BEDOUIN ETHNOBOTANY: PLANT CONCEPTS AND PLANT USE

IN A DESERT PASTORAL WORLD

by

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ABSTRACT

Modern botanical folk classification theory developed from studies of small-scale agriculturists, secondarily of hunter-gatherers. This work explores the little-studied pastoral subsistence mode through an examination of plant classification and plant uses among nomadic, Najdi Arabic-speaking, camel-herding tribes of eastern Saudi Arabia based on data collected 1960-1975, before oil-related economic developments had significantly impacted rural life. Bedouins' use of wild plants is primarily for livestock grazing, secondarily for firewood, although 38 species are recognized as edibles, 30 as medicinals and 25 for other uses. The role of wild food plants for famine relief is ecologically limited. Bedouin folk classification generally fits Berlin's 1992 model but with some anomalous features. The basic life form split is between annuals and perennials rather than woody and herbaceous, reflecting highly perceptible plant adaptations in a hyper-arid habitat. This leads to two levels of life forms. Labeled intermediates include an important group based on camel nutritional needs and which can hardly be separated from the general purpose classification. Folk generics number 209, of which seven are unaffiliated to life form; 65 percent of 400 scientific species are labeled. Only three generics are polytypic. While the small number of generics reflects the limited species diversity of the environment, the minuscule degree of generic polytypy may be a general characteristic of the pastoral subsistence mode, which involves less plant manipulation even than among foragers. Data from North Africa show that Arabian plant names and concepts extend 5,500 kilometers to the west among Arabic-speaking tribes of the Sahara. A comparison of today's Bedouin plant terminology with that recorded from
Bedouins in Arabic lexicographic works of the ninth and tenth centuries A.D. shows that little change has occurred over 1100 years. Bedouin life since about 1980 has seen increasing loss of schooled younger people to settled pursuits and the hiring of foreign help in herding. Camel herds are still large, but indigenous knowledge of plants is threatened despite growth in the numbers of Najdī Arabic speakers and the persistence of Bedouin lore in oral and written literature.
PREFACE

I have to slip into a bit of personal history to explain how a study like this comes crawling out of forty years' woodwork. I began collecting Bedouin Arabic plant names and plant-related terminology in the early 1960s when I worked for the Arabian American Oil Company (ARAMCO) at Dhahran, Saudi Arabia, as a practical Arabist attached to the company's Arabian Research Unit. This was an academic-style research group, part of the company's Government Relations Department, set up to provide its then all-American management with expertise in Arabian geography, people, customs and language. It was an organization in many respects unique in the business world at the time. Several areas of work took our small group into active contact with the Bedouin population of the Kingdom. We did stints in remote desert areas, such as along the Trans-Arabian Pipeline across northern Arabia, where the population was made up almost entirely of Bedouins. On "field relations" assignments we learned to negotiate with herders over the value of camels lost in oil field sumps (they were somehow always pregnant females of the most highly prized strains). Our Research Unit was office-based in Dhahran, and we generally gained more "field experience" by bringing to ourselves members of various Bedouin tribes whom we hired as part-time "relators," the term "informant" being thought stigmatized by intelligence-gathering connotations. At the same time, we scrounged field trips with better equipped company departments, such as the oil exploration people or, as often in my case, took to the desert ourselves on weekends with our personal Land Rovers and Bedouin acquaintances as guides.
We were encouraged to collect all kinds of information about the tribes in whose territory the company carried out its operations. We were the corporate authority, along with the Law Department, on the boundaries of Saudi Arabia. These boundaries, many of them then undemarcated and in active dispute with neighboring states, were of vital interest inasmuch as the company's concession area was defined by them in many areas. International boundary claims in lands with a nomadic population often revolved around traditional tribal grazing ranges and the distribution of "home wells." Which state's tribes grazed where, and who, by long practice and tradition, "owned" what water wells? At the same time we were charged with providing all the place names, both in Arabic and in standardized transliteration, for Saudi Arabia's first nation-wide series of aerial photo-based maps. We worked over the data bit by bit with a roomful of Bedouin consultants chosen for their knowledge of each geographical area.

As I worked day-to-day with these masters of desert lore, the Bedouins, I noticed that they often used the names of plants or plant communities in describing the boundaries or characteristics of different geographical areas. Their version of geography seemed to involve as much botany as topography. Having something of a penchant for natural history, I began collecting the Bedouins' names for plants and tried to learn their scientific identities with available references, which were preciously scant in those days. I built up, alongside my other duties, card catalogs of Bedouin plant names and vegetation terminology. I took a correspondence course in plant taxonomy, read other taxonomic textbooks, and exchanged letters with European botanists with Middle East experience. Additionally, I collected in my spare time several thousand plant specimens for herbaria such as the Natural History Museum, London. These, which in part constituted vouchers for vernacular names, formed the basis for a standard taxonomic flora of eastern Saudi Arabia (Mandaville 1990). At one point I began drafting a paper on "Bedouin Concepts
of the Plant World,” but it was filed aside when the Research Unit was shut down and its staff dispersed. I became occupied in more mundane aspects of oil company work.

Sometime around 1975 I came across a review of Berlin, Breedlove and Raven’s now classic book, *Principles of Tzeltal Plant Classification* (Berlin, Breedlove and Raven 1974). Open-mouthed and wide-eyed, stumbling a bit through the unfamiliar jargon, I marveled at how these authors had done with the Tzeltal speaking people of southeastern Mexico just what I had once thought of doing with the Arabic speaking Bedouins of eastern Arabia. But they had done it in an incomparably more complete and theory-based manner. Pouring through the references in this work I discovered that a theoretical base for folk classifications study had been developing over some 20 years, and I scrambled to catch up.

I think of this foray into Bedouin Arabic plant lore as the long-delayed joining of two loves: the desert-adapted plants of Arabia and the remarkable people who have followed them, prayed for their germination, named them, and depended on them for their livelihood for thousands of years.
1. INTRODUCTION

1.1. Introductory Remarks

More than one university professor of linguistics has gently let me know that my affair with Bedouin Arabic plant classification "falls a bit behind the cutting edge of linguistics theory and studies these days." Methodology and interests in this discipline have indeed changed since Sturtevant (1964:100) proclaimed "the new ethnography" and told us that:

To put it another way, a *culture itself* amounts to the sum of a given society's folk classifications, all of that society's ethnoscience, its particular ways of classifying its material and social universe [emphasis added].

I doubt that anyone believes this today. But even by 1964 one aspect of ethnographic semantics -- that concerned with man's conceptualization of his living natural world -- was in fruitful development as part of efforts to discover what was common in this domain to many societies and languages. Over the next 15 years it was given a great impetus by the impressive work of Brent Berlin and colleagues. My remarks in the Preface of this study indicate what an effect that work had on me.

The fields of ethnobotany and ethnozoology, traditionally concerned almost exclusively with a society's *uses* of plants and animals, have only relatively recently expanded their interests to the conceptual and classificatory. In recent years textbooks in these fields (e.g. Martin 1995 for ethnobotany) have begun to deal with folk classification as an essential aspect of fieldwork. By the 1980s it had already begun to figure in applied anthropology, perhaps through its good fit with the recent focus in
international aid work on "bottoms up" development. Here, some workers have begun to emphasize the importance of an understanding of folk classification systems along with broader concepts of nature as a base upon which to build successful approaches to the use of land, plants and animals (Brokensha, Warren and Werner 1980).

The aim of this study is to provide, within the limits of my data and experience, the full extent of the relationship between the Bedouins of eastern and northeastern Arabia and the plant life of their hyper-arid homelands. Given the apparent absence in the literature of descriptions of plant classifications among Near Eastern pastoral nomads -- indeed the scarcity of such data on pastoralists in general -- I give primary attention to this aspect. Plant uses, however, will be described first because I feel that an understanding of that side provides useful background for a better appreciation of some points of classification.

My approach to describing the Bedouin Arabic plant classification scheme is one that has become almost standard in recent years: to compare it with the terminology and framework employed by Brent Berlin and associates that is described, with other developments, in the second part of this Introduction. My data from pastoral nomads has raised some anomalies with respect to that model, and I will attempt to explain these in terms of the desert environment and of some utilitarian factors associated with camel pastoralism.

I have not been able to find any account of Bedouin Arabic plant classification, nor for that matter of any other Arabic-speaking group in the Arabian Peninsula or North Africa, in the existing literature. Joseph Hobbs' very useful account of the natural history (including plant names and some uses) of the Mā'āz Bedouins of Egypt's Eastern Desert (Hobbs 1989) provides a tabular classification of the animal kingdom among these people, who had emigrated from the northwestern Arabian Peninsula some 200-300 years
earlier. His list of plant names is fascinating in its obvious close similarity to our Najdi Arabic material, but it deals only with basic level names (folk generics). There is, of course, a varied trove of Bedouin plant names scattered through the European travel and mémoires literature. Beginning at least as early as the 1876-1878 travels of Burton in Midian and Doughty in the Hijaz and northern Najd (not to speak of the eighteenth century Nehrbur expedition to Yemen, which lies outside our linguistic area), it was the custom of such travelers to take note of the Arabic names of the more conspicuous plants and animals they encountered. Some of the more scientific-minded brought back plant specimens for herbarium identification (e.g. Burton 1879; Philby 1922, 1933; Cheesman 1926). Western travelers or residents more fluent in Arabic and with more Bedouin experience, such as Philby and Musil (see below) picked up some of the more common Bedouin life form or intermediate level names. The annotated list of Kuwait plants by Violet Dickson (1955) is of this class, and her notes also describe uses of plants by Bedouins and townsfolk, all backed by specimens determined at Kew. By and large, however, such writers were content to collect at the basic name level, and only sporadically.

In another category altogether are the several works of the Czech explorer and historian Alois Musil, whose accounts of his north Arabian travels between 1908 and 1915 have left us a wealth of geographic and Bedouin lore, often in astounding detail. Although his primary objectives were not ethnobotanical, he collected many Bedouin plant names, most of them identified scientifically through specimens studied by Velenovsky. His material, particularly vernacular names and plant uses, provides a most valuable picture of Bedouin-plant relations at a time when the northern Bedouins were still untouched by the great political and economic events to follow later in the twentieth century. For our purposes, the most useful of Musil's works are his Manners and
Customs of the Rwala Bedouins (1928a) and Northern Neğd (1928b), the former being a broad ethnographic treatment of this important Najdi Arabic-speaking tribe. I will refer to his material more explicitly in Chapter 6, describing plant uses, where it provides a valuable comparative benchmark for my data of the 1960s.

Plant references in classical Arabic literature will be discussed in Chapter 13, where I attempt to provide a diachronic dimension by discussing Bedouin plant classification and nomenclature as it was some 1100 years ago. My argument, made possible by a quirk of the methodology of the classical Arabic philologists of the eighth and ninth centuries A.D., will be that the great majority of Bedouin plant names and categories used today are virtually identical with their usage more than a millennium ago.

Looking toward the possibility of discerning some common characteristics of the botanical folk classifications of pastoral groups in general, I have tried, not very successfully, to discover classification accounts of other groups of this subsistence type. Little comparative material was turned up beyond the very useful work carried out between 1985 and 1988 by Bernd and Ingo Heine and their associates on plant classifications of pastoral groups in the northern border region of Kenya. This material is discussed and compared with my Arabic data in section 9.8..

I should point out, at this outset, one characteristic of my Bedouin Arabic data that might tend to be overlooked in later descriptive details. This is the fact that it was collected almost entirely in the period 1960-1975. It is thus not a picture of "Bedouin plant classification today" but rather one of those ethnographic snapshots in time, providing a picture that in some respects may be passing but in others lives on. Donald Cole, in his perceptive ethnographic account (Cole 1975) of Āl Murrah, one of the main tribes supplying data for the present study, uses Saudi Arabian oil revenues as an index of economic and social change in some aspects of tribal life. He notes that change was
already underway at the time of his field work, carried out in the late 1960s when annual oil revenues were approaching a billion dollars. Yet those developments were still quite minor compared to what happened in the years nearer 1981, when total revenues reached 108.2 billion (Kanovsky 1994). That was a boom time in Saudi Arabia, with tremendous expenditures on public infrastructure such as education, housing, hospitals, highways and telecommunications, as well as subsidies to the agricultural sector including the Bedouins. In the 1960s, when I was gathering most of my data and when Cole was collecting his, Bedouin life was still in many respects what it had been in Musil's time, with the exception of some trickle-down use of motor vehicles and some income from the oil company or government employment of some tribesmen. In this respect I feel confident that my snapshot (and his), even if our shutters clicked just-in-time, more fairly represents the old Arabia than the new. In Chapter 14 I offer some comments on recent developments that may be leading to greater change in the Bedouins' experience and perception of the natural world.

The term "plants" in this study refers almost exclusively to the wild desert flora of the study area. The Bedouins' involvement in agriculture, at least at the time of my data collection, was essentially nonexistent. They used, and had names for, some products of cultivation -- staples like rice, dates, onions and of course coffee, tea and sugar come immediately to mind -- but they knew these plants essentially as town-purchased products, not living entities. The date palm is an exception in view of its special importance as a local staple product and the fact that Bedouins have in the past had rights in some oasis date groves and are familiar with the palm as a feral or wild species in some parts of the study area. I have also included some cultivated fodder plants, such as barley, oats and alfalfa, which are occasionally found growing spontaneously if briefly on
disturbed desert sites and which the Bedouins sometimes purchase in villages as supplementary livestock feed.

Another point that bears emphasis is that although my data are drawn from a total of some ten different tribal groups, those groups are unevenly represented. The greater part is taken from consultants of two tribes of the central and southern parts of the study area, Āl Murrah and Banī Hājir. In several respects, as will be noted later, I have taken their core input as a standard against which I compare what might be called supplementary data from more distant groups.

My system of transcription for Bedouin speech is described in Chapter 4. For general written Arabic, including current tribal, personal and place names (except a few towns that have accepted English spellings), I follow a modified version of the system used by the [British] Permanent Committee on Geographical Names (PCGN) and the [American] Board on Geographic Names (BGN).

For the scientific taxonomy and nomenclature of vascular plants I follow Mandaville 1990, which is still reasonably up-to-date. I refer also to one or two species not found in the coverage area of that flora, or which were subsequently described as new.

