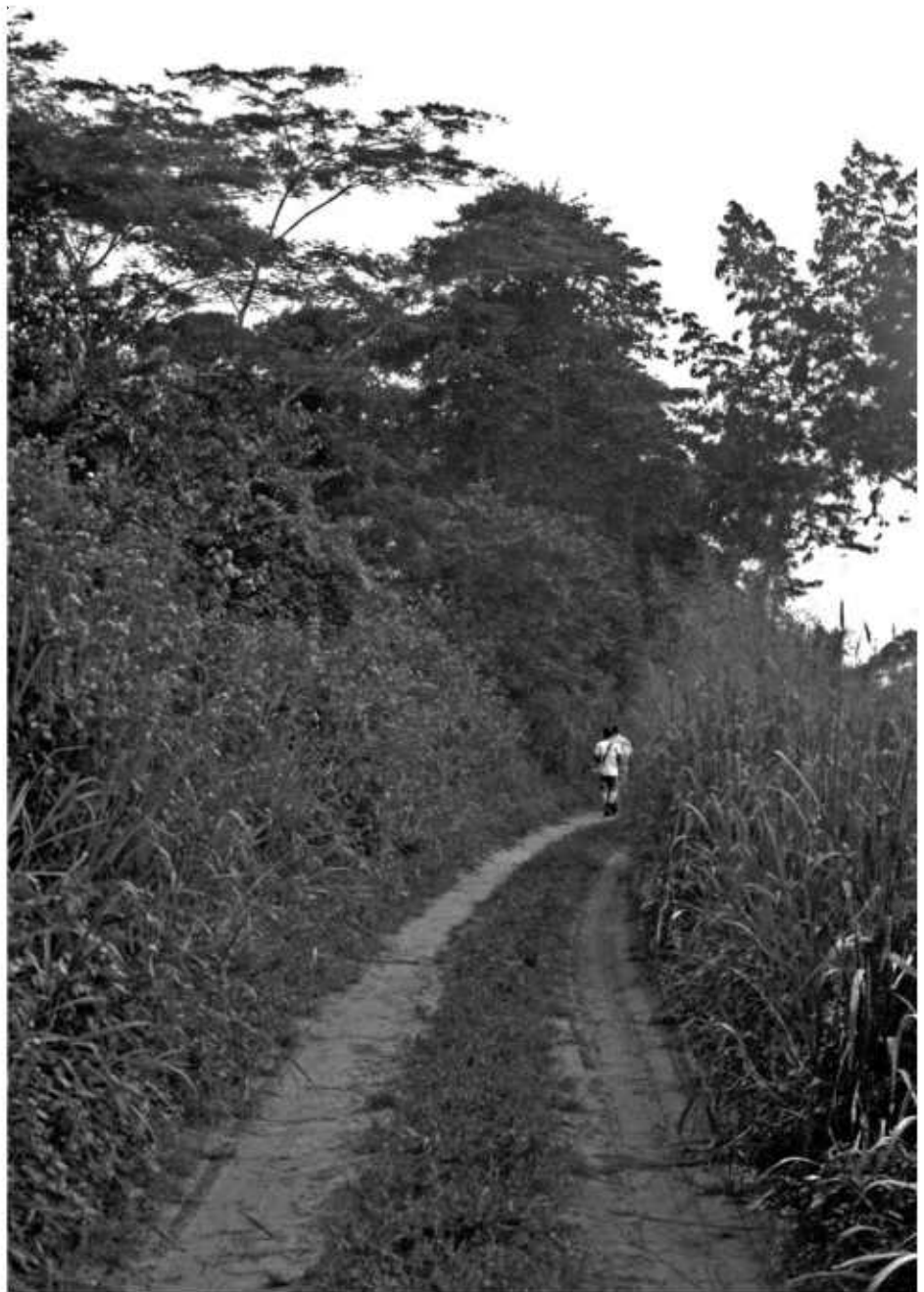


FIGURE 76. Ghana, Berekuso, 1 mi N (Oct 1967).

collectors' coordinates confirm that camp was about 5 mi E Damango. The Damango Scarp Forest Reserve is approximately 1.6 km northeast of town and the small Dombi Forest Reserve lies about 3.2 km south of town on the south side of the Sorri River. Rosevear (1965) referred to the habitat as "Doka Woodland."

Taxa: *Galago*, *Erythrocebus*; *Xerus*, *Acomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Praomys*; *Lepus*; *Crocidura*; *Nycteris*.

**Denu**, Volta Region (Map 11: 377).

Coordinates: 06°06'N, 01°09'E C, G.

Collectors: B. J. Hayward and A. Kofi (31 Aug 1967).

Habitat: "Attics of buildings" (AK).

Taxon: *Mops*.

**Doyum**, Eastern Region (Map 11: 358).

Coordinates: 05°54'N, 00°01'E C, G.

Collectors: J. C. Geest, J. W. LeDuc, C. B. Robbins, and H. W. Setzer (14–16 Nov 1967).



FIGURE 77. Ghana, Butre: Epiphytes (photograph by J. C. Geest, 20 Jan 1968).

Habitat: "Attic . . . two story building . . . nim tree in the village" (JWL). "We then set up a mist net at the chief's old house" (CBR).

Remarks: This village is on the Accra Plains. Field catalog entries for 14 Nov use the locality variant Doyum Police Post, but this was not written on specimen labels.

Taxa: *Epomophorus*, *Chaerephon*, *Mops*.

**Efeipo Krom**, Western Region (Map 11: 341).

Coordinates: 04°57'N, 01°52'W C.

Collector: J. C. Geest (8–15 Jul 1968).

Habitat: "The area is in the high forest zone but there is very little forest left . . . much of the area is in oil palms. There is a small plot of degraded forest just south of the village. There are streams and palm swamps north and south of the village . . . There are a large number of coconut palms in the village . . . Cocoa and sugar cane are planted on the slopes and the valleys, respectively. There is quite a lot of thicket growing around

and in the farms [Figure 78]. There are also some large bamboo clumps near the streams . . . The soil color is quite red and very wet now . . . farms of cassava, maize." "Remnant forest" (specimen labels).

Remarks: The collector's coordinates could not be definitely verified; however, our topographic map (Survey of Ghana, *Takoradi*, 1:250,000) is annotated with a mark at these approximate coordinates in the vicinity of Boronyi Krom (04°57'N, 01°54'W G, as Brunikrom), a place that does fall near the collector's coordinates.

Taxa: *Galago*, *Cercopithecus*; *Funisciurus*, *Heliosciurus*, *Paraxerus*, *Protoxerus*, *Cricetomys*, *Lophuromys*, *Gerbilliscus*, *Dasymys*, *Dephomys*, *Hylomyscus*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Crocidura*; *Megaloglossus*, *Saccolaimus*; *Civettictis*; *Neotragus*.

**Elmina**, Elmina Castle, Central Region (Map 11: 344).

Coordinates: 05°04'N, 01°22'W C (05°05'N, 01°21'W G).



FIGURE 78. Ghana, Efeipo Krom (photograph by J. C. Geest, 8 Jul 1968).

Collectors: B. J. Hayward and A. Kofi (20 Aug 1967).

Habitat: "Dungeons." (BJH).

Remarks: While at **Jukwa** (16–21 Aug), a side trip was made to this locality. Some specimens were collected from the San Jorge Castle also at Elmina. On the map consulted (Survey of Ghana, *Takoradi*, 1:250,000), Elmina is identified also as Edina. Rosevear (1965) characterized the surrounding habitat as being "Coastal scrub."

Taxon: *Hipposideros*.

**Gambaga**, Northern Region (Map 11: 321).

Coordinates: 10°31'N, 00°28'W C (10°32'N, 00°27'W G).

Collector: J. C. Geest (7–14 May 1968).

Habitat: "The Gambaga Scarp is between 1,200 and 1,400 feet [366–427 m]. The scarp is forested with typical Sudan woodland trees for the most part [Figure 79] . . . There are flat topped bluffs with loose, rocky slopes . . . The dominant tree seems to be *Parkia* . . . There are also Shea butter trees . . . The soil is quite

sandy and red brown in color. We are camped on a small river."

Remarks: The "small river" referenced above is a tributary of the Gambaga or Nyingari River. Rosevear (1965) characterized the habitat as being "Sudan Woodland."

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Acomys*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Eidolon*, *Epomophorus*, *Micropteropus*, *Nanonycteris*, *Hipposideros*, *Nycteris*, *Chaerephon*, *Scotophilus*; *Galerella*.

**Jukwa**, Central Region (Map 11: 343).

Coordinates: 05°15'N, 01°21'W C (05°16'N, 01°20'W G).

Collectors: B. J. Hayward and A. Kofi (16–21 Aug 1967).

Habitat: "Many bamboo planted in this area . . . They grow mostly along the rivers and depressions forming deep shade and dense thickets . . . pond edge . . . guava tree" (BJH). "Cocoa farm" (AK).



FIGURE 79. Ghana, Gambaga: Guinea woodland (photograph by J. C. Geest, 5 May 1968).

Remarks: Camp was established near the Saruwi River.

The map (Survey of Ghana, *Takoradi*, 1:250,000) referenced used the older name of Dwokwaa instead of Jukwa. While at Jukwa, side trips were made to **Cape Coast** and **Elmina**.

Taxa: *Lophuromys*, *Uranomys*, *Lemniscomys*, *Mastomys*, *Praomys*; *Crocidura*; *Eidolon*, *Epomops*, *Megaloglossus*, *Nycteris*, *Chaerephon*, *Mops*, *Neoromicia*, *Myotis*.

**Kade, 6 mi [9.7 km] NW**, Eastern Region (Map 11: 334).

Coordinates: 06°06'N, 00°51'W C.

Collectors: J. C. Geest, J. W. LeDuc, W. P. Murdoch Jr., C. B. Robbins, and H. W. Setzer (26 Oct–2 Nov 1967); J. C. Geest (26–29 Mar 1968).

Habitat: “There are several *Musanga cecropioides* along the trail on the forest edge . . . The side opposite the forest is planted in cassava which is higher than my

head” (JCG). “Old secondary high forest, next to a cocoa grove . . . yam field . . . swampy area [Figure 80] . . . cleared area of dense, fairly low vines” (JWL). “The area is secondary high forest [with] . . . low grass bordering a banana grove . . . orange grove” (CBR).

Remarks: Collecting activity was centered on the University of Ghana Experimental Farm, which the collectors used for their coordinates. Geest identified the farming complex as “6 mi N Kade” on his specimen labels. For the first two days (27–28 Oct) at the site, LeDuc and Robbins simply noted the locality as “Kade” on specimen labels, but they later amended field catalogs and journals to read 6 mi NW Kade.

Taxa: *Funisciurus*, *Heliosciurus*, *Paraxerus*, *Graphiurus*, *Cricetomys*, *Lophuromys*, *Uranomys*, *Hybomys*, *Hyalomyscus*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*; *Crocidura*; *Epomops*,



FIGURE 80. Ghana, Kade, 6 mi NW (photograph by J. C. Geest, 29 Mar 1968).

*Hypsignathus, Megaloglossus, Myonycteris, Scotonycteris, Hipposideros, Saccolaimus, Mops, Scotophilus.*

**Keta**, Volta Region (Map 11: 376).

Coordinates: 05°55'N, 00°59'E C, G.

Collector: B. J. Hayward (31 Aug 1967).

Habitat: "Syrenga trees in fruit and many mango trees in flower."

Remarks: This locality is on a sand spit projecting between the Keta Lagoon on one side and the Gulf of Guinea on the other.

Taxon: *Epomophorus*.

**Kokofu**, Brong-Ahafo Region (Map 11: 328).

Coordinates: 07°43'N, 00°52'W C (07°43'N, 00°53'W G).

Collector: J. C. Geest (20–25 May 1968).

Habitat: "This locality seems to have been quite good riverine forest in the not too distant past . . . The grass is approximately 2 feet [0.6 m] in height and there are

numerous trees near the village . . . thicket made up of a low growing *Bauhinia*-type tree . . . *Lophira lanceolata* is by far the most common tree of the surrounding savanna woodland [Figure 81] . . . An occasional *Parkia* is seen . . . young *Bombax*. Principal crops are yams and ground nuts."

Taxa: *Galago; Funisciurus, Heliosciurus, Protoxerus, Uranomys, Gerbilliscus, Lemniscomys, Mastomys, Mus, Praomys; Crocidura; Eidolon, Hipposideros, Nycteris; Genetta.*

**Kpeve**, Volta Region (Map 11: 372).

Coordinates: 06°41'N, 00°20'E C, G.

Collector: J. C. Geest (2 Dec 1967).

Habitat: "Road culvert" (specimen labels).

Taxon: *Nycteris*.

**Krobo Mountain**, Eastern Region (Map 11: 364).

Coordinates: 06°05'N, 00°03'E C, G.





FIGURE 81. Ghana, Kokofu: Guinea woodland (photograph by J. C. Geest, 20 May 1968).

Collectors: J. C. Geest, J. W. LeDuc, C. B. Robbins, and H. W. Setzer (13, 19 Nov 1967).

Habitat: "Rock crevasses . . . slopes covered by tall grass . . . hollow *Bombax* tree [Figure 82] . . . The forest on the top has many ferns, lianas, and tall trees" (JCG). "Large rock face . . . crevice" (JWL).

Remarks: This locality, close to the Volta River, was visited twice by the AMP crew while they awaited the release of their field gear from Ghanaian customs (E. Setzer, personal communication). Krobo Mountain (1,108 ft [338 m] maximum elevation) lies close to Okwenya (06°06'N, 00°03'E G). Rosevear (1965) characterized the habitat as "Guinea Woodland."

Taxa: *Cercopithecus*; *Rhinolophus*, *Hipposideros*, *Taphozous*.

Kwahu Tafo, Eastern Region (Map 11: 336).

Coordinates: 06°39'N, 00°40'W C, G.

Collector: B. Hughes (20 Nov 1967).

Habitat: "Cocoa grove" (JCG).

Remarks: A specimen was given to Geest by Barry Hughes, and he entered it into his field catalog (JCG 4208) that same day while working at **Medina**.

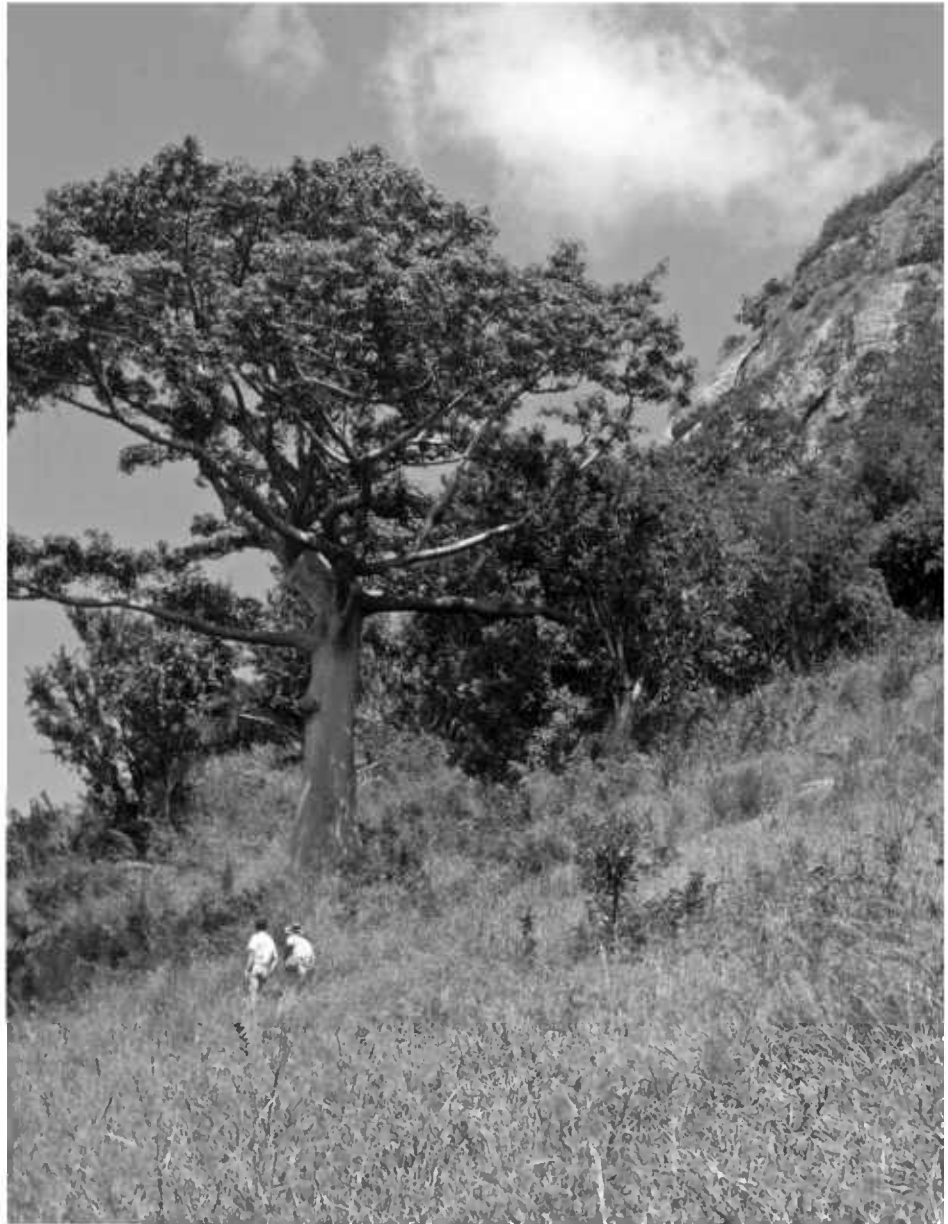
Taxon: *Lophuromys*.

Legon, University of Ghana, Eastern Region  
(Map 11: 350).

Coordinates: 05°40'N, 00°12'W C (05°39'N, 00°11'W G).

Collectors: J. C. Geest, B. J. Hayward, A. Kofi, J. W. LeDuc, C. B. Robbins, and H. W. Setzer (many dates in Jul–Dec 1967; 2 Apr, 12 Jun, 23 Sep 1968); L. W. Robbins and R. E. Vaden (22 Sep–7 Oct 1968).

Habitat: "Tall savanna grass and marsh sedges, 3 feet [0.9 m] high. The soil is red laterite and well packed . . . oil palm grove . . . coffee grove . . . dam at a break in the bamboo clumps" (JCG). "Banana grove at the



**FIGURE 82.** Ghana, Krobo Mountain:  
Tree containing *Hipposideros cyclops*  
(photograph by J. C. Geest, 12 Nov 1967).

base of a big *Ceiba* tree . . . a lot of sugar cane and oil palm here” (BJH). “Tall grass that surrounded a cassava farm” (AK). “Stagnant stream in a grove of trees (20–30 feet [6.1–9.1 m]) with much leaf litter . . . neem grove (*Azadirachta indica*) . . . A prominent shrub . . . (*Cassia*) was present also” (CBR). “Grove of date palms” (REV). “Accra plains” (specimen labels).

Remarks: The University of Ghana at Legon provided a base of operations for the AMP field teams while in that country. Many specimens were opportunistically collected on the university grounds (including Legon Hill and the Botanical Gardens) in between field expe-

ditions to other parts of Ghana. The village of Papao (05°39'N, 00°12'E G), at the foot of Legon Hill, was the site of collecting activities on 29 Sep 1967, though this town is not indicated on specimen labels. Specimens were also taken 2 mi [3.2 km] from the university at the Achimota Forest Reserve as well as 1 mi [1.6 km] N and 6 mi [9.7 km] N (05°44'N, 00°11'W C) Legon.

Taxa: *Perodicticus*, *Galago*; *Xerus*, *Graphiurus*, *Gerbiliscus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*; *Atelerix*; *Crocidura*; *Eidolon*, *Epomophorus*, *Epomops*, *Micropteropus*, *Myonycteris*, *Nanonycteris*,

*Hipposideros, Lavia, Taphozous, Nycteris, Chaerephon, Mops, Scotophilus, Neoromicia.*

**Leklebi Agbesia**, Volta Region (Map 11: 374).

Coordinates: 06°56'N, 00°29'E C.

Collector: J. C. Geest (23–30 Jun 1968).

Habitat: “The town is at the base of the mountains . . . under teak trees . . . The mountains at the lower levels are planted in coffee and at the upper levels are planted in cocoa. All grown under the forest canopy . . . The stream at this place has a canopy of cocoa . . . The soil on the slope is yellow-red laterite which is quite rocky. The soil of the valley is red-brown laterite with some sand in it. Fallow fields in the valley are grown up in elephant grass 9 feet [2.7 m] high . . . dense scrub vegetation that borders the farms in the valley . . . Cassava is the major crop with quite a lot of corn also being grown . . . Yams . . . coconut palms . . . banana.” “Remnant forest” (specimen labels).

Remarks: The AMP field map (Survey of Ghana, *Ho*, 1:250,000) was annotated with this locality just south of [Leklebi] Duga (06°57'N, 00°29'E G) and is referred to as “Agbesia,” located at the foot of the Akwapim-Togo Ranges and close to a tributary of the Flabo River.

Taxa: *Galago*; *Xerus*, *Funisciurus*, *Heliosciurus*, *Graphiurus*, *Lophuromys*, *Uranomys*, *Grammomys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Crociodura*; *Epomops*, *Hypsignathus*, *Lissonycteris*, *Micropteropus*, *Hipposideros*, *Mops*, *Glauconycteris*, *Mimetillus*; *Genetta*.

**Mamfe**, Eastern Region (Map 11: 356).

Coordinates: 05°56'N, 00°07'W C, G.

Collector: J. W. LeDuc (10 Dec 1967).

Habitat: “Road culvert” (specimen labels).

Taxon: *Nycteris*.

**Mankesin**, vicinity of, Central Region (Map 11: 346).

Coordinates: 05°17'N, 01°02'W C (05°17'N, 01°02'W G, as Mankesim).

Collector: J. C. Geest (29 Jul 1967).

Remarks: While in **Legon**, Geest was given a single specimen of *Nycteris* that was found on a vehicle radiator in the vicinity of Mankesin.

Taxon: *Nycteris*.

**Medina**, 2 mi [3.2 km] N Legon, Eastern Region (Map 11: 351).

Coordinates: 05°42'N, 00°12'W C (05°41'N, 00°10'W G, as Madina).

Collectors: J. C. Geest (16 Oct; 12, 20 Nov 1967); J. W. LeDuc (9 Nov 1967).

Habitat: “Accra Plains” (specimen labels).

Taxa: *Galago*; *Arvicanthis*, *Mastomys*; *Atelerix*; *Manis*.

**Nabogo**, Northern Region (Map 11: 323).

Coordinates: 09°45'N, 00°49'W C (09°44'N, 00°49'W G).

Collector: J. C. Geest (12–23 Apr 1968).

Habitat: “The river has little vegetation near it and nothing that could be called riverine forest . . . Away from the river the vegetation is that of Guinea woodland and what Rosevear calls doka woodland. Most of it is heavily cutover and grazed . . . Guinea corn is grown in these fields . . . The soil is quite sandy but containing some clay.”

Remarks: The river mentioned by Geest is the Nabogo.

Taxa: *Xerus*, *Heliosciurus*, *Cricetomys*, *Uranomys*, *Gerrbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Atelerix*; *Crociodura*; *Epomophorus*, *Nycteris*; *Genetta*, *Galerella*.

**Nankasi**, Eastern Region (Map 11: 360).

Coordinates: 06°06'N, 00°23'W C (06°05'N, 00°23'W G).

Collector: H. W. Setzer (10 Dec 1967).

Habitat: “Road culvert” (specimen label).

Taxon: *Nycteris*.

**Nkawkaw, 1 mi [1.6 km] N**, Eastern Region (Map 11: 335).

Coordinates: 06°33'N, 00°44'W C.

Collectors: J. C. Geest, B. J. Hayward, and A. Kofi (3–12 Aug 1967).

Habitat: “The forest is bathed in clouds and is really dripping” (JCG). “Has remnants of forest but a lot of cassava, bananas, and palm. Small stream just below camp . . . North of here was a big escarpment cliff, looked to be about 700–800 feet [213.4–243.8 m] high . . . On top, the hills were covered with beautiful forest [Figure 83] . . . Lots of small streams running down in many places. Trees were over 100 feet [30.5 m] I would say” (BJH). “Tall grass . . . under some cassava plants . . . cocoa farm” (AK).

Remarks: Most of Geest’s specimen labels indicate this locality simply as “Nkawkaw.” The escarpment noted above is the Southern Scarp, and the forest is the Southern Scarp Forest Reserve (06°33'N, 00°40'W G).

Taxa: *Galago*; *Cricetomys*, *Lophuromys*, *Gerrbilliscus*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*; *Crociodura*; *Eidolon*, *Epomops*, *Lissonycteris*, *Megaloglossus*, *Myonycteris*, *Scotonycteris*, *Rhinolophus*, *Hipposideros*, *Nycteris*, *Scotophilus*, *Glauconycteris*, *Neoromicia*.



FIGURE 83. Ghana, Nkawkaw, 1 mi N (photograph by B. J. Hayward, 9 Aug 1967).

**Oda**, Eastern Region (Map 11: 333).

Coordinates: 05°52'N, 01°00'W C.

Collectors: J. W. LeDuc, L. W. Robbins, H. W. Setzer, and R. E. Vaden (8–15 Oct 1968).

Habitat: "Cocoa, a few yams, bananas, and cassava are the major crops . . . orange grove" (JWL). "The habitat is cut-over high forest" (REV).

Remarks: On the map (Survey of Ghana, *Accra*, 1:250,000) consulted, Oda is also referred to as Nsuaem. Rosevear (1965) designated the habitat as being "High Forest."

Taxa: *Perodicticus*; *Xerus*, *Heliosciurus*, *Paraxerus*, *Graphiurus*, *Cricetomys*, *Lophuromys*, *Uranomys*, *Hylomyscus*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*, *Atherurus*; *Crociodura*; *Eidolon*, *Epomops*, *Megaloglossus*, *Micropteropus*, *Scotonycteris*, *Hipposideros*, *Nycteris*, *Scotophilus*; *Genetta*; *Neotragus*.

**Odomi Jongo**, 2 mi [3.2 km] E Nkwanta, Volta Region (Map 11: 330).

Coordinates: 08°15'N, 00°32'E C.

Collector: J. C. Geest (16–23 Jun 1968).

Habitat: "A mixture of forest and Guinea woodland trees . . . For the most part it appears to be remnant forest into which some fire resistant trees have migrated . . . Near the river there are a large number of cocoa trees as well as bananas. Yams, cassava, and melons occur on the slopes away from the river. The soil is laterite and becomes quite sandy in places . . . elephant grass which is about 7 feet [2.1 m] in height . . . portion of the forest that contains many oil palms." "Remnant forest" (specimen labels).

Remarks: As such, Odomi Jongo could not be located on maps but it was determined not to be the same village as Odomi (08°19'N, 00°31'E G), the latter being approximately 3.5 mi [5.6 km] north of Nkwanta (08°16'N, 00°31'E G). Geest's journal makes clear that he was east of Nkwanta, along the road to Shiare, and a dot penned on a road map (Survey of Ghana, Road Map of Ghana, *Northern Section*, 1:500,000), presumably used in the field, corresponds to the above coordinates.

Taxa: *Funisciurus*, *Graphiurus*, *Cricetomys*, *Uranomys*, *Gerbilliscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Crocidura*; *Epomophorus*, *Epomops*, *Hypsignathus*, *Lissonycteris*, *Megaloglossus*, *Micropteropus*, *Nanonycteris*, *Hipposideros*, *Scotophilus*, *Glauconycteris*, *Mimetillus*.

**Okorasi**, Eastern Region (Map 11: 361).

Coordinates: 06°02'N, 00°16'W C (06°02'N, 00°15'W G).

Collector: J. W. LeDuc (10 Dec 1967).

Habitat: "Road culvert" (specimen labels).

Taxon: *Nycteris*.

**Pirisi**, Upper Region (Map 11: 319).

Coordinates: 10°07'N, 02°27'W C, G.

Collector: J. C. Geest (25 Feb–1 Mar 1968).

Habitat: "This is what Rosevear [1965] calls doka woodland [Figure 84]. The land is grazed heavily near the village . . . The soil is beige in color and rather sandy. There are some large red volcanic boulders jutting through the soil."

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Steatomys*, *Uranomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Crocidura*; *Epomophorus*, *Micropteropus*, *Nycteris*, *Otomops*; *Genetta*.

**Pra Suhien Forest Reserve**, Central Region  
(Map 11: 342).

Coordinates: 05°21'N, 01°24'W C.

Collector: L. R. Cole (14 Nov 1967).

Remarks: This entry is based on a single specimen of *Hipposideros* collected by Cole but logged in the field catalog of J. C. Geest on 20 Nov 1967 while at **Medina**.

Taxon: *Hipposideros*.

**Prestea, 32 mi [51.5 km] W**, Western Region  
(Map 11: 337).

Coordinates: 05°23'N, 02°28'W C.

Collector: J. C. Geest (6–15 Jan 1968).

Habitat: "Forest reserve that is thought to be primary forest . . . The trees are tall but small in girth and quite



FIGURE 84. Ghana, Pirisi: Guinea woodland (photograph by J. C. Geest, 26 Feb 1968).

close together [Figure 85] . . . *Tarrietia utilis* . . . and *Lophira alata* were the two dominant trees of the area . . . The canopy is high but made up of these smaller trees and lianas . . . 30 feet [9.1 m] *Musanga cecropioides* line the roadway . . . wooden culverts . . . small pool along the roadside . . . The soil is decomposed granite and yellow clays.”

Remarks: The map consulted (Survey of Ghana, *Prestea*, 1:250,000) refers to the Fure Forest Reserve (05°22'N,

02°17'W G) to the west of *Prestea*. L. R. Cole sporadically collected a few *Malacomys* specimens at 15 mi [24.1 km] W Prestea between July 1966 and April 1971 and provided them to the AMP.

Taxa: *Lophuromys*, *Dephomyys*, *Hybomys*, *Hylomyscus*, *Malacomys*, *Praomys*; *Crocidura*; *Epomops*, *Hypsignathus*, *Megaloglossus*, *Myonycteris*, *Scotonycteris*, *Hipposideros*, *Chaerephon*, *Mops*, *Pipistrellus*, *Glauconycteris*, *Mimetillus*.



FIGURE 85. Ghana, *Prestea*, 32 mi W:  
Forest profile (photograph by J. C. Geest, 14  
Jan 1969).

**Prince's Town, 7 mi [11.3 km] N, Western Region**  
(Map 11: 339).

Coordinates: 04°51'N, 02°04'W C.

Collectors: B. J. Hayward and A. Kofi (22–26 Aug 1967).

Habitat: “The majority of the forest is gone, but there are remnant trees . . . edge of a forest clearing near two large banana trees . . . There was little undergrowth and the forest canopy was complete” (BJH). “Thick forest. There are tall trees in this area . . . and the undergrowth is very bushy” (AK).

Remarks: Collections were also made 6 mi [9.7 km] N Prince's Town at Anima Krom (04°50'N, 02°05'W G), which lies on the Nyan River. Cape Three Points Forest Reserve (04°50'N, 02°03'W G) is less than a mile [1.6 km] to the east.

Taxa: *Lophuromys*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Praomys*; *Epomops*, *Megaloglossus*, *Myonycteris*, *Rousettus*, *Scotoonycteris*, *Rhinolophus*, *Hipposideros*, *Pipistrellus*.

**Pulima, Upper Region (Map 11: 318).**

Coordinates: 10°51'N, 02°03'W C, G.

Collector: J. C. Geest (2–7 Mar 1968).

Habitat: “Two trees that are really prominent here in the Sudan [woodland; Figure 86] are *Parkia clappertonia* and *Samania salmonia* . . . tomatoes and oca . . . [A river] has been dammed in several places with earthen dams which leaves many small pools about 30–40 feet [9.1–12.2 m] across . . . river bottom is in grass as pasturage for cattle . . . The soil is yellow-brown and quite sandy.”

Remarks: The river referenced above is a small tributary of the Kanyanbia.

Taxa: *Heliosciurus*, *Acomys*, *Uranomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Genetta*.

**Sakpa, Northern Region (Map 11: 325).**

Coordinates: 08°52'N, 02°21'W C, G.

Collector: J. C. Geest (14–21 Mar 1968).



FIGURE 86. Ghana, Pulima: *Acomys* sp. Habitat, Sudan woodland (photograph by J. C. Geest, 2 Mar 1968).

Habitat: "Old stand of Guinea woodland [Figure 87]. The trees are quite old and very close together . . . The woodland is quite extensive, most places dominated by species of *Isoberlinea* . . . Some of the trees are estimated to be 60–80 feet [18.3–24.4 m] high . . . silk cotton trees . . . *Bauhinia* . . . dry stream bed . . . man made pond . . . about 18 feet [5.5 m] across."

Remarks: The field map (Survey of Ghana, *Kintampo*, 1:250,000) shows a penciled continuation of a stream bed about 4.8 km southeast of Sakpa that may correspond to the "dry stream bed" mentioned. This un-

named stream flows southeastward about 55 km to the Black Volta River.

Taxa: *Xerus*, *Funisciurus*, *Cricetomys*, *Steatomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Crocidura*; *Epomophorus*, *Micropteropus*, *Rhinolophus*, *Hipposideros*, *Nycteris*, *Mops*, *Scotoecus*, *Scotophilus*, *Glauconycteris*, *Mimetillus*, *Neoromicia*.

Shishe, Upper Region (Map 11: 322).

Coordinates: 10°42'N, 00°13'W C, G.



FIGURE 87. Ghana, Sakpa: Guinea woodland (photograph by J. C. Geest, 17 Mar 1968).



Collector: J. C. Geest (1–6 May 1968).

Habitat: “The vegetation is that of Sudan woodland with many Baobab (*Adansonia digitata*) and *Parkia* trees in evidence. The vegetation is quite dense . . . The soil is dark red brown and quite loamy in texture . . . cultivated fields around the houses.”

Remarks: This camp was located 3.2 km north of “the [Aburi] scarp,” a reference to the Gambaga Scarp. The Morago West Forest Reserve (10°39'N, 00°17'W G) is less than 3.2 km southwest of Shishe.

Taxa: *Galago*; *Heliosciurus*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Crocidura*; *Epomophorus*; *Galerella*.

**Subinja**, 2 mi [3.2 km] E Wenchi, Brong-Ahafo Region (Map 11: 326).

Coordinates: 07°45'N, 02°04'W C (07°44'N, 02°04'W G).

Collector: J. C. Geest (19–24 Feb 1968).

Habitat: “The major terrain is of low rolling hills . . . Along the river and on the slopes adjacent to it cocoa is planted. Also along the river there remains the major-

ity of tall trees that are still to be seen. There are large fields of elephant grass and among these are a few fields of cassava. Scattered about almost in a random fashion are clumps of banana and occasional paw paw trees. [In the savannah some trees are] 150–180 feet [45.7–54.9 m] high and do not seem to be savannah species.” “Derived savannah” (Figure 88) (specimen labels).

Remarks: The river mentioned above is most likely the Subin. Rosevear (1965) described the habitat around Wenchi as “High Forest.”

Taxa: *Xerus*, *Funisciurus*, *Heliosciurus*, *Graphiurus*, *Cricetomys*, *Lophuromys*, *Uranomys*, *Gerbilliscus*, *Dephomys*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Epomops*, *Hypsignathus*, *Lissonycteris*, *Micropteropus*, *Rousettus*, *Hipposideros*, *Chaerephon*, *Glauconycteris*, *Neoromicia*.

**Suhum**, 2.4 mi [3.9 km] E, Eastern Region (Map 11: 359).

Coordinates: 06°03'N, 00°26'W C.

Collector: H. W. Setzer (10 Dec 1967).



FIGURE 88. Ghana, Subinja: Derived savanna (photograph by J. C. Geest, 20 Feb 1968).

Habitat: "Road culvert" (specimen label).

Taxon: *Hipposideros*.

**Teshi**, Eastern Region (Map 11: 348).

Coordinates: 05°34'N, 00°06'W C (05°35'N, 00°06'W G).

Collectors: J. C. Geest, J. W. LeDuc, C. B. Robbins, and H. W. Setzer (22–26 Nov 1967).

Habitat: "In the roof of an old, two-story building . . . [other dwellings]" (JWL).

Remarks: The AMP field team visited Teshi to collect bats while waiting to clear customs at **Legon**.

Taxa: *Micropteropus*, *Mops*, *Scotophilus*.

**Tinkong, 3 mi** [4.8 km] NW, Eastern Region (Map 11: 362).

Coordinates: 06°01'N, 00°15'W C.

Collector: H. W. Setzer (10 Dec 1967).

Habitat: "Road culvert" (specimen label).

Taxon: *Hipposideros*.

**Tsibu, 7 mi** [11.3 km] N, Volta Region (Map 11: 370).

Coordinates: 06°39'N, 00°18'E M (Survey of Ghana, *Ho*, 1:250,000).

Collectors: J. W. LeDuc and H. W. Setzer (2 Dec 1967).

Habitat: "Road culvert" (specimen labels).

Remarks: See Remarks under **Bame, 7 mi S** for explanation for modifying the coordinates supplied by the collectors for this site (06°37'N, 00°18'E). Our estimated coordinates for 7 mi N (actually NE) Tsibu correspond to a penciled hatch mark indicated on the Ghana map, probably used by LeDuc, and differ slightly from those of the collector. This specimen was collected on a tributary of the Amimli River, which flows into the Dayi and subsequently into the Volta on the west side of Awudome Mountain, part of the Akwapim-Togo Ranges. Another collection site was 2 mi [3.2 km] SSW Tsibu (06°34'N, 00°17'E C).

Taxon: *Nycteris*.

**Tutu**, Eastern Region (Map 11: 355).

Coordinates: 05°53'N, 00°09'W C, G.

Collector: H. W. Setzer (10 Dec 1967).

Habitat: "Road culvert" (specimen label).

Taxon: *Nycteris*.

**Veya**, Upper Region (Map 11: 320).

Coordinates: 10°52'N, 00°52'W C (10°52'N, 00°51'W G, as Vea).

Collector: J. C. Geest (24–30 Apr 1968).

Habitat: "Sudan woodland . . . [The terrain] begins to get quite rocky . . . The rocks are granite and each out-

crop supports quite a number of trees . . . The larger trees are Baobabs . . . Between the rock outcrops the land is almost all under cultivation."

Taxa: *Acomys*, *Mastomys*, *Mus*, *Praomys*; *Felis*, *Genetta*.

**Weija**, Eastern Region (Map 11: 347).

Coordinates: 05°34'N, 00°21'W C (05°34'N, 00°20'W G).

Collectors: J. W. LeDuc and C. B. Robbins (16–17 Dec 1967).

Habitat: "Grass-roofed house which was vacant" (CBR). "Road culvert" (specimen labels).

Taxa: *Hipposideros*, *Nycteris*.

**Wulasi**, Northern Region (Map 11: 329).

Coordinates: 08°39'N, 00°00'GM C (08°39'N, 00°01'E G).

Collector: J. C. Geest (14–20 May 1968).

Habitat: "Rosevear includes this area in the doka woodland . . . but now one is hard pressed to see a doka tree . . . *Lophira lanceolata* is one of the more common trees as it is over most of the Guinea woodland [Figure 89]. The soil is sandy and overlays a red volcanic scoria . . . *Parkia clappertonia* . . . an occasional mango tree . . . At the river . . . is a pond . . . about 4 feet [1.2 m] deep. Tall sedges are growing all around it . . . Major crops of the area are yams and ground nuts."

Remarks: Geest used "GM" to indicate that this locality is on the prime meridian.

Taxa: *Galago*; *Heliosciurus*, *Gerbilliscus*, *Taterillus*, *Mastomys*, *Praomys*, *Cryptomys*; *Atelerix*; *Epomophorus*, *Micropteropus*, *Scotophilus*, *Neoromicia*.

**Yabraso**, Brong-Ahafo Region (Map 11: 327).

Coordinates: 08°04'N, 01°48'W C (08°04'N, 01°47'W G).

Collector: J. C. Geest (6–12 Apr 1968).

Habitat: "Surrounding countryside is rather typical of Guinea woodland. The trees are 40–50 feet [12.2–15.2 m] high with a girth of about 3 feet [0.9 m] on the average," and "the grass is from 4–12 inches [0.1–0.3 m] high . . . Along the river there are taller grasses and some larger trees. They appear to be remnant trees of what could have been riverine forest . . . The soil is quite brown and rich looking . . . In the riverine forest [Figure 90] along the river there are many dum palms . . . There is good forest on either side of the falls . . . mango trees near the village."

Remarks: The falls mentioned by Geest are the Kintampo Water Falls (08°05'N, 01°47'W G), also known by the colonial-era name of Fuller Falls. Both Yabraso and the Kintampo Water Falls are located on the Oyoko River, which flows (approximately 19 km from Yabraso) into the Black Volta via the Deba



FIGURE 89. Ghana, Wulasi (photograph by J. C. Geest, 14 May 1968).

River. The Kintampo Water Falls lie about 1.6 km north of Yabraso on a more northern tributary of the Oyoko.

Taxa: *Funisciurus*, *Heliosciurus*, *Protoxerus*, *Graphiurus*, *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Hylomyscus*, *Mastomys*, *Mus*, *Praomys*; *Eidolon*, *Epomops*, *Lissonycteris*, *Micropteropus*, *Nanonycteris*, *Rousettus*, *Chaerephon*, *Mops*, *Pipistrellus*, *Mimetillus*, *Neoromicia*; *Manis*; *Genetta*, *Nandinia*.

#### TOGO

**GENERAL REMARKS.** The AMP team consisted of J. W. LeDuc and C. B. Robbins, who were frequently accompanied by Bramer Moshi, University of Ghana, who served as skinner and translator. Permitting difficulties hampered their fieldwork, curtailing the time spent in the field (about five weeks) and accounting for the relatively few localities visited (Map 12). As a result of these delays, collecting activity was confined to two abbreviated periods (9–31 May and 27 Jun to 11 Jul) separated by a collecting trip in between to Benin (1–25 Jun). National Museum

of Natural History specimens of Chiroptera and Rodentia were documented, respectively, by Robbins (1980) and Robbins and Van der Straeten (1996).

**ITINERARY.** J. W. LeDuc and C. B. Robbins: **Dapango**, 9–13 May 1968; **Padori**, 16–19 May 1968; **Pewa**, 22–25 May 1968; **Pagala**, 27–31 May 1968; **Gbatope**, 27–28 Jun 1968; **Ezime**, 30 Jun–5 Jul 1968; **Agou**, 7–11 Jul 1968.

**Agou** (Map 12: 383).

Coordinates: 06°51'N, 00°44'E C (06°53'N, 00°44'E G).

Collectors: J. W. LeDuc and C. B. Robbins (7–11 July 1968).

**Habitat:** “Crops of coco and coffee. Further away there are yams, pineapple, cassava, and some paw-paw and bananas. The forest directly surrounding us is almost finished” (JWL). “Habitat is still secondary high forest [Figure 91] . . . bananas, papaya, cocoa, ground nuts, corn, coffee, palm oil, cassava, and yams” (CBR).

**Remarks:** At Agou, LeDuc and Robbins made camp on a soccer field. Just north of town are two large peaks that were “heavily forested,” a tract that lies within



FIGURE 90. Ghana, Yabraso: Riverine forest in Guinea woodland (photograph by J. C. Geest, 11 Apr 1968).

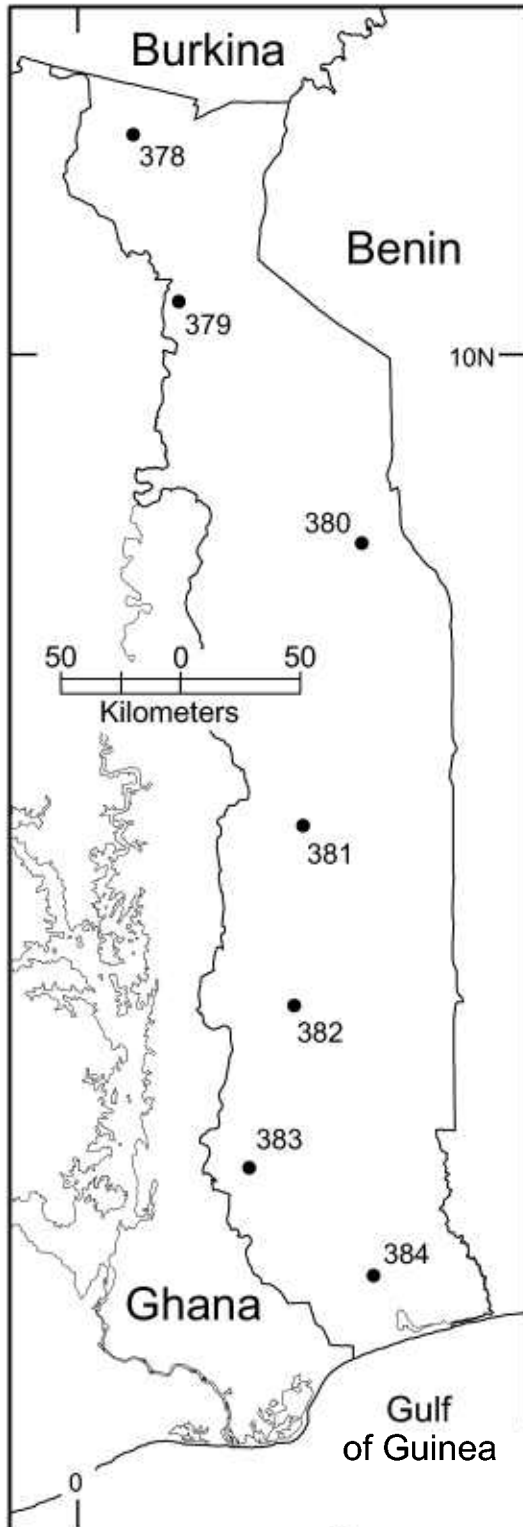
the Forêt Classée d'Agou (CAO, *Palimé*, 1:200,000). Many rodents were purchased from the locals, who were very cooperative and even obtained specimens from the aforementioned forest.

Taxa: *Galago*, *Cercopithecus*; *Heliosciurus*, *Graphiurus*, *Lophuromys*, *Grammomys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Stochomys*; *Crocidura*; *Hipposideros*, *Taphozous*, *Nycteris*.

**Dapango**, Savanna Region (Map 12: 378).

Coordinates: 10°52'N, 00°13'E C (10°52'N, 00°12'E G).  
Collectors: J. W. LeDuc and C. B. Robbins (9–13 May 1968).

Habitat: "Sharp rock ledge that drops down about 20–40 feet [6.1–12.2 m] abruptly, then 100 feet [30.5 m] or so gradually to a second plain [Figure 92]. The area directly surrounding our camp is quite flat and rocky.



MAP 12. African Mammal Project cardinal collecting localities 378–384 in Togo.

378. Dapango	380. Pawa	382. Ezime	384. Gbatope
379. Padori	381. Pagala	383. Agou	

The area has been in cultivation, but isn't now. It was possibly in ground nuts or corn. All the land on this upper plain is quite flat and lacks vegetation except for a few scattered large trees" (JWL). "Heavily populated and extensively cultivated. Rock hills . . . the area is quite barren of vegetation . . . small caves in rocky hillside nearby" (CBR). "Sudan Savanna" (specimen labels).

Remarks: In their field journals, LeDuc and Robbins recorded that their camp was situated 3 km southwest of Dapango (10°51'N, 00°10'E M, CAO, *Sansanné-Mango*, 1:200,000), about 1 km from the main road and 300 yards [270 m] from an unnamed small village.

Taxa: *Xerus*, *Cricetomys*, *Steatomys*, *Acomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Atelerix*; *Crocidura*; *Eidolon*, *Rhinolophus*, *Nycteris*, *Chaerephon*; *Galerella*.

**Ezime** (Map 12: 382).

Coordinates: 07°29'N, 00°56'E C, G.

Collectors: J. W. LeDuc and C. B. Robbins (30 Jun–5 Jul 1968).

Habitat: "Habitat . . . is indeed unique. Bordering on the north side of the village is a ridge—several hundred feet high and covered with what appears to be high forest. The south side of the village borders on a fairly level area covered by guinea woodland and small patches of forest [Figure 93]. Where the river runs across this area there occurs a dense riverine forest . . . base of ridge . . . coffee and coco. Small patches of pineapple . . . east and south of the village there is corn and yams . . . dense riverine forest, secondary high forest and a short patch of coffee . . . small pond . . . mango (?) tree" (JWL). "Secondary high forest [as also indicated on specimen labels]. There is cocoa, coffee, corn, cassava, yams, ground nuts, and papaya grown here. The forests have very high trees and the ones near villages have the cocoa and coffee forming a secondary canopy under these large trees. Many streams in the area . . . bush and grass scrub . . . pond" (CBR).

Remarks: This locality, which impressed LeDuc as "unique" in view of the wide variety of habitats, was successfully sampled with considerable help from the locals and in spite of heavy rains. In all, 34 vertebrate genera were collected. The river mentioned in the habitat descriptions is a tributary of the Oulé River, located to the south side of Ezime.

Taxa: *Galago*, *Cercopithecus*, *Colobus*; *Xerus*, *Funisciurus*, *Heliosciurus*, *Graphiurus*, *Lophuromys*, *Uranomys*, *Gerbilliscus*, *Arvicanthis*, *Dasymys*, *Hylomyscus*,



FIGURE 91. Togo, Agou (12 Jul 1968).

*Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Anomalurus*;  
*Lepus*; *Crocidura*; *Eidolon*, *Epomops*, *Hypsignathus*,  
*Micropteropus*, *Hipposideros*, *Nycteris*, *Chaerephon*,  
*Mops*, *Scotophilus*, *Neoromicia*; *Nandinia*.

**Gbatope**, Maritime Region (Map 12: 384).

Coordinates: 06°26'N, 01°17'E C (06°26'N, 01°16'E G,  
as Agbatopé).

Collectors: J. W. LeDuc and C. B. Robbins (27–28 Jun  
1968).

Habitat: “Coconut palms . . . bush . . . The foliage is quite  
thick. Occasionally there is an oil palm . . . small corn  
field . . . there is little crop work . . . general habitat  
we’re calling invasive guinea woodland [Figure 94]  
after Rosevear [1965] . . . floor of small valley . . . river  
running. The river has overflowed badly now . . . thick  
growth of vines, etc. causing a ‘wall’ of vegetation . . . oil  
palms, a little corn and small private plots of vegetables.  
Coconut palms” (JWL). “The area is or has been at one

time high forest. Due to cultivation and land clearing  
only isolated large trees remain. We will call this area  
‘invasive guinea woodland’ [also as penned on speci-  
men labels] according to Rosevear [1965] . . . dense  
low bush, coconut palm, oil palms, corn, cassava, and  
other crops . . . dense brush” (CBR).

Taxa: *Mastomys*, *Praomys*; *Epomophorus*, *Chaerephon*,  
*Mops*, *Glauconycteris*; *Neotragus*.

**Padori**, Savanna Region (Map 12: 379).

Coordinates: 10°13'N, 00°25'E C (10°14'N, 00°26'E G).

Collectors: J. W. LeDuc and C. B. Robbins (16–19 May  
1968).

Habitat: “Habitat . . . unique . . . large ponds and . . .  
lakes. The lay of the land is quite flat. These flat lands  
are obviously quite swampy during the rains. The  
vegetation we are calling Sudan Savanna. There are a  
lot of acacia trees, baobab, and several types of small  
bush trees. Grasses are quite prevalent [Figure 95].



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FIGURE 92. Togo, Dapango (13 May 1968).



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FIGURE 93. Togo, Ezime (6 Jul 1968).

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FIGURE 94. Togo, Gbatope (photograph by C. B. Robbins, 28 Jun 1968).

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FIGURE 95. Togo, Padori: *Lavia* habitat (photograph by C. B. Robbins, 19 May 1968).

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The crops include yams, possibly cassava, a lot of tobacco” (JWL). “Cultivated in most areas . . . baobab tree . . .” (CBR).

Remarks: Padori lies in the flood plain of the Koumongou River, a tributary of the Oti, and is subject to periodic flooding. While in Padori, they collected a good series of *Lavia* from trees along the Koumongou River.

Taxa: *Xerus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Mastomys*, *Praomys*; *Lepus*; *Atelerix*; *Crocidura*; *Lavia*, *Nycteris*, *Mops*.

**Pagala** (Map 12: 381).

Coordinates: 08°11'N, 00°58'E C, G.

Collectors: J. W. LeDuc and C. B. Robbins (27–31 May 1968).

Habitat: “Camp in center of a teak forest . . . dense guinea savanna with exceptionally good riverine forest along the waterways and dried stream beds” (JWL). “Camp in a teak grove . . . near the Anie River. The area is dense Guinea Savanna [Figure 96]. Many trees and

very high grass. The habitat along the river has larger forest type trees: riverine forest” (CBR).

Remarks: LeDuc and Robbins camped near the western edge of Pagala, in a teak forest close by the Anie River. Their description would position the base camp just inside the Forêt Classée du Balam boundary (CAO, *Fazao*, 1:200,000). According to Robbins, Pagala was chosen as a locality because “[this] is the closest we could get to Bismarckburg” (ruins; 08°11'N, 00°41'E G), the type locality of the rare muroid rodent *Leimacomys buettneri*.

Taxa: *Galago*, *Cercopithecus*; *Heliosciurus*, *Protoxerus*, *Graphiurus*, *Cricetomys*, *Uranomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Crocidura*; *Epomorphorus*, *Micropteropus*, *Chaerephon*; *Genetta*, *Nandinia*.

**Pewa** (Map 12: 380).

Coordinates: 09°17'N, 01°14'E C, G.



FIGURE 96. Togo, Pagala (1 Jun 1968).



FIGURE 97. Togo, Pewa (26 May 1968).

Collectors: J. W. LeDuc and C. B. Robbins (22–25 May 1968).

Habitat: “Very dense guinea savanna [Figure 97] . . . large rock outcroppings . . . The land is cultivated to a certain extent but there still remains many patches of good bush . . . cassava and yams, although small plots of vegetables occur . . . dense grass . . . rocks” (JWL). “The area is very strange. We are in the Guinea Savanna zone but we are at the top of a mountain range . . . heavy vegetation and many rocks . . . semi-high grass-bush . . . water in high grass . . . mango trees” (CBR).

Remarks: LeDuc and Robbins established camp near a Peace Corps fish culture project. On 23 May, they explored a cave 2–3 mi [3.2–4.8 km] from town but found no bats. Later, they hunted baboons by a waterfall outside of Bafilo (09°21'N, 01°16'E G) but, again, without success.

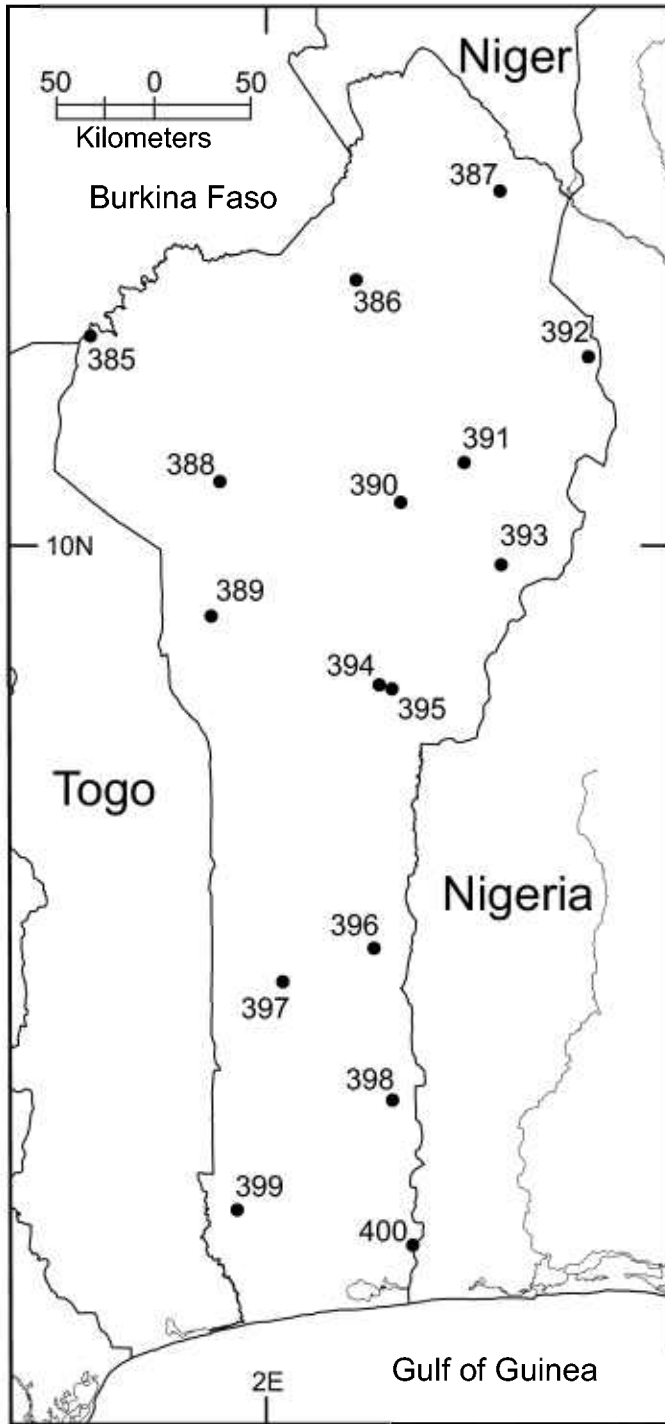
Taxa: *Procavia*; *Heliosciurus*, *Graphiurus*, *Cricetomys*, *Uranomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasyomys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*;

*Atelerix*; *Crocidura*; *Lissonycteris*, *Rhinolophus*, *Taphozous*, *Nycteris*, *Chaerephon*, *Mops*, *Nycticeimops*, *Neoromicia*.

#### BENIN (DAHOMÉY)

GENERAL REMARKS. Compared with Togo, LeDuc and Robbins realized a more successful survey in Benin (Map 13) over a longer period (about four months). Although final independence from France was achieved in 1960, as the Republic of Benin, original specimen tags all bear the older name “Dahomey,” still in vogue at the time of the AMP fieldwork (Jan–Jun 1968). National Museum of Natural History specimens of Chiroptera and Rodentia were documented, respectively, by Robbins (1980) and Robbins and Van der Straeten (1996).

ITINERARY. J. W. LeDuc and C. B. Robbins: **Diho**, 12–16 Jan 1968; **Bimbereke**, 18–26 Jan 1968; **Gbessarouperou**, 23 Jan 1968; **Guene**, 28 Jan–1 Feb 1968;



MAP 13. African Mammal Project cardinal collecting localities 385–400 in Benin (Dahomey).

385. Porga	391. Gbessarouperou	397. Zizonkame
386. Banikoara	392. Segbana	398. Ketou
387. Guene	393. Nikki	399. Kpodave
388. Kouande	394. Tourou	400. Ayitedjou
389. Soubroukou	395. Parakou	
390. Bimbereke	396. Diho	

Banikoara, 2–10 Feb 1968; Segbana, 11–16 Feb 1968; Nikki, 19–24 Feb 1968; Parakou, 27 Feb–1 Mar 1968; Tourou, 29 Feb 1968; Ketou, 4–9 Mar 1968; Zizonkame, 14–18 Apr 1968; Soubroukou, 20–24 Apr 1968; Kouande, 26–30 Apr 1968; Porga, 3–7 May 1968; Ayitedjou, 15–18 Jun 1968; Kpodave, 21–24 Jun 1968.

**Ayitedjou**, Eastern Region (Map 13: 400).

Coordinates: 06°39'N, 02°44'E G (as Aitedjou).

Collectors: J. W. LeDuc and C. B. Robbins (15–18 Jun 1968).

Habitat: “The area here is quite complex [in terms of habitat]. The main forest blocks are Secondary High Forest . . . large groves of oil palms, corn fields, cassava, and pineapple . . . some of the juju forests are quite dense with large trees . . . a good deal of the low (elevation)—oil palm—forest plots are under water and very swampy . . . water at the edge of a bridge . . . forest and bush . . . low thicket areas” (CBR). “The habitat here is quite unique . . . area was high forest at one time but now almost all the land is used for oil palm groves. These groves are quite mature. There’s an occasional juju forest scattered about . . . These [forests] are Secondary High Forest with few really tall trees. Running through the valley . . . is a large swamp with a river in the center . . . swamp is quite full now due to all the rain . . . The flora within the swamp is quite dense . . . Some of the trees are fairly tall, though not as high as in a mature High Forest . . . entire area [of the swamp] is covered with a solid blanket of plants, vines, bamboo, and so on, reaching about 30–40 feet [9.1–12.2 m] high . . . river in the swamp . . . very dense foliage (vines, bamboo, small palms, etc.) . . . close to the ground usually not going higher than 6–10 feet [1.8–3.0 m] off the ground” (JWL).

Remarks: Ayitedjou is situated about 3 km north of Igolo, Nigeria, and their camp was just east of the lagoon system according to Robbins. We used the USBGN (1965) coordinates for plotting this site because the collectors’ coordinates (06°39'N, 02°48'E) place the camp in Nigeria.

Taxa: *Cercopithecus*, *Chlorocebus*; *Funisciurus*, *Heliosciurus*, *Protoxerus*, *Cricetomys*, *Gerbilliscus*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Thryonomys*; *Crocidura*; *Mops*.

**Banikoara**, Borgou Region (Map 13: 386).

Coordinates: 11°18'N, 02°26'E C, G (as Banikora).

Collectors: J. W. LeDuc and C. B. Robbins (2–10 Feb 1968).

Habitat: “Stands of grass present. Still typical Sudan Savannah [Figure 98] . . . tall (3–4 feet [0.9–1.2 m]) grass



FIGURE 98. Benin, Banikoara (photograph by C. B. Robbins, 10 Feb 1968).

... mango trees ... [dark] lava type rocks" (CBR).  
 "Area is very dry Sudan Savannah" (JWL).

Remarks: On 2 Feb, LeDuc and Robbins drove to Banikoara, where they set up camp in a grove of mango trees. On 8 and 9 Feb, traps were set about 1 mi [1.6 km] east of camp in a rocky escarpment, although this was not mentioned on specimen labels. LeDuc spelled this locality "Banikora" in his journal.

Taxa: *Heliosciurus*, *Graphiurus*, *Acomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Atelerix*; *Galerella*.

**Bimbereke**, Borgou Region (Map 13: 390).

Coordinates: 10°14'N, 02°40'E C, G (as Bimbéréké).

Collectors: J. W. LeDuc and C. B. Robbins (18–26 Jan 1968).

Habitat: "Very heavily wooded and not burned much ... clay type soil is very rocky ... rock outcroppings on hills near by ... rocks ... light decomposed granite-

shale type ... pond—the local water supply" (CBR).  
 "Camp ... teak forest ... soil was very rocky ... vegetation ... burned off grass, although not dense, and medium to tall trees [Figure 99] ... rock hill about 1/4 mile [0.4 km] from camp. The habitat here was again rocky with most of the grasses burnt off ... pond used for water for the village ... small stream" (JWL).

Remarks: LeDuc and Robbins camped just north of Bimbereke on the edge of a teak forest reserve (10°18'N, 02°35'E G, as Forêt Classée de Wénou-Bénou). On 23 Jan, they went hunting at the village of **Gbessarouperou** with some local men and returned to camp the following morning. The remaining time at Bimbereke was spent preparing the game they collected at Gbessarouperou and previously collected specimens.

Taxa: *Cercopithecus*, *Chlorocebus*; *Funisciurus*, *Heliosciurus*, *Acomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Epomophorus*, *Micropteropus*, *Rhinolo-*



FIGURE 99. Benin, Bimbereke (photograph by C. B. Robbins, 26 Jan 1968).

*phus*, *Nycteris*, *Nycticeinops*, *Scotoecus*, *Scotophilus*, *Pipistrellus*, *Neoromicia*; *Nandinia*.

**Diho**, Central Region (Map 13: 396).

Coordinates: 08°05'N, 02°31'E C, G.

Collectors: J. W. LeDuc and C. B. Robbins (12–16 Jan 1968).

Habitat: “Habitat is burned to a great extent . . . grass, pineapple, and cassava . . . Guinea Savannah Grassland [Figure 100]” (CBR). “Camp in a freshly burned area of cultivated guinea savanna . . . unburned area consisted mainly of thick grasses, not exceptionally tall, and a few short trees. The soil was very dusty and dry . . . citrus patch . . . pineapple patch” (JWL).

Remarks: Village inhabitants supplied so many specimens during the team’s stay at Diho that traps were set on only one of the five evenings here.

Taxa: *Galago*, *Chlorocebus*; *Xerus*, *Funisciurus*, *Heliosciurus*, *Cricetomys*, *Dendromus*, *Uranomys*, *Gerbillus*

*cus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Rattus*; *Lepus*; *Atelerix*; *Crociodura*; *Epomophorus*, *Micropteropus*, *Rhinolophus*.

**Gbessarouperou**, Borgou Region (Map 13: 391).

Coordinates: 10°25'N, 03°01'E C, G (as Gbessaroupérou).

Collectors: J. W. LeDuc and C. B. Robbins (23 Jan 1968).

Habitat: “Guinea Savannah” (specimen label).