1.2. The Development of Folk Classification Theory

This section aims at providing a basic understanding of folk classification theory and terminology as they have developed since the 1950s. I give special attention to the framework and terminology of Brent Berlin, which have become to great extent a model for other workers. Beyond that I am necessarily selective but have attempted to provide background for the theoretical interpretations of my own data, mainly in Chapter 9.
Descriptions of some aspects of man's relationship with the natural world of plants and animals are as old as ethnology itself. Early ethnobotany (first use of the term is generally attributed to Harshberger 1896), however, was concerned almost exclusively with the uses of plants rather than with views and concepts of the plant world. Until the mid-twentieth century a typical "ethnobotany" consisted of a list of plants with scientific names, often arranged according to the families of Western botanical taxonomy, or alphabetically, giving for each entry a "native" name (more or less correctly assigned and transliterated) and a description of how each plant taxon was used, whether for medicinal purposes, food, construction materials or tools.¹

By the 1950s several of the social sciences were undergoing a shift in approach that could be called at least quasi-paradigmatic. This was the "cognitive revolution" leading away from strict behaviorism in psychology and, in linguistics, to Chomsky's interpretation of grammar as a mental object (D'Andrade 1995). In ethnography, this was paralleled by a new focus on the conceptual, mental aspects of societies under study with emphasis on the semantics of words ("terms") in the minds of the studied subjects. This led to rapid developments in the field called ethnographic semantics, with an early concentration on the analysis of kinship terminology. It was soon extended to other domains, as in Metzger and Williams' analysis of the concept of firewood among the Tzeltal of Mexico's Chiapas highlands (D'Andrade 1995:58-62) and Frake's taxonomy of the kinds of illnesses recognized by the Subanun of Mindanao, the Philippines (Frake 1961). Frake, one of the early successful practitioners of ethnographic semantics,

¹ This approach was not the universal ideal. Gilmore (1932:324), for example, pointed out with respect to American native groups that "It is not Indian economic botany only which we should seek .... We should learn what their naturalists know about plant anatomy .... We should obtain their views of plant taxonomy and their methods in nomenclature ... what they know of the relation of plants to their environment ... and of association of species." It is fair to say that in practice, however, these finer points were generally neglected; it was in fact the "economic botany" that continued to prevail.
evaluated the approach succinctly: "The analysis of a culture's terminological systems will not, of course, exhaustively reveal the cognitive world of its members, but it will certainly tap a central portion of it. ... To the extent that cognitive coding tends to be linguistic and tends to be efficient, the study of the referential use of standard, readily-elicitable linguistic responses -- or terms -- should provide a fruitful beginning point for mapping a cognitive system" (Frake 1962).

There is a general recognition now that man's concepts and mental arrangements of living things -- plants and animals -- may be fundamentally unique in several respects. Each basic kind of living thing seems to be presumed to have an intrinsic but hidden special nature, or "essence," that is not present in non-living natural or man-made objects (Atran 1990:57-58). I would speculate that this could arise easily from man's universal observation of the reproductive faculty of living things and the common sense notion that "like begets like." Pine seeds reliably produce more pine trees, not oaks or elms. Some invisible pattern is being passed down through the generations. The scientist with his theories and instruments calls it genes or DNA coding; the non-scientific observer assumes there is "something in there," some kind of "pineness," but is not sure what.

Another special feature of human conceptualization of living things is, at least to some extent, the mental organization of such objects in hierarchical, inclusive ways based on the notion that one thing is "a kind of" something else, e.g. that a pine is "a kind of" tree (see Wierzbicka 1996:372, who cites Atran and Hunn with similar views). One might be marked correct in a scholastic examination in saying that "pine is to tree as chair is to furniture," but a closer examination of the two relations will show that they are fundamentally different. This is shown by linguistic evidence: One can say (speaking of a single object) "Look at that tree!" but not "Look at that furniture." "Chair" is a countable noun, while "furniture" is a mass noun. Additionally, one can easily imagine,
and sketch in a few seconds, a picture of a "tree" (in a general sense, just "a tree") but one cannot imagine or draw (as a single object) "a furniture." "Furniture" is an abstraction based on cultural function. Similar considerations apply to other groupings of artifacts such as "tools" or "toys" (Wierzbicka 1984:317). The "kind of" relationship implies a "vertical" structure such as that exhibited by Fig. 1.2 (below) showing Berlin, Breedlove and Raven's 1973 scheme.

Plant and animal kinds and groups can also, however, be related in a "horizontal" manner, where taxa are considered to be not "kinds" of others but rather "like", or "different from," others. Another important basis for horizontal relationships is that of binary opposition, where features of contrasting taxa are perceived as opposite ends of a dimension such as size ("big vs. small") or woodiness ("hard/woody vs. "soft/herbaceous") resulting in the life forms "tree" and "herb" (Brown 1984:99-104). The majority of specialists in folk classification admit the existence of both vertical and horizontal relationships but may differ on the emphasis that should be given to each.

Conklin had already applied some of the new cognitive techniques in his doctoral dissertation on the ethnobotany of the Hanunóo of Mindoro Island in the Philippines (Conklin 1954). This work, as described by Berlin (1992:4), was "the first ethnographically and botanically sophisticated description of a full ethnobotanical system of classification for a nonliterate society."1 Some of Conklin's descriptive terminology for his Hanunóo data appears somewhat foreign to workers today, such as references to

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1 Berlin's description here is a bit misleading with respect to "non-literate society." Conklin's work was in fact atypical in that his "chief informant" and in some areas 60-75 percent of his fellow countrymen were able to read and write using a 48-character Indic-derived script (Conklin 1954:17-18, 56). The question of study subject literacy is always a factor in folk classification work, primarily because the ability to read implies the possibility of general education which worldwide often includes some elements of Western folk classification or some basic concepts of Western scientific taxonomy. Consultants might thus be tempted to answer classification questions in terms of school-learned views rather than those of their everyday speech. Randall and Hunn (1984:333) describe this process and give some interesting first-hand examples from Randall's work with Sinama (southern Philippine)-speaking consultants. In my Chapter 13 I allude to a similar process in Saudi Arabia. With respect to Conklin's work, remarks by him (e.g. 1954:18) indicate that such "tainting" of his data was in fact unlikely.
the "exocentricity" and "endocentricity" of name forms, but his concepts are clearly familiar. A few years later he set forth some of the basic terminology seen in recent folk biological classification work. A key concept there was that of the lexeme as the data unit of folk classification, his lexeme being "a meaningful form whose significance cannot be inferred from a knowledge of anything else in the language" (Conklin 1962:121). Thus, to use two of Conklin's own examples, the expression "pitch pine" is a single lexeme, while "cheap pine" is not. Conklin's classification of lexemes has been subsequently refined in some respects, but his basic concept is still valid. He also described levels of contrast and types of contrast, such as inclusion (a pine is a kind of tree) and exclusion (a pine is not a kind of oak) and the hierarchic structure that characterizes many folk classifications. He defined folk taxonomy as "a system of monolexemically-labeled folk segregates related by hierarchic inclusion" (ibid:128).

The next major landmark in the development of folk classification theory was the description by Brent Berlin and his associates, Dennis Breedlove and Peter Raven, of general principles considered applicable to the speech of virtually all nonliterate societies. This was based partly on their study of Tzeltal (southeastern Mexico) folk classification and incorporated data from a number of other studies dealing with unrelated languages (Berlin, Breedlove and Raven 1973).

With respect to nomenclature, Berlin, Breedlove and Raven built upon Conklin's concept of the lexeme but argued persuasively for a refinement in the two basic lexemic types called by Conklin "unitary" and "composite." Under this revision, lexemes are, first, either "primary" or "secondary." Primary lexemes are often (but not always) unique single-word expressions such as oak, pine or maple. Secondary lexemes are composed of primary lexemes with the addition of a modifier, such as white oak, ponderosa pine or sugar maple. Primary lexemes are further subdivided on the basis of whether they are
semantically unanalyzable like oak or interpretable to some degree with respect to meaning, like crabgrass. Analyzable primaries break further into the subcategories of "productive" or "unproductive," the former being names such as crabgrass or creosote bush, that include the label of an immediately superordinate category (here, grass and bush). Unproductive analyzable primaries are semantically transparent to some degree but do not include the name of a superordinate taxon. Examples: butter and eggs (the plant); poison oak (poison oak not being a kind of oak).

Productive primary lexemes superficially resemble secondary lexemes but differ by their occurrence in contrast sets some members of which do not include the label of a superordinate taxon. Thus crabgrass contrasts directly with fescue, grama and tanglehead (other kinds of grasses). Secondary lexemes, by contrast, are involved only in sets every member of which names the superordinate taxon: white pine, pitch pine, yellow pine, ponderosa pine. This lexemic typology is summarized in Fig. 1.1, which includes two examples of each type.

![Fig. 1.1. Relationships of lexeme types (after Berlin, Breedlove and Raven 1973:218).](image-url)
With respect to folk biological classification, Berlin, Breedlove and Raven postulated a five- or six-level hierarchic structure with five or six categories treated as basic across all non-literate societies and across different languages. The categories are termed (proceeding from the more to less inclusive): *unique beginner* (unique in the sense that it does not, like the others, belong to a contrast set with one or more other members), referring to all plants or all animals in general; *life form*, which includes widely used terms for groups of kinds of organisms, such as "trees" and "vines" with plants, or "snakes" and "bugs" with animals; *generics*, referring to basic kinds of plants or animals, such as "oak" or "squirrel"; *specifics*, which are particular kinds of generics (where the latter are subdivided by name); and *varietals*, which are named subdivisions of specifics. A sixth possible category called *intermediate* was proposed as falling between the life form and generic but requiring further evidence for consideration as a cross-cultural category. Berlin, Breedlove and Raven presented this scheme in diagrammatic form (Fig. 1.2).
Fig. 1.2. Diagram of Berlin, Breedlove and Raven's 1973 folk classification model. Examples have been added from American English folk classification. The taxon "corn" is treated here as an unaffiliated generic and thus occurs at level 1 rather than the usual level 2 for generics. Due to space constraints, only a few of the actually existing taxa are shown at levels 1-4. The category "intermediate" is not shown; when present it would add a level between life form and generic. After Berlin, Breedlove and Raven (1973:215).
The authors pointed out some characteristics of these general categories that are for the most part constant across different cultures and languages: The unique beginner is often unnamed in many unwritten languages; thus, the majority of languages among nonliterate societies do not have words for "plants" or "animals" in general. The most basic, numerous and often-used category of organisms is the generic, which corresponds to such common English plant names as "oak" or "daisy", or "deer" or "skunk" among animals. They are numerous but in number tend not to exceed roughly 500 in any given language. The majority of generics are grouped together into more inclusive categories (life forms), such as "trees" and "vines" or "snakes" and "fish." Life forms are limited in number and usually do not exceed something on the order of 10 in any language. A few generics are said to be unaffiliated in that they are not considered to be a member of any life form. These are often generics of particular cultural importance or ones that exhibit unusual anatomical structure. Some generics (usually a minority) are subdivided into specifics which have labels including the generic name and a modifying adjective referring to some attribute of the specific. Thus in American English "white oak" is a folk specific referring to a particular kind of oak. Specifics may in some cases (although these are rather rare) be further subdivided into varietals, which then carry the specific name with an added attribute, e.g. "baby lima bean" (a kind of lima bean which is in turn a kind of bean). Organisms labeled as specifics or varietals tend to be of special cultural importance -- often domesticated plants or animals. The category called intermediate, where it exists, tends to be nameless or "covert," with its presence indicated by indirect means.

Berlin, Breedlove and Raven pointed out also that taxa of the same category generally and cross-culturally appear at the same taxonomic levels. The unique beginner always occurs at level zero, and life forms occur only at level one. Generic taxa generally
occur at level two but may (when they are not affiliated with any life form) be found at level one. Specifics are usually positioned at level three but may occur also at level two when included in an unaffiliated generic. Varietals, when present, are generally found at level four but may be found at level three when ultimately included in an unaffiliated generic. Examples of many of these cases may be seen in Fig. 1.2 (above).

The types of lexemes used to label the general categories are also to some extent predictable. Generally in all systems and languages, the generic, life form and (when present) the unique beginner are labeled with primary lexemes. Secondary lexemes are applied to the infrageneric categories specific and varietal.

The launching of Berlin, Breedlove and Raven's model, particularly after it was taken as the basis of their classic work on Tzeltal plant classification (Berlin, Breedlove and Raven 1974), greatly stimulated folk classification research across a broader range of societies with the objective of testing these "general principles." Berlin's model also came under some criticism. Some of these critiques were matters of terminology. Bulmer (1974), for example, objected to use of the term "generic" for the basic folk name category because it implied the existence of a further subdivision that often did not exist and because many uninomials referred to logical or biological species. Brown (1974) questioned the validity of covert (unnamed) categories as elements in folk classification. Other criticism dealt with structural matters. For example: Hunn and French (1984) questioned the pervasive application of the hierarchical principle of inclusion, pointing out that many conceptual relationships between plants among their Sahaptin consultants (northwestern United States) were not examples of hierarchical structure but rather of "coordination," referring to relationships with "core" or prototypical taxa. Ellen (1986:87) suggested by implication that Berlin and associates, in imputing a strictly hierarchical system of ethnobiological classification to all societies, were in fact imposing
their own structural biases derived from the Western classical Linnaean system of scientific taxonomy.

Berlin in 1992 reformulated his model and supporting arguments in book form, incorporating revisions based partly on critiques such as those above and partly on considerations of new data. He emphasizes that "these proposals are to be considered as hypotheses for testing against new empirical data" (Berlin 1992:21). A summary of the revised principles in Berlin's own words (ibid.: 31-35) is provided in Appendix B.

One of the more noteworthy revisions in the 1992 scheme was the dropping of the former numbered "levels" which partitioned the vertical dimension of the 1973 taxonomic tree diagram (Fig. 1.2). The tree diagram, whether inverted, horizontal or otherwise, is itself dropped and replaced with variations on the Venn diagrams of mathematical set theory, a convention that had already been used by other authors with respect to folk classification (Hunn 1976, with description of earlier use by Bright and Bright). See Fig. 1.3.
These shifts were no doubt generated at least in part by criticisms that the authors were "imposing" the system of Linnaean taxonomy (with its characteristic tree diagram) on data from their consultants -- an issue which has led also to a general avoidance by many authors of the term "taxonomy" in reference to folk systems. Additionally, "intermediate" is now accepted as a full-fledged member of the family of ranks, although its absence in some systems is recognized by indicating that the numbers of ranks may number "from four to six." The phenomenon of prototypicality is explicitly recognized along with its influence on some areas of nomenclature. The term "kingdom" replaces the less intuitive "unique beginner" for the most inclusive category. Berlin also, and in my view successfully, defended continued use of the term "generic" for the basic level rank.

Berlin's conceptual scheme for ethnobiological classification, with all its explicit or implicit ramifications, is by no means universally accepted by specialists in the field. It
has, however, become not only a handy model and set of terms, but the standard against which the great majority of workers now describe and compare their new materials. Given its reasonably good fit with my Bedouin Arabic data, I have not hesitated to adopt it as a basis for description and discussion.

Other workers, meanwhile, were making important contributions to the field of folk classification in general. Brown (1984a) carried out a multi-staged investigation of the life form rank culminating in a synthesis demonstrating that a basic inventory of life forms for both plants and animals is found cross-culturally. This study with respect to plants (and I will focus here only on the ethnobotanical side) reviewed 188 languages from diverse geographical and ecological regions, examining use of the life form classes glossed in English as "tree", "grerb", "bush", "vine", and "grass" ("grerb" being a term coined for convenience from "herb" and "grass," reflecting the frequent folk grouping of these two forms in a single class). Brown demonstrated that these life form classes were not only widespread, but that there were cross-cultural constraints on the combinations in which they could occur. This involved "implicational relationships" of the kind discovered for the cross-cultural nomenclature of 11 basic color categories by Berlin and Kay (1969). This kind of relationship is evident when the existence of one term "implies" -- virtually "requires" -- the existence of another, but not vice versa. Thus with regard to the hue aspect of color in Berlin and Kay’s study, it was found that languages that had a term for green almost invariably had also a term denoting red. The reverse was not true: some languages had a term for red alone. These combinational constraints implied that color terms were acquired by languages in a small number of determined orders; in the case above, red precedes green. Berlin and Kay listed seven evolutionary language stages characterized by what color terms had evolved. Stage I languages had terms only for broad spectral segments glossed "black" and "white"; stage II encoded black, white, and
Brown found that plant life forms also varied in number. A few languages had a term only for "tree" (broadly defined), some only for "tree" and "grerb". "Grerb" was not found alone, however, and a label for "bush" could occur only if "tree" and "grerb" (or "grass") were both also found. Languages could be classed in any of six evolutionary stages determined by the number of basic life form types they had developed. Brown summarized these implicational relationships and evolutionary stages as in Fig. 1.4:

![Fig. 1.4. Plant life form encoding sequence and language stages (after Brown 1984a:24).](image)

Brown's characterization of life forms, with their distributional constraints and evolutionary sequence, were criticized by Hunn (1982), who felt the validity of Brown's arguments was impaired because the majority of his life forms were not universal basic terms (in the sense of the basic colors of Berlin and Kay). For Hunn, even classes like "tree", "shrub" and "herb" were arbitrary placements along a continuous cline and were
not, in his view, consistently applied. Randall and Hunn (1984) offered a more extended critique, partly on the basis that Brown's data were unreliable, being based to some extent on inexpert dictionary glosses or on information from interviewees whose life form concepts may have been distorted by introduced patterns. Additionally, they pointed out, the life forms chosen as universal by Brown did not correspond to a number of those found in languages they had studied in detail (southern Philippine Sinama, northwestern U.S. Sahaptin and Chiapas, Mexican Tzeltal), and overlooked utilitarian factors intrinsic to the nature of life forms under their interpretations. Brown (1984b) responded pointing out that earlier limitations in his data had largely been overcome in his latest (1984a) formulation and that his hypothesis did not disallow the existence of life forms other than those of his basic ten. An interpretation of Randall and Hunn's data with more careful reference to his life form definitions would, he said, put them largely in agreement with his hypothesis.

Another major contribution by Brown was a very broad-scale review of the folk classification systems of hunter-gatherers vs. small-scale agriculturists with respect to numbers of labeled biological classes and numbers of binomial names (Brown 1985). It was concluded that the foraging groups had smaller total name inventories and that these rarely included binomials. Brown also provided an explanatory framework for these findings. This work is discussed in more detail in section 9.8 in connection with the fit of my data from a nomadic pastoral society.

One of the more persistent issues in folk classification theory has been the discipline-basic question of whether folk classification and nomenclature arise from man's innate intellectual tendencies to name and arrange the perceived discontinuities in the living natural world, or whether these processes reflect the physical or non-physical cultural usefulness of these living kinds and their classifications. The often remarked
extreme positions in this polarity are (for the "intellectualists" or "perceptualists") Levi-Strauss' emphasis on the primacy of intellectual function in his *Savage Mind* and (for the utilitarians, functionalists or adaptionists) Malinowski's much-quoted "short road" from the wilderness to the belly and mind of the savage (e.g. Morris 1984:45).

Brent Berlin, probably considered the leading theorist in folk classification studies, has long been a strong proponent of the intellectualist position. His 1992 restatement of "general principles" specifies that "ethnobiological systems of classification are based primarily on the affinities that humans observe among the taxa themselves, quite independent of the actual or potential cultural significance of these taxa" (1992:31). Another of his principles points out that "a substantial majority of ethnobiological taxa will correspond closely in content with taxa recognized independently by Western botany and zoology" (ibid.:34). This last statement is linked closely to one of Berlin's main arguments for the non-functionalist position: that an often observed close fit between folk and scientific taxa (the latter by rule excluding cultural factors), as well as the apparent "uselessness" of many folk taxa, are evidence for a perceptual rather than a utilitarian basis for ethnobiological classification (Berlin 1992:80-89). Another advocate of the perceptualist position is Atran (1990:54), who says that "For items that pertain to the conceptual space of human function and use, then, there may well be 'unclear cases' of category affiliation, but this has no direct relevance to folk biological classification."

This idea of Atran is characteristic of a key distinction often emphasized by the intellectualist school: that of "general purpose" vs. "special purpose" classifications (Berlin, Breedlove and Raven 1966:274-275). While admitting the empirical fact that some folk classification systems do have taxa based on utilitarian factors, such as edibility, the perceptualists argue that such human functional attributes do not pertain to the "general purpose" classification of plants but rather to a different "special purpose"
system based on one utilitarian criterion. Such criteria, it is stated or implied, are not as significant to basic classification and should not be confounded with general purpose attributes.

Berlin, Boster and O'Neill had already (1981) presented the results of experiments in the bird naming patterns of the Aguaruna Jívaro (northern Peru), concluding from the results that "classification is primarily determined by the perceptual salience of each species." Birds rated independently by Western ornithologists as highly salient in a perceptual sense by such factors as size, coloration and plumage were found to have stable, widely recognized Aguaruna names. The names of those rated as less salient perceptually were characterized by higher variability.

Field workers, meanwhile, were continuing to record folk taxa among both plants and animals that were clearly based on utilitarian factors. Hunn (1982) provided a first extended and theoretically based reaction to what he saw as continuing neglect of the utility dimension. He argued that folk biological knowledge domains "cannot be adequately understood in such a functional vacuum" (ibid.:832) and that a number of empirical findings, such as the existence of "empty" or residual classification space, cannot be accounted for by the strict set theoretical model followed by Berlin, Breedlove and Raven (1973). Folk classification theory, said Hunn, had become rent by two contradictory models: a formal taxonomic hierarchy model on the one hand and on the other by one including both "a general purpose biologically natural taxonomic core" and a "periphery" of special purpose, biologically artificial taxa. The "core-periphery" pattern is superior in explanatory power, he said, and can explicitly recognize the purpose of classification (Hunn 1982:830). Extending his discussion to the problem of how to measure and record cultural utility, Hunn suggested that any such approach should be from "the native point of view" and based on a working premise that no two folk taxa will
be functional equivalents. Each taxa should be defined in terms of a unique "activity signature," which he thought might consist of a series of imperative sentences giving instruction for action in uses of the taxon being considered.

Morris (1984) supported the utilitarian position with his discussion of folk classification among the Chewa of Malawi with particular focus on their concepts of fungi. Here, of a total biological inventory of some 500 larger fungal species, only about 70 species -- those considered edible -- participate in a classification with numerous labeled taxa. The remainder, when referred to at all, are simply lumped under a term glossed as "useless organisms" (used also in reference to useless animal taxa). Functional considerations also play a role in Chewa life form classes.

Clément (1995) argues for a utilitarian approach based on an analysis of Montagnais and Cree (Quebec, Canada) data showing a utilitarian basis for life form classes indicated by linguistic clues.

Brown (1995) examined the question of utilitarian factors in folk classification by examining the labels given by New World natives to 77 non-native plants, animals and artifacts introduced by European colonists in both North and South America. The study involved 292 language cases and 196 distinct languages. Each label encoded was examined on the basis of whether it was utilitarian in nature (such as a horse being called "he carries heavy things") or basically perceptual (such as a horse being referred to as "large tapir"). It was found that only 10 percent of introduced living things had utilitarian names while the proportion for artifacts was 63 percent. The result was all the more striking in that the plants and animals involved were all domesticated forms specially bred for utilitarian purposes. Brown's conclusion was that these findings largely substantiate the intellectualist view. He pointed out also, however, that some names for introduced
plants were utilitarian in more than 30 percent of the language cases, indicating that functional considerations do sometimes play a role in ethnobiological cognition.

With respect to my own position in this debate, I began my investigations of Bedouin Arabic plant classification as an assuming functionalist (a subspecies of ethnobotanist described, among others, by Hays 1982:93), thinking that even if utilitarian factors were not immediately dominant in my data, they would become so in time with a better understanding of plant names, classification and uses. I have finally been led by my data to the conclusion that my consultants' plant classification is built mainly on perceptual criteria. Yet utilitarian features may be evident in a few generic names, and they certainly play a dominant role in one intermediate-rank taxon, as will be described in section 9.3. As also pointed out there, I argue against the idea that this category should be disintegrated from the others as a part of some other, "special purpose," universe. Nor would I deny that considerations of utility might play larger, even overriding, roles in other folk classification systems.
2. THE STUDY AREA

I define my study area, in eastern Saudi Arabia, as portrayed in Map 2.1. The part enclosed by the dotted line is what I would refer to as the "core area," which is that region ranged by the tribes of my primary consultants and in which I have fairly complete

Map 2.1. Arabian Peninsula, showing study area. The core study area is enclosed in dotted line. Names of consultants' tribes are centered on their home territories.
knowledge of the flora in terms of scientific taxonomy. Tribal names shown outside that area indicate the range centers of other groups contributing data but for whom I do not have a reasonably full ethnobotanical inventory. The names are placed in the approximate centers of the home territories, or **dirahs**, where the water and occupation rights of each group are generally unquestioned.

2.1. Geology and Topography

For place names referred to here and in other parts of this study, see Map 2.2. Our core geographical area covers approximately 520,000 km$^2$ in eastern and northeastern Saudi Arabia. It lies in part of what geologists know as the Arabian Shelf, the eastern of the two major structural provinces of the Arabian Peninsula. Making up a bit less than two thirds of the Peninsula's total area, this province is characterized by eastward-dipping sedimentary rock strata laid down by ancient seas upon a crystalline basement complex. The total depth of these sediments increases from zero at the surface contact with the basement in the west to something over 5000 m eastward and southeastward in the basins beneath today's Persian Gulf and northern Rub' al-Khāli sand desert. Upper Jurassic and some earlier horizons in this sequence provide the prolific reservoirs of the world's largest onshore and offshore oil fields (Powers et al. 1966). The exposure of the basement complex in the western part of the Peninsula forms the other major geologic province, the Arabian Shield, composed of Precambrian metamorphic and igneous rocks that were continuous with an African shield counterpart until separated by the opening of the Red Sea rift in later Tertiary times. This event came too late to block some commonality, particularly with the dominance of *Acacia* spp. and associates, of the flora of western Arabia and that of lands on the western side of the Red Sea (Mandaville 1984).
Map 2.2. Central and northern Arabian Peninsula showing place names mentioned in the text. The majority of name spellings on this map follow the (unmodified) BGN system.
Our study area is today bounded on the east by the western shore of the Persian Gulf and on the west roughly by the western margin of the great arc of dunes called ad-Dahhā'. It extends northwestward into the northern plains and in the south includes the northern part of the Rub' al-Khāli. The greatest part of this area falls within the current Saudi Arabian administrative area known as the Eastern Province. The northwestern portion, beyond the long depression called al-Bāṭīn, is administered as part of the Northern Frontiers.

Overall, this is a region of slight to moderate topographic relief. The surface, where not obscured by bodies of wind-blown sands, gravel sheets or evaporites, consists of Tertiary sedimentary rocks. The land rises almost imperceptibly westward from the convoluted shoreline of the Gulf across flat to rolling sandy plains until, at an elevation of some 250 m, it meets the rocky escarpment marking the edge of the Ṣummān plateau. The coastal zone merges gradually on the north and northwest with smooth plains, in parts covered with lag gravels and in part with shallow sands. In the south it meets other gravel plains leading into the hyper-arid Rub' al-Khāli, which extends a tongue of mobile sands -- al-Jāfūrah -- northward along the coast.

Shallow sands cover most of the coastal lowlands and in some parts, particularly in the Jāfūrah sand body south of about 26° N, these may be heaped up into permanent areas of wind-blown dunes. Limestone or sandstone bedrock erosion remnants in some areas rise above the sand surface, but these seldom stand more than 30-60 m above mean local elevation. The region includes the ancient and still important spring-fed oases of al-Quṭif on the coast and al-Ḥasā farther inland and, overall, water sources are more plentiful than in other topographic regions of the study area. Hand dug wells, generally quite shallow and often seasonal, provide brackish water traditionally used for livestock and Bedouin households. Far more important since the 1970s, however, are the deeper water
wells drilled for the widespread oil production facilities of the region and in some cases by government agencies such as the Ministry of Agriculture and Water. It was long-standing oil company policy to leave exploration bore holes open for Bedouin use when potable water was encountered, and these provide water in much greater quantity and with greater dependability than the old hand-dug wells. There are no natural perennial streams in any part of our study area, and dry water courses flow only briefly after rare, heavy rains in their watersheds.

A characteristic terrain feature of the coastal lowlands, found extensively along the coast but also at some points farther inland, is the salt flat known as the *sabkha* (pl. *sibākh*). These are dead-flat areas, sometimes several miles wide, with a characteristic puckered, brownish salt crust that overlies a shallow brackish or briny water table. Along the coast they may be formed by the filling of former bays and estuaries with silts and marls. The crust, usually only a few inches thick overlying briny mire, is too saline to support plant life, but the flat's margins may be surrounded by zoned halophytes. These surfaces, particularly after winter rains, are avoided by camel herders and automobile drivers alike. Any vehicle attempting a crossing over such an uncompacted surface will almost immediately bog down beyond its axles. Some of the *sibākh* are crossed by long-established automobile tracks consisting of little more than two parallel ruts but in which the crust surface has been compacted by long use. These provide passable routes except after heavy rains.

The coastal lowlands have been fairly well furnished with paved roads since the 1970s. Apart from the trackless parts of *sibākh* and areas with large mobile dunes, its terrain is also easily passable by off-road vehicles. Even the heavier dune areas may be crossed by skillful drivers in high-clearance vehicles equipped with sand tires.
The Șummān plateau, which varies in width from about 80 to 250 km, is rocky terrain marked by low limestone hills and knolls and by depressions and basins floored with whitish silt playas. Along its eastern margins, erosion has cut channels in the rocky plateau edge, leaving a line of outstanding buttes and tablelands. It rises gently toward the west to an elevation of about 400 m, where it meets the eastern edge of the Dahna' sands. For the most part, this is easy terrain for motor vehicles with adequate ground clearance. Water supplies are scarce compared with those of the coastal lowlands, and there are fewer hand-dug wells although the many rock-floored basins may hold pools of rainwater for weeks after heavy winter rains. What hand-dug wells are found there tend to be very deep, in some cases exceeding 60 m.