Remarks: While camped at **Bimbereke** (18–26 Jan), LeDuc and Robbins hunted larger mammals with some local men on 23 Jan, driving east and northeast about 40 mi [64 km] to the village of Gbessarouperou. There they hiked another 3 mi [4.8 km] east with a company of 15 men into “real bush country.” During the single night of hunting, the party collected 20 specimens, three of which were given to the native hunters in gratitude for their efforts.

Taxa: *Caracal*, *Genetta*; *Alcelaphus*, *Ourebia*, *Cephalophus*, *Sylvicapra*.

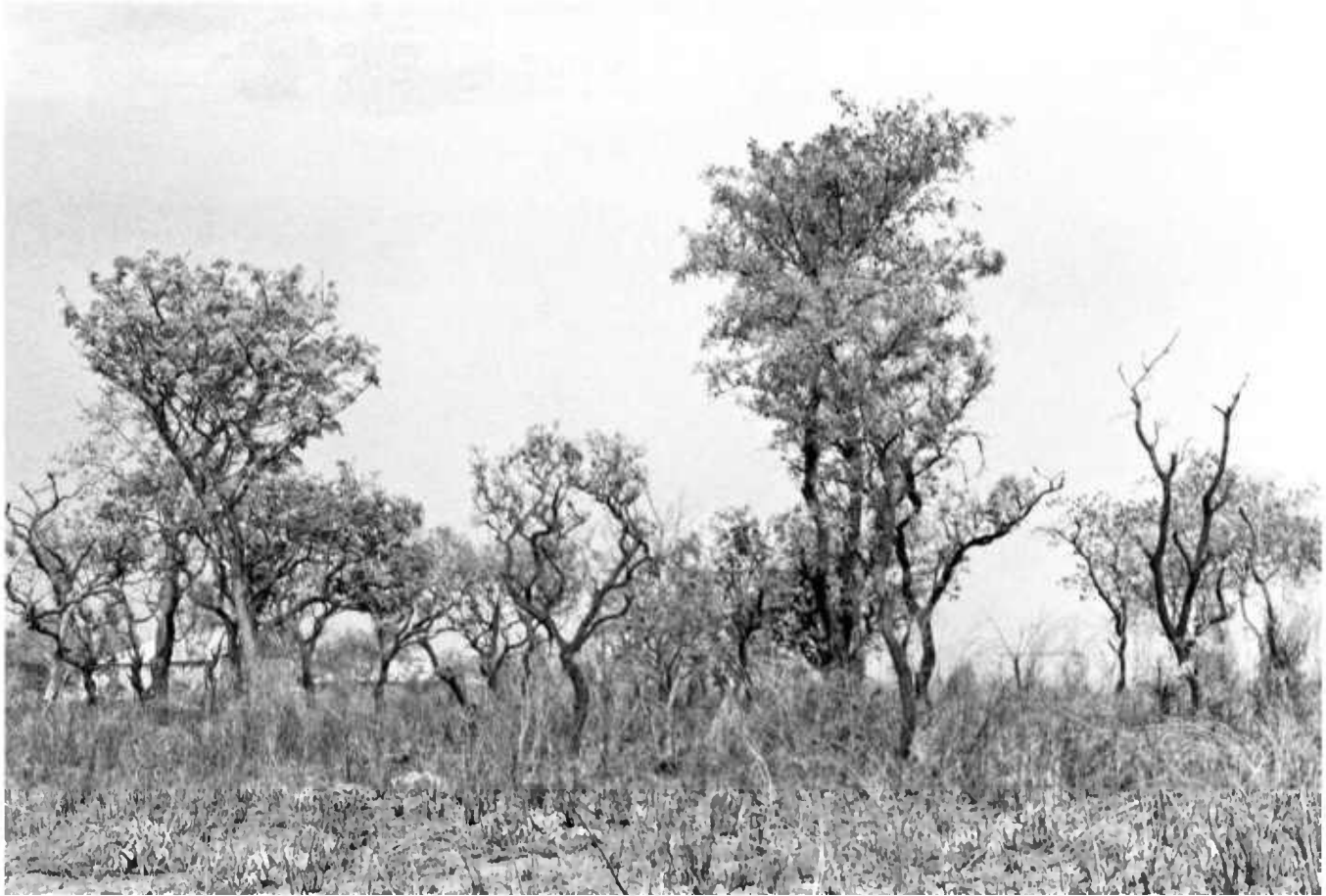


FIGURE 100. Benin, Diho (16 Jan 1968).

**Guene**, Borgou Region (Map 13: 387).

Coordinates: 11°44'N, 03°13'E C, G (as Guéné).

Collectors: J. W. LeDuc and C. B. Robbins (28 Jan–1 Feb 1968).

Habitat: “*Acacia seyal*, the orange bark Sudan Savannah indicator tree, is present. Also flame trees, baobab, and many other thorny species of tree and shrub . . . bushes . . . swampy-like stream . . . cattle” (CBR). “Recently harvested peanut field . . . vegetation was typically Sudan Savannah [Figure 101] . . . burned fairly recently . . . cattle . . . bush surrounding camp . . . swampy area just outside the village . . . used as a watering hole for cattle” (JWL).

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Gerbiliscus*, *Taterillus*, *Lemmiscomys*, *Mastomys*; *Lepus*; *Atelerix*; *Epomophorus*, *Micropteropus*, *Hipposideros*, *Nycteris*, *Chaerephon*, *Scotophilus*, *Neoromicia*; *Galerella*.

**Ketou**, Eastern Region (Map 13: 398).

Coordinates: 07°21'N, 02°37'E C (07°22'N, 02°36'E G).

Collectors: J. W. LeDuc and C. B. Robbins (4–9 Mar 1968).

Habitat: “The area is probably in the Guinea Savannah Zone but it isn’t all so. Driving here . . . there were very obvious patches of High Forest . . . bombax trees—also other very large trees remaining . . . So our specimen labels will call this Guinea Savannah [Figure 102]. An analysis of pictures of the area may change this [perception] . . . Habitat is high grasses, thorn bushes etc., in an area of apparently remnant high forest: Invasive Guinea Savannah since many large trees still remain . . . similar except cassava fields and yams” (CBR). “Undisturbed guinea savanna. There are many more trees here than in previous guinea savanna camps. The entire area is green with the new grasses . . . bush (guinea savanna) . . . The habitat is one of dense thicket



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FIGURE 101. Benin, Guene (1 Feb 1968).

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FIGURE 102. Benin, Ketou (photograph by C. B. Robbins, 10 Mar 1968).

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reaching about 12–15 feet [3.7–4.6 m] high . . . grasses and Invasive Guinea Savanna” (JWL).

Remarks: LeDuc and Robbins camped about 0.5 mi [0.8 km] east of Ketou. On 5 Mar, after disappointing trap success, they drove to a remnant area of high forest about 3 mi [4.8 km] east of camp, which LeDuc described as “Invasive Guinea Savanna.” This locality variant is not indicated on specimen labels or in field catalogs. Later that day, they collected *Mops* from the town post office in Ketou proper.

Taxa: *Galago*; *Xerus*, *Lophuromys*, *Uranomys*, *Gerbilliscus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Rattus*; *Crocidura*; *Chaerephon*, *Mops*.

**Kouande**, Atacora Region (Map 13: 388).

Coordinates: 10°20'N, 01°41'E C.

Collectors: J. W. LeDuc and C. B. Robbins (26–30 Apr 1968).

Habitat: “The area is still in the Guinea Savannah Zone but getting to the edge. [The Atacora Mountains] are rocky with much brush and small trees” (CBR). “[Mountains] rocky, heavily vegetated, and generally undisturbed. The general habitat is Guinea Savanna [Figure 103], however, the vegetation isn’t as closely clumped or as high as previous areas further south . . . rocks . . . bush” (JWL).

Remarks: Camp was established just west of town close to the Atacora Mountains. LeDuc indicated in his journal that their camp was on the “southern edge of the village along the road.” Just to the west of Kouande (Kouandé G) lies the Forêt Classée des Collines de Kouandé (10°22'N, 01°41'E G), which encompasses an isolated range of foothills (maximum elevation 574 m) of the Atacora Mountains.

Taxa: *Galago*, *Chlorocebus*; *Xerus*, *Heliosciurus*, *Graphiurus*, *Cricetomys*, *Steatomys*, *Gerbilliscus*, *Taterillus*,



FIGURE 103. Benin, Kouande (30 Apr 1968).



*Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Aterix*; *Crocidura*; *Epomophorus*, *Micropterus*; *Cephalophus*.

**Kpodave**, Mono Region (Map 13: 399).

Coordinates: 06°49'N, 01°46'E C (06°50'N, 01°42'E G, as Kpodaha).

Collectors: J. W. LeDuc and C. B. Robbins (21–24 Jun 1968).

Habitat: “Secondary High Forest. Many oil palms, peanut farms, corn. The roads have very high grass as do the fringes of the forest plots. Again a mixed up . . . forest grove . . . Besides the usual high trees and low scrub [Figure 104] and thicket and vines are kola trees and guava trees . . . oil palm forest” (CBR). “The habitat is similar to much of the south of Dahomey. The majority of the land has been cleared and is under cultivation . . . ground nuts, corn, and oil

palms . . . tall ‘razor grass’ grows everywhere that isn’t under constant attention. Occasionally . . . a lone, tall tree . . . left from the forest, and one or two small (1 acre [0.4 ha] or so) juju plots . . . but for the most part the High Forest . . . has vanished” (JWL).

Remarks: Kpodave is just west of the Dahomey Gap, where the savanna zone reaches the Gulf of Guinea and splits the high forest of west Africa into two separate blocks (see, e.g., Rosevear, 1953; Robbins, 1978).

Taxa: *Perodicticus*, *Galago*; *Heliosciurus*, *Cricetomys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Crocidura*; *Eidolon*, *Epomops*, *Hipposideros*, *Taphozous*, *Chaerephon*, *Mops*, *Neoromicia*.

**Nikki**, Borgou Region (Map 13: 393).

Coordinates: 09°56'N, 03°13'E C (09°56'N, 03°12'E G).

Collectors: J. W. LeDuc and C. B. Robbins (19–24 Feb 1968).



FIGURE 104. Benin, Kpodave (24 Jun 1968).



FIGURE 105. Benin, Nikki (photograph by C. B. Robbins, 24 Feb 1968).

Habitat: "Tall grass...cassava field...mango trees [Figure 105]" (CBR). "Camp...surrounded by villages on two sides...and grasses with scattered wells and wash areas on the other two sides...cassava patch...tall grass just a few yards from camp...boys set fire to all the dry grass surrounding our camp in an effort to collect more rats. Unfortunately all the habitat was destroyed, leaving us with poor habitat photos" (JWL).

Taxa: *Xerus*, *Uranomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Crocidura*; *Epomophorus*, *Rhinolophus*, *Hipposideros*, *Nycteris*, *Chaerephon*, *Mops*, *Scotophilus*.

Parakou, Borgou Region (Map 13: 395).

Coordinates: 09°20'N, 02°37'E C (09°21'N, 02°37'E G).

Collectors: J. W. LeDuc and C. B. Robbins (27 Feb–1 Mar 1968).

Habitat: "The area has lush growth...many mango trees, high grass and swamp areas with standing pools of water. The area is still Guinea Savannah [Figure 106]...cassava...mango trees...grass...bush about 1/4 mile [0.4 km] from here...north of town about 3 miles [4.8 km]...rocky outcropping" (CBR). "We aren't far enough from town to be in actual bush since the area is highly cultivated with small vegetable plots...there are several vacant areas covered by grasses (short 1–3 feet [0.3–0.9 m])...mango trees...bush about 1 mile [1.6 km] east of camp...stream near camp at a small dammed pond...bush fringing the town" (JWL).

Remarks: The field team established camp just south of Parakou near a vegetable farm. A map we examined (CAO, *Parakou*, 1:200,000) indicates that this farm was in the Périmètre de Reboisement de Parakou (09°20'N, 02°36'E G). On 26 Feb, traps were set in the bush about 1 mi [1.6 km] east of camp, and on



FIGURE 106. Benin, Parakou (2 Mar 1968).

29 Jan, they set traps and collected in a rocky outcrop about 3 mi [4.8 km] north. Neither of these Parakou variants is recorded on specimen labels or in field catalogs. Also on 29 Jan, LeDuc and Robbins drove to **Tourou** to collect fruit bats.

Taxa: *Galago*; *Gerbilliscus*, *Arvicanthis*, *Mastomys*, *Praomys*; *Crocidura*; *Epomophorus*, *Micropteropus*, *Chaerephon*, *Scotophilus*, *Neoromicia*.

**Porga**, Atacora Region (Map 13: 385).

Coordinates: 11°02'N, 00°58'E C, G.

Collectors: J. W. LeDuc and C. B. Robbins (3–7 May 1968).

Habitat: “Sudan Savannah . . . Pendjari River” (CBR). “Sudan Savanna and the land is basically quite flat [Figure 107]. The local crops here aren’t very evident” (JWL).

Remarks: The Pendjari River (LeDuc noted that it is also known as the Oti River) was about 1 km to the east of

this camp. From 4 to 6 May, the team collected near the Porga Lodge, a hunting lodge about 3 mi [4.8 km] north of camp.

Taxa: *Galago*, *Erythrocebus*; *Xerus*, *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Praomys*; *Crocidura*; *Nycteris*, *Chaerephon*, *Mops*; *Genetta*.

**Segbana**, Borgou Region (Map 13: 392).

Coordinates: 10°56'N, 03°42'E C, G.

Collectors: J. W. LeDuc and C. B. Robbins (11–16 Feb 1968).

Habitat: “Grass and brush . . . The area is again in the Sudan Savannah belt [Figure 108] . . . quite a lot of sandy areas . . . stream. A few pools remain. The area has lush growth—palms, thick grass, and many other trees . . . riverine forest area . . . east of town . . . mango tree” (CBR).

Remarks: LeDuc and Robbins set up their encampment adjacent to an unused airstrip. On 14 Feb, they set



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FIGURE 107. Benin, Porga (1 May 1968).

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FIGURE 108. Benin, Segbana: Riverine area (photograph by C. B. Robbins, 16 Feb 1968).

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traps in a “riverine forest” area about 0.25 mi [0.4 km] east of town. Robbins indicated that they collected many snakes during their stay here.

Taxa: *Xerus*, *Heliosciurus*, *Graphiurus*, *Gerbilliscus*, *Taterillus*, *Arvicanthus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Crocidura*; *Epomophorus*, *Micropteropus*, *Nycteris*, *Chaerephon*, *Scotophilus*, *Pipistrellus*, *Glauconycteris*, *Neoromicia*.

**Soubroukou**, Atacora Region (Map 13: 389).

Coordinates: 09°41'N, 01°38'E C (09°40'N, 01°38'E G).

Collectors: J. W. LeDuc and C. B. Robbins (20–24 Apr 1968).

Habitat: “Still in the Guinea Zone but is reaching the northern limit. The village is surrounded by very large trees and thicket. Crops in evidence throughout the valley here with a low rock-grass outcropping just east of camp” (CBR). “The majority of the habitat . . . is cultivated land . . . small plot of untouched forest . . . forest appears to have been High Forest at one time but now only the

large trees remain [Figure 109]. The floor of the forest is thick with high shrubs and vines . . . small lake” (JWL).

Remarks: The very large trees surrounding a portion of the village formed part of the Forêt Classée de Soubroukou (09°41'N, 01°38'E G).

Taxa: *Xerus*, *Gerbilliscus*, *Taterillus*, *Arvicanthus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Aterix*; *Crocidura*; *Eidolon*, *Hipposideros*, *Nycteris*, *Chaerephon*, *Mops*, *Neoromicia*.

**Tourou**, Borgou Region (Map 13: 394).

Coordinates: 09°21'N, 02°33'E C, G.

Collectors: J. W. LeDuc and C. B. Robbins (29 Feb 1968).

Habitat: “Hiked into the bush about 1/2 mile [0.8 km]. The area was very swampy . . . many very tall oil palms trees” (CBR).

Remarks: While at **Parakou** (27 Feb–1 Mar), LeDuc and Robbins traveled 7 km west to the village of Tourou to collect fruit bats.

Taxon: *Eidolon*.



FIGURE 109. Benin, Soubroukou (25 Apr 1968).



FIGURE 110. Benin, Zizonkame (18 Apr 1968).

Zizonkame, Central Region (Map 13: 397).

Coordinates: 07°55'N, 02°01'E C.

Collectors: J. W. LeDuc and C. B. Robbins (14–18 Apr 1968).

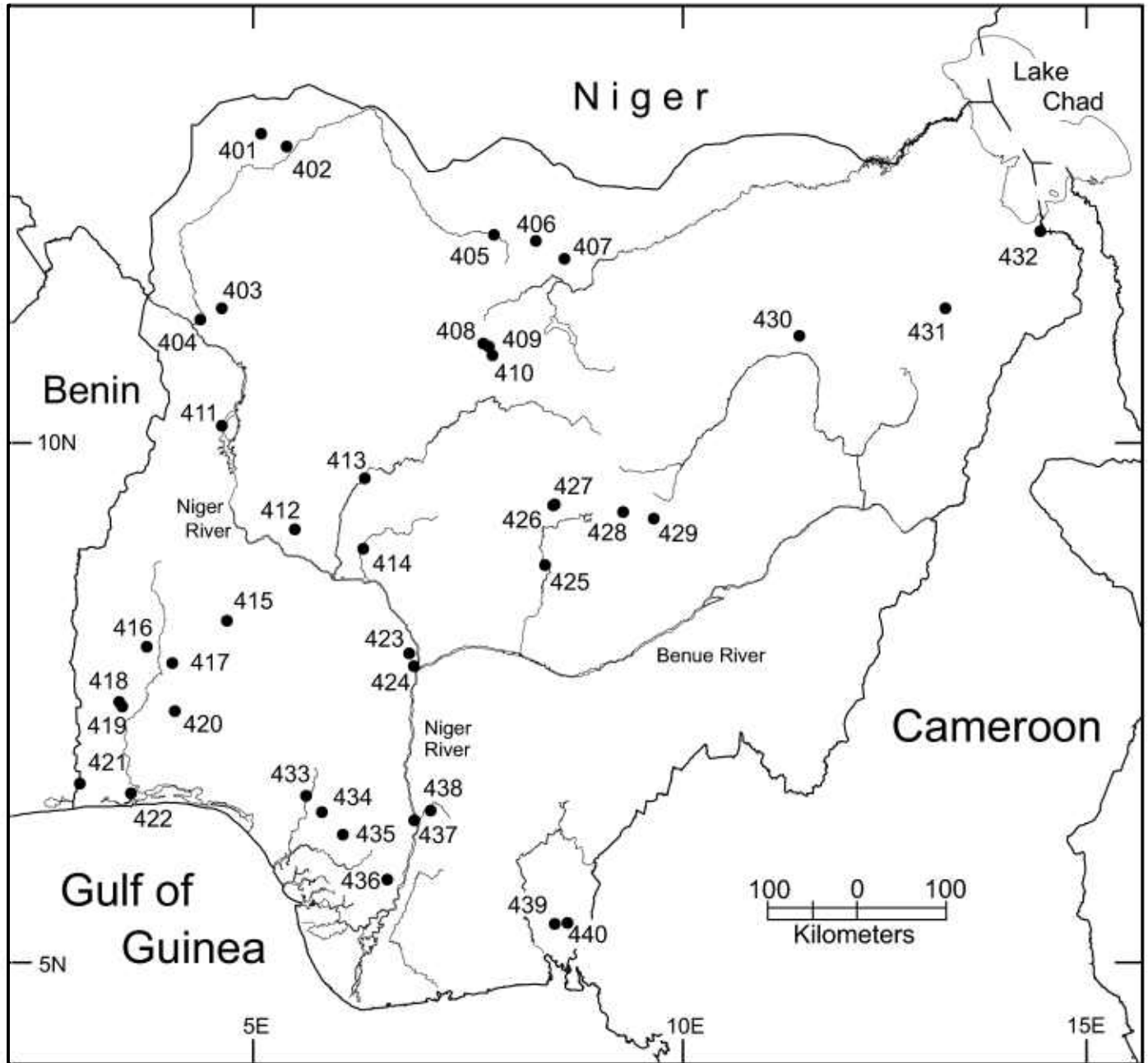
Habitat: “Definitely in the Guinea Savannah (Woodland) Zone. The general area has fairly tall grass in places (3–4 feet [0.9–1.2 m]), new grass in burned areas, thicket, larger trees, and bushes . . . ponds near the village” (CBR). “The general habitat is Guinea Savanna [Figure 110] . . . green and lush with spring growth . . . a few small cultivated plots interdispersed throughout . . . oil palms . . . about 5 feet [1.5 m] tall . . . very small stream surrounded by a slight riverine forest . . . grasses near camp . . . oil palm plot surrounded by cassava . . . pond” (JWL).

Remarks: According to Robbins, Zizonkame is about 6 km east of Savalou (07°56'N, 01°58'E G) and north-west of Dassa-Zoumé (07°45'N, 02°11'E G).

Taxa: *Galago*, *Chlorocebus*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Uranomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Thryonomys*; *Atelerix*; *Crocidura*; *Epomophorus*, *Hipposideros*, *Nycteris*, *Chaerephon*, *Scotophilus*, *Neoromicia*; *Manis*.

#### NIGERIA

**GENERAL REMARKS.** The Nigerian survey (Map 14) was mainly accomplished by two couples, the Herberts and the Geests, who operated independently at successive time periods. Dorothy (“Dotty”) L. Herbert, the team’s designated “bug picker,” and H. John Herbert each maintained personal logs of the localities visited and collections made during Dec 1965 to Jul 1966. Julius C. and Bettye Geest formed the second Nigerian team, active



MAP 14. African Mammal Project cardinal collecting localities 401–440 in Nigeria.

401. Tangaza	411. Shagunu	421. Ilashe, 4 mi S	431. Maiduguri, 22 mi S
402. Kware	412. Kudu	422. University of Lagos	432. Dikwa, 31 mi NE
403. Dada	413. Zungeru	423. Agbaja	433. Benin, 30 mi W
404. Iella	414. Tsanchaga	424. Felele	434. Benin City
405. Karaduwa	415. Afon	425. Mada River	435. Sapoba Forest Reserve
406. Bichi, 1 mi W	416. Upper Ogun Ranch	426. Ugar Jabar	436. Ashaka
407. Panisau	417. Oyo, 7 mi W	427. Agamachi	437. Asaba, 5 mi N
408. Zaria, 15 mi NW	418. Idere	428. Panyam Fish Farm	438. Aguleri, 1.5 mi E
409. Zaria, 7 mi NW	419. Igbo Ora	429. Kabwir, 1 mi S	439. Calabar, 15 mi N
410. Zaria, 5 mi S	420. Ibadan	430. Fika	440. Oban, 14 mi S

from Oct 1966 to Jun 1967. Setzer joined each team for several days at the start of their respective expeditions. The Virus Research Laboratory, supported by the Rockefeller Foundation and affiliated with the University of Ibadan, served as an important logistical base for both field teams, and Dr. Graham Kemp of that organization facilitated many collecting operations and regularly accompanied the teams to gather blood and visceral samples for virological investigation (e.g., see Kemp et al., 1974). Audu served as cook, translator, and all-around field assistant. Stanley B. Akpan, a field worker hired under the auspices of the Rockefeller Foundation, assisted the Virus Research Laboratory and AMP teams with collecting and preparing specimens, not only in and around Ibadan but also at the Sapoba Forest Reserve and Dada. The considerable taxonomic and locality information that resulted from the collective efforts of these individuals, especially the Geests and the Herberts, materially enhanced Happold's (1987) faunal study of Nigerian mammals. Given the sporadic nature of collecting in Ibadan, we excluded that locality from the following itineraries.

**ITINERARIES.** H. J. and D. L. Herbert and H. W. Setzer: **Agamachi**, 6 Dec 1965; **Panyam Fish Farm**, 6–11 Dec 1965; **1 mi S Kabwir**, 11–15 Dec 1965.

H. J. and D. L. Herbert: **Benin**, 17, 29 Dec 1965–1 Jan 1966; **30 mi W Benin**, 27 Dec 1965–2 Jan 1966; **Sapoba Forest Reserve**, 4–10 Jan 1966; **7 mi W Oyo**, 1, 5 Feb 1966; **Ashaka**, 8–15 Feb 1966; **5 mi N Asaba**, 15–22 Feb 1966; **1.5 mi E Aguleri**, 22–28 Feb 1966; **15 mi N Calabar**, 8–14 Mar 1966; **14 mi S Oban**, 14–19 Mar 1966; **22 mi S Maiduguri**, 1–7 Apr 1966; **31 mi NE Dikwa**, 7–12 Apr 1966; **1 mi W Bichi**, 16–20 Apr 1966; **15 mi NW Zaria**, 21–28 Apr 1966; **5 mi S Zaria**, 23–26 Apr 1966; **Kware**, 7–14 May 1966; **7 mi NW Zaria**, 14–15 May 1966; **Fika**, 18–24 May; **Zungeru**, 25–26 May 1966; **Shagunu**, 7–16 Jun 1966; **Sapoba Forest Reserve**, 28 Jun–16 Jul 1966.

J. C. Geest and H. W. Setzer: **Igbo Ora**, 17–26 Oct 1966; **Idere**, 25–26 Oct 1966.

J. C. Geest: **University of Lagos**, 31 Oct–7 Nov 1966; **4 mi S Ilashe**, 8–14 Nov 1966; **Kware**, 24 Nov–1 Dec 1966; **Tangaza**, 1–6 Dec; **Iella**, 6–10 Dec 1966; **Upper Ogun Ranch**, 12–16 Dec 1966; **Tsanchaga**, 6–12 Jan 1967; **Karaduwa**, 13–19 Jan 1967; **Panisau**, 21 Jan–5 Feb 1967; **Kudu**, 3–9 Mar 1967; **Mada River**, 10–19 Mar 1967; **Ugar Jabar**, 22 Mar–2 Apr 1967; **Panyam Fish Farm**, 7–16 Apr 1967; **Afon**, 4–11 May 1967; **Felele**, 13–19 May 1967; **Agbaja**, 14 May 1967; **Dada**, 28 May–3 Jun 1967.

**Afon**, Northern Region (Map 14: 415).

Coordinates: 08°19'N, 04°31'E C (08°19'N, 04°32'E G).

Collector: J. C. Geest (4–11 May 1967).

Habitat: "Absence of trees suitable to shield the tent . . . shrubs and low trees . . . grass . . . low glabrous leaved shrub that is so prevalent in Guinea Savanna [Figure 111] and a common pest plant in fallow fields. For the most part the area is heavily cultivated with grass in the fallow fields. The grass is approximately 18 inches [46 cm] high . . . The few trees that are present are widely scattered . . . two trees were prominent, *Isobertina* and *Delonyx*, the latter being in bloom." "Guinea Savanna" (specimen labels).

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Graphiurus*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Crocidura*, *Suncus*; *Epomophorus*, *Micropteropus*, *Hipposideros*, *Nycteris*.

**Agamachi**, Eastern Region (Map 14: 427).

Coordinates: 09°32'N, 08°24'E M (AMS, *Zaria*, 1:1,000,000).

Collectors: D. L. and H. J. Herbert and H. W. Setzer (6 Dec 1965).

Habitat: "Guinea Woodland" (specimen labels).

Remarks: This was an overnight stop by Setzer and the Herberts during their trip from Ibadan to the Jos Plateau. D. L. Herbert's journal places Agamachi as 63 mi [101 km] southwest of Jos. This place-name is located about 6 mi [9.7 km] south of Kagoro (09°36'N, 08°23'E G) according to a map probably used by AMP field crews. The site is near the Jemaa locale (**Ugar Jabar**, see locality account) later visited by Geest.

Taxon: *Mastomys*.

**Agbaja**, 17 mi [27.4 km] NW Lokoja, Northern Region (Map 14: 423).

Coordinates: 07°59'N, 06°40'E C (07°59'N, 06°39'E G).

Collector: J. C. Geest (14 May 1967).

Habitat: "Guinea Savanna" (specimen label).

Remarks: The single specimen taken here was collected on an incidental visit to the Agbaja market by a field companion of Geest's while collecting at **Felele** (13–19 May).

Taxon: *Mastomys*.

**Aguleri**, 1.5 mi [2.4 km] E, Eastern Region (Map 14: 438).

Coordinates: 06°21'N, 06°55'E M (AMS, *Nigeria and Part of Tchad*, 1:2,000,000).

Collectors: H. J. and D. L. Herbert (22–28 Feb 1966).

Habitat: "The country . . . is rolling Guinea Savanna with high bush and scattered trees. High Forest/Guinea Woodland [Figure 112]" (HJH).





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FIGURE 111. Nigeria, Afon: Flame tree (photograph by J. C. Geest, May 1967).

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FIGURE 112. Nigeria, Aguleri, 1.5 mi E (Feb 1966).

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Remarks: In his field journal, H. J. Herbert indicated that the base camp for this locality was in the compound of the local Catholic mission college, situated outside Aguleri (06°20'N, 06°53'E G) and "on a hill overlooking the Anambra River."

Taxa: *Xerus*, *Heliosciurus*, *Cricetomys*, *Gerbilliscus*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Rattus*; *Crocidura*; *Hypsignathus*, *Chaerephon*, *Mops*; *Manis*.

**Asaba, 5 mi [8.0 km] N**, Midwestern Region  
(Map 14: 437).

Coordinates: 06°15'N, 06°43'E M (Shell-BP, SW Sheet, 1:1,000,000).

Collectors: D. L. and H. J. Herbert (15–22 Feb 1966).

Habitat: "There are high forest, cleared areas, and cultivated fields" (DLH). "Primarily high bush with intermittent palms and some high forest species, probably overall Guinea Savanna . . . this area was predominantly High Forest but is now reduced to a transition zone between High Forest and Guinea Savanna" (HJH).

Remarks: H. J. Herbert recorded several distance modifiers for specimens collected in and around the region of Asaba. The central camp and main collecting area were established on the campus of the Rural Training College, about 5 mi N Asaba, and less than 1 mi [1.6 km] from the Niger River. On February 15, along the road from Ashaka to Asaba (8 mi [12.9 km] W Asaba), they purchased a duiker. On social visits to nearby St. Patrick's College (4 mi [6.4 km] W Asaba), several commensal mammals were donated by the reverend brothers. Incidental specimens were purchased during supply trips to the communal market in Asaba (06°11'N, 06°45'E G).

Taxa: *Perodicticus*, *Galago*; *Cricetomys*, *Mastomys*, *Rattus*; *Crocidura*; *Mops*; *Philantomba*.

**Ashaka**, Midwestern Region (Map 14: 436).

Coordinates: 05°38'N, 06°24'E G.

Collectors: D. L. and H. J. Herbert (8–15 Feb 1966).

Habitat: "Many cassava fields with hedgerows" (DLH). "The habitat here seems to be at one time High Forest but is now high grass (12 feet [3.7 m]) with oil palms scattered throughout and remnant patches of hardwood forest" (HJH).

Remarks: Camp was established on the grounds of the Ashaka Catholic Grammar School.

Taxa: *Perodicticus*, *Cercopithecus*; *Heliosciurus*, *Protoxerus*, *Cricetomys*, *Lophuromys*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Oenomys*, *Rattus*; *Crocidura*; *Civettictis*.

**Benin, 30 mi [48.3 km] W**, Midwestern Region  
(Map 14: 433).

Coordinates: 06°30'N, 05°27'E M (Shell-BP, SW Sheet, 1:1,000,000).

Collectors: D. L. and H. J. Herbert (27 Dec 1965–2 Jan 1966).

Habitat: "Huge mahogany trees, dense fern undergrowth . . . tropical high forest" (DLH). "High forest area . . . very thick humid forest, some of the large trees over 100 feet [30 m] in height" (HJH).

Remarks: The Herberts twice camped at this site: the first time as an overnight stop (17 Dec 1965) on their return to Ibadan from the Jos Plateau and the second time to survey. They placed their camp within a forest reserve but did not identify it by name. The estimated coordinates correspond to a spot marked on an annotated AMP-period road map along the road to Ibadan that was actually more northwest of Benin City and about 16 mi [26 km] airline distance. The 30 mi [48.3 km] west modifier is presumably a by-road calculation.

Taxa: *Dendrohyrax*; *Perodicticus*, *Cercopithecus*; *Heliosciurus*, *Lophuromys*, *Hybomys*, *Hylomyscus*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Crocidura*; *Saccolaimus*.

**Benin City**, Midwestern Region (Map 14: 434).

Coordinates: 06°20'N, 05°38'E G.

Collectors: D. L. and H. J. Herbert (17, 29 Dec 1965–1 Jan 1966).

Habitat: "Open field High Forest," "Tropical forest, bought from boy on street" (specimen labels).

Remarks: While the principal field camp was located in forest at Benin, 30 mi W (see locality account), a few specimens were opportunistically gathered on provisioning trips to the Benin marketplace.

Taxa: *Cricetomys*, *Rattus*; *Manis*.

**Bichi, 1 mi [1.6 km] W**, Kano Province, Northern Region  
(Map 14: 406).

Coordinates: 12°16'N, 08°12'E M (Shell-BP, NE Sheet, 1:1,000,000).

Collectors: D. L. and H. J. Herbert (16–20 Apr 1966).

Habitat: "The habitat is Sudan Savanna (Rosevear, 1965) but is completely taken up with farms and villages" (HJH). "Sudan Savanna" (specimen labels).

Remarks: H. J. Herbert identified Bichi (12°14'N, 08°14'E G) as about 30 mi [48.3 km] north (actually more northwest) of Kano, along the road to Katsina. They established camp on the grounds of the Bichi Training College, just west of the town.

Taxa: *Cricetomys*, *Arvicanthis*, *Mastomys*, *Praomys*; *Lepus*; *Atelerix*; *Eidolon*, *Scotophilus*; *Felis*.

**Calabar, 15 mi [24.1 km] N**, Eastern Region  
(Map 14: 439).

Coordinates: 05°10'N, 08°22'E M (Shell-BP, *SE Sheet*, 1:1,000,000).

Collectors: D. L. and H. J. Herbert (8–14 Mar 1966).

Habitat: “At one time was high forest but is now cleared yam and cassava fields and palm oil nut trees . . . high forest on a river’s edge” (HJH). “High Forest” (specimen labels).

Remarks: Tents were pitched on a school compound to the north of Calabar (04°57'N, 08°19'E G). The river mentioned under Habitat is a tributary of the Calabar River.

Taxa: *Arctocebus*, *Perodicticus*, *Galago*; *Funisciurus*, *Heliosciurus*, *Cricetomys*, *Hylomyscus*, *Mus*, *Rattus*, *Anomalurus*, *Thryonomys*; *Crocidura*; *Megaloglossus*, *Scotophilus*, *Neoromicia*; *Genetta*, *Crossarchus*.

**Dada**, Northern Region (Map 14: 403).

Coordinates: 11°34'N, 04°29'E C (11°33'N, 04°29'E G, as Baban Dada)

Collectors: J. C. Geest and S. B. Akpan (28 May–3 Jun 1967).

Habitat: “The habitat is Sudan Savanna with a few *Isobertia* and scattered acacia. The soil is hard-packed laterite (sandy), rather beige brown. There is a small fadama nearby” (JCG).

Remarks: The USBGN (1971) contains no plausible entry for a place named Dada, as such, within the vicinity of the coordinates given by Geest. A “Babandada” does occur at nearly the same USBGN location, appears on AMP-period road maps (Esso West Africa, Inc., *Nigeria*, 1:2,500,000), and is positioned consistent with the itinerary Geest recorded in his field journal. Apparently, Geest and Akpan, perhaps following the everyday verbal shorthand of the local people, contracted the formal name to “Dada.”

Taxa: *Galago*; *Xerus*, *Heliosciurus*, *Cricetomys*, *Gerbiliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*; *Atelerix*; *Crocidura*; *Eidolon*, *Epomophorus*, *Rhinolophus*, *Hipposideros*, *Nycteris*; *Genetta*.

**Dikwa, 31 mi [49.9 km] NE**, Northern Region  
(Map 14: 432).

Coordinates: 12°22'N, 14°10'E M (AMS, *Nigeria and Part of Tchad*, 1:2,000,000).

Collectors: D. L. and H. J. Herbert (7–12 Apr 1966).

Habitat: “Extremely flat country with infrequent trees and shrub-like bushes” (DLH). “Sudan Savanna, bordering on Sahel Savanna according to Rosevear” (HJH).

Remarks: Most of H. J. Herbert’s specimen labels cite the locality with reference to Dikwa (12°02'N, 13°55'E G). His journal indicates, however, that the collections were made on a Ministry of Agriculture irrigation project about 2 mi [3.2 km] from Gamboru (12°22'N, 14°13'E G) and 10 mi [16 km] south of Lake Chad. Some labels read “31 mi NE Dikwa, Gamboru.”

Taxa: *Erythrocebus*; *Xerus*, *Gerbiliscus*, *Taterillus*, *Arvicanthis*, *Mastomys*; *Crocidura*; *Lavia*, *Taphozous*, *Nycteris*, *Glauconycteris*; *Ichneumia*, *Canis*.

**Felele, 3.6 mi [5.8 km] NW Lokoja**, Northern Region  
(Map 14: 424).

Coordinates: 07°51'N, 06°43'E C, G (as Filele).

Collector: J. C. Geest (13–19 May 1967).

Habitat: “The country is Guinea Savanna on the slopes, and along the small stream there are mangoes, ceiba, and oil palms predominantly. The canopy is quite high and densely shades the stream bottom [Figure 113]. The floor of the forest patch is heavily littered with leaves and rotten mangoes. [The slopes] are well wooded with trees of the Guinea woodland. *Isobertia* is the dominant tree, although *Mungos* and *Parkia* are also present. The slopes have rock rubble covering the surface of the ground . . . mounds of cassava, yams, and ground nuts . . . also grown are chick peas and guinea corn [Figure 114].”

Remarks: Although some specimen labels may be ambiguously read as “3.6 mi NW Felele at Lokoja,” Geest’s field catalog and journal unquestionably designate the specific collecting site as **Felele** (Filele G or Felelen Buzu on maps), which he referenced as 3.6 mi NW Lokoja and on the Niger River. Further, his coordinates concur with those of the USBGN (1971) for Felele, not Lokoja (07°48'N, 06°44'E G).

Taxa: *Xerus*, *Funisciurus*, *Heliosciurus*, *Graphiurus*, *Cricetomys*, *Uranomys*, *Gerbiliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Crocidura*; *Epomophorus*, *Hypsignathus*, *Microp-teropus*, *Myonycteris*, *Hipposideros*, *Chaerephon*; *Atilax*, *Galerella*.

**Fika**, Northern Region (Map 14: 430).

Coordinates: 11°17'N, 11°18'E G.

Collectors: D. L. and H. J. Herbert (18–24 May 1966).

Habitat: “A veritable oasis . . . dry, sandy, Sudan Savanna . . . shrubby bushes and occasional good sized trees around



FIGURE 113. Nigeria, Felele (photograph by J. C. Geest, May 1967).

inhabited areas where there is water" (DLH). "Very rocky, hilly, low-tree covered Sudan Savanna" (HJH).

Remarks: The Herberts pitched camp at a veterinarian post on the outskirts of Fika.

Taxa: *Chlorocebus*; *Xerus*, *Cricetomys*, *Arvicanthis*, *Mastomys*; *Lepus*; *Crocidura*; *Epomophorus*, *Rhinolophus*, *Scotophilus*; *Ourebia*, *Sylvicapra*.

**Ibadan**, Western Region (Map 14: 420).

Coordinates: 07°23'N, 03°54'E G.

Collectors: D. L. and H. J. Herbert (2, 4, 9 Nov 1965; 14–31 Jan; 19 Feb; 26, 28, 29 Apr; 2, 3, 5 May; 21, 25–27 Jun; 20, 22 Jul 1966); S. B. Akpan (numerous dates from 23 Mar 1966–26 May 1967); J. C. Geest and H. W. Setzer (10, 13–16 Oct 1966); J. C. Geest (21, 25 Feb; 21, 24–26 May 1967).

Habitat: "High Forest [Figure 115]" (HJH).

Remarks: Ibadan served as a convenient layover for AMP participants between excursions to more distant regions of Nigeria. Consequently, collecting dates were inter-



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FIGURE 114. Nigeria, Felele (photograph by J. C. Geest, May 1967).

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FIGURE 115. Nigeria, Ibadan (High forest, 1966).

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mittent, and specimens were often collected on an opportunistic basis, usually on the university campus or its facilities. Akpan, however, collected here more intensively for about 50 days over a 14 month span. Common specific localities within or near Ibadan, as encountered on specimen labels and mentioned in collectors' field books, include the Ife University Farm, University of Ibadan, the University of Ibadan Farm, the University of Ibadan Zoo, and the Field Moore Plantation.

Taxa: *Heliosciurus*, *Graphiurus*, *Cricetomys*, *Lophuromys*, *Uranomys*, *Arvicanthis*, *Hybomys*, *Hylomyscus*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*; *Crocidura*; *Epomophorus*, *Epomops*, *Hypsignathus*, *Micropteropus*, *Myonycteris*, *Chaerephon*, *Mops*, *Scotophilus*, *Neoromicia*.

**Idere**, Western Region (Map 14: 418).

Coordinates: 07°29'N, 03°15'E G.

Collectors: J. C. Geest and H. W. Setzer (25–26 Oct 1966).

Habitat: No information available.

Remarks: The collection site is a cave near Idere, where Geest and Setzer netted bats in between their trapping around **Igbo Ora** (see locality account).

Taxa: *Hipposideros*, *Coleura*.

**Iella**, 2 mi [3.2 km] E Bahindi, Northern Region (Map 14: 404).

Coordinates: 11°27'N, 04°13'E C (11°28'N, 04°11'E G).

Collector: J. C. Geest (6–10 Dec 1966).

Habitat: "Camp in a large fadama under a fig tree . . . The fadama is quite different than the surrounding hill sides [which are] rocky with trees and shrubs about 8 to 10 feet [2–3 m] high. The fadama contains much marsh, some palm trees as well as scattered older trees 20–50 feet [6–15 m] high . . . The grass throughout the fadama is about 3 to 6 [feet, 1–2 m] in height. The soil is gray in color with a silty-clay texture." "Sudan Savanna" (specimen labels).

Remarks: Although his original destination was Bahindi, Geest elected to remain on the east bank of the Sokoto River and collect around Iella, just to the east of the larger village.

Taxa: *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Crocidura*; *Ictonyx*.

**Igbo Ora**, Western Region (Map 14: 419).

Coordinates: 07°26'N, 03°17'E G.

Collectors: H. J. Herbert (23 Dec 1965; 4, 19, 26 Jan 1966); J. C. Geest and H. W. Setzer (17–26 Oct 1966).

Habitat: "Camped under *Ceiba* tree and another large buttressed tree . . . small scrub forest area . . . tall grass . . . two plants of the pea family . . . soil is laterite with large amount of sand . . . grasses 7–8 feet [2.1–2.4 m]" (JCG). "Derived Savanna" (specimen labels).

Remarks: The sporadic collection dates given by Herbert reflect incidental captures sent from Igbo Ora to the Rockefeller Foundation lab at the University of Ibadan. Geest camped on the grounds of the Igbo Ora Health Center, which was associated with the Rockefeller Foundation. The stream referred to above is likely a tributary of the Apekki-Ogoun River. On 18 Oct, Geest relocated his trapline from 2 mi [3.2 km] W Igbo Ora to 1 mi [1.6 km] west, but the latter locality is not recorded on specimen labels. The compound name of this town is commonly hyphenated (Igbo-Ora) on specimen labels.

Taxa: *Lophuromys*, *Gerbilliscus*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*; *Crocidura*; *Epomophorus*, *Epomops*, *Hypsignathus*, *Lissonycteris*, *Megaloglossus*, *Micropteropus*, *Nycteris*, *Chaerephon*.

**Ilashe**, 4 mi [6.4 km] S, 6 mi [9.7 km] N Ago Shasha, Western Region (Map 14: 421).

Coordinates: 06°38'N, 02°47'E G (for Idoforo; see Remarks).

Collector: J. C. Geest (8–14 Nov 1966).

Habitat: "Extensive cultivation [of maize], ground nuts, and melons . . . fallow fields with about two years of brush growing in them. The [red] soil . . . in the pasture . . . quite sandy." "Remnant High Forest" (specimen labels).

Remarks: Geest journeyed west from Lagos, crossed the Yewa River, and proceeded to Ilashe (06°42'N, 02°47'E G) near the Benin border. He identified his field site as 4 mi [6.4 km] south of the town, where he camped near the small village of Idoforo (see above coordinates) and which he further fixed as 6 mi [9.7 km] north of Ago Shasha (which is parenthetically appended on specimen labels). Because both Ilashe and Ago Shasha appear on period maps, Geest elected to use only these place-names on specimen labels instead of Idoforo. The village is listed in the Nigerian USBGN (1971) and is located the appropriate distances and directions from both Ilashe and Ago Shasha.

Taxa: *Cercopithecus*; *Funisciurus*, *Heliosciurus*, *Cricetomys*, *Gerbilliscus*, *Hybomys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*, *Thryonomys*; *Crocidura*; *Neoromicia*; *Felis*.

**Kabwir, 1 mi [1.6 km] S**, Plateau Province, Northern Region (Map 12: 429).

Coordinates: 09°23'N, 09°34'E M (AMS, Zaria, 1:1,000,000, as Kabir).

Collectors: D. L. and H. J. Herbert and H. W. Setzer (11–15 Dec 1965).

Habitat: “Traps set in the rocks and the area near the lake . . . the area near the river . . . in the rocks of a terraced native corn field” (HJH).

Remarks: Base camp was established near a dam, possibly on a tributary of the Jingar/Wase River, an impoundment just south of Kabwir (09°24'N, 09°34'E G) on the eastern edge of the Jos Plateau.

Taxa: *Acomys*, *Taterillus*, *Lemniscomys*, *Mastomys*, *Praomys*; *Atelerix*; *Crocidura*; *Chaerephon*.

**Karaduwa**, Northern Region (Map 14: 405).

Coordinates: 12°20'N, 07°42'E C (12°19'N, 07°41'E G).

Collector: J. C. Geest (13–19 Jan 1967).

Habitat: “Karaduwa is situated on the Karaduwa River, which is dry now. Near the village is a large fadama-like area . . . grove of *Borassus* palms . . . The soil is brown and very sandy. The only ground cover left is herbaceous legumes and another herbaceous plant with spiky seeds. Nearby is a large pasture with some small badly cropped grasses . . . and clumps of the previous mentioned herbs. There are occasional sandy patches . . . over hanging shrubs and some grasses.” “Sudan Savanna [Figure 116]” (specimen labels).

Remarks: Geest established camp about 0.5 mi [0.8 km] from the village.

Taxa: *Galago*, *Chlorocebus*; *Cricetomys*, *Desmodilliscus*, *Gerbilliscus*, *Gerbillus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Crocidura*; *Eidolon*, *Epomophorus*, *Rhinolophus*, *Nycteris*; *Felis*, *Genetta*, *Ictonyx*.



FIGURE 116. Nigeria, Karaduwa: *Myomys* [= *Praomys*] habitat (photograph by J. C. Geest, Jan 1967).

**Kudu**, Northern Region (Map 14: 412).

Coordinates: 09°16'N, 05°20'E C, G.

Collector: J. C. Geest (3–9 Mar 1967).

Habitat: "Camp in a mixed grove of trees. There are many trees in this portion of the Guinea Savanna [Figures 117, 118] although they are not heavily foliated nor are they very close together . . . In some places the grass ground cover has been burned, but under the mangoes there has been little burning . . . here [Kudu] the rains have not yet come . . . There is little standing water . . . tall grasses . . . small stand of timber which is quite thick . . . scattered oil palms . . . forest adjacent to a small stream . . . There is a good canopy . . . The abrupt change from typical savanna type vegetation to the stream side vegetation is striking . . . the ground cover consists of leaves . . . there is no grass or other herbage."

Remarks: Geest noted in his journal that the stream-side forest, where he obtained examples of *Praomys*, was approximately 1.5 mi [2.4 km] south of Kudu, but this designation does not appear on specimen labels.

Taxa: *Xerus*, *Cricetomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Thryonomys*; *Crocidura*; *Epomophorus*, *Micropterus*, *Hipposideros*, *Nycteris*; *Genetta*, *Ichneumia*.

**Kware**, 12 mi [19.3 km] or 14 mi [22.5 km] N Sokoto, Northern Region (Map 14: 402).

Coordinates: 13°15'N, 05°15'E C (13°13'N, 05°16'E G).

Collectors: D. L. and H. J. Herbert (7–14 May 1966); J. C. Geest (24 Nov–1 Dec 1966).

Habitat: "Pretty agricultural but there is a long thin lake . . . with tall grass and reeds lining its shores. Open fields of tall grass among the tilled plots. Cattle everywhere" (DLH). "The habitat is Sudan Savanna [Figure 119] with gently rolling terrain . . . [1] mile [1.6 km] long lake which is a green oasis in the brown of the rest of the country" (HJH). "The rest house is near a lake which is bordered by a marshy area. Sugar cane and cassava grow in small plots near the marshy margins of the lake" (JCG).



FIGURE 117. Nigeria, Kudu: Guinea savanna (photograph by J. C. Geest, Mar 1967).





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FIGURE 118. Nigeria, Kudu: Guinea savanna (photograph by J. C. Geest, Mar 1967).

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FIGURE 119. Nigeria, Kware (photograph by D. L. Herbert, 12 May 1966).

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Remarks: For their inventory around Kware, both AMP crews established their base camp at a rest house situated by an elongate lake surrounded by marsh. Each team, however, calculated Kware as different distances north of Sokoto (13°04'N, 05°15'E G), Herbert as 12 mi and Geest as 14 mi.

Taxa: *Xerus*, *Cricetomys*, *Desmodilliscus*, *Gerbilliscus*, *Gerbillus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Mastomys*, *Mus*; *Atelerix*; *Crocidura*; *Eidolon*, *Epomophorus*, *Micropteropus*, *Nycteris*, *Chaerephon*; *Genetta*, *Ictonyx*.

**Mada River**, 3 mi [4.8 km] E Gudi, Northern Region (Map 14: 425).

Coordinates: 08°54'N, 08°17'E C.

Collector: J. C. Geest (10–19 Mar 1967).

Habitat: “Only place that we have been able to find suitable shade. The soil . . . is red laterite . . . sandy [almost white] laterite near the river . . . There are many trees along the river, but most of the adjoining hills are relatively bare with the exception of numerous small trees 3 to 4 feet [0.9–1.2 m] high and an occasional tall tree giving the area almost a park-like appearance . . . traps along the river where the trees are relatively thick . . . a fadama containing much tall grass and some standing water nearby. The forest was rather dense with many buttressed trees of the high forest [type] . . . in the river bottom . . . most of the hillsides are cultivated . . . forested area nearby. There seems to be more trees here than in the more typical Guinea Savanna.” “Guinea Savanna” (specimen labels).

Remarks: Geest concentrated his collecting activities near the river because the countryside around Gudi was largely cleared and barren.

Taxa: *Galago*; *Xerus*, *Funisciurus*, *Heliosciurus*, *Graphiurus*, *Cricetomys*, *Steatomys*, *Gerbilliscus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Atelerix*; *Epomophorus*, *Chaerephon*; *Genetta*.

**Maiduguri**, 22 mi [35.4 km] S, Bornu Ranch, Northern Region (Map 14: 431).

Coordinates: 11°34'N, 13°02'E M (Shell-BP, NE Sheet, 1:1,000,000).

Collectors: D. L. and H. J. Herbert (1–7 Apr 1966).

Habitat: “The area here is extremely dry—much tall grass where it hasn't been burned. Smallish trees dot the landscape, which is absolutely flat” (DLH). “The habitat is very dry Sudan Savanna, dust and sand are prominent . . . 4 foot [1.2 m] grass and grazed savanna . . . waterhole” (HJH).

Remarks: All specimen labels checked bear only the distance from Maiduguri as the place of collection, but both Herberts noted that they camped on the Bornu Ranch south (actually more SSW) of the town. Following the road south 22 mi [35.4 km] from Maiduguri on a period map yielded a point that falls in the vicinity of Masba (11°34'N, 13°01'E G). Some of the larger mammals (*Chlorocebus*, *Erythrocebus*) were obtained along a river another 10 mi [16.1 km] south of the main campsite. The Bornu Ranch, then a USAID-managed experimental cattle ranch, sits amidst the Bornu Plains, a flat expanse of Sudan Savanna that dominates northeastern Nigeria.

Taxa: *Galago*, *Chlorocebus*, *Erythrocebus*; *Xerus*, *Gerbilliscus*, *Taterillus*, *Lemniscomys*, *Mastomys*; *Lepus*; *Felis*; *Sylvicapra*.

**Oban**, 14 mi [22.5 km] S, Eastern Region (Map 14: 440). Coordinates: 05°11'N, 08°32'E M (AMS, Nigeria and Part of Tchad, 1:2,000,000).

Collectors: D. L. and H. J. Herbert (14–19 Mar 1966).

Habitat: “High forest . . . good deep river” (DLH). “The ground is littered from the palm trees and low bushes . . . high forest” (HJH).

Remarks: The Herberts stayed in the rest house of the Kwa Falls Palm Oil Estate, which was conveniently situated at the edge of high forest and the Kwa River, south of Oban (05°19'N, 08°34'E G) and just to the east of the Cross River.

Taxa: *Galago*; *Funisciurus*, *Heliosciurus*, *Cricetomys*, *Lophuromys*, *Hybomys*, *Lemniscomys*, *Mus*, *Praomys*; *Crocidura*; *Hipposideros*; *Atilax*.

**Oyo**, 7 mi [11.3 km] W, Northern Region (Map 14: 417). Coordinates: 07°53'N, 03°53'E M (Shell-BP, SW Sheet, 1:1,000,000).

Collectors: D. L. and H. J. Herbert (1, 5 Feb 1966).

Habitat: “Guinea Savannah” (specimen labels).

Remarks: While headquartered on the university campus at Ibadan, H. J. Herbert made incidental trips to collect bats west of Oyo (07°51'N, 03°56'E G).

Taxa: *Eidolon*, *Epomophorus*, *Chaerephon*, *Mops*.

**Panisau**, Northern Region (Map 14: 407).

Coordinates: 12°05'N, 08°32'E G (as Fanisau).

Collector: J. C. Geest (21 Jan–5 Feb 1967).

Habitat: “Most of the area is cultivated. Ground nuts and guinea corn seem to be the principal crops . . . Around and often in the fields are [baobab] trees . . . Tall grass . . . between many of the fields and along the shore

. . . of the lake . . . soil is red brown to white [laterite that] contains much sand. There is a small rock strewn hill 200 feet [61 m] behind the village that is almost devoid of plant life. North of the village are high [granite] boulders surrounded by tall grasses.” “Sudan Savanna” (specimen labels).

Remarks: Geest placed his campsite by a small impoundment near the town, which he reckoned as 14 mi [22.5 km] north Kano and 4 mi [6.4 km] north (by trail) of the Kano airport. These distances agree with the USBGN (1971) coordinates for Fanisau. The collector’s own coordinates (12°04’N, 08°00’E), as later penned in his journal but not on original specimen labels, must represent an errant reading of the longitude. The locality spelling given here concurs with that which Geest observed on area road signs and was corroborated by the district commissioner. Panisau, or variably “Fanisau,” “Faniso,” “Farniso,” and “Parniso” (Rosevear, 1965), is an important type locality for west African small mammals. The “P” and “F” alternatives commonly encountered are derived from inconsistent anglicization of the Hausa people’s pronunciation for the place.

Taxa: *Graphiurus*, *Cricetomys*, *Steatomys*, *Desmodilliscus*, *Gerbilliscus*, *Gerbillus*, *Taterillus*, *Arvicanthis*, *Mastomys*, *Mus*, *Praomys*; *Lepus*; *Crocidura*; *Eidolon*, *Epomophorus*, *Nycteris*; *Felis*, *Vulpes*, *Ictonyx*.

**Panyam Fish Farm**, 2 mi [3.2 km] N Panyam, Northern Region (Map 14: 428).

Coordinates: 09°27’N, 09°12’E C.

Collectors: D. L. and H. J. Herbert and H. W. Setzer (6–11 Dec 1965); J. C. Geest (7–16 Apr 1967).

Habitat: “There are cultivated fields, shoulder high grass, outcrop rock mountains, and water” (DLH). “Native huts . . . maize fields . . . rocks . . . moist area . . . river . . . high grass field” (HJH). “Rocky hill across the river to the east of the fish farm . . . tall grasses near the river, and up a densely wooded gully. Most of the grass has been burned off leaving exposed rocky outcrops and lava beds . . . living fence of the euphorb commonly used for fences . . . on the plateau . . . planted guavas, coffee, and mangoes. The major tree . . . in this area is the *Borassus* palm, which now is in fruit . . . There are sedges and pig weed ground cover near the ponds [Figure 120]. The sedges are about



FIGURE 120. Nigeria, Panyam Fish Farm.

waist high and fruiting" (JCG). "The habitat is riverine, palm-grass savanna and rocky hills . . . high grassy plateau . . . except for giginya palm [Hausa for *Borassus aethiopum*], reminded one very much of western Kansas" (HWS). "Plateau Savanna" (specimen label).

Remarks: The two field teams used different locality formats for what is the same general collecting area, the provincial fish hatchery located on the Jos Plateau north of Panyam (09°25'N, 09°13'E G). On their tags, H. J. Herbert and Setzer identified the site with reference to Panyam (2 mi N, Plateau Province), whereas Geest employed the name of the hatchery (Panyam Fish Farm, Northern Region) as well as his estimated coordinates. Both field crews focused their survey operations on and around the grounds of the fish farm. According to a map consulted (AMS, *Zaria*, 1:1,000,000), the river mentioned under Habitat is likely a tributary of the northeasterly flowing Leri River.

Taxa: *Graphiurus*, *Dendromys*, *Arvicanthis*, *Dasymys*, *Grammomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*, *Cryptomys*; *Lepus*; *Atelerix*; *Crocidura*; *Epomophorus*, *Chaerephon*, *Scotophilus*, *Neoromicia*.

**Sapoba Forest Reserve, Midwestern Region**  
(Map 14: 435).

Coordinates: 06°06'N, 05°53'E G.

Collectors: D. L. and H. J. Herbert (4–10 Jan 1966); D. L. and H. J. Herbert and S. B. Akpan (28 Jun–16 Jul 1966).

Habitat: "It is completely in high forest. The overhead canopy isn't complete so there is a lot of debris on the forest floor" (DLH, June 1966). "[Sapoba] camp . . . on the bend of the Igbabon River and it is High Forest and swampland near the river" (HJH, January 1966). "Three days to hack through the under brush [in setting up grid] of this high forest habitat . . . native gardens . . . edge of high forest" (HJH, July 1966).

Remarks: D. L. Herbert referred to a rubber plantation that was apparently close by. H. J. Herbert indicated that this was the Pamol Rubber Plantation, where they initially set up camp until granted approval to camp in the reserve. During both visits, the Herberts stayed at the reserve's guest house, situated within apparently pristine high forest near the bend of the Igbabon River. They used the full name "Sapoba Forest Reserve" as the locality designation on their first stay but contracted the name to "Sapoba" for specimens obtained on the second trip, which was designed as a grid study.

Taxa: *Dendrohyrax*; *Perodicticus*, *Galago*, *Cercopithecus*; *Funisciurus*, *Heliosciurus*, *Protoxerus*, *Cricetomys*,

*Lophuromys*, *Grammomys*, *Hybomys*, *Lemniscomys*, *Malacomys*, *Mastomys*, *Mus*, *Praomys*, *Rattus*, *Anomalurus*, *Atherurus*, *Thryonomys*; *Crocidura*; *Epomops*; *Manis*; *Philantomba*.

**Shagunu, Northern Region (Map 14: 411).**

Coordinates: 10°21'N, 04°28'E C (10°20'N, 04°28'E G, as New Shagunnu).

Collectors: D. L. and H. J. Herbert (7–16 Jun 1966); J. C. Geest (12–13 Jun 1967).

Habitat: "The surrounding area is Guinea Savanna, fairly open, gently rolling hills with small trees dotting the landscape" (DLH). "Along the river's edge and into the bush leading away from the [Niger] River . . . very rocky . . . with grass and low stunted trees . . . Guinea Savanna" (HJH).

Remarks: The Herberts' field camp, located on the Shagunu Biological Research Station and managed by the University of Ife at Ibadan, overlooked the Niger River. In his log dated 13 Jun, H. J. Herbert noted that he moved his traplines near the "old village of Bussa" (10°15'N, 04°30'E G), to the southeast of Shagunu. This side excursion, which apparently yielded only one *Mastomys*, is not reflected on the specimen label or in the field catalog. Geest did not actually visit Shagunu, but he received series of fluid-preserved *Hipposideros* and *Rhinolophus* that were collected earlier in 1966–1967 at Shagunu by J. I. Menzies, Ife University, and prepared them while staying in Ibadan.

Taxa: *Gerbilliscus*, *Lemniscomys*, *Mastomys*, *Praomys*; *Lepus*; *Rhinolophus*, *Hipposideros*, *Mops*.

**Tangaza, Northern Region (Map 14: 401).**

Coordinates: 13°23'N, 04°57'E C (13°22'N, 04°56'E G).

Collector: J. C. Geest (1–6 Dec 1966).

Habitat: "Traps are set across a sandy plot and the line continued through a grass boundary area between the ground nut fields and into a fallow field of grass surrounded by guinea corn on three sides . . . There are also a couple of grassy fadamas with some free water nearby." "Sudan Savanna" (specimen labels).

Remarks: Geest provided coordinates for Tangaza in his field journal and also mentioned it as being 26 mi [41.8 km] west of Kware, although specimen labels and his field catalog fail to indicate these data.

Taxa: *Graphiurus*, *Cricetomys*, *Desmodilliscus*, *Gerbillus*, *Taterillus*, *Arvicanthis*, *Dasymys*, *Mastomys*; *Lepus*; *Crocidura*; *Eidolon*, *Epomophorus*, *Taphozous*; *Galerella*, *Ictonyx*.



FIGURE 121. Nigeria, Tsanchaga (photograph by J. C. Geest, Jan 1967).

**Tsanchaga**, 8 mi [12.9 km] E Bida, Northern Region  
(Map 14: 414).

Coordinates: 09°04'N, 06°08'E C (09°04'N, 06°06'E G,  
as Tsantsaga).

Collector: J. C. Geest (6–12 Jan 1967).

Habitat: “The fadama is about 4 miles [6.4 km] (by road) wide. There are many farm plots of rice and cassava scattered through it. Above the flood plain of the fadama [Figure 121] the vegetation seems to be that of farmed Guinea Savanna. There are scattered trees and quite a lot of tall (6 feet [1.8 m]) grass. The major trees are similar to . . . oak . . . in leaf-size and bark appearance and also palms . . . [cassava is] extensively farmed . . . fallow plots have been burned . . . Soil . . . light tan and somewhat sandy in places but for the most part hard packed. A narrow fast moving stream . . . quite a lot of flooded and water soaked soil.”

Remarks: After departing from Bida, Geest stopped to sample a lush, extensive fadama that he encountered just to the west of Tsanchaga. The braided streams that course through the fadama may be part of the

Gbako River system, a small northern tributary of the Niger.

Taxa: *Erythrocebus*; *Graphiurus*, *Gerbilliscus*, *Taterillus*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Crocidura*; *Epomophorus*, *Micropteropus*, *Chaerophon*, *Scotophilus*, *Neoromicia*.

**Ugar Jabar**, 2 mi [3.2 km] N Jemaa, Jos Plateau,  
Northern Region (Map 14: 426).

Coordinates: 09°31'N, 08°23'E C.

Collector: J. C. Geest (22 Mar–2 Apr 1967).

Habitat: “We are camped in a field adjacent to a hillside covered with good forest [Figure 122] . . . string of traps through a rocky slope and also in the gully that contains a large number of *Ceiba* trees . . . among the grasses along a river and up a densely wooded gully [Figure 123] . . . arum plants . . . *Anchomanes wel-witschii* . . . fig tree . . .”

Remarks: After traveling south from Kagora toward Jemaa (09°28'N, 08°23'E G), Geest established his field camp near the southern boundary of a forest reserve,



FIGURE 122. Nigeria, Ugar Jabar  
(photograph by J. C. Geest).

on wooded slopes between 2,000–3,000 ft [610–914 m] and along the western rim of the Jos Plateau. The river mentioned above is possibly the Gimi River, a tributary of the Mada. On specimen labels, “Ugar Jabar” is used as the principal locality name, which we cannot locate as such, and “2 mi N Jemaa” is parenthetically appended in his journal and on the back of labels. Apparently, Geest employed the former as a local designation to mean the area populated by the Jabar people who lived in the vicinity of his camp. On 28 Mar, Geest moved the trapline into the Jamaa For-

est “Preserve.” Some purchased specimens originated from a fadama somewhere to the east of camp.

Taxa: *Xerus*, *Funisciurus*, *Heliosciurus*, *Graphiurus*, *Crice-tomys*, *Uranomys*, *Gerbilliscus*, *Aethomys*, *Arvicanthis*, *Dasymys*, *Hylomyscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Oenomys*, *Praomys*; *Crocidura*.

University of Lagos, Federal District (Map 14: 422).

Coordinates: 06°32'N, 03°23'E M (Shell-BP, SW Sheet, 1:1,000,000).

Collector: J. C. Geest (31 Oct–7 Nov 1966).



FIGURE 123. Nigeria, Ugar Jabar (photograph by J. C. Geest).

Habitat: “‘Virgin’ forest . . . tall trees with many clearings. [The forest] is a small patch of maybe 2 acres [0.8 ha] . . . grass and weeds adjacent to [garden] plots. Some small 6–8 foot [1.8–2.4 m] woody trees . . . few scattered palms . . . semi wooded area with many low trees 15–20 feet [4.6–6.1 m] high . . . many ferns . . . palm grove forest . . . grassland-weed-small shrub area . . . swampy in places. [The trapline] extends from the marsh to the grass field . . . and through a patch of native scrub with a few remnant trees . . . *Ceiba* . . . fig tree.” “High Forest” (specimen labels).

Remarks: The university proper, where Geest collected, is located to the north of the geographic center of Lagos (06°27'N, 03°24'E G) according to the annotated map cited above.

Taxa: *Funisciurus*, *Heliosciurus*, *Lophuromys*, *Dasymys*, *Hybomys*, *Hylomyscus*, *Lemniscomys*, *Mus*, *Praomys*; *Crocidura*; *Epomophorus*, *Epomops*.

**Upper Ogun Ranch**, Western Region (Map 14: 416).

Coordinates: 08°03'N, 03°35'E M (Shell-BP, SW Sheet, 1:1,000,000).

Collector: J. C. Geest (12–16 Dec 1966).

Habitat: “This part of the ranch does not have improved pasture and seems to be typical Guinea Savanna. Tall grasses (8–12 feet [2.4–3.7 m]) are the major vegetation . . . There are almost no other herbaceous plants, the grasses dominate all the available habitat . . . small stream [with] a few [small] trees . . . occasional palm tree . . . The river banks also have many trees . . . riparian forest.”

Remarks: Geest pitched his tents on the lawn of the ranch's guest house, near the Ogun River. In his field catalog and journal, Geest located the ranch as 12 mi [19.3 km] north of Iseyin (07°58'N, 03°36'E G), a locality modifier that is not recorded on his specimen labels.

Taxa: *Heliosciurus*, *Protoxerus*, *Cricetomys*, *Gerbilliscus*, *Arvicanthis*, *Lemniscomys*, *Mastomys*, *Mus*, *Praomys*; *Crocidura*; *Micropteropus*, *Hipposideros*.

**Zaria, 5 mi** [8.0 km] S, Northern Region (Map 14: 410).  
Coordinates: 11°05'N, 07°40'E G (for Kufena Hill; see Remarks).

Collectors: D. L. and H. J. Herbert (23–26 Apr, 15 May 1966).

Habitat: “Huge rock outcropping. . .” (DLH). “Guinea savanna” (specimen labels).

Remarks: The massive rock dome that looms over flat Guinea Savanna to the south (more accurately the south-southwest) of Zaria immediately attracted H. J. Herbert’s attention. While the base camp was maintained at the agricultural station at **15 mi NW Zaria** (see locality account), the Herberts regularly visited this rock outcropping that rises “about 600 feet [185 m] from the savanna floor” to run traplines and hunt. D. L. Herbert referred to this locale as “Kofina Rock,” which the USBGN (1971) lists as Kufena Hill and which affords the coordinates for this collecting site. Only the distance south of Zaria, not the proper name of the hill, is found on specimen labels and in the field catalog.

Taxa: *Procavia*; *Xerus*, *Mastomys*, *Praomys*.

**Zaria, 7 mi** [11.3 km] NW, Northern Region (Map 14: 409).

Coordinates: 11°10'N, 07°38'E G (for Samaru; see Remarks).

Collectors: D. L. and H. J. Herbert (14–15 May 1966).

Habitat: “Guinea savannah” (specimen labels).

Remarks: On their return from Sokota to Fika, the Herberts stayed briefly at the rest house of Ahmadu Bello University in Samaru (coordinates cited above) and incidentally collected bats. Although H. J. Herbert used slightly different distances, this “7 mi NW” designation is essentially the same as the field site of 25 Apr written as “5 mi [8.0 km] NW Zaria.” The place-name Samaru does not appear on field labels of specimens collected during either visit, but the town is repeatedly noted in the journals of both Herberts. While here, on May 15, the Herberts returned to Kofina Rock (**Zaria, 5 mi S**; see locality account).

Taxa: *Chaerephon*, *Scotophilus*, *Neoromicia*.

**Zaria, 15 mi** [24.1 km] NW, Northern Region (Map 14: 408).

Coordinates: 11°12'N, 07°34'E G (for Shika; see Remarks).

Collectors: D. L. and H. J. Herbert (21–28 Apr 1966).

Habitat: “Water, high grass, and fields which aren’t overgrazed” (HJH). “Guinea Savanna” (specimen labels).

Remarks: The Herberts drove into Zaria and arranged to camp at the Experimental Agricultural Station, a place situated to the northwest of Zaria and near the village of Shika, at the above coordinates. The farm was operated by Ahmadu Bello University, whose main campus was in Samaru, just northwest of Zaria. D. L. Herbert specifically identified both Shika as being “9 mi [14.5 km] N of Samaru and 15 mi [24.1 km] NW of Zaria” and the experimental station as the areas where they conducted most of their field work. That village name, however, does not appear on specimen labels or in H. J. Herbert’s field catalog. On the evening of 25 Apr, they traveled to 5 mi NW Zaria (see **Zaria, 7 mi NW**) to net bats at the home of a USAID administrator.

Taxa: *Xerus*, *Heliosciurus*, *Cricetomys*, *Gerbilliscus*, *Arvicanthis*, *Dasymys*, *Mastomys*, *Mus*; *Aterix*; *Eidolon*, *Epomophorus*.

**Zungeru**, Northern Region (Map 14: 413).

Coordinates: 09°48'N, 06°09'E G.

Collectors: D. L. and H. J. Herbert (25–26 May 1966).

Habitat: “Guinea savannah,” “building” (specimen labels).

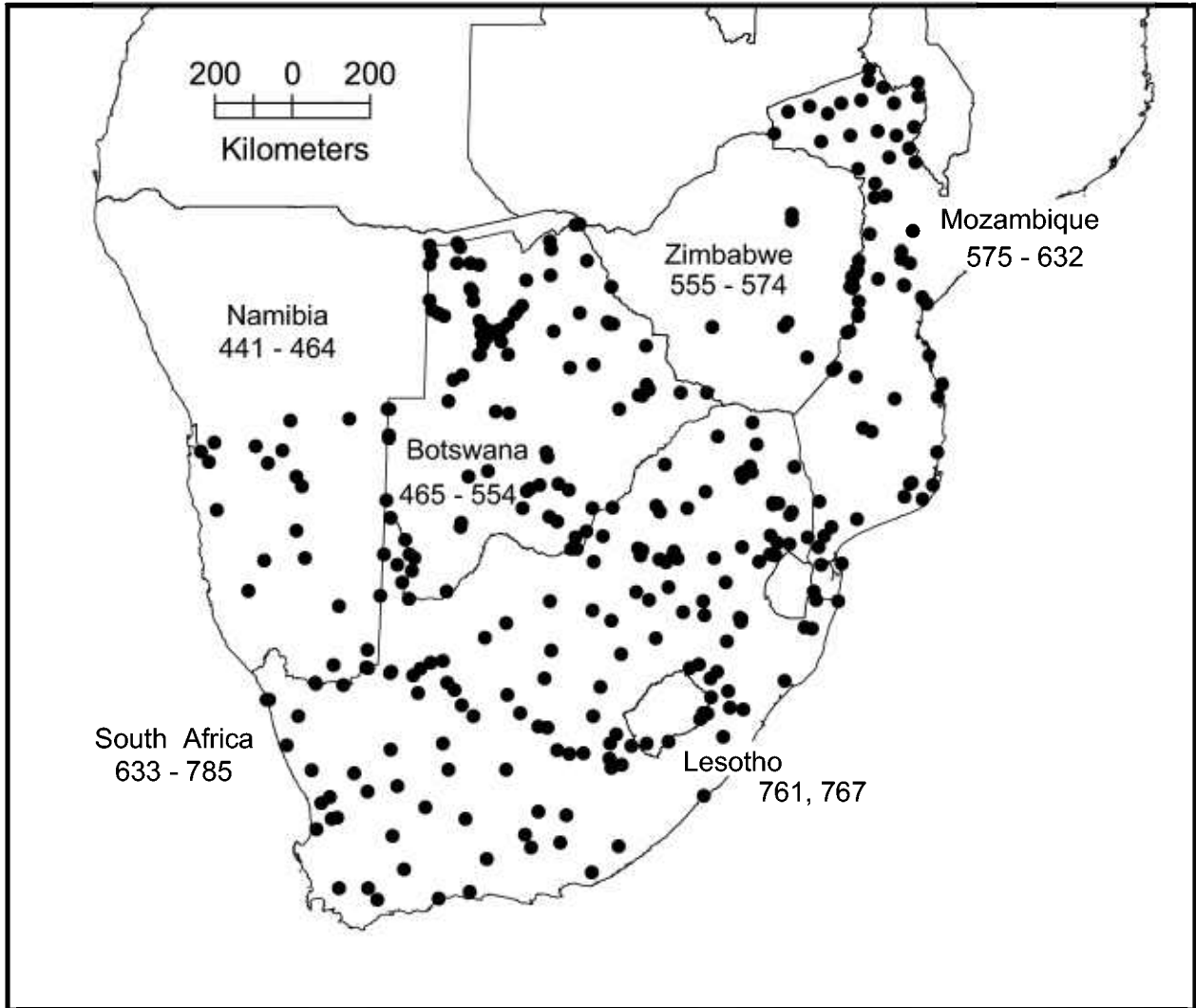
Remarks: On their way to **Shagunu** (see locality account), the Herberts stopped overnight near the railway rest house in Zungeru and incidentally collected some rodents and bats.

Taxa: *Mastomys*; *Epomophorus*, *Nycteris*, *Chaerephon*, *Mops*.

## SOUTHERN AFRICA

**GENERAL REMARKS.** The AMP began in earnest in Southern Africa. Over a six-year period (Aug 1963 to Dec 1969), 26 field workers (Table 1) participated in survey of six countries (Map 15), devoting substantial person-days of collecting to Botswana, Mozambique, and South Africa (Table 11). Such metrics of survey effort are reflected in the large numbers of mammals obtained, representing most mammalian orders (Table 6). Hunting was applied more often and/or more effectively as a collecting method in southern Africa and plausibly accounts for the larger series of carnivores and artiodactyls obtained there (Table 6). Notable collecting successes of mammalian groups endemic to or most diverse within southern Africa include the golden moles (Afrosoricida), elephant shrews (Macroscelidea), and certain rodent families (Pedetidae, Bathyergidae, Petromuridae) (Tables 3, 6).





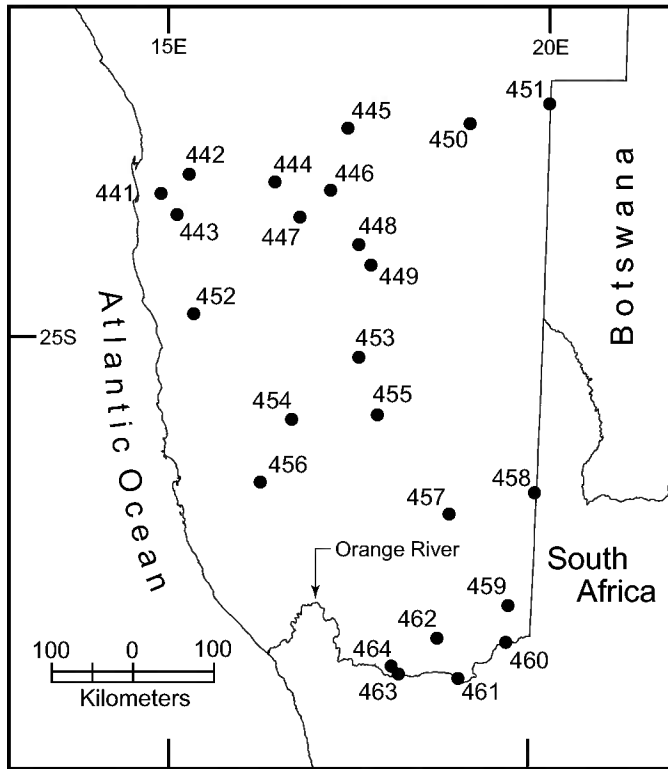
MAP 15. African Mammal Project cardinal collecting localities 441–785 in southern Africa.

The following terms commonly appear as part of locality names or within habitat descriptions in southern African countries, in particular, Botswana and South Africa: donga, dry watercourse; dorp, village; fontein, spring, stream, or well; karoo, semidesert region; kloof, gorge, ravine or intermittent stream, or steep, narrow valley; koppie or kopje, hill or hillock characteristic of the veld; kraal, a fencing enclosure or the village surrounded by such an enclosure; krantz, outcrop; mashamba, garden; oog, spring; pan, a shallow depression filled with water during the rainy season and a hard-caked surface during dry periods; rantjies, hills; veld, grassland with scattered trees and shrubs; and vlei or flei, intermittent stream, marsh or pond, also the valley containing such a stream.

The FAO abbreviation in several locality Remarks pertains to a georeferenced database on African dams produced by the Food and Agriculture Organization of the United Nations.

#### NAMIBIA (SOUTH WEST AFRICA)

**GENERAL REMARKS.** Collecting activity in Namibia was confined to desert and arid scrub formations in the southern part of the country (Map 16), corresponding largely to the Namib Desert and Namaqualand. Specimen labels frequently bear the abbreviation SWA for South West Africa, the name applied before its sovereignty as Namibia (Mar 1990). Douglas Goode of the



MAP 16. African Mammal Project cardinal collecting localities 441-464 in Namibia (South West Africa).

441. Swartbank Mountain	453. Kaitzub Farm
442. Namib Park	454. Lovedale Farm
443. Gobabeb	455. Brucharos Mountain
444. Hakos Mountains	456. Klein Aus Farm
445. Windhoek, 11 mi E	457. Kochena Farm
446. Rehoboth, 4 mi N	458. Skaanskolk Farm
447. Kobos	459. Ariamsvlei, 10 mi W
448. Kalkrand, 17 mi N	460. Stolzenfels
449. Kalkrand, 6 mi S	461. Pella (Mission), 10 mi NW
450. Gobabis, 4.5 mi SW	462. Warmbad
451. Sandfontein	463. Warmbad, 47 mi S
452. Sossus Vlei	464. Goodhouse

Namib Desert Research Station variously assisted teams with collecting at Gobabeb and its vicinity. The Namibian sites visited by Lambrechts and Graupner form part of the Orange River Survey (Feb 1968 to Jan 1969), jointly conducted by the Smithsonian Institution AMP and the Mammal Research Institute, University of Pretoria (see General Remarks under South Africa).

ITINERARIES. R. E. Cole, A. L. Moore, and A. C. Risser: **Hakos Mountains**, 12-14 Nov 1963; **Gobabeb**, 15-25 Nov 1963; **Swartbank Mountain**, 23 Nov 1963.

R. D. Hepplewhite and A. R. Silberstein: **6 mi S Kalkrand**, 12 Mar 1966; **17 mi N Kalkrand**, 12 Mar 1966;

**4 mi N Rehoboth**, 12 Mar 1966; **11 mi E Windhoek**, 12-14 Mar 1966; **4.5 mi SW Gobabis**, 15-18 Mar 1966; **Sandfontein**, 18-20 Mar 1966; **Kobos**, 22-26 Mar 1966; **Sossus Vlei**, 27 Mar-1 Apr 1966; **Kaitzub Farm**, 3-7 Apr 1966; **Brucharos Mountain**, 7-12 Apr 1966; **Lovedale Farm**, 13-19 Apr 1966; **Klein Aus Farm**, 20-24 Apr 1966; **Kochena Farm**, 26-29 Apr 1966; **Skaanskolk Farm**, 30 Apr-2 May 1966; **Warmbad**, 3-6 May 1966; **47 mi S Warmbad**, 6 May 1966; **10 mi W Ariamsvlei**, 7-10 May 1966.

A. V. W. Lambrechts: **Stolzenfels**, 30 Jun-4 Jul 1968.

O. F. Graupner and A. V. W. Lambrechts: **Stolzenfels**, 17-21 Jan 1969; **10 mi NE Pella Mission, South Africa** (north/south bank Orange River), 22-24 Jan 1969; **Goodhouse, South Africa** (north/south bank Orange River), 25-27 Jan 1969.

D. A. Schlitter and H. W. Setzer: **Namib Park**, 3 Dec 1969; **Gobabeb**, 4-13 Dec 1969.

**Ariamsvlei, 10 mi [16.1 km] W** (Map 16: 459).

Coordinates: 28°05'S, 19°41'E G (for Charley's Puty; see Remarks).

Collectors: R. D. Hepplewhite and A. R. Silberstein (7-10 May 1966).

Habitat: "The farm is generally covered with silvery leafed bushes which grow in the stony sand, but there is an old river bed with pools in it and acacia trees along the banks, about a mile [1.6 km] from us. There are sand dunes in places" (RDH).

Remarks: Although specimen labels and field catalogs designate the collecting site with respect to Ariamsvlei (28°07'S, 19°49'E G), Hepplewhite recorded in his journal that they camped on a farm named Charley's Puty (Charliesputs G).

Taxa: *Procapra*; *Desmodillus*, *Gerbillurus*, *Micaelamys*, *Thallomys*.

**Brucharos Mountain, Berseba** (Map 16: 455).

Coordinates: 25°52'S, 17°48'E G (as Mount Brukkaros).

Collectors: R. D. Hepplewhite and A. R. Silberstein (7-12 Apr 1966).

Habitat: "Brucharos Mountain is of volcanic origin and stands all alone in a flat plain. Camp is on the southwestern face of the mountain in a cleft which has a dry stream bed at the bottom of it. The hill has many small rocks strewn over it as well as over the plain for about 1/2 mile [0.8 km]. The plain has a number of bushes about 5 feet [1.5 m] high on it, and in one of the clumps of bushes we saw a mongoose while coming here. The hill has bushes similar to those on the plain, in the bottoms of the gullies, but the rest of the

hill has a different type of vegetation with a number of unusual plants” (RDH).

Remarks: Hepplewhite and Silberstein initially set up camp on the southwest face of Brucharos Mountain. On 10 Apr, they moved their camp to the southeast side of the mountain, hoping to improve trap success and to access roads for better hunting. Collecting success there was low as well.

Taxa: *Elephantulus*; *Petromyscus*, *Micaelamys*; *Lepus*, *Pronolagus*; *Crocidura*.

**Gobabeb**, Namib Desert Research Station (Map 16: 443). Coordinates: 23°33'S, 15°02'E C, G.

Collectors: R. E. Cole, A. L. Moore, and A. C. Risser (15–25 Nov 1963); D. A. Schlitter and H. W. Setzer (4–13 Dec 1969).

Habitat: “Acacia trees . . . soft sand . . . The dunes nearest the river bed support an occasional acacia tree and a shrub [Figures 124, 125]. Farther from the river there

are isolated clumps of grass that may stand about 3 feet [0.9 m] high. The sand, often called ‘liquid sand,’ is light tannish red in color and when one steps on the side of a dune the sand flows down like molasses rolls down a cookie sheet . . . *Salvadora* . . . fig tree . . . waterhole . . . rocks, sand and gravel. A very sharp, needle-like grass grows on the dunes . . . gravel flats . . . These small dunes support quite a luxuriant growth of vegetation, acacias . . . and the thorn shrub plus other small annuals and succulents . . . mountains (more accurately—rocky kopjes) . . . Naras bushes” (ACR).

Remarks: Cole, Moore, and Risser arrived at the Namib Desert Research Station at Gobabeb and set up camp along the Kuiseb River according to Risser’s catalog. Risser also indicated that this locality was 68 mi [109.5 km] ESE Walvis Bay, although this detail is not recorded on specimen labels. Journal entries indicate that they collected extensively throughout the



FIGURE 124. Namibia, Gobabeb: Ron E. Cole with bat net in Kuiseb River, Namib Desert (photograph by A. C. Risser, Nov 1963).



FIGURE 125. Namibia, Gobabeb: Namib Desert.

area but did not specify actual collection sites in most cases. On 21 Nov, they drove to some rocky kopjes, where they collected a *Lepus*. Later, they collected on a gravelly plain 1 mi [1.6 km] E Gobabeb (23°33'S, 15°03'E M, ITM, Namibia, 1:2,000,000). Schlitter and Setzer collected two species of *Gerbillurus* at 3 mi [4.8 km] S Namib Desert Research Station on a sandy, rocky, gravelly plain and interspersed dunes vegetated with *Naras*. All of Cole's and Risser's specimen labels indicate "Gobabeb" as the principal collecting locality, with "Namib Desert Research Station" as the modifier. Schlitter and Setzer, collecting there in Dec 1969, adopted the opposite locality convention for their field labels. USBGN coordinates for both place-names are identical.

Taxa: *Petromyscus*, *Desmodillus*, *Gerbillurus*, *Rhabdomys*, *Thallomys*; *Lepus*; *Crocidura*; *Nycteris*, *Sauromys*, *Eptesicus*, *Laephotis*, *Miniopterus*.

**Gobabis, 4.5 mi** [7.2 km] **SW** (Map 16: 450).

Coordinates: 22°30'S, 18°55'E M (WAC, *Pelican Point*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (15–18 Mar 1966).

Habitat: "The dry river bed is sandy . . . but the broader river has a number of thorn trees in it with brushwood piled up against them from the last floods. The soil here is very sandy . . . On the banks of the river the soil is still sandy but the grass is more sparse and thorn trees and bushes thicker. Higher up from the river is a rocky area with stony soil and low thickly placed bushes" (RDH).

Remarks: On 14 Mar, Hepplewhite and Silberstein arrived at the farm of Mr. Kruger, 3 mi [4.8 km] SE Gobabis, and he directed them to their final campsite. On 16 Mar, they set traps on a rocky hillside with short grass "about a mile [1.6 km] closer to town," designated on labels as 3.5 mi [5.6 km] SW Gobabis.

Taxa: *Elephantulus*; *Xerus*, *Saccostomus*, *Desmodillus*, *Gerbillurus*, *Micaelamys*, *Thallomys*, *Pedetes*; *Lepus*; *Felis*, *Suricata*.

**Goodhouse**, north bank Orange River (Map 16: 464).

Coordinates: 28°54'S, 18°15'E C.

Collector: A. V. W. Lambrechts (25–27 Jan 1969).

Habitat: “North bank . . . on open terrain.”

Remarks: On 24 Jan, Lambrechts left Pella Mission, South Africa, and headed to Goodhouse, camping on a farm by the same name on the south bank of the Orange River (Goodhouse, South Africa). Survey work was conducted on both the north (in Namibia) and south banks of the Orange River. This locality is in the vicinity of Warmbad, 47 mi S, where Hepplewhite and Silberstein collected in 1966.

Taxa: *Petromyscus*, *Desmodillus*, *Gerbillurus*, *Micaelamys*.

**Hakos Mountains**, 191 km E Walvis Bay (Map 16: 444).

Coordinates: 23°10'S, 16°20'E G.

Collectors: R. E. Cole, A. L. Moore, and A. C. Risser (12–14 Nov 1963).

Habitat: “The Hakos Mts. are extremely rugged, mostly mica shale and very sparse vegetation [Figure 126] except in the kloofs . . . dry river bed . . . quasi-barren area” (ACR).

Remarks: Risser wrote that the team camped along a dry river bed at Djab Farm, on the western side of the Hakos Mountains (Hakosberge G). This farm, presumably located along the Djab River, is not mentioned on specimen labels.

Taxa: *Elephantulus*; *Petromyscus*, *Desmodillus*, *Micaelamys*, *Petromus*.

**Kaitzub Farm**, 20 mi [32.2 km] SW Gibeon  
(Map 16: 453).

Coordinates: 25°12'S, 17°32'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (3–7 Apr 1966).

Habitat: “The river bed is about 50–70 feet [15.2–21.3 m] below the surrounding countryside, and the banks slope down towards the river from about 1/4 mile [0.4 km] on either side of the river in most places. However, there are quite a number of cliffs . . . The slopes are very rocky with sparse grass and scattered thorn bushes about 3 feet [0.9 m] high. The river has ponds



FIGURE 126. Namibia, Hakos Mountains: Djab Farm (Nov 1963).

in it every 200 or 300 yards [183 or 274 m] but the farmer says this is because of the recent rain and that normally there are very few pools" (RDH).

Remarks: Camp was established on Kaizub Farm, about 200 yards [183 m] from a pool in a semidry river bed, probably a tributary of the Leber River.

Taxa: *Elephantulus*; *Procavia*; *Petromyscus*, *Micaelamys*, *Petromus*.

**Kalkrand, 6 mi [9.7 km] S** (Map 16: 449).

Coordinates: 24°08'S, 17°39'E M (WAC, *Lüderitz Bay*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (12 Mar 1966).

Habitat: "Low grass, scattered bushes" (specimen label).

Remarks: The single specimen from this and the following locality were opportunistic collections made while Hepplewhite and Silberstein were driving en route from Pretoria to Windhoek.

Taxon: *Proteles*.

**Kalkrand, 17 mi [27.4 km] N** (Map 16: 448).

Coordinates: 23°54'S, 17°29'E M (WAC, *Pelican Point* and *Lüderitz Bay*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (12 Mar 1966).

Habitat: "Low grass, scattered bushes" (specimen label).

Taxon: *Lepus*.

**Klein Aus Farm, 3 mi [4.8 km] W Aus** (Map 16: 456).

Coordinates: 26°39'S, 16°15'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (20–24 Apr 1966).

Habitat: "The ground is very sandy with scattered clumps of grass—semi-desert type of ground. The hills are rocky and seem to be part of a narrow ridge of hills running north-south. In places there are sandy dunes running towards the hills. In the valleys between the rocky hills are a number of thorn trees, and on the hills themselves are scattered low bushes among the rocks. The dunes are covered with low bushes" (RDH).

Taxa: *Elephantulus*; *Petromyscus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*, *Thallomys*, *Petromus*; *Crocidura*.

**Kobos, 38 mi [61.2 km] SW Rehoboth** (Map 16: 447).

Coordinates: 23°35'S, 16°40'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (22–26 Mar 1966).

Habitat: "An old dry river winds through the farm in quite a deep channel. Running into it are hundreds of dry

rivulets. Around the town it is a flat plain covered with very short grass and dotted here and there with bushes. About 1/2 mile [0.8 km] from the village the bushes become thicker. There are a number of koppies and one hill standing quite alone on the plain about 1/2–1 mile [0.8–1.6 km] south of the village. These hills seem to be of volcanic origin because they have huge boulders all over them" (RDH).

Remarks: Kobos is a farm and a reserve with about 20 small houses and a school. While working in the area, Hepplewhite and Silberstein made periodic trips to Rehoboth to obtain permits to collect in the restricted diamond area. On 26 Mar, having received their permits, they left for **Sossus Vlei** in the diamond area.

Taxa: *Elephantulus*; *Desmodillus*, *Micaelamys*, *Pedetes*, *Petromus*; *Lepus*; *Tadarida*, *Eptesicus*; *Felis*.

**Kochena Farm, 62 mi [99.8 km] E Keetmanshoop**

(Map 16: 457).

Coordinates: 27°01'S, 18°49'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (26–29 Apr 1966).

Habitat: "We are on the edge of the Karasberge, with rocky hills to the west and [?] alternating rocky and grassy plains to the east. In most places there are scattered low bushes about 18–24 inches [45.7–61.0 cm] high. A number of dry river beds flow through the plain. These have sand in the bottom and are bordered by bushes about 4 feet [1.2 m] high and thorn trees, but not the usual acacia thorn tree . . . rocky cliffs bordering on the dry river" (RDH).

Remarks: On the way to Kochena Farm, Hepplewhite and Silberstein were advised that it was located about 70 mi [112.7 km] NE Karasburg (28°01'S, 18°45'E G); however, specimens collected from Kochena Farm formally indicate 62 mi [99.8 km] E Keetmanshoop (26°35'S, 18°08'E G). These two modifier descriptors plot some 90 km apart. USBGN coordinates for Kochena Farm plot near the Karasberge, by air about 71 mi [114.3 km] NNE Karasburg and 52 mi [83.7 km] SE Keetmanshoop. Neither of these reference points precisely match those supplied by the collectors, but we suspect that the difficulty in estimating distances and directions while traveling on rough tracks accounts for the discrepancies.

Taxa: *Elephantulus*; *Procavia*; *Desmodillus*, *Gerbillurus*, *Micaelamys*; *Lepus*, *Pronolagus*.

**Lovedale Farm, 20 mi [32.2 km] W Helmeringhausen**

(Map 16: 454).

Coordinates: 25°55'S, 16°39'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (13–19 Apr 1966).

Habitat: “This is karakul sheep country. The dry river beds are bordered by acacia thorn trees and other smaller bushes. The ground is sandy in the valleys but becomes rocky on the koppies and mountains of which there are many here. The hillsides are very rocky and have scattered, small bushes on them. In one place in the river there is a small pool but there is a definite flow of water from one side to the other so I think there is underground water” (RDH).

Taxa: *Elephantulus*, *Macroselides*; *Petromyscus*, *Desmodillus*, *Micaelamys*, *Rhabdomys*, *Thallomys*; *Lepus*, *Pronolagus*; *Genetta*.

**Namib Park** (Map 16: 442).

Coordinates: 23°05'S, 15°10'E G.

Collectors: D. A. Schlitter and H. W. Setzer (3 Dec 1969).

Habitat: “Isolated bush and grassy sand veld,” “netted over waterhole,” “granite sand at the base of a granite koppie” (specimen labels).

Remarks: Schlitter used Namib Park (Namib-Naukluft Park G) as his general locality designation and provided coordinates for three collecting sites within the park: 2 mi [3.2 km] E Amichab Mountain (23°12'S, 15°32'E C), Ganab Water Hole (23°00'S, 15°31'E C), and Tumas Mountain (23°29'S, 15°31'E C). His coordinates for the distance from Amichab Mountain are geographically consistent with the USBGN listing for that feature (23°12'S, 15°31'E G), and those for the Ganab Water Hole approximate the USBGN figures (23°07'S, 15°32'E G). We could not verify a Tumas Mountain within the USBGN gazetteer, but a Tumas Berg does appear on a topographic map (AMS, *South West Africa*, 1:2,000,000) at approximately 23°10'S, 15°31'E. Even this estimation is uncomfortably distant from Schlitter’s “granite koppie.” Other granitic outcroppings arise from the Tumas Flats in this region, and it is possible either that Schlitter misapplied the place-name or that local peoples loosely apply the name Tumas Mountain to any of these high rock lands.

Taxa: *Petromyscus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*; *Sauromys*.

**Pella (Mission), 10 mi** [16.1 km] NW, north bank Orange River (Map 16: 461).

Coordinates: 28°56'S, 19°02'E M (WAC, *Lower Orange River*, 1:1,000,000).

Collector: A. V. W. Lambrechts (22–24 Jan 1969).

Habitat: “Extremely mountainous terrain . . . narrow, flat strip between the river and the mountains . . . It is

very dry, with the vegetation sparse or non-existent. There is no grass at all. Even the mountains are almost devoid of vegetation.”

Remarks: As there are no roads indicated on the maps consulted, our estimated coordinates are based upon azimuth and range from Pella Mission (29°02'S, 19°09'E G). Pella Mission itself is located on the south bank of the Orange River in Northern Cape Province, South Africa. On 21 Jan, Lambrechts once again drove from Stolzenfels to a place referred to as “Die Mik,” northwest of Pella Mission (**10 mi NW Pella Mission**, South Africa). He found the area to be much drier than it had been the previous Jul, and he had thought then that it was extraordinarily dry. He collected on both the north (Namibia) and south banks (South Africa) of the Orange River during the Jan survey. On 24 Jan, Lambrechts left for **Goodhouse**, South Africa, where collecting was also conducted on the Namibian side of the Orange River.

Taxa: *Petromyscus*, *Micaelamys*.

**Rehoboth, 4 mi** [6.4 km] N (Map 16: 446).

Coordinates: 23°16'S, 17°05'E M (WAC, *Pelican Point*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (12 Mar 1966).

Habitat: No information available.

Remarks: A *Genetta* was collected at this locality while the duo traveled to Windhoek at the beginning of their expedition into Namibia.

Taxon: *Genetta*.

**Sandfontein, 1 mi** [1.6 km] S police post (Map 16: 451).

Coordinates: 22°18'S, 19°59'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (18–20 Mar 1966).

Habitat: “The country is very arid with sparse grass and bushes growing in the light yellowish sand, and an occasional tree. There are also occasional rocky outcrops. There is a dry river bed running parallel to the SWA/Bechuanaland [Namibia/Botswana] border where the grass is a lot thicker and larger and there are fewer bushes. There is also a dam with water in it in the river” (RDH).

Remarks: The AMP team discovered that the original farm called Sandfontein had been subdivided into the Sandfontein and Buitepos farms. In his journal, Hepplewhite acknowledged that they camped on the latter, situated on the Namibia-Botswana border, but the older name “Sandfontein” was preferably used for the locality because it appeared on their map. We follow

the collectors and use the coordinates for Sandfontein Farm, which are close to those for the town of Buitepos (22°16'S, 19°59'E G).

Taxa: *Xerus*, *Saccostomus*, *Malacothrix*.

**Skaanskolk Farm**, 5 mi [8.0 km] W Rietfontein [South Africa] (Map 16: 458).

Coordinates: 26°46'S, 19°58'E G (as Schanskolk).

Collectors: R. D. Hepplewhite and A. R. Silberstein (30 Apr–2 May 1966).

Habitat: “The ground is very sandy—in fact it is not very different from the Kalahari desert sand—a reddish sand. The grass is very scattered indeed, and there are bushes interspersed among the grass. Just behind the camp is a ridge of black rocks. The ground slopes down towards a sort of pan with a dry river running out of it . . . field . . . much longer grass and obviously hasn't been used for grazing this year” (RDH).

Remarks: On specimen labels, Silberstein specified Skaanskolk Farm, whereas Hepplewhite used only Skaanskolk.

Taxa: *Elephantulus*; *Xerus*, *Petromyscus*, *Desmodillus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*; *Lepus*; *Crocidura*.

**Sossus Vlei**, Diamond Area No. 2 (Map 16: 452).

Coordinates: 24°42'S, 15°17'E G (as Sossusvlei).

Collectors: R. D. Hepplewhite and A. R. Silberstein (27 Mar–1 Apr 1966).

Habitat: “The vlei itself is at the end of a series of pans, all part of a river which runs into the dune area and comes to an end in this vlei—Sossus. None of the other pans have water. Sossus Vlei has a pan of water about 1/2 mile [0.8 km] long and 1/4 mile [0.4 km] wide and about 5 feet [1.5 m] deep at its deepest point. On the north side the dunes come right to the waters edge, but on the other sides there is a sort of beach area which is covered with caked dry mud. On the south side this area extends for about a mile [1.6 km] and has many little dunes dotted all over it, and these dunes have a thorny, rather thick, low bush growing on them . . . There are quite large acacia-type trees in this area, and some are standing in the pan, indicating that it is not normally as large as this. The dunes around the pan are about 300 feet [91.4 m] high, but some of them on the way here are reputed to be 600 feet [182.9 m] high” (RDH).

Taxa: *Gerbilliscus*, *Gerbillurus*, *Rhabdomys*.

**Stolzenfels**, north bank Orange River (Map 16: 460).

Coordinates: 28°30'S, 19°40'E G.

Collectors: A. V. W. Lambrechts (30 Jun–4 Jul 1968); O. F. Graupner and A. V. W. Lambrechts (17–21 Jan 1969).

Habitat: “We caught the *Petromyscus* in barren, rocky hills with almost no vegetation. Both survey lines were put out in valleys between the hills. The vegetation on both banks is very sparse due to the drought which lasted for the last three years. There is no grass at all” (AVWL).

Remarks: Camp was established on the north bank of the Orange River, and both the north (Namibia) and south (see **Stolzenfels**, South Africa) banks were collected. Lambrechts indicated that the collecting locality was Stolzenfels Farm, about 10–12 mi [16.1–19.3 km] south of Jerusalem Farm (28°23'S, 19°36'E G).

Taxa: *Elephantulus*; *Procapra*; *Saccostomus*, *Petromyscus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*.

**Swartbank Mountain**, 36 km WNW of Gobabeb (Map 16: 441).

Coordinates: 23°18'S, 14°48'E G (as Swartbankberg).

Collectors: R. E. Cole, A. L. Moore, and A. C. Risser (23 Nov 1963).

Habitat: “The area is very flat, gravel gradually sloping into the base of the mountain, then jagged rocks. There is an abundance of succulents and other plant life in contrast to the denuded flats. Near the top there is a section of very black boulders” (ACR).

Remarks: While encamped at **Gobabeb**, the AMP crew made a one-day trip to collect at Swartbank Mountain.

Taxa: *Petromyscus*, *Gerbillurus*.

**Warmbad** (Map 16: 462).

Coordinates: 28°27'S, 18°44'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (3–6 May 1966).

Habitat: “There are isolated rocky outcrops but generally the ground is sandy and flat with scattered bushes in places. The ground is whitish in many places” (RDH).

Taxa: *Elephantulus*, *Macroscelides*; *Malacothrix*, *Gerbillurus*, *Micaelamys*, *Petromyscus*; *Pronolagus*.

**Warmbad, 47 mi** [75.6 km] S (Map 16: 463).

Coordinates: 28°52'S, 18°14'E M (WAC, *Lower Orange River*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (6 May 1966).

Habitat: “Rocky hillside” (specimen labels).

Remarks: This locality was situated along the Orange River according to Hepplewhite's journal, probably in



the vicinity of Goodhouse, South Africa (Goodhouse, Namibia and South Africa).

Taxa: *Xerus*, *Petromus*.

**Windhoek, 11 mi** [17.7 km] E (Map 16: 445).

Coordinates: 22°33'S, 17°17'E M (WAC, *Pelican Point*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (12–14 Mar 1966).

Habitat: “The dry river bed in which the camp is situated the ground rises on both banks into rocky ‘koppies’ with sandy soil. There is a moderately thick covering of 2–3 foot [0.6–0.9 m] high grass interspersed with thorn bushes and a few acacia trees about 35–60 feet [10.6–18.3 m] high” (RDH).

Taxa: *Elephantulus*; *Saccostomus*, *Desmodillus*, *Micaelamys*.

BOTSWANA (BECHUANALAND OR  
BECHUANALAND PROTECTORATE)

**GENERAL REMARKS.** Labels on specimens that were collected prior to Oct 1966 use “Bechuanaland Protectorate” or simply “Bechuanaland” as the country name, while those on specimens collected after independence from South Africa (Sep 1966) reflect the current name of Botswana. Reay H. N. Smithers, curator at the National Museum of Rhodesia (NMR, now the Natural History Museum of Zimbabwe), Bulawayo, significantly contributed to the success of AMP activities in southern Africa and in particular Botswana (Map 17), and those field results reciprocally contributed to his book *The Mammals of Botswana* (Smithers, 1971). A large number of specimens collected by AMP crews were deposited in the NMR, and we did not verify geographic or taxonomic information associated with those specimens.

Cartographic sources proved important in localizing collecting sites in Botswana. World Aeronautical Charts in the Mammal Division archives bear penciled marks and notations that often coincide with cited coordinates. We believe that these annotations are derived from AMP collectors or affiliated staff and attempted to verify them whenever possible or noted questionable occurrences in locality remarks. Two draft maps in the Mammal Division map collection were also useful—H. J. Smithers’ “Bechuanaland Protectorate and The Caprivi Strip,” a blue-lined proof for the map subsequently published in Smithers (1971), and a hand-drawn map entitled “T. N. Liversedge Collecting Localities Botswana.”

Several Botswanan localities were identified or verified using the published gazetteers in Smithers (1971) or Leistner and Morris (1976), both of which employed quarter-degree grid cells, an alphanumeric system of geographic reference. Locality coordinates derived from these gazetteers are therefore extrapolations, but they suffice for purposes of approximate placement if not exact location.

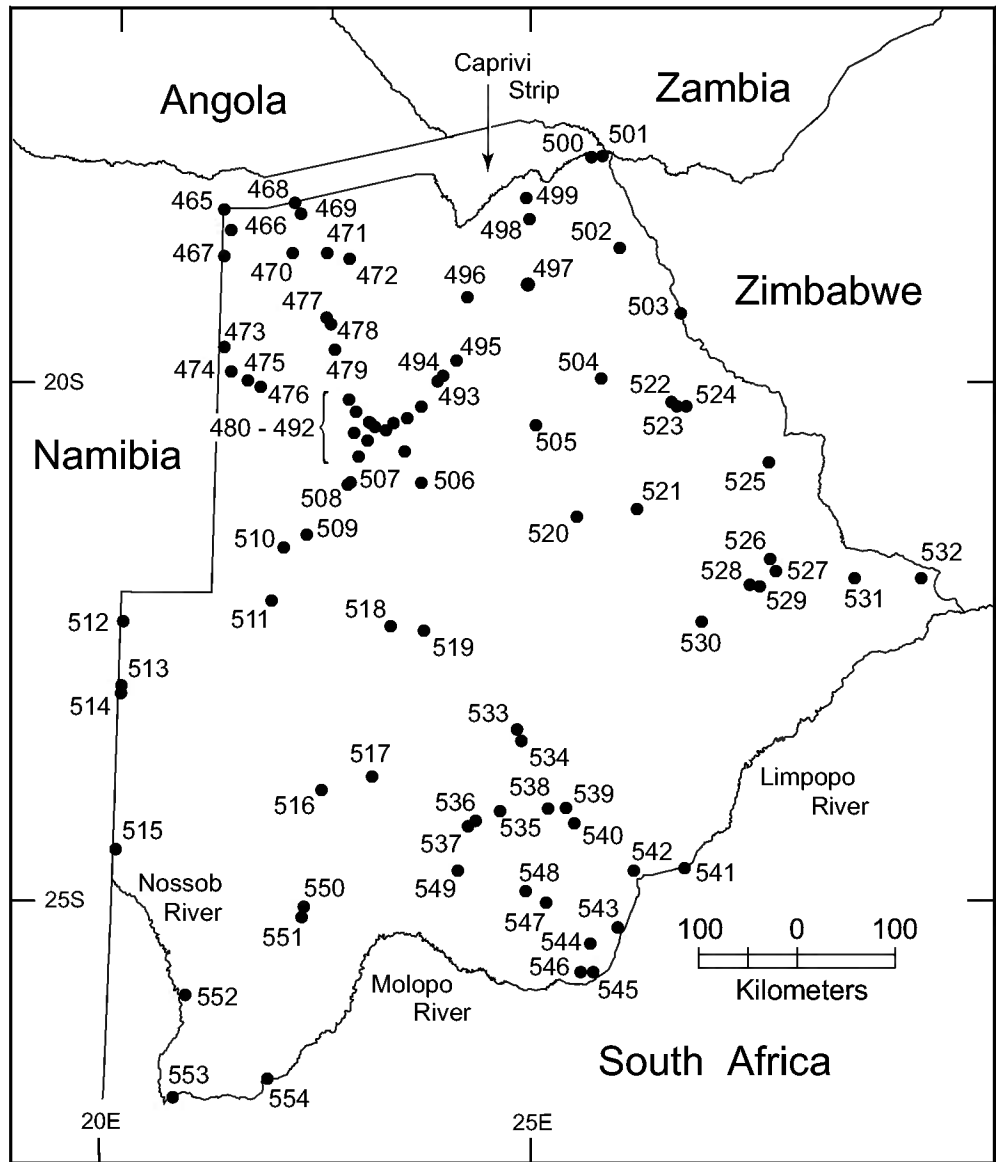
The incomplete nature of certain collectors’ field books hindered locality interpretation. Tim N. Liversedge’s and S. W. Goussard’s field journals lack entries for most of their time spent in Botswana, which complicated our efforts to determine exactly where many camps were established. Also, the lengthy periods between camps seem longer than can be explained by the travel distances between them; whether the collectors were on break or attending vehicular difficulties is unknown. In the only section of TNL field notes (21 May to 11 Jun 1968) possessed by the Mammal Division, Liversedge recorded an “expedition to N.E. extension of Kalahari type habitat” but offered no further explanation of this collecting interval. His entries seem to indicate that a location was determined by “dead reckoning,” as based upon track directions, odometer readings, and information from local inhabitants. Liversedge made several references in his journal to his game scout Leyakwa, who accompanied him during this period. The field catalog of S. W. Goussard is missing for the period 14 Jun to 29 Aug 1967 (numbers SWG 1130–1448), but his presence at various localities over these dates is evidenced by specimens in the NMNH collection. We collated names and dates of the many ancillary localities visited by Goussard from the NMNH database and confirmed them against specimen labels.

Given all of the above caveats, we regard the coordinates provided for cardinal localities in Botswana to contain a higher degree of imprecision than other countries where AMP teams collected.

**ITINERARIES.** R. M. Davis, A. R. Hardy, and H. J. Herbert (A. L. Moore 7 Jan–24 Feb): **Tsaugara Pan**, 7–12 Jan 1965; **3 mi NNW Dodo Cross Roads**, 15–19 Jan 1965; **Kasane**, 21–29 Jan 1965; **10 mi W Kasane**, 22–26 Jan 1965; **12 mi SW Kachikau**, 31 Jan–2 Feb 1965; **10 mi E Goha Hills**, 4–7 Feb 1965; **10 mi N Joverega**, 8–14 Feb 1965; **Shorobe**, 15–21 Feb 1965; **Kwaii River Area**, 19 Feb 1965; **6 mi N Maun**, 22 Feb–4 Mar 1965; **Kwaii River Area**, 28 Feb–1 Mar 1965; **Maun**, 2–4 Mar 1965; **10 mi SW Schitwa**, 5–12 Mar 1965; **Mabele a Pudi**, 12–17 Mar 1965; **50 mi E Mabele a Pudi**, 14 Mar 1965; **10 mi SW Schitwa**, 18 Mar 1965; **Tsau**, 18–28 Mar 1965; **No-kaneng**, 29 Mar–4 Apr 1965; **10 mi N Aha Hills**, 6–13

MAP 17. African Mammal Project cardinal collecting localities 465–554 in Botswana (Bechuanaland).

- 465. Molembo, 55 mi W
- 466. Shakawe, 50 mi W, 12 mi S
- 467. Shakawe, 56 mi W, 28 mi S
- 468. Shakawe, 7 mi N
- 469. Shakawe
- 470. Tsodilo Hills
- 471. Sepopa
- 472. Seronga
- 473. Aha Hills, 10 mi N
- 474. Kai Kai
- 475. Drodsky's Caves, 10 mi NW
- 476. Drodsky's (Drotsky's) Caves
- 477. Gomare, 5 mi S
- 478. Nokaneng, 15 mi N
- 479. Nokaneng
- 480. Tsau
- 481. Tsau, 8 mi SE
- 482. Sehitwa, 5 mi NW
- 483. Dautsa Flats
- 484. Sehitwa, 10 mi SW
- 485. Masarwanyane Pan
- 486. Tsau, 21 mi SE
- 487. Tsau, 26 mi SE
- 488. Kwebe Hills, 18 mi NW
- 489. Kwebe Hills
- 490. Toten
- 491. Maun, 35 mi SW
- 492. Maun, 20 mi SSW
- 493. Maun
- 494. Maun, 6 mi N
- 495. Shorobe
- 496. Kwaai River Area
- 497. Joverega, 10 mi N
- 498. Goha Hills, 10 mi E
- 499. Kachikau, 12 mi SW
- 500. Kasane, 10 mi W
- 501. Kasane
- 502. Dodo Cross Roads, 3 mi NNW
- 503. Tamafuli
- 504. Tsaugara Pan
- 505. Khumaha
- 506. Mabele a Pudi, 50 mi E
- 507. Mabele a Pudi
- 508. Kuke Cordon
- 509. Ghansi, 20 mi NE
- 510. Ghansi
- 511. Ghansi, 35 mi S
- 512. Mamono
- 513. Mamono, 45 mi S
- 514. Mamono, 50 mi S



- 515. Mamono, 150 mi S
- 516. Tsane, 25 mi ENE
- 517. Kang
- 518. Xade Pan, 4 mi E
- 519. Camp 3
- 520. Chukutsa Pan
- 521. Musu, 12 mi W
- 522. Nata, 13 mi W
- 523. Nata, 10.2 mi W
- 524. Nata
- 525. Francistown, 40 mi NW
- 526. Foley Siding, 8 mi W
- 527. Francistown, 45 mi SW
- 528. Seruli, 16 mi W

- 529. Seruli, 9 mi W
- 530. Serowe, 18 mi NW
- 531. Magogopate
- 532. Zelu, 3 mi W
- 533. Kuche Pan
- 534. Kuche Pan, 10 mi SE
- 535. Maboane, 10 mi W
- 536. Takatokwane, 15 mi SW
- 537. Takatokwane, 20 mi SW
- 538. Letlaking, 10 mi W
- 539. Letlaking
- 540. Letlaking, 11 mi SE
- 541. Sequane
- 542. Gaberones, 5 mi W

- 543. Lobatsi
- 544. Matebe, 7 mi N
- 545. Ramatlabama, 10 mi W
- 546. Ramatlabama, 18 mi W
- 547. Kanye, 30 mi W
- 548. Digomo de Kai
- 549. Sekhuma Pan
- 550. Mabua Sefubi Pan
- 551. Mpatutlwa Pan
- 552. Vloorskop
- 553. Bokspits, 6 mi NE
- 554. Khuis

Apr 1965; Drodsky's (Drotsky's) Caves, 10 Apr 1965; 35 mi SW Maun, 19 Apr 1965; Nata, 23–26 Apr 1965.

R. D. Hepplewhite, T. N. Liversedge, and H. W. Setzer: 5 mi W Gaberones, 13–14 Nov 1965; 10 mi W Maboane, 16–20 Nov 1965; 10 mi W Letlaking, 21–23 Nov 1965; 11 mi SE Letlaking, 23–26 Nov 1965.

R. D. Hepplewhite and T. N. Liversedge: Toten, 7–9 Feb 1966; Kwebe Hills, 12–15 Feb 1966; 18 mi NW Kwebe Hills, 15–18 Feb 1966; Dautsa Flats, 19–20 Feb 1966.

T. N. Liversedge (S. D. Durrant and H. W. Setzer, 10–15 Sep 1966): Magogopate, 9–13 Apr 1966; 3 mi W Zelu, 15–20 Apr 1966; 20 mi SW Takatokwane, 1–5 May 1966; 15 mi SW Takatokwane, 4 May 1966; Kuche Pan, 8–11 May 1966; 10 mi SE Kuche Pan, 12 May 1966; Letlaking, 13 May 1966; 5 mi W Gaberones, 14–28 May 1966; Lobatsi, 29 May–2 Jun 1966; Sequane, 4–8 Jun 1966; 10 mi W Ramatlabama, 10–12 Jun 1966; 18 mi W Ramatlabama, 12 Jun 1966; 7 mi N Matebe, 14 Jun 1966; Digomo de Kai, 16–18 Jun 1966; Sekhuma Pan, 19–21 Jun 1966; Kang, 25–29 Jun 1966; Ghansi, 2–5 Jul 1966; 45 mi S Mamono, 7–13 Jul 1966; Mamono, 7, 10 Jul 1966; 20 mi NE Ghansi, 10 Jul 1966; Dautsa Flats, 17 Jul 1966; 12 mi W Musu, 22–24 Aug 1966; Chukutsa Pan, 26–29 Aug 1966; Tamafupi, 2–5 Sep 1966; 13 mi W Nata, 10 Sep 1966; Khumaha, 11–14 Sep 1966; 10.2 mi W Nata, 14 Sep 1966; 13 mi W Nata, 15 Sep 1966; Pink Pan, 12 Oct 1966; 4 mi E Xade Pan, 14–19 Oct 1966; Camp 3, 16–19 Oct 1966; 35 mi S Ghansi, 25–29 Oct 1966; 40 mi NW Francistown, 16 Jan 1967; Masarwanyane Pan, 19 Jan 1967; 150 mi S Mamono, 21–26 Jan 1967; 50 mi S Mamono, 27 Jan 1967; 25 mi ENE Tsane, 29 Jan–5 Feb 1967; 30 mi W Kanye, 4 Feb 1967; Mabua Sefubi Pan, 7–14 Feb 1967; Mpatutlwa Pan, 10 Feb 1967; Vloorskop, 16–21 Feb 1967; 6 mi NE Bokspits, 23–27 Feb 1967; Khuis, 1–5 Mar 1967.

S. W. Goussard and T. N. Liversedge: 8 mi W Foley Siding, 2–6 Apr 1967; 20 mi SSW Maun, 10 Apr 1967; Nokaneng, 10 Apr 1967; 5 mi S Gomare, 11 Apr 1967; Sepopa, 12–23 Apr 1967; Tsodilo Hills, 26 Apr–1 May 1967; Shakawe, 4–11 May 1967; Tsodilo Hills, 15 May 1967; Shakawe, 16–18 May 1967; 55 mi W Mohembo, 21 May 1967; 50 mi W, 12 mi S Shakawe, 22 May–1 Jun 1967; Shakawe, 3 Jun 1967; 56 mi W, 28 mi S Shakawe, 4 Jun 1967; Kai Kai, 5 Jun 1967; Drodsky's (Drotsky's) Caves, 5–9 Jun 1967; 10 mi NW Drodsky's Caves, 9 Jun 1967; 10 mi N Aha Hills, 11–13 Jun 1967; 15 mi N Nokaneng, 16–25 Jun 1967; Maun, 17, 20 Jun 1967; 26 mi SE Tsau, 21 Jun 1967; 21 mi SE Tsau, 22 Jun 1967; 8 mi

SE Tsau, 23 Jun 1967; Seronga, 29 Jun–1 Jul 1967; 7 mi N Shakawe, 3 Jul 1967; Shakawe, 5 Jul 1967; 5 mi NW Schitwa, 13 Jul 1967; Kuke Cordon, 15 Jul 1967; Camp 4, 17 July 1967.

T. N. Liversedge: 45 mi SW Francistown, 23 May–1 Jun 1968; 9 mi W Seruli, 29 May 1968; 18 mi NW Serowe, 3–7 Jun 1968; 16 mi W Seruli, 9–11 Jun 1968.

**Aha Hills, 10 mi [16.1 km] N** (Map 17: 473).

Coordinates: 19°39'S, 21°03'E G (for Kubie; see Remarks).

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (6–13 Apr 1965); S. W. Goussard and T. N. Liversedge (11–13 Jun 1967).

Habitat: "Cattle thorn fence" (HJH).

Remarks: Hardy referred (journal entry) to "N'dobe [sic; Kube?], a village about 7 miles [11.3 km] north of the Northern Aha Hills and about 1 mile [1.6 km] from the [Namibian] border." Plots of these distances (WAC, *Tsumeb*, 1:1,000,000) closely conform to USBGN coordinates for Kubie. Furthermore, Davis placed this locality at 90 mi [145 km] from Nokaneng, 1 mi [1.6 km] east of the Namibian border, and "about 10 miles [16 km] north of Aha Hills," a location that is penciled as Kubie on the WAC topographic sheet. Davis also mentioned traveling 6 mi [9.7 km] east to Mahupa (19°34'S, 21°07'E G), which distance and direction are plausible if their collecting site was Kubie. In addition to collecting at 10 mi N Aha Hills, Goussard and Liversedge obtained specimens from north edge Aha Hills and simply Aha Hills. On 9 Jun, they drove to Drodsky's Caves to collect bats.

Taxa: *Galago*; *Paraxerus*, *Graphiurus*, *Dendromus*, *Gerbiliscus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*, *Zelotomys*, *Pedetes*; *Lepus*; *Crocidura*; *Rhinolophus*; *Panthera*, *Mungos*, *Otocyon*; *Raphicerus*.

**Bokspits, 6 mi [9.7 km] NE** (Map 17: 553).

Coordinates: 26°51'S, 20°47'E M (WAC, *Molopo River*, 1:1,000,000).

Collector: T. N. Liversedge (23–27 Feb 1967).

Habitat: "Bushes, riverbed," "scrub, riverbed," "low acacia bushes" (specimen labels).

Remarks: Liversedge's field catalog indicates that the camp northeast of Bokspits was on the Molopo River, but the river is not reflected on specimen labels. Liversedge also collected on 27 Feb at 4 mi [6.4 km] NNW Bokspits and at 11 mi [17.7 km] NNW Bokspits on the Nossop River.

Taxa: *Xerus*, *Graphiurus*, *Desmodillus*, *Gerbillurus*, *Rhodomys*, *Parotomys*, *Pedetes*, *Cryptomys*; *Cynictis*.

**Camp 3** (Map 17: 519).

Coordinates: 22°22'S, 23°22'E P.

Collector: T. N. Liversedge (16–19 Oct 1966).

Habitat: "Scrub bush," "scrub" (specimen labels).

Remarks: Smithers (1971) identified Camp 3 as in the Central Kalahari Game Reserve at 22 23 A4, which approximate our above coordinates. Unfortunately, there are no journal entries to clarify the location of Camp 3. We located an unlabeled locality marked at approximately 22°23'S, 23°20'E on T. N. Liversedge's draft map, "Collecting Localities Botswana," and believe these to represent Camp 3. Moreover, they agree closely with Smithers' quarter-degree values.

Taxa: *Xerus*, *Saccostomus*, *Dendromus*, *Steatomys*, *Gerbilliscus*, *Gerbillurus*, *Mus*, *Thallomys*, *Pedetes*; *Genetta*, *Cynictis*, *Suricata*, *Hyaena*, *Proteles*, *Otocyon*; *Alcelaphus*, *Antidorcas*, *Sylvicapra*.

**Camp 4.**

Coordinates: Not located.

Collector: S. W. Goussard and T. N. Liversedge (17 Jul 1967).

Habitat: "Scrub" (specimen labels).

Remarks: The location of Camp 4 could not be determined.

Taxa: *Dendromus*, *Gerbillurus*, *Mastomys*, *Mus*; *Crocidura*; *Phacochoerus*, *Raphicerus*.

**Chukutsa Pan** (Map 17: 520).

Coordinates: 21°17'S, 25°01'E G.

Collectors: T. N. Liversedge (26–29 Aug 1966).

Habitat: "Pan fringe," "scrub bushes" (specimen labels).

Taxa: *Elephantulus*; *Galago*; *Xerus*, *Paraxerus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*; *Lepus*; *Canis*.

**Dautsa Flats**, 14 mi [22.5 km] W Sehitwa (Map 17: 483).

Coordinates: 20°33'S, 22°30'E P (Borello and Borello, 1997).

Collectors: R. D. Hepplewhite and T. N. Liversedge (19–20 Feb 1966); T. N. Liversedge (17 Jul 1966).

Habitat: "Grassland," "acacia bushes" (specimen labels).

Remarks: Labels of specimens captured on Liversedge's second visit mention only 14 mi [22.5 km] W Sehitwa, not Dautsa Flats.

Taxa: *Saccostomus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Mastomys*, *Rhodomys*, *Pedetes*; *Crocidura*; *Mops*, *Scotophilus*, *Neoromicia*; *Proteles*; *Antidorcas*.

**Digomo de Kai** (Map 17: 548).

Coordinates: 24°52'S, 24°37'E G (Dikomu di Kai).

Collector: T. N. Liversedge (16–18 Jun 1966).

Habitat: "Few scattered bushes," "open grassland," "bushes, grass," "scattered bushes," "rocky hill" (specimen labels).

Remarks: Smithers' (1971) quarter-degree location for Dikgomodikae (Kgomodikae; 24 24 D3) approximates the above USBGN coordinates for Dikomu di Kai.

Taxa: *Saccostomus*, *Acomys*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Pedetes*, *Cryptomys*; *Lepus*; *Crocidura*; *Scotophilus*, *Neoromicia*.

**Dodo Cross Roads, 3 mi [4.8 km] NNW** (Map 17: 502).

Coordinates: 18°42'S, 25°23'E M (WAC, *Livingstone*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (15–19 Jan 1965).

Habitat: "Camped in an acacia-mopani woodland" (RMD).

Remarks: Davis indicated (field journal) that the team drove west 120 mi [193 km] from Francistown to Nata and proceeded another 140 mi [225 km] north to their campsite near Dodo Cross Roads. While Herbert trapped around the camp, Davis placed his traps 5 mi [8.0 km] to the north, so his specimens are labeled 8 mi [12.9 km] NNW Dodo Cross Roads. The skin tag on a *Paraxerus* is labeled as 13 mi [20.9 km] W Dodo Cross Roads and that on a *Caracal* indicates 10 mi [16.1 km] W Dodo Cross Roads, although Herbert's catalog for both specimens gives the general base camp designation. Herbert observed that there was an abundance of water-filled pans in the area.

Taxa: *Galago*; *Paraxerus*, *Gerbilliscus*, *Pedetes*, *Cryptomys*; *Caracal*; *Raphicerus*.

**Drotsky's (Drotsky's) Caves**, 25 mi [40.2 km] SE Kai Kai (Map 17: 476).

Coordinates: 20°02'S, 21°28'E C? (see Remarks).

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (10 Apr 1965); S. W. Goussard and T. N. Liversedge (5–9 Jun 1967).

Habitat: "The caves are deep and one can go a 1/4 of a mile [0.4 km] in the earth . . . very beautiful with the stalagmites and stalactites" (HJH). "Bush and grassland" (specimen labels).

Remarks: Coordinates of unknown origin have been penciled into both Goussard's and Liversedge's field catalogs and closely correspond to a plus mark an-

notated as “Drotsky’s Cave” on a topographic map (WAC, *Lake Ngami*, 1:1,000,000). Smithers’ (1971) quarter-degree placement (20 21 A2) is consistent with our plotted coordinates. Davis and his companions visited this locality to collect bats from their camp north of **Aha Hills** (6–13 Apr 1965); specimens from this visit are labeled “Drotsky’s Caves, 25 mi [40.2 km] southeast of Kai Kai.” Goussard and Liversedge abbreviated the locality designation to “Drotsky’s Caves” (as per Smithers, 1971), without reference to Kai Kai, for their more extensive collections in 1967. Liversedge also referred (field catalog) to “Drotsky’s Caves, Khweabe Hills” and later to “Drotsky’s Caves, Kihabe Hills,” although his specimen labels mention neither locality modifier. These hills must differ from Kkwebe Hills (20°39’S, 23°05’E G).

Taxa: *Graphiurus*, *Saccostomus*, *Dendromus*, *Gerbilliscus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*, *Zelotomys*, *Pedetes*; *Crocidura*; *Rhinolophus*, *Hipposideros*, *Nycteris*; *Felis*; *Raphicerus*.

**Drotsky’s Caves, 10 mi [16.1 km] NW** (Map 17: 475).  
Coordinates: 19°58’S, 21°19’E M (WAC, *Lake Ngami*, 1:1,000,000).  
Collectors: S. W. Goussard and T. N. Liversedge (9 Jun 1967).

Habitat: “Bush and grassland” (specimen label).

Remarks: Goussard collected a *Xerus* at this locality, presumably en route to **Aha Hills** (11–13 Apr 1967). Coordinates were estimated by following the track from Drotsky’s Cave toward Kai Kai.

Taxon: *Xerus*.

**Foley Siding, 8 mi [12.9 km] W** (Map 17: 526).  
Coordinates: 21°41’S, 27°11’E M (WAC, *Shashi River*, 1:1,000,000).  
Collectors: S. W. Goussard and T. N. Liversedge (2–6 Apr 1967).

Habitat: “Bush fence, mopane,” “mopane” (specimen labels).

Remarks: Smithers (1971) referred to this locality simply as Foley (21°41’S, 27°19’E G), and some of Liversedge’s specimen labels record the locality as “8 mi W Foley.” His field catalog deliberately references “Foley Siding.” On 2 Apr, Liversedge collected an *Aepyceros* at 10 mi [16.1 km] W Foley Siding.

Taxa: *Paraxerus*, *Graphiurus*, *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*; *Lepus*; *Crocidura*; *Aepyceros*.

**Francistown, 40 mi [64.4 km] NW** (Map 17: 525).  
Coordinates: 20°45’S, 27°07’E M (WAC, *Shashi River*, 1:1,000,000).  
Collector: T. N. Liversedge (16 Jan 1967).  
Habitat: “Rocky kopje” (specimen labels).  
Taxa: *Acomys*, *Micaelamys*.

**Francistown, 45 mi [72.4 km] SW** (Map 17: 527).  
Coordinates: 21°48’S, 27°15’E M (WAC, *Bulawayo*, 1:1,000,000).  
Collector: T. N. Liversedge (23 May–1 Jun 1968).  
Habitat: “Acacia scrub surrounding pan.”

Remarks: Liversedge established camp the evening of 23 May approximately a mile [1.6 km] beyond the village of Kwechu. We could not locate this village on available maps and estimated coordinates by following the road running south-southwest from Francistown. Liversedge described this camp as situated by a small, dry pan surrounded by *Acacia* scrub. On 25 May, he collected *Xerus* at 50 mi [80.5 km] SW Francistown, and later that day he collected at 57 mi [91.7 km] SW Francistown at a large pan.

Taxa: *Elephantulus*; *Galago*; *Xerus*, *Saccostomus*, *Gerbilliscus*, *Gerbillurus*, *Mastomys*, *Micaelamys*, *Pedetes*, *Cryptomys*, *Hystrix*; *Lepus*; *Felis*, *Genetta*, *Cynictis*, *Canis*, *Vulpes*; *Alcelaphus*, *Antidorcas*, *Raphicerus*, *Sylvicapra*.