The eastern margin of the Dahna' sands bounds the Șummān plateau on the west, and its western edge forms a convenient boundary for our study area. This long, narrow arc of dunes is one of the major topographic features of Arabia and has always marked the eastern threshold of the central Arabian plateau lands known as Najd. The Dahna's belt of red dunes (the sand grains are stained by iron and other metallic oxides) links the major sand body of northwestern Arabia, the Nafūd, with the Rub' al-Khāli in the south. In many parts it consists of several parallel ridges ('urūq, sing. 'irq, literally "vein" or "nerve") of dunes, each with a specific name, separated by intervening bands of harder ground. The 'urūq display varied dune forms, from barchans to high-peaked star dunes, and all are difficult to cross off-road with motor vehicles although there are some recognized tracks that avoid the most difficult terrain. Apart from some deep bore holes which have been drilled since the 1970s, the Dahna' is a virtually waterless area although its deep sands have traditionally been a favorite winter grazing ground of the Bedouins.

North of about latitude 27° 30' N and west of 48° E the coastal lowlands merge gradually into flat plains. Diminishing relief and sand cover mark this transition, as the
general land elevation rises very gradually toward the west. Broad parts of these flatlands are made up of late Pliocene or early Pleistocene alluvial deposits from the Wādī ar-Rumah--al-Bāṭīn drainage system, with silty surfaces strewn with lag gravels and cobbles carried all the way from the igneous and metamorphic exposures of the Arabian Shield in western Arabia. Farther to the northwest, the smooth plains grade into the region known as al-Ḥajarah ("the rock lands"), with its rough surface of exposed limestones. Over most of this area, at least as far as the margins of the rougher al-Ḥajarah, the flat and generally smooth terrain is ideal for off-road vehicle travel. A major topographical feature is the broad, linear, southwest to northeast-aligned depression of al-Bāṭīn, the course of which marks the line of a major flow channel cut during earlier pluvial times. Water resources in all of this area today are very poor, and the few hand-dug wells are deep (40-60 m). Even deep-drilled boreholes provide poor quality water.

South of roughly the 23rd Parallel, the study area enters the northern precincts of the Rubʿ al-Khālī, which has a total area of some 650,000 km² and has been described as the largest area of continuous sand cover in the world. Its sands are underlain in the west by the ancient gravel flows of Wādī ad-Dawāsir, and its floor grades farther downslope into evaporites with marls and sabkha exposed among the dune massifs of the east and northeast. Dune structures are of great scale, ranging from broad sand sheets in the north to parallel linear forms scores of kilometers long and rounded "sand mountains" up to 250 m high. Our study area extends through only the northwestern quadrant of this great sand area, corresponding roughly to the range of the tribe of Āl Murrah, although some limited ethnobotanical data were acquired from tribesmen of the sands farther south. Water supplies in the Rubʿ al-Khālī are extremely limited, with few hand-dug wells providing water fit for human consumption. Other wells provide high-salinity water that can be tolerated by camels and thus make possible some exploitation of limited grazing
resources, generally limited to the cool season and to areas that have been favored by recent rains. The use of motor transport in the Rub’ al-Khāli was pioneered by oil company explorationists in the late 1930s. Today Bedouins use off-road vehicles there, sometimes even in such difficult terrain as the huge dune massifs of the northeast.

2.2. Climate

The dry, subtropical climate of eastern Saudi Arabia is typical of that of world desert regions lying along the poleward margins of the Trade Wind belts and in the descending belt of the Hadley Cell. These regions receive generally stable, descending air that is adiabatically warmed as it loses altitude and is consequently dried (Wallén 1966:32; Allan and Warren 1993:14). This leads to the formation in these desert territories of semi-permanent high pressure zones with divergent circulation that suppresses cloud cover and precipitation except when this pattern is disturbed by incursions of rare storm centers from outside. The southernmost parts of the Arabian Peninsula lie along the southern margin of this climate province. In summer, with the seasonal northward shift of the Intertropical Convergence Zone, they may be touched by precipitation from the rising air masses of that belt (Huschke, Rapp and Schutz 1970). This brings summer moisture to the coastal region of Dhufar, and increases somewhat the still-rare chances for summer convectional rains as far inland as the southern Rub’ al-Khāli.

Our entire study area, however, as far south as the central Rub’ al-Khāli, has a Mediterranean climate regime in the sense of exhibiting a clear division into hot and cool seasons with rainfall confined almost exclusively to the cool period of October to April. The winter rains are associated with "Mediterranean" or "western" depressions, which are low pressure storm centers that enter from the Mediterranean region and move east and southeast across the Arabian Peninsula (Huschke, Rapp and Schutz 1970:12).
Particularly in spring, these may bring squall lines and thunderstorms with brief torrential rains and gale-force winds. In midwinter they tend to bring prolonged cloud buildups with longer and more beneficial rains. These depressions are gradually dissipated as they move across the Peninsula, and the probability of rain decreases to the southeast. They do not normally carry precipitation as far as the Rub' al-Khali, but there are exceptions, such as the broad frontal development with widespread rains I saw across the central and southwestern sands in February 1982.

Annual rainfall means range from around 115 mm in the far north and northwest of our area to less than 35 mm in the central Rub' al-Khali. Dews are not infrequent in the coastal areas, but they have not been measured or otherwise evaluated. Snow is virtually unknown, although there have been very rare minor falls in the Najd uplands just outside our area such as the one that occurred in Riyadh and al-Kharj on 3 January 1973. Brief intense hail storms sometimes accompany spring squalls.

For plant life, the reliability, or lack thereof, of rains from year to year is as consequential as its amount. The variability of rainfall amounts in our area is typical of many world arid regions. For example, total annual rainfall at Dhahran over 39 years ranged widely between extremes of 5 mm and 277 mm (Arabian American Oil Company 1979). One measure of rainfall variability is "relative interannual variability," calculated by finding the average of year-to-year rainfall differences over a long period and expressing this as a percent of the mean (Wallén 1966:38). This value for the great majority of our study area stations ranges between 70 and 90 percent. Between individual years, variability may exceed the mean. Annual and monthly rainfall records and relative variabilities for selected stations in our area are summarized in Table 2.1. The majority of the station locations are shown on Map 2.2.
Table 2.1
Rainfall Data, Eastern Province Stations

<table>
<thead>
<tr>
<th>Station</th>
<th>Mean</th>
<th>Absolute Maximum</th>
<th>Absolute Minimum</th>
<th>Years Record</th>
<th>Percent Variability</th>
</tr>
</thead>
<tbody>
<tr>
<td>as-Saffāniyah</td>
<td>109</td>
<td>206</td>
<td>30</td>
<td>11</td>
<td>81</td>
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<tr>
<td>al-Qaysūmah</td>
<td>108</td>
<td>348</td>
<td>8</td>
<td>23</td>
<td>56</td>
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<tr>
<td>an-Nū'ayriyah</td>
<td>108</td>
<td>300</td>
<td>23</td>
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<td>77</td>
</tr>
<tr>
<td>ash-Shumālūl</td>
<td>107</td>
<td>283</td>
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<tr>
<td>Ras Tanura</td>
<td>94</td>
<td>297</td>
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<td>27</td>
<td>79</td>
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<tr>
<td>Abqaiq</td>
<td>92</td>
<td>181</td>
<td>7</td>
<td>30</td>
<td>89</td>
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<tr>
<td>27-08N, 49-12E</td>
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<td>247</td>
<td>10</td>
<td>14</td>
<td>85</td>
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<tr>
<td>as-Sarrār</td>
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<td>230</td>
<td>43</td>
<td>14</td>
<td>71</td>
</tr>
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<td>89</td>
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<tr>
<td>Khurayṣ</td>
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<td>158</td>
<td>12</td>
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<td>al-Hufūf</td>
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<td>14</td>
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<td>73</td>
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<tr>
<td>Yabriṅ</td>
<td>39</td>
<td>104</td>
<td>9</td>
<td>14</td>
<td>71</td>
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</table>

Mean Monthly Rainfall, mm

<table>
<thead>
<tr>
<th></th>
<th>J</th>
<th>F</th>
<th>M</th>
<th>A</th>
<th>M</th>
<th>J</th>
<th>J</th>
<th>A</th>
<th>S</th>
<th>O</th>
<th>N</th>
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<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>41</td>
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<tr>
<td>al-Qaysūmah</td>
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<td>15</td>
<td>15</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>an-Nū'ayriyah</td>
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<td>17</td>
<td>21</td>
<td>24</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>31</td>
</tr>
<tr>
<td>ash-Shumālūl</td>
<td>20</td>
<td>15</td>
<td>18</td>
<td>22</td>
<td>3</td>
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<td>0</td>
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<td>21</td>
</tr>
<tr>
<td>Abqaiq</td>
<td>21</td>
<td>19</td>
<td>13</td>
<td>10</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>27-08N, 49-12E</td>
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<td>8</td>
<td>18</td>
<td>20</td>
<td>10</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
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<td>12</td>
</tr>
<tr>
<td>as-Sarrār</td>
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<td>10</td>
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<td>17</td>
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<td>0</td>
<td>0</td>
<td>5</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Dhahran</td>
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<td>12</td>
<td>12</td>
<td>10</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Khurayṣ</td>
<td>8</td>
<td>3</td>
<td>18</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>al-Hufūf</td>
<td>10</td>
<td>2</td>
<td>19</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Yabriṅ</td>
<td>4</td>
<td>5</td>
<td>12</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Note: Monthly means do not add to annual means, having been derived from different data. "Percent variability" refers to "relative interannual variability" as defined in the text. Source of data: Arabian American Oil Company (1979); Saudi Arabian Ministry of Agriculture and Water Resources, Hydrological Publication (various issues). Saudi Arabian Ministry of Planning, Statistical Yearbook (various issues through 1998).
Temperatures measured by standard means range from an absolute maximum of 52° C (Abqaiq in July) to -3° C inland in January. Frosts have been reported inland as far south as the central Rub' al-Khali. Points near the Gulf coast experience less extreme ranges. Temperatures for Abqaiq (Fig. 2.1) are typical for inland stations.

Fig. 2.1. Monthly average temperature and humidity at Abqaiq (1950-1976). From Arabian American Oil Company (1979), courtesy of the Saudi Arabian Oil Company (Saudi Aramco).
Evaporation rates, because of their close relationship to evapotranspiration and availability of surface moisture for plant growth, are of special interest in any study involving natural vegetation. Most of the data for our study area are in the form of open-surface measurements by the American Class-A pan method. Some of these are summarized in Table 2.2, which shows rates ranging from 35 to 100 times the local mean annual precipitation. Direct measurements are not available for the probably most extreme conditions in the central Rub' al-Khali, but the rates listed for al-Aflāj and as-Sulayyil, near the western borders of this region, suggest the values to be expected.

Table 2.2
Mean Annual Evaporation Rates
South-Central to Eastern Saudi Arabia

<table>
<thead>
<tr>
<th>Station</th>
<th>Evaporation, mm</th>
<th>Years Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>al-Hufūf</td>
<td>2660</td>
<td>4</td>
</tr>
<tr>
<td>al-Qatif</td>
<td>2960</td>
<td>4</td>
</tr>
<tr>
<td>al-Kharj</td>
<td>3070</td>
<td>5</td>
</tr>
<tr>
<td>Ḥaraḍ</td>
<td>3451</td>
<td>1</td>
</tr>
<tr>
<td>al-Aflāj</td>
<td>4130</td>
<td>6</td>
</tr>
<tr>
<td>as-Sulayyil</td>
<td>5250</td>
<td>9</td>
</tr>
</tbody>
</table>


Measurement method is Class-A pan.

The mean wind velocities measured in eastern Arabia are not great by world standards, but wind effects in such an open, loose-soiled desert environment can often prove decisive for plant survival. Winds significantly increase the desiccating power of the already hot, dry atmosphere, have a powerful effect in molding topography, particularly in
dune sands, and directly affect the root stability of individual plants. They also have strong effects on the human environment, reducing visibility and general comfort.

Winds in our area have a diurnal tendency to increase around midday, probably as a result of differential warming. More spectacular are the results, even far inland, of a strong seasonal pressure pattern over the Gulf. The directional pattern of the basically northeast Trades are strongly distorted beginning about May, when a trough of low pressure moves up the Gulf as an extension of the great seasonal low over the Asian land mass to the east (Huschke, Rapp and Schutz 1970). This leads to the well-known shamāl (literally "north") winds of early to middle summer which may blow for days, sometimes gusting 30 to 65 km/hr from the north-northwest along the isobars of the Gulf low. From north to south there is a progressive directional shift in this wind from northwest to north and finally northeast -- all apparent in the longitudinal dune alignments of the Dahna' and the Rub' al-Khali. The shamāl (a term often used somewhat inaccurately by Westerners to refer to the dust storms that may or may not accompany it) is always quite dry. Its coincidence with rising summer temperatures and longer days makes June and July the time of greatest moisture stress for plants and animals. August, although a hot month, is the calmest, with rising relative humidity. Figure 2.2, diagramming mean wind speed and direction for Abqaiq, shows the directional skewing effect of the shamāl.
Relatively strong northerly winds may also occur in winter. Dust storms are common in our area, particularly in the *shamāl* season when they may go on for days with reduced visibility. True sand storms, where sand is raised a meter or more above ground level, require exceptional wind velocities and are rare. The great bulk of sand movement takes place within 50 cm of the surface (Bagnold 1941:10-11).

A glance at the rainfall and temperature charts for our area will show immediately that we are dealing with "arid lands" or "desert." Yet aridity can be more precisely defined. Students of dryland climates have long been concerned with methods of classifying different regions in terms of their aridity: basically the relationship between
water needs and water supply. More than a dozen well known climate classification systems or "indices of aridity" have been devised to provide qualitative or quantitative means of comparing different arid lands (for a useful summary of such methods see McGinnies, Goldman and Paylore 1968: 44-52; McGinnies 1988:61-62). Some indices or classification systems were based only on measures of such basic parameters as precipitation and temperature, but more recent systems have tended to include the factor of potential evapotranspiration because of its more direct relationship with moisture conditions and plant water use. The best known index is probably that of Thomthwaite (1948), which he calls a moisture index (Im). This, as later revised (Thomthwaite and Mather 1962:120), is defined as 100 [(P/PE) - 1], where P = precipitation and PE = potential evapotranspiration. Values of -67, -33 and 0 separate "arid," "semi-arid," "dry subhumid," and "moist subhumid", respectively (ibid.:121). Meigs applied Thomthwaite's moisture index in his preparation of world maps of arid regions for UNESCO, adding the class "extremely arid" for areas which showed no seasonality of rainfall and where there was a record of at least one 12-month period without rainfall (Meigs 1953). Under this system, the part of our study area in the Rub' al-Khali is classed as extremely arid and all the rest as arid. (map, p. xxiv in McGinnies, Goldman and Paylore 1968).