**Gaberones, 5 mi [8.0 km] W** (Map 17: 542).  
Coordinates: 24°40’S, 25°49’E M (WAC, *Vaal River*, 1:1,000,000).  
Collectors: R. D. Hepplewhite, T. N. Liversedge, and H. W. Setzer (13–14 Nov 1965); T. N. Liversedge (14–28 May 1966).

Habitat: “Kopjie . . . sandy soil in the flat. Acacias and thorn scrub is the dominant vegetation with some attempts at cultivation” (HWS).

Remarks: The estimated coordinates are based upon azimuth and range relative to Gaberones (Gaberone G) and fall close to a penciled mark (origin unknown) on the village of Khabane (24°40’S, 25°46’E G), which lies about 8 mi [12.9 km] west of Gaberones. Setzer’s specimens from the Nov visit are labeled as “5 mi W” of Gaberones, while Liversedge’s labels read “6 mi W.” When Liversedge returned the following May, he adopted the 5 mi distance for his locality designation.

Taxa: *Elephantulus*; *Procapra*; *Galago*; *Paraxerus*, *Graphiurus*, *Saccostomus*, *Acomys*, *Desmodillus*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Rhabdomys*,

*Pedetes; Lepus; Atelerix; Crocidura; Rhinolophus; Cynictis, Ictonyx.*

**Ghansi** (Map 17: 510).

Coordinates: 21°34'S, 21°47'E G (as Ghanzi).

Collector: T. N. Liversedge (2–5 Jul 1966).

Habitat: "Scrub" (specimen labels).

Taxa: *Desmodillus, Gerbillurus; Cynictis, Ictonyx.*

**Ghansi, 20 mi** [32.2 km] NE (Map 17: 509).

Coordinates: 21°27'S, 22°02'E M (WAC, *Kalahari*, 1:1,000,000).

Collector: T. N. Liversedge (10 Jul 1966).

Habitat: No information available.

Remarks: A single *Nycteris* was killed on the road at this locality, but Liversedge was 45 mi S Mamono on 10 Jul. Considering that Liversedge's catalog entry for this specimen was inserted between 13 and 17 Jul, a likely explanation is that someone else collected the bat and gave it to Liversedge after 13 Jul.

Taxon: *Nycteris.*

**Ghansi, 35 mi** [56.3 km] S (Map 17: 511).

Coordinates: 22°10'S, 21°53'E M (WAC, *Kalahari*, 1:1,000,000).

Collector: T. N. Liversedge (25–29 Oct 1966).

Habitat: "Scrub" (specimen labels).

Remarks: Liversedge added "Hanahai Valley" to this locality designation in his field catalog, although the qualifier is not duplicated on specimen labels. Liversedge's draft map ("T. N. Liversedge Collecting Localities Botswana") contains a collecting locality to the south of Ghanzi, along the road to Tsane and near these coordinates.

Taxa: *Elephantulus; Xerus, Saccostomus, Steatomys, Desmodillus, Gerbilliscus, Gerbillurus, Lemniscomys, Mastomys, Micaelamys, Mus, Thallomys; Genetta, Cynictis, Otocyon; Alcelaphus, Sylvicapra.*

**Goha Hills, 10 mi** [16.1 km] E (Map 17: 498).

Coordinates: 18°25'S, 24°22'E M (WAC, *Livingstone*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (4–7 Feb 1965).

Habitat: "We are camped at the edge of the hills on the edge of a mopane forest which covers the hills . . . hills (near rocks) . . . near a water hole" (HJH).

Remarks: The AMP team pitched their camp close to a pan believed to be at Goha Hills, but two days later, they learned that their actual collecting site was 10 mi E Goha Hills and about 20 mi [32.2 km] S Kachikau

(18°10'S, 24°28'E G). The *Galago* and *Genetta* were each labeled only as Goha Hills, while all other specimens have "10 mi E Goha Hills" for their locality.

Taxa: *Galago; Paraxerus, Micaelamys; Genetta, Canis; Raphicerus, Sylvicapra.*

**Gomare, 5 mi** [8.0 km] S (Map 17: 477).

Coordinates: 19°22'S, 22°10'E M (ITM, *Botswana*, 1:1,500,000).

Collectors: S. W. Goussard and T. N. Liversedge (11 Apr 1967).

Habitat: "Big tree" (specimen label).

Remarks: Coordinates are based upon a measured offset from Gumare found on the above topographic map, which agrees with the team's itinerary.

Taxon: *Papio.*

**Joverega, 10 mi** [16.1 km] N (Map 17: 497).

Coordinates: 19°03'S, 24°23'E M (WAC, *Livingstone*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (8–14 Feb 1965).

Habitat: "Open field. The soil is very sandy with scattered grass stands. The woods (mopane forest) are full of squirrels . . . pan" (HJH).

Remarks: The field team hoped to collect at Tsotsoroga Pan (18°43'S, 24°21'E G), but they found it dry. Instead they camped at a "beautiful pan . . . with good water . . . just out of the game reserve [Chobe] and only about 10 miles [16.1 km] from Joverega." They were later informed that their beautiful pan is called Kaiser or Half-way pan. A single *Aepyceros* was taken at Joverega (19°08'S, 24°15'E G) on 14 Feb. We estimated the map coordinates by following the single track heading northeast from Joverega.

Taxa: *Galago; Paraxerus; Lepus; Galerella, Crocuta; Equus; Phacochoerus, Aepyceros, Raphicerus.*

**Kachikau, 12 mi** [19.3 km] SW (Map 17: 499).

Coordinates: 18°13'S, 24°20'E M (WAC, *Livingstone*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (31 Jan–2 Feb 1965).

Habitat: "Definitely tree savanna . . . small bushes" (RMD). "Tree savanna with very high grass (6–7 feet [1.8–2.1 m])" (HJH).

Remarks: The crew left **Kasane** and drove 52 mi [83.7 km] west to Kachikau and then southwest, finding a suitable camp next to a pan. Map coordinates were estimated by following the track southwest of Kachikau (18°10'S, 24°28'E G).

Taxa: *Galago*; *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Mastomys*, *Pedetes*, *Cryptomys*; *Genetta*; *Raphicerus*.

**Kai Kai**, Ngamiland (Map 17: 474).

Coordinates: 19°53'S, 21°08'E G.

Collectors: S. W. Goussard and T. N. Liversedge (5 Jun 1967).

Habitat: "Pan fringe" (specimen labels).

Remarks: These specimens represent opportunistic collections that were made en route to **Drotsky's Caves**. Smithers' (1971) alternate spelling for Kai Kai is KhaeKhae.

Taxa: *Xerus*; *Galerella*.

**Kang** (Map 17: 517).

Coordinates: 23°46'S, 22°51'E G.

Collector: T. N. Liversedge (25–29 Jun 1966).

Habitat: "Old lands," "acacia bushes," "red sand, scattered acacia bushes," "open ground" (specimen labels).

Remarks: Peripheral collecting sites near this locality include 10 mi [16.1 km] NW Kang (23°37'S, 22°47'E M) on 25 Jun and 7 mi [11.3 km] W Kang (23°48'S, 22°44'E M) and 10 mi [16.1 km] W Kang (23°49'S, 22°42'E M) on 26 Jun.

Taxa: *Elephantulus*; *Xerus*, *Desmodillus*, *Gerbillurus*, *Thallomys*, *Pedetes*, *Cryptomys*; *Genetta*, *Cynictis*, *Suricata*, *Canis*, *Otocyon*, *Vulpes*; *Raphicerus*.

**Kanye, 30 mi** [48.2 km] **W** (Map 17: 547).

Coordinates: 24°59'S, 24°51'E M (WAC, *Molopo River* and *Vaal River*, 1:1,000,000).

Collector: T. N. Liversedge (4 Feb 1967).

Habitat: "Mixed woodland" (specimen label).

Remarks: While Liversedge was encamped at **25 mi** ENE **Tsane** (29 Jan–5 Feb), a *Papio* was collected at this locality according to Liversedge's field catalog and the specimen label. Because of the great distance between Kanye and Liversedge's camp east-northeast of Tsane (over 200 mi [320 km]), this specimen must have been given to Liversedge by someone else, and he presumably prepared it while at the Tsane camp.

Taxon: *Papio*.

**Kasane** (Map 17: 501).

Coordinates: 17°49'S, 25°09'E G.

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (21–29 Jan 1965).

Habitat: "Tree savanna with very sandy soil" (HJH).

Remarks: Camp was established on the Chobe River, just within the Chobe Game Reserve (Chobe National Park; 18°40'S, 24°30'E G), located close to Kasane.

In his journal, Herbert indicated that all hunting was conducted outside of the park and observed that game was plentiful within the park but scarce outside. Collections were simultaneously made at the village of Chobe, **10 mi W Kasane** (22–26 Jan). On several evenings, beginning on 21 Jan, they went night hunting in the direction of Kasungula. They collected *Hipposideros* from an old building in Kasane on 23 Jan. On 25 Jan, Moore collected a *Paraxerus* 1.5 mi [2.4 km] E Kasane in "thick tree bush." Later on the same day, they went into Kasane proper and collected *Mops* from the roof of the police building. Moore collected a *Hystrix* at 5 mi [8.0 km] W Kasane and a *Mastomys* at 1.5 mi [2.4 km] W Kasane in a cornfield. Other Kasane variations include 2 mi [3.2 km] S Kasane and 2 mi [3.2 km] W (Chobe Game Reserve) and 3 mi [4.8 km] E.

Taxa: *Galago*, *Papio*; *Paraxerus*, *Saccostomus*, *Dendromys*, *Steatomys*, *Acomys*, *Gerbilliscus*, *Dasymys*, *Mastomys*, *Micaelamys*, *Mus*, *Pelomys*, *Otomys*, *Pedetes*, *Hystrix*; *Lepus*; *Crocidura*; *Hipposideros*, *Chaerephon*, *Mops*; *Felis*, *Canis*; *Sylvicapra*.

**Kasane, 10 mi** [16.1 km] **W**, Chobe, (Map 17: 500).

Coordinates: 17°50'S, 25°02'E M (WAC, *Victoria Falls*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (22–26 Jan 1965).

Habitat: "Native field" (specimen labels).

Remarks: While camped at **Kasane** (21–29 Jan), the AMP crew regularly traveled west to a native village they identified as "Chobe," the site of an old logging camp and airstrip. Although we could not locate any gazetteer listing for a Chobe in this vicinity, an unnamed mark (origin unknown) penciled on the above map corresponds to the appropriate distance west of Kasane, and traces of a former airstrip are clearly visible in land-satellite imagery (Google Earth) in the same area.

Taxa: *Steatomys*, *Gerbilliscus*, *Mastomys*, *Pelomys*; *Crocidura*.

**Khuis** (Map 17: 554).

Coordinates: 26°40'S, 21°50'E G.

Collector: T. N. Liversedge (1–5 Mar 1967).

Habitat: "Pan fringe," "river bed" (specimen labels).

Remarks: Liversedge added Molopo River as a locality modifier in his field catalog but did not note the river on specimen labels.

Taxa: *Elephantulus*, *Macroscelides*; *Xerus*, *Graphiurus*, *Desmodillus*, *Gerbillurus*, *Micaelamys*, *Mus*, *Rhabdomys*,

*Parotomys*, *Pedetes*; *Lepus*; *Neoromicia*; *Cynictis*, *Suricata*, *Otocyon*; *Antidorcas*, *Raphicerus*.

**Khumaha**, Botletle River (Map 17: 505).

Coordinates: 20°24'S, 24°31'E M (WAC, *Lake Ngami*, 1:1,000,000).

Collectors: S. D. Durrant, T. N. Liversedge, and H. W. Setzer (11–14 Sep 1966).

Habitat: “Riverine bush” (specimen labels).

Remarks: Some uncertainty surrounds our localization of this camp. The USBGN contains no listing for a Khumaha per se, but Smithers (1971) and Leistner and Morris (1976) provide plausible transliterations as Kumaga (Khumaga; 20 24 B3) and Khumaga (20 24 AD), respectively. One topographic sheet (ITM, *Botswana*, 1:1,500,000) identified a “Xhumaga” on the west bank of the Boteti River that more closely approximates the coordinates in Leistner and Morris (1976). According to his journal entry, Setzer clearly placed the camp on the north bank of the Botletle River (Boteti River G), and Liversedge’s draft map (“T. N. Liversedge Collecting Localities Botswana”) shows a camp near the bend of the Botletle River. Our estimated coordinates therefore correspond to a point just west of the bend on the north bank of the Botletle River. On their day of departure, the team collected a *Canis* at 7.7 mi [12.4 km] N Khumaha (20°17'S, 24°31'E M).

Taxa: *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Mastomys*, *Cryptomys*; *Caracal*, *Canis*; *Raphicerus*, *Sylvicapra*.

**Kuche Pan** (Map 17: 533).

Coordinates: 23°19'S, 24°27'E G (as Kuke Pan; see Remarks).

Collector: T. N. Liversedge (8–11 May 1966).

Habitat: “Pan fringe,” “pan surface,” “scrub bush” (specimen labels).

Remarks: The phonetic variations in the spelling of this place-name are confusing. The “Khutswe” of Smithers (1971; 23 24 A4 ≈ 23°23'S, 24°23'E) and the USBGN (23°20'S, 24°25'E) approximately concur with the locations of “Kutse Pan” (ITM, *Botswana*, 1:1,500,000) and “Kuke Pan” (WAC, *Lake Ngami*, 1:1,000,000) on maps available to us and with the USBGN coordinates cited above. On the latter map, a town called “Kuke” is crossed out and penciled in its place is “Kuchwe.” There appear to be many variant names for what appears to be one and the same locality. Liversedge referred to this locality as Southern Edge Bushman Reserve in his field catalog but not on specimen labels.

Taxa: *Xerus*, *Saccostomus*, *Desmodillus*, *Gerbillurus*, *Mus*, *Pedetes*, *Cryptomys*; *Felis*, *Canis*; *Antidorcas*.

**Kuche Pan, 10 mi** [16.1 km] SE (Map 17: 534).

Coordinates: 23°26'S, 24°30'E M (WAC, *Lake Ngami*, 1:1,000,000).

Collector: T. N. Liversedge (12 May 1966).

Habitat: No information available.

Remarks: On the way to **5 mi W Gaberones** (14–28 May), Liversedge collected a *Raphicerus* at this locality. Coordinates are based upon azimuth and range relative to Kuche Pan.

Taxon: *Raphicerus*.

**Kuke Cordon**, Maun–Ghanzi road (Map 17: 508).

Coordinates: 21°00'S, 22°28'E M (ITM, *Botswana*, 1:1,500,000).

Collector: S. W. Goussard (15 Jul 1967).

Habitat: “Grass and bushes” (specimen labels).

Remarks: This entry is derived entirely from USNM specimens and could not be verified against any field books, given the gap in Goussard’s field numbers (SWG 1130–1448) for the period 14 Jun–29 Aug 1967. Our map-based coordinates are derived from the intersection of the Maun–Ghanzi road and the Kuke Veterinary Cordon Fence (Borello and Borello, 1997), which runs from Kuke Gate (21°00'S, 23°53'E P) due west to the Botswana–Namibia border (21°00'S, 21°00'E P).

Taxa: *Paraxerus*, *Saccostomus*, *Gerbilliscus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Micaelamys*; *Crociodura*.

**Kwaai River Area** (Map 17: 496).

Coordinates: 19°10'S, 23°43'E M (ITM, *Botswana*, 1:1,500,000).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (19, 28 Feb–1 Mar 1965).

Habitat: “Open tree savanna country” (HJH).

Remarks: Hunting excursions were made to this locality while the AMP team was based first at **Shorobe** (15–21 Feb) and later at **6 mi N Maun** (22 Feb–4 Mar). The collectors’ journals place this locality 50–55 mi [80.5–88.5 km] north of Shorobe, although on 1 Mar, Herbert wrote that they drove 65 mi [104.6 km]. The above map coordinates were estimated for a locality labeled Kbwai, which at best represents an approximation for the Kwaai River Area. Davis and Herbert hunted within what is now the Moremi Game Reserve.

Taxa: *Paraxerus*; *Canis*; *Phacochoerus*, *Aepyceros*, *Damaliscus*.



**Kwebe Hills**, Ngamiland (Map 17: 489).

Coordinates: 20°39'S, 23°05'E G (as Kkwebe Hills).

Collectors: R. D. Hepplewhite and T. N. Liversedge (12–15 Feb 1966).

Habitat: “Low hillside, acacia bushes,” “vlei edge, short grass, acacia bushes” (specimen labels).

Remarks: Variant spellings include Khwebe Hills (ITM; Smithers, 1971), Kgwebe Hills (Smithers, 1971), and Kkwebe Hills (USBGN).

Taxa: *Saccostomus*, *Desmodillus*, *Gerbilliscus*, *Micaelamys*, *Pedetes*; *Sylvicapra*.

**Kwebe Hills, 18 mi [29 km] NW** (Map 17: 488).

Coordinates: 20°27'S, 22°52'E M (WAC, *Lake Ngami*, 1:1,000,000).

Collectors: R. D. Hepplewhite and T. N. Liversedge (15–18 Feb 1966).

Habitat: “Sandy soil, thick shrubs,” “acacia” (specimen labels).

Remarks: The tag on a *Xerus* specimen indicates the specific site as the edge Lake Ngami flood plain.

Taxa: *Galago*; *Xerus*, *Paraxerus*, *Pedetes*; *Lepus*; *Mops*, *Neoromicia*.

**Letlaking** (Map 17: 539).

Coordinates: 24°04'S, 25°02'E G.

Collector: T. N. Liversedge (13 May 1966).

Habitat: “Scrub bushes” (specimen label).

Remarks: Liversedge collected a *Rhabdomys* at this locality en route to **5 mi W Gaberones** (14–28 May).

Taxon: *Rhabdomys*.

**Letlaking, 10 mi [16.1 km] W** (Map 17: 538).

Coordinates: 24°05'S, 24°50'E M (WAC, *Molopo River*, 1:1,000,000).

Collectors: R. D. Hepplewhite, T. N. Liversedge, and H. W. Setzer (21–23 Nov 1965).

Habitat: “Sandy soil with rather dense thorn bush cover. There is grass but very sparse . . . thorn fence around a deserted kraal” (HWS).

Remarks: We estimated the coordinates on the basis of a penciled annotation on the above topographic map. As at Maboane, the team had little trap success at this camp.

Taxa: *Saccostomus*, *Gerbilliscus*, *Gerbillurus*, *Aethomys*, *Mus*, *Pedetes*, *Cryptomys*; *Lepus*.

**Letlaking, 11 mi [17.7 km] SE** (Map 17: 540).

Coordinates: 24°13'S, 25°08'E M (WAC, *Molopo River*, 1:1,000,000).

Collectors: R. D. Hepplewhite, T. N. Liversedge, and H. W. Setzer (23–26 Nov 1965).

Habitat: “Water tank” (HWS). “Dry water course near a water pump and dam” (TNL).

Remarks: The AMP crew camped “in a canyon at a pump where hundreds of cattle come to water [Figure 127].” Setzer described the walls of the canyon as rocky, steep, and averaging 30–40 feet [9.1–12.2 m] in height. Compared to previous camps, their success with trapping improved considerably here.

Taxa: *Graphiurus*, *Desmodillus*, *Aethomys*, *Micaelamys*; *Lepus*; *Scotophilus*, *Neoromicia*; *Cynictis*, *Galerella*.

**Lobatsi** (Map 17: 543).

Coordinates: 25°13'S, 25°40'E G.

Collector: T. N. Liversedge (29 May–2 Jun 1966).

Habitat: “Short grass,” “rocky kloof,” “low bushes” (specimen labels).

Taxa: *Elephantulus*; *Papio*; *Acomys*, *Micaelamys*, *Rhabdomys*; *Crocidura*; *Sauromys*, *Scotophilus*.

**Mabele a Pudi, 45 mi [72.4 km] SW** Sehitwa (Map 17: 507).

Coordinates: 20°57'S, 22°30'E M (WAC, *Kalahari*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (12–17 Mar 1965).

Habitat: “The area here is rather thick bush with lots of rock outcrops and boulders on the hill” (RMD). “Thick thorn bush country. There are a number of small hills (200 feet [61 m] high) sticking out of the flat plains” (HJH).

Remarks: Herbert used “Mabele a Pudi” for this locality, while Davis spelled it as one word, “Mabeleapudi.” Both orthographies appear on various maps that we consulted. The coordinates provided above, for a Mabeleapudi, resemble the position found on other maps and are consistent with the collectors’ descriptions of their itinerary and whereabouts. This Mabele a Pudi, however, cannot be the same as the two found in the USBGN (at 22°56'S, 27°20'E and 22°17'S, 26°41'E). Herbert’s journal mentions their elevation as 4,000 feet [1,219 m]. During a cursory exploration of the area, the team found camp to be about 2 km from the Ghanzi-Ngamiland District border. Hardy and Herbert set a trapline on 12 Mar while on the way to the “hoof and mouth disease station” and collected five *Cryptomys*. On 14 Mar, the team went hunting about **50 mi E Mabele a Pudi** (see next locality account).



FIGURE 127. Botswana, near Letlaking: Native cattle (23–26 Nov 1965).

Taxa: *Galago*; *Paraxerus*, *Gerbilliscus*, *Micaelamys*, *Cryptomys*; *Neoromicia*; *Genetta*, *Lycaon*; *Raphicerus*, *Oryx*.

**Mabele a Pudi**, 50 mi [80.5 km] E (Map 17: 506).

Coordinates: 20°57'S, 23°17'E M (WAC, *Kalahari*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (14 Mar 1965).

Habitat: No information available.

Remarks: While camped at **Mabele a Pudi**, the AMP crew hunted from their vehicle by driving east along a fence row, and Davis shot a *Raphicerus* and an *Oryx*.

Taxa: *Raphicerus*, *Oryx*.

**Maboane**, 10 mi [16.1 km] W (Map 17: 535).

Coordinates: 24°06'S, 24°18'E M (ITM, *Botswana*, 1:1,500,000).

Collectors: R. D. Hepplewhite, T. N. Liversedge, and H. W. Setzer (16–20 Nov 1965).

Habitat: “There are vast grassy, sandy plains with scattered acacia trees and clumps of thorn bush” (HWS).

Remarks: The AMP team ended up camping at this locality after taking a wrong turn on the way to Kuchwe Pan. They encountered rains here that were the first of any significance since 1960. The team experienced poor trap success at this camp. Maboane (24°06'S, 24°27'E M) is not gazetted in the USBGN, Smithers (1971), or the AMP's vintage WACs but was found on the topographic sheet cited above.

Taxa: *Saccostomus*, *Dendromus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Pedetes*, *Cryptomys*; *Lepus*; *Antidorcas*.

**Mabua Sefubi Pan** (Map 17: 550).

Coordinates: 25°01'S, 22°09'E G (as Mabua Sefhubi Pan).  
Collector: T. N. Liversedge (7–14 Feb 1967).

Habitat: “Parklands,” “pan fringe,” “low acacia bushes,” “short grass, pan” (specimen labels).

Remarks: Although specimen tags read only Mabua Se-fubi Pan (Mabuasehube Pan per Smithers, 1971), Liversedge included “78 mi [125.5 km] SSE Tsane” as a locality modifier in his field catalog. On 10 Feb, he hunted at **Mpatutlwa Pan**.

Taxa: *Elephantulus*; *Xerus*, *Saccostomus*, *Desmodillus*, *Gerbillurus*, *Micaelamys*, *Mus*, *Rhabdomys*, *Otomys*, *Pedetes*; *Lepus*; *Cynictis*, *Canis*, *Otocyon*; *Oryx*.

**Magogopate** (Map 17: 531).

Coordinates: 21°52'S, 28°08'E P.

Collector: T. N. Liversedge (9–13 Apr 1966).

Habitat: “Mopane near village,” “rocky hill,” “riverine bush” (specimen labels).

Remarks: While specimen labels almost universally read Magogopate, Liversedge designated the locality as “Magogopate Game Camp, Shashi River Area” in his field catalog. Smithers (1971) used the spelling Magogophate (Mogogophate), and his quarter-degree coordinates (21 28 C3) interpolate to those given above.

Taxa: *Elephantulus*; *Procavia*; *Galago*; *Acomys*, *Gerbilliscus*, *Micaelamys*, *Pedetes*; *Lepus*; *Felis*, *Genetta*; *Raphicerus*, *Sylvicapra*.

**Mamono** (Map 17: 512).

Coordinates: 22°17'S, 20°02'E G (as Mamuno).

Collector: T. N. Liversedge (7, 10 Jul 1966).

Habitat: “Acacia scrub” (specimen labels).

Remarks: Liversedge collected here on two occasions while camped **45 mi S Mamono** (7–13 Jul).

Taxa: *Xerus*, *Desmodillus*, *Gerbillurus*; *Cynictis*.

**Mamono, 45 mi** [72.4 km] S (Map 17: 513).

Coordinates: 22°52'S, 20°11'E M (WAC, *Kalahari*, 1:1,000,000).

Collector: T. N. Liversedge (7–13 Jul 1966).

Habitat: “Acacia woodland” (specimen labels).

Remarks: Liversedge collected at **Mamono** on 7 and 10 Jul and at **55 mi** [88.5 km] **S Mamono** on 9 Jul. All three localities lie close to the Namibian border.

Taxa: *Elephantulus*; *Saccostomus*, *Malacothrix*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Mus*, *Zelotomys*, *Pedetes*, *Cryptomys*; *Lepus*; *Crocidura*; *Otocyon*; *Raphicerus*, *Sylvicapra*.

**Mamono, 50 mi** [80.5 km] S (Map 17: 514).

Coordinates: 22°56'S, 20°10'E M (WAC, *Kalahari*, 1:1,000,000).

Collector: T. N. Liversedge (27 Jan 1967).

Habitat: No information available.

Remarks: Liversedge collected a *Raphicerus* at this locality after breaking camp at **150 mi S Mamono**.

Taxon: *Raphicerus*.

**Mamono, 150 mi** [241.4 km] S (Map 17: 515).

Coordinates: 24°28'S, 20°02'E M (WAC, *Kalahari* and *Molopo River*, 1:1,000,000).

Collector: T. N. Liversedge (21–26 Jan 1967).

Habitat: “Acacia savanna” (specimen labels).

Taxa: *Xerus*, *Graphiurus*, *Dendromus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Mus*, *Rhabdomys*, *Pedetes*; *Lepus*; *Neoromicia*; *Felis*, *Canis*, *Vulpes*; *Antidorcas*, *Raphicerus*, *Sylvicapra*.

**Masarwanyane Pan** (Map 17: 485).

Coordinates: 20°42'S, 22°35'E G.

Collector: T. N. Liversedge (19 Jan 1967).

Habitat: No information available.

Remarks: Liversedge collected an acacia rat en route to his camp at **150 mi S Mamono** (21–26 Jan 1967).

Taxon: *Thallomys*.

**Matebe, 7 mi** [11.3 km] N (Map 17: 544).

Coordinates: 25°22'S, 25°22'E P.

Collector: T. N. Liversedge (14 Jun 1966).

Habitat: “Acacia” (specimen labels).

Remarks: This locality does not certainly appear on maps we consulted. We interpolated our coordinates from Smithers' (1971) quarter-degree figures for Matebe (25 25 A4) and regard them as very rough estimates. A “Mmathethe” does appear approximately in this region on one topographic map (ITM, *Botswana*, 1:1,500,000).

Taxa: *Gerbilliscus*, *Aethomys*.

**Maun** (Map 17: 493).

Coordinates: 19°59'S, 23°25'E G.

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (2–4 Mar 1965); S. W. Goussard and T. N. Liversedge (17, 20 Jun 1967).

Habitat: “Riverine bush,” “house” (specimen labels).

Remarks: While camped at **6 mi N Maun** (22 Feb–4 Mar 1965), the Davis team returned to Maun to collect bats. While working at **15 mi N Nokaneng** (16–25 Jun 1967), Liversedge made two side trips to Maun to collect or purchase *Mops*, a *Genetta*, and two *Chlorocebus*.

Taxa: *Chlorocebus*; *Chaerephon*, *Mops*, *Scotophilus*; *Genetta*.

**Maun, 6 mi [9.7 km] N** (Map 17: 494).

Coordinates: 19°57'S, 23°30'E M (WAC, *Lake Ngami*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (22 Feb–4 Mar 1965).

Habitat: "Tree savanna with very open grassland . . . next to the river . . . mealy (corn) field . . . open field . . . forest . . . open fields and near forests . . . mopane forest . . . open field near a thorn fence . . . bush area with very sandy soil" (HJH).

Remarks: Davis wrote that camp was established "under some beautiful big trees right along side the Thalmakane [Thamalakan G] River about 6 mi [9.7 km] north of Maun." Our map-based coordinates plot on the east side of the river (R. M. Davis, personal communication) at this approximate distance northeast of Maun. On 28 Feb, Davis and Herbert left to hunt large mammals in the **Kwaai River Area**, and they also collected bats in the village of **Maun** during their stay at this camp.

Taxa: *Galago*, *Chlorocebus*; *Paraxerus*, *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Mastomys*, *Pedetes*; *Lepus*; *Felis*, *Genetta*, *Paracynictis*; *Raphicerus*, *Sylvicapra*.

**Maun, 20 mi [32.2 km] SSW** (Map 17: 492).

Coordinates: 20°13'S, 23°15'E M (WAC, *Lake Ngami*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (10 Apr 1967).

Habitat: "Acacia forest" (specimen label).

Remarks: While traveling to **Sepopa** from **8 mi W Foley Siding**, Liversedge collected a *Chlorocebus* at this locality "on the Toten Road."

Taxon: *Chlorocebus*.

**Maun, 35 mi [56.3 km] SW** (Map 17: 491).

Coordinates: 20°20'S, 23°06'E M (WAC, *Lake Ngami*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (19 Apr 1965).

Habitat: No information available.

Remarks: A single *Aepyceros* was taken at this locality during a break in field work while the crew repaired vehicles at Maun. Coordinates above correspond to a penciled mark located on the above map, on the road at the appropriate distance southwest of Maun.

Taxon: *Aepyceros*.

**Mohembo, 55 mi [88.5 km] W** (Map 17: 465).

Coordinates: 18°20'S, 21°00'E M (WAC, *Okovango River*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (21 May 1967).

Habitat: "Woodland" (specimen labels).

Remarks: The Goussard and Liversedge field catalogs indicate that this locality was on the Namibian border. Our map coordinates are based upon azimuth and range plotted determined relative to Mohembo (Muhembo G).

Taxa: *Gerbilliscus*, *Mus*, *Thallomys*.

**Mpatutlwa Pan** (Map 17: 551).

Coordinates: 25°07'S, 22°08'E G.

Collector: T. N. Liversedge (10 Feb 1967).

Habitat: "Pan fringe" (specimen labels).

Remarks: While at **Mabua Sefubi Pan** (7–14 Feb), Liversedge hunted at Mpatutlwa Pan. His field catalog adds "84 miles [135.2 km] SSE Tsane" as a modifier, but this information is not conveyed on specimen labels. According to quarter-degree units, Smithers (1971) listed Mpatutlwa Pan (Mpathutlwa) at 25 22 A1, or about 25°08'S, 22°08'E, in very close agreement with the USBGN coordinates.

Taxa: *Lepus*; *Canis*, *Otocyon*.

**Musu, 12 mi [19.3 km] W** (Map 17: 521).

Coordinates: 21°12'S, 25°41'E M (ITM, *Botswana*, 1:1,500,000).

Collector: T. N. Liversedge (22–24 Aug 1966).

Habitat: "Mopane," "acacia" (specimen labels).

Remarks: Leistner and Morris (1976) identified a Musu at 21 25 BB, which quarter-degree sector broadly agrees with a Mosu found on the above topographic sheet at 21°12'S, 25°52'E. These estimated coordinates are close to **Chukutsa Pan** (26–29 Aug), Liversedge's next stop.

Taxa: *Saccostomus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Mastomys*; *Lepus*; *Raphicerus*, *Sylvicapra*.

**Nata** (Map 17: 524).

Coordinates: 20°13'S, 26°11'E G.

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (23–26 Apr 1965).

Habitat: "Open savanna" (HJH). "Mopane forest . . . dry, flat savanna . . . mixed forest alongside the river" (RMD).

Remarks: The AMP team camped along the Nata River. The evening of 23 Apr, they drove 6 mi [9.7 km] southeast of Nata into open savanna and collected a *Proteles*, a *Raphicerus*, a *Galago*, two *Pedetes*, and two *Lepus* in thick bush. An *Antidorcas* was also col-

lected 10 mi [16.1 km] west of Nata. Specimens from both of these side excursions were cataloged and labeled as being collected at Nata.

Taxa: *Galago*; *Gerbilliscus*, *Micaelamys*, *Mus*, *Pedetes*; *Lepus*; *Neoromicia*; *Proteles*; *Antidorcas*, *Raphicerus*.

**Nata, 10.2 mi [16.4 km] W** (Map 17: 523).

Coordinates: 20°13'S, 26°05'E M (WAC, *Shashi River*, 1:1,000,000).

Collectors: S. D. Durrant, T. N. Liversedge, and H. W. Setzer (14 Sep 1966).

Habitat: "Open scrub," "scrub plain" (specimen labels).

Remarks: The team incidentally collected a *Connochaetes* and a *Vulpes* at this locality. Our coordinates match a pencil mark found on the above map used by AMP and plausibly concur with the distance from Nata.

Taxa: *Vulpes*; *Connochaetes*.

**Nata, 13 mi [20.9 km] W** (Map 17: 522).

Coordinates: 20°11'S, 26°01'E M (WAC, *Shashi River*, 1:1,000,000).

Collectors: S. D. Durrant, T. N. Liversedge, and H. W. Setzer (10, 15 Sep 1966).

Habitat: "Scattered trees and grassland" (specimen labels).

Remarks: Coordinates are estimates based upon by-road mileage from Nata.

Taxa: *Saccostomus*, *Dendromus*, *Gerbilliscus*, *Gerbillurus*, *Mus*.

**Nokaneng** (Map 17: 479).

Coordinates: 19°40'S, 22°16'E G (as Nokaning).

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (29 Mar–4 Apr 1965); S. W. Goussard and T. N. Liversedge (10 Apr 1967).

Habitat: "Set up camp under the few remaining large acacia trees (the rest have been destroyed by the 'Tsetse Fly Control Project'). This area is predominantly tree savanna . . . mealy field . . . corn field . . . Habitat is thick bush with grass" (HJH).

Remarks: During the evening of 30 Mar 1965, the team went night hunting, and Davis remarked that "all but the mongoose and spring hare were collected on the aerodrome." On 2 Apr, they retrieved and preserved a *Graphiurus* that had just been killed in camp by a black mamba (which was also collected). Several *Chlorocebus* and a *Xerus* were taken 8 mi [12.9 km] north of camp; all were cataloged and labeled as originating from Nokaneng. En route to **Sepopa** (12–23 Apr 1967) from Foley Siding, Liversedge collected a *Cynictis* at this locality.

Taxa: *Chlorocebus*; *Xerus*, *Paraxerus*, *Graphiurus*, *Steatomys*, *Gerbilliscus*, *Mastomys*, *Micaelamys*, *Pedetes*, *Hystrix*; *Lepus*; *Crocidura*; *Chaerephon*; *Felis*, *Genetta*, *Cynictis*, *Proteles*, *Otocyon*; *Damaliscus*, *Raphicerus*, *Tragelaphus*, *Sylvicapra*.

**Nokaneng, 15 mi [24.1 km] N** (Map 17: 478).

Coordinates: 19°26'S, 22°13'E M (WAC, *Okovango River*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (16–25 Jun 1967).

Habitat: "Mixed grassland," "flood plain grassland" (specimen labels).

Remarks: The coordinates reflect a point found on the above map, appropriately positioned about 15 mi N Nokaneng and near the town of Massubia (19°25'S, 22°15'E G) on the Taokhe River. On 21 Jun, Liversedge collected a *Kobus* and a *Redunca* at 18 mi [29.0 km] NE Nokaneng. On that same day and the next, Goussard collected at 25 mi [40.3 km] NE Nokaneng. He also collected a *Hystrix* from 8 mi [12.9 km] S Nokaneng on 22 Jun.

Taxa: *Orycteropus*; *Chlorocebus*; *Paraxerus*, *Dendromus*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Mus*, *Thalpomys*, *Otomys*, *Pedetes*, *Hystrix*; *Lepus*; *Crocidura*; *Chaerephon*, *Pipistrellus*, *Neoromicia*; *Felis*, *Genetta*, *Cynictis*, *Galerella*, *Paracynictis*, *Proteles*, *Otocyon*; *Phacochoerus*, *Sylvicapra*, *Kobus*, *Redunca*.

**Pink Pan.**

Coordinates: Not located.

Collector: T. N. Liversedge (12 Oct 1966).

Habitat: "Scrub" (specimen labels).

Remarks: Smithers (1971) recorded a Pinic Pan at 21 23 D3 (approximately 21°52'S, 23°38'E); however, Auerbach (1987) equated Pinic Pan to Pink Pan at 21 22 D3 (approximately 21°52'S, 22°38'E). Without the collector's field books, we cannot determine whether or which of these coordinates represents Liversedge's "Pink Pan."

Taxa: *Gerbilliscus*, *Gerbillurus*, *Mus*, *Pedetes*; *Canis*; *Connochaetes*, *Raphicerus*, *Sylvicapra*.

**Ramatlabama, 10 mi [16.1 km] W** (Map 17: 545).

Coordinates: 25°39'S, 25°25'E M (WAC, *Vaal River*, 1:1,000,000).

Collector: T. N. Liversedge (10–12 Jun 1966).

Habitat: "Open grasslands, few bushes," "low acacia bushes" (specimen labels).

Remarks: The map coordinates are based upon azimuth and range relative to Ramathlabama (25°39'S, 25°34' E M).

Taxa: *Elephantulus*; *Xerus*, *Malacothrix*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Rhabdomys*, *Pedetes*; *Cynictis*.

**Ramatlabama, 18 mi** [29.0 km] W (Map 17: 546).

Coordinates: 25°39'S, 25°17'E M (WAC, *Vaal River*, 1:1,000,000).

Collector: T. N. Liversedge (12 Jun 1966).

Habitat: No information available.

Taxon: *Cynictis*.

**Sehitwa, 5 mi** [8.0 km] NW (Map 17: 482).

Coordinates: 20°22'S, 22°41'E M (WAC, *Kalahari*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (13 Jul 1967).

Habitat: "Grassland" (specimen label).

Taxon: *Antidorcas*.

**Sehitwa, 10 mi** [16.1 km] SW (Map 17: 484).

Coordinates: 20°33'S, 22°40'E M (WAC, *Kalahari*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (5–12 Mar 1965); R. M. Davis (18 Mar 1965).

Habitat: "Scattered acacia bushes and there are no grasses as they have been grazed away by cattle, donkeys, etc. In some areas there is no vegetation at all but very small clumps of dried up grasses here and there" (RMD). "Low bush (thorn acacia) very flat black soil with scattered patches of sand. It appears to be a grazing land for many cattle . . . open savanna area" (HJH).

Remarks: Informed of a borehole with a large holding tank, the team headed southwest of Sehitwa on the Ghanzi road and camped there. On 18 Mar, while driving between **Mabele a Pudi** and **Tsau**, Davis collected an *Antidorcas* here. Our map-interpreted coordinates are based upon a by-road distance, following a track that leads southwest from Sehitwa.

Taxa: *Elephantulus*; *Xerus*, *Saccostomus*, *Gerbilliscus*, *Mastomys*, *Rhabdomys*, *Pedetes*; *Scotophilus*, *Neoromicia*; *Felis*, *Cynictis*, *Paracynictis*, *Proteles*, *Canis*, *Vulpes*, *Ictonyx*; *Antidorcas*, *Raphicerus*.

**Sekhuma Pan** (Map 17: 549).

Coordinates: 24°40'S, 23°51'E G (as Sekoma Pan).

Collector: T. N. Liversedge (19–21 Jun 1966).

Habitat: "Bushes, scant grass," "scattered bushes," "pan fringe," "scattered acacia bushes" (specimen labels).

Remarks: The USBGN coordinates agree favorably with the quarter-degree units for Sekuma Pan (24 23 D2) listed in Smithers (1971).

Taxa: *Elephantulus*; *Xerus*, *Gerbillurus*, *Mus*; *Cynictis*.

**Sepopa** (Map 17: 471).

Coordinates: 18°45'S, 22°09'E M (ITM, *Botswana*, 1:1,500,000).

Collectors: S. W. Goussard and T. N. Liversedge (12–23 Apr 1967).

Habitat: "Open bush," "acacia forest" (specimen labels).

Remarks: No USBGN entry occurs for Sepopa, but we discovered a "Sepupa" on the above map and used it to formulate our coordinates. The quarter-degree placement of Sepopa in Smithers (1971; 18 22 C1) and Leistner and Morris (1976; 18 22 CC) generally agrees with our map estimation. Furthermore, Sepopa is indicated on Smithers's blue-lined map at approximately 18°45'S, 22°12'E ("Bechuanaland Protectorate and The Caprivi Strip"). In his field catalog, Liversedge added "Okavango River" as a locality modifier but did not record this on his specimen labels.

Taxa: *Galago*, *Chlorocebus*; *Paraxerus*, *Graphiurus*, *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Pelomys*, *Thallomys*, *Pedetes*, *Cryptomys*; *Lepus*; *Crocidura*; *Epomophorus*, *Nycteris*, *Neoromicia*, *Kerivoula*; *Felis*, *Mellivora*; *Tragelaphus*.

**Sequane, Marico River** (Map 17: 541).

Coordinates: 24°38'S, 26°24'E P (Borello and Borello, 1997).

Collector: T. N. Liversedge (4–8 Jun 1966).

Habitat: "Acacia near old fields," "bare ground, acacia bushes," "rock clusters," "riverine bush" (specimen labels).

Remarks: Although Sequane does not appear in the USBGN, Smithers (1971) recorded a Sequane (Sikwane) at 24 26 C2, which extrapolates to 24°38'S, 26°22'E. A Sikwane also appears on the Marico River on a large-scale topographic map (ITM, *Botswana*, 1:1,500,000) at approximately 24°36'S, 26°22'E. Liversedge also collected at the following localities (and dates) in the vicinity of Sequane: 5 mi [8.0 km] W (6–8 Jun), 14 mi [22.5 km] W and 10 mi [16.1 km] W (6 Jun), and 9 mi [14.5 km] W and 18 mi [29.0 km] W (7 Jun).

Taxa: *Elephantulus*; *Galago*; *Paraxerus*, *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*, *Pedetes*; *Lepus*; *Atelerix*; *Crocidura*; *Genetta*, *Galerella*; *Raphicerus*.

**Seronga** (Map 17: 472).

Coordinates: 18°48'S, 22°24'E M (Smithers, *Bechuanaland Protectorate and the Caprivi Strip*).

Collectors: S. W. Goussard and T. N. Liversedge (29 Jun–1 Jul 1967).

Habitat: “River bank,” “riverine bush,” “open bush,” “riverine trees,” “open bush, loose white sand,” “river bank grass” (specimen labels).

Remarks: While not gazetted in the USBGN, Smithers (1971) placed Seronga at 18 22 C4 (interpolated to 18°52'S, 22°22'E), and we derived coordinates from his blue-lined map, which depicts Seronga on the Bonga River.

Taxa: *Elephantulus*; *Paraxerus*, *Graphiurus*, *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Dasymys*, *Mastomys*, *Mus*, *Thallomys*, *Cryptomys*; *Lepus*; *Crocidura*; *Sylvicapra*.

**Serowe, 18 mi [29.0 km] NW** (Map 17: 530).

Coordinates: 22°17'S, 26°27'E M (WAC, *Bulawayo*, 1:1,000,000).

Collector: T. N. Liversedge (3–7 Jun 1968).

Habitat: “Large pan in scrub country . . . the country fringing the grassed pan is mainly *Grervia-Terminalia* [sic] scrub on heavy sand with a thin grass cover. There are a few acacia trees and bushes dotted about.”

Remarks: The coordinates are based on a road distance. On 7 Jun, Liversedge collected a *Paraxerus* at 12 mi [19.3 km] NW Serowe.

Taxa: *Paraxerus*, *Gerbilliscus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Zelotomys*, *Pedetes*, *Cryptomys*; *Cynictis*, *Suricata*; *Raphicerus*.

**Seruli, 9 mi [14.5 km] W** (Map 17: 529).

Coordinates: 21°57'S, 27°05'E M (WAC, *Bulawayo*, 1:1,000,000).

Collector: T. N. Liversedge (29 May 1968).

Habitat: “Mopane” (specimen labels).

Remarks: While camped at **45 mi SW Francistown** (23 May–1 Jun), Liversedge collected two *Paraxerus* at this locality. In his catalog, he indicated the site as northwest of Seruli Siding (21°57'S, 27°14'E G), although this information is not contained on specimen labels.

Taxon: *Paraxerus*.

**Seruli, 16 mi [25.7 km] W** (Map 17: 528).

Coordinates: 21°56'S, 26°58'E M (WAC, *Bulawayo*, 1:1,000,000).

Collector: T. N. Liversedge (9–11 Jun 1968).

Habitat: “A small pan (Lebu) in a strip of sandy *Acacia* veld between belts of mopane . . . fringing bush . . . scrub bush too thick for night hunting.”

Remarks: Liversedge slightly amended the locality in his field catalog as “16 miles west Seruli Siding (Lebu Pan).” We could not locate a Lebu Pan and so estimated the cited coordinates relative to Seruli.

Taxa: *Paraxerus*, *Saccostomus*, *Gerbilliscus*, *Gerbillurus*, *Mastomys*, *Micaelamys*; *Genetta*.

**Shakawe** (Map 17: 469).

Coordinates: 18°22'S, 21°51'E G.

Collectors: S. W. Goussard and T. N. Liversedge (4–11, 16–18 May, 3 Jun, 5 Jul 1967).

Habitat: “Open grassland,” “cultivated fields” (specimen labels).

Remarks: The USBGN coordinates closely concur with those (18°23'S, 21°53'E) estimated for Shakawe as found on the west bank of the Okavango River on available maps (ITM, *Botswana*, 1:1,500,000; “Bechuanaland Protectorate and the Caprivi Strip”). On the way to **Drotsky's Caves** on 3 Jun, Liversedge collected a *Hydrichtis* on the “[Okavango] river's edge” (specimen label) at Shakawe. Goussard obtained a *Felis* on 5 Jul at this locality.

Taxa: *Elephantulus*; *Galago*; *Paraxerus*, *Graphiurus*, *Saccostomus*, *Dendromus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Mus*, *Pelomys*, *Thallomys*, *Pedetes*, *Cryptomys*; *Lepus*; *Crocidura*; *Epomophorus*, *Neoromicia*, *Kerivoula*; *Felis*, *Hydrichtis*, *Ictonyx*.

**Shakawe, 7 mi [11.3 km] N** (Map 17: 468).

Coordinates: 18°16'S, 21°47'E M (WAC, *Okovango River*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (3 Jul 1967).

Habitat: “Grassy river edge,” “thick grass, river edge,” “open bush,” “open riverine bush” (specimen labels).

Remarks: The distance plotted from Shakawe, northwest along the Okavango River, approximately places the collecting site at Sehengo (Sehengos; 18°16'S, 21°47'E G). Liversedge expanded the locality as “East bank Okavango River” in his field catalog but not on his field tags.

Taxa: *Gerbilliscus*, *Mastomys*, *Mus*, *Cryptomys*.

**Shakawe, 50 mi [80.5 km] W, 12 mi [19.3 km] S** (Map 17: 466).

Coordinates: 18°32'S, 21°05'E M (WAC, *Okovango River*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (22 May–1 Jun 1967).

Habitat: “Dry river bed, grasslands,” “short grass few bushes,” “woodland” (specimen labels).

Remarks: The reference to “dry river bed” on specimen labels may refer to the Khaudum Omuramba found near this locality (WAC, *Okovango River*, 1:1,000,000). Coordinates were estimated by plotting the USBGN coordinates for Shakawe onto the cited WAC sheet

(Shakawe is not portrayed) and laying out the cited distances.

Taxa: *Galago*, *Chlorocebus*; *Paraxerus*, *Dendromus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Mus*, *Otomys*, *Pedetes*; *Lepus*; *Crocidura*; *Chaerephon*, *Tadarida*, *Nycticeinops*, *Scotophilus*, *Laephotis*, *Neoromicia*; *Caracal*, *Canis*, *Otocyon*; *Raphicerus*, *Sylvicapra*, *Redunca*.

**Shakawe, 56 mi [90.1 km] W, 28 mi [45.1 km] S**  
(Map 17: 467).

Coordinates: 18°47'S, 21°01'E M (WAC, *Okovango River*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (4 Jun 1967).

Habitat: "Open woodland" (specimen label).

Remarks: A *Damaliscus* was collected during travel to **Drotsky's Caves**. The direction and distance west and south of Shakawe position their locality along the border between Botswana and Namibia.

Taxon: *Damaliscus*.

**Shorobe** (Map 17: 495).

Coordinates: 19°45'S, 23°40'E P (Borello and Borello, 1997).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (15–21 Feb 1965).

Habitat: "Our camp is in said [mopane] forest . . . mealy field. . ." (HJH).

Remarks: Native peoples significantly enhanced collecting success at Shorobe and contributed many mammals and "lots of snakes." On 19 Feb, Davis and Herbert drove 50 mi [80.5 km] north of camp (55 mi [88.5 km] according to Herbert) to hunt in the **Kwaai River Area**.

Taxa: *Galago*, *Chlorocebus*, *Papio*; *Paraxerus*, *Steatomys*, *Gerbilliscus*, *Mastomys*, *Mus*, *Pedetes*, *Cryptomys*; *Lepus*; *Genetta*, *Paracynictis*.

**Takatokwane, 15 mi [24.1 km] SW** (Map 17: 536).

Coordinates: 24°12'S, 24°02'E M (WAC, *Molopo River*, 1:1,000,000).

Collector: T. N. Liversedge (4 May 1966).

Habitat: "Red sand" (specimen label).

Remarks: While at **20 mi SW Takatokwane** (1–5 May), Liversedge made a trip to this pan on 4 May. Liversedge also mentioned Korwe Pan (Bore Hole) in his field catalog for this locality, but this modifier does not appear on specimen labels. USBGN coordinates for Korwe Pan (25°24'S, 25°27'E) suggest that they

represent another Korwe Pan or that Liversedge misapplied this name.

Taxa: *Elephantulus*; *Cryptomys*; *Cynictis*.

**Takatokwane, 20 mi [32.2 km] SW** (Map 17: 537).

Coordinates: 24°15'S, 23°57'E M (WAC, *Molopo River*, 1:1,000,000).

Collector: T. N. Liversedge (1–5 May 1966).

Habitat: "Pan fringe" (specimen labels).

Remarks: Liversedge amplified this locality in his field catalog as "Kutswe Pan (borehole and cattle post)," a modification that does not appear on specimen labels. The entry for Kutswe Pan (24 24 A3; about 24°23'S, 24°08'E) in Smithers' (1971) gazetteer approximates our estimate, which we extrapolated by applying the USBGN coordinates for Takatokwane (24°02'S, 24°10'E) on the WAC map and laying out a southwest azimuth and range.

Taxa: *Xerus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Pedetes*, *Cryptomys*; *Lepus*; *Antidorcas*, *Raphicerus*.

**Tamafupi** (Map 17: 503).

Coordinates: 19°20'S, 26°05'E M (WAC, *Livingstone*, 1:1,000,000).

Collector: T. N. Liversedge (2–5 Sep 1966).

Habitat: "Pan fringe," "acacia, grass" (specimen labels).

Remarks: Although specimens are labeled as Tamafupi, Liversedge described this locality as Tamafupi Game Camp in his field catalog. Our coordinates correspond to "Tamafupa Pan," a place found on the WAC series just inside the Botswana-Zimbabwe border. Smithers' (1971) quarter-degree placement for Tamafupi (19 26 A3) reasonably agrees with our interpretation. On 4 Sep, Liversedge collected a *Gerbillurus* on the Pandamatenga Road.

Taxa: *Paraxerus*, *Saccostomus*, *Dendromus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Mus*, *Pedetes*, *Cryptomys*; *Lepus*; *Mops*, *Scotophilus*, *Neoromicia*; *Felis*, *Genetta*, *Helogale*; *Phacochoerus*, *Hippotragus*.

**Toten**, Ngamiland (Map 17: 490).

Coordinates: 20°23'S, 22°57'E G (as Toteng).

Collectors: R. D. Hepplewhite and T. N. Liversedge (7–9 Feb 1966).

Habitat: "Thorn veld" (specimen labels).

Taxa: *Galago*; *Xerus*, *Paraxerus*, *Saccostomus*, *Gerbilliscus*, *Pedetes*; *Neoromicia*; *Paracynictis*, *Canis*.

**Tsane, 25 mi [40.2 km] ENE** (Map 17: 516).

Coordinates: 23°54'S, 22°18'E M (WAC, *Molopo River*, 1:1,000,000).



Collector: T. N. Liversedge (29 Jan–5 Feb 1967).

Habitat: “Pan fringe” (specimen labels).

Remarks: The distance and direction relative to Tsane (24°05'S, 21°54'E G) would position this locality as close to, if not at, Kangyane Pan (23°56'S, 22°19'E G).

Taxa: *Elephantulus*; *Xerus*, *Saccostomus*, *Malacothrix*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Mus*, *Pedetes*, *Cryptomys*; *Lepus*; *Neoromicia*; *Suricata*, *Crocuta*, *Hyaena*, *Otocyon*; *Antidorcas*.

**Tsau**, Ngamiland (Map 17: 480).

Coordinates: 20°09'S, 22°27'E G.

Collectors: R. M. Davis, A. R. Hardy, and H. J. Herbert (18–28 Mar 1965).

Habitat: “Thorn fence protecting a native field. The habitat is mostly heavy sand, bush and large trees” (HJH).

Remarks: The AMP crew camped next to the Tsau police station.

Taxa: *Elephantulus*; *Galago*; *Xerus*, *Paraxerus*, *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Mastomys*, *Pedetes*; *Lepus*; *Chaerephon*; *Genetta*, *Cynictis*, *Helogale*, *Mungos*, *Canis*, *Otocyon*, *Ictonyx*; *Phacochoerus*, *Aepyceros*, *Raphicerus*, *Sylvicapra*.

**Tsau, 8 mi** [12.9 km] SE (Map 17: 481).

Coordinates: 20°15'S, 22°33'E M (WAC, *Kalahari*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (23 Jun 1967).

Habitat: “Acacia woodland” (specimen label).

Remarks: Liversedge collected two *Lycaon* at this locality while working at **15 mi N Nokaneng** (16–25 Jun).

Taxon: *Lycaon*.

**Tsau, 21 mi** [33.8 km] SE (Map 17: 486).

Coordinates: 20°22'S, 22°41'E M (WAC, *Kalahari*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (22 Jun 1967).

Habitat: “Woodland and grass” (specimen label).

Remarks: Goussard collected an *Aepyceros* at this locality while camped at **15 mi N Nokaneng** (16–25 Jun).

Taxon: *Aepyceros*.

**Tsau, 26 mi** [41.8 km] SE (Map 17: 487).

Coordinates: 20°25'S, 22°45'E M (WAC, *Kalahari*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (21 Jun 1967).

Habitat: “Acacia woodland” (specimen label).

Remarks: Liversedge collected a *Hystrix* here while camped at **15 mi N Nokaneng** (16–25 Jun).

Taxon: *Hystrix*.

**Tsaugara Pan** (Map 17: 504).

Coordinates: 19°57'S, 25°14'E G.

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (7–12 Jan 1965).

Habitat: “Tree and bush savanna with good grass covering. The pan is full of sedges and the water is stagnant and has dead bird bodies floating in it. The soil is primarily sand” (HJH).

Remarks: Davis noted that the distance to the main road from the pan was “about 7.5 miles [12.1 km]” and from that turn to Francistown was another 192 mi [309 km].

Taxa: *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Gerbillurus*, *Mastomys*, *Mus*, *Pedetes*, *Cryptomys*; *Lepus*; *Canis*; *Raphicerus*, *Sylvicapra*.

**Tsodilo Hills** (Map 17: 470).

Coordinates: 18°45'S, 21°46'E G.

Collectors: S. W. Goussard and T. N. Liversedge (26 Apr–1 May, 15 May 1967).

Habitat: “Parklands, acacia,” “bush fence,” “trees, thick undergrowth,” “thick grass,” “thick grass, hill’s base,” “mixed woodland,” “bush, hillside,” “grass, bushes” (specimen labels).

Remarks: On 15 May, while based at **Shakawe** (16–18 May), Goussard collected a *Sylvicapra* and a *Chlorocebus* at Tsodilo Hills.

Taxa: *Elephantulus*; *Galago*, *Chlorocebus*; *Paraxerus*, *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*, *Thallomys*, *Pedetes*; *Lepus*; *Crocidura*; *Tadarida*; *Felis*, *Genetta*, *Mungos*; *Raphicerus*, *Tragelaphus*, *Sylvicapra*.

**Vloorskop** (Map 17: 552).

Coordinates: 25°52'S, 20°52'E P.

Collector: T. N. Liversedge (16–21 Feb 1967).

Habitat: “Open scrub, river bed,” “grass and scrub river bed,” “scrub, hillside,” “scrub, dune side,” “acacia trees,” and “dead trees, riverbed” (specimen labels).

Remarks: In his field catalog, Liversedge noted this locality as being “60 miles [96.6 km] up the Nossop from Twee Rivieren [South Africa],” a locality modifier not found on specimen labels. Minutes were interpolated from Smithers’ (1971) quarter-degree figures (25 20 D4).

Taxa: *Elephantulus*; *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Mus*, *Rhabdomys*, *Thallomys*, *Zelotomys*, *Parotomys*, *Pedetes*; *Neoromicia*; *Canis*, *Otocyon*, *Vulpes*.

**Xade Pan, 4 mi [6.4 km] E** (Map 17: 518).

Coordinates: 22°20'S, 23°00'E M (ITM, Botswana, 1:1,500,000).

Collector: T. N. Liversedge (14 Oct 1966).

Habitat: "Pan fringe" (specimen labels).

Remarks: Our by-road estimate from the Xade that appears on the ITM map roughly concurs with Smithers' (1971) location of Xade Pan (22 23 A3 ≈ 22°22'S, 23°08'E).

Taxa: *Graphiurus*, *Saccostomus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*; *Lepus*; *Crocidura*; *Lycaon*, *Otocyon*.

**Zelu, 3 mi [4.8 km] W** (Map 17: 532).

Coordinates: 21°52'S, 28°52'E P (for Zelu Hill; see Remarks).

Collector: T. N. Liversedge (15–20 Apr 1966).

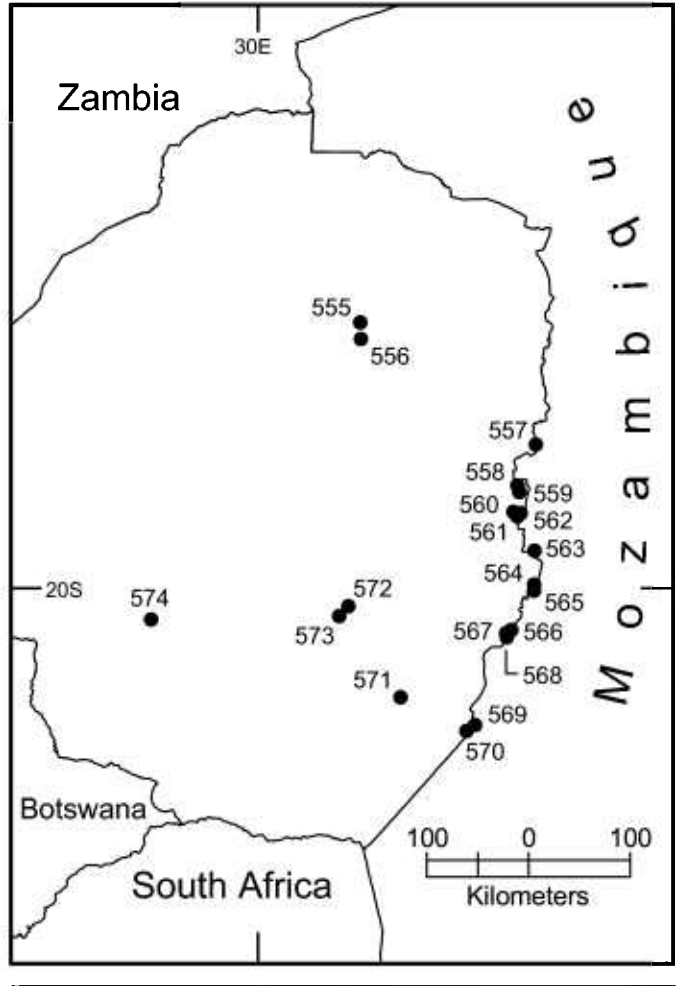
Habitat: "Acacia," "acacia bushes," "rocky hill," "rocks" (specimen labels).

Remarks: Only "3 miles W Zelu" appears on Liversedge's specimen tags, but he formulated the locality either as "3 miles west of Zelu, Shashi River" or "3 miles west of Zelu Hill, Shashi River" in his field catalog. We derived our coordinates as a centroid for the quarter-degree rectangle from Smithers (1971) for Zelu Hill (21 28 D4), which is situated near the Shashi River.

Taxa: *Procapra*; *Galago*, *Chlorocebus*; *Paraxerus*, *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Micaelamys*, *Pedetes*; *Lepus*; *Scotophilus*; *Felis*; *Sylvicapra*.

#### ZIMBABWE (SOUTHERN RHODESIA)

**GENERAL REMARKS.** The country name was recorded on specimen tags either as "So. Rhodesia" (A. C. Risser, Sep–Oct 1963) or simply "Rhodesia" (S. W. Gousard, Sep 1967 to Jan 1968). The name Zimbabwe was adopted once the country achieved full nationhood (Apr 1980). Dr. Reay H. N. Smithers again assisted field operations of AMP teams, whose collecting activities were concentrated in eastern Zimbabwe, near the border with Mozambique (Map 18). Many field numbers are initialed with "NMR," identifying those specimens left with Smithers to be deposited in the National Museum of Rhodesia at Bulawayo. Other specimens from Southern Rhodesia were donated to the NMNH Mammal Division in the early 1960s, presumably through the auspices of Smithers; however, these are relatively few in number and lack accompanying field catalogs or journals, and we regard them as non-AMP. Entries to field journals are sometimes incomplete in regard to routes traveled, such that some itineraries and locality dates were reconstructed from specimen tags and field catalogs.



**MAP 18.** African Mammal Project cardinal collecting localities 555–574 in Zimbabwe (Southern Rhodesia).

- 555. Henderson Research Station
- 556. Thorn Park
- 557. Nyamkwarara River
- 558. Manchester Gardens
- 559. Leopard Rock Hotel
- 560. Helvetia Farm
- 561. Chetora B Farm
- 562. Banti Reserve South
- 563. Dunblaine
- 564. Hayfield B Farm
- 565. Ngorima Reserve (East)
- 566. Farfell Farm
- 567. Mount Selinda
- 568. Chirinda Forest
- 569. Sabi-Lundi Confluence
- 570. Marhumbini
- 571. Buffalo Range Game Ranch
- 572. Kyle Game Reserve
- 573. Zimbabwe Ruins
- 574. Essexvale Ranch

ITINERARIES. A. C. Risser (R. E. Cole 20–28 Sep 1963; H. W. Setzer 20–23 Sep 1963): **Buffalo Range Game Ranch**, 20–23 Sep 1963; **Thorn Park**, 26 Sep–20 Oct 1963.

S. W. Goussard (A. V. W. Lambrechts 22–28 Jan 1968; T. N. Liversedge 13–28 Jan 1968; H. W. Setzer 19 Sep–11 Oct 1967): **Manchester Gardens**, 19–22 Sep 1967; **Leopard Rock Hotel**, 20 Sep 1967; **Chirinda Forest**, 24 Sep–5 Oct 1967; **Mount Selinda**, 3–4 Oct 1967; **Farfell Farm**, 4–5 Oct 1967; **Henderson Research Station**, 8–18 Oct 1967; **Nyamkwarara River**, 1–6 Nov 1967; **Banti Reserve South**, 7–12 Nov 1967; **Chetora B Farm**, 10–12 Nov 1967; **Helvetia Farm**, 10–12 Nov 1967; **Dunblaine**, 13–19 Nov 1967; **Ngorima Reserve (East)**, 21 Nov–1 Dec 1967; **Hayfield B Farm**, 1 Dec 1967; **Kyle Game Reserve**, 6–17 Dec 1967; **Zimbabwe Ruins**, 17–19 Dec 1967; **Marhumbini**, 11 Jan 1968; **Sabi-Lundi Confluence**, 13–18 Jan 1968; **Essexvale Ranch**, 22–28 Jan 1968.

**Banti Reserve South**, Umtali District, Manicaland (Map 18: 562).

Coordinates: 19°20'S, 32°48'E G (as Banti South).  
Collector: S. W. Goussard (7–12 Nov 1967).

Habitat: “Grassy hillside . . . reeds close to the stream . . . along the stream in reeds and grass . . . in scrub on the hillside . . . open grassland at the foot of the hills.”

Remarks: In his field journal, Goussard noted that he camped next to a stream in the Banti Reserve South at an elevation of approximately 5,100 feet [1,555 m]. His field catalog indicates “Banti Forest Reserve South” for this locality.

Taxa: *Dasymys*, *Grammomys*, *Mastomys*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Lepus*; *Crocidura*, *Myosorex*.

**Buffalo Range Game Ranch**, 10 mi [16.1 km] E Triangle (Map 18: 571).

Coordinates: 21°01'S, 31°37'E G (as Buffalo Range Farm).  
Collectors: R. E. Cole, A. C. Risser, and H. W. Setzer (20–23 Sep 1963).

Habitat: “Along the river . . . grassy—slightly rocky area adjacent to the visitor’s quarters . . . native kraals” (ACR). “Rock and tall grass habitat . . . native huts” (REC).

Remarks: Risser used the full name Buffalo Range Game Ranch on his field tags, but Cole and Setzer abbreviated the locality designation to “Buffalo Range” on their labels. Cole reckoned the game ranch as 30 mi [48.3 km] east of Triangle (21°02'S, 31°27'E G) in his field journal; however, specimen labels and field catalogs of all three collectors uniformly indicate 10 mi E Triangle. The team collected along the Chiredzi River

with the assistance of the foreman and chief hunter, Larry Roberts. Some specimens collected here were deposited at the National Museum of Rhodesia.

Taxa: *Heterohyrax*; *Saccostomus*, *Acomys*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*; *Panthera*, *Genetta*, *Galerella*; *Raphicerus*, *Sylvicapra*.

**Chetora B Farm**, Umtali District, Manicaland (Map 18: 561).

Coordinates: 19°21'S, 32°46'E G (as Chetora Farm).  
Collector: S. W. Goussard (10–12 Nov 1967).

Habitat: “Rocks in *Brachystegia* woodland . . . swampy area full of reeds and grass.”

Remarks: Goussard collected at this farm while camped at **Banti Reserve South** (7–12 Nov). An elevation of approximately 4,000 feet [1,219 m] is given in his journal.

Taxa: *Otolemur*; *Micaelamys*; *Genetta*; *Tragelaphus*, *Sylvicapra*.

**Chirinda Forest**, Manicaland (Map 18: 568).

Coordinates: 20°26'S, 32°42'E G (as Chirinda Forest Area).

Collectors: S. W. Goussard and H. W. Setzer (24 Sep–5 Oct 1967).

Habitat: “Cloud forest,” “grassy hillside” (specimen labels).

Remarks: In a letter to his family, Setzer described the trees in Chirinda Forest as being “over 150 feet [45.7 m] high” and indicated that the forest had “many air plants, orchids, lichens and other parasitic plants.” He also observed that he had never seen so many monkeys.

Taxa: *Petrodromus*; *Otolemur*, *Cercopithecus*; *Cricetomys*, *Dendromus*, *Acomys*, *Aethomys*, *Grammomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Crocidura*, *Myosorex*; *Epomophorus*, *Nycteris*, *Neoromicia*.

**Dunblaine**, Martin Forest Reserve, Melsetter District, Manicaland (Map 18: 563).

Coordinates: 19°41'S, 32°58'E C (19°42'S, 32°58'E G).  
Collector: S. W. Goussard (13–19 Nov 1967).

Habitat: “Grassy hillside. The grass is actually very short with a few patches of tall grass and little bits of forest in the ravines. It is also very dry around here . . . bananas.”

Remarks: Goussard set up camp at Dunblaine (Dunblane G), close to the Musapa River in the Martin Forest Reserve, at 4,300 feet [1,311 m] elevation (per his field journal). On the afternoon of 15 Nov, Goussard moved

his trapline to a valley about 2 mi [3.2 km] from camp, but this repositioning is not reflected on specimen labels. On the same day, he collected a *Rhinolophus* in a cave next to a waterfall. On 18 Nov, he moved traps to the Musapa River valley, setting the trapline in thick grass and reeds. Goussard visited the Comer Farm, about 3 mi [4.8 km] from camp, on 19 Nov and collected herps and a specimen of *Dendromus*, according to its specimen label (his field catalog indicates Dunblaine as the locality for this specimen, however). In spite of ranging considerably to sample productive habitats, he had little collecting success because the dry weather left most of the mountain streams dry.

Taxa: *Dendromus*, *Acomys*, *Mastomys*, *Micaelamys*, *Mus*, *Rhabdomys*; *Rhinolophus*, *Neoromicia*.

**Essexvale Ranch**, Matabeleland (Map 18: 574).

Coordinates: 20°18'S, 28°56'E G (as Essexvale).

Collectors: S. W. Goussard, A. V. W. Lambrechts, and T. N. Liversedge (22–28 Jan 1968).

Habitat: “Woodland, bare ground,” “grassland,” “savanna-grassland,” “grassland-bushes” (specimen labels).

Taxa: *Elephantulus*; *Orycteropus*; *Paraxerus*, *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Micaelamys*, *Otomys*; *Lepus*; *Crocidura*; *Neoromicia*; *Genetta*, *Ichneumia*, *Paracynictis*, *Canis*; *Sylvicapra*.

**Farfell Farm**, 3 mi [4.8 km] NE Mount Selinda, Manicaland (Map 18: 566).

Coordinates: 20°24'S, 32°46'E G.

Collectors: S. W. Goussard and H. W. Setzer (4–5 Oct 1967).

Habitat: “Grassy hillside,” “grassland” (specimen labels).

Remarks: The team collected at Farfell Farm during the same period that they worked **Chirinda Forest** (24 Sep–5 Oct) and **Mount Selinda** (3–4 Oct). The locality on Goussard’s specimen labels is truncated to “Farfell Farm, Mount Selinda.”

Taxa: *Acomys*, *Aethomys*, *Grammomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Cryptomys*; *Crocidura*; *Genetta*.

**Hayfield B Farm**, Melsetter District, Manicaland (Map 18: 564).

Coordinates: 19°59'S, 32°59'E G.

Collector: S. W. Goussard (1 Dec 1967).

Habitat: “Grassland . . . grassy hillside.”

Remarks: Goussard collected at this farm “up the mountain” from **Ngorima Reserve (East)**.

Taxa: *Acomys*, *Mastomys*; *Crocidura*.

**Helvetia Farm**, Umtali District, Manicaland (Map 18: 560).

Coordinates: 19°19'S, 32°43'E G.

Collector: S. W. Goussard (10–12 Nov 1967).

Habitat: “Cultivated land . . . grassland . . . near rocks.”

Remarks: This farm, elevation 3,700 feet [1,128 m] (field journal), was located about 7 mi [11.3 km] from Goussard’s main camp at **Banti Reserve South** (7–12 Nov).

Taxa: *Otolemur*; *Acomys*, *Gerbilliscus*, *Mastomys*; *Lepus*; *Sylvicapra*.

**Henderson Research Station**, 20 mi [32.2 km] N Salisbury, Mashonaland (Map 18: 555).

Coordinates: 17°34'S, 31°00'E M (WAC, *Mazoe River*, 1:1,000,000).

Collectors: S. W. Goussard and H. W. Setzer (8–18 Oct 1967).

Habitat: “Bush savanna,” “open savanna,” “riverine bush” (specimen labels).

Remarks: The coordinates provided are a by-road estimate, tracing the road that leads north from Salisbury (Harare G) to a location on the south end of a small lake. The field site falls close to Mazoe Dam (17°32'S, 31°00'E G), located on the Mazoe River according to the FAO.

Taxa: *Elephantulus*; *Saccostomus*, *Dendromus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Micaelamys*, *Mus*, *Pelomys*, *Rattus*, *Rhabdomys*, *Otomys*, *Thryonomys*; *Lepus*; *Crocidura*; *Epomophorus*, *Rhinolophus*; *Galerella*.

**Kyle Game Reserve**, Fort Victoria District, Victoria (Map 18: 572).

Coordinates: 20°11'S, 31°01'E G (as Kyle Dam National Park).

Collector: S. W. Goussard (7–17 Dec 1967).

Habitat: “The area is grassy and rocky . . . a grass and rocky kopje close to the lake . . . open grassland with a few bushes and trees scattered in between . . . grass, bushes and trees . . . grassy vlei close to the lake . . . dry creek with grass and a few reeds . . . grassland close to fairly thick forest-like trees.”

Remarks: Goussard established camp close to the lake in the Kyle Game Reserve. In his journal, he indicated that his location was about 22 mi [35.4 km] NW Fort Victoria, but the USBGN coordinates for Kyle Dam National Park actually plot 15 mi [24.1 km] SE Fort Victoria (WAC, *Bulawayo*, 1:1,000,000).

Taxa: *Elephantulus*; *Steatomys*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Otomys*; *Crocidura*; *Nycteris*.

**Leopard Rock Hotel**, Manicaland (Map 18: 559).

Coordinates: 19°08'S, 32°47'E G.

Collector: H. W. Setzer (20 Sep 1967).

Habitat: No information available.

Remarks: This locality was presumably visited while collecting at **Manchester Gardens** (19–22 Sep).Taxa: *Rhinolophus*, *Neoromicia*.**Manchester Gardens**, Vumba National Park, Manicaland (Map 18: 558).

Coordinates: 19°05'S, 32°45'E G (for Vumba National Park; see Remarks).

Collectors: S. W. Goussard and H. W. Setzer (19–22 Sep 1967).

Habitat: "Cloud forest country" (HWS letter).

Remarks: The coordinates for Vumba National Park approximate those for Manchester Farm (19°06'S, 32°48'E G). In a letter to his family (20 Sep 1967), Setzer wrote that their elevation was "about 5,000 feet" [1,524 m] and that heavy fog enveloping the cloud forest burned off by 0900 hours.

Taxa: *Galago*, *Otolemur*, *Cercopithecus*; *Heliosciurus*, *Dendromus*, *Acomys*, *Grammomys*, *Mastomys*, *Mus*, *Rhabdomys*; *Lepus*, *Pronolagus*; *Crocidura*, *Myosorex*; *Rhinolophus*.**Marhumbini**, Gona-Rhe-Zhou, Victoria (Map 18: 570).

Coordinates: 21°20'S, 32°21'E G (as Marhumbini Mission).

Collector: S. W. Goussard (11 Jan 1968).

Habitat: "Woodland (Mopane)" (specimen labels).

Remarks: Coordinates for Gona-Re-Zhou Game Reserve (21°40'S, 31°45'E G) appreciably depart from those for Marhumbini Mission.

Taxa: *Otolemur*; *Genetta*; *Sylvicapra*.**Mount Selinda**, Manicaland (Map 18: 567).

Coordinates: 20°25'S, 32°42'E G (for Mount Selinda Mission; see Remarks).

Collectors: S. W. Goussard and H. W. Setzer (3–4 Oct 1967).

Habitat: "Grassy hillside," "cave" (specimen labels).

Remarks: In a letter to his family, Setzer noted that "Mt. Selinda is in the middle of the Chirinda Forest and is also the site of a large Congregational Mission." He indicated that their camp was situated about a mile [1.6 km] from a forest station where they got their water.

Taxa: *Aethomys*, *Mastomys*, *Rhabdomys*; *Crocidura*; *Hipposideros*, *Nycteris*.**Ngorima Reserve (East)**, Melsetter District, Manicaland (Map 18: 565).Coordinates: 20°02'S, 32°59'E M (WAC, *Limpopo River*, 1:1,000,000).

Collector: S. W. Goussard (21 Nov–1 Dec 1967).

Habitat: "Riverine forest, with thick undergrowth . . . riverine bush, consisting of reeds, grass, trees and bushes . . . no rocks for at least 1 mile [1.6 km] away from camp . . . cleared lands . . . local people have planted some corn."

Remarks: Camp was established in the eastern part of the Ngorima Reserve (20°05'S, 32°53'E G, as Ngorima Tribal Trust Land) on the Lusitu (Rusitu G) River, close to its confluence with the Haroni River and at an elevation of 1,100 feet [335 m] (field journal). In this region, the Lusitu River forms the border with Mozambique.

Taxa: *Petrodromus*; *Cercopithecus*; *Heliosciurus*, *Saccostomus*, *Dendromus*, *Acomys*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Pelomys*, *Rattus*; *Crocidura*, *Myosorex*; *Rhinolophus*, *Nycteris*, *Neoromicia*; *Nandinia*.**Nyamkwarara River**, Stapleford, Umtali District, Manicaland (Map 18: 557).Coordinates: 18°42'S, 32°55'E M (WAC, *Mazoe River*, 1:1,000,000).

Collector: S. W. Goussard (1–6 Nov 1967).

Habitat: "The habitat changes from bamboo, grass, reeds, open areas, loose stones, a few rocks, bushes and trees to heaps of chopped off bamboo. The Forestry [sic] is cleaning the area of all trees . . . in bamboo, grass, odd palm trees and reeds . . . hillside covered in grass, bushes and young saplings . . . next to the river."

Remarks: Goussard drove first to the Stapleford Research Station (5,500 ft [1,676 m]) and then continued down the mountain to the Nyamkwarara River, where camp was established at 2,200 ft [671 m]. Coordinates for the Nyamkwarara School (18°45'S, 32°53'E G) and Stapleford Forest (18°42'S, 32°53'E G) both plot above 3,000 ft [914.4 m] on the WAC sheet consulted, so our coordinates were estimated for a point below 3,000 ft and downstream from these localities.

Taxa: *Dendromus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Grammomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Cryptomys*; *Lepus*.**Sabi-Lundi Confluence**, Victoria (Map 18: 569).Coordinates: 21°17'S, 32°25'E M (WAC, *Limpopo River*, 1:1,000,000).

Collectors: S. W. Goussard and T. N. Liversedge (13–18 Jan 1968).

Habitat: “Riverine bush,” “grassy vlei,” “black vlei soil” (specimen labels).

Taxa: *Calcochloris*; *Otolemur*, *Chlorocebus*; *Paraxerus*, *Saccostomus*, *Steatomys*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Mus*, *Cryptomys*; *Lepus*; *Epomophorus*, *Hipposideros*, *Scotophilus*; *Sylvicapra*.

**Thorn Park**, Smithers Ranch, 6 mi [9.7 km] N Salisbury (Map 18: 556).

Coordinates: 17°43'S, 31°01'E G (as Thornpark).

Collectors: R. E. Cole (26–28 Sep 1963); A. C. Risser (26 Sep–20 Oct 1963).

Habitat: “Grassy field that was bordered by cedar trees on two sides.” (ACR).

Remarks: Cole and Risser established camp at Thorn Park, a ranch owned by Dr. Reay Smithers on the north edge of Salisbury (17°50'S, 31°03'E G, as Harare) at approximately 5,000 ft [1,524 m]. Here Risser was convalescing from an appendectomy, and much collecting was accomplished with the help of Smithers and his employees. Cole departed on 29 Sep and returned to field work in South Africa. Specimens from this locality were variously labeled by Risser as Salisbury, Thorn Park; Salisbury, Thorn Park, Smithers Ranch; and Salisbury, Thorn Park, 6 mi N Salisbury. Smithers collected a road-killed *Cricetomys* in front of the Salisbury General Hospital on 15 Oct that he gave to Risser. On 17 Oct, Risser collected a single specimen of *Rhabdomys* at Wheeler's Farm, Calgary, Mazoe Valley, about 4 miles [6.4 km] north of Smithers Ranch, in “tall grass and in the margin of the mealie fields.” Risser also collected at Gwebi River, 4 mi [6.4 km] N Salisbury on 17, 18, and 20 Oct. A *Lepus* was collected by Risser on 18 Oct at Komani Farm, 7 mi [11.3 km] N Salisbury.

Taxa: *Cricetomys*, *Dendromus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Rattus*, *Rhabdomys*; *Lepus*; *Crocidura*.

**Zimbabwe Ruins**, Fort Victoria District, Victoria (Map 18: 573).

Coordinates: 20°17'S, 30°56'E G.

Collector: S. W. Goussard (17–19 Dec 1967).

Habitat: “Grass, rocks and thick bush . . . forest, grassland and rocks.”

Remarks: Goussard set up camp on the camping ground of the ruins (referred to as the Zimbabwe Reserve in his field journal). A *Rhinolophus* was collected from a nearby cave.

Taxa: *Elephantulus*; *Dendromus*, *Steatomys*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*; *Crocidura*; *Rhinolophus*.

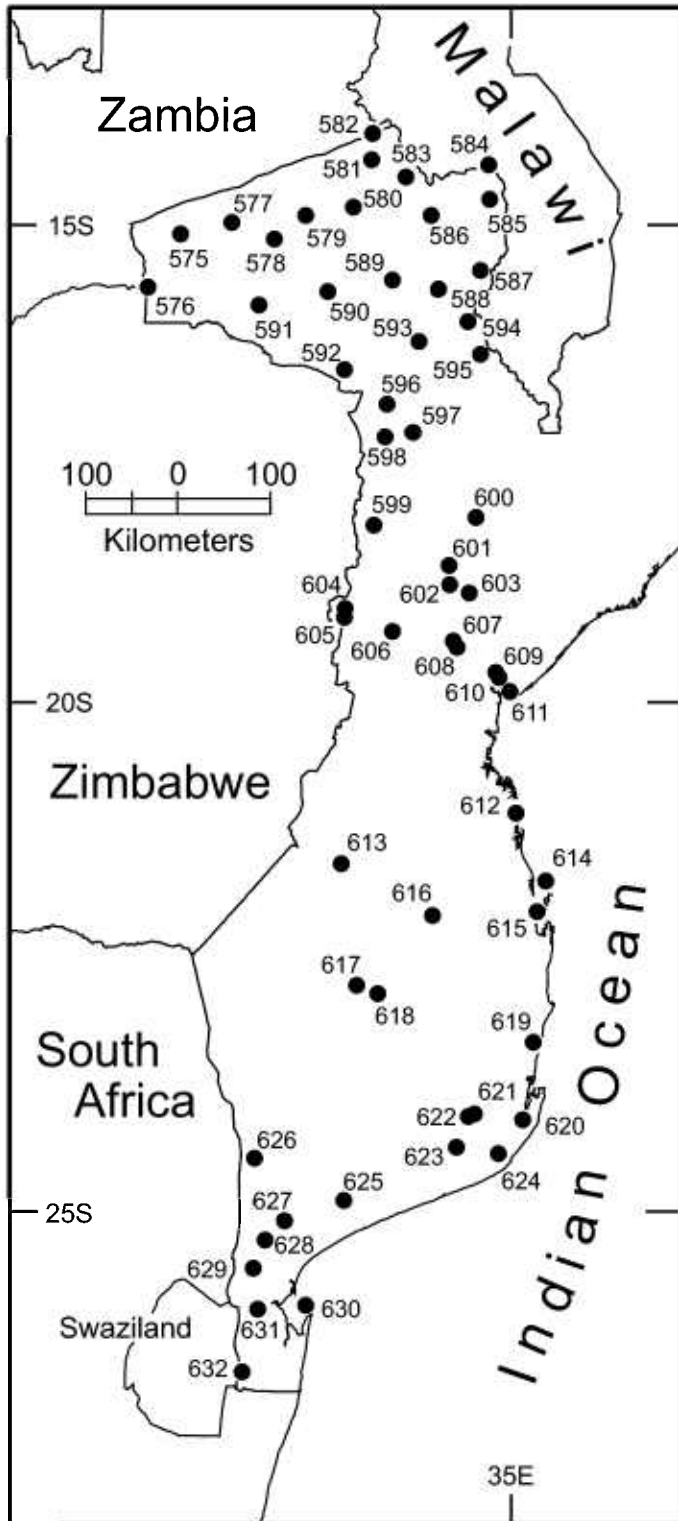
#### MOZAMBIQUE

**GENERAL REMARKS.** The extensive fieldwork in Mozambique (Map 19) was largely accomplished over an eight-month period (Jan–Apr and Jul–Nov 1964) by three teams of somewhat fluid membership. Alvin L. Moore is believed to have initially accompanied R. E. Cole (and subsequently others) as the team member responsible for collecting parasites from mammal specimens. Moore's participation is inferred from entries in his entomology field catalog (he did not maintain a journal to our knowledge, and entries in his field catalog are minimal) and from Cole's and Herbert's infrequent references to “Al” or “Alvin” in their respective field journals. The original team over the latter part of 1964 was a large one, composed of Davis, Hardy, Herbert, Lingebach, and Moore, but it was split into two independent teams after leaving the camp at 2 km N Vila Gamito: (1) Davis, Hardy, and Lingebach and (2) Herbert and Moore. There is scant reference to Lingebach (even less than to Moore), and we cannot be certain that he continually accompanied Davis and Hardy.

We extensively relied upon the *Atlas de Moçambique* (Empresa Moderna, 1960) to identify or corroborate localities in Mozambique. The worn condition of our copy of the atlas and the numerous inscriptions within it testify to extensive use in the field by the collectors. Discrepancy exists among journal entries, field catalog entries, and specimen labels in the use of the Beira District versus Manica and Sofala District, and either district name may be found on specimens from the same locality. This inconsistency appears to stem from differences and changes in these geopolitical terms as recognized on maps and in gazetteers (e.g., the USBGN does not recognize Beira District).

AMP field teams operating in Mozambique occasionally stayed at camps maintained by the Witwatersrand Native Labour Association (WENLA or WENELA, as used in the collectors' accounts). Associated with the South African Chamber of Mines, WENELA served as a labor-recruiting agency and established stations or camps in Mozambique as well as other southern African countries.

**ITINERARIES.** R. E. Cole and A. L. Moore: **1 mi NE Boane**, 11–12 Jan 1964; **Inhaca Island**, 16–19 Jan 1964; **Mahau River**, 22–25 Jan 1964; **Massangena**, 1–9 Feb 1964; **Chigubo Administrative Poste**, 11–12 Feb 1964; **30 km WNW Chigubo**, 13–15 Feb 1964; **Chigubo Administrative Poste**, 17–18 Feb 1964; **Chimonzo**, 21–28



MAP 19. African Mammal Project cardinal collecting localities 575–632 in Mozambique.

- 575. Zambuè
- 576. Zumbo
- 577. Mucanha River
- 578. Fingoè
- 579. Vila Vasco da Gama
- 580. New Bene (Tambuè)
- 581. Vila Gamito, 22 km S
- 582. Vila Gamito, 10 km N
- 583. Furancungo, 30 mi NNW
- 584. Bragança
- 585. Vila Coutinho
- 586. Furancungo, 10 km E
- 587. Vila Coutinho, 93 km S
- 588. Muchena
- 589. Chiúta
- 590. Chicoo, 14 mi ESE
- 591. Magüe (New) Borôma
- 592. Chiôco, 8 km SW
- 593. Tete, 2 mi SE
- 594. Vila Caldas Xavier
- 595. Mecito
- 596. Changara
- 597. Mungari, 5 km N
- 598. Changara, 33 km S
- 599. Vila Gouveia
- 600. Maringue
- 601. Gorongosa Mountain
- 602. Vila Paiva de Andrada, 4 km NE
- 603. Gorangoza Park
- 604. Vila de Manica, 3 km N
- 605. Vumba Mountain
- 606. Vila Pery
- 607. Vila Machado
- 608. Vila Machado, 3 km SE
- 609. Mezimbite
- 610. Dondo
- 611. Beira, 10 km N
- 612. Mombane
- 613. Massangena
- 614. Gangareme
- 615. Vilanculos, 2 km W
- 616. Mabote
- 617. Chigubo, 30 km WNW
- 618. Chigubo Administrative Poste
- 619. Massinga, 2 km N
- 620. Jangamo
- 621. Panda
- 622. Panda, 6 km W
- 623. Coguno
- 624. Inharrime, 3 km NE
- 625. Chimonzo
- 626. Mapulanguene, 8 km E
- 627. Magude, 15 km SW
- 628. Inyoka Mountains
- 629. Moamba
- 630. Inhaca Island
- 631. Boane, 1 mi NE
- 632. Mahau River

Feb 1964; 15 km SW Magude, 29 Feb–2 Mar 1964; Inyoka Mountains, 1 Mar 1964; 8 km E Mapulanguene, 3–5 Mar 1964; Moamba, 9–12 Mar 1964; Mombane, 22–24 Mar 1964; Mabote, 27–30 Mar 1964; 2 km W Vilanculos, 1–4 Apr 1964; 2 km N Massinga, 6–11 Apr 1964; Jangamo, 13–16 Apr 1964; 6 km W Panda, 18–20 Apr 1964; Panda, 21 Apr 1964; Coguno, 23–27 Apr 1964; 3 km NE Inharime, 29–30 Apr 1964.

R. M. Davis, A. R. Hardy, H. J. Herbert, J. C. Lingeback, and A. L. Moore (J. H. Case, C. G. Coetzee, and H. W. Setzer): 1 mi NE Boane, 11–13 Jul 1964; 33 km S Changara, 19 Jul 1964; 2 mi SE Tete, 20–24 Jul 1964; Muchena, 25–29 Jul 1964; 10 km E Furancungo, 1–3 Aug 1964; 30 mi NNW Furancungo, 5–7 Aug 1964; 10 km N Vila Gamito, 9–10 Aug 1964; 22 km S Vila Gamito, 11 Aug 1964.

R. M. Davis and A. R. Hardy (J. C. Lingeback): 5 mi N Mungari, 16–19 Aug 1964; Vila Gouveia, 21–25 Aug 1964; 3 km N Vila de Manica, 28–31 Aug 1964; Vumba Mountain, 1 Sep 1964; Vila Pery, 3–8 Sep 1964; 3 km SE Vila Machado, 10–14 Sep 1964; Vila Machado, 15 Sep 1964; Gorongosa Mountain, 19–23 Sep 1964; 4 km NE Vila Paiva de Andrada, 25–29 Sep 1964; Maringue, 2–4 Oct 1964; 10 km N Beira, 24–30 Oct 1964; Mezimbite, 1–9 Nov 1964; Dondo, 5, 8 Nov 1964.

H. J. Herbert and A. L. Moore: 14 mi ESE Chicoa, 16–19 Aug 1964; Magüe (New) Borôma, 20–23 Aug 1964; Zumbo, 25–30 Aug 1964; Zambuê, 1–4 Sep 1964; Muchanha River, 5–7 Sep 1964; Fingoê, 9–11 Sep 1964; Vila Vasco da Gama, 13–16 Sep 1964; New Bene (Tambuê), 17–19 Sep 1964; Chiúta, 20–22 Sep 1964; Bragança, 30 Sep–4 Oct 1964; Vila Coutinho, 6–9 Oct 1964; 93 km S Vila Coutinho, 10–12 Oct 1964; Vila Caldas Xavier, 14–16 Oct 1964; Mecito, 18–20 Oct 1964; 8 km SW Chiôco, 25–28 Oct 1964; Changara, 1–5 Nov 1964; Gorongoza Park, 10–12 Nov 1964.

S. W. Goussard and T. N. Liversedge: Gangareme, 30 Aug–5 Sep 1967.

**Beira, 10 km N**, Manica and Sofala District  
(Map 19: 611).

Coordinates: 19°42'S, 34°47'E M (AMS, Beira, 1:500,000).  
Collectors: R. M. Davis and A. R. Hardy (24–30 Oct 1964).

Habitat: "Cashew tree grove . . . banana trees . . . dry flai . . . coconut trees . . . native hut . . . small store . . . I would call this whole area a savanna" (RMD).

Remarks: Davis and Hardy left Beira (19°51'S, 34°50'E G) and camped north of town in a cashew tree grove.

Taxa: *Otolemur*; *Saccostomus*, *Acomys*, *Uranomys*, *Dasyomys*, *Grammomys*, *Mastomys*, *Pelomys*, *Otomys*, *Cryptomys*; *Crocidura*; *Epomophorus*, *Taphozous*, *Chaerephon*, *Mops*.

**Boane, 1 mi** [1.6 km] NE, Lourenço Marques District  
(Map 19: 631).

Coordinates: 26°01'S, 32°20'E M (IGC, Maputo, 1:250,000).

Collectors: R. E. Cole and A. L. Moore (11–12 Jan 1964); R. M. Davis, H. J. Herbert, J. C. Lingeback, A. L. Moore, and H. W. Setzer (11–13 Jul 1964).

Habitat: "The swampy grass field where I had set traps resembled a small lake this morning . . . grassy meadow surrounded with brush" (REC). "Dry grass field . . . roof of storage building" (RMD).

Remarks: Cole and Moore were the first AMP field team to collect at this locality. Specimens taken on 11 Jan were labeled *Instituto de Investigação Científica de Moçambique, 20 mi* [32.2 km] W Lourenço Marques (Maputo; 25°58'S, 32°34'E G). The grounds of the institute were the first stop and staging point for subsequent AMP surveys in the country. Although their camp was not moved, specimens collected on 12 Jan were labeled *2 mi* [3.2 km] S Boane. The second AMP field team conducted more extensive collecting "at the Instituto" and designated the locality relative to Boane (26°02'S, 32°20'E G). In a personal letter (14 Jul 1964), Setzer related that "we are living in a house at the Institute about 25 kilometers from Lourenço Marques." On 13 Jul, specimens were also taken from *10 km N Boane*.

Taxa: *Petrodromus*; *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*; *Crocidura*; *Chaerephon*, *Neoromicia*.

**Bragança, Tete District** (Map 19: 584).

Coordinates: 14°24'S, 34°20'E C.

Collectors: H. J. Herbert and A. L. Moore (30 Sep–4 Oct 1964).

Habitat: "This country is very high plateau with high peaks scattered throughout. Most of the soil is burnt over and is used for gardens or cattle grazing . . . native field and garden . . . flai [sic, flei?] . . . kopie" (HJH).

Remarks: The two entries for Bragança in the USBGN gazetteer do not approximate those provided by the collectors, whose coordinates are confirmed by the presence of another Bragança on their field map (AM, Sheet 7, 1:1,000,000).



Taxa: *Procapia*; *Saccostomus*, *Dendromus*, *Gerbilliscus*, *Aethomys*, *Dasymys*, *Mastomys*, *Mus*, *Otomys*; *Suncus*; *Crocuta*.

**Changara**, Tete District (Map 19: 596).

Coordinates: 16°50'S, 33°16'E C, G.

Collectors: H. J. Herbert and A. L. Moore (1–5 Nov 1964).

Habitat: “In native fields of this tree savanna . . . rocks near the river . . . hillside in sandy soil . . . rocky hill” (HJH).

Remarks: The Changara camp was, apparently, close to the Luenha River (AM, *Sheet 4*, 1:1,000,000). According to the USBGN, Luenha is a variant spelling of Changara.

Taxa: *Elephantulus*; *Saccostomus*, *Steatomys*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Mus*; *Genetta*; *Neotragus*, *Raphicerus*, *Sylvicapra*.

**Changara, 33 km S**, Tete District (Map 19: 598).

Coordinates: 17°10'S, 33°16'E C.

Collector: H. W. Setzer (19 Jul 1964).

Remarks: A lion skull was collected south of Changara while the AMP team was traveling to Tete.

Taxon: *Panthera*.

**Chicoa, 14 mi [22.5 km] ESE**, Tete District (Map 19: 590).

Coordinates: 15°41'S, 32°32'E M (IGC, *Marávia-Chicôa*, 1:250,000).

Collectors: H. J. Herbert and A. L. Moore (16–19 Aug 1964).

Habitat: “Thorn acacia tree savanna . . . a shop . . . baobab tree” (HJH).

Remarks: Our coordinates correspond to a mark found on the above-cited map, appropriately positioned east-southeast of Chicoa and on the road to Vila Gamito.

Taxa: *Galago*; *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*; *Lepus*; *Nycteris*, *Nycticeimops*; *Sylvicapra*.

**Chigubo Administrative Poste**, Gaza District (Map 19: 618).

Coordinates: 22°49'S, 33°31'E C (22°50'S, 33°31'E G, as Chigubo).

Collectors: R. E. Cole and A. L. Moore (11–12, 17–18 Feb 1964).

Habitat: “Roof at the Poste [building] . . . the edge of the lagoon” (REC).

Remarks: Cole and Moore arrived at Chigubo and set up operations in the Chef de Poste building. Specimen labels indicate that on 11 Feb, a *Lepus* and a *Sylvicapra* were collected 2 km N Chigubo, probably acquired during a night hunt, which the crew conducted frequently in Mozambique. The team returned to this locality on 16 Feb after collecting at **30 km WNW Chigubo** (13–15 Feb). In the evening, they went to the cantina in Chigubo, where they collected a number of *Mops*. Moore collected an *Aethomys* 7 km S Chigubo Administrative Poste on 18 Feb.

Taxa: *Calcochloris*; *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Thallomys*; *Lepus*; *Chaerephon*, *Mops*; *Raphicerus*, *Sylvicapra*.

**Chigubo, 30 km WNW**, Gaza District (Map 19: 617).

Coordinates: 22°44'S, 33°18'E M (AM, *Sheet 2*, 1:1,000,000).

Collectors: R. E. Cole and A. L. Moore (13–15 Feb 1964).

Habitat: “Open plains bordered by thick bush” (REC).

Remarks: Cole and Moore left their camp at the **Chigubo Administrative Poste** and established camp 30 km west-northwest of Chigubo. The team arose early on 16 Feb to hunt buffalo and carnivores, apparently without success, and returned to Chigubo. Map-based coordinates were estimated on a dead-end road that trended west-northwest from Chigubo.

Taxa: *Paraxerus*, *Gerbilliscus*, *Mastomys*, *Pedetes*; *Lepus*.

**Chimonzo**, Gaza District (Map 19: 625).

Coordinates: 24°55'S, 33°15'E C (24°57'S, 33°17'E G).

Collectors: R. E. Cole and A. L. Moore (21–28 Feb 1964).

Habitat: “Chimonzo is quite tropical, very dense vegetation and large vines hanging down from the tall trees . . . corn field . . . grassy field . . . banana tree . . . The foliage is really thick with hanging vines and practically no opening in the canopy . . . very large fig tree . . . peanut fields” (REC).

Remarks: Cole and Moore scouted around the Guijá area for a suitable camp but eventually, because of rains and resulting swampy land, headed southeast to Chimonzo. Cole collected a number of *Epomophorus* from a fig tree about 1 mi [1.6 km] from camp on 22 Feb; on 25 Feb, several *Chaerephon* were collected from the cantina in Chimonzo.

Taxa: *Calcochloris*; *Chlorocebus*; *Heliosciurus*, *Saccostomus*, *Gerbilliscus*, *Lemniscomys*, *Mastomys*, *Mus*; *Crocidura*; *Epomophorus*, *Chaerephon*, *Neoromicia*.

**Chiôco, 8 km SW, Tete District (Map 19: 592).**

Coordinates: 16°29'S, 32°47'E C.

Collectors: H. J. Herbert and A. L. Moore (25–28 Oct 1964).

Habitat: “The terrain is tree savanna and heavy bush . . . cotton field . . . . The native people . . . farm and raise cattle and goats” (HJH).

Remarks: Herbert and Moore set up camp at a “safari outfits camp” southwest of Chiôco (16°25'S, 32°49'E G, as Aldeia Chioco).

Taxa: *Paraxerus*, *Saccostomus*, *Lemniscomys*, *Mastomys*; *Felis*, *Leptailurus*, *Genetta*, *Crocuta*; *Neotragus*, *Raphicerus*, *Tragelaphus*, *Sylvicapra*.**Chiúta, Tete District (Map 19: 589).**

Coordinates: 15°34'S, 33°17'E C (15°33'S, 33°17'E G, as Aldeia Chiuta).

Collectors: H. J. Herbert and A. L. Moore (20–22 Sep 1964).

Habitat: “Went night hunting down a steep mountain road . . . rocks . . . grass field . . . pool” (HJH).

Taxa: *Acomys*, *Gerbilliscus*, *Aethomys*, *Grammomys*, *Lemniscomys*, *Mastomys*; *Lepus*; *Chaerephon*, *Sauromys*, *Tadarida*, *Eptesicus*, *Nycticeinops*, *Scotophilus*, *Miniopterus*; *Sylvicapra*.**Coguno, Inhambane District (Map 19: 623).**

Coordinates: 24°23'S, 34°33'E C, G.

Collectors: R. E. Cole and A. L. Moore (23–27 Apr 1964).

Habitat: “Very green and thick with bush and deciduous trees . . . grass areas . . . fairly thick forest . . . abandoned mashamba which is now overrun with pineapple and tapioca plants . . . soil is sandy and a buffy brown color . . . Pezo trees [sic, possibly m'peza, a local name for *Xylopiya aethiopica*] . . . *Acacia* brush . . . grassy areas near camp . . . peanut and tapioca fields . . . dry rice field” (REC).Remarks: Camp was established at the abandoned WENELA camp “just northwest” of Coguno. Most specimens were collected around this camp, but some were taken 5 km ESE Coguno and 9 km ESE Coguno. In his journal entry for 23 Apr, Cole recorded that they went night hunting 14 km ESE Coguno on open plains bordered by large “Pezo trees,” where they collected one *Lepus* and two *Otolemur*. Specimen labels, as well as Cole's field catalog, indicate the locality as 14 km ESE Panda, which must represent a lapsus since they had just finished working in the vicinity of **Panda** (18–21 Apr).Taxa: *Otolemur*; *Paraxerus*, *Graphiurus*, *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*; *Lepus*; *Crocidura*; *Chaerephon*, *Mops*, *Glauconycteris*.**Dondo, Manica and Sofala District (Map 19: 610).**

Coordinates: 19°37'S, 34°45'E G.

Collectors: R. M. Davis and A. R. Hardy (5, 8 Nov 1964).

Habitat: “Old house” (RMD).

Remarks: Davis and Hardy made two trips to collect bats in the village of Dondo while camped at **Mezimbite** (1–9 Nov).Taxon: *Mops*.**Fingoè, Tete District (Map 19: 578).**

Coordinates: 15°09'S, 31°53'E C, G.

Collectors: H. J. Herbert and A. L. Moore (9–11 Sep 1964).

Habitat: “Mountain behind administrator's house . . . rocks . . . high grass” (HJH).

Taxa: *Acomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Mus*; *Lepus*.**Furancungo, 10 km E, Tete District (Map 19: 586).**Coordinates: 14°54'S, 33°42'E M (IGC, *Angonia-Macanga*, 1:250,000).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, J. C. Lingeback, A. L. Moore, and H. W. Setzer (1–3 Aug 1964).

Habitat: “Tree savanna . . . flei . . . near the river [Figure 128] . . . little mountain [Figure 129] . . . creek bottom” (RMD). “Tree savanna with occasional open meadows . . . grassy area near river” (HJH).

Remarks: The team settled about 10 km east of Furancungo, which is about 100 km north of Massamba and 170 km north of Tete. Herbert noted that base camp was 5 km from a river, which appears on an annotated map (referenced above) as a tributary of the Pônfi (Rio Ponti) and is named the Namicungo. Elevation is stated as 1,300 m for this locality (HJH's journal), although none is given on skin tags. A few specimens originated from Furancungo proper as well as from 20 km E Furancungo.Taxa: *Otolemur*; *Steatomys*, *Gerbilliscus*, *Aethomys*, *Grammomys*, *Mus*, *Rattus*, *Heliophobius*; *Crocidura*; *Sylvicapra*.**Furancungo, 30 mi [48.3 km] NNW, Tete District (Map 19: 583).**Coordinates: 14°31'S, 33°23'E M (IGC, *Angonia-Macanga*, 1:250,000).



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FIGURE 128. Mozambique, Furancungo, 10 km E: Stream (Aug 1964).

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FIGURE 129. Mozambique, Furancungo, 10 km E (Aug 1964).

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Collectors: C. G. Coetzee, R. M. Davis, A. R. Hardy, H. J. Herbert, J. C. Lingeback, A. L. Moore, and H. W. Setzer (5–7 Aug 1964).

Habitat: “Tree savanna . . . camp along a flei . . . high grasses next to the fields, under corn shocks and in banana tree clumps” (RMD). “Meadow near camp” (HJH).

Remarks: The coordinates were estimated by road from Furancungo. Lingeback standardly labeled his specimens as “NW” Furancungo, but all other collectors used the “NNW” compass bearing. Many specimens labeled from this locality were actually taken at the native village of Qauaza (RMD’s journal), about 5 km east of camp. Qauaza was not located in the USBGN gazetteer or on AMP maps.

Taxa: *Petrodromus*; *Saccostomus*, *Steatomys*, *Acomys*, *Gerbilliscus*, *Dasymys*, *Grammomys*, *Mastomys*, *Mus*; *Lepus*; *Crocidura*; *Neoromicia*; *Tragelaphus*.

**Gangareme**, Bazaruto Island, Inhambane District (Map 19: 614).

Coordinates: 21°40’S, 35°25’E C (21°39’S, 35°26’E G, as Ponta Gengareme).

Collectors: S. W. Goussard and T. N. Liversedge (30 Aug–5 Sep 1967).

Habitat: “Vlei grassland,” “bushes,” “sand dune and bushes” (specimen labels).

Taxa: *Paraxerus*, *Gerbilliscus*, *Aethomys*, *Mastomys*.

**Gorangoza Park**, Manica and Sofala District (Map 19: 603). Coordinates: 18°41’S, 34°19’E G (as Parque Nacional da Gorongosa).

Collectors: H. J. Herbert and A. L. Moore (10–12 Nov 1964).

Habitat: No information available.

Remarks: Herbert and Moore briefly stopped at Gorangoza Park before leaving Mozambique, although Herbert omitted mention of this locality in his journal.

Taxa: *Mastomys*; *Crocidura*.

**Gorongosa Mountain**, Morrumbosze River Falls, 20 km N Vila Paiva de Andrada, Manica and Sofala District (Map 19: 601).

Coordinates: 18°24’S, 34°04’E G (as Serra da Gorongosa).

Collectors: R. M. Davis and A. R. Hardy (19–23 Sep 1964).

Habitat: “Rocks right along the water . . . mashamba . . . along the stream” (RMD).

Remarks: With a police guide, Davis and Hardy camped at Gorongosa Mountain just below the Rio Morrumbosze Falls, reported to be about 400 feet [122 m] high.

Taxa: *Saccostomus*, *Acomys*, *Grammomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Cryptomys*; *Lepus*; *Crocidura*.

**Inhaca Island**, Biological Research Station, Lourenço Marques District (Map 19: 630).

Coordinates: 26°00’S, 32°54’E C (26°02’S, 32°54’E G, as Ilha da Inhaca).

Collectors: R. E. Cole and A. L. Moore (16–19 Jan 1964).

Habitat: “Much agriculture . . . There are four main vegetation areas, mangrove swamps, fresh water lagoons, forests and sand dunes. Fresh fruit is everywhere . . . The soil was quite sandy . . . very large fig trees . . . grass fields . . . remote forest” (REC).

Remarks: The team collected *Epomophorus* from large fig trees in the village of Posto Inhaca. Other locality variants included 1 mi [1.6 km] behind and 1 mi [1.6 km] NE of the research station and SE tip of the island.

Taxa: *Gerbilliscus*, *Mastomys*, *Rattus*; *Epomophorus*, *Chaerephon*.

**Inharrime, 3 km NE**, Inhambane District (Map 19: 624).

Coordinates: 24°23’S, 35°03’E M (BCG, *Indambane-Inharrime-Homoine-Zavala*, 1:250,000).

Collectors: R. E. Cole and A. L. Moore (29–30 Apr 1964).

Habitat: “Abandoned tapioca [mashamba] with grass border . . . forest . . . grass borders (2–3 feet [0.61–0.91 m] tall) of a lagoon . . . white sand–grass habitat . . . patch of black sand consisting of 600–700 feet<sup>2</sup> [55.7–65.0 m<sup>2</sup>]” (REC).

Remarks: The principal collecting site was 3 km northeast of Inharrime (24°29’S, 35°02’E G), with a secondary site at 4 km SW Inharrime (24°30’S, 35°00’E M), close to a lagoon.

Taxa: *Cricetomys*, *Saccostomus*, *Gerbilliscus*, *Mastomys*; *Crocidura*.

**Inyoka Mountains**, 45 km SW Magude, Gaza District (Map 19: 628).

Coordinates: 25°20’S, 32°21’E M (AM, *Sheet 1*, 1:1,000,000).

Collectors: R. E. Cole and A. L. Moore (1 Mar 1964).

Habitat: “Very low roofed cave” (REC).

Remarks: While camped at **15 km SW Magude** (29 Feb–2 Mar), Cole and Moore visited a cave in the Inyoka Mountains, which lie close to the Sábîè River and the Sábîè Post (25°19’S, 32°14’E G). In his journal, Cole loosely approximated this locality as “about 40–50 km SW of Magude,” but his catalog specified “45 km SW Magude.” Our cited coordinates are a by-road estimate.

Taxon: *Hipposideros*.

**Jangamo**, 29 km S Inhambane, Inhambane District  
(Map 19: 620).

Coordinates: 24°06'S, 35°19'E C, G.

Collectors: R. E. Cole and A. L. Moore (13–16 Apr 1964).

Habitat: “Soil is sandy around Jangamo, it is a reddish-brown sand and there is quite a bit of vegetation . . . peanut field. . .thick bush forest with quite a [layer of litter] . . . wet thick grass meadow . . . fig trees . . . small stream . . . banana trees . . . very steep bank of a small stream running through a small banana plantation. The grass is about one foot [0.3 m] tall here . . . although there are few large trees in this area; it must be called a forest. The trees are mostly 1–3 inches [2.5–7.6 cm] thick at the base, about 10–12 feet [3.0–3.7 m] tall and spaced about 6–12 inches [15.2–30.5 cm] apart” (REC).

Remarks: Cole and Moore located their base of operations at the WENELA camp outside the small town of Jangamo, 29 km south of Inhambane (23°52'S, 35°23'E G). Specimens were also collected 5 km to the north, and these are labeled as 24 km S Inhambane. A few were taken about 6 km south of Jangamo and recorded as 35 km S Inhambane.

Taxa: *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Pelomys*; *Crociodura*; *Epomorphorus*, *Nycteris*, *Neoromicia*.

**Mabote**, WENELA camp, Inhambane District  
(Map 19: 616).

Coordinates: 22°02'S, 34°07'E C (22°02'S, 34°08'E G).

Collectors: R. E. Cole and A. L. Moore (27–30 Mar 1964).

Habitat: “Corn field . . . The bush was quite thick making hunting a little difficult . . . cotton fields . . . grass and the sandy fields . . . in a thornbush area with scattered patches of knee high grass and a sandy soil” (REC).

Remarks: The AMP team drove to Mabote and established their camp on the grounds of the WENELA camp. Accompanied by the Chef de Poste, they went night hunting at 20 km S Mabote, getting a *Pedetes* and a *Sylvicapra*. A few *Gerbilliscus* were collected 6 km S Mabote.

Taxa: *Graphiurus*, *Acomys*, *Gerbilliscus*, *Lemniscomys*, *Mastomys*, *Pedetes*, *Sylvicapra*.

**Magude**, 15 km SW, Gaza District (Map 19: 627).

Coordinates: 25°07'S, 32°33'E M (AM, *Sheet 1*, 1:1,000,000).

Collectors: R. E. Cole and A. L. Moore (29 Feb–2 Mar 1964).

Habitat: “Plenty of trees and tall grass—but no agriculture. The soil is quite sandy but down about 6 inches

[15.2 cm] it turns to quite hard clay . . . brackish pools . . . corn and peanut crops” (REC).

Remarks: Cole and Moore drove to Magude (25°01'S, 32°39'E G) and camped southwest of town. Our coordinates are a by-road estimate from Magude. While at this camp, the team made a visit to the **Inyoka Mountains** to collect bats in a cave. Satellite localities include 17 km SW Magude, where they collected an *Elephantulus*, and 24 km SW Magude, where a *Chaerephon* was taken from the roof of a shop.

Taxa: *Elephantulus*; *Aethomys*, *Mastomys*; *Chaerephon*.

**Magüe (New) Borôma**, Tete District (Map 19: 591).

Coordinates: 15°49'S, 31°44'E C (15°48'S, 31°45'E G, as Mágoè).

Collectors: H. J. Herbert and A. L. Moore (20–23 Aug 1964).

Habitat: “Mango grove . . . plenty of water . . . rocky kopie” (HJH).

Remarks: Magüe Novo and Borôma share the same USBGN coordinates. One of our topographic maps (AM, *Sheet 6*, 1:1,000,000) has Magué circled, and this position corresponds to the place-name Borôma on another map (IGC, *Marávia-Chicôa*, 1:250,000).

Taxa: *Galago*, *Chlorocebus*; *Saccostomus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*; *Epomorphorus*, *Rhinolophus*, *Nycticeimops*, *Scotophilus*; *Genetta*; *Raphicerus*, *Sylvicapra*.

**Mahau River**, Lourenço Marques District (Map 19: 632).

Coordinates: 26°40'S, 32°10'E C.

Collectors: R. E. Cole and A. L. Moore (22–25 Jan 1964).

Habitat: “The entire area is tall grass and scattered *Acacia* trees. This area, as all of the surrounding areas, is subject to flooding when the rains come and this was partially flooded a week ago” (REC).

Remarks: Cole recorded in his field journal that their campsite was located 2 km south of the Mahau River (26°33'S, 32°14'E G, as Rio Sichani), but that distance modifier does not appear on specimen labels or in his field catalog. We were unable to locate this river on any of our maps. On 24 Jan, a trapline was set “in the foothills of the Lebombos Mountains.”

Taxa: *Otolemur*; *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*; *Lepus*; *Genetta*; *Aepyceros*, *Redunca*.

**Mapulanguene**, 8 km E, Gaza District (Map 19: 626).

Coordinates: 24°30'S, 32°10'E M (AM, *Sheet 1*, 1:1,000,000).

Collectors: R. E. Cole and A. L. Moore (3–5 Mar 1964).

Habitat: "Camp in a very thick thorn forest . . . *Acacia*-grass habitat around camp . . . corn field" (REC).

Remarks: Map coordinates are based upon a by-road estimate, which places this site near the Uanetze River, although Cole nowhere mentioned a river. Camp was established east of Mapulanguene (24°29'S, 32°05'E G), a small village about 15 km from the border with South Africa.

Taxa: *Elephantulus*; *Otolemur*, *Chlorocebus*; *Saccostomus*, *Gerbilliscus*, *Mastomys*; *Lepus*; *Raphicerus*.

**Maringue**, Manica and Sofala District (Map 19: 600).

Coordinates: 17°58'S, 34°23'E G (as Maríngue).

Collectors: R. M. Davis and A. R. Hardy (2–4 Oct 1964).

Habitat: "Tree savanna" (specimen labels).

Remarks: Davis and Hardy camped behind the hospital on the north side of Maringue. According to Davis, traps were actually set 4 km west of town, a distance not reflected on specimen labels.

Taxa: *Elephantulus*, *Petrodromus*; *Saccostomus*, *Gerbilliscus*, *Lemniscomys*, *Mastomys*, *Thryonomys*; *Lepus*; *Mungos*; *Ourebia*, *Raphicerus*.

**Massangena**, Gaza District (Map 19: 613).

Coordinates: 21°30'S, 33°00'E C (21°32'S, 32°57'E G).

Collectors: R. E. Cole and A. L. Moore (1–9 Feb 1964).

Habitat: "Tall grass between the compound and the Save River . . . a lagoon southeast of the compound . . . small stream. The ground around the lagoon is covered with medium sized stones and rocks and *Acacia* trees" (REC).

Remarks: The team stayed in a house (compound) at Massangena near the Save River. On 31 Jan, they night hunted, heading south along the road to Machaíla, and obtained *Sylvicapra*, *Pedetes*, and *Otolemur*. On 2 Feb, Cole set a trapline close to the Massangena lagoon "about 2 miles [3.2 km] SW" of their compound. On 6 Feb, bats were collected from a giant fig tree about 0.5 [miles?, 0.8 km] from the house. None of these minor locality modifiers appear on specimen labels or in field catalogs. While night hunting along the road to Malvéria on 8 Feb, a *Galago*, *Lepus*, and *Pedetes* were taken in grass and thick bush at 10 mi [16.1 km] W Massangena.

Taxa: *Elephantulus*; *Galago*, *Otolemur*, *Chlorocebus*; *Paraxerus*, *Graphiurus*, *Saccostomus*, *Steatomys*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Pedetes*; *Lepus*; *Crocidura*; *Epomophorus*, *Rhinolophus*, *Nycteris*, *Scotophilus*; *Neotragus*, *Raphicerus*, *Sylvicapra*.

**Massinga, 2 km N**, Inhambane District (Map 19: 619).

Coordinates: 23°19'S, 35°23'E C.

Collectors: R. E. Cole and A. L. Moore (6–11 Apr 1964).

Habitat: "Around Massinga there is quite a bit of coconut and banana trees . . . in general the vegetation is green and lush . . . thick bush and eucalyptus trees . . . grassy marsh land . . . adjacent bush . . . dense bush forest . . . meadow . . . small stream. This stream is almost completely covered over with a canopy of banana tree leaves . . . very dense bushy forest with many fig trees and coconut palms in the clearings" (REC).

Remarks: In his journal, Cole indicated that camp was placed "a short way east of Massinga (23°20'S, 35°23'E G)," but most specimens from this area were actually taken 2 km N of town. Some were also collected at 4 km N Massinga according to specimen labels and catalogs (3 km N according to Cole's journal) and at 9 km NE Massinga (mistakenly noted as NW in Cole's field journal). Bats were collected at a School House in town and also 2 km S of town.

Taxa: *Petrodromus*; *Graphiurus*, *Saccostomus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*; *Crocidura*; *Epomophorus*, *Chaerephon*, *Mops*, *Neoromicia*.

**Mecito**, 45 km S Vila Caldas Xavier, Tete District (Map 19: 595).

Coordinates: 16°19'S, 34°21'E C (16°17'S, 34°20'E G).

Collectors: H. J. Herbert and A. L. Moore (18–20 Oct 1964).

Habitat: "Native garden (mashamba). This area was once maponi forest but has been cleared . . . mopane forest" (HJH).

Remarks: Camp was pitched beside a saw mill.

Taxa: *Petrodromus*; *Papio*; *Heliosciurus*, *Paraxerus*, *Steatomys*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*; *Lepus*; *Crocidura*; *Genetta*; *Sylvicapra*.

**Mezimbite**, 8 km NW Dondo, Manica and Sofala District (Map 19: 609).

Coordinates: 19°35'S, 34°43'E G (as Mezimbite Rail Station).

Collectors: R. M. Davis and A. R. Hardy (1–9 Nov 1964).

Habitat: "Old house . . . mango trees" (RMD).

Remarks: Davis indicated that their camp was situated opposite the 36 km road marker on the road from Beira. He was not impressed with the habitat for collecting rodents. Bats were also collected from buildings in the village of **Dondo**. In his journal, Davis indicated that Roberts spelled this type locality Zimbiti. In his pub-

lications, Roberts spelled Mezimbite inconsistently, both as Mzimbiti (Roberts, 1913) and as Zimbiti (Roberts, 1913, 1951).

Taxa: *Petrodromus*; *Otolemur*; *Saccostomus*, *Acomys*, *Lophuromys*, *Uranomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Pelomys*, *Cryptomys*; *Crocidura*; *Rhinolophus*, *Miniopterus*; *Civettictis*, *Atilax*, *Mungos*; *Tragelaphus*.

**Moamba**, Lourenço Marques District (Map 19: 629).

Coordinates: 25°36'S, 32°14'E C (25°36'S, 32°15'E G).

Collectors: R. E. Cole and A. L. Moore (9–12 Mar 1964).

Habitat: “Fairly tropical with quite a few banana trees . . . along [the banks of the Komati River] are quite varied vegetation patterns with good stands of sugar cane . . . grass, *Acacia* tree habitat around agriculture—namely corn fields . . . aloe plants . . . Rhodesian mahogany tree” (REC).

Remarks: Cole wrote in his journal that their camp was situated 2 mi [3.2 km] west of Moamba, about 50 yards [45.7 m] from the Komati River. Only the town itself is indicated on specimen labels and in his field catalog.

Taxa: *Paraxerus*, *Saccostomus*, *Gerbilliscus*, *Mastomys*; *Epomophorus*, *Chaerephon*, *Mops*, *Neoromicia*, *Miniopterus*.

**Mombane**, Inhambane District (Map 19: 612).

Coordinates: 20°59'S, 35°01'E C, G (as Nova Mambone).

Collectors: R. E. Cole and A. L. Moore (22–24 Mar 1964).

Habitat: “Around the border of a corn field in tall grass . . . set in a grazed out field along the banks of the Save River . . . edge of an old mangrove swamp area . . . thorn bushes . . . building” (REC).

Remarks: “Mombane,” as found on specimen labels but not on any of our maps, is clearly a misspelling of Mambone. On a summary sheet at the front of his journal, Cole equated Mombane to Nova Mambone, whose USBGN coordinates are in concord with those of the collectors. The AMP crew stayed in a house at Mambone while they collected in the surrounding vicinity. Traps were set 2 km NW (near the bank of the Save River), 4 km SE, 8 km SE (around the airport and near a mangrove swamp), and 4 km WNW of town. Cole obtained a *Chlorocebus* 6 km NE of Mambone. Bats were netted in a building in town.

Taxa: *Chlorocebus*; *Acomys*, *Gerbilliscus*, *Mastomys*; *Lepus*; *Crocidura*; *Mops*.

**Mucanha River**, Tete District (Map 19: 577).

Coordinates: 14°58'S, 31°23'E C.

Collectors: H. J. Herbert and A. L. Moore (5–7 Sep 1964).

Habitat: “Rocks . . . near the river . . . ground has been recently burned” (HJH).

Remarks: A topographic map (AM, *Sheet* 6, 1:1,000,000) bears an annotation on the east bank of the Rio Mucanha that matches the collectors' coordinates.

Taxa: *Saccostomus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*; *Genetta*, *Rhynchogale*; *Raphicerus*.

**Muchena**, 10 mi [16.1 km] E Massamba, Tete District (Map 19: 588).

Coordinates: 15°41'S, 33°48'E C, G (as Aldeia Muchena)

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, J. C. Lingeback, A. L. Moore, and H. W. Setzer (25–29 Jul 1964).

Habitat: “We cleared an area in high grasses and set up camp. The area would be described as tree savanna . . . cistern . . . ruins of an old prison . . . dungeon” (RMD). “The terrain is tree savanna and the grass is sometimes 8 feet [2.4 m] tall” (HJH).

Remarks: The AMP crew set up camp at Muchena on the Revúbuè River. Specimens of *Acomys* and *Aethomys* were collected by Herbert on 28 Jul at 14 mi [22.5 km] E Massamba “in rocks.” Presumably in reference to the collecting locality of these Herbert specimens, Davis noted that Setzer and others had set traps “up into the mountains on the other side of the river” and to the east of town on 27 Jul.

Taxa: *Elephantulus*, *Petrodromus*; *Chlorocebus*; *Saccostomus*, *Steatomys*, *Acomys*, *Aethomys*, *Grammomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Thryonomys*; *Lepus*; *Rhinolophus*, *Hipposideros*, *Triaenops*, *Nycteris*, *Miniopterus*; *Raphicerus*, *Redunca*.

**Mungari**, 5 km N, Manica and Sofala District (Map 19: 597).

Coordinates: 17°07'S, 33°34'E M (IGC, *Báruè*, 1:250,000).

Collectors: R. M. Davis, A. R. Hardy, and J. C. Lingeback (16–19 Aug 1964).

Habitat: “Supposed tree savanna and mashambas” (RMD).

Remarks: The team traveled to Mungari (17°10'S, 33°33'E G) and set up camp near a water hole north of town. Two *Nycticeinops* were collected in town, rather than at camp, although this locale was not specified on specimen labels. On 16 Aug, some hunters gave them a *Phacochoerus*, and the team, in general, had considerable success night hunting at this locality.

Taxa: *Petrodromus*; *Otolemur*; *Acomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Cryptomys*; *Lepus*; *Rhinolophus*, *Nycticeinops*, *Neoromicia*; *Felis*, *Genetta*; *Phacochoerus*, *Raphicerus*, *Sylvicapra*.

**New Bene (Tambu e)**, Tete District (Map 19: 580).

Coordinates: 14°50'S, 32°48'E C.

Collectors: H. J. Herbert and A. L. Moore (17–19 Sep 1964).

Habitat: "River (which is very dry except for a few pot holes of water)." (HJH)

Remarks: Herbert originally referred to this camp as Bene but corrected this to "New Bene (Tambu e)" and indicated that it is on the Luangua River. An AMP field map (IGC, *Mar via* 3, 1:250,000) has a "Tambu e" penciled on it that matches the collectors' coordinates, but the annotation is located on the Rio L ua north and west of a Pene (15°04'S, 32°55'E G) located by the Rio Luangua. Herbert mentioned an elevation of 467 m in his field journal but did not record the datum on specimen labels or in his field catalog.

Taxa: *Gerbilliscus*, *Mastomys*; *Lepus*; *Genetta*; *Sylvicapra*.

**Panda**, Inhambane District (Map 19: 621).

Coordinates: 24°03'S, 34°43'E G.

Collectors: R. E. Cole and A. L. Moore (21 Apr 1964).

Habitat: "Abandoned cantina . . . fig trees" (REC).

Remarks: Cole and Moore opportunistically collected bats in the village of Panda while camped at **6 km W Panda** (18–20 Apr).

Taxa: *Epomophorus*, *Mops*.

**Panda, 6 km W**, Inhambane District (Map 19: 622).

Coordinates: 24°05'S, 34°40'E M (BCG, *Panda-Homo ne-Manjacaze-Inharrime-Zavala*, 1:250,000).

Collectors: R. E. Cole and A. L. Moore (18–20 Apr 1964).

Habitat: "Peanut and tapioca mashamba. The soil is a red sand . . . grass along a marshy river bank . . . banana trees" (REC).

Remarks: Cole and Moore set up camp in the WENELA camp near Panda (24°03'S, 34°43'E G) and mainly collected about 6 km west of the village. They also obtained specimens at **4 km N Panda** along a river (Rio Inhatouco per the BCG map), at **5 km SE Panda**, and at **12 km W Panda**, *Macocolombane*.

Taxa: *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*; *Crocidura*; *Neoromicia*; *Herpestes*.

**Tete, 2 mi [3.2 km] SE**, Tete District (Map 19: 593).

Coordinates: 16°12'S, 33°38'E C.

Collectors: J. H. Case, R. M. Davis, A. R. Hardy, H. J. Herbert, J. C. Lingeback, A. L. Moore, and H. W. Setzer (20–24 Jul 1964).

Habitat: "Low bush. The area is very dry and all thorn [Figure 130] . . . small, deserted building" (RMD). "Low bush–shrubby tree area. Most of the vegetation has been eaten off by the native cattle and goats" (HJH).

Remarks: The party camped near the Tsetse Control Camp at Benga (16°11'S, 33°37'E G), about 1 mi [1.6 km] from the Zambezi River and across from Tete (16°09'S, 33°35'E G). A Peace Corps volunteer John H. Case joined the party and worked with the crew at this locality.

Taxa: *Elephantulus*, *Petrodromus*; *Otolemur*; *Paraxerus*, *Saccostomus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Thallomys*; *Lepus*; *Rhinolophus*, *Hipposideros*, *Triaenops*, *Nycteris*, *Chaerephon*, *Mops*, *Tadarida*; *Genetta*; *Raphicerus*, *Tragelaphus*, *Sylvicapra*.

**Vila Caldas Xavier**, Tete District (Map 19: 594).

Coordinates: 15°59'S, 34°10'E C (15°59'S, 34°11'E G, as Cambulatsitsi).

Collectors: H. J. Herbert and A. L. Moore (14–16 Oct 1964).

Habitat: "Tree savanna . . . rocks. The country is low land mostly tree savanna there is very little water . . . field" (HJH).

Taxa: *Petrodromus*; *Otolemur*; *Saccostomus*, *Acomys*, *Aethomys*, *Lemniscomys*; *Lepus*; *Raphicerus*.

**Vila Coutinho**, Tete District (Map 19: 585).

Coordinates: 14°44'S, 34°22'E C, G.

Collectors: H. J. Herbert and A. L. Moore (6–9 Oct 1964).

Habitat: "Habitat same as **Bragan a**, high plateau with scattered rock kopies" (HJH).

Remarks: Herbert and Moore set up their camp near the Mau  River (14°57'S, 34°11'E G). Their coordinates match a circled locality by this name located on an AMP map (AM, *Sheet* 7, 1:1,000,000).

Taxa: *Heterohyrax*; *Acomys*, *Gerbilliscus*, *Aethomys*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*; *Crocidura*; *Mops*.

**Vila Coutinho, 93 km S**, Tete District (Map 19: 587).

Coordinates: 15°28'S, 34°17'E M (AM, *Sheet* 7, 1:1,000,000).

Collectors: H. J. Herbert and A. L. Moore (10–12 Oct 1964).





FIGURE 130. Mozambique, Tete, 2 mi SE: Convoy on road (Jul 1964).

Habitat: “Native field. The terrain is mostly acacia forest with area cleared by the natives for farming” (HJH).

Remarks: The collectors’ original coordinates (15°46’S, 34°28’E) plot this site in Malawi and are clearly in error. Our estimation corresponds to a locality marked on the above-cited map and represents a by-road distance relative to **Vila Coutinho**, the collecting area where the team previously worked.

Taxa: *Otolemur*; *Saccostomus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Dasymys*, *Grammomys*, *Lemniscomys*, *Mastomys*, *Mus*; *Lepus*; *Crociodura*; *Neoromicia*; *Raphicerus*, *Tragelaphus*.

**Vila de Manica, 3 km N**, Manica and Sofala District (Map 19: 604).

Coordinates: 18°55’S, 32°54’E M (AM, Sheet 3, 1:1,000,000).

Collectors: R. M. Davis and A. R. Hardy (28–31 Aug 1964).

Habitat: “Mashambas . . . tall grasses . . . tree savanna . . . banana trees . . . old gold mines” (RMD).