UNESCO, as part of preparations for the United Nations Conference on Desertification in 1977 at Nairobi, published its "Map of the World Distribution of Arid Regions" (UNESCO 1977). This classified the arid regions in terms of the ratio P/PE, where P refers to precipitation and PE to potential evapotranspiration. Evapotranspiration was calculated by the Penman (1948) rather than the Thomthwaite (1948) method. The term "hyper-arid" was applied to regions where P/PE was less than 0.03. Areas with P/PE between 0.03 and 0.20 were termed "arid," and those between 0.20 and 0.50 "semi-
arid" (UNESCO 1977). Applying these criteria classes that part of our area north of about the 25th Parallel as "arid" and that to the south of this line as "hyper-arid."

Another attempt at a world-wide mapping of arid zones was carried out by the United Nations Environment Program in 1992 and published as part of its World Atlas of Desertification (UNEP 1992). The ratio P/PE was again taken as the defining function, but the calculations of PE were based on the Thornthwaite method. Recognizing that Thornthwaite's approach tended to underestimate PE in dry environments, the boundary between "hyper-arid" and "arid" regions was placed at a P/PE value of 0.05 rather than 0.03 as a "partial correction" (see UNEP 1997). Additional correction was provided through use of an empirical formula. Our area was shown on the world-scale map as "arid" north of approximately the 28th Parallel and "hyperarid" to the south of that line. UNEP's World Atlas was revised in 1997 (UNEP 1997), with class definitions still based on the 1992 map. This revision had very little effect on the 1992 classification of the Arabian Peninsula, and our area was mapped again as described above.

With respect to the geographical area we are concerned with here, the problem with all these world-wide classification and mapping exercises is the lack of input data. In fact it appears that apart from two or three stations on the Gulf coast, not a single precipitation or temperature station from our area was used in the 1992 and 1997 UNEP mapping projects and that boundaries were drawn on the basis of interpolation or subjective estimates (map of precipitation and temperature stations in UNEP 1992, 1997). In view of this paucity of input data for the maps, I have calculated P/PE for three inland points in the northern, central and southern parts of our study area respectively using the Thornthwaite (1948) method to estimate PE, then adjusting those PE values following the empirical formula of Hulme, Marsh and Jones to correct for the Thornthwaite method's
tendency to underestimate PE in arid environments (Hulme, Marsh and Jones 1992:12-17). The correction formula takes the form

\[ PE_a = 1.30 \, PE_t - 0.43 \, P + 246 \]

where \( PE_a \) is adjusted PE, \( PE_t \) is uncorrected PE by the Thomthwaite method, and 
\( P \) = annual precipitation in mm. The correction places our calculations on the same basis as those of UNEP (1992, 1997).

Table 2.3 shows both the unadjusted and adjusted PE values for each station.

<table>
<thead>
<tr>
<th>Station</th>
<th>P (mm)</th>
<th>PE (mm)</th>
<th>( PE_a ) (mm)</th>
<th>( P/PE_a )</th>
<th>Years</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>al-Qaysūmah</td>
<td>115</td>
<td>1331</td>
<td>1927</td>
<td>0.059</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Abqaiq</td>
<td>92</td>
<td>1483</td>
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<td>30</td>
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</tr>
<tr>
<td>Yabrīn</td>
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<td>1533</td>
<td>2222</td>
<td>0.018</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

\( P \) = annual precipitation; \( PE \) = calculated potential evapotranspiration by the Thornthwaite (1948) method; \( PE_a \) = PE adjusted by the method of Hulme, Marsh and Jones (1992:12-17). Source of temperature and precipitation input data: Arabian American Oil Company (1979); Saudi Arabia, Ministry of Agriculture and Water, *Hydrological Publication* (various issues); Saudi Arabia, *Statistical Yearbook* (various issues to 1998).

These results confirm the general accuracy of UNEP's 1992 and 1997 mapping of our study area within their own definitions of aridity classes. Yet all three (1977, 1992, 1997) of the UN world arid lands maps are at some variance with our facts in terms of their verbal descriptions of "hyperarid" regions. All three characterize such regions as having no seasonality of rainfall, yet all of our hyperarid area, even down through the
northern Rub' al-Khāli, shows a clear winter-spring rainfall regime with rainfall virtually zero at other times. The 1977 map description states that the hyper-arid zone with P/PE less than 0.03 has "almost no perennial vegetation except some bushes in river beds" and that grazing is generally impossible, both of which are not the case in our area. The 1992 and 1997 descriptions call the hyperarid environments "the true deserts" that "offer very limited opportunities for human activities." The expression "very limited" is open to interpretation, but our Bedouin consultants would no doubt beg to differ with that evaluation.

2.3. Flora and Vegetation

As viewed by the plant geographer, our study area falls entirely in the Saharo-Sindian regional zone, that great desert biome that extends all the way from the Atlantic coast of North Africa across Egypt, the Arabian Peninsula and into the arid region of northwestern India. Within the Arabian Peninsula, this zone is generally now divided into an Arabian regional subzone and a Nubo-Sindian province (Kürschner 1998). All but perhaps a narrow Gulf coastal belt of our area lies within the Arabian subzone. I have earlier (Mandaville 1984, 1990) suggested that the entire southern half of the Peninsula could be assigned to a Sudanian (corresponding to the Nubo-Sindian) province on the basis of contracted occurrences of Acacia (except in the Rub' al-Khali). I feel now that those occurrences might better be treated as relicts or intrusives in Saharo-Arabian territory.

The assignment of the Gulf coastal zone of our area to the Nubo-Sindian province is based on the occurrence there of communities led by Nubo-Sindian species such as Panicum turgidum and associates including Cymbopogon, Eremopogon, Leptadenia
pyrotechnica, Salvia aegyptiaca, Monsonia and Polygala erioptera. The boundary with Saharo-Arabian territory, however, is very poorly defined (Kürschner 1998).

Overall, our area is characterized by communities of widely spaced subshrubs, or in some cases by totally shrubless areas, with either of which may be associated more or less dense sprinklings of ephemeral annuals restricted entirely to the late winter-spring season and reflecting the seasonal and chance spatial patterns of local rainfall. The proportion of these briefly growing annuals (as a fraction of total species) is greatest in our northern plains, about 63 percent, and declines southward to about 17 percent in the northern Rub‘ al-Khali (Mandaville 1990:25). Total perennial vegetation cover is in general considerably less than 10 percent. Tree forms are virtually absent, except in cultivated areas or as a few rare stands of Acacia associated with basins or the larger relict water courses.

Many of the more important plant communities are led by woody dominants of a single species. The majority of these formations appear to be in close equilibrium with their natural environment, and the processes of plant succession sometimes emphasized in studies of mesic or humid regions seem to play a minor role except on disturbed sites. Overall, the vegetation is best developed and probably most productive in the boundary region between our central coastal lowlands and the northern plains, where favorable soil conditions and greater rainfall occur together. The following brief descriptions of some of the more significant plant communities of the study area are based on the author’s field experience and not on any formal attempt at a plant-sociological analysis.

**Rimth Saltbush Shrubland** This open shrubland dominated by the rimth saltbush, Haloxylon salicornicum (Chenopodiaceae) probably covers more land than any other community in northeastern Arabia. It ranges from Iraq in the northeast down into
the northern edge of the Rub' al-Khāli. It is best developed on deeper stabilized sand where its stature increases and spacing is closer, but it also occurs on gravel plains and even over the rocky Ṣummān, where it is wide-spaced and stunted. On 18 February 1970 I surveyed a well-developed stand 18 km southwest of as-Saffānıyāh (study site in 27° 53.4'N, 48° 37.8'E) with the results shown in Table 2.4.

Table 2.4
Survey Data, Rimth Saltbush Shrubland

<table>
<thead>
<tr>
<th>Species</th>
<th>Relative Density</th>
<th>Percent Total Shrub Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haloxylon salicornicum</td>
<td>.90</td>
<td>95</td>
</tr>
<tr>
<td>Panicum turgidum</td>
<td>.08</td>
<td>3</td>
</tr>
<tr>
<td>Lycium shawii</td>
<td>.02</td>
<td>2</td>
</tr>
</tbody>
</table>

Shrub Layer
Total density: 772/Ha
Total cover: 8.6 percent

<table>
<thead>
<tr>
<th>Species</th>
<th>Freq</th>
<th>Density/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plantago boissieri</td>
<td>.92</td>
<td>145</td>
</tr>
<tr>
<td>Schismus barbatus</td>
<td>.84</td>
<td>65</td>
</tr>
<tr>
<td>Astragalus spp.</td>
<td>.64</td>
<td>14</td>
</tr>
<tr>
<td>Ifloga spicata</td>
<td>.60</td>
<td>50</td>
</tr>
<tr>
<td>Lotus halophilus</td>
<td>.44</td>
<td>8</td>
</tr>
<tr>
<td>Paronichia arabica</td>
<td>.32</td>
<td>6</td>
</tr>
<tr>
<td>Medicago laciniata</td>
<td>.32</td>
<td>5</td>
</tr>
<tr>
<td>Launaea capitata</td>
<td>.28</td>
<td>4</td>
</tr>
<tr>
<td>Crucianella membranacea</td>
<td>.28</td>
<td>4</td>
</tr>
<tr>
<td>Cutandia memphitica</td>
<td>.16</td>
<td>2</td>
</tr>
<tr>
<td>Ononis serrata</td>
<td>.12</td>
<td>2</td>
</tr>
</tbody>
</table>

There had been good rains, and this sampling included 20 annuals, of which those with a frequency of 0.1 or greater are included in the list.

‘Arraj Shrubland This is another open shrublet community but having ‘arraj (Rhanterium epapposum, Compositae) as dominant. It is best developed in parts of the northern plains and northern Ṣummān where bedrock is not far beneath the surface. It is
found also in Kuwait and Iraq and reaches south to about the 23rd Parallel where it may still be seen along the eastern edge of the Dahna' sands. A pure stand of *Rhanterium* surveyed by me 17 February 1970 at a location 17 km northeast of Qaryat al-'Ulyā (study site in 27° 36.7'N, 47° 49.2'E) had an unusually high perennial density and cover: 3145/Ha and 16.3 percent, respectively. A semi-random quadrat sampling of the annual layer showed the following associates having a frequency of 0.10 or greater (Table 2.5):

Table 2.5

<table>
<thead>
<tr>
<th>Species</th>
<th>Freq.</th>
<th>Density/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Plantago boissieri</em></td>
<td>.73</td>
<td>22</td>
</tr>
<tr>
<td><em>Picris babylonica</em></td>
<td>.56</td>
<td>7</td>
</tr>
<tr>
<td><em>Schismus barbatus</em></td>
<td>.49</td>
<td>12</td>
</tr>
<tr>
<td><em>Neurada procumbens</em></td>
<td>.48</td>
<td>4</td>
</tr>
<tr>
<td><em>Erodium laciniatum</em></td>
<td>.16</td>
<td>1</td>
</tr>
<tr>
<td><em>Asphodelus tenuifolius</em></td>
<td>.15</td>
<td>1</td>
</tr>
<tr>
<td><em>Medicago laciniiata</em></td>
<td>.13</td>
<td>1</td>
</tr>
<tr>
<td><em>Plantago ciliata</em></td>
<td>.12</td>
<td>1</td>
</tr>
<tr>
<td><em>Rostraria pumila</em></td>
<td>.10</td>
<td>2</td>
</tr>
<tr>
<td><em>Astragalus spp.</em></td>
<td>.10</td>
<td>1</td>
</tr>
</tbody>
</table>

A total of 18 other annuals of lesser frequency were also recorded.

**Thmām Grass-Shrubland** I use the term "grass-shrubland" for this community type, rather than "grassland," because this species of perennial grass, *thmām*, *Panicum turgidum*, grows as spaced, rounded and culm-branched "shrublets" rather than as tufts or turf. This community is widely distributed in the coastal lowlands, from the coast up to about 100 km inland. It sometimes has woody associates such as *Calligonum comosum* (which may function as a codominant), *Lycium shawii* or (near the coast) *Leptadenia pyrotechnica*. On 19 October 1980 I surveyed, using the quarters method, a stand 25 km south-southwest of al-Fāḍīlī (study site in 26° 46.0'N, 49° 05.7'E), finding
the Panicum with a density of 1439/Ha, Calligonum comosum with 76/Ha, and total shrub cover of 3.5 percent.

**Calligonum-Artemisia Sand Shrubland** This distinctive community is found on inland dune sands of the central and northern Peninsula, particularly in the Dahnā' south to about the 23rd Parallel. Its diagnostic species is Artemisia monosperma (Compositae), which is hardly found outside it. Calligonum comosum (Polygonaceae) is almost always present, and Scrophularia hypericifolia (Scrophulariaceae) is an associate in parts of the northern Dahnā’. When cool season rains have been good, this formation supports a wide variety of annuals, including Plantago spp., Eremobium aegyptiacum, Cutandia memphitica, Linaria tenuis, and Anthemis scrobicularis.

**Ephedra Shrubland** This community, which may be associated with gypsaceous soils, is characterized by essentially pure stands of Ephedra alata (Ephedraceae). It occurs in scattered locations, each seldom of much areal extent.

**Achillea-Artemisia Silt Basin Association** This is a northern community type distinctive by its highly aromatic dominants, the composites Achillea frangrantissima and Artemisia sieberi. It is common in the Ḥajarah and al-Widyān regions on the northwestern borderlands of our area, but patches of it may be encountered on heavy silts and clay basins of the northern plains and in the Șummān.

**Ghaḍā Shrubland** This community has as its dominant the large ghaḍā shrub, Haloxylon persicum (Chenopodiaceae) and is found in some deeper sand habitats of the southern coastal lowlands and the northern Rub‘ al-Khāli. Ghaḍā is the largest of our saltbushes, sometimes exceeding man-height, and is found in sand terrain less stable than that supporting its smaller relative, Haloxylon salicornicum. It may form islands in rimth
country and in the Rub' al-Khālī may border ḥādh shrubland (see below). Ghaḍā grows more widely spaced than the smaller saltbushes but contributes much greater cover per individual. Because it is found in the more southern parts of our area with mobile sand and less rainfall, the variety of annuals associated with it is usually quite limited: *Plantago boissieri*, *Eremobium aegyptiacum* and, at least in the northern parts of its range, *Silene villosa*.

**Ḥādh Saltbush Shrubland** This community is endemic to the Rub' al-Khālī, as is its dominant species, ḥādh, *Cornulaca arabica* (Chenopodiaceae). Ḥādh shrublets may be spaced 3-20 m or more depending on local conditions. It may occur as virtually pure stands covering thousands of square kilometers or have as associates *Calligonum crinitum*, *Tribulus arabicus* or *Limeum arabicum*. The sedge *Cyperus conglomeratus* is usually found with it. This community is bounded on the north at about the 23rd Parallel; it appears to extend south to near the limit of the sands.