Remarks: Davis and Hardy camped and trapped just north of Vila de Manica (18°56’S, 32°53’E G). They also collected bats from abandoned gold mine tunnels and in funnel-shaped banana leaves at 10 km N Vila de Manica. Near the end of their stay, they collected at nearby **Vumba Mountain**.

Taxa: *Otolemur*; *Uranomys*, *Aethomys*, *Lemniscomys*, *Mastomys*; *Rhinolophus*, *Pipistrellus*, *Neoromicia*.

**Vila Gamito, 10 km N**, Tete District (Map 19: 582).

Coordinates: 14°04’S, 32°59’E C.

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, J. C. Lingeback, A. L. Moore, and H. W. Setzer (9–10 Aug 1964).

Habitat: “Old gold mine tunnel” (RMD). “Tree savanna” (Figures 131, 132) (specimen labels).



FIGURE 131. Mozambique, Vila Gamito, 10 km N (Aug 1964).



FIGURE 132. Mozambique, Vila Gamito, 10 km N (Aug 1964).

Remarks: The team camped about 2 km N Vila Gamito, at Mualadze (14°10'S, 32°59'E G), but obtained only a few rodents at their base. We used the 10-km-N designation as the cardinal locality because the majority of specimens, mostly bats, were taken there.

Taxa: *Dendromus*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*; *Rhinolophus*, *Hipposideros*, *Triaenops*, *Nycteris*, *Miniopterus*; *Raphicerus*.

**Vila Gamito, 22 km S**, Tete District (Map 19: 581).

Coordinates: 14°21'S, 32°58'E M (AM, *Sheet* 7, 1:1,000,000).

Collector: J. C. Lingeback (11 Aug 1964).

Habitat: "Tree savanna" (specimen label).

Remarks: A *Papio* was opportunistically collected at this locality after the AMP team had departed **10 km N Vila Gamito**.

Taxon: *Papio*.

**Vila Gouveia**, Manica and Sofala District (Map 19: 599).

Coordinates: 18°03'S, 33°11'E G (as Catandica).

Collectors: R. M. Davis, A. R. Hardy, and J. C. Lingeback (21–25 Aug 1964).

Habitat: "Creek . . . pool . . . mashamba . . . banana trees . . . rocky mountain side [also referred to as 'hillside'] . . . small old building" (RMD).

Remarks: The team camped next to a creek that had been dammed to form a pool. A mark on map AM, *Sheet* 4 (1:1,000,000) is situated in foothills approximately 2 km SW Vila Gouveia and may represent the focus of the team's fieldwork.

Taxa: *Carpitalpa*, *Otolemur*; *Acomys*, *Gerbilliscus*, *Lemniscomys*, *Mastomys*, *Mus*, *Cryptomys*; *Lepus*; *Crocidura*; *Rhinolophus*, *Nycteris*, *Tadarida*, *Pipistrellus*, *Neoromicia*; *Sylvicapra*.

**Vila Machado**, Manica and Sofala District (Map 19: 607).

Coordinates: 19°16'S, 34°13'E G (as Nhamatanda).

Collectors: R. M. Davis and A. R. Hardy (15 Sep 1964).

Habitat: "Buildings of the hospital" (RMD).

Remarks: The team returned to the village to collect bats while they were camped at **3 km SE Vila Machado** (10–14 Sep).

Taxa: *Chaerephon*, *Mops*.

**Vila Machado, 3 km SE**, Manica and Sofala District (Map 19: 608).

Coordinates: 19°18'S, 34°13'E M (AM, *Sheet* 3, 1:1,000,000; WAC, *Mazoe River*, 1:1,000,000).

Collectors: R. M. Davis and A. R. Hardy (10–14 Sep 1964).

Habitat: "The same tree savanna type habitat . . . mashambas . . . vegetation too thick . . . nearby creek . . . fields" (RMD).

Remarks: Davis and Hardy established camp to the southeast of Vila Machado on a tributary of the M'Tuchira River according to both maps referenced. On 10 Sep, they went night hunting at 10 km SE Vila Machado.

Taxa: *Elephantulus*; *Otolemur*, *Cercopithecus*; *Acomys*, *Gerbilliscus*, *Lemniscomys*, *Mastomys*, *Thryonomys*; *Lepus*; *Crocidura*; *Genetta*; *Ourebia*, *Redunca*.

**Vila Paiva de Andrada, 4 km NE**, Manica and Sofala District (Map 19: 602).

Coordinates: 18°39'S, 34°06'E M (AM, *Sheet* 3, 1:1,000,000).

Collectors: R. M. Davis and A. R. Hardy (25–29 Sep 1964).

Habitat: "What would be called a forest, I guess . . . mashambas . . . hollow tree" (RMD).

Remarks: Davis and Hardy camped to the northeast of Vila Paiva de Andrada (18°41'S, 34°04'E G, as Gorongosa) along the road to Chemba.

Taxa: *Otolemur*; *Saccostomus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Pelomys*, *Cryptomys*; *Lepus*; *Felis*, *Genetta*.

**Vila Pery**, Manica and Sofala District (Map 19: 606).

Coordinates: 19°07'S, 33°29'E G (as Chimoio G).

Collectors: R. M. Davis and A. R. Hardy (3–8 Sep 1964).

Habitat: "Mashambas . . . typical tree savanna community [Figure 133] . . . trees and bushes in the middle of the village" (RMD).

Remarks: Davis and Hardy established their base in a burned area just southwest of Vila Pery (also known as Chimoio per the USBGN). An AMP map (AM, *Sheet* 3, 1:1,000,000) contains an annotation, located approximately 3 km SSW Vila Pery, that may have been placed to indicate their actual campsite.

Taxa: *Petrodromus*; *Chlorocebus*; *Paraxerus*, *Saccostomus*, *Dendromus*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Otomys*, *Cryptomys*, *Thryonomys*; *Lepus*; *Crocidura*; *Civettictis*; *Tragelaphus*.

**Vila Vasco da Gama**, Tete District (Map 19: 579).

Coordinates: 14°54'S, 32°15'E C, G (as Chiputo G).

Collectors: H. J. Herbert and A. L. Moore (13–16 Sep 1964).

Habitat: "Mountain marsh. The local Chef de Post grows coffee, peaches, mangoes, passion fruit, citrus, all vegetables, bananas, and mealy" (HJH).



FIGURE 133. Mozambique, Vila Pery: Mau Mountain (photograph by H. W. Setzer, 1964).

Remarks: Vila Vasco da Gama (or Chiputo per the USBGN) is on the southern slopes of Montes Tchiputo. Herbert recorded that they collected at an elevation of 4,000 ft [1,219 m].

Taxa: *Aethomys*, *Dasymys*, *Grammomys*, *Mastomys*, *Mus*, *Pelomys*, *Heliophobius*; *Lepus*; *Crocidura*; *Atilax*.

**Vilanculos, 2 km W**, Inhambane District (Map 19: 615).

Coordinates: 21°59'S, 35°19'E C.

Collectors: R. E. Cole and A. L. Moore (1–4 Apr 1964).

Habitat: “The soil is sandy and there is quite a bit of bush—both thorny and otherwise present. Also, some corn fields . . . *Acacia* trees . . . 2–3 foot [0.6–0.9 m] tall grass” (REC).

Remarks: The collectors’ longitude equates to that of the town itself (22°00'S, 35°19'E G, as Vilankulo); a plot 2 km W is closer to 21°59'S, 35°17'E. The team went night hunting at 32 km SW Vilanculos and shot two *Otolemur* in *Acacia* trees, a *Lepus* in tall grass, and a

*Kobus*. A *Mops* was collected in a school house on the W edge of Vilanculos.

Taxa: *Otolemur*; *Gerbilliscus*; *Lepus*; *Mops*; *Kobus*.

**Vumba Mountain, 5 km S Vila de Manica**, Manica and Sofala District (Map 19: 605).

Coordinates: 18°59'S, 32°53'E G (as Vumba).

Collectors: R. M. Davis and A. R. Hardy (1 Sep 1964).

Habitat: “Stream with very dense vegetation . . . mossy fallen log right next to the stream” (RMD).

Remarks: Davis and Hardy briefly collected at this locality toward the end of their stay at 3 km N Vila de Manica (28–31 Aug).

Taxa: *Dendromus*, *Acomys*, *Grammomys*; *Crocidura*.

**Zambuè**, Tete District (Map 19: 575).

Coordinates: 15°06'S, 30°48'E C (15°07'S, 30°48'E G).

Collectors: H. J. Herbert and A. L. Moore (1–4 Sep 1964).

Habitat: “We trapped in a marsh area and in open fields. The terrain is tree savanna” (HJH).

Remarks: Herbert was impressed by the abundance of large game at Zambuè.

Taxa: *Acomys*, *Gerbilliscus*, *Grammomys*, *Mastomys*, *Mus*; *Lepus*; *Rhynchogale*; *Tragelaphus*, *Sylvicapra*.

**Zumbo**, Tete District (Map 19: 576).

Coordinates: 15°38'S, 30°26'E C (15°37'S, 30°27'E G).

Collectors: H. J. Herbert and A. L. Moore (25–30 Aug 1964).

Habitat: “Acacia, acacia grass” (specimen labels).

Remarks: Zumbo is located on the Zambeze River. Other than minimal skin-tag remarks, Herbert provided no other habitat description for the place.

Taxa: *Elephantulus*; *Paraxerus*, *Saccostomus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Pelomys*; *Lepus*; *Crocidura*; *Felis*, *Genetta*; *Raphicerus*.

#### SOUTH AFRICA AND LESOTHO

**GENERAL REMARKS.** South Africa received by far the greatest collecting effort of the 20 countries visited by AMP field teams. Twenty-one of 26 collectors active in the southern Africa region spent at least some of their time in South Africa, and some collecting activity occurred in each year over the period 1963–1969 (Table 1); correlated person-days of survey effort surpassed that devoted to any other country and by a substantial margin (Table 11); the complex geography, diverse environments, and large area of the country demanded widespread collecting for even minimally informative biological inventory (154 cardinal localities recognized; Map 20); and the total specimens collected were consequently the greatest, especially of Rodentia (Table 6, Figure 4). The success of AMP ventures in South Africa crucially depended on the collegiality formed between Setzer and Waldo Meester, Curator of Mammals in the Transvaal Museum (1952–1963), Pretoria, and later founder and director of the Mammal Research Institute (1966–1971), University of Pretoria. Meester, together with others from the Transvaal Museum, such as C. G. Coetzee and I. L. Rautenbach, provided important in-country logistical support and served as local contacts for arranging permits and collecting access in South Africa, as well as other southern African countries. The South African Institute of Medical Research (SAMIR) also provided support in South Africa.

The Orange River Survey formed a discrete and focused project within the course of South African survey, carried out in collaboration with the Mammal Research Institute,

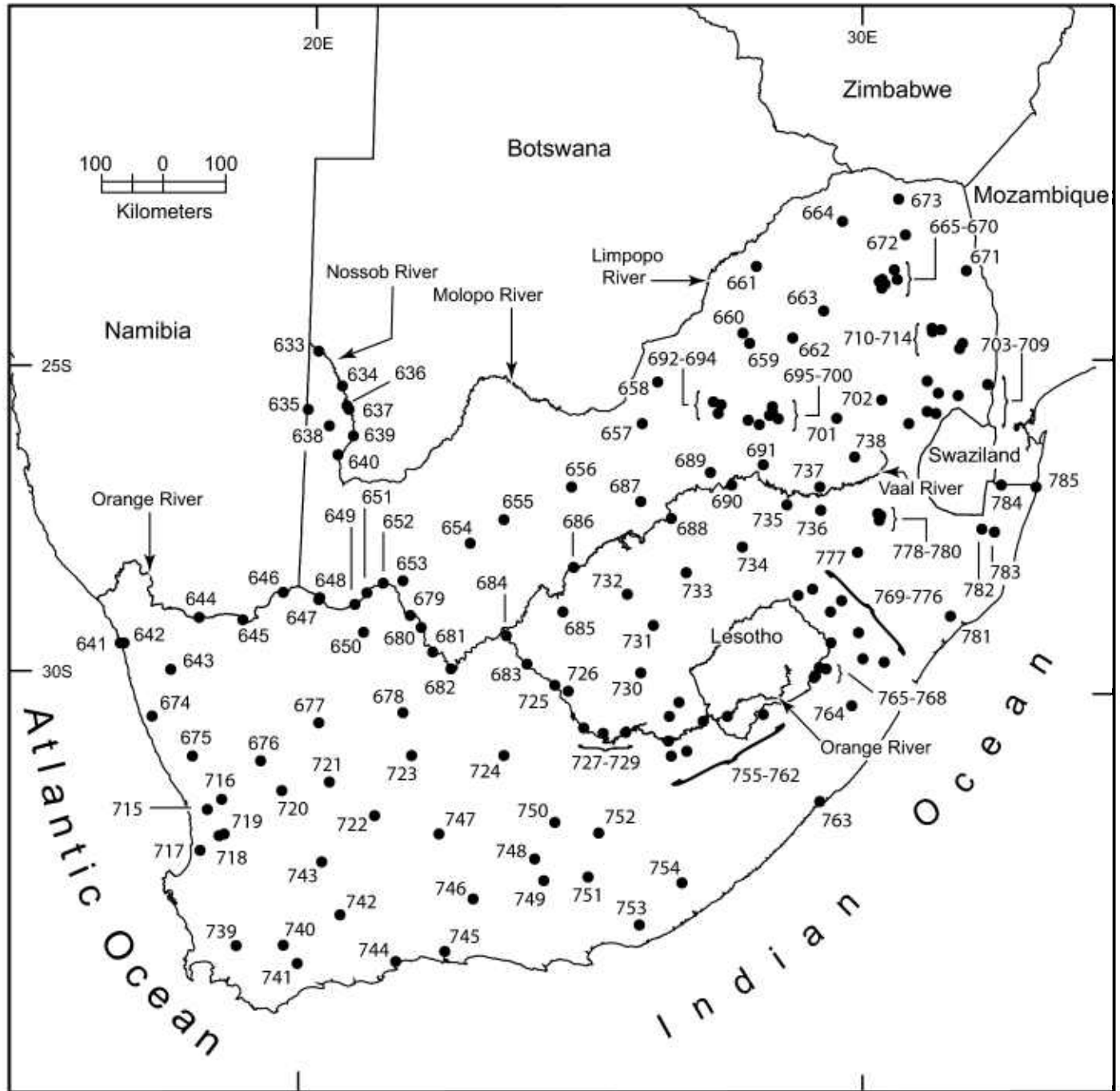
University of Pretoria. Approximately one year in duration (Feb 1968 to Jan 1969), the expedition involved four collectors (A. V. W. Lambrechts, O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius) whose mission was to gather baseline distributional data on small mammals that would be potentially impacted by planned hydrologic impoundments and agricultural development along the Orange River. The itinerary of Lambrechts, the principal collector for the Orange River Survey, also covered major tributaries of the Orange, including the Aub, Great Fish, Nossob, Small Fish, and Sundays rivers. Collecting protocol applied during the Orange River Survey was deliberately standardized and involved two rounds of collection at a given locality (separated by about six months), establishment of traplines on both sides of the river at any given locality, and deployment of a set number of traps in survey lines (200 traps each) on each river bank. At collecting sites where the Orange River forms the border between provinces or countries, the province/country named first in the supplemental locality string is that where the camp was made.

More than elsewhere, South African localities often contain the names of small family farms as the most geographically precise place-name. In instances where we were unable to locate farms with certainty, we relegated them to the nonbold supplementary locality information and relied upon other locality data to georeference the locality (typically distance and direction references to some larger town). Occasionally, a farm is mentioned in a collector's field journal but was not included in the formal locality designation as written on labels or in the field catalog. In these cases, the farm name may serve to provide the locality coordinates, and we emphasized its utility in the Remarks section.

**ITINERARIES (INCLUDING LESOTHO AND SOUTH AFRICA).** R. E. Cole (A. L. Moore, P. J. Geldenhuys, A. C. Risser, and H. W. Setzer): **5 mi NE Ellisras**, 24–28 Aug 1963; **Alicecot**, 14–17 Sep 1963; **2 mi E Rustenburg**, 6–11 Oct 1963; **22 mi NNW Lichtenburg**, 11–17 Oct 1963; **6 mi N, 1 mi W Wolmaransstad**, 19–24 Oct 1963; **Uitkomst (Farm)**, 2–6 Nov 1963.

R. E. Cole, P. J. Geldenhuys, and A. C. Risser (A. L. Moore): **5 mi E Port Nolloth**, 29 Nov–4 Dec 1963; **Modderfontein**, 6–12 Dec 1963; **5 mi E Van Rhynsdorp**, 14–17 Dec 1963; **2 mi W Klawer**, 17 Dec 1963; **Pakhuis Pass**, 18–22 Dec 1963.

A. C. Risser (P. J. Geldenhuys): **2 mi N Clanwilliam**, 18–20 Dec 1963; **Kluitjieskraal**, 5–7 Jan 1964; **9 mi N Mosselbaai**, 8–12 Jan 1964; **Goudveld**, 14–20 Jan 1964; **Brakfontein**, 22–24 Jan 1964; **DeHoop**, 25–29 Jan 1964; **Modderfontein**, 30 Jan–2 Feb 1964.



MAP 20. African Mammal Project cardinal collecting localities 633–785 in South Africa and Lesotho.

- |                               |                               |                             |                              |
|-------------------------------|-------------------------------|-----------------------------|------------------------------|
| 633. Groot Kolk, 2 mi SE      | 642. Port Nolloth, 5 mi E     | 651. Louisvale, 1 mi N      | 660. Buffelshoek             |
| 634. Nossob Camp              | 643. Modderfontein            | 652. Uptington, 13 mi E     | 661. Ellisras, 5 mi NE       |
| 635. Mata Mata                | 644. Goodhouse                | 653. Uptington, 35 mi NE    | 662. Nylstroom, 4 mi E       |
| 636. Kameelsleep, 5 mi N      | 645. Pella Mission, 10 mi NW  | 654. Sishen                 | 663. Moordrift               |
| 637. Dikbaardskolk, 3 mi N    | 646. Stolzenfels              | 655. Kuruman, 6 mi E        | 664. Brakrivier              |
| 638. Kamkwa (Borchole)        | 647. Aughrabies, 7 mi W       | 656. Vlakfontein            | 665. Haenertsburg, 2 mi E    |
| 639. Twee Rivieren, 30 mi NNE | 648. Aughrabies Falls, 1 mi S | 657. Lichtenburg, 22 mi NNW | 666. Magoebaskloof           |
| 640. Twee Rivieren            | 649. Keimoes Island           | 658. Kleinfontein           | 667. Houtbosdorp, 2 mi E     |
| 641. Port Nolloth, 2 mi S     | 650. N'Rougas Farm            | 659. Rooiberg, 2 mi W       | 668. Woodbush Forest Reserve |
- (continued)*

*(Map 20 collecting localities, continued)*

669. Tzaneen, 12 mi N  
 670. Tzaneen, 6 mi NE  
 671. Groot Letaba (Game Reserve)  
 672. Klein Letaba (Post Office), 8 mi W  
 673. Tshipise, 1 mi NE  
 674. Wallekraal  
 675. Bitterfontein, 3 mi NNW  
 676. Loeriesfontein, 6 mi S  
 677. Brandvlei, 2 mi S  
 678. Van Wyksvlei, 11 mi E  
 679. Groblershoop, 2 mi NW  
 680. Boegoeberg Dam, 1/2 mi E  
 681. Koegas, 10 mi SE  
 682. Prieska, 1 mi E  
 683. Hopetown, 2 mi NE  
 684. Douglas, 10 mi S  
 685. Carter's Ridge  
 686. Warrenton, 2 mi E  
 687. Wolmaransstad, 6 mi N, 1 mi W  
 688. Bothaville, 6 mi NW  
 689. Potchefstroom, 3 mi ENE  
 690. Parys, 5 mi ENE  
 691. Vereeniging, 10 mi NE [SE]  
 692. Commisiondrift  
 693. Rustenburg, 2 mi E  
 694. Rustenburg, 5 mi W  
 695. Uitkomst Farm  
 696. Jukskei River  
 697. Zwartkop  
 698. Wonderboom  
 699. Fountains  
 700. Rietvlei Dam  
 701. Witbank Dam  
 702. Hartbeespruit  
 703. Badplaas  
 704. Barberton, 14 mi W  
 705. Barberton, 2 mi SW  
 706. Witrivier, 11 mi W  
 707. Nelspruit, 4 mi E, 2 mi S  
 708. Malclane, 7 mi SW  
 709. Komatipoort, 2 mi N  
 710. Mariepskop Forest Reserve  
 711. Mariepskop Mountain  
 712. Klaserie  
 713. Alicecot  
 714. Newington, 7 mi ENE  
 715. Klawer, 2 mi W  
 716. Van Rhynsdorp, 5 mi E  
 717. Redelinghuys, 6 mi WNW  
 718. Clanwilliam, 2 mi N  
 719. Pakhuis Pass  
 720. Calvinia, 6 mi E  
 721. Rietfontein  
 722. Gansfontein  
 723. Carnarvon, 1 1/2 mi E  
 724. Modderfontein  
 725. Petrusville, 12 mi W  
 726. Knoffelfontein  
 727. Philippolis, 18 mi S  
 728. Norvalspont, 8 mi E  
 729. Bethulie, 3 mi S  
 730. Reddersburg, 2 mi S  
 731. Glen  
 732. Dealesville, 9 mi N  
 733. Welgelee  
 734. Lindley, 10 mi NW  
 735. Frankfort, 9 mi N  
 736. Vrede, 15 mi N  
 737. Standerton, 10.7 mi W  
 738. Davel  
 739. Stettynskloof  
 740. Montagu, 4 mi W  
 741. Kluitjieskraal  
 742. Wagendrift  
 743. Gunsfontein  
 744. Mosselbaai, 9 mi N  
 745. Goudveld  
 746. Brakfontein  
 747. DeHoop  
 748. Graaff-Reinet, 23 mi SE  
 749. Jansenville, 8 mi NE  
 750. Coloniesplaats  
 751. Somerset East, 5 mi W  
 752. Cradock, 8 mi N  
 753. Grahamstown, 11 mi SSW  
 754. Pirie Trout Hatchery  
 755. Lady Grey, 12 mi SW  
 756. Hillside  
 757. Aliwal North, 2 mi E  
 758. Smithfield, 14 mi S  
 759. Weenkop  
 760. Sterkspruit, 12 mi N  
 761. Fort Hartley [Lesotho]  
 762. Mariazell Mission  
 763. Port St. Johns, 4 mi W  
 764. Sneezewood, 7 mi NW  
 765. Drakensberg Garden(s) Hotel, 2 mi W  
 766. Drakensberg Garden(s), 2 mi N  
 767. Sani Pass  
 768. Makhake Store  
 769. Hardingdale  
 770. Kilgobbin  
 771. Giant's Castle Game Reserve  
 772. Petchaye  
 773. Zuurlaager  
 774. Rydalmont  
 775. Harrismith, 12 mi S  
 776. Smalhoek  
 777. Newcastle, 10 mi S  
 778. Groenkloof Farm  
 779. Goedgevonde  
 780. Wakkerstroom, 2 mi E  
 781. Eshowe, 6 mi E  
 782. Nkonkoni  
 783. Makatini Flats  
 784. Ndumu Game Reserve boundary  
 785. Kosi Bay

A. C. Risser (P. J. Geldenhuys, A. F. Hallett, and T. A. Heist): Coloniesplaats, 13–16 Feb 1964; 11 mi SSW Grahamstown, 19–22 Feb 1964; Pirie Trout Hatchery, 24 Feb–3 Mar 1964; Hillside, 3–8 Mar 1964; 14 mi S Smithfield, 9 Mar 1964; 2 mi S Reddersburg, 9 Mar 1964; Knoffelfontein, 10–13 Mar 1964; Glen, 17–22 Mar 1964; 9 mi N Dealesville, 21 Mar 1964; 6 mi NW Bothaville, 25–27 Mar 1964; Rydalmont, 29 Mar–1 Apr 1964.

T. A. Heist and A. C. Risser (J. E. W. Dixon and G. R. Hughes): Petchaye, 3–6 Apr 1964; Giant's Castle Game Reserve, 4, 10 Apr 1964; Hardingdale, 9–13 Apr 1964; 6 mi E Eshowe, 17–21 Apr 1964; Makatini Flats, 22–26 Apr 1964; Nkonkoni, 28–30 Apr 1964; Kosi Bay, 2–8 May 1964; Ndumu Game Reserve, 10 May 1964.

R. M. Davis, A. R. Hardy, and A. L. Moore (H. J. Herbert): Mariepskop Forest Reserve, 3–7 Dec 1964; Woodbush Forest Reserve, 9–11 Dec 1964; Rietvlei Dam, 12 Dec 1964; 12 mi N Tzaneen, 14–18 Dec 1964.

T. N. Liversedge (R. D. Hepplewhite): Jukskei River, 19 Sep 1965; Fountains, 21 Sep–9 Oct, 19–22 Oct 1965; Wonderboom, 26–27 Oct 1965; 5 mi W Rustenburg, 1–2 Nov 1965; 2 mi W Rooiberg, 4–7 Dec 1965; 4 mi E Nylstroom, 8–11 Dec 1965; Moordrift, 13–16 Dec 1965; Brakrivier, 17–19 Dec 1965; Sani Pass, 8–10 Jan 1966; 2 mi W Drakensberg(s) Garden Hotel, 11–14 Jan 1966; Mariazell Mission, 15–17 Jan 1966; 7 mi NW Sneezewood, 19–20 Jan 1966; Groenkloof Farm, 25 Jan 1966; 5 mi W Rustenburg, 29–31 Jan 1966.

R. D. Hepplewhite and A. R. Silberstein: 35 mi NE Upington, 11 Mar 1966.

R. D. Hepplewhite and A. R. Silberstein (S. D. Durrant, I. L. Rautenbach, and H. W. Setzer): Goedgevonde, 17–23 Jun 1966; Zuurlaager, 25–27 Jun 1966; Kilgobbin, 28 Jun–1 Jul 1966; Makhake Store, 2–6 Jul 1966; 2 mi N Drakensberg Garden(s), 7–9 Jul 1966; 4 mi W Port St. Johns, 14–18 Jul 1966; 12 mi SW Lady Grey, 20–23 Jul

1966; Weenkop, 25–29 Jul 1966; 2 mi E Warrenton, 10–13 Aug 1966; 11 mi E Van Wyksvlei, 15–19 Aug 1966; 7 mi W Aughrabies, 21–24 Aug 1966; 1 mi N Louisvale, 25–28 Aug 1966; Sishen, 28 Aug 1966; 6 mi E Kuruman, 30 Aug–2 Sep 1966; Vlakkfontein, 3–6 Sep 1966; 2 mi S, 4 mi E Nelspruit, 23–26 Sep 1966; Klaserie, 27–30 Sep 1966; Magoebaskloof, 30 Sep–3 Oct 1966; 2 mi E Haenertsburg, 13–23 Oct 1966; 2 mi E Houtbosdorp, 25–27 Oct 1966.

I. L. Rautenbach and A. R. Silberstein: 2 mi SW Barberton, 16–23 Nov 1966; 7 mi SW Malelane, 24 Nov–4 Dec 1966; 11 mi W Witrivier, 6–13 Dec 1966; Mariëskop Mountain, 17–18 Dec 1966; 1 mi NE Tshipise, 7–16 Jan 1967; 8 mi W Klein Letaba, 18–24 Jan 1967; 2 mi E Houtbosdorp, 26 Jan–4 Feb 1967; 6 mi NE Tzaneen, 5–15 Feb 1967.

A. V. W. Lambrechts (S. J. Liversedge, J. J. L. Pretorius, H. W. Setzer, and O. F. Graupner), Orange River Survey: 12 mi N Sterkspruit, 19–24 Feb 1968; 2 mi E Aliwal North, 25 Feb–8 Mar 1968; Fort Hartley (Lesotho), 11–13 Mar 1968; 3 mi S Bethulie, 17–21 Mar 1968; 8 mi E Norvalspont, 23–27 Mar 1968; 8 mi N Cradock, 29 Mar–3 Apr 1968; 5 mi W Somerset East, 4–8 Apr 1968; 8 mi NE Jansenville, 8–15 Apr 1968; 23 mi SE Graaff-Reinet, 17–22 Apr 1968; 18 mi S Philippolis, 24–28 Apr 1968; 12 mi W Petrusville, 30 Apr–4 May 1968; 2 mi NE Hopetown, 6–10 May 1968; 10 mi S Douglas, 12–17 May 1968; 1 mi E Prieska, 19–23 May 1968; 10 mi SE Koegas, 25–29 May 1968; 1/2 mi E Boegoeberg Dam, 31 May–4 Jun 1968; 2 mi NW Groblershoop, 5–9 Jun 1968; 13 mi E Upington, 12–16 Jun 1968; Keimoes Island, 18–22 Jun 1968; 1 mi S Aughrabies Falls, 24–28 Jun 1968; Stolzenfels, 30 Jun–3 Jul 1968; 10 mi NW Pella Mission, 5–8 Jul 1968; 2 mi E Aliwal North, 1–4 Aug 1968; 12 mi N Sterkspruit, 6–10 Aug 1968; 3 mi S Bethulie, 12–17 Aug 1968; 8 mi E Norvalspont, 22–26 Aug 1968; 8 mi N Cradock, 28–31 Aug 1968; 5 mi W Somerset East, 3–7 Sep 1968; 8 mi NE Jansenville, 9–13 Sep 1968; 23 mi SE Graaff-Reinet, 20–24 Sep 1968; 18 mi S Philippolis, 25–30 Sep 1968; 12 mi W Petrusville, 2–6 Oct 1968; 2 mi NE Hopetown, 8–12 Oct 1968; 10 mi S Douglas, 14–17 Oct 1968; 1 mi E Prieska, 20–24 Oct 1968; 10 mi SE Koegas, 26–30 Oct 1968; 1/2 mi E Boegoeberg Dam, 1–5 Nov 1968; 2 mi NW Groblershoop, 7–11 Nov 1968; 13 mi E Upington, 14–17 Nov 1968; 7 mi ENE Newington, 16–18 Nov 1968; Nossob Camp, 23–26 Nov 1968; 2 mi SE Groot Kolk, 27–29 Nov 1968; 3 mi N Dikbaardskolk, 29 Nov 1968; 5 mi N Kameelsleep, 30 Nov–3 Dec 1968; Twee Rivieren, 4–7 Dec 1968; 30 mi NNE Twee Rivieren, 5 Dec 1968; Mata Mata, 9–12 Dec 1968; Kamkwa (Borehole), 11 Dec 1968; Keimoes Island, 6–10 Jan 1969; 1 mi S

Aughrabies Falls, 11–15 Jan 1969; Stolzenfels, 17–21 Jan 1969; 10 mi NW Pella Mission, 22–24 Jan 1969; Goodhouse, 25–27 Jan 1969.

O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius: Witbank Dam, 12–14 Feb 1969; Hartbeespruit, 15–18 Feb 1969; Badplaas, 19–21 Feb 1969; Davel, 22 Feb–1 Mar 1969; 10.7 mi W Standerton, 2–6 Mar 1969; 15 mi N Vrede, 7–8 Mar 1969; 9 mi N Frankfort, 10–12 Mar 1969; 10 mi NW Lindley, 13–16 Mar 1969; 5 mi ENE Parys, 18–20 Mar 1969; 10 mi NE [SE] Vereeniging, 21–24 Mar 1969; 3 mi ENE Potchefstroom, 25–26 Mar 1969; Zwartkop, 31 Mar 1969; Groenkloof, 1 Apr 1969; Commisiondrift, 10–13 Apr 1969; Buffelshoek, 15–22 Apr 1969; Kleinfontein, 25–27 Apr 1969; Carter's Ridge, 30 Apr–1 May 1969; Welgelee, 4–6 May 1969; 12 mi S Harrismith, 7–11 May 1969; Smalhoek, 16–17 May 1969; 10 mi S Newcastle, 19–21 May 1969; N'Rougas Farm, 1–5 Jun 1969; 2 mi S Brandvlei, 7–10 Jun 1969; 6 mi S Loeriesfontein, 11–14 Jun 1969; 6 mi E Calvinia, 16–21 Jun 1969; Rietfontein, 22–23 Jun 1969; Stettynskloof, 5–8 Jul 1969; 6 mi WNW Redelinguys, 10–14 Jul 1969; Pakhuis Pass, 15–18 Jul 1969; 3 mi NNW Bitterfontein, 19–21 Jul 1969; Wallekraal, 22–25 Jul 1969; 2 mi S Port Nolloth, 27 Jul 1969; 1 1/2 mi E Carnarvon, 16–19 Aug 1969; Gansfontein, 21–23 Aug 1969; Gunsfontein, 25–28 Aug 1969; Wagendrift, 29 Aug–2 Sep 1969; 4 mi W Montagu, 4–8 Sep 1969; 2 mi N Komati-poort, 27 Sep–10 Oct 1969; 14 mi W Barberton, 11–14 Oct 1969; 2 mi E Wakkerstroom, 16–17 Oct 1969; Groot Letaba (Game) Reserve, 29 Oct–6 Nov 1969.

Alicecot, 3 mi [4.8 km] WNW Newington, Transvaal (Map 20: 713).

Coordinates: 24°50'S, 31°22'E G (as Alicecot Farm).

Collectors: R. E. Cole, A. L. Moore, A. C. Risser, and H. W. Setzer (14–17 Sep 1963).

Habitat: "Bush . . . grassland . . . wash near camp . . . waterhole" (ACR). "Rolling grassland quite populated with acacia trees . . . denser stands of grass . . . heavily browsed" (REC).

Remarks: Alicecot Farm is located on the Sabie-Sand Game Refuge, a private reserve. Nine *Gerbilliscus* specimens, originally written as captured WNW Newington, had their labels amended to read 3 mi NNW Newington.

Taxa: *Paraxerus*, *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Lepus*, *Scotophilus*, *Helogale*, *Aepyceros*.

Aliwal North, 2 mi [3.2 km] E, Cape Province/Orange Free State (Map 20: 757).

Coordinates: 30°42'S, 26°44'E M (WAC, Upper Orange River, 1:1,000,000).



Collectors: A. V. W. Lambrechts and S. J. Liversedge (25 Feb–8 Mar 1968); H. W. Setzer (25 Feb–2 Mar 1968); A. V. W. Lambrechts (1–4 Aug 1968).

Habitat: “We are collecting far less specimens than in [Feb] . . . Habitat changes include a big change in vegetation. Coupled with the dry winter season at the moment, the grazing [land] is very much overstocked by Bantu cattle and goats. This resulted in a very sparse grass cover, compared to February” (AVWL, Aug).

Remarks: During both visits to Aliwal North (30°42'S, 26°42'E G), the AMP crew camped on the south bank of the Orange River, to the west of the Orange-Kraai confluence, and collected on both banks.

Taxa: *Elephantulus*; *Xerus*, *Graphiurus*, *Saccostomus*, *Dendromus*, *Malacothrix*, *Mystromys*, *Desmodillus*, *Gerbiliscus*, *Aethomys*, *Mastomys*, *Mus*, *Rattus*, *Rhabdomys*, *Pedetes*, *Cryptomys*; *Galerella*, *Ictonyx*.

**Aughrabies, 7 mi** [11.3 km] W, Rooidam, Cape Province (Map 20: 647).

Coordinates: 28°37'S, 20°15'E M (ONC, *Sheet Q-4*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (21–24 Aug 1966).

Habitat: “The river is about 5 miles [8.0 km] north of us but we can't get to it because it is part of the reserve. We can get to edge of a tributary though but that is cultivated with lucerne [alfalfa] growing there. Around camp there are a lot of thorn bushes growing in the sandy soil . . . Rocky outcrops are scattered around about one mile [1.6 km] from each other and consist mostly of a huge central rock a couple of hundred yards across with a few smaller rocks lying on it” (RDH).

Remarks: Rooidam Farm, where the AMP crew camped, borders a game reserve, a reference to Aughrabies Falls National Park. The Orange River is about 5 mi [8.0 km] to the north, but there it flows through a reserve and was off limits for collecting. The above coordinates were derived by plotting distance over a road likely traveled from Aughrabies (28°38'S, 20°21'E G).

Taxa: *Elephantulus*; *Gerbiliscus*, *Gerbillurus*, *Mastomys*, *Micaelamys*, *Rhabdomys*, *Pedetes*; *Lepus*.

**Aughrabies Falls, 1 mi** [1.6 km] S, Cape Province (Map 20: 648).

Coordinates: 28°36'S, 20°22'E M (WAC, *Lower Orange River*, 1:1,000,000).

Collectors: A. V. W. Lambrechts (24–28 Jun 1968); O. F. Graupner, A. V. W. Lambrechts, and J. J. L. Pretorius (11–15 Jan 1969).

Habitat: “Rocky outcrops to the west of our camp” (AVWL, Jun). “It is very dry and there is almost no green vegetation at all” (AVWL, Jan).

Remarks: This site is within Aughrabies Falls National Park. In Jun, only the south bank of the Orange River was surveyed. The Jan expedition camped in the same spot as in the previous Jun.

Taxa: *Elephantulus*; *Procapia*; *Xerus*, *Saccostomus*, *Petromyscus*, *Desmodillus*, *Gerbiliscus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*, *Pedetes*, *Petromus*; *Crocidura*; *Galerella*, *Ictonyx*.

**Badplaas, 30 mi** [48.3 km] E Carolina, Transvaal (Map 20: 703).

Coordinates: 25°57'S, 30°34'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (19–21 Feb 1969).

Habitat: “Mimosa trees, high grass, shrubs and a few subtropical trees . . . banks of the river . . . The habitat on the river banks changes from rocks and grass to bush and grass and shrubs and then to swampland” (JJLP).

Remarks: The AMP crew set up camp on the grounds of the Transvaal Provincial Administration for the Carolina District in Badplaas, a locality on the Transvaal escarpment. The river mentioned is a tributary of the Komati.

Taxa: *Mastomys*, *Micaelamys*, *Rhabdomys*; *Crocidura*, *Myosorex*.

**Barberton, 2 mi** [3.2 km] SW, Transvaal (Map 20: 705).

Coordinates: 25°48'S, 31°02'E M (WAC, *Delagoa Bay*, 1:1,000,000).

Collectors: I. L. Rautenbach and A. R. Silberstein (16–23 Nov 1966).

Habitat: “Caves and old mines . . . grassy area” (ARS).

Remarks: Some specimens were also collected at 3 mi [4.8 km] SW and 4 mi [6.4 km] SW of Barberton (25°47'S, 31°03'E G).

Taxa: *Dendromus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Lepus*; *Crocidura*; *Rhinolophus*.

**Barberton, 14 mi** [22.5 km] W, Transvaal (Map 20: 704).

Coordinates: 25°46'S, 30°52'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (11–14 Oct 1969).

Habitat: “Mainly in plantations and . . . (thick vegetation along) streams in the plantations . . . mine shafts and tunnels . . . a natural vegetated hill” (JJLP).

Remarks: The team drove west of Barberton (25°47'S, 31°03'E G) and established camp in the Twello Forest (25°48'S, 31°09'E G) area along the main road to Carolina.

Taxa: *Aethomys*; *Myosorex*; *Epomophorus*, *Rhinolophus*.

**Bethulie, 3 mi [4.8 km] S**, Cape Province/Orange Free State (Map 20: 729).

Coordinates: 30°32'S, 25°59'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: A. V. W. Lambrechts (17–21 Mar 1968); A. V. W. Lambrechts and S. J. Liversedge (12–17 Aug 1968).

Habitat: "River bank . . . karoo-grass . . . north bank . . . very sparse grass compared to the south bank. It is also very flat on the north bank and large areas are still flooded or muddy from rain. The habitat changes from riverine shrub to disused cultivated lands (lucerne [alfalfa]) to karoo shrubs with grass on the south bank" (AVWL, Mar).

Remarks: The team drove out of Bethulie (30°30'S, 25°58'E G) on the Bethulie–Bergersdorp road and turned [east], about 200 yards [180 m] south of the bridge over the Orange River. They camped on land administered by the Department of Water Affairs, approximately 800 yards [730 m] east of the main road and about 250 yards [230 m] west of a railroad bridge under construction over the Orange River. A few specimen labels have a locality modifier of 2 mi [3.2 km] S.

Taxa: *Elephantulus*; *Graphiurus*, *Saccostomus*, *Malacothrix*, *Mystromys*, *Desmodillus*, *Gerbillurus*, *Mastomys*, *Mus*, *Rhabdomys*, *Pedetes*; *Lepus*; *Felis*, *Ictonyx*.

**Bitterfontein, 3 mi [4.8 km] NNW**, Cape Province (Map 20: 675).

Coordinates: 30°59'S, 18°15'E M (WAC, *Lower Orange River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (19–21 Jul 1969).

Habitat: "Big areas are cultivated . . . mainly hillsides and rocky outcrops—flat rocks and boulders. The vegetation consists mainly of drought resistant shrubs except a few small spots of grass on the moist hill plateau . . . sandy hillside" (JJLP).

Remarks: The AMP crew camped north-northwest of Bitterfontein (31°02'S, 18°16'E G), just west of the main road to Garies.

Taxa: *Elephantulus*; *Desmodillus*, *Gerbillurus*, *Micaelamys*; *Galerella*.

**Boegoeberg Dam, 1/2 mi [0.8 km] E**, Cape Province (Map 20: 680).

Coordinates: 29°03'S, 22°12'E G (as Boegoeberg Dam).

Collector: A. V. W. Lambrechts (31 May–4 Jun, 1–5 Nov 1968).

Habitat: "The camp is on the flat, grassy area . . . The south survey line runs parallel to and to the east of the mountain on the south bank while the north line cuts in a northeast direction through the hills on the North-bank . . . marshy terrain . . . habitat covered with small rocks and shrubs . . . patches of big rocks" (AVWL, May). "Herd of goats . . . habitat for the [first] 1,000 yards [914 m] of the south line is in a very poor condition. Thereafter it is still very dry, but better, including some grass. On the north bank it is also a lot more dried out than the previous time . . . reed bed next to water's edge" (AVWL, Nov).

Remarks: Camp was set up just east of the Boegoeberg Dam on the south bank of the Orange River during both visits.

Taxa: *Elephantulus*, *Macroscelides*; *Procapra*; *Chlorocebus*; *Saccostomus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*; *Miniopterus*; *Galerella*; *Raphicerus*.

**Bothaville, 6 mi [9.7 km] NW**, Holfontein, Orange Free State (Map 20: 688).

Coordinates: 27°22'S, 26°32'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: A. F. Hallett, T. A. Heist, and A. C. Risser (25–27 Mar 1964).

Habitat: "Camp right on the banks of the Vaal River. Grassy area under acacias and willow. Mealie [corn] fields, riparian, grazing lands . . . heavily grazed grassland adjacent to native kraals . . . sunflower fields. Soil is sandy loam . . . scrub grassland . . . acacia bush—grassland" (ACR).

Remarks: Coordinates are based upon a by-road distance from Bothaville (27°22'S, 26°37'E G); the road runs more directly west than northwest of the city. The farm where they camped was by the Vaal River (Valsrivier G), but we could not locate a Holfontein farm in such a geographic context. On 24 Mar, they trapped a rocky outcrop about 4 mi [6.4 km] from their camp, though without success.

Taxa: *Elephantulus*; *Gerbilliscus*, *Mastomys*, *Cryptomys*;  
*Lepus*; *Genetta*, *Cynictis*, *Galerella*, *Ictonyx*.

**Brakfontein**, 12 mi [19.3 km] N Willowmore, Cape  
Province (Map 20: 746).

Coordinates: 33°08'S, 23°26'E G (as Brakfontein Farm).

Collectors: P. J. Geldenhuys and A. C. Risser (22–24 Jan  
1964).

Habitat: “This is karoo scrub. Domestic stock is angora  
goats and sheep. Red soil and rocky underfoot . . .

tents under the acacias . . . The change in vegetation  
from Knysna[’s ecoregion] (**Goudveld**) to [Brakfontein’s]  
karoo ecoregion coming over the pass was very definite . . .  
small creek with some pools . . . rocky kopje . . . rocky  
outcropping . . . sandy soil . . . stream . . . brackish . . .  
riparian association of acacias and scattered bush [Figure 134]  
. . . Area we set in was sand, succulent (karoo scrub) and  
thorn bushes” (ACR).

Remarks: Of several farms named Brakfontein in the  
region, the cited coordinates agree very closely to the



FIGURE 134. South Africa, Brakfontein: Field camp in karoo scrub, 12 mi N Willowmore (photograph by A. C. Risser, Jan 1964).

distance and direction from Willowmore as verified on available maps. It is unclear whether the habitat description about Knysna refers to the vegetative type, to the town, or perhaps to both. On 24 Jan, Joe DeBeer, an employee of the McGregor Museum in Kimberly, collected a *Procavia* in a rocky kopje to the south of the mountain (perhaps a reference to Die Langkloof) at Neve Plaas (33°46'S, 23°34'E G, likely as Nuweplaas). The provenience of this specimen in Risser's catalog was attributed to Brakfontein Farm. It appears that only parasites were taken from this specimen, as it was not received at the NMNH.

Taxa: *Macroscelides*; *Saccostomus*, *Desmodillus*, *Gerbillurus*, *Mastomys*, *Micaelamys*, *Myomyscus*, *Rhabdomys*, *Myotomys*, *Parotomys*; *Crocidura*; *Rhinolophus*, *Tadarida*, *Neoromicia*.

**Brakrivier**, 26 mi [41.8 km] NW Bochum, Transvaal (Map 20: 664).

Coordinates: 22°59'S, 29°12'E M (WAC, *Shashi River*, 1:1,000,000).

Collectors: R. D. Hepplewhite and T. N. Liversedge (17–19 Dec 1965).

Habitat: "Rocky hill . . . banks of the dry Brakrivier" (TNL). "Thorn trees" (specimen labels).

Remarks: Hepplewhite and Liversedge drove to Bochum (23°17'S, 29°07'E G) and camped about 2 mi [3.2 km] north of the Brakrivier Bridge (Liversedge's journal). Coordinates provided above were based upon the description "2 miles N of Brakrivier bridge [road crossing river]," about 26 mi [41.8 km] from Bochum. The road from Bochum actually trends north-northeast rather than northwest. African Mammal Project maps do not show a bridge over the Brakrivier 26 mi to the northwest of Bochum as indicated on specimen labels. On 17 Dec, they trapped at a rocky hill about 0.5 mi [0.8 km] from camp; on 18 Dec, the traps were reset along the dry Brakrivier. Some Liversedge specimens were labeled Brakrivier Bridge, 25 mi [40.2 km] NW Bochum, although this variant was not indicated in his field catalog. A *Paraxerus*, collected by Hepplewhite, was labeled Trooivlei, 26 mi [41.8 km] NW Bochum. Efforts to locate Trooivlei on maps were unsuccessful.

Taxa: *Paraxerus*, *Saccostomus*, *Aethomys*, *Mastomys*.

**Brandvlei**, 2 mi [3.2 km] S, Cape Province (Map 20: 677).

Coordinates: 30°29'S, 20°28'E M (WAC, *Lower Orange River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (7–10 Jun 1969).

Habitat: "The ground surface changes from sandy to gravel soil with drought resistant vegetation and no rocky outcrops for miles" (JJLP).

Remarks: The AMP team camped on the municipal grounds south of Brandvlei (30°27'S, 20°29'E G).

Taxa: *Macroscelides*; *Gerbillurus*, *Parotomys*; *Suricata*, *Otocyon*.

**Buffelshoek**, 16 mi [25.7 km] SE Thabazimbi, Transvaal (Map 20: 660).

Coordinates: 24°32'S, 27°37'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (15–22 Apr 1969).

Habitat: "Typical bush savanna of the Bushveld with high hill ridges running through . . . flat area crossing waterstreams . . . flat sandy soil area with trees, (shrubs) and grass . . . marshy area and edge of cultivated lands and through a poplar plantation . . . trapping in the hills and mountains" (JJLP).

Remarks: The crew camped on the Buffelshoek Farm owned by H. C. Fouché, off of the road to Warmbad–Alma. Specimens tags, field catalogs, and Pretorius' journal all place the farm as "16 mi SE Thabazimbi," but the coordinates of Buffelshoek fall east-southeast of Thabazimbi (24°36'S, 27°24'E G). The farm's coordinates do intersect a point about 16 road miles from Thabazimbi (TPC, *Sheet Q-5A*, 1:500,000) and are consistent with other local landmarks mentioned by the collectors. A series of *Miniopterus*, labeled as from Buffelshoek, were taken on 15 Apr from a cave located at Gatkoppie, also along the Warmbad–Alma road but at 20 mi [32.2 km] "SE" Thabazimbi; a Gatkop Mountain (24°36'S, 27°38'E G) lies due east of Thabazimbi. On 22 Apr, they obtained bats from a cave on the nearby Waterval Farm (24°36'S, 27°36'E G), also recorded as 16 mi "SE" Thabazimbi but, in fact, due east of that town. On 16 Apr, they unsuccessfully explored caves and mine shafts for bats at 6 mi [9.7 km] NW Thabazimbi; a *Procavia* was collected there, although its locality too is designated as Buffelshoek.

Taxa: *Elephantulus*; *Procavia*; *Paraxerus*, *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*; *Rhinolophus*, *Hipposideros*, *Nycteris*, *Scotophilus*, *Neoromicia*, *Miniopterus*; *Galerella*; *Raphicerus*.

**Calvinia**, 6 mi [9.7 km] E, Cape Province (Map 20: 720).

Coordinates: 31°30'S, 19°53'E M (WAC, *Lower Orange River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (16–21 Jun 1969).

Habitat: “Various karoo shrubs and the soil is mainly sandy with a few rocky ridges between two parallel running mountains far off on the north and south . . . edges of cultivated lands . . . edge of a dry ditch . . . sides of a river which still have a few pools of water” (JJLP). “Gravel and shrubs,” “bare gravel ground,” “drought resistant shrubs” (specimen labels).

Remarks: Coordinates are based on by-road miles along the Williston road to the east of Calvinia (31°28'S, 19°47'E G) and near the Kobe River. Pretorius referred to the farm where they camped as Onderdownes (31°31'S, 19°56'E G, as Onder-Downs) in his journal and as Onderdownes Wes in his field catalog. Onderdownes proper is improbably far to the east of their field site, but the Onderdownes Wes designation may represent a nongazetted outlier to the main farm complex.

Taxa: *Macrosclides*; *Desmodillus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*, *Myotomys*, *Cryptomys*; *Rhinolophus*; *Cynictis*, *Otocyon*, *Ictonyx*; *Raphicerus*.

**Carnarvon, 1 1/2 mi [2.4 km] E, Cape Province**  
(Map 20: 723).

Coordinates: 30°58'S, 22°09'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (16–19 Aug 1969).

Habitat: “Flat sandy areas alongside dry river bed with typical semi dense karooveld (small bush)” (JJLP).

Remarks: The AMP party pitched camp on the municipal grounds to the east of Carnarvon (30°57'S, 22°08'E G), probably along the dry Carnarvon River bed.

Taxa: *Macrosclides*; *Gerbillurus*, *Rhabdomys*; *Ictonyx*.

**Carter's Ridge, 1 mi [1.6 km] W Kimberly, Cape Province**  
(Map 20: 685).

Coordinates: 28°46'S, 24°44'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (30 Apr–1 May 1969).

Habitat: “The habitat consists of karoo shrubs (‘drought resistant’) and grass with scattered large thorn trees (mimosas) and hardly any other shrubs. The area is mostly a red sandy soil with a few limestone ridges breaking through with only one single rocky outcrop” (JJLP).

Remarks: The AMP crew set up camp about 2 mi [3.2 km] to the west of the center of the Kimberly, on a farm called Carter's Ridge and just opposite the city's drive-in theater.

Taxa: *Elephantulus*; *Xerus*, *Micaelamys*, *Hystrix*; *Lepus*; *Raphicerus*.

**Clanwilliam, 2 mi [3.2 km] N, Cape Province**  
(Map 20: 718).

Coordinates: 32°09'S, 18°54'E M (WAC, *Cape of Good Hope*, 1:1,000,000).

Collectors: P. J. Geldenhuys and A. C. Risser (18–20 Dec 1963).

Habitat: “Under branches in [vineyard],” “grass between river and orange grove” (specimen labels).

Remarks: Geldenhuys and Risser collected simultaneously at this locality, just north of Clanwilliam (32°11'S, 18°54'E G), while based at **Pakhuis Pass** (18–22 Dec). We extracted the locality data from specimens as there is no mention of this locality in field journals. The river referred to is, likely, the Olifants.

Taxa: *Mus*, *Rhabdomys*, *Otomys*.

**Coloniesplaats, 28 mi [45.1 km] N Graaff-Reinet, Cape Province**  
(Map 20: 750).

Coordinates: 31°59'S, 24°48'E G.

Collectors: T. A. Heist and A. C. Risser (13–16 Feb 1964).

Habitat: “Camp in a poplar grove . . . primarily a sheep ranch . . . pasture . . . rock ridge . . . river which runs through the farm” (TAH). “Karoo scrub, but is unique in that there is a permanent water source, the river causing a vlei area and plenty of rocky outcroppings. Some planting has been done on the 8,000 morgen [16,960 acres; 6,863 ha] farm—stands of poplar which make a protective row. Also planted was wheat, mealie [corn], lucern [alfalfa]. They graze cattle in the vlei area and sheep roam the rest of the land. A variety of habitats in this location. River bordered with cane [reeds]” (ACR).

Remarks: The position of a Koloniesplaats found on a topographic map (31°59'S, 24°47'E; AMS, *Natal*, 1:2,000,000) nearly matches the USBGN coordinates. Risser salvaged a road-killed *Ictonyx* about 30 mi [48.3 km] N Graaff-Reinet.

Taxa: *Elephantulus*; *Xerus*, *Saccostomus*, *Malacothrix*, *Mystromys*, *Mastomys*, *Micaelamys*, *Rhabdomys*, *Otomys*, *Pedetes*; *Lepus*; *Crocidura*; *Neoromicia*; *Cynictis*, *Ictonyx*.

**Commisiondrift, 10 mi [16.1 km] SW Rustenburg, Transvaal**  
(Map 20: 692).

Coordinates: 25°48'S, 27°15'E G (as Olifantsnekdam; see Remarks).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (10–13 Apr 1969).

Habitat: “Typical semitropical with thick bush and trees . . . high hills with rocks and grass and cliffs on the

one side. The other is thick tree, brush and grassland with open areas in between . . . wide cave opening about 3 yards [2.7 m] deep . . . high rocky hills . . . stream below the dam wall. The hills are covered with grass, trees and scrub with large and steep bare rocky patches in between” (JJLP).

Remarks: The locality coordinates are for the reservoir Commissie Drift (or its USBGN standard name, “Olifantsnekdam”) and closely agree with a distance measured by road from Rustenburg (direction more S than SW). According to the FAO map, the stream referenced in Habitat is the Hex. The AMP crew camped on the southwestern bank of the Commissiondrift Dam along the main road to Johannesburg.

Taxa: *Elephantulus*; *Procapra*; *Mastomys*, *Micaelamys*; *Tadarida*, *Eptesicus*, *Glauconycteris*; *Redunca*.

**Cradock, 8 mi [12.9 km] N, Cape Province**  
(Map 20: 752).

Coordinates: 32°04'S, 25°35'E M (WAC, *Algoa Bay*, 1:1,000,000; ONC, *Sheet R-4*, 1:1,000,000).

Collector: A. V. W. Lambrechts (29 Mar–3 Apr, 28–31 Aug 1968).

Habitat: “Very little grass, due to the drought . . . *no grass at all* [emphasis in original] only scattered karoo shrubs plus scattered rocks. Disused cultivated lands” (AVWL, Mar). “[Grazing of] sheep. The vegetation on both banks is almost nonexistent due to the drought. Even the drought resistant karoo shrub seems to have died out . . . fresh rodent signs are along the river’s banks (riverine shrub) and on the rocky outcrops, where there is still some grass left . . . barren ground strewn with rocks and stones” (AVWL, Aug).

Remarks: Arriving at Cradock (32°11'S, 25°37'E G), Lambrechts took the Cradock–Hofmeyer (Hofmeyer G) road out of town and camped along the east bank of the Marlow Agricultural School. During his stay, Lambrechts surveyed both the east and west banks of the river.

Taxa: *Elephantulus*, *Macroscelides*; *Xerus*, *Saccostomus*, *Malacothrix*, *Desmodillus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Mus*, *Rhabdomys*, *Myotomys*; *Galerella*, *Suricata*.

**Davel [0.8 km E], 12 mi [19.3 km] NW Ermelo,**  
Transvaal (Map 20: 738).

Coordinates: 26°27'S, 29°40'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (22 Feb–1 Mar 1969).

Habitat: “Highveld grass—sunflower lands and mealie [corn] lands . . . marshy ground” (JJLP).

Remarks: Davel is located 20 mi [32.2 km] west-northwest of Ermelo, which does not agree with the distance indicated in the locality description. Because Davel is cited as the locality on most, though not all, specimen labels, we employed its USBGN coordinates rather than a map estimate for 12 mi NW Ermelo. The actual location of camp, as relayed in Pretorius’ field journal, was about a 0.5 mi [0.8 km] east of Davel.

Taxa: *Gerbilliscus*, *Mastomys*, *Mus*, *Rattus*, *Rhabdomys*, *Otomys*, *Pedetes*; *Lepus*; *Atelerix*; *Cynictis*, *Vulpes*.

**Dealesville, 9 mi [14.5 km] N, Baden Baden, Orange Free State** (Map 20: 732).

Coordinates: 28°33'S, 25°46'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: P. J. Geldenhuys, A. F. Hallett, T. A. Heist, and A. C. Risser (21 Mar 1964).

Habitat: “Heavily grazed scrub, some erosion . . . a spring which supplies water . . . flat country, some cultivated” (ACR).

Remarks: The team collected on the Baden Baden Farm north of Dealesville (28°40'S, 25°46'E G) while camped at **Glen** (17–22 Mar). Cited coordinates were estimated by road from Dealesville.

Taxa: *Mystromys*, *Gerbilliscus*, *Mus*.

**DeHoop, 17 mi [27.3 km] NNE Beaufort West, Cape Province** (Map 20: 747).

Coordinates: 32°09'S, 22°44'E G.

Collectors: P. J. Geldenhuys and A. C. Risser (25–29 Jan 1964).

Habitat: “Habitat is karoo scrub and rocky mountains . . . rocky hillsides . . . swimming pool and water reservoir . . . vleie where the vegetation is tall grass, dense weeds and acacia thickets. Soil is hard packed and cracking like a mud flat” (ACR).

Remarks: In his journal, Risser inexplicably located the DeHoop Farm about 19 mi [30.6 km] NW Beaufort West, but this direction conflicts with the standard locality as recorded in field catalogs and on specimen labels. Moreover, coordinates derived from laying out the by-road distance northeast of Beaufort West (32°21'S, 22°35'E G) exactly match one of several farms named DeHoop listed in the USBGN.

Taxa: *Elephantulus*; *Procapra*; *Desmodillus*, *Mastomys*, *Micaelamys*, *Mus*, *Rhabdomys*, *Myotomys*; *Lepus*, *Pronolagus*; *Crocidura*; *Tadarida*, *Neoromicia*, *Miniopterus*.

**Dikbaardskolk, 3 mi [4.8 km] N, Kalahari-Gemsbok**

National Park, Cape Province (Map 20: 637).

Coordinates: 25°43'S, 20°42'E M (CDSM, *Nossob*, 1:250,000).

Collectors: A. V. W. Lambrechts and H. W. Setzer (29 Nov 1968).

Habitat: No information available.

Remarks: An *Oryx* was collected at this locality en route to their camp at 5 mi N Kameelsleep. In his journal, Lambrechts recorded that they were 1.5 mi [2.4 km] north of the Dikbaardskolk borehole (spring; 25°45'S, 20°42'E G).

Taxon: *Oryx*.

**Douglas, 10 mi [16.1 km] S, Cape Province (Map 20: 684).**

Coordinates: 29°12'S, 23°42'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collector: A. V. W. Lambrechts (12–17 May, 14–17 Oct 1968).

Habitat: "Amongst thorn shrubs, with scattered rocks . . . There is plenty of cover, sandy ground and also rocks, plus enough grass" (AVWL, May). "The vegetation on the north bank is approximately the same as before, while on the south bank it has been grazed constantly and is therefore more sparse" (AVWL, Oct).

Remarks: Lambrechts traveled south of Douglas (29°04'S, 23°46'E G) along the Douglas–Prieska road and established camp on the south bank of the Orange River. He further localized his site as about 200 yards [182.9 m] east of the bridge and about 100 yards [91.4 m] east of a weir in the river. Both the north and the south banks of the Orange River were surveyed during his visits.

Taxa: *Elephantulus*, *Desmodillus*, *Gerbillurus*, *Rhabdomys*, *Pedetes*; *Felis*, *Proteles*, *Otocyon*, *Vulpes*, *Ictonyx*.

**Drakensberg Garden(s), 2 mi [3.2 km] N, Natal**

(Map 20: 766).

Coordinates: 29°43'S, 29°15'E M (WAC, *Drakensberg*, 1:1,000,000; TPC, *Sheet Q-5D*, 1:500,000).

Collectors: R. D. Hepplewhite, I. L. Rautenbach, and A. R. Silberstein (7–9 Jul 1966).

Habitat: "Most of the grass in the vicinity had been burnt, but a patch of grass with big bushes about 100 yards [91 m] wide and a little more than a mile [1.6 km] long has been left between the two courses of the river . . . but in the valley, between the two courses of the river, the grass is thick and quite long with scattered bushes" (RDH).

Remarks: Coordinates are based upon azimuth and range from Drakensberg Garden (29°45'S, 29°15'E G). The

river mentioned above is one of the many upper tributaries in the Drakensberg Mountains that feed into the Mzimkulu River.

Taxa: *Rhabdomys*, *Otomys*, *Cryptomys*; *Crocidura*, *Myosorex*.

**Drakensberg Garden(s) Hotel, 2 mi [3.2 km] W, Natal**

(Map 20: 765).

Coordinates: 29°45'S, 29°13'E M (WAC, *Drakensberg*, 1:1,000,000; TPC, *Sheet Q-5D*, 1:500,000).

Collector: T. N. Liversedge (11–14 Jan 1966).

Habitat: "Grassy hillside," "grassy plain," "short grass," "long grass," "grassy riverside," "grassy vlei," "between trees on bare hill," "grassy embankment," "river bed," "river bank," "rock crevice" (specimen labels).

Remarks: Coordinates are based upon azimuth and range from Drakensberg Garden Hotel (29°45'S, 29°15'E G), which according to the USBGN, has the same coordinates as those for Drakensberg Garden. The elevation given in Liversedge's journal is 6,500 ft [1,980 m].

Taxa: *Graphiurus*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Crocidura*, *Myosorex*.

**Elliras, 5 mi [8.0 km] NE, Nieman's Farm, Transvaal**

(Map 20: 661).

Coordinates: 23°36'S, 27°47'E M (WAC, *Shashi River*, 1:1,000,000; Acocks, *Veld Types of South Africa*, 1:1,500,000).

Collectors: R. E. Cole, A. L. Moore, and A. C. Risser (24–28 Aug 1963).

Habitat: "Old cultivated mealie [corn] field now with cattle on it, cane grass and white thorn (bushes and trees) adjoining the river . . . bush (all 'catclaw') . . . Dense thornbush country . . . junction of the two rivers [Figure 135] . . . pond near house" (ACR). "Open field . . . dominant vegetation is cane grass and acacia . . . close to farm house in thorn bush habitat. Cattle grazing in grass stubble" (REC).

Remarks: According to their journals, Cole and Risser camped on Nieman's Farm (sometimes misspelled as "Neiman"), near the junction of the Mogol and Tambu rivers. Because the name of the farm does not appear on specimen labels we examined and no plausible USBGN entry exists for the region, we adopted a map-based estimate relative to Elliras (23°40'S, 27°44'E G) and the river junction. The names of the rivers appear on only a few skin tags. Cole indicated that the native name for the Mogol is Mokopo, and both variations appear on maps (Mogol per WAC, *Shashi River*, 1:1,000,000; Mokopo per ONC, *P-4*, 1:1,000,000).



FIGURE 135. South Africa, Ellisras, 5 mi NE: Area near junction of the Mogol and Tambuti rivers (photograph by A. C. Risser, Aug 1963).

The Tambuti is spelled as Tambotie on one map (Acocks, *Veld Types of South Africa*, 1:1,500,000) and as Tambotierivier in the USBGN. The Tambuti flows northwesterly and joins the Mogol approximately 5 mi [8 km] northeast of Ellisras.

Taxa: *Saccostomus*, *Gerbilliscus*, *Mastomys*, *Micaelamys*; *Lepus*; *Neoromicia*.

Eshowe, 6 mi [9.7 km] E, Zululand, Natal (Map 20: 781). Coordinates: 28°50'S, 31°32'E M (WAC, *Drakensberg*, 1:1,000,000).

Collectors: J. E. W. Dixon, T. A. Heist, G. R. Hughes, and A. C. Risser (17–21 Apr 1964).

Habitat: "Primarily a sugar cane plantation and the rolling steep hills are covered with cane, with interspersed



patches of natural *Lantana* and *Mimosa* bush which gets very dense in places . . . kikuyu grass . . . riverine bush . . . black sandy soil by a cane field . . . dense riverine bush . . . banana plants . . . gum tree break row” (ACR).