**Rub' al-Khālī ‘Abal Shrublands** This is another wide-spaced community found only in the Rub' al-Khālī, where *Calligonum crinitum* subsp. *arabicum* takes the place of *Calligonum comosum* of the northern sands. It is accompanied almost everywhere by *Cyperus conglomeratus* and often by *Stipagrostis drarii* and *Limeum arabicum*.

**Succulent Halophyte Associations** A series of distinctive, often sharply zoned halophyte associations, almost always led by chenopods, is found in and around coastal salt marshes and sometimes around inland sabkhahs. They are characterized by such species as *Suaeda vermiculata*, *Seidlitzia rosmarinus*, *Bienertia cycloptera*, and *Halocnemum strobilaceum*. 
**Shrubless Community Types**  There are some wide tracts in our study area -- apart from mobile sands, bare rock and terrain with other obvious limits -- that are virtually without woody plants. The most notable examples are the *gra'ah* ("bald") lands found in the northeastern part of the northern plains. Shrublets are absent here and vegetation is almost entirely restricted to a flush of short-lived annuals in those years when there are good winter rains. The grass *Stipa capensis* often takes spring dominance here with *Plantago* spp., *Helianthemum* spp. and a variety of other annual associates.

**Micro-communities**  I use this term for highly specialized associations, often related to distinct terrain forms, that may be found as islands within some of the broader community types. An example are the "sidr" basins" scattered through the sparse *rinth* saltbush country of the Ṣummān. Here, in rounded, clay-floored basins of various sizes (which may become long-lasting pools after heavy rains), are well developed stands of *Ziziphus nummularia* (Rhamnaceae), *sidr*, sheltering associates such as *Ephedra foliata* and *Sisymbrium erysimoides*. The open ground is occupied after rains by silt-loving herbs such as *Althaea ludwigi* and *Notoceras bicorne*. The ecological importance of this habitat is far out of proportion to the limited ground area it occupies, and such basins are concentration centers for birds and other wildlife, as well as the nomads' herds.

**The Annual Cycle of Plant Growth**  Throughout eastern Arabia, as in other hot deserts without summer rainfall, summer is the unfavorable season for plant growth, leading to dormancy or the evasion of drought by the production of seeds. The growth cycle for many desert plants thus begins in the autumn or winter, rather than in spring as in more temperate regions.

Some perennial plants in the study area show a resumption of active growth as early as September, well before the arrival of the first rains. This may be associated with
shortening day length, moderating temperatures, and the increase in atmospheric humidity which has occurred by this season in coastal areas. The pace of growth quickens, however, with arrival (if they arrive at all) of the first Mediterranean depression rains of the season -- usually in November or December but occasionally in October. Such rains, if early, may lead to a flush of germinating annuals within a few weeks. If they come in December or January, cold weather may delay germination, or growth much beyond that stage, until the warming of spring. Along with the germination of annuals comes a resumption of new shoot and leaf production by the perennials, many of which have shed leaves or died back completely with the beginning of the previous summer's drought.

Desert annuals may flower and set seed within a few weeks after germination, completing their life cycle in a fraction of the usual growing season of more humid environments. Some of them have apparently evolved chemical germination inhibitors or other moisture detection devices in their seeds to protect them from the danger of germination before soil moisture levels would allow further growth (Cloudsley-Thompson and Chadwick 1964). If germination is followed by moisture stress, some plants conserve growth energy by flowering or fruiting in a dwarf size hardly as big as early seedlings under more normal conditions. In a converse manifestation of such form plasticity, growth may be prolonged with the plants achieving unusually great stature if rains are repeated and well spaced. Geographic areas of growth and reproduction of both annuals and perennials may be extremely patchy when rains come from small local storms.

The annuals (if they have emerged at all in any given year) are often at the peak of maturity in March or early April, although some species are habitually early or late bloomers. Perennials, including some grasses, usually peak sometime later. By late April or May, depending on local conditions, any annuals have withered and are gone for the
season. Many perennials maintain active growth into May or June before falling again into dormancy. Some deeply rooted woody plants of tropical origin such as Acacia and Ziziphus flower and fruit in June or July or even later. A very few smaller perennials such as succulent Zygophyllum spp. or the semi-succulent Heliotropium bacciferum, while peaking in late spring or early summer, are able to maintain some active growth through even the hottest part of the dry season. They are in fact rarely seen not bearing at least a few flowers or fruit.

A very clear exception in these patterns is found in the saltbushes of the family Chenopodiaceae, which are either succulents or have other highly modified, drought-resistant anatomy. These are in active vegetative growth during the hot season and flower and fruit in October and November. Some of them flower in both spring and autumn.

In closing this section I would emphasize that a good growth of annuals over any appreciable geographical extent in our study area is the exception rather than the norm. Given the interannual variation in rainfall and considering that a good growth of spring annuals is dependent on both the amount and timing of cool-season precipitation episodes, it is not unusual for three or four years to go by without more than a token sprinkling of ephemerals developing in some very restricted areas. On the other hand, when good rains do fall widely and with good timing, the effect on the desert landscape can be most dramatic. Vegetation cover, usually less than 5 or 10 percent with the widely spaced perennials, can seemingly overnight rise to approach 80 percent or more with a flowered carpet of rich green stretching to the horizon. As I will argue in Chapter 9, these phenomena influence the Bedouins' concepts and classification of the plant world.
3. THE PEOPLE

I appreciate that the social unit involved in this study is broader than is usual in ethnobiological investigations. My data collection began with a concentration on plant nomenclature with an early objective of examining inter-tribal and inter-regional variation in names. Consultants were thus drawn from several different tribes.\(^1\) It soon became clear, however, that essentially the same "plant language" was spoken by all the northern and eastern Saudi Arabia-based tribes, from the frontiers with Jordan and Iraq down into the central Rub' al-Khāli. The speech of all of these tribes belongs to the same dialect group, generally known as Najdi Arabic (Ingham 1994). They are all pastoral nomads who consider themselves, with pride to be **badii** (nomads) as opposed to **haḍar** (settled folk of the towns, villages and farms). Some subsections of virtually all of the tribes, particularly in recent years, have adopted a settled existence for economic reasons, but they still consider themselves **badii** by lineage and thus basically different from the long-settled agriculturists or townspeople. The social systems, material culture and ecological relations of all these tribes are essentially the same, with an economy and subsistence long based on camel raising, supplemented to varying degree with sheep and some goat husbandry. All of these tribal peoples are Sunni Muslims and all, except the northernmost such as the Ruwalah, have been affected in near-equal degree by the Islamic

\(^1\)The concept of "tribe" is fuzzier in Bedouin speech than it is in English because the term **qabilah**, usually glossed in English as "tribe" can in practice be used for smaller or larger social divisions. Confusion can arise in such cases as the Ruwalah, often treated as a tribe but who form part of a larger unit, the ‘Anazah, who are more often referred to in the literature as a "confederation" although the relationship of its divisions are supposedly based on ancient kinship. In practice there is usually not much confusion about what constitutes a tribe, and I follow the concept as used in most of the English and Arabic literature. The smaller tribal segments, usually referred to in English as a "section" or "subsection" are called in Bedouin Arabic a **fakhq, ḥmilah, or bdidah**.
reformist Unitarian (or so-called Wahhābi) movement that has impacted Arabian tribal and political life at intervals from the late eighteenth century to the present. On all these grounds I felt justified in lumping my data, with the proviso that variations in usage will be pointed out and assigned to tribal sources.

The following brief description of Bedouin life refers to the state of tribal affairs during the period of my primary data collection, 1960-1975. Many of these points are still valid today. Some changes that have taken place in more recent years, largely as a result of economic developments in Saudi Arabia, will be discussed in Chapter 14.

All the Bedouin tribes are characterized by a segmentary lineage system with descent reckoned strictly in the male line. Parallel segments at each level are held to stem from descendants of a common forefather, and the name of each tribal section usually includes in some form the name of this supposed eponymous ancestor. At the lower level, near that of bayt (which is an extended family occupying one or a few tents) is the important concept of ibn ʿāmm, which literally means "father's brother's son," and may be used in that restricted sense. It also, however, has a classificatory reference (sometimes in the plural form, banī ʿāmm) to all those males descended from a common ancestor about five generations above the present adult generation (Lancaster 1997; Cole 1975). In some contexts it can be applied in a much wider sense (Cole 1975). It can also correspond to the traditional five-generation "vengeance group" that in long tribal custom is responsible for avenging a crime committed against one of its members or for paying the penalty for a crime committed by one of its own.

At the inter-tribal level there is a widely recognized division into groups called aṣīl ("of pure lineage," as figured by traditions of ancient genealogy) and ghayr aṣīl (non-aṣīl). Tribes in the latter category are less numerous, examples being the Ṣulabah, Hutaym and Sharārāt in the northwest and the Rashāʾidah and the ʿAwāzīm in the east.
Historically some of these have been held in protected client status by some of the *aṣīl* tribes. In practice they today suffer little prejudice in the desert scheme of things beyond the virtual impossibility of their members being accepted in marriage by one of the *aṣīl* groups.

Some tribes are considered to be more closely related than others, such as the several groups that belong to the ʿAnazah confederation or as the Āl Murrah and the ʿUjmān, who both recognize their common descent from an ancient ancestor, Yām. These related groups may be rivals in some respects but have often assisted each other when opposed by a common enemy.

Leadership of the tribe is vested in the person called *shaykh*, or *amīr*, and the major sections of the tribe often also have their own leading members similarly styled but of lesser status. The function of the paramount *shaykh*, since inter-tribal raiding and warfare was suppressed by central governments in the 1930s, is primarily to represent the tribe's interests vis-a-vis the national government and to intercede with the government on behalf of his fellow tribesmen in personal legal cases, claims and requests for government services. He also acts as a mediator in intra-tribal disputes, and there is a general preference for such differences to be settled internally in the interest of preserving tribal autonomy to the greatest possible extent. The *shaykh* of a tribe has virtually no coercive powers but can often be very persuasive, as many depend on his mediatiorial services. His position is not automatically hereditary from father to son but does generally reside within a single tribal clan which tends to remain the same over a relatively long period, at least of several generations. Succession is decided within the shyakhly clan on the basis of which senior member is considered best fitted for the job, taking into account tribal public opinion and the candidate's reputation and influence in central government circles. Generosity and hospitality are among the highest virtues in Bedouin
esteem, and any leading tribal personality is expected to spend freely on the almost constant entertainment of visitors and to be free with what largesse may come his way.

The Bedouins' relations with their grazing lands will be explored in more detail in section 6.1, but it may be noted here that neither a tribe as a whole nor its individuals or leaders "own" the land they use for livestock production. By long desert custom (and by Islamic law) grazing land is a commons for all Muslims. In the core of its generally recognized home territory or dirah, a tribe holds priority rights to the use of water sources, but the dirah of any tribe may be, and often is, used for winter and spring grazing by other groups. The use of "home" wells, at least in the cool season, may also be shared when their production is adequate.

The dwelling occupied by the Bedouin household is the tent, woven of black goat hair or mixed wool and goat hair, known as the bayt sha'r ("house of hair"). In eastern and northeastern Arabia it is almost invariably pitched with its back to the prevailing wind, the north-northwest. If the wind should reverse, the back curtain can be quickly moved around to the front. The tent is divided by a vertical curtain into the men's section, or majlis, at the right end (as seen facing the tent) and the family, or women's section, on the left. Visitors and male friends are received and entertained in the men's section, closely in front of which lies the fire, nearly always burning or smoldering, used in brewing the coffee and tea essential for hospitality. It is poor form for visitors to approach the tent from any direction except the majlis end, and then from the outer front quarter where their approach is clearly visible, giving the women time to retire to their more private section. When non-family members are present, the womenfolk wear veils and generally keep to their side of the curtain but may from there sometimes participate in conversation with men known to the family. Children, including younger girls, have the free run of both worlds, and young boys are expected to assist in hospitality by helping
Plate 3.1. Consultant Juḥaysh ibn Muṭlaq of the Dawāsir displays coffee-making implements. These would normally be kept inside the face of the guest section of the tent, which is seen here end-on, facing left. He holds in his left hand the mihmāš, the long-handled, heavy iron pan used for roasting coffee beans; in his right, a stack of the small, handleless coffee cups. The roasted beans are ground in the brass mortar and pestle in front of his right hand. Three beak-spouted coffee pots are in center front. Photograph courtesy of the Saudi Arabian Oil Company (Saudi Aramco).
serve the customary offerings of coffee, dates and tea. Girls, too, must know these tent obligations. On one occasion I called at a tent when nobody was home save a young girl about eight years old. She gravely invited me (and I was quite unknown to her) to sit in the guest section, blew up the coffee fire and with perfect poise prepared and served me coffee, dates and rounds of tea while I waited for her father to return from a shopping trip.

Firewood, in the form of uprooted desert shrublets, is often piled around the majlis tent end and provides some extra shelter in the cold season. Camels that are taken out grazing during the day, usually by the older boys in the family, are brought in close to the tent at night, as are any family goats or sheep. The whole family sleeps in the larger, family part of the tent, while any guests are put up in the majlis.

Household cooking is done at a separate fire associated with the women's tent section, and even by 1965 a few families were using kerosene or bottled gas with portable burners for this purpose. The coffee, or hospitality, fire on the other hand, is invariably fueled with traditional desert firewood, sometimes supplemented with dry camel dung, which makes good coals.

Bedouin livestock is kept primarily for milk and milk products, which are a dietary staple. Meat is generally eaten only on special occasions, such as for the major feast days of Islam or in honor of visiting guests, when a young male goat or sheep (or very rarely a camel) may be slaughtered. Before about 1955 wild game was an occasional supplement to the Bedouin diet, with meat provided by several species of gazelle found in the northern plains or southerly sand areas. Even the oryx was still found in the Great Nafūd and the Rub' al-Khāli. The main quarry among the birds was the ḥbārā (the houbara bustard, *Chlamydotis undulata*), which was hunted with falcons. By 1960 most of the larger game had been hunted to extinction or near-extinction by motorized hunting
parties, often groups of the royal families of Saudi Arabia and neighboring Gulf states using semi-automatic or even automatic firearms. The average Bedouin was thereafter reduced to coursing hares with his *slūği* (a fast, greyhound-like hunting hound) or bagging an occasional bustard, itself now very scarce. Protein input was also supplemented by more lowly fare, including the desert locust (*Schistocerus gregarius*), of which huge swarms arrived in some years to decimate desert as well as farm vegetation. The large, spiny-tailed vegetarian lizard (*ḏabb*, pl. *ḏubbān*) is considered edible. Wild plants in the diet will be discussed in section 6.3.

Rice, since about the time of World War I, has supplanted wheat as the staple starch. A typical family meal of above average fare might consist of fresh or soured camel milk and a pot of rice boiled with onions and a tin or two of tomato paste. Thin unleavened wheat flour bread may be made on some occasions. Dates are also considered to be a staple and are often purchased semi-dried in large compressed blocks or sacks which keep well for months due to their high sugar content. Fresh fruit, such as imported apples and oranges, may occasionally be purchased in the towns and are considered to be great treats by the children.

The dependence of Bedouins on the products of the towns has been noted in literature since at least the time of the Islamic philosopher-historian Ibn Khaldūn (1332-1406 A.D.) and has been studied in more recent times (Ibn Khaldūn n.d.:153; Khazanov 1983). The Bedouins in our study area in fact rely on village and town markets for virtually all of their foodstuffs except milk products and meat. Regular purchases include coffee, tea, sugar, cardamom (an essential spice used in Arabian coffee), dates, rice, onions, tinned tomato paste, as well as small items such as salt and matches. Essential hardwares likewise are town-purchased. These include housing materials such as tenting strips, poles, ropes and iron stakes; also coffee pots, teapots, metal bowls for milk,
cooking pots, knives, flashlights and batteries, stoves and petroleum fuels (if used). The majority of these market items — even traditional ones such as the ghutrah (men's head cloth) and house wares such as tent material and the brass pots and mortar and pestle used in coffee making — are now imported from outside the Kingdom, usually from other Asian countries. Clothing may be purchased ready-made in the towns, but the women often make their own and children's garments themselves from purchased material. I used to bring families gifts of flower-print material after being coached in advance by the husband on the favorite patterns. And I remember finding a broken and sand-polished, hand-crank Singer sewing machine on an abandoned Bedouin campsite.

I acquired several examples of the beautiful weavings, in the form of the colorful, patterned, elongated wool rug called a sāḥah, made by Bedouin women on a flat loom staked out on the sand. These may be used as ground cloths or sewn together as tent partitions. They may also be sewn into camel bags or general storage bags.

The men folk seldom demonstrated much in the way of handicraft skills. Metal work, as for making knives and other implements, is held to be a low-caste trade associated with the non-āṣīl tribes such as the Ṣulabah. South Arabian tribesmen of the southern Rub` al-Khāli appear to be more self-sufficient, and a Rāshidī from those parts taught me to braid wool and leather into halters and leads for camels. Within our study area, even the lowly camel stick, not to speak of more complicated items such as riding and pack saddle frames, is purchased in town rather than made at home. This should not be taken as a measure of the average Bedouin's mechanical aptitude. Some of them had acquired motor vehicles as early as the 1960s, usually in the form of light trucks retired from oil company service and sold at low cost to employees. Several of my Āl Murrah acquaintances of this period became quite adept in dealing with a balky internal combustion engine or broken running gear.
At the time of my data collection virtually all Bedouins were non-literate, but they were certainly not without literature. Poetry is the prime art form among them, and almost any tribesman can recite from memory long poems on themes ranging from love to tribal warfare. Some are also skilled raconteurs of the šālfah, a genre of historical narrative describing famous events and personages of the past (Ingham 1997:144-169). Many a long evening around the coffee fire begins with the request inshid!, "give [us] a poem! (nshīdah)".

Bedouins have sometimes been described as being lax in the observance of Islamic religious obligations. This may well have been the situation in some parts of the Peninsula in not-so-distant times. Musil, for example, in his meticulous and extensive ethnographic description of the Ruwalah of the period 1908-1915, has no chapter or section on, and few references to, religion in the orthodox sense although two chapters are devoted to the supernatural and the spirit world (Musil 1928a). Even more recently the Ruwalah have been described as being not much concerned with the formal aspects of religion (Lancaster 1997:52). My experience has been much the contrary among the tribes of the east and northeast. All the people that I worked with, visited or traveled with were always punctilious in their execution of the five obligatory daily prayers and in keeping the fast of Ramadhan. Their speech is constantly sprinkled with pious expressions, and many individuals, although illiterate, could quote some parts of the Qur'ān. Their somewhat puritan outlook today (still balanced by a great deal of common sense) was doubtless generated in large part by the Unitarian movement that was given such emphasis in the alliance of the Āl Saʿūd ruling family with partisans of the reformer Muhammad ibn ʿAbd al-Wahhāb (Rentz 1960:554). Although the ikhwān settlement plan (see below) did not take permanent root among Bedouins, the revival of orthodox
religious ideas obviously did. This influence was less pervasive in the far northwestern parts of the present Kingdom, probably accounting for the apparently more relaxed attitudes in that region.

The central government of Saudi Arabia has made several attempts, for reasons of political expediency or simply for "modernization," to induce the Bedouins to adopt a settled life based on agriculture. The first, promulgated during the first quarter of the twentieth century, was a religious-oriented scheme generally known in Western literature as the "ikhwān movement." Beginning around 1912, King 'Abd al-'Aziz Ibn Sa'ūd sent religious leaders out to the tribes to preach the virtues of a settled life based on the ultra-conservative Unitarian tenets of the eighteenth century reformer, Muḥammad ibn 'Abd al-Wahhāb. Parcels of land with water wells, usually lying within the traditional territory of each tribe concerned, were assigned as hujar (sing. hijrah, "place of refuge, settlement") where the tribesmen were to live as ikhwān ("brethren") in a pious life based on small-scale farming (Philby 1955:261-264). Many such settlements were established in diverse parts of the Kingdom, but none of them involved more than a small portion of each tribe's membership, and many of them were abandoned within a few decades.

One of the more important "modernizing" plans for Bedouin settlement was attempted in the 1960s as the Faysal Settlement Project, named after King Faysal, who acceded to the throne in 1964. The plan was to settle, over a five-year period, some 1,000 families of the Āl Murrah and ad-Dawāsir tribes on 10,000 acres to be put into cultivation in the Wādī as-Sabhā basin in the Eastern Province. Irrigation water was supplied by 50 pumped wells, and costs for the first five-years' operation were approximately 39 million dollars (Mandaville 1965a). Despite optimistic pre-project surveys carried out among the Bedouins (during a particularly severe drought period), members of neither tribe were finally, in practice, willing to become farmers. The project was completed but turned
over to commercial farming interests that used non-Bedouin labor in the large-scale mechanized production of alfalfa hay and other fodder for sale on the market.

A settlement scheme in northwestern Saudi Arabia in the early 1960s to assist the drought-stricken Sharārāt tribe in Wādī as-Sirhān also came to naught (ibid.). On the other hand, later Bedouin settlement and assistance projects in the far northwest of the country have reportedly been more successful, and Cole and Altorki (2000) describe some aspects of Bedouin settlement in al-Qašīm through a more natural, evolutionary process facilitated by government-financed loans for agricultural projects and family housing. The latter approach, in my experience, has been typical of recent developments Kingdom-wide.

The following summary descriptions of the tribes involved in my ethnobotanical data collection are arranged in rough order of their importance as sources for my data. It should be noted, however, that the first two groups listed, Āl Murrah and Banī Hājir, contributed more than all the others combined and are therefore described in greater detail. Population figures should be taken as order-of-magnitude estimates, as tribal census figures, if they exist at all, are not available.

Āl Murrah (sing. Marri) Āl Murrah are one of the most important tribes in eastern Saudi Arabia and are unusual in several respects. Perhaps more than any other group they maintained their camel-herding nomadic ways, holding out against a general tendency to sedentarization in the growing oil economy of Saudi Arabia. Their primary dirah is bordered roughly in the north by the latitude of al-Ḥasā and extends south to the central Rubʿ al-Khālī. The Dahnāʾ sand belt runs along its western edge, and to the east it extends beyond the base of the Qatar peninsula. One of the more frequent Āl Murrah ranges lies between the 50th and 52nd Meridians, along the line of water wells that forms a main north-south crossing route of the Rubʿ al-Khālī. The tribe, while primarily a deep
sand-dwelling group, has the most extensive range of movement of any tribe in the east or northeast, and its members may be found, according to season and pasture conditions, almost anywhere east of the Dahnā' sands from the central Rubʿ al-Khāli to the borders of Iraq in the north.

Āl Murrah had an earlier home in southwestern Arabia in the vicinity of Najrān, although the date of their migration to the tribe's present range in the east is not known. They claim kinship with a group in the Najrān area, and they consider themselves closely related to the ‘Ujmān tribe on the basis of common descent from an ancient ancestor, Yam (Rentz and Mulligan 1950). Estimates of the tribal population range from 5,000 (Philby quoted in Rentz 1957) to 28,000 (Matthews 1960). Cole's (1975) figure of 15,000 appears reasonable. The tribe has seven to nine main sections arrayed in two major descent groups. The paramount shaykhs come from the Āl Fuhaydah section, and according to my last notes (of 1981), the incumbent then was Faysal ibn Muḥammad ibn Lāhūm ibn Shuraym, frequently referred to simply as "Ibn Shuraym." He replaced his cousin, Ṭālib ibn Rāshid, who died 15 December 1980. Faysal also became commander of the central government's 40th National Guard brigade.

The women of Āl Murrah appear to have a freer and more open social role than in many tribes. In my experience it is the only tribe of our study region in which a man's formal name may include a matronym referring to his mother or grandmother (my consultants Sālim ibn Ḥamad ibn Miznah and ‘Alī ibn Ḥamad ibn Fāri'ah are examples).

Āl Murrah have a particularly high reputation as trackers and guides in eastern Arabia, and the central government's amirs in major Eastern Province towns still maintain Marrī trackers on call to help apprehend criminals, the tracker's testimony being accepted in courts of law as that of an expert witness. The following couplet (Rentz and Mulligan
1950) is generally known in eastern Saudi Arabia and refers to the government's methods of tracking down lawbreakers:

\[
\begin{align*}
&\textit{fis-samā barqiyah} & \text{In the sky, radio telegraph} \\
&\textit{fil-ard marriyah} & \text{On the ground, Marrīs}
\end{align*}
\]

One section of Āl Murrah seasonally visited the derelict oasis of Yabrin, on the northern edge of the Rub' al-Khālī, to collect dates from the semi-wild palms growing there near slow-flowing springs. Two \textit{hijrah} settlements were established there by the same people during the heyday of the \textit{ikhwān} movement. Āl ‘Adhbah section also established colonies at Nibāk and as-Sikak, near the base of the Qatar peninsula. All four settlements are now inhabited by members of the original groups and have grown to small villages with schools and other government services.

**Bani Hājir** (sing. \textit{Hājirī}) Bani Hājir still remember Tathliht, in the southwestern mountains of Saudi Arabia, as their original home, and they consider the tribe of Janb there as their relatives. Their move to eastern Arabia may have taken place two or three hundred years ago. They also claim a close relationship with the Manāshir, who now range in the present territory of the United Arab Emirates (Rentz 1957; Rentz and Mulligan 1950). Bani Hājir ranged primarily in, and east of, the Qatar peninsula until about 1900, when the greater portion of the tribe moved west as a result of a dispute with Āl Thānî, the Qatari ruling family (Rentz and Mulligan 1950). Since then their \textit{dirah} has lain primarily in the sand dune area known as al-Bayḍā’, which extends from the vicinity of al-Jubayl on the Saudi Arabian coast south to around al-‘Uqayr. Additionally, as a reward for their loyalty and military services in the cause of the Sa‘ūdī royal family, they were assigned settlement rights in the area of al-Jawf (Jawf Bani Hājir) west of the
present oil town of Abqaiq (Buqayq). Here several of their leading shaykhs established
hujar, which were later abandoned, then reoccupied.

Banī Hájir include 14 major tribal sections, including al-Makhaḍibah (or al-
Makhāḍib), in which lies the shaykhly clan, ash-Sha‘ābīn. In 1982 the incumbent
paramount shaykh was Hamūd ibn Shāfī ibn Sālim, who succeeded his father upon the
latter’s death in Kuwait during the winter of 1955-56. The members of Banī Hájir have
been estimated to total some 14,000 (Matthews 1960).

Banī Hájir often camp outside their dirah proper, sometimes with ‘Ujmān groups
to the northwest, sometimes with the ‘Awāzīm in as-Sūdah, near the former Saudi
Arabia-Kuwait Neutral Zone. The tribe raises both camels and sheep. My primary
consultant of this tribe, ‘Ālī ibn Sa‘īd of al-Makhāḍibah, took pride in his fine riding
camels of ‘umāniyah stock.

**Al-‘Ujmān** (often written ‘Ajmān; sing. in either case ‘Ajmi) The ‘Ujmān are an
important tribe of eastern Saudi Arabia, with a dirah centered on the district known as
Wādi al-Miyāh (which is not a true wādī or seasonal watercourse, but rather a wide,
elongated depressed area along the eastern edge of the Śummān plateau). A significant
portion of the tribe has become settled, or semi-settled in the series of Wādī al-Miyāh
villages stretching from an-Nu’ayrīyah in the north to ‘Uray’irah in the south. Estimates
of the population of the tribe have ranged from 15,400 to 28,000 (Matthews 1960). The
‘Ujmān have six main divisions and 24 sections (Rentz 1951). The paramount shaykh,
generally known as Ibn Ḥithlayn, is of the section called Āl Mu‘īd. Rākān ibn Didān Ibn Ḥithlayn was still alive in 1975, although his son (another Didān) was then assuming
many of his leadership functions. As noted above, al-‘Ujmān are related to Āl Murrah
and like them have migrated to eastern Arabia from their ancestral home in the vicinity of
Najrān in the southwest. Ingham (1994) places their sub-dialect along with that of Āl Murrah and Qaḥṭān in the southern Najdī group.

**Qaḥṭān** (sing. Qaḥṭānī) Qaḥṭān are the third of our consultant-contributing groups whose language is classed as southern Najdī. A major portion of the tribe is settled as villagers in their early homeland in southeastern Ḩijāz, while Bedouin sections range up through southern Najd. Some of them have taken jobs in the oil industry towns of the Eastern Province, and some of their leaders have commanded National Guard brigades assigned there. Their numbers have been estimated as 28,000 (Matthews 1960), and their paramount *shaykh* was said in 1961 to be Khalīl ibn Nāṣir Ibn Qarmalah of Āl Saḥmā’.

**Ad-Dawāsir** (sing. Dawsārī) Ad-Dawāsir are a large and now widespread group with a historical center in the Wādī ad-Dawāsir area of southern Najd but broadly extending up into central Najd. Large portions of the tribe have long followed a settled life, but perhaps a third of its total population of some 35,000 has been nomadic (Matthews 1960). An important Dawsārī family, the Sudayrīs (as-Sadārā) has married into the Saudi ruling family and has contributed many able governors and other officials to the provinces of the Kingdom. The tribe has two main divisions and many sections and has long had a connection with the Gulf area, where in earlier times some of its members worked as pearl divers. They were also instrumental in founding now important coastal cities such as ad-Dammām and al-Khubar (Rentz 1965). Among their important *shuyūkh* in 1972 were Muḥammad ibn Uqayyyān Ibn Naṣṣār of al-Ghayāthāt, located at al-Kharj, and Shaybān ibn Bāḏī Ibn Quwayd of al-Masāʿirah, at al-Quwayz in Wādī ad-Dawāsir.