Remarks: The AMP crew camped on a sugar cane plantation called Buxton (owned or operated by Ronnie and Maureen Lloyd), which appears on most but not all skin labels, to the east of Eshowe (28°53'S, 31°28'E G). Our by-road interpretation indicates a northeast compass bearing. Risser's journal entry for 20 Apr records that Dixon and Hughes collected in the evergreen forest of the Ngoye Forest Reserve (plateau; 28°50'S, 31°40'E G). Also on that date, Dixon collected three *Lepus saxatilis* from Papama, 15 mi [24.1 km] E Eshowe. Papama was not found in any of our cartographic resources.

Taxa: *Amblysomus*; *Chlorocebus*; *Paraxerus*, *Aethomys*, *Mastomys*, *Cryptomys*, *Thryonomys*; *Lepus*; *Crocidura*, *Myosorex*.

**Fort Hartley**, 10 mi [16.1 km] NE Quthing, [Lesotho] (Map 20: 761).

Coordinates: 30°20'S, 27°45'E G.

Collector: A. V. W. Lambrechts (11–13 Mar 1968).

Habitat: “Both survey lines [north and south banks] . . . extremely rocky mountains . . . Bantu hut . . . native kraal”

Remarks: Lambrechts camped on the south bank of the Orange River “about 10 miles [16.1 km] from where we turned off at Quthing and about 0.5 miles [0.8 km] west-northwest of the Fort Hartley store” and collected on both sides of the river.

Taxa: *Aethomys*, *Mastomys*, *Mus*, *Rattus*, *Rhabdomys*; *Neoromicia*.

**Fountains**, 5 mi [8.0 km] S Pretoria, Transvaal (Map 20: 699).

Coordinates: 25°47'S, 28°11'E G (as Fontaine Rail Station).

Collectors: R. D. Hepplewhite and T. N. Liversedge (21 Sep–9 Oct, 19–22 Oct 1965).

Habitat: No information available.

Remarks: Hepplewhite and Liversedge collected together in Sep and Oct 1965 and identified their specimens with “HL” field numbers (presumably for Hepplewhite-Liversedge, but found in Liversedge's field catalog). This locality is given as “5 mi S Pretoria” in the field catalog, but most specimen labels lack the 5-mi-S modifier and bear only “Fountains” as the locality. Other label variations include Fountains Valley, South

Fountains, South Fountains Valley, 2 mi [3.2 km] S Fountains, Hennops River, and Lukas Ridge.

Taxa: *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Rhinolophus*, *Nycteris*, *Miniopterus*; *Poecilogle*.

**Frankfort, 9 mi** [14.5 km] N, Sandspruit (or Sandfontein), Orange Free State (Map 20: 735).

Coordinates: 27°14'S, 28°25'E M (WAC, *Vaal River*, 1:1,000,000; ONC, *Sheet Q-5*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (10–12 Mar 1969).

Habitat: “The habitat changes from marshy areas to cultivated lands with grass in between and a few flat rocky hills . . . willow trees” (JJLP).

Remarks: Pretorius recorded that the AMP team set up camp on the Sandfontein Farm, along the west bank of the Wilge River. However, he used Sandspruit as the farm name on specimen labels. By either name, we could not convincingly locate a farm among the many listed by the USBGN and so relied upon a by-road approximation in relation to Frankfort (27°17'S, 28°30'E G). The Wilge River flows from the southeast through Frankfort to the Vaal Dam reservoir to the northwest; their field site on the west bank thus lies to the northwest of Frankfort. If one literally accepts the azimuth and range as recorded by the collectors, the team must have camped on a southern tributary of the Vaal River.

Taxa: *Mastomys*, *Mus*, *Rattus*; *Lepus*; *Raphicerus*.

**Gansfontein**, 3 mi [4.8 km] NE [NW] Fraserburg, Cape Province (Map 20: 722).

Coordinates: 31°53'S, 21°28'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (21–23 Aug 1969).

Habitat: “Typical karooveld—sandy soil with small dried shrubs as well as rocky koppies and on the northern and eastern sides a series of mountains. The camp was pitched in a dry river bed surrounded by rocky ledges” (JJLP).

Remarks: The crew pitched camp on Gansfontein Farm in a dry river bed, probably a tributary of the Sout River. The team located their site along the Williston road to the northeast of Fraserburg (31°55'S, 21°31'E G), as evidenced on specimen tags and in field catalogs. However, the Williston road bears northwest from Fraserburg, not “NE.” A Gansfontein farm does occur about 3 mi NW Fraserburg and nearby the Williston road.

Taxa: *Elephantulus*, *Macroscelides*; *Micaelamys*, *Rhabdomys*.

**Giant's Castle Game Reserve, 45 mi [72.4 km] SW**

Estcourt, 5,000 ft [1,524 m], 1,463 m, and 1,783 m, Natal (Map 20: 771).

Coordinates: 29°14'S, 29°29'E G.

Collectors: T. A. Heist, G. R. Hughes, and A. C. Risser (4, 10 Apr 1964).

Habitat: "Open slope of a hillside to rocky krantzies [Figure 136] . . . stream bed [dry] . . . tall grassy-rocky hillside . . . kikuyu grass . . . thornveld . . . farm buildings by haystacks and into mealie [corn] fields and 'tambuti' grass" (ACR).

Remarks: The team collected at this locality on two occasions, while working at **Petchaye** (4 Apr) and while at **7 mi NE Pietermaritzburg** (10 Apr). George R. Hughes, an employee of the Natal Park Board, accompanied Risser and Heist during this segment of their trip and

donated three specimens that he had earlier collected from this locality to the AMP.

Taxa: *Chrysospalax*, *Amblysomus*; *Procavia*; *Dendromus*, *Cryptomys*.

**Glen, 15 mi [24.1 km] N Bloemfontein, Orange Free State (Map 20: 731).**

Coordinates: 28°55'S, 26°19'E G (as Glen Agricultural College).

Collectors: P. J. Geldenhuys, A. F. Hallett, T. A. Heist, and A. C. Risser (17–22 Mar 1964).

Habitat: "Mostly grassveld with tall *Bouteloua*-like grass [grama grass] about knee deep in ungrazed areas. Some rocky koppies. *Acacia* thickets along the river and in isolated spots in the grassveld. Cattle and sheep grazing, some cultivated lands . . . gum trees . . . grass on the slope of a dam behind camp" (ACR).

Remarks: Risser and company established camp on an experimental agricultural farm bordered on the south



FIGURE 136. South Africa, Giant's Castle Game Reserve: Estcourt (photograph by A. C. Risser).

by the Modder River. Coordinates for the Glen Agricultural College fit their description and define a point at an appropriate by-road distance north-northeast of Bloemfontein (29°08'S, 26°12'E G) and just north of the Modder River (WAC, *Upper Orange River*, 1:1,000,000). The dam noted under Habitat, according to the FAO, is possibly the Mazelspoort (29°01'S, 26°24'E M). The AMP team made a side trip to collect on a farm called Baden Baden at **9 mi N Dealesville**.

Taxa: *Elephantulus*; *Xerus*, *Malacothrix*, *Mystromys*, *Gerbilliscus*, *Mastomys*, *Micaelamys*, *Mus*, *Rhabdomys*, *Otomys*, *Pedetes*; *Lepus*; *Neoromicia*; *Cynictis*, *Suricata*.

**Goedgevonde**, 43 mi [69.2 km] SW Piet Retief, Transvaal (Map 20: 779).

Coordinates: 27°14'S, 30°18'E G (as Goedgevonden).

Collectors: R. D. Hepplewhite and A. R. Silberstein (17–23 Jun 1966).

Habitat: “Farm . . . high up in the Drakensberg . . . in the valleys there is grass about 8 inches [20 cm] long and at the bottom the ground is black and clayish whereas on the sides of the valley the ground is reddish. Along the sides of the hills the grass is more sparse and there are rocky outcrops and rocky ridges with shrubs growing on them. There are streams in many places . . . The grass is long . . . (adjacent to the turnip field) . . . hillside . . . among the rocks and between the bushes” (RDH).

Remarks: The cited coordinates define a point that is slightly less than the mileage recorded by the collectors (38 versus 43 mi) from Piet Retief (27°00'S, 30°48'E G), but they do identify a farm of the appropriate name, situated in the Drakensberg Mountains and to the south of the Piet Retief–Wakkerstroom road. Several *Rhabdomys* and *Cryptomys*, collected on 17 Jun, were labeled 43 mi [69.2 km] S Piet Retief on Goedehoop Farm. In his catalog, Hepplewhite included these specimens with those collected from Goedgevonde, but Silberstein crossed out Goedehoop and inscribed Goedgevonde in his catalog. The collectors obviously viewed the differing spellings as the same place.

Taxa: *Amblysomus*; *Procapra*; *Mastomys*, *Micaelamys*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Lepus*; *Crociodura*; *Ichneumia*.

**Goodhouse**, Cape Province/Namibia (Map 20: 644).

Coordinates: 28°54'S, 18°15'E G.

Collector: A. V. W. Lambrechts (25–27 Jan 1969).

Habitat: “North bank [traps set] on open terrain . . . south bank [traps set] on mountains.”

Remarks: On 24 Jan, Lambrechts headed to Goodhouse and camped on a farm by that same name on the south bank of the Orange River. Survey work was conducted on both the north (in Namibia) and south banks of the Orange.

Taxa: *Petromyscus*, *Micaelamys*, *Petromus*; *Rhinolophus*.

**Goudveld**, 10 mi [16.1 km] N Knysna, Cape Province (Map 20: 745).

Coordinates: 33°55'S, 23°00'E G (as Goudveldbos).

Collectors: P. J. Geldenhuys and A. C. Risser (14–20 Jan 1964).

Habitat: “Road thru the forest [Figure 137] . . . firs . . . bracken ferns, sedges, heather and grasses in the plowed soil . . . fern heather, shrub-covered slope . . . virgin forest . . . in one part of the virgin forest it is quite open, the canopy layer shutting out the light from the under story. Leaf and fern and wood mold make a rich and deep humus on the floor. It may be that these fern covered slopes are where the indigenous or cultivated forest has been cleared to make way for trees (pines) to be planted. There is evidence of burning within the last five years . . . forest along the stream (not flowing now, but has pools) . . . borders of the cultivated forest” (ACR).

Remarks: The team drove to the Millwood Forest Station, “now known as Goudveld [forest]” according to Risser, situated more truly to the north-northwest of Knysna (34°02'S, 23°02'E G). Millwood Forest (33°52'S, 23°01'E) is also in the immediate region. They set up camp about 5 mi [8.0 km] from the forest station, in an abandoned house of a mining town (Millwood?) that was active in the 1870s.

Taxa: *Amblysomus*; *Chlorocebus*; *Acomys*, *Grammomys*, *Mus*, *Myomyscus*, *Rhabdomys*, *Otomys*, *Cryptomys*, *Georychus*; *Crociodura*, *Myosorex*; *Genetta*, *Atilax*.

**Graaff-Reinet**, 23 mi [37.0 km] SE, Cape Province (Map 20: 748).

Coordinates: 32°32'S, 24°29'E M (WAC, *Algoa Bay*, 1:1,000,000).

Collectors: A. V. W. Lambrechts and S. J. Liversedge (17–22 Apr 1968); A. V. W. Lambrechts (20–24 Sep 1968).

Habitat: “The Sundays River is flowing very seldom this near to its origin. Its ecological value is thus almost nil. Due to this, plus the fact that there is extensive cultivated land (from a dam in the river) on the northern bank, we will do no collecting on the northern bank.



FIGURE 137. South Africa, Goudveld: Knysna Forest; Brian Wessels (left) and Art Risser hunt for small mammals (photograph by A. C. Risser, Jan 1964).

The grass vegetation for the whole area is very sparse, and the ground is over grazed, due to the drought" (AVWL, Apr). "The vegetation is still very sparse, with little or no grass" (AVWL, Sep).

Remarks: Lambrechts and crew sited their camp 3 road miles [4.8 km] southwest of Kendrew Station (32°31'S, 24°30'E G), on the Kendrew–Marais Siding road and about 1 mi [1.6 km] south of the "low level" bridge over the Sundays (Sondags) River. Our map coordinates are based upon road miles traveled southwest of the local landmark Kendrew Station, which places their camp more to the south-southwest of Graaff-Reinet (32°15'S, 24°33'E G).

Taxa: *Macroscelides*; *Saccostomus*, *Malacothrix*, *Desmodillus*, *Gerbillurus*, *Mastomys*, *Mus*, *Rhabdomys*, *Pedetes*, *Cryptomys*; *Nycteris*, *Neoromicia*, *Miniop-terus*; *Otocyon*.

Grahamstown, 11 mi [17.7 km] SSW, Mosslands, Cape Province (Map 20: 753).

Coordinates: 33°25'S, 26°22'E M (WAC, *Algoa Bay*, 1:1,000,000).

Collectors: T. A. Heist and A. C. Risser (19–22 Feb 1964).

Habitat: "Sheep. Lots of trees. Camped next to creek in a cow path" (TAH). "Rolling, heavily vegetated hills, steep slopes with land cut up by cultivated parts for

pasture and leucern [alfalfa] . . . the river about 1/4 mile [0.4 km] below Neil's [Neil Moss, farm owner] house. Vegetation is aloes, acacia, succulents and other shrubs which are dense along the field borders, mountain slopes and along the river . . . rocky shrubby outcropping that runs through a grassy pastureland" (ACR).

Remarks: On 21 and 22 Feb, specimens of jackals were acquired from Paarde Kraal, 10 mi [16.1 km] S Grahamstown (Grahamstown = 33°18'S, 26°32'E G).

Taxa: *Mystromys*, *Mastomys*, *Micaelamys*, *Mus*, *Rhabdomys*, *Cryptomys*; *Lepus*, *Pronolagus*; *Neoromicia*; *Galerella*, *Canis*.

**Grobbershoop, 2 mi** [3.2 km] NW, Cape Province (Map 20: 679).

Coordinates: 28°52'S, 21°59'E M (ONC, *Sheet Q-4*, 1:1,000,000).

Collectors: A. V. W. Lambrechts and S. J. Liversedge (5–9 Jun 1968); A. V. W. Lambrechts (7–11 Nov 1968).

Habitat: "The habitat on the south bank [Orange River] is red, sandy soil, with shrubs and scattered stones (pebbles). On the north bank it is sand dunes mixed with rocky patches" (AVWL, Nov).

Remarks: The AMP crew camped just outside of Groblershoop (28°53'S, 21°59'E G) on the north bank of the Orange River, about 100 yards [91.4 m] to the west of the bridge on the Groblershoop–Griekwastad road.

Taxa: *Elephantulus*, *Macroscelides*; *Xerus*, *Saccostomus*, *Malacothrix*, *Desmodillus*, *Gerbillurus*, *Mastomys*, *Micaelamys*.

**Groenkloof Farm, 3 mi** [4.8 km] S Wakkerstroom, Natal (Map 20: 778).

Coordinates: 27°24'S, 30°10'E G.

Collector: T. N. Liversedge (25 Jan 1966).

Habitat: "Bushes and grass, hillside," "black soil near bushes" (specimen labels).

Remarks: The USBGN coordinates for Groenkloof Farm define a point at the appropriate distance and direction from Wakkerstroom (27°21'S, 30°08'E G). Liversedge abbreviated farm as "Fm" on specimen labels.

Taxa: *Rhabdomys*, *Cryptomys*.

**Groenkloof, Pretoria, Transvaal.**

Coordinates: Not certainly located.

Collector: J. J. L. Pretorius (1 Apr 1969).

Habitat: No information available.

Remarks: We were unable to definitely locate a Groenkloof near Pretoria (25°45'S, 28°10'E G) on any of our

period maps or gazetteers. However, an Internet site (<http://myweb.absa.co.za/EFRETIEF/Ringing%20localities.doc>, accessed Jun 2006) disclosed two closely placed sites in the Pretoria region: Groenkloof, Jan Cilliers Park (25°46'S, 28°13'E), and Groenkloof N/R (25°47'S, 28°12'E). We have no corroborative basis for deciding which place is the one visited by Pretorius.

Taxon: *Scotophilus*.

**Groot Kolk, 2 mi** [3.2 km] SE, Kalahari-Gemsbok National Park, Cape Province (Map 20: 633).

Coordinates: 24°54'S, 20°10'E M (CDSM, *Nossob*, 1:250,000).

Collectors: A. V. W. Lambrechts and H. W. Setzer (27–29 Nov 1968).

Habitat: "The habitat for almost the whole park area is sand dunes covered with shrubs, grass and camel thorn trees. Acacia trees occur in the dry river beds" (AVWL).

Remarks: The coordinates are based upon road miles from Groot Kolk as found on a topographic map.

Taxa: *Elephantulus*; *Desmodillus*, *Gerbillurus*, *Mus*, *Rhabdomys*.

**Groot Letaba (Game) Reserve, Transvaal** (Map 20: 671).

Coordinates: 23°40'S, 31°25'E M (AMS, *Transvaal*, 1:2,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (29 Oct–6 Nov 1969).

Habitat: Shugam's Kraal: "mopane veld;" Baderoukwe: "dense grass;" and Zebrakop: "dense grass and mopane shrubs" (specimen labels).

Remarks: Our coordinates correspond to the center of a circle drawn on an AMP map, just northwest of the confluence of the Groot Letaba and Tendi rivers. USBGN coordinates for the Groot Letaba Game Reserve (Groot-Letaba Wildreservaat) are 22°44'S, 31°06'E, and those for Letaba Camp are 23°51'S, 31°34'E. The locality information on most specimen labels omits the modifier "Game." In his field catalog and on specimen labels, Liversedge included Shugam's Kraal as a modifier for Groot Letaba in entries for specimens collected 29–31 Oct. Similarly, Camp I is a modifier for specimens collected 1–3 Nov. Pretorius' catalog coverage of Groot Letaba begins on 5 Nov and includes three modifiers: July's Kraal, Baderoukwe Truin (sic, perhaps "Farm"), and Zebrakop, all of which are also found on his specimen labels. The USBGN provides the standardized spelling for Baderoukwe as Baderukwe, with two farms bearing that name in the same region (23°49'S, 31°03'E; 23°47'S, 31°03'E).

Taxa: *Elephantulus*; *Graphiurus*, *Saccostomus*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*; *Helogale*.

**Gunsfontein**, 15 mi [24.1 km] SSW Sutherland, Cape Province (Map 20: 743).

Coordinates: 32°34'S, 20°41'E G (as Gunsfontein Farm).  
Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (25–28 Aug 1969).

Habitat: "In the lower 'Roggeveld' [Mountains]. Mainly rocky areas with mountains on the southwestern side and the vegetation consists of typical dense dry karoo shrubs" (JJLP).

Remarks: According to Pretorius, the AMP team camped on Gunsfontein Farm, which actually lies to the south, rather than south-southwest, of Sutherland (32°24'S, 20°40'E G).

Taxa: *Elephantulus*; *Petromyscus*, *Gerbillurus*, *Micaelamys*, *Myotomys*; *Pelea*.

**Haenertsburg**, 2 mi [3.2 km] E, Transvaal (Map 20: 665).  
Coordinates: 23°56'S, 29°58'E M (WAC, *Shashi River*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (13–23 Oct 1966).

Habitat: "The vlei is about 100 yards [91.4 m] across and used to be a dam before the present drought began. It is covered with bushes and short grass. The hillside is covered with grass where it is still in its natural state and with pines elsewhere. Towards the top of the hills there is still some natural forest with heavy undergrowth" (RDH).

Remarks: The AMP camp was set up on an unnamed farm about 4 mi [6.4 km] south of Woodbush, probably a reference to Woodbush Forest Reserve (23°44'S, 30°02'E G), and east of Haenertsburg (23°56'S, 29°57'E G).

Taxa: *Amblysomus*; *Graphiurus*, *Dendromus*, *Aethomys*, *Mastomys*, *Mus*, *Rattus*, *Rhabdomys*, *Otomys*; *Myosorex*.

**Hardingdale**, 7 mi [11.3 km] NE Pietermaritzburg, Natal (Map 20: 769).

Coordinates: 29°32'S, 30°24'E P (Taylor, 1998).  
Collectors: T. A. Heist, G. R. Hughes, and A. C. Risser (9–13 Apr 1964).

Habitat: "Rolling green hills, grassveld which is probably burnt over annually, mealie [corn] lands and weedy, grassy borders, sugar cane fields, wattle plantations. There is a pond below the wattle plantation . . . Tall grasses, reeds, *Typha* around pond. Everything is very damp. Tambuti grass along fences and motor tracks" (ACR).

Remarks: Risser and crew camped in a wattle plantation on the Hardingdale Farm, northeast of Pietermaritzburg (29°37'S, 30°23'E G). Taylor's (1998) published coordinates agree reasonably with those (29°31'S, 30°26'E M) we plotted on available maps. On 10 Apr, three specimens were obtained from **Giant's Castle Game Reserve**.

Taxa: *Amblysomus*; *Mastomys*, *Mus*, *Rattus*, *Rhabdomys*, *Cryptomys*; *Crocidura*, *Myosorex*; *Galerella*.

**Harrismith**, 12 mi [19.3 km] S, Orange Free State (Map 20: 775).

Coordinates: 28°25'S, 29°05'E G (for Tweevlei Farm; see Remarks).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (7–11 May 1969).

Habitat: "Sandy soil with a few big rocky hills covered with grass and hardly any shrubs . . . cultivated lands . . . with a few willow trees . . . stream" (JJLP).

Remarks: Journal entries reveal that the AMP team camped on Tweevlei Farm. The approximate road miles traveled "along the Oliviershoek Road" yielded coordinates (28°26'S, 29°05'E M) that are nearly identical to USBGN values for Tweevlei Farm. The compass bearing of their field site from Harrismith is more SSE, not due S.

Taxa: *Graphiurus*, *Mystromys*, *Gerbilliscus*, *Mastomys*, *Rhabdomys*, *Myotomys*; *Proteles*, *Ictonyx*.

**Hartbeespruit**, 8 mi [12.9 km] NNE Belfast, Transvaal (Map 20: 702).

Coordinates: 25°40'S, 30°07'E G (as Hartebeesspruit).  
Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (15–18 Feb 1969).

Habitat: "Riverine grass, reeds and rocky hills covered with grass" (JJLP).

Remarks: Camp was established on the Hartbeespruit Farm, whose USBGN coordinates are located at a plausible distance northeast of Belfast (25°41'S, 30°02'E G) and off the Dullstroom road.

Taxa: *Elephantulus*; *Graphiurus*, *Mastomys*, *Micaelamys*, *Mus*, *Rhabdomys*; *Pronolagus*; *Crocidura*, *Myosorex*; *Vulpes*.

**Hillside**, 19 mi [30.6 km] S Aliwal North, Cape Province/Orange Free State (Map 20: 756).

Coordinates: 30°57'S, 26°46'E G.  
Collectors: A. F. Hallett, T. A. Heist, and A. C. Risser (3–8 Mar 1964).

Habitat: "Karoo scrub. Red soil with termite mounds . . . grazing lands . . . lake bordered . . . with cottonwoods

or poplars and grass with the shore line of rocky outcroppings along part. Scrub covered rocky mountain slopes jutting from the karoo floor" (ACR).

Remarks: The AMP crew stayed on a farm operated by George Montgomery, identified on some specimen labels as Hillside. The USBGN coordinates, which are for a Hillside village, closely approximate those based on a by-road map estimate relative to Aliwal North (30°42'S, 26°42'E G; WAC, *Upper Orange River*, 1:1,000,000, and TPC, *Sheet Q-5D*, 1:500,000).

Taxa: *Elephantulus*; *Procapra*; *Xerus*, *Graphiurus*, *Dendromys*, *Mystromys*, *Mastomys*, *Micaelamys*, *Mus*, *Rattus*, *Rhabdomys*, *Otomys*, *Pedetes*, *Cryptomys*; *Lepus*; *Crocidura*.

**Hopetown, 2 mi [3.2 km] NE, Cape Province**  
(Map 20: 683).

Coordinates: 29°36'S, 24°03'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collector: A. V. W. Lambrechts (6–10 May, 8–12 Oct 1968).

Habitat: "Amongst a clump of tall bluegum trees . . . south survey line . . . habitat covered with innumerable small stones and no grass and very sparse shrubs" (AVWL, May). "The vegetation is in a much poorer state than the previous time. No spring rains fell yet . . . riverine shrub on the south bank [of the Orange River]" (AVWL, Oct).

Remarks: From Hopetown (29°37'S, 24°05'E G), Lambrechts proceeded over the Hopetown–Kimberley road about 1 mi [1.6 km], turned west, and set up camp on the south bank of the Orange River. Both banks of the river were surveyed during both visits.

Taxa: *Saccostomus*, *Desmodillus*, *Gerbillurus*, *Mastomys*, *Mus*, *Rhabdomys*, *Myotomys*, *Cryptomys*, *Hystrix*; *Genetta*, *Galerella*.

**Houtbosdorp, 2 mi [3.2 km] E, Transvaal (Map 20: 667).**  
Coordinates: 23°50'S, 29°55'E M (ONC, *Sheet P-5*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (25–27 Oct 1966); I. L. Rautenbach and A. R. Silberstein (26 Jan–4 Feb 1967).

Habitat: "From the stream at the bottom of the valley, the sides rise steeply and are covered by bushes. At the top of the hills are the borders of the forest reserve at Woodbush and there are pines there. Further up the valley is an area of 'natural' forest but there are apple trees growing there, as it was previously an orchard" (RDH).

Remarks: On 24 Oct, the AMP crew arrived at a campsite on an unnamed farm, owned by a Mr. Houter,

situated next to the Woodbush Forest Reserve and to the east of Houtbosdorp (23°47'S, 29°54'E G). The Mammal Division houses no field journals that cover the second visit to this locality.

Taxa: *Heterohyrax*; *Cercopithecus*; *Dendromys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Rattus*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Myosorex*; *Rhinolophus*, *Miniopterus*.

**Jansenville, 8 mi [12.9 km] NE, Cape Province**  
(Map 20: 749).

Coordinates: 32°51'S, 24°40'E M (WAC, *Algoa Bay*, 1:1,000,000).

Collectors: A. V. W. Lambrechts and S. J. Liversedge (8–15 Apr 1968); A. V. W. Lambrechts (9–13 Sep 1968).

Habitat: "Predominant vegetation is *Euphorbia* shrubs or 'Noorsthorn' with no grass at all. The *Euphorbia* grows to about 36 inches [91.4 cm] tall and is very dense in some places. It also has been very dry for the past five years" (AVWL, Apr). "Due to the recent rains the veld is in a better state than the previous time, though there is still almost no grass" (AVWL, Sep).

Remarks: On 8 Apr, Lambrechts and Liversedge traveled from Jansenville on the Gouwskraal road, arrived on the north bank of the Sundays (Sondags) River, and camped on the DeRust Farm in an area known as "Noorsveld." The map coordinates, as derived from journal descriptions and by-road miles traveled, designate a site that lies directly north, rather than northeast, of Jansenville (32°56'S, 24°40'E G). Traveling 8 mi [12.9 km] to the northeast would place the camp on a tributary of the Sundays River, not the Sundays proper. Both banks of the Sundays were surveyed during their Sep stay.

Taxa: *Elephantulus*; *Chlorocebus*; *Saccostomus*, *Desmodillus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Rhabdomys*; *Tadarida*; *Otocyon*.

**Jukskei River, Johannesburg, Transvaal (Map 20: 696).**  
Coordinates: 25°53'S, 27°55'E G.

Collectors: R. D. Hepplewhite and T. N. Liversedge (19 Sep 1965).

Habitat: No information available.

Remarks: The Jukskei River flows north from Johannesburg. No field journal entries exist for this locality.

Taxon: *Ateleurix*.

**Kameelsleep, 5 mi [8.0 km] N, Kalahari-Gemsbok**  
National Park, Cape Province (Map 20: 636).

Coordinates: 25°46'S, 20°44'E M (CDSM, *Nossob*, 1:250,000).

Collectors: A. V. W. Lambrechts and H. W. Setzer (30 Nov–3 Dec 1968).

Habitat: “Dunes covered with shrubs and a fair amount of grass” (AVWL).

Remarks: The coordinates were based upon distance north of Kameelsleep Spring (25°50'S, 20°44'E G).

Taxa: *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Mus*, *Rhabdomys*, *Thallomys*.

**Kamkwa (Borehole)**, Aub River, Kalahari-Gemsbok

National Park, Cape Province (Map 20: 638).

Coordinates: 26°01'S, 20°24'E G.

Collector: A. V. W. Lambrechts (11 Dec 1968).

Habitat: “Sand and grass” (specimen labels).

Remarks: Lambrechts collected here one evening while based at **Mata Mata**. Traplines were set on the Aub River at the junction of the Mata Mata–Twee Rivieren road and the “dunes road” that connects the Aub and Nossob rivers.

Taxa: *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*.

**Keimoes Island**, Cape Province (Map 20: 649).

Coordinates: 28°42'S, 20°58'E G.

Collectors: A. V. W. Lambrechts and S. J. Liversedge (18–22 Jun 1968); A. V. W. Lambrechts (6–10 Jan 1969).

Habitat: “Camping on Keimoes Island. The Orange River here is split into about four major and several smaller streams, thus forming islands. All of the islands are extensively cultivated. Some, like Keimoes Island, are several hundred morgen [in area]. Our camp is on the eastern part of the island, and about 1/4 mile [0.4 km] to the southwest of the big hill on the island's eastern edge . . . Except for the first parts of the survey lines, all the trapping has been done on a mountain” (AVWL, Jun). “The complex of hills we are working on is in general much the same as before, though the grass cover seem to be somewhat more sparse . . . extremely rocky, and covered with drought resistant shrubs and grass” (AVWL, Jan).

Remarks: On 16 Jun 1968, Lambrechts and Liversedge set up camp on the eastern portion of Keimoes Island, labeling specimens collected there 2 mi [3.2 km] E Keimoes. “Both survey lines, due to small holdings and cultivation, will have to be on the island, and thus on the same [north] bank of the Orange.” On 4 Jan 1969, Lambrechts camped 1 mi [1.6 km] east of Keimoes (town; 28°42'S, 20°58'E G) on Keimoes Island. Specimens that were collected on the second visit are labeled “Keimoes Island.”

Taxa: *Desmodillus*, *Micaelamys*.

**Kilgobbin**, 3 mi [4.8 km] W Dargle Station, Natal (Map 20: 770).

Coordinates: 29°28'S, 30°03'E P (Taylor, 1998).

Collectors: R. D. Hepplewhite, I. L. Rautenbach, and A. R. Silberstein (28 Jun–1 Jul 1966).

Habitat: “The hills are partly covered by dense undergrowth and partly by grass. The valleys are all grass covered and the grass is very long in places. There is a river in the valley in which we are camped, with rocks in the river . . . steep banks” (RDH).

Remarks: The team arrived at a farm west of Dargle Station (rail station; 29°28'S, 30°06'E G). Hepplewhite's journal and field catalog designation for this locality reads “Kilgobbin Farm, Dargle District, Howick.” A few specimen labels also refer to Howick (29°28'S, 30°14'E G), in conjunction with Dargle Station and Kilgobbin Farm. Howick and Dargle are found on the heavily annotated road map that obviously accompanied the field team (Mobil Southern Africa, *Road Map South Africa, Section 2*, 1:2,280,000). The above coordinates, as taken from Taylor (1998), are for Kilgobbin Farm; Davis and Misonne's (1964) coordinates for Kilgobbin (29°28'S, 30°07'E) are comparable.

Taxa: *Amblysomus*; *Mastomys*, *Mus*, *Rattus*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Myosorex*.

**Klaserie**, 20 mi [32.3 km] N Bosbokrand, Transvaal (Map 20: 712).

Coordinates: 24°33'S, 31°02'E G (as Klaserie Railstation).

Collectors: S. D. Durrant, R. D. Hepplewhite, H. W. Setzer, and A. R. Silberstein (27–30 Sep 1966).

Habitat: “[One hundred] yards [91.4 m] from camp is a dry water course with grass along the banks. From this [dry water course] a ridge rises which is covered with thorny scrub and grass on the one side and trees on the north side. [Two hundred] yards [182.9 m] south of the camp site and on the other side of a ridge is a fairly fast flowing river with reeds on the banks and grass and bushes beyond this . . . south side of the river bank” (RDH).

Remarks: On 28 Sep, the AMP crew went to a citrus farm on the north side of the railroad tracks, where they collected some *Cryptomys*.

Taxa: *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Lemmiscomys*, *Mastomys*, *Mus*, *Cryptomys*.

**Klawer**, 2 mi [3.2 km] W, Cape Province (Map 20: 715).

Coordinates: 31°47'S, 18°35'E M (WAC, *Lower Orange River*, 1:1,000,000).





FIGURE 138. South Africa, Klawer, 2 mi W: Vegetation on dunes (photograph by A. C. Risser, Dec 1963).

Collectors: R. E. Cole, P. J. Geldenhuys, and A. C. Risser (17 Dec 1963).

Habitat: "Dune edges covered with herbaceous shrubs, succulents" (Figure 138) (ACR).

Remarks: Before leaving their camp at 5 mi E Van Rhynsdorp, the AMP crew collected "about 15 miles [24.1 km] away, south of the Olifants River," between Klawer (31°47'S, 18°37'E G) and Vredendal (31°40'S, 18°30'E G). At the same time, they also set traps in the dunes 2 miles [3.2 km] west of Vredendal according to Risser's journal, but no specimens were collected here.

Taxa: *Desmodillus*, *Gerbillurus*, *Mus*, *Rhabdomys*.

**Kleinfontein**, 20 mi [32.2 km] NE Zeerust, Transvaal (Map 20: 658).

Coordinates: 25°20'S, 26°09'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (25–27 Apr 1969).

Habitat: "Camped at foot of a series of low rocky hills covered with grass and other various bushveld shrubs

and trees. On the flat areas at the foot of the hills there are big cultivated monkeynut lands. The ground structure is sandy . . . rocky hill with a plateau on top with sandy soil" (JJLP).

Remarks: The AMP crew established camp at Kleinfontein, a farm situated to east of the Zeerust–Silkaatskop road and to the north-northeast of Zeerust (25°32'S, 26°05'E G). The coordinates for the farm conform closely to those derived from a by-road plot relative to Zeerust.

Taxa: *Elephantulus*; *Procapra*; *Paraxerus*, *Saccostomus*, *Acomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Rattus*; *Rhinolophus*, *Pipistrellus*, *Neoromicia*; *Genetta*.

**Klein Letaba (Post Office)**, 8 mi [12.9 km] W, Transvaal (Map 20: 672).

Coordinates: 23°08'S, 30°20'E M (WAC, *Shashi River*, 1:1,000,000).

Collectors: I. L. Rautenbach and A. R. Silberstein (18–24 Jan 1967).

Habitat: "Long grass," "rocky hillside" (specimen labels).  
 Remarks: Coordinates were based upon distance from Klein Letaba (23°08'S, 30°27'E G).  
 Taxa: *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*; *Lepus*; *Crocidura*.

**Kluitjieskraal**, 7 mi [11.3 km] SW Swellendam, Cape Province (Map 20: 741).

Coordinates: 34°06'S, 20°21'E G.

Collectors: P. J. Geldenhuys and A. C. Risser (5–7 Jan 1964).

Habitat: "Trees on the river bank . . . rocky slope . . . covered with aloes and shrubs. Fern grassy patches here and there. Not 100% ground cover by any means . . . grassy flat (looks like a golf course fairway) . . . reeds near the river's edge . . . small pool among the rocks and reeds" (ACR).

Remarks: The team established camp on the Kluitjieskraal Farm southwest of Swellendam. Originally, Risser recorded that their camp was on the Kluitjieskraal River, but at some later time, he wrote in the journal margin, "No! Camp was *on* [emphasis in original] Breede. Kluitjieskraal was nearby." According to the collectors' road mileage and direction from Swellendam (34°02'S, 20°26'E G), their itinerary would have crossed the Breede River and terminated in the vicinity of an unnamed tributary of the Breede. This point approximates the USBGN coordinates for the mouth of the Kluitjieskraal Stream (34°03'S, 20°21'E G) and the eponymous farmstead (cited above) and persuades us that Risser's first assessment of their whereabouts is more nearly correct.

Taxa: *Procapia*; *Gerbilliscus*, *Aethomys*, *Myomyscus*, *Rhabdomys*, *Otomys*; *Lepus*; *Myosorex*; *Cynictis*.

**Knoffelfontein**, 16 mi [25.7 km] S Luckhoff, Orange Free State (Map 20: 726).

Coordinates: 29°53'S, 24°50'E G.

Collectors: A. F. Hallett, T. A. Heist, and A. C. Risser (10–13 Mar 1964).

Habitat: "Area is typical karoo scrub, red sandy soil and FLAT except for the mountains in the distance . . . Near the house [of the farm Knoffelfontein] is a rocky mountain [hillside]. At base is riparian condition with *Acacias*, reed-like grasses . . . sedges" (ACR).

Remarks: On 9 Mar, the AMP crew headed for Luckhoff (29°45'S, 24°47'E G) and intended to camp on the Knoffelfontein Farm. Unable to contact the Lubbes, the owners of Knoffelfontein, they settled at an overnight camp close to the Philippolis–Luckhoff road junc-

tion. The skin labels of the few specimens collected here read "Knoffelfontein [unspecified] miles S Luckhoff," but Risser recorded the locality as "Knoffelfontein, 16 miles south of Luckhoff" in his field catalog. Afterward, all specimens collected "16 mi S of Luckhoff" omit reference to the farm. The following day, the AMP crew retraced their route back to Luckhoff, contacted the Lubbes, and drove to their farm where the crew encamped for the balance of their stay. The distance traveled south of Luckhoff (per WAC, *Upper Orange River*, 1:1,000,000) would have placed the team in the vicinity of one USBGN-listed Knoffelfontein Farm, to the west of the Philippolis–Luckhoff road. Given the large size of the farm (5,000 morgen = 4,284 ha, or 10,584 acres), we are uncertain how accurately its central coordinates reflect the focus of their field activity.

Taxa: *Elephantulus*; *Procapia*; *Desmodillus*, *Mastomys*, *Micaelamys*, *Mus*, *Rhabdomys*, *Otomys*, *Pedetes*, *Cryptomys*; *Lepus*; *Crocidura*; *Tadarida*, *Neoromicia*; *Proteles*, *Otocyon*.

**Koegas**, 10 mi [16.1 km] SE, Cape Province (Map 20: 681).

Coordinates: 29°24'S, 22°26'E G (for De Duinen; see Remarks).

Collector: A. V. W. Lambrechts (25–29 May, 26–30 Oct 1968).

Habitat: "On both sides of the river there are sand dunes, stretching to about 400 yards [365.8 m] from the river on the south bank and to about 600 yards [548.6 m] on the north; both running parallel to the river . . . mixed with rocks and small stones; that is where the sand dunes gradually merge with the rocky, open habitat farther from the river" (AVWL, May). "Habitat . . . approximately the same [as before] . . . sand dunes . . . rock strewn country with shrubs and no grass . . . rocky hill . . . sand dunes covered with shrubs" (AVWL, Oct).

Remarks: On 24 May, Lambrechts headed to Koegas (also Koegasburg; 29°18'S, 22°21'E G) and camped on the south side of the Orange River. The water pumping station was on the other side of the river across from his camp. During the Oct trip, Lambrechts camped on a farm, De Duinen (The Dunes), almost exactly 10 mi via a straight line southeast of Koegas and on the south side of the Orange River. We thus adopted the farm for our coordinates of this locality, although neither De Duinen (De Duine per AMS, *Upington*, 1:1,000,000) or The Dunes appears on specimen labels.

Taxa: *Elephantulus*, *Macroscelides*; *Saccostomus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Rhabdomys*, *Parotomys*; *Genetta*.

**Komatipoort, 2 mi** [3.2 km] N, Transvaal (Map 20: 709). Coordinates: 25°22'S, 31°57'E G (as Tenbosch; see Remarks).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (27 Sep–10 Oct 1969).

Habitat: “On the banks of the Crocodile River . . . bushveld savanna on sandy soil with rocky ridges to the east” (JJLP).

Remarks: In his field journal, Pretorius commented that their base camp was located on the Tenbosch Farm, along the banks of the Crocodile (Krokodil) River and near the boundary of Kruger National Park, and amended the distance as 2.7 mi [4.3 km] north of Komatipoort (25°26'S, 31°56'E G). “Tenbosch” is specified as part of the locality designation in Pretorius’ field catalog, but only the 2-mi-N distance relative to Komatipoort is written on skin tags. Of the two Tenbosch farmsteads that occur in the vicinity, that cited above is closest, lies due north of Komatipoort, and borders the west bank of the Crocodile River. The straight-line distance from this Tenbosch to the center of town (4 mi) is slightly farther than that (2.7 mi) reported by Pretorius.

Taxa: *Graphiurus*, *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Micaelamys*, *Mus*; *Crociodura*; *Mops*, *Neoromicia*; *Genetta*.

**Kosi Bay, 12 mi** [19.3 km] E Maputa, Zululand, Natal (Map 20: 785).

Coordinates: 26°54'S, 32°52'E G.

Collectors: J. E. W. Dixon, T. A. Heist, G. R. Hughes, and A. C. Risser (2–8 May 1964).

Habitat: “Coastal dune: bush, *Sterlitzia*, umdoni trees, *Strychnos* . . . small vlei (reeds—water, kikuyu grass). Cultivated fields put in by the natives—which are ever increasing—are slowly eating away at the natural bush. Aerodrome: very level, grassy area with small patches of bush. Mealie [corn] field, kraals and grassy hills with a small ‘puddle’ near by . . . banana plant . . . swamp forest [Figure 139] . . . Mealie and millet fields around with scattered small patches of bush. Mostly open, however . . . sandveld around their native kraals . . . entanglement of ferns, thorn vines, canopy trees of *Ficus hippotomai*, *Mancaranga capensis*, *Myrica conifera*, understory of *Stenochlaena [tenuifolia]* [giant vine fern] . . . *Sterlityia* (bird of paradise)” (ACR).

Remarks: At Ingwavuma (27°08'S, 31°59'E G), the commissioner gave permission for the party to proceed into the native reserve area and stay around Maputa (Manguzi; 26°59'S, 32°45'E G). Camp was pitched on the shore of Kosi Bay (Natal Parks, Kosibaai), which is actually northeast of Maputa. On 3 May, traplines were placed in the vicinity of the Maputa aerodrome and also in Maputa itself. The following day, traps were set around the South African Police Station in Maputa, and four *Chaerephon* were collected from the General Store in Maputa.

Taxa: *Calcochloris*; *Saccostomus*, *Dendromus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Mus*, *Cryptomys*; *Chaerephon*, *Mops*, *Neoromicia*.

**Kuruman, 6 mi** [9.7 km] E, Sweethome, Cape Province (Map 20: 655).

Coordinates: 27°26'S, 23°33'E M (WAC, *Molopo River*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (30 Aug–2 Sep 1966).

Habitat: “The ground is very sandy . . . with scattered bushes and very sparse grass” (RDH).

Remarks: On 31 Aug, the team collected a number of *Miniopterus* and *Rhinolophus* in The Eye (Die Oog, spring; 27°28'S, 23°27'E G), Kuruman Cave, from which the village of Kuruman (27°27'S, 23°26'E G) receives its water supply. Later, they visited a cave near a farm at 3 mi [4.8 km] E Kuruman and collected *Rhinolophus*.

Taxa: *Desmodillus*, *Gerbilliscus*, *Rhabdomys*, *Pedetes*, *Cryptomys*; *Rhinolophus*, *Miniopterus*.

**Lady Grey, 12 mi** [19.3 km] SW, Cape Province (Map 20: 755).

Coordinates: 30°50'S, 27°05'E M (TPC, *Sheet Q-5D*, 1:500,000).

Collectors: R. D. Hepplewhite, I. L. Rautenbach, and A. R. Silberstein (20–23 Jul 1966).

Habitat: “Stream lies at the bottom of an old river bed with sandy cliff banks. Above the river the ground is very flat with grass on the one side and over grazed land on the other. Here and there are koppies with rocks on them” (RDH).

Remarks: The coordinates are a by-road estimate from Lady Grey (30°42'S, 27°14'E G). The river mentioned in Habitat is probably the Bossieslaagtespruit, a tributary of the Kraai. One specimen of *Lepus* was labeled Vryuitzig, which is possibly a phonetic spelling of Fraaiuitzicht, a locality modifier also found on some



FIGURE 139. South Africa, Kosi Bay: Dense forest near Kosi Bay, 12 mi E Maputa (photograph by J. E. W. Dixon, May 1964).

specimen labels. Three specimens of *Pedetes* were labeled Dardinell. None of these place-names could be located within a wide search radius around the collectors' distance and direction from Lady Grey.

Taxa: *Elephantulus*; *Procapra*; *Xerus*, *Saccostomus*, *Mastomys*, *Micaelamys*, *Rhabdomys*, *Myotomys*, *Pedetes*, *Cryptomys*; *Lepus*.

Lichtenburg, 22 mi [35.4 km] NNW, Transvaal  
(Map 20: 657).

Coordinates: 25°57'S, 25°55'E M (WAC, *Vaal River*,  
1:1,000,000).

Collectors: R. E. Cole, P. J. Geldenhuys, and H. W. Setzer  
(11–17 Oct 1963).

Habitat: "The habitat is open to the greater extent—called high Veld fringe. It is grassland and acacia and quite a bit of volcanic rock . . . old mealie [corn] field . . . sedge field" (REC). "The thorn bush we are camped in now is called 'sweet thorn' . . . Another type [of thorn] around here grows quite close to the ground and has thorns that resemble a cat's claw" (H. W. Setzer to Mrs. Setzer, personal communication, Oct 1963).

Remarks: The cited coordinates fall at the center of a cluster of marks located on a probable AMP field map.

Although the commonly used skin-tag designation reads “22 mi NNW Lichtenburg,” Cole further localized their campsite as 15 mi [24.1 km] west and 12 mi [19.3 km] north of Lichtenburg (26°09'S, 26°10'E G) in his field journal. A few specimens were collected at peripheral sites labeled as 15 mi [24.1 km] W, 4 mi [6.4 km] N and 15 mi [24.1 km] W, 7 mi [11.3 km] N Lichtenburg.

Taxa: *Xerus*, *Dendromys*, *Mystromys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Micaelamys*, *Pedetes*; *Lepus*; *Cynictis*.

**Lindley, 10 mi** [16.1 km] NW, Lusthoff, Orange Free State (Map 20: 734).

Coordinates: 27°45'S, 27°54'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (13–16 Mar 1969).

Habitat: “River banks, low hills with sandstone rock layers and scattered rocks, grassveld and cultivated lands. A good and promising variation of habitats . . . grassveld on the hills plateau” (JJLP).

Remarks: From Lindley (27°52'S, 27°55'E G), Pretorius and crew drove 12 mi [19.3 km] along the Lindley–Heilbron road and camped on the Lusthoff Farm. This distance, from Pretorius' field journal, does not exactly match the 10-mi-NW modifier as found on specimen labels and in Liversedge's catalog. The river cited may be a tributary of the Rhenoster and Vaal rivers.

Taxa: *Elephantulus*; *Xerus*, *Mystromys*, *Mastomys*, *Micaelamys*, *Pedetes*, *Cryptomys*.

**Loeriesfontein, 6 mi** [9.7 km] S, Cape Province (Map 20: 676).

Coordinates: 31°03'S, 19°29'E M (WAC, *Lower Orange River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (11–14 Jun 1969).

Habitat: “Dry river bed between high hills. The surface is thickly covered with shrubs and the soil changes from sandy to scale [sic] gravel . . . rocky side of a hill . . . gravel soil with shrubs . . . sandy soil with large, loose boulders and various drought resistant shrubs . . . hill plateau” (JJLP).

Remarks: The AMP crew pitched camp on the municipal grounds south of Loeriesfontein (30°58'S, 19°27'E G) on the banks of a dry river bed, perhaps a tributary of the Zout River. On 13 Jun, a trapline was set on a rocky hillside approximately 2 mi [3.2 km] from camp, a site not distinguished on specimen labels.

Taxa: *Elephantulus*, *Macrosclides*; *Procapra*; *Petromyscus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*, *Myotomys*, *Cryptomys*; *Galerella*.

**Louisvale, 1 mi** [1.6 km] N, Cape Province (Map 20: 651). Coordinates: 28°32'S, 21°12'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (25–28 Aug 1966).

Habitat: “The camp is on the south bank of the Orange River. Along the fringe of the river is a belt of trees but this has been cleared in places to make way for lucerne [alfalfa] and other crops which are grown in this area. There are many embankments . . . The sandy area under irrigation is about 1/4 mile [0.4 km] wide here and then comes a rocky ridge. On the other side of the rocky ridge the ground is almost flat and where it is not cultivated has low scrub and bushes. Our traplines entered from the river's edge to the top of the rocky ridge” (RDH).

Remarks: The USBGN coordinates for Louisvale are 28°34'S, 21°12'E. See also the locality account for **Sishen**.

Taxa: *Elephantulus*; *Saccostomus*, *Desmodillus*, *Gerbilliscus*, *Mastomys*, *Micaelamys*, *Rhabdomys*, *Thallomys*; *Sauromys*, *Neoromicia*.

**Magoebaskloof, 10 mi** [16.1 km] W Tzaneen, Transvaal (Map 20: 666).

Coordinates: 23°52'S, 30°01'E G.

Collectors: S. D. Durrant, R. D. Hepplewhite, H. W. Setzer, and A. R. Silberstein (30 Sep–3 Oct 1966).

Habitat: “Camped in a valley surrounded by mixed native forest on the banks of the river [probably a tributary of the Groot Letaba] and pine and citrus trees on the slopes of the hills. There is a fair amount of short grass on the banks of the stream and in open spots” (RDH).

Taxa: *Chlorocebus*; *Dendromys*, *Aethomys*, *Grammomys*, *Mastomys*, *Mus*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Crocidura*, *Myosorex*.

**Makatini Flats, 20 mi** [32.2 km] E Mkuze, Zululand, Natal (Map 20: 783).

Coordinates: 27°34'S, 32°12'E M (WAC, *Delagoa Bay*, 1:1,000,000).

Collectors: J. E. W. Dixon, T. A. Heist, G. R. Hughes, and A. C. Risser (22–26 Apr 1964).

Habitat: “Mkuze River . . . riverine bush. Makitini Flats: a relatively flat area of *Acacia*, *Themida* grass. Some areas are dense bush. Grass is about 2 feet [0.6 m] high except where there are burned areas . . . red soil

burned area . . . Thickets of thorns (*Euphorbia*) and *Entamboti* [sic?] trees" (ACR).

Remarks: The crew camped near the Mkuze River in the Mkuze Game Reserve (27°38'S, 32°15'E G) to the east of Mkuze. Our by-road estimate of Makatini Flats, which emphasizes the distance relative to Mkuze and the Mkuze River, differs from those given by other authorities (27°15'S, 32°13'E G; 27°25'S, 32°08'E, Taylor, 1998). Bats were collected by T. C. Henry (Heist's catalog) at the Mkuze Game Reserve Headquarters. On 24 Apr, Risser noted that a trapline was set in the rocky area at the other side of the game reserve but failed to mention the distance and direction from camp. On 25 and 26 Apr, Dixon and Hughes collected at 25 mi [40.2 km] SE Mkuze on the Nyala State Lands (27°56'S, 32°13'E M).

Taxa: *Petrodromus*; *Chlorocebus*; *Saccostomus*, *Dendromus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*, *Cryptomys*; *Lepus*; *Crocidura*; *Chaerephon*, *Tadarida*, *Scotophilus*; *Ichneumia*; *Aepyceros*.

**Makhake Store**, Sani Pass, Natal (Map 20: 768).

Coordinates: 29°37'S, 29°25'E G.

Collectors: R. D. Hepplewhite, I. L. Rautenbach, and A. R. Silberstein (2–6 Jul 1966).

Habitat: "From the banks of the rocky river, a gently sloping area stretching about 1/3 mile [0.5 km] on either side, is covered with grass with patches of bramble and bushes here and there. Beyond this point the ground begins to rise steeply into hills which soon tower above. The hills are fairly rocky with protea bushes quite common and a certain amount of undergrowth in the gullies. There is also a more or less continuous strip of bush directly alongside the river . . . garden" (RDH).

Remarks: The rocky river cited in Habitat is probably a reference to the Mkomazi drainage basin.

Taxa: *Amblysomus*; *Dendromus*, *Mastomys*, *Mus*, *Rattus*, *Rhabdomys*, *Otomys*; *Myosorex*.

**Malelane, 7 mi** [11.3 km] **SW**, Transvaal (Map 20: 708).

Coordinates: 25°32'S, 31°24'E M (WAC, *Delagoa Bay*, 1:1,000,000).

Collectors: I. L. Rautenbach and A. R. Silberstein (24 Nov–4 Dec 1966).

Habitat: "Mine . . . high grass" (ARS).

Remarks: Rautenbach and Silberstein camped on an unnamed farm near Malelane (also as Majelane on maps; 25°29'S, 31°31'E G). On 28 Nov, they went to

Louis Creek, (25°38'S, 31°17'E G, as Louw's Creek) to net bats.

Taxa: *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Mus*; *Lepus*; *Rhinolophus*, *Miniopterus*; *Genetta*.

**Mariazell Mission**, Matatiele District, Cape Province (Map 20: 762).

Coordinates: 30°18'S, 28°22'E G (as Maria Zell Mission).

Collector: T. N. Liversedge (15–17 Jan 1966).

Habitat: "Heavy undergrowth and rocks," "undergrowth and grass," "short grass and bushes" (specimen labels).

Remarks: The town of Mariazell in Cape Province lies approximately 40 km west of Matatiele (30°20'S, 28°48'E G).

Taxa: *Graphiurus*, *Rhabdomys*; *Myosorex*.

**Mariepskop Forest Reserve**, Transvaal (Map 20: 710).

Coordinates: 24°35'S, 30°53'E G (as Mariepskop Bosreserwe).

Collectors: R. M. Davis, A. R. Hardy, and A. L. Moore (3–7 Dec 1964).

Habitat: "River . . . wet vlei" (RMD).

Remarks: The AMP team reported an elevation of about 4,500 ft [1,370 m].

Taxa: *Dendromus*, *Mastomys*, *Rhabdomys*; *Myosorex*.

**Mariepskop Mountain**, Transvaal (Map 20: 711).

Coordinates: 24°32'S, 30°52'E G.

Collectors: I. L. Rautenbach and A. R. Silberstein (17–18 Dec 1966).

Habitat: No information available.

Remarks: The collectors received permission to trap on the top of Mariepskop Mountain and located their camp a few miles below the peak. All specimens collected at this locality were preserved in fluid, presumably because of the persistent rains. On 17 Dec, Rautenbach shot two vervets (*Cercopithecus*); however, the skulls were lost, and none were accessioned into the NMNH.

Taxa: *Mastomys*, *Otomys*; *Epomophorus*, *Neoromicia*.

**Mata Mata**, Aub River, Kalahari-Gemsbok National Park, Cape Province (Map 20: 635).

Coordinates: 25°46'S, 20°01'E G.

Collector: A. V. W. Lambrechts (9–12 Dec 1968).

Habitat: "Sand dunes. Sand and shrubs" (AVWL).

Remarks: While camped at Mata Mata, Lambrechts also collected (11 Dec) at **Kamkwa (Borehole)**.

Taxa: *Gerbilliscus*, *Gerbillurus*, *Rhabdomys*, *Parotomys*.

**Modderfontein**, 2 mi [3.2 km] N Deelfontein, Cape Province (Map 20: 724).

Coordinates: 30°57'S, 23°47'E G.

Collectors: P. J. Geldenhuys and A. C. Risser (30 Jan–2 Feb 1964).

Habitat: “Open vlei . . . karoo . . . camp is under the willows by a small lake . . . rocky hillside . . . bamboo clumps . . . large pond . . .” (ACR).

Remarks: Geldenhuys and Risser established their campsite on Modderfontein, a farm whose ownership Risser alternately attributed to a Mr. DeBeers or De Jagers.

Taxa: *Elephantulus*; *Xerus*, *Malacothrix*, *Desmodillus*, *Gerbillurus*, *Mastomys*, *Micalamys*, *Mus*, *Myomyscus*, *Rhabdomys*, *Myotomys*; *Crocidura*; *Neoromicia*; *Suricata*.

**Modderfontein**, 7 mi [11.3 km] W Springbok, Cape Province (Map 20: 643).

Coordinates: 29°41'S, 17°48'E G.

Collectors: R. E. Cole, P. J. Geldenhuys, and A. C. Risser (6–12 Dec 1963).

Habitat: “Crystal clear spring water, rocky kopjes [Figure 140], rocky mountain slopes covered with tree aloes,



**FIGURE 140.** South Africa, Modderfontein: Rocky kopje on Modderfontein Farm, 7 mi W Springbok. *Procapra* and *Lepus* habitat (photograph by A. C. Risser, Dec 1963).



FIGURE 141. South Africa, Modderfontein: Trappers work near Springbok (photograph by A. C. Risser, Dec 1963).

succulents and deciduous shrubs. Some euphorbias . . . cultivated lands—mostly wheat . . . rocky, succulent covered hillside . . . fresh water ponds . . . old wheat fields . . . acacias” (Figure 141) (ACR). Risser sketched a map in his journal that also depicts sand dunes.

Remarks: The coordinates cited for Modderfontein farm compare favorably with those based upon by-road miles traveled west of Springbok ( $29^{\circ}40'S$ ,  $17^{\circ}53'E$  G). The team established camp about 0.5 mi [0.8 km] from the farm house under a large stand of acacias and next to a small, dry stream bed, probably a tributary of the Buffels River. On 7 Dec, Geldenhuis collected *Rhabdomys* from scrub along a water course 1

mi [1.6 km] S Springbok. On 8 Dec, they hunted in the rocks (kopjes and canyon) about 1 mi [1.6 km] west of the farm house and collected a *Pronolagus* and a *Procapra*. Between 10 and 12 Dec, specimens were also collected at the Aerodrome ( $29^{\circ}42'S$ ,  $17^{\circ}57'E$  G), 4 mi [6.4 km] ESE Springbok. Another locality variant includes 8 mi [12.9 km] W Springbok. Another variant in Geldenhuis' field catalog is 6 mi [9.7 km] W, which is contradicted by the locality indicated on specimen labels as “7 mi W.” In contrast to the rest of his handwritten catalog, the section between 29 Nov 1963 and 2 Feb 1964 is typewritten and does not appear to be a primary source of data.



Taxa: *Chrysochloris*; *Elephantulus*, *Macroscelides*; *Pro-cavia*; *Desmodillus*, *Gerbillurus*, *Mastomys*, *Micaelamys*, *Mus*, *Rhabdomys*, *Myotomys*, *Parotomys*, *Petromus*; *Lepus*, *Pronolagus*; *Crocidura*; *Sauromys*, *Tadarida*, *Neoromicia*, *Cistugo*.

**Montagu, 4 mi** [6.4 km] W, Cape Province (Map 20: 740). Coordinates: 33°49'S, 20°05'E M (ONC, *Sheet R-4*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (4–8 Sep 1969).

Habitat: “High mountains [Langeberg Mountains] on our eastern side with uneven area extending from there towards and past our camp. There is also a river [tributary of the Breede?] flowing past the camp . . . The vegetation along the river consists of thick reeds as well as thorn trees and in the sandy areas along the river banks . . . On the uneven areas vegetation consists of small shrubs and succulents, whereas the nature of the soil is more rocky” (JJLP).

Remarks: Camp was established on the municipal grounds to the west of Montagu (33°47'S, 20°07'E G) and near the Aston road (sic; Ashton G). Our estimated coordinates plot more to the southwest of the town.

Taxa: *Elephantulus*; *Micaelamys*, *Mus*, *Myomyscus*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Crocidura*; *Atilax*, *Cynictis*.

**Moordrift, 7 mi** [11.3 km] SW Potgietersrus, Transvaal (Map 20: 663).

Coordinates: 24°15'S, 28°57'E G.

Collectors: R. D. Hepplewhite and T. N. Liversedge (13–16 Dec 1965).

Habitat: “Farm . . . at the foot of a range of rocky, well-wooded hills. A river formed the boundary on one side of the farm. The vegetation on the flat ground was predominantly acacia bushes and short grass. The water courses were more heavily wooded and had less acacias. The ground was very dry . . . dry watercourse . . . in an acacia and grass belt dividing two peanut fields . . . flat floodplain of the river which was open except for a few thorn trees and sparsely covered with short grass” (TNL).

Remarks: The coordinates cited are for Moordrift Farm, where Hepplewhite and Liversedge camped and which favorably correspond to those (24°16'S, 28°58'E M, WAC, *Vaal River*, 1:1,000,000) derived from mileage relative to Potgietersrus (24°11'S, 29°01'E G). The river and flood plain noted in the habitat description is probably the Nyl River.

Taxa: *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Micaelamys*, *Mus*, *Rattus*, *Pedetes*; *Lepus*; *Genetta*, *Ichneumia*, *Ictonyx*.

**Mosselbaai, 9 mi** [14.5 km] N, Klein Brakrivier, Cape Province (Map 20: 744).

Coordinates: 34°03'S, 22°08'E G (for Rooineuwel Farm; see Remarks).

Collectors: P. J. Geldenhuys and A. C. Risser (8–12 Jan 1964).

Habitat: “The banks are heavily vegetated with Port Jackson willow, acacia, black wattle trees, reeds and grass fern pines and flowering blue gums. Our camp is on a grassy-succulent opening . . . dairy farm . . . old wheat stubble field now grown over slightly with weeds . . . grass-bush-tree borders to the cultivated land” (ACR).

Remarks: Geldenhuys and Risser camped at Rooineuwel Farm, a farm not mentioned on specimen labels. USBGN coordinates of the farm concord with those derived from plotting mileage on available maps relative to Mosselbaai (34°11'S, 22°08'E G). The Klein Brakrivier flows through the Rooineuwel farmstead.

Taxa: *Pro-cavia*; *Dendromus*, *Gerbilliscus*, *Mus*, *Rattus*, *Rhabdomys*, *Otomys*, *Bathyergus*, *Hystrix*; *Crocidura*, *Myosorex*.

**Ndumu Game Reserve boundary**, Zululand, Natal (Map 20: 784).

Coordinates: 26°52'S, 32°15'E G.

Collectors: J. E. W. Dixon and A. C. Risser (10 May 1964).

Habitat: “Good sections of dense riverine forest [Figure 142] (*Ficus sycomorus*), Mahemaan [sic] bush (composed of thicket forest, fever trees) and the sand forest composed of *Newtonia clistanthis* [sic] and *Euphorbia* sp. Most of the canopy trees have *Usnea barbata* (old man’s beard)” (ACR).

Remarks: The companions traveled to the lowveld of the Ndumu Game Reserve, whose northern boundary with Mozambique is formed by the Usutu River. Risser characterized the region as transitional. Several *Aethomys* collected by Risser also bear the locality modifier near Pongolo River.

Taxa: *Gerbilliscus*, *Aethomys*, *Grammomys*.

**Nelspruit, 4 mi** [6.4 km] E, **2 mi** [3.2 km] S, Transvaal (Map 20: 707).

Coordinates: 25°29'S, 31°03'E M (WAC, *Vaal River* and *Delagoa Bay*, 1:1,000,000).

Collectors: R. D. Hepplewhite, H. W. Setzer, and A. R. Silberstein (23–26 Sep 1966).



FIGURE 142. South Africa, Ndumu Game Reserve boundary: Riverine forest (photograph by A. C. Risser, May 1964).

Habitat: "Lots of reeds and tall grass on the banks of the dam and in the vlei. The vlei lies between a number of rocky ridges above which there is a stretch of rocky grassland and then a series of rocky outcrops or low rocky hills. Scattered here and there are patches of natural bush and on the western side of the dam and about 100 yards [91.4 m] from it is a citrus orchard . . . a koppie about 1/4 mile [0.4 km] from camp" (RDH).

Remarks: Our coordinates were estimated on the basis of azimuth and range from Nelspruit (25°28'S, 30°58'E G). Camp was pitched next to a dam, probably the Friedenheim Dam according to the FAO, on the Crocodile Valley Citrus Estates (25°28'S, 31°02'E G).

Taxa: *Steatomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*; *Crocidura*; *Neoromicia*, *Miniopterus*.

Newcastle, 10 mi [16.1 km] S, Gardenia, Natal  
(Map 20: 777).

Coordinates: 27°53'S, 29°49'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (19–21 May 1969).

Habitat: "The grass is high and thick. Except for a few clumps of wattle trees scattered in the area there is hardly any other shrubs and trees except high up on the hillside where there are various shrubs and aloes . . . marshy area . . . marshy grassland . . . stream" (JJLP).

Remarks: Coordinates for Gardenia Farm, where the team camped, are based upon distance from Newcastle (27°45'S, 29°56' G) and Pretorius' remarks about the close proximity of their field site to the Newcastle–Normandien road. Our map-derived coordinates contrast somewhat with those of Taylor (1998; 27°50'S, 29°56'E), which do plot in a southerly direction but do not fall in close proximity to the aforementioned road.

Taxa: *Gerbilliscus*, *Mastomys*, *Micaelamys*, *Mus*; *Crocidura*; *Rhinolophus*, *Miniopterus*.

**Newington, 7 mi [11.3 km] ENE, Transvaal**  
(Map 20: 714).

Coordinates: 24°45'S, 31°25'E C.

Collectors: O. F. Graupner, J. J. L. Pretorius, and H. W. Setzer (16–18 Nov 1968).

Habitat: “Low veld, sandy soil” (OFG).

Remarks: The collectors' coordinates lie approximately 12 km NNE Newington (24°49'S, 31°17'E G).

Taxa: *Galago*; *Saccostomus*, *Gerbilliscus*, *Mastomys*, *Micaelamys*.

**Nkonkoni, 6 mi [9.7 km] N Mkuze, Zululand, Natal**  
(Map 20: 782).

Coordinates: 27°32'S, 31°59'E G.

Collectors: J. E. W. Dixon, T. A. Heist, G. R. Hughes, and A. C. Risser (28–30 Apr 1964).

Habitat: “Looks very much like the west side of the Huachuca Mountains, Cochise County, [southern] Arizona [Figure 143]. *Acacia nigrescens*, a cat-claw thorn tree-shrub is the dominant . . . tall grasses [Figure 144]. Foothills have scattered patches of dense bush . . . bush thickets . . . dry stream bed are on the flats . . . rocky mountain hillside” (ACR).

Remarks: The coordinates of Nkonkoni Farm agree with those derived from distance and direction (albeit more NNW) from Mkuze (27°37'S, 32°02' G) as plotted on an AMP map (WAC, *Delagoa Bay*, 1:1,000,000). On 28 Apr, Risser and Dixon set a trapline on the southern slope of the Lebombo Mountains, which Risser described in his journal as being “very bushy and wet.”

Taxa: *Saccostomus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Micaelamys*, *Mus*; *Crocidura*.

**Norvalspont, 8 mi [12.9 km] E, Orange Free State/Cape Province** (Map 20: 728).

Coordinates: 30°35'S, 25°35'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collector: A. V. W. Lambrechts (23–27 Mar, 22–26 Aug 1968).

Habitat: “South bank . . . mainly scattered karoo shrub with very sparse grass. Small rocks abound . . . north bank . . . changes from cultivated lands to rocks with grass plus shrubs and scattered thornbushes. The habitat on both banks stays the same (small rocks and stones) but with more grass on the north bank” (AVWL, Mar).

Remarks: Camp was situated on the north bank of the Orange River to the east of Norvalspont (30°38'S, 25°27'E G). The field site was about 6 mi [9.7 km] upstream [east] from the “new” Hendrick F. Verwoerd Dam (30°37'S, 25°30'E, FAO). As indicated by the dual provinces, Lambrechts collected on both the north and south banks of the Orange River.

Taxa: *Elephantulus*; *Saccostomus*, *Malacothrix*, *Desmodillus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Mus*, *Rhabdomys*, *Myotomys*, *Pedetes*, *Cryptomys*; *Tadarida*; *Genetta*, *Galerella*, *Proteles*; *Sylvicapra*.

**Nossob Camp, Kalahari-Gemsbok National Park, Cape Province** (Map 20: 634).

Coordinates: 25°25'S, 20°36'E G.

Collector: A. V. W. Lambrechts (23–26 Nov 1968).

Habitat: “Grass and shrubs,” “shrubs and sand” (specimen labels).

Remarks: Variant specimen labels also include 1 mi [1.6 km] N and 2 mi [3.2 km] N Nossob Camp.

Taxa: *Elephantulus*; *Saccostomus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Rhabdomys*, *Parotomys*; *Neoromicia*.

**N'Rougas Farm, 16 mi [25.7 km] N Kenhardt, Cape Province** (Map 20: 650).

Coordinates: 29°07'S, 21°09'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (1–5 Jun 1969).

Habitat: “Although most of the area is flat and changes from sandy soil to gravel there is a short ridge of rocky hills. Vegetation consists of drought resistant grass and shrubs. Along the dry river bed where we are camping there are quite a lot—but scattered thorn trees” (JJLP).

Remarks: The two specimens of *Otocyon* collected from this locality bear the name of the farm as “N'Rougas,” whereas journal entries spell the farm as “N'Ougas.” A USBGN-listed farm of the former orthography does correspond to the distance and direction traveled from Kenhardt (29°21'S, 21°09'E G) and borders a small river, as indicated on available maps.



FIGURE 143. South Africa, Nkonkoni: George Hughes collecting trapped mammals and radioing back to camp from Lebombo Mountains, 6 mi N Mkuze (photograph by A. C. Risser, Apr 1964).

Taxa: *Elephantulus*; *Procavia*; *Xerus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*, *Hystrix*; *Felis*, *Genetta*, *Galerella*, *Otocyon*, *Ictonyx*.

Nylstroom, 4 mi [6.4 km] E, Transvaal (Map 20: 662).  
Coordinates: 24°40'S, 28°28'E M (WAC, Vaal River, 1:1,000,000).

Collectors: R. D. Hepplewhite and T. N. Liversedge (8–11 Dec 1965).

Habitat: "Strip of woodland between two ploughed lands . . . rocky hillside" (TNL).

Remarks: Hepplewhite and Liversedge based their camp on an unnamed farm east of Nylstroom (24°42'S, 28°24' G). The next day, they collected at Num Num



FIGURE 144. South Africa, Nkonkoni: Landscape north side of Lebombo Mountains (photograph by A. C. Risser).

(24°42'S, 28°38'E G), a farm at 10 mi [16.1 km] E Nylstroom. Specimens were also collected at Nylstroom Town (24°42'S, 28°23' G) and the Nylstroom golf course.

Taxa: *Elephantulus*, *Paraxerus*, *Graphiurus*, *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*, *Cryptomys*; *Scotophilus*.

**Pakhuis Pass**, 10 mi [16.1 km] NE Clanwilliam, Cape Province (Map 20: 719).

Coordinates: 32°09'S, 19°02' G (as Pakhuispas).

Collectors: R. E. Cole, P. J. Geldenhuys, A. L. Moore, and A. C. Risser (18–22 Dec 1963); O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (15–18 Jul 1969).

Habitat: “Camp is located under some huge pines and there is a brook flowing behind us. Very rocky, broken terrain, similar in general appearance to the Chiricahua National Monument region, Arizona . . . grassy,

unused irrigation ditch . . . vineyards . . . bush covered sand dune . . . rocky kloof . . . rocky, grassy flat . . . rocky, brushy (*Protea* dominant) area just outside the forest boundary. A vlei area quite moist, covered with juncus-sedge like plants runs partially through part of the trap set . . . rocky slope . . . Very dense vegetation and bare rocks [Figure 145]. Ferns and horsetails in drainage ways . . . shale rock scrub hillside . . . meadow just below the pass. This is a fairly large meadow bordered by rocky mountain slopes [Figure 146]. Ground cover is reeds, rushes, ferns, grass . . . two small water courses . . . Soil is sandy” (ACR). “The area is extremely rocky with sandy areas between the mountains and marshy streams” (JJLP).

Remarks: The expanded locality above matches specimen labels from the second AMP visit. On the first trip here, Cole and companions abbreviated the locality to read Clanwilliam, Pakhuis Pass. In his journal, Cole



FIGURE 145. South Africa, Pakhuis Pass: Ron Cole setting steel traps in Pakhuis Mountains, 10 mi ENE Clanwilliam (photograph by A. C. Risser, Dec 1963).

further amplified the locality as “Pakhuis Mts., 12 mi [19.3 km] ENE Clanwilliam.” The USBGN coordinates jibe with Cole’s modified location of the pass and with our by-road determination. Several specimens were also collected by the first team at 5 mi [8.0 km] NW Clanwilliam, 6 mi [9.7 km] N Clanwilliam at Kleinvlei, and 2 mi N Clanwilliam. According to a sketch map in Risser’s journal, Kleinvlei is, or was, a farm owned by a Mr. Berg.

Taxa: *Chrysochloris*; *Elephantulus*; *Procavia*; *Acomys*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Mus*, *Myomyscus*, *Rhabdomys*, *Otomys*, *Cryptomys*, *Georychus*; *Lepus*; *Crocidura*, *Myosorex*; *Genetta*, *Galerella*.

Parys, 5 mi [8.0 km] ENE, Boomplaas, Orange Free State (Map 20: 690).

Coordinates: 26°52’S, 27°33’E M (WAC, Vaal River, 1:1,000,000).



FIGURE 146. South Africa, Pakhuis Pass: Eastern side of the Pakhuis Mountains, about 10 mi ENE Clanwilliam (photograph by A. C. Risser, Dec 1963).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (18–20 Mar 1969).

Habitat: “Most of the area is cultivated and the rest of the habitat consists of rocky outcrops and grasslands with scattered karoo scrub although were little in numbers” (JJLP).

Remarks: Pretorius and team established camp on the Boomplass Farm, just off the main road to Vereeniging and east-northeast of Parys (26°54’S, 27°27’E G). Of the many farms named Boomplaas listed by the

USBGN, none plausibly corresponds to other available landmarks.

Taxa: *Elephantulus*; *Malacothrix*, *Mastomys*, *Micaelamys*, *Mus*, *Rhabdomys*; *Crocidura*.

**Pella Mission, 10 mi [16.1 km] NW, Cape Province/**  
Namibia (Map 20: 645).

Coordinates: 28°56’S, 19°02’E M (WAC, *Lower Orange River*, 1:1,000,000).

Collector: A. V. W. Lambrechts (5–8 Jul 1968, 22–24 Jan 1969).

Habitat: "Extremely mountainous terrain . . . narrow, flat strip between the river and the mountains . . . It is very dry, with the vegetation sparse or non-existent. There is no grass at all. Even the mountains are almost devoid of vegetation" (AVWL, Jul).

Remarks: During his Jul visit, Lambrechts camped and collected on the south bank of the Orange River at a place known locally as Die Mik. According to the USBGN, Pella Mission is a variant name for the town of Pella (29°02'S, 19°09'E). Lambrechts actually labeled a few specimens as 8 mi [13 km] SW Pella, although this variant is not mentioned in his field catalog or journal. Both the north (Namibia) and south banks of the Orange River were surveyed during his 1969 visit.

Taxa: *Graphiurus*, *Petromyscus*, *Desmodillus*, *Micaelamys*, *Petromys*; *Ictomyx*.

**Petchaye**, 7 mi [11.2 km] SE Estcourt, Natal (Map 20: 772).

Coordinates: 29°05'S, 29°57'E P (Taylor, 1998).

Collectors: T. A. Heist and A. C. Risser (3–6 Apr 1964).

Habitat: "Rocky hillsides, open rolling pasturelands, tall grass vleis and banks of water catchments, thornveld, farm outbuildings and grown up weedy patches" (ACR).

Remarks: The published coordinates for Petchaye concur with estimates based upon mileage traveled by road from Estcourt (29°00'S, 29°53'E G). The farm where the team camped was on the east side of the Drakensberg Mountains. They trapped in a thornveld about 9 mi [14.5 km] from Petchaye, according to Risser's field journal, but this locale is not indicated in field catalogs or on specimen labels.

Taxa: *Amblysomus*; *Elephantulus*; *Mastomys*, *Micaelamys*, *Rattus*, *Rhabdomys*, *Cryptomys*; *Crocidura*.

**Petrusville**, 12 mi [19.3 km] W, Orange Free State/Cape Province (Map 20: 725).

Coordinates: 29°55'S, 24°38'E G (for Havengabrug; see Remarks).

Collector: A. V. W. Lambrechts (30 Apr–4 May, 2–6 Oct 1968).

Habitat: "The south survey line runs into rocky terrain for its whole length. The north survey line has rocks . . . shrubs . . . with one small rocky hill . . . high hill. . . ." (AVWL, Apr–May). "The habitat is in good condition for this time of the year" (AVWL, Oct).

Remarks: Lambrechts camped on the old Petrusville–Luckhoff road next to the Havenga Bridge (or Havengabrug G), which feature we used for the locality

coordinates. Lambrechts reckoned his camp as west of Petrusville, but the Havenga Bridge plots more directly north of Petrusville (30°05'S, 24°39'E G).

Taxa: *Elephantulus*; *Procapia*; *Saccostomus*, *Desmodillus*, *Gerbillurus*, *Aethomys*, *Micaelamys*, *Mus*, *Rhabdomys*; *Crocidura*.

**Philippolis**, 18 mi [29.0 km] S, Orange Free State/Cape Province (Map 20: 727).

Coordinates: 30°30'S, 25°13'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: A. V. W. Lambrechts (24–28 Apr 1968); A. V. W. Lambrechts and S. J. Liversedge (25–30 Sep 1968).

Habitat: "North bank . . . abundant grass . . . pile of rocks . . . collected [*Gerbillurus*] frequently on substrate with a 70% rock cover . . . sandy soil" (AVWL, Apr). "Though no rain fell as yet, the veld is in a reasonably good condition" (AVWL, Sep).

Remarks: The April camp was located about 1.5 mi [2.4 km] east of the bridge across the Orange River on the Philippolis–Colesberg road, where the annual Dingaan's Day or Day of the Covenant Festival is held. The team set up their September camp on the north bank of the Orange River, about 2 mi [3.2 km] west of the bridge and south of Philippolis (30°16'S, 25°17'E G). Our coordinates relate to the April camp and the distance east of the bridge.

Taxa: *Elephantulus*; *Procapia*; *Xerus*, *Saccostomus*, *Malacothrix*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Rhabdomys*, *Pedetes*, *Cryptomys*, *Hystrix*; *Vulpes*.

**Pirie Trout Hatchery**, 12 mi [19.3 km] NW King Williams Town, Cape Province (Map 20: 754).

Coordinates: 32°45'S, 27°17'E G (as The Hatchery).

Collectors: T. A. Heist and A. C. Risser (24 Feb–3 Mar 1964).

Habitat: "Pirie forest . . . creek about 100 yards [91.4 m] away" (TAH). "The hatchery is situated at the edge of the Pirie Forest and bordering the forests and interspersed are grassy meadows [Figure 147]. Water abundant; very lush green vegetation. Wattle trees, pines, poplars . . . The forest is dense except in the plantation schemes. Not much in the way of forest floor cover but leaf debris and branch entanglements. Grass cover in the fields where no grazing has occurred is thick, sometimes waist deep. An occasional vlei or small water course . . . in most of the fields around the hatchery. Forest extends on up to the top of the mountains" (ACR).





FIGURE 147. South Africa, Pirie Trout Hatchery (photograph by A. C. Risser, Feb 1964).

Remarks: Heist and Risser traveled north from King Williams Town (32°53'S, 27°24'E G) and then west to site their camp on the Pirie Trout Hatchery, situated along the southern edge of the Pirie Forest (32°45'S, 27°14'E G). A forest department employee informed the team that the forest was more than 50 years old. On 3 Mar, Risser acquired two *Graphiurus* from the Kaffrarian Museum that had been held in captivity; associated skin labels describe their locality as King Williams Town area.

Taxa: *Amblysomus*; *Graphiurus*, *Dendromus*, *Mastomys*, *Mus*, *Rhabdomys*, *Otomys*, *Cryptomys*; *Myosorex*; *Rhinolophus*, *Neoromicia*, *Miniopterus*; *Genetta*.

Port Nolloth, 2 mi [3.2 km] S, Cape Province  
(Map 20: 641).

Coordinates: 29°17'S, 16°53'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (27 Jul 1969).

Habitat: "The bush" (JJLP). "Littoral sand and shrubs" (specimen labels).

Taxa: *Gerbillurus*, *Myotomys*.

**Port Nolloth, 5 mi** [8.0 km] E, Cape Province  
(Map 20: 642).

Coordinates: 29°17'S, 16°57'E M (WAC, *Lower Orange River*, 1:1,000,000).

Collectors: R. E. Cole, P. J. Geldenhuys, and A. C. Risser (29 Nov–4 Dec 1963).

Habitat: "Area is covered with succulent bushes, and a low, thorny shrub. Soil is probably 100% sand . . . sand dune area . . . [covered with a] lush growth of succulents and Euphorbia. Also unidentified shrubs about waist to shoulder high" (ACR).

Remarks: Although camp was established 5 mi east of Port Nolloth (29°15'S, 16°52'E G), some specimens were also collected 5 mi ENE Port Nolloth from 2 to 4 Dec.

Taxa: *Macroscelides*; *Saccostomus*, *Steatomys*, *Gerbillurus*, *Mus*, *Rhabdomys*, *Myotomys*, *Parotomys*; *Lepus*; *Crocidura*.

**Port St. Johns, 4 mi** [6.4 km] W, Cape Province  
(Map 20: 763).

Coordinates: 31°36'S, 29°30'E M (WAC, *Drakensberg*, 1:1,000,000).

Collectors: R. D. Hepplewhite, I. L. Rautenbach, and A. R. Silberstein (14–18 Jul 1966).

Habitat: "The country is very mountainous with trees and heavy undergrowth on the mountain sides. In the valleys and on the tops of the hills there are open patches with long grass. The rivers have a belt of trees, shrubs and heavy undergrowth along their banks" (RDH).

Remarks: The AMP crew received permission to camp and hunt in an unidentified forest reserve west of Port Saint Johns (31°38'S, 29°32'E G).

Taxa: *Chlorocebus*; *Dasymys*, *Mastomys*, *Rhabdomys*, *Otomys*; *Crocidura*, *Myosorex*.

**Potchefstroom, 3 mi** [4.8 km] ENE, Witrand, Transvaal  
(Map 20: 689).

Coordinates: 26°41'S, 27°10'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (25–26 Mar 1969).

Habitat: "There is great variation in habitat namely cultivated lands, marshy areas, riverine scrub and grass on the river bank, grassland and flat rocky hills . . . rhom trees and scrubs [sic] and grassland . . . maize [corn] lands" (JJLP).

Remarks: The coordinates are based on a by-road estimate relative to Potchefstroom (26°43'S, 27°06'E G). Camp was established on the Witrand Farm on the Potchefstroom–Pretoria road, but we could not locate a geographically plausible candidate among the several Witrand farms listed in the USGBN. The river noted above may be the Mooi, a tributary of the Vaal.

Taxa: *Gerbilliscus*, *Mastomys*, *Mus*, *Rhabdomys*; *Raphicerus*.

**Prieska, 1 mi** [1.6 km] E, Cape Province (Map 20: 682).

Coordinates: 29°40'S, 22°46'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collector: A. V. W. Lambrechts (19–23 May, 20–24 Oct 1968).

Habitat: "East of Prieska . . . intensive cultivation along both banks of the river. To the west . . . numerous koppies, with large dongas in between . . . reeds . . . riverine forest with muddy ground . . . dense riverine shrub . . . open country with sandy soil, grass and shrubs" (AVWL, May). "North bank which is riverine shrub. On the south bank . . . riverine shrub. . . ." (AVWL, Oct).

Remarks: On both visits Lambrechts stayed on the municipal camp ground, in close vicinity to Prieska (29°40'S, 22°45'E G) and on the south bank of the Orange River.

Taxa: *Elephantulus*, *Macroscelides*; *Saccostomus*, *Malacothrix*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Mus*, *Rhabdomys*, *Myotomys*, *Cryptomys*; *Cynictis*.

**Reddersburg, 2 mi** [3.2 km] S, Orange Free State  
(Map 20: 730).

Coordinates: 29°41'S, 26°10'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: A. F. Hallett, T. A. Heist, and A. C. Risser (9 Mar 1964).

Habitat: No information available.

Remarks: En route to Luckhoff, a road-killed *Cynictis* was salvaged by Risser south-southeast of Reddersburg (29°39'S, 26°10'E G).

Taxon: *Cynictis*.

**Redelinghuys, 6 mi** [9.7 km] WNW, Cape Province  
(Map 20: 717).

Coordinates: 32°24'S, 18°29'E M (WAC, *Cape of Good Hope*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (10–14 Jul 1969).

Habitat: “[Eighteen] mile [29.0 km] long fresh water lagoon. Except for the turfy soil on the sides of the lagoon the rest is sandy . . . shrubs and grass . . . marshy sides of the lagoon . . . cultivated lands and the dunes . . . soft sand . . . thickly vegetated areas . . . hills . . . swamps” (JJLP).

Remarks: From Redelinghuys (32°29'S, 18°32'E G), the crew traveled westerly on the road to Elandsbaai and found a suitable camp nearby a “lagoon,” undoubtedly part of Verlorenvlei.

Taxa: *Chrysochloris*; *Procapia*; *Dendromus*, *Micaelamys*, *Mus*, *Rhabdomys*, *Otomys*, *Bathyergus*, *Cryptomys*; *Myosorex*; *Atilax*, *Galerella*.

**Rietfontein**, 14 mi [22.5 km] W Williston, Cape Province (Map 20: 721).

Coordinates: 31°22'S, 20°43'E G (as Rietfontein Oos).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (22–23 Jun 1969).

Habitat: “Rocks and shrubs,” “riverine shrubs” (specimen labels).

Remarks: From Williston (31°21'S, 20°55'E G), the AMP crew drove west, along the Calvinia–Williston road, and camped on the Rietfontein Farm, near a tributary of the Sak (Zak) River.

Taxa: *Macrosclides*; *Desmodillus*, *Micaelamys*, *Rhabdomys*, *Myotomys*.

**Rietvlei Dam**, Pretoria, Transvaal (Map 20: 700).

Coordinates: 25°53'S, 28°17'E G.

Collector: H. J. Herbert (12 Dec 1964).

Habitat: “Moist field” (HJH).

Remarks: While specimen labels refer to this locality as Rietvlei Dam, Herbert referred to the Rietvlei Water Scheme-Reserve in his catalog. The dam is on the Hennops River (Sesmylspruit).

Taxa: *Rhabdomys*, *Otomys*; *Myosorex*.

**Rooiberg**, 2 mi [3.2 km] W, Weinek (or Weynek), Transvaal (Map 20: 659).

Coordinates: 24°45'S, 27°43'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: R. D. Hepplewhite and T. N. Liversedge (4–7 Dec 1965).

Habitat: “Camped between a dry stream bed and a rocky ridge. The vegetation is composed mainly of scattered acacia trees and short grass with occasional patches of low scrub and tallish grass . . . dark grey soil on the flats near streams . . . disused mine shafts” (TNL).

Remarks: Coordinates were estimated on the road that trends northwest from Rooiberg (24°46'S, 27°44'E G). On specimen labels, Hepplewhite referred to the farm where they camped as “Weynek,” while Liversedge spelled the farm “Weinek.” We could not locate such a farm by either spelling in the area.

Taxa: *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Mastomys*, *Micaelamys*, *Mus*, *Pedetes*, *Cryptomys*; *Rhinolophus*; *Canis*.

**Rustenburg**, 2 mi [3.2 km] E, Transvaal (Map 20: 693).

Coordinates: 25°40'S, 27°17'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: R. E. Cole, P. J. Geldenhuys, A. L. Moore, and H. W. Setzer (6–11 Oct 1963).

Habitat: “Most of the land is under orange tree cultivation but there are some grassy fields . . . water catchment . . . burned area up a rocky hillside” (REC). 8 mi W, 2 mi S Rustenburg: “Low bush savanna” (REC). 8 mi W, 6 mi S Rustenburg: “Mountainous terrain . . . 3–4 foot [0.9–1.2 m] high grass and some brush including thorn bush locally known as wait-a-bit” (REC).

Remarks: Two other areas around Rustenburg (25°40'S, 27°15'E G) were also collected: on 8 Oct at 8 mi [12.9 km] W, 2 mi [3.2 km] S and on 9 Oct at 8 mi [12.9 km] W, 6 mi [9.7 km] S.

Taxa: *Elephantulus*; *Graphiurus*, *Saccostomus*, *Steatomys*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Micaelamys*, *Otomys*; *Scotophilus*.

**Rustenburg**, 5 mi [8.0 km] W, Transvaal (Map 20: 694).

Coordinates: 25°38'S, 27°09'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: R. D. Hepplewhite and T. N. Liversedge (1–2 Nov 1965); T. N. Liversedge (29–31 Jan 1966).

Habitat: “Rocky hillside” (specimen labels).

Taxa: *Elephantulus*; *Paraxerus*, *Micaelamys*; *Lepus*.

**Rydalmont**, 4 mi [6.4 km] E Witziesshoek, Orange Free State (Map 20: 774).

Coordinates: 28°31'S, 28°50'E G (as Rydal Mountain).

Collectors: T. A. Heist and A. C. Risser (29 Mar–1 Apr 1964).

Habitat: “Rolling hilly grassland with numerous rocky outcrops especially closer to the mountains. Black wattle trees . . . Also some oaks. River runs nearby—reeds and grasses on banks . . . a number of adjoining farms . . . grassy pasturelands . . . mealie [corn] fields” (ACR).



FIGURE 148. South Africa, Rydalmont: Trapping location, Harrismith (Apr 1964).

Remarks: Our coordinates are those for a USBGN-listed farm named Rydal Mountain. They conform favorably to those derived from a by-road estimate relative to Witzieshoek (28°32'S, 28°48'E G) and also correspond to an annotation found on an AMP field map (WAC, *Drakensberg*, 1:1,000,000). The team traveled to Rydalmont (Figure 148), once a resort, according to Risser, and camped at the northern end of the Drakensberg Mountains around 5,000 ft [1,524 m]. Witzieshoek is the European name for Phuthaditjhaba (<http://en.wikipedia.org/wiki/Phuthaditjhaba>, accessed Jul 2006), as found on a map we consulted (TPC, *Sheet Q-5D*, 1:500,000), and is situated near the Elands River.

Taxa: *Graphiurus*, *Gerbilliscus*, *Mastomys*, *Micaelamys*, *Mus*, *Rattus*, *Rhabdomys*, *Cryptomys*; *Crocidura*, *Suncus*, *Myosorex*.

**Sani Pass**, Basutoland [Lesotho]-Natal border, 9,400 ft [2,865 m], Natal (Map 20: 767).

Coordinates: 29°36'S, 29°18'E G.

Collector: T. N. Liversedge (8–10 Jan 1966).

Habitat: "Near rocks," "caught among rocks" (specimen labels).

Taxa: *Dendromus*, *Myotomys*; *Myosorex*.

**Sishen**, near, Cape Province (Map 20: 654).

Coordinates: 27°47'S, 22°59'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (28 Aug 1966).

Habitat: No information available.

Remarks: On the way from Louisvale (28°34'S, 21°12'E) to Kuruman, Silberstein salvaged an *Ictonyx* at this locality, as written on the specimen label. However, his field catalog for this specimen reads **1 mile N Louisvale**, presumably a lapsus for the locality they just departed.

Taxon: *Ictonyx*.

**Smalhoek**, 12 mi [19.3 km] W Ladysmith, Natal (Map 20: 776).

Coordinates: 28°34'S, 29°35'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (16–17 May 1969).

Habitat: “Half sandy soil, flat areas with streams running through and a few ridges—rocky hills covered with thick long grass, shrubs and trees” (JJLP).

Remarks: In his catalog, Liversedge originally recorded this locality as “12 miles NE Ladysmith, Smalhoek Farm.” Subsequently “NE” was crossed out and replaced with “W.” Hence, specimen labels for this locality read either “12 mi NE” or “12 mi W” as the site of the farm relative to Ladysmith (28°33'S, 29°47'E G). The USBGN coordinates of Smalhoek identify a farm situated west of Ladysmith, just north of the Ladysmith–Bergville road, and reasonably concur with those derived from mileage traced upon the map WAC, *Drakensberg*, 1:1,000,000. Unfortunately, those specimen labels that were erroneously written in the field do not reflect this correction.

Taxa: *Elephantulus*; *Graphiurus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*; *Crocidura*; *Raphicerus*.

**Smithfield, 14 mi [22.5 km] S**, Orange Free State (Map 20: 758).

Coordinates: 30°20'S, 26°43'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: A. F. Hallett, T. A. Heist, and A. C. Risser (9 Mar 1964).

Habitat: No information available.

Remarks: Risser collected a road-killed *Ictonyx* en route to Luckhoff from south of Smithfield (30°13'S, 26°32'E G).

Taxon: *Ictonyx*.

**Sneezewood, 7 mi [11.3 km] NW**, Cape Province (Map 20: 764).

Coordinates: 30°10'S, 29°55'E M (WAC, *Drakensberg*, 1:1,000,000).

Collectors: R. D. Hepplewhite and T. N. Liversedge (19–20 Jan 1966).

Habitat: “Rocky outcrop,” “bushes on hillside,” “rocky hillside, forest,” “dark (black) earth near stream” (specimen labels).

Remarks: The coordinates are based upon straight-line miles northwest from Sneezewood (30°15'S, 29°37'E G), which name is hand-written onto their topographic map and also indicated on their heavily annotated road map (Mobil Southern Africa, *Road Map South Africa, Section 2*, 1:2,280,000).

Taxa: *Rhabdomys*, *Cryptomys*; *Myosorex*.

**Somerset East, 5 mi [8.0 km] W**, Cape Province (Map 20: 751).

Coordinates: 32°44'S, 25°30'E M (WAC, *Algoa Bay*, 1:1,000,000).

Collectors: A. V. W. Lambrechts and S. J. Liversedge (4–8 Apr 1968); A. V. W. Lambrechts (3–7 Sep 1968).

Habitat: “Though the habitat seems to be the same as at Cradock . . . Small Fish River has only been flowing for a couple of days since the beginning of 1967” (AVWL).

Remarks: From Somerset East (32°43'S, 25°35'E G), the team proceeded on the Pearston–Graaff-Reinet road and located a campsite situated between the road to Jansenville and the Small Fish (Klein Fish) River. They camped on the east bank of the river, about 0.5 mi [0.8 km] south of the road.

Taxa: *Elephantulus*, *Macroscelides*; *Procavia*; *Saccostomus*, *Dendromus*, *Mystromys*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Mus*, *Rhabdomys*, *Otomys*.

**Standerton, 10.7 mi [17.2 km] W**, Transvaal (Map 20: 737).

Coordinates: 26°54'S, 29°04'E G (for Rietkuil Farm; see Remarks).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (2–6 Mar 1969).

Habitat: “Sandy soil and cultivated lands with ‘oulands’ grass on the edges of the lands . . . maize [corn]” (JJLP).

Remarks: According to Pretorius’ journal entry, the crew pitched their camp on the Rietkuil Farm, about 0.5 mi [0.8 km] south of the main road to Johannesburg and west of Standerton. The farm’s name does not appear on specimen labels or in field catalogs, but we used those USBGN coordinates because they conform so closely to our map-based estimate in relation to Standerton (26°57'S, 29°15'E G). A single specimen of *Mastomys* bears the locality modifier 10.3 mi (16.6 km) W Standerton.

Taxa: *Mastomys*, *Mus*, *Rhabdomys*.

**Sterkspruit, 12 mi [19.3 km] N**, Orange Free State/Cape Province (Map 20: 760).

Coordinates: 30°24'S, 27°20'E M (ONC, *Sheet Q-5*, 1:1,000,000).

Collectors: A. V. W. Lambrechts, S. J. Liversedge, and H. W. Setzer (19–24 Feb 1968); A. V. W. Lambrechts (6–10 Aug 1968).

Habitat: “Rocks with grass,” “short grass on hilltop,” “cultivated land,” “rocks,” “sparse grass,” “rocks and shrubs” (specimen labels).

Remarks: The AMP team set up camp along the Zastron road, to the north of Sterkspruit (30°32'S, 27°22'E G) and on the north bank of the Orange River.

Taxa: *Elephantulus*; *Xerus*, *Dendromus*, *Malacothrix*, *Mystromys*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Mus*, *Rhabdomys*, *Pedetes*; *Suncus*; *Ictonyx*.

**Stettynskloof**, 22 mi [35.4 km] SW Worcester, Cape Province (Map 20: 739).

Coordinates: 33°50'S, 19°15'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (5–8 Jul 1969).

Habitat: "Below the dam wall a lot of mountain streams run into the main river. The sides of the streams are thickly covered with various riverine shrubs and grasses. Our camping spot is closely surrounded with high mountains . . . thick marshy area with riverine shrubs, bracken and grass" (JJLP).

Remarks: Pretorius and crew drove to this site in the highlands to the southwest of Worcester, just below the Stettynskloof Dam in Stettynskloof itself (some maps consulted [e.g., Acocks, *Veld Types of South Africa*, 1:1,500,000] refer to the town as Stetty). The reservoir at Stettynskloof Dam lies approximately 18 airline miles [29.0 km] SW Worcester, along a tributary (the Stettynskloof River, according to the FAO) of the Breede River and in a gorge, features noted by Pretorius.

Taxa: *Dendromus*, *Acomys*, *Micaelamys*, *Mus*, *Myomyscus*, *Rhabdomys*, *Otomys*, *Georychus*; *Crocidura*, *Myosorex*; *Genetta*.

**Stolzenfels**, Namibia/Cape Province (Map 20: 646).

Coordinates: 28°31'S, 19°43'E G (as Schuitsdrift-Oos; see Remarks).

Collectors: A. V. W. Lambrechts (30 Jun–3 Jul 1968); O. F. Graupner, A. V. W. Lambrechts, and J. J. L. Pretorius (17–21 Jan 1969).

Habitat: "North survey line . . . flat, sandy area with shrubs and no rocks . . . open shrub land and . . . cultivated lands" (AVWL, Jan).

Remarks: In Jun 1968, Lambrechts camped on the north bank of the Orange River on the Stolzenfels Farm, about 10–12 mi [16.1–19.3 km] south of Jerusalem. Both the north (see **Stolzenfels**, Namibia) and south (Cape Province) sides of the Orange were surveyed. In Jan 1969, Lambrechts and company camped across from Stolzenfels (Namibia), on the south bank of the Orange River in Cape Province. There they camped on the Schuitsdrift Farm, whose coordinates we adopted for the South African locus of their field activity, between

Aughrabies Falls and Onseepkans, and again collected on both the north and south banks. Only "Stolzenfels" is recorded on labels as the collecting site.

Taxa: *Saccostomus*, *Desmodillus*, *Gerbilliscus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*; *Sauromys*; *Ictonyx*.

**Tshipise, 1 mi** [1.6 km] NE, Transvaal (Map 20: 673).

Coordinates: 22°36'S, 30°11'E M (WAC, *Shashi River*, 1:1,000,000).

Collectors: I. L. Rautenbach and A. R. Silberstein (7–16 Jan 1967).

Habitat: "Sandy soil," "bank of Njelele River," "mopane bush" (specimen labels).

Remarks: The locality near Tshipise (22°36'S, 30°10'E G) lies close to the Njelele River (Nzhelele G). The cited map uses the variant spelling "Chipise" for Tshipise.

Taxa: *Elephantulus*; *Papio*; *Paraxerus*, *Saccostomus*, *Gerbilliscus*, *Gerbillurus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*; *Lepus*; *Chaerephon*, *Mops*; *Otocyon*.

**Twee Rivieren**, Kalahari-Gemsbok National Park, Cape Province (Map 20: 640).

Coordinates: 26°27'S, 20°34'E G.

Collectors: A. V. W. Lambrechts and S. J. Liversedge (4–7 Dec 1968).

Habitat: "Sand dunes and . . . limestone ridge" (AVWL).

Remarks: Our coordinates refer to the Twee Rivieren Farm, which, according to Lambrechts, is located at the extreme southern end of the park near the Nossob River.

Taxa: *Elephantulus*; *Desmodillus*, *Gerbillurus*.

**Twee Rivieren, 30 mi** [48.2 km] NNE, Kalahari-Gemsbok National Park, Cape Province (Map 20: 639).

Coordinates: 26°10'S, 20°50'E M (ONC, *Sheet Q-4*, 1:1,000,000).

Collectors: A. V. W. Lambrechts and S. J. Liversedge (5 Dec 1968).

Habitat: "Acacia tree" (specimen labels).

Remarks: This locality and that at 40 mi [64.4 km] NNE Twee Rivieren are on the Nossob River and were incidentally visited while the team was camped at **Twee Rivieren** (4–7 Dec).

Taxon: *Thallomys*.

**Tzaneen, 6 mi** [9.7 km] NE, Transvaal (Map 20: 670).

Coordinates: 23°48'S, 30°14'E M (WAC, *Shashi River*, 1:1,000,000).

Collectors: I. L. Rautenbach and A. R. Silberstein (5–15 Feb 1967).

Habitat: "Long grass" (specimen labels).

Remarks: Some specimens are labeled 6 mi "SE" or 6 mi "NW" Tzaneen, but we believe that these compass bearings are erroneous. The catalogs of both Rautenbach and Silberstein have "SE" changed to "NE," so apparently the correction was not applied to the already written skin tags. On the same date (15 Feb) that Silberstein entered 6 mi "NW" Tzaneen in his catalog, Rautenbach's catalog entry indicated the direction as 6 mi "NE" Tzaneen.

Taxa: *Saccostomus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Lemniscomys*, *Mastomys*, *Micaelamys*, *Otomys*; *Lepus*; *Crocidura*; *Taphozous*.

**Tzaneen, 12 mi [19.3 km] N, Transvaal**  
(Map 20: 669).

Coordinates: 23°39'S, 30°10'E M (WAC, *Shashi River*, 1:1,000,000).

Collectors: R. M. Davis, A. R. Hardy, H. J. Herbert, and A. L. Moore (14–18 Dec 1964).

Habitat: "The country is very hilly (mountainous) covered with pine, eucalyptus and heavy bush. The open fields are covered with brush about 3 feet [0.9 m] in height" (HJH). "Forest streams and in open field" (RMD).

Remarks: Davis mentioned in his journal that the distance by road to this locality was 17 mi [27.4 km] from Tzaneen (23°50'S, 30°10'E G), so "12 mi N" was intended to be a straight-line direction.

Taxa: *Saccostomus*, *Aethomys*, *Mastomys*, *Rattus*; *Crocidura*.

**Uitkomst Farm, 32 mi [51.5 km] W Pretoria, Transvaal**  
(Map 20: 695).

Coordinates: 25°54'S, 27°46'E G.

Collectors: R. E. Cole and A. C. Risser (2–6 Nov 1963).

Habitat: "Rolling hills, rocky kopjes and deep riverine kloofs . . . limestone caves . . . rocky, grass-covered slopes behind the camp and along the stream [Figure 149] . . . rock outcroppings . . . densely vegetated



FIGURE 149. South Africa, Uitkomst Farm: Johannes Seete (left) and Al Moore standing by a mist net over a stream, 32 mi W Pretoria (photograph by A. C. Risser, Nov 1963).



FIGURE 150. South Africa, Uitkomst Farm: Giraffes in bushveld, 32 mi W Pretoria (photograph by A. C. Risser, Nov 1963).

banks of the stream . . . swampy, being fed from a spring or springs somewhere up the slope” (ACR).

Remarks: From Pretoria, Cole and Risser traveled west to Uitkomst Farm, a private game reserve (Figure 150) owned by Colonel Jack Scott. There they intended to locate bat roosts in the reserve’s well-populated caves. In his journal, Risser placed the farm in Krugersdorp District, where a gazetted Uitkomst Farm is situated at a plausible distance to the north of Krugersdorp and west-southwest of Pretoria. According to de Ruiter and Berger (2000), Uitkomst (also referenced as the Jack Scott Nature Reserve) is now part of the John Nash Nature Reserve and lies about 45 km N Johannesburg. The scenery along the journey to Uitkomst reminded Risser of southern Arizona.

Taxa: *Aethomys*, *Micaelamys*, *Otomys*; *Rhinolophus*, *Myotis*, *Miniopterus*; *Galerella*.

Upington, 13 mi [20.9 km] E, Cape Province  
(Map 20: 652).

Coordinates: 28°23’S, 21°25’E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: A. V. W. Lambrechts (12–16 Jun 1968);  
A. V. W. Lambrechts and S. J. Liversedge (14–17 Nov 1968).

Habitat: “Rocks and shrubs,” “rocks and shrubs and sand,” “rocks and bushes,” “sandbank and shrubs” (specimen labels).

Remarks: During the June survey, Lambrechts camped on an unidentified farm, on the north bank of the Orange River and along the Upington–Olifantshoek road. Only the north bank was surveyed as the south bank was heavily cultivated. In Nov, Lambrechts and Liversedge again set up camp 13 mi [20.9 km] east of Upington (28°27’S, 21°15’E G), but this time on the south bank of the Orange and opposite the settlement of Sultana-Oord (28°25’S, 21°27’E G).

Taxa: *Elephantulus*, *Desmodillus*, *Gerbilliscus*, *Gerbillus*, *Micaelamys*; *Galerella*.

Upington, 35 mi [56.3 km] NE, Cape Province  
(Map 20: 653).

Coordinates: 28°21’S, 21°49’E M (WAC, *Upper Orange River*, 1:1,000,000).



Collectors: R. D. Hepplewhite and A. R. Silberstein (11 Mar 1966).

Habitat: "Kalahari bushes" (specimen label).

Remarks: While en route to Namibia from Pretoria, the AMP crew picked up a road-killed *Otocyon*.

Taxon: *Otocyon*.

**Van Rhynsdorp, 5 mi** [8.0 km] E, Cape Province  
(Map 20: 716).

Coordinates: 31°38'S, 18°49'E M (WAC, *Lower Orange River*, 1:1,000,000).

Collectors: R. E. Cole, P. J. Geldenhuys, and A. C. Risser (14–17 Dec 1963).

Habitat: "Camped under some acacias along a semi dry stream bed . . . grassy field . . . riparian strip: acacias bordering grassy field . . . trees and shrubs by the stream" (ACR). "River (nearly dry, just stagnant pools here and there)" (REC).

Remarks: The team camped on land owned by the Koch family, to the east of Van Rhynsdorp (31°37'S, 18°44'E G) and near an intermittent river. At the end of their stay, the team also collected at **2 mi W Klawer**.

Taxa: *Desmodillus*, *Gerbillurus*, *Mus*, *Rhabdomys*; *Miniopterus*; *Genetta*, *Galerella*.

**Van Wyksvlei, 11 mi** [17.7 km] E, Gannavloer, Cape Province (Map 20: 678).

Coordinates: 30°23'S, 22°01'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (15–19 Aug 1966).

Habitat: "Last time they had rain was in the floods of 1961. Most of the area is sandy with low bushes about a foot to 18 inches [30.0–45.7 cm] in height, rather densely scattered [sic]. There is a large open field which was plowed in preparation for planting but as the rain didn't come, it was never planted. About one mile [1.6 km] from camp are a range of rocky outcrops with black rocks and low bushes" (RDH).

Remarks: Hepplewhite and Silberstein camped on a farm called Gannavloer. Because the USBGN lists two farms named Gannavloer in the region, either of which is plausible, we based the coordinates upon road miles relative to Van Wyksvlei (30°21'S, 21°49'E G). On 18 Aug, they trapped on a rocky ridge about 1 mi [1.6 km] from camp.

Taxa: *Elephantulus*, *Macrosclides*; *Procapra*; *Xerus*, *Desmodillus*, *Gerbillurus*, *Micaelamys*, *Mus*, *Rhabdomys*, *Parotomys*, *Hystrix*; *Lepus*; *Felis*, *Otocyon*.

**Vereeniging, 10 mi** [16.1 km] NE [SE], Transvaal  
(Map 20: 691).

Coordinates: 26°43'S, 28°05'E G (for Lewensbron Farm; see Remarks).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (21–24 Mar 1969).

Habitat: "Mimosa trees, thorn shrubs and grass . . . marshy areas. Further back from the bank there is only open grasslands with scattered mimosas . . . alongside the river" (JJLP).

Remarks: Although specimen labels and field books read 10 mi "NE," other landmarks mentioned by the collectors argue that their field activity was confined to the southeast of Vereeniging. Pretorius and crew journeyed to the Lewensbron and Badfontein farms, owned by a D. De Toit, and established camp on the south bank of the Klip River, from which they surveyed both the north and south sides of the river. A Lewensbron Farm (see above coordinates) and a Badfontein Farm (26°42'S, 28°06'E G) exist side by side, to the south of the Klip River and approximately 10 mi by road southeast of Vereeniging (26°40'S, 27°56'E G). "Farm—Lewensbron" appears as a locality modifier in Graupner's field catalog, but the name was not applied to skin tags.

Taxa: *Gerbilliscus*, *Mastomys*, *Micaelamys*, *Cryptomys*; *Galerella*.

**Vlakfontein, 4 mi** [6.4 km] N Vryburg, Cape Province  
(Map 20: 656).

Coordinates: 26°54'S, 24°45'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (3–6 Sep 1966).

Habitat: "The country is very similar to that around Kuruman, but there are more bushes. The soil is very sandy with sparse grass but it is quite long. There are cultivated fields here . . . About one half mile [0.8 km] north of us is a dry vlei with longish grass. . . ." (RDH).

Remarks: The USBGN coordinates of Vlakfontein are for a farm that lies at the proper distance to the north of Vryburg (26°57'S, 24°44'E G).

Taxa: *Desmodillus*, *Gerbilliscus*, *Mastomys*, *Mus*, *Rhabdomys*.

**Vrede, 15 mi** [24.1 km] N, Rondebult, Orange Free State  
(Map 20: 736).

Coordinates: 27°15'S, 29°08'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (7–8 Mar 1969).

Habitat: "Stream flowing through the farm in marshy area . . . rocky hill" (JJLP).

Remarks: Pretorius and team camped on a farm called Rondebult, situated about 4 mi [6.4 km] southeast of the Ascent Rail Station. Minor inconsistencies surround the distance of this farm relative to Vrede. Specimens taken on 7 Mar are labeled 10 mi [16.1 km] N Vrede, while those obtained on 8 Mar are labeled 15 mi [24.1 km] N Vrede. In their field catalogs, on the other hand, Liversedge recorded that all specimens were taken 15 mi [24.1 km] N, while Pretorius indicated 17 mi [27.4 km] N Vrede. We georeferenced this locality in relation to the Ascent Rail Station (27°14'S, 29°05'E G) and the nearest stream as represented on the AMP map cited above. As so interpreted, our coordinates fall approximately 20 km N Verde, rather than 24 km.

Taxa: *Mastomys*, *Rattus*, *Rhabdomys*, *Pedetes*.

**Wagendrift**, 19 mi [30.6 km] SSW Laingsburg, Cape Province (Map 20: 742).

Coordinates: 33°21'S, 20°54'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (29 Aug–2 Sep 1969).

Habitat: "There are high mountains on both sides of the camp with high rocky crests. Vegetation consists of thorn trees in the river bed as well as small thorny shrubs on the mountainsides, the main vegetation are succulents and small dry shrubs . . . karoo shrubs" (JJLP).

Remarks: Pretorius commented in his journal that "We are camping 19 miles south-southwest of Laingsburg [33°12'S, 20°51'E G] on the farm Wagendrift on the Seweweekspoort [33°22'S, 21°25'E G] road and about 2 miles [3.2 km] from the Ladysmith boundary." The distance of the cited Wagendrift Farm from Laingsburg plots approximately 13 mi [20.9 km] SSE Laingsburg on available topographic maps (AMS, *Cape Town*, 1:1,000,000; ONC, *R-4*, 1:1,000,000). Nevertheless, the collectors' by-road calculation of 19 mi [30.6 km] seems reasonable considering the large scale of our maps, the rugged terrain they crossed, and allowance for many hairpin turns. The farm's coordinates would place their base camp near the Seweweekspoort road and in intimate contact with mountainous terrain, as described by Pretorius. However, this set of landmarks lies in a SSE direction from Laingsburg, not SSW. The mountains of interest are the Klein Swartberge, and the river is probably a tributary of the Groot River.

Taxa: *Elephantulus*, *Petromyscus*, *Micaelamys*, *Rhabdomys*, *Myotomys*, *Galerella*.

**Wakkerstroom**, 2 mi [3.2 km] E, Natal (Map 20: 780).

Coordinates: 27°20'S, 30°10'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (16–17 Oct 1969).

Habitat: "Typical highveld vegetation but extremely marshy on the flats between the hills . . . area burnt recently and is now covered with short green grass" (JJLP).

Remarks: The AMP team reached Wakkerstroom (27°21'S, 30°08'E G) and camped on the Municipal Grounds next to the Wakkerstroom Dam. Our estimated by-road coordinates place their field site as northeast of the town, not directly east. On 16 Oct, they set traps in a marsh about 1 mi [1.6 km] N Wakkerstroom (not indicated on specimen labels), along a stream.

Taxa: *Mystromys*, *Rhabdomys*.

**Wallekraal**, 40 mi [64.4 km] WNW Garies, Cape Province (Map 20: 674).

Coordinates: 30°23'S, 17°30'E G.

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (22–25 Jul 1969).

Habitat: "The area in which we are camping varies from karoo vegetation to extremely sandy dunes with shrubs. A dry river bed passes through close to our camp" (JJLP).

Remarks: Pretorius placed Wallekraal about 15 mi (24.1 km) from the Atlantic coast.

Taxa: *Cryptochloris*, *Eremitalpa*, *Desmodillus*, *Gerbillurus*, *Micaelamys*, *Rhabdomys*, *Paratomys*, *Bathyergus*, *Cryptomys*, *Petromus*; *Genetta*, *Suricata*; *Vulpes*, *Ictonyx*.

**Warrenton**, 2 mi [3.2 km] E, Vaal River, Orange Free State (Map 20: 686).

Coordinates: 28°06'S, 24°52'E M (WAC, *Upper Orange River*, 1:1,000,000).

Collectors: R. D. Hepplewhite and A. R. Silberstein (10–13 Aug 1966).

Habitat: "The Vaal River has a wide rocky bed with reed covered islands in it and patches of reed along the banks. Immediately above the banks are a series of rocky rantjies covered with bushes and long grass but after about 200 yards [182.9 m] the bushes become sparser and the grass shorter, giving way to sandy soil" (RDH).

Remarks: A single *Mastomys* is labeled as collected 3 mi [4.8 km] E Warrenton.

Taxa: *Elephantulus*; *Saccostomus*, *Malacothrix*, *Desmodillus*, *Gerbilliscus*, *Aethomys*, *Mastomys*, *Micaelamys*, *Mus*, *Pedetes*, *Cryptomys*; *Lepus*; *Atelerix*.

**Weenkop**, 20 mi [32.2 km] N Rouxville, Orange Free State (Map 20: 759).

Coordinates: 30°11'S, 26°51'E G.

Collectors: R. D. Hepplewhite, I. L. Rautenbach, and A. R. Silberstein (25–29 Jul 1966).

Habitat: “Rocky hillside,” “grassy plain,” “sandy grassland,” “sandy riverbank,” “short grass” (specimen labels).

Remarks: The coordinates for Weenkop Farm, where the AMP crew camped, compare favorably with those derived from plotting road miles traveled relative to Rouxville (30°25'S, 26°50'E G).

Taxa: *Elephantulus*; *Xerus*, *Saccostomus*, *Gerbilliscus*, *Mastomys*, *Micaelamys*, *Rattus*, *Rhabdomys*, *Pedetes*, *Cryptomys*; *Crocidura*; *Cynictis*, *Proteles*.

**Welgelee**, 7 mi [11.3 km] W Virginia, Orange Free State (Map 20: 733).

Coordinates: 28°11'S, 26°51'E G (as Welgelegen).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (4–6 May 1969).

Habitat: “Most parts are cultivated areas, sandy soil mostly with only grass vegetation” (JJLP).

Remarks: Pretorius’ journal description identifies the collecting site as the Welgelee Farm, located about 4 mi [6.4 km] to the left (east) of the main Virginia–Theunissen road. The USBGN coordinates of the farm approximate these directions and by-road mileage (as per WAC, *Upper Orange River*, 1:1,000,000), except that the true azimuth of the locality is south-southwest of Virginia (28°07'S, 26°54'E G).

Taxa: *Mystromys*, *Gerbilliscus*; *Raphicerus*.

**Witbank Dam**, 6 mi [9.7 km] E Witbank, Transvaal (Map 20: 701).

Coordinates: 25°52'S, 29°18'E G (for Doringpoortdam; see Remarks).

Collectors: O. F. Graupner, S. J. Liversedge, and J. J. L. Pretorius (12–14 Feb 1969).

Habitat: “Grass and scattered rocks. There are no trees and a few scrubs . . . quite different from the surrounding high veld habitat—a typical middle veld habitat with growth consisting of mimosa trees, thick grass and a variety of other middle veld shrubs” (JJLP).

Remarks: Pretorius and team camped on the bank of the Olifants River near the Witbank Dam. According to the FAO, the dam is located near the Doornpoort farm (25°52'S, 29°19'E) and known locally as Doringpoortdam. The USBGN coordinates for the latter equate to a by-road plot to the east of Witbank (25°52'S, 29°14'E G). On 13 Feb, traplines were reset about 1 mi [1.6 km] downstream, north of the dam wall.

Taxa: *Elephantulus*; *Mastomys*, *Micaelamys*, *Rhabdomys*; *Crocidura*.

**Witrivier (also White River)**, 11 mi [17.7 km] W, Transvaal (Map 20: 706).

Coordinates: 25°19'S, 30°51'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: I. L. Rautenbach and A. R. Silberstein (6–13 Dec 1966).

Habitat: “Long grass,” “waterberry tree,” “banana tree,” “long grass on mountain side,” “long reeds in river bed,” “long grass next to river,” “open field” (specimen labels).

Remarks: The coordinates are based on azimuth and range off set from Witrivier (25°19'S, 31°01'E G). On 10 Dec, the AMP crew attempted to recover *Suncus* from old termite hills near Leggogot (Legogotu; 25°12'S, 31°02'E G), but after breaking down several hills, they succeeded in collecting only a small mamba (Silberstein’s journal).

Taxa: *Graphiurus*, *Steatomys*, *Gerbilliscus*, *Aethomys*, *Dasymys*, *Lemniscomys*, *Mastomys*, *Mus*, *Rhabdomys*, *Otomys*; *Lepus*; *Crocidura*, *Myosorex*; *Epomorphorus*, *Pipistrellus*, *Neoromicia*.

**Wolmaransstad**, 6 mi [9.7 km] N, 1 mi [1.6 km] W, Transvaal (Map 20: 687).

Coordinates: 27°07'S, 25°58'E M (WAC, *Vaal River*, 1:1,000,000).

Collectors: R. E. Cole, P. J. Geldenhuys, and H. W. Setzer (19–24 Oct 1963).

Habitat: “Bush savannah . . . rock koppie . . . through grass and bush, up into a rocky hill . . . old corn field . . . trassie bush . . . tall grass field . . . *Acacia* bushes” (REC).

Remarks: On 21 Oct, the team set traps on the farm of Mr. Firth, 7 mi [11.3 km] south of Wolmaransstad (27°12'S, 25°58'E G), although specimens taken there were labeled 5 mi [8.0 km] S Wolmaransstad. On 23 Oct, Setzer collected a *Gerbilliscus* labeled 1 mi [1.6 km] N, 1 mi [1.6 km] W Wolmaransstad, although his field catalog indicated the locality as 6 mi [9.7 km] N, 1 mi [1.6 km] W. On 24 Oct, Geldenhuys collected

three *Rhabdomys* in trassie (sic) bushes at Townlands Maquassie (Makwassie; 27°19'S, 25°59'E G).

Taxa: *Elephantulus*; *Gerbilliscus*, *Mastomys*, *Micaelamys*, *Rhabdomys*, *Pedetes*; *Lepus*; *Suricata*.

**Wonderboom**, Apies River, Pretoria, Transvaal  
(Map 20: 698).

Coordinates: 25°42'S, 28°10'E G (as Wonderboom Rail Station).

Collectors: R. D. Hepplewhite and T. N. Liversedge (26–27 Oct 1965).

Habitat: No information available.

Taxon: *Micaelamys*.

**Woodbush Forest Reserve**, 15 mi [24.1 km] W Tzaneen, Transvaal (Map 20: 668).

Coordinates: 23°48'S, 29°58'E G (for Dap Naude Dam; see Remarks).

Collectors: R. M. Davis, A. R. Hardy, and A. L. Moore (9–11 Dec 1964).

Habitat: "Vleis . . . dense growth along streams" (RMD).

Remarks: In his journal, Davis remarked that their campsite was just below the Dap Naude Dam, which we adopted as the coordinates for this locality. According to the FAO, the dam is located on the Broederstroom River.

Taxa: *Graphiurus*, *Grammomys*, *Mastomys*, *Rhabdomys*, *Otomys*; *Myosorex*.

**Zuurlaager**, 6 mi [9.7 km] E Bergville, Natal  
(Map 20: 773).

Coordinates: 28°44'S, 29°25'E G.

Collectors: R. D. Hepplewhite and A. R. Silberstein (25–27 Jun 1966).

Habitat: "The sides of the valley are very steep . . . At the top of the valley the ground is undulating with occasional hills. The grass is generally long but has been grazed very short in places . . . stone walled kraal not far from camp . . . open field with long grass bordering on some trees . . . cliff . . . vlei around some trees" (RDH).

Remarks: The Zuurlaager Farm, where Hepplewhite and Silberstein camped, is located on the Tugela River. The coordinates cited closely approximate those (28°46'S, 29°26'E M) we extrapolated from available maps relative to Bergville (28°44'S, 29°22'E G).

Taxa: *Elephantulus*; *Procapra*; *Mastomys*, *Micaelamys*, *Otomys*; *Lepus*; *Crocidura*.

**Zwartkop**, 10 mi [16.1 km] SSW Pretoria, Transvaal  
(Map 20: 697).

Coordinates: 25°50'S, 28°08'E G.

Collector: J. J. L. Pretorius (31 Mar 1969).

Habitat: No information available.

Taxon: *Neoromicia*.

# Appendix

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## CARTOGRAPHIC SOURCES

The following maps and aeronautical charts were consulted to provide geographic coordinates or to corroborate a collector's original coordinates. Many of these documents were apparently used in the field by the AMP collectors as indicated by their dates and worn and creased condition. Furthermore, some maps contain x-marks and written notations that we believe were applied by the AMP collectors and that supplied another line of evidence to help us localize a collecting site.

### ALGERIA

Army Map Service. 1964. *Colomb-Béchar* (NH 30). 1:1,000,000. Washington, D.C.

### BENIN (DAHOMEY)

Le Service Géographique de l'A.O.F. 1955. Carte de l'A.O.F. *Bimbéréké* (NC-31-XV), *Djougou* (NC-31-VIII). 1:200,000. Dakar, Senegal.

L'Institut Géographique National. 1955–1957. Carte de l'Afrique de l'Ouest. *Kandi* (NC-31-XXI), *Lomé* (NB-31-XIV), *Natitingou* (NC-31-XIV), *Parakou* (NC-31-IX). 1:200,000. Paris.

———. 1963. Carte de l'Afrique de l'Ouest. *Zagnanado 3c* (Dassa-Zoumé, NB-31-XXI-3c). 1:50,000. Paris.

———. 1964. Fond Planimétrique de l'Afrique de l'Ouest. *Porto-Novo* (NB-31-XV). 1:200,000. Paris.

### BOTSWANA (BECHUANALAND OR BECHUANALAND PROTECTORATE)

International Travel Maps. 1997. *Botswana* (ITM 855). 1:1,500,000. Vancouver, British Columbia: ITMB Publishing/World Wide Books and Maps.

Smithers, H. J. (n.d). *Preliminary Plan of Nata Crown Lands*. 1:500,000. Blue-lined draft. [Annotated.]

———. (n.d). *Bechuanaland Protectorate and the Caprivi Strip*. Approximately 1:1,267,200. Blue-lined draft, preprint facsimile of geopolitical base map used in Smithers (1971:5, map i). [Annotated.]

———. (n.d). *Bechuanaland Protectorate and the Caprivi Strip*. Approximately 1:1,267,200. Photocopied reduction (8.5 × 11 inches) of above map, hand-labeled "T. N. Liverversedge Collecting Localities Botswana." [Annotated.]

World Aeronautical Chart. 1947–1952. *Lake Ngami* (1274), *Molopo River* (1301), *Okovango River* (1178), *Shashi River* (1275), *Vaal River* (1300), *Victoria Falls* (1177). 1:1,000,000. Washington, D.C.: Aeronautical Chart Service, U.S. Air Force. [Annotated.]

———. 1959. *Bulawayo* (3275), *Livingstone* (3177). 1:1,000,000. Salisbury, Southern Rhodesia: Department of Federal Surveys. [Annotated.]

———. 1964. *Kalahari* (3274), *Tsumeb* (3178). 1:1,000,000. Pretoria: Government Printer. [Annotated.]

#### BURKINA FASO (UPPER VOLTA)

Le Service Géographique de l'A.O.F. 1954–1955. Carte de l'A.O.F. *Houndé* (NC-30-XXI), *Léo* (NC-30-XXII). 1:200,000. Dakar, Senegal.

L'Institut Géographique National. 1960–1968. Carte de l'Afrique de l'Ouest. *Arlé* (NC-31-XX), *Banfara* (NC-30-XIV), *Dédougou* (ND-30-III), *Dori* (ND-30-XVIII), *Fada Ngourma* (ND-31-I), *Kaya* (ND-30-XI), *Pama* (NC-31-XIX), *Pô* (NC-30-XXIII). 1:200,000. Paris.

———. 1967. Carte de l'Afrique de l'Ouest. *Bobo-Dioulasso* (NC-30-NO), *Kandi* (NC-31-NO). 1:500,000. Paris.

#### CHAD

Army Map Service. 1958. *Darfur* (NE 34-35/ND 34-35). 1:2,000,000. Washington, D.C.

#### CÔTE D'IVOIRE (IVORY COAST)

L'Institut Géographique National. 1959–1968. Carte de l'Afrique de l'Ouest. *Dimbokro* (NB-30-XIV), *Gagnoa* (NB-30-XIII), *Guiglo* (NB-29-XVII), *Kong* (NC-30-VIII), *Téhini-Bouna* (NC-30-IX-X). 1:200,000. Paris

Pneu Michelin. 1967. Carte Michelin. *Côte d'Ivoire* (175). 1 cm pour 8 km [approximately 1:800,000]. Paris.

#### GHANA

Survey of Ghana. 1963–1966. *Accra* (North B-30R), *Bole* (North C-30/P), *Daboya* (North C-30/Q), *Gambaga* (North C-30/L and Part of F and Part of North C-31/A and G), *Ho* (North B-31/G), *Kete Krachi* (North B-30/F), *Kintampo* (North C-30/Part V and W), *Koforidua* (North B-30/L), *Kumasi* (North B-30/K), *Navrongo* (North C-30/K), *Prestea* (North B-30/P and Part of V), *Salaga* (North C-30/Part V and W), *Takoradi* (North B-30/Q and Part of W), *Tamale* (North C-31/R), *Wa* (North C-30/J). 1:250,000. Accra. [Annotated.]

———. 1965. Road Map of Ghana. *Northern Section, Southern Section*. 1:500,000. 5th ed. Accra. [Annotated.]

#### LIBYA

Army Map Service. 1942–1959. *Bengāsi* (NI 34), *Bengāsi-Āugila* (NH&NI 34), *Cufra* (NG 34), *Sebha* (NG 33), *Tripoli* (NI 33), *Tripoli-Socna* (NI 33/NH 33). 1:1,000,000. Washington, D.C.

———. 1958. *Fezzan* (NG 32-33/NF 32-33), *Libyan Desert* (NG 34-35/NF 34-35). 1:2,000,000. Washington, D.C.

———. 1958. *Beda Littoria* (NI 34-15). 1:250,000. Washington, D.C.

World Aeronautical Chart. 1951. *Krīti (West)* (424), *Libyan Plateau* (448), *Tazérbo Oasis* (542). 1:1,000,000. Washington, D.C.: Aeronautical Chart and Information Service, U.S. Air Force.

#### MAURITANIA

Army Map Service. 1942. *Port-Étienne* (NF-28), *St. Louis* (NE 28). 1:1,000,000. Washington, D.C.

L'Institut Géographique National. 1955–1965. Carte de l'Afrique de l'Ouest. *Bouly* (ND-29-XIX), *Fort Gouraud* (NF-28-XVIII), *Kiffa* (NE-29-I), *Mbout* (NE-28-VI), *Nouamrhar* (NE-28-XX-XXI), *Sélibabi* (XXIV). 1:200,000. Paris.

#### MOROCCO

Defense Mapping Agency. 1989–1995. Operational Navigation Chart (ONC). *Sheet H-1, Sheet G-1, Sheet H-2*. 1:1,000,000. St. Louis, Mo.

L'Institut Géographique National. 1954. Carte Général du Maroc. *El-Jadida, Hamada du Guir, Marrakech, Ouazazate, Oujda, Rabat*. 1:500,000. Paris. [Annotated.]

## MOZAMBIQUE

- Army Map Service. 1959. *Beira* (SE 36/6). 1:500,000. Washington, D.C.
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## NAMIBIA (SOUTH WEST AFRICA)

- Army Map Service. 1958. *South West Africa* (SF 33-34/SG 33-34). 1:2,000,000. Washington, D.C.
- International Travel Maps. 1997. *Namibia* (60X). 1:2,000,000. Vancouver, British Columbia: ITMB Publishing/World Wide Books and Maps.
- Mobil Oil Southern Africa. 1963. *Road Map South Africa, Section 1*. 1:2,280,000. Johannesburg: Map Studio Production (Pty) Ltd. Jan. [Annotated.]
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ZIMBABWE (SOUTHERN RHODESIA)

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Figures must be original and submitted as individual TIFF or EPS files. Resolution for art files must be at least 300 dpi for grayscale and color images and at least 1200 dpi for line art. Electronic images should measure no more than 100% and no less than 75% of final size when published. JPG files will not be accepted. Color images significantly increase costs so should be included only if required. Funding for color art is subject to approval by SISP and the Publications Oversight Board.

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ENDNOTES are to be used in lieu of footnotes and should be keyed manually into a separate MS Word file, in a section titled “Notes”. Notes should not contain bibliographic information. Manually type superscript numerals in text and use full-sized numerals at the beginning of each note in the “Notes” section. SISP will determine the best placement of the notes section, either at the end of each chapter or at the end of the main text.

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