**Shammar** (sing. Shammarī) The Shammar are usually described in two groups, one of which for some 200 years has been located in northern Iraq (the "Eastern Shammar"). The Shammar of Saudi Arabia are centered in the area of Jabal Shammar in northern
Najd, which includes the important town of Ḥā'il. Here was located the capital of an important Shammar family, the House of Rashid, who were long-time rivals of the House of Saʿūd for mastery of central and northern Arabia and who were not subdued until 1921. The tribe has long had settled elements at Ḥā'il and in villages around Jabal Salmā and Jabal Ajā. The population of the Saudi Arabian Shammar has been estimated at some 35,000 (Matthews 1960), with four main sections. Shammar speak the northern variant of Najdi Arabic, and their plant terminology displays some interesting variations from the usual central and southern patterns.

**Ar-Ruwalah (sing. Ruwaylii)** The Ruwalah are an important and very large tribe of far-northwestern Saudi Arabia and the greater Syrian Desert. They were large-scale camel breeders until the early 1960s, after a major drought across northern Arabia caused great livestock losses and led to greater dependence on sheep herding and more settled modes of livelihood (Lancaster 1997:99-100). The Ruwalah form an important part of the ʿAnazah, which is sometimes described as a tribal confederation, sometimes as a tribe with major divisions. The *dirah* of the Ruwalah in the recent past has included the areas of Taymā and Khaybar, Wādī as-Sirḥān, and the Hamād and al-Widyān districts of Saudi Arabia’s northwestern borderlands.

The Czech historical geographer Alois Musil made several lengthy field trips with the Ruwalah between 1908 and 1915 and has left a most valuable account (Musil 1928a) of their way of life at a time before the introduction of the automobile and post-World War political arrangements began making inroads into traditional Bedouin ways. Musil also collected botanical specimens and vernacular plant names, leaving in his works a unique means of gauging some aspects of change in the ethnobotanical knowledge of this group.
The shaykhly family of the Ruwalah is that of Ibn Sha'lan of al-Mur'āz. Their chiefs have at times maintained close ties with Syria, some of them having been members of that state's Chamber of Deputies. In more recent years they have increasingly thrown in their lot with the government of Saudi Arabia and have played important roles in that country's National Guard organization (Lancaster 1997). The population of the tribe has been estimated as between a quarter and half a million (ibid.).

Banī Khālid (sing. Khālidi) Banī Khālid are historically one of the most important tribes of northeastern Arabia, their shaykhly family of Āl Ḥumayd (often known as Āl ‘Uray'ir) having virtually ruled the Gulf coast and hinterland for major periods between the sixteenth and eighteenth centuries. This ascendancy was broken with their defeat by the first Sa'ūdī state in 1793, but they continued to play an intermittent role in the provincial politics of al-Ḥasā province until 1913, when the region was added to the growing domains of ‘Abd al-‘Azīz Ibn Sa’ūd (Di Meglio 1978). The tribe, with six main sections, is now largely settled, with major numbers inhabiting the village of ‘Anik in the oasis of al-Ṭathīf. They also own lands associated with two of their hijrah sites on the coast north of al-Jubayl. The leading personalities of Āl ‘Uray'ir, after submitting to Sa‘ūdī rule, intermarried with Āl Sa‘ūd and took up residence in the capital city of Riyadh. Their most notable leader there in the early 1970s was Nā‘īf ibn Muḥammad Ibn ‘Uray'ir. The tribal population was estimated as 7000-8000 by Matthews (1960).

Muṣayr (sing. Muṣayrī) By tradition the original homeland of Muṣayr was in the Ḥijāzī uplands between Mecca and Medina. They moved east into central Najd, whence they were displaced by the ‘Utaybah into their present dirah farther to the northeast between al-Artāwiyah and Ḥafar al-Batīn (Ingham 1993). Their range includes the village of Qaryat al-‘Ulyā and the wells known as Tiwāl Muṣayr ("the deep wells of Muṣayr").
among which are al-Lihābah, al-Lišāfah, al-Qar‘ah and Wabrah. Some members of the
tribe have in recent years settled in villages established at these traditional summering
places. The Muṭayr have two main divisions, each with three sections. One of these
sections, al-Muwahah of ‘Iwā, includes the shaykly clan, the Dūshān (Rentz 1951). The
paramount shaykh in the 1960s and early 1970s was Bandar ibn Faysal ad-Dawīsh.
Matthews (1960) estimated the tribal population as about 35,000.
4. CONSULTANTS, LANGUAGE AND WORK PROCEDURES

The number of Bedouin consultants contributing to this study was approximately 20, not counting those involved in one-time events such as chance field encounters with passing herdsmen. Of this 20, a core of about 10 long-term consultants contributed an estimated 80 percent of the total data. All consultants were male, of age 35-75, with the majority in the upper part of this range. All had spent at least half of their lives as active nomadic herdsmen and had been originally selected by reputation and interview for their knowledge as informants for map place-name work, field guidance and the provision of general tribal information. These skills are based on the kind of field experience that is also basic to the acquisition of botanical knowledge. All consultants received some nominal remuneration as recompense for their work time.\(^1\)

None of the consultants had any specialist plant knowledge (of medicinal plants, for example), and all but one were non-literate. The exception was an elder of the Shammar tribe who had acquired a rudimentary knowledge of written Arabic. None had experience of any form of horticulture.

4.1. Najdī Arabic

Virtually all consultants were monolingual speakers of the Arabic dialect known as Najdī. The few exceptions were members of Āl Rāshid, al-Manāhil and Āl Wahībah, of

\(^1\) This compensation rate was Saudi riyals 8.5 per day (then equal to approximately US$ 1.90). This was paid regularly every two weeks on the basis of 14 days work although actual work time was much less.
the southern and eastern Rubʿ al-Khālī, who spoke southern Arabic and whose contributions will be so identified.

Najdī Arabic is that Arabic spoken by the settled inhabitants of the central plateau region of the Arabian Peninsula, known as Najd, and by numerous Bedouin tribes, some of which are centered in the same region and some of which have spilled over to occupy new homelands to the north and east, now outside Najd proper (Ingham 1994). It is characterized by several archaic features found also in Classical Arabic, although the idea sometimes expressed by Westerners or city Arabs that Bedouins “speak Classical Arabic” is certainly not true. Some of these old features are (mainly from Ingham 1994):

1. Retention of the indefinite noun marker (танвин) suffix in the form -in (from the coalescence of classical -un, -an, -in).

2. Retention of classical th and dh, which have merged with t and d in many other dialects.

3. Existence of the internal passive in verbs (as opposed to the replacing prefixes t- or in- in other dialects).

4. The use of certain particles such as gid (classical qad) as a marker of the emphatic past and tham (“then”; classical thumma).

On the other hand, some classical features have been "lost," such as the distinction between d and z, which have coalesced (with the pronunciation of d as z, in my transcription ẓ).

The Najdī dialect group is subdivided by Ingham (1994) into three main subdialect types called northern, central and southern. These, in my experience, hardly differ from one another as much as do the varieties of American English. The northern variant, characterized by the speech of the Jabal Shammar region and the Shammar tribe, appears to be the most distinctive. The southern variant of Najdī, including the speech of
Qaḥṭān, Āl Murrah, ‘Ujmān and Banī Hājur, is the most prevalent in my ethnobotanical data.

All dialects of Arabic, like other members of the Semitic language family such as Hebrew and Ethiopic (Geez), are characterized by having verbal and nominal (including adjectival) word forms built on a skeleton of three (rarely four) root consonants in specified sequence. Each root, which is a grammatical abstraction that does not exist as such in either the spoken or written language, carries a broad, sometimes vague, semantic field, some aspect of which is usually recognizable in concrete vocabulary. “Real words” consist of the root consonants supplemented by various vowels and a few standard supplementary consonants assembled in a large but finite series of patterns, providing different shades of meaning that are, to at least some extent, predictable. Thus in classical Arabic, from the root (indicated here in capital letters) KBR, with the general meaning of “bigness,” we have derived verbal forms such as KaBuRa, “to grow big, tall”; KaBBaRa, “to enlarge, magnify”; taKaBBaRa, “to be haughty” (consider oneself big); noun forms such as KiBR “greatness, stoutness”; and adjectives such as KaBiR, “big, large.”

This syntactical peculiarity of Arabic has a consequence in ethnosemantic studies such as the one at hand. Inasmuch as the great majority of plant names can be traced, at least theoretically, to a root of some generalized meaning, nearly all of them can be conceived as exhibiting some degree of semantic transparency, and this is true even of the primary, simple lexemes that are folk generics and that in many languages are often unanalyzable. The consequences, and particularly the limitations, of this aspect of Arabic semantics are discussed more fully in section 9.5.2.

Najdi Arabic, like other Arabic dialects, also has a collective noun form that is peculiar to names of natural objects, usually animals and plants, but also stones and
minerals. Known in classical grammar as the *ismu l-jins* ("noun of kind"), it can be tested for by asking for the name of "just one of it," which for a generic noun will be returned with the feminine singular suffix -*ah*. Thus *‘arfaj*, "*‘arfaj* bushes in general"; *‘arfajah*, "a single *‘arfaj* bush." Not all plant names are generic nouns of this type, but the great majority of them are, and it is the form usually returned, either in the collective or singular (technically the "unitative"), to the question: "What is its name?" or "What do you call it?" Interestingly, the word "*jins*" which appears in the formal grammatical term, is used in current Arabic scientific writing as equivalent to the Linnaean "genus." Plant names in this collective noun form appear in general to be more psychologically salient than those that are not. Thus, among the life forms, the universally recognized categories *shajar* ("perennials") and *‘ishb* ("annuals") are collectives, while *at-tawāli‘*, a category apparently used by only a few northern tribes, is a standard "broken plural." All lexemes that are generic nouns are in this study given in the collective, not their singular, forms.

Like virtually all Bedouins, my consultants had had some contact with classical Arabic as used in Islamic religious observances, in formal speeches by government officials on public occasions or, in modern form, on the radio. In general, however, except in the case of a few prayer formulas used by all Muslims, their knowledge of classical Arabic was passive -- largely understood but not spoken.

4.2. Transcription of Bedouin Speech

I should emphasize that the pre-existing data from which this study is drawn were not collected for linguistic purposes, at least not in the sense of maintaining a fully accurate phonetic record of what was heard from the mouths of consultants. The data-collecting

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1 The apparent lexical similarity of Arabic *jins* to both Latin *genus* and Greek *genos* is, as far as I have been able to determine, only coincidental.
research environment in which I worked was rather one more typical of traditional oriental studies, where classical Arabic was generally hovering in the background as an unspoken standard. And this fit our objectives. Place names were collected for the purpose, after considerable study and evaluation, of publication on Arabic-language maps in classical Arabic form. My plant terminology was collected, in many cases, for easy comparison with the forms of the same names that I knew might be found in classical literature. And in any case, my concern was primarily that of semantics. It was not therefore unusual for me to hear a Bedouin plant name that sounded, for example, something like ibšēla and to record it on a card in the classical form busaylah. Similarly, in most cases all dialectal variants of the classical phonemes qāf and kāf went down as "g" or "q", and "k," respectively, although some consultants sometimes used the fronted affricated versions "dz" or "tz". We went to great pains to get our phonemes correct but were not much concerned with our colloquial phonics, particularly the precise "coloration" of the short vowels or, sometimes even, their presence or absence.

I do not feel that this shorthand compromised in any significant way the purposes of this study, but it does mean that my data should not be used by a descriptive linguist as examples, say, of Banī Hajir short vowel practice when they see plant names recorded by me followed by "Banī Hajir." My source notes thus refer to the plant name, not its precise phonetic expression. The Bedouin plant name forms should thus be taken as "common" or "normalized" Najdī Arabic, probably with a southern Najdī bias, rather than as a precise phonetic rendering of specific utterances. I do claim that my transcriptions provide generally good and fully understandable renditions of the speech that I heard even though they may not be fully consistent to the sub-dialect level. Bedouin speech in my text is marked by the use of bold italics.
I have adopted, with the idea of causing minimal discomfort to the eye of the non-linguist, a Bedouin Arabic transcription system that resembles general approaches used in English-language Middle East studies journals. My aim here is to maintain all phonemic distinctions while minimizing diacritical marks by employing conventional digraphs such as $kh$, $th$ and $sh$. In those few cases where the consonants of apparent digraphs should be read with their individual values, I insert a forward slash to indicate this, e.g. $ad/ham$, “black” rather than $adham$. Table 4.1 lists each of these symbols followed by a linguistic description.

Table 4.1

Bedouin Arabic Phonetics and Transcription

<table>
<thead>
<tr>
<th>Consonants</th>
<th>Plosives</th>
<th>Fricatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>$b$</td>
<td>voiced bilabial</td>
<td>$f$</td>
</tr>
<tr>
<td>$t$</td>
<td>voiceless dental</td>
<td>$th$</td>
</tr>
<tr>
<td>$d$</td>
<td>voiced dental</td>
<td>$dh$</td>
</tr>
<tr>
<td>$\ddot{t}$</td>
<td>palatalized voiceless dental</td>
<td>$s$</td>
</tr>
<tr>
<td>$k$</td>
<td>voiceless velar</td>
<td>$z$</td>
</tr>
<tr>
<td>$g$</td>
<td>voiced velar</td>
<td>$\ddot{s}$</td>
</tr>
<tr>
<td>$\ddot{d}$</td>
<td>palatalized voiced interdental</td>
<td>$\ddot{d}$</td>
</tr>
<tr>
<td>$sh$</td>
<td>voiceless palato-alveolar</td>
<td>$kh$</td>
</tr>
<tr>
<td>$gh$</td>
<td>voiced uvular</td>
<td>$h$</td>
</tr>
<tr>
<td>$\ddot{c}$</td>
<td>voiced pharyngeal</td>
<td>$h$</td>
</tr>
</tbody>
</table>

| Liquids | $l$ | dental |
| Nasals | $m$ | bilabial |
| | $n$ | alveolar |

| Continuants (Semi-vowels) | $w$ | bilabial |

| Vowels | $y$ | palatal |
| $i, \ddot{i}$ | $a, \ddot{a}$ |
| $\ddot{e}$ | $u, \ddot{u}, \ddot{o}$ |

1 The Semitic Transliterator font used to print this work is available from Linguist's Software, Inc., P.O. Box 580, Edmonds, WA 98020-0580, USA, tel. (425) 775-1130, www.linguistsoftware.com.
I transcribe the feminine singular suffix as -\textit{ah} rather than -\textit{a}, as the final \textit{“h”} may be weakly sounded in Bedouin speech. The definite article is shown, when applicable, in its assimilated form (thus \textit{an-najil}, not \textit{al-najil}). It is recognizable by the following hyphen.

Several items in the Arabic sound inventory have no equivalents in English or many other Western languages. The following pronunciation guide can be followed by non-Arabic speakers for casual reading.

Vowels: These should be pronounced as if they were Spanish or Italian. Vowels with macrons should be prolonged and their syllables stressed.

Consonants: The following may be pronounced as in English: \textit{b, d, f, g} (as in \textit{“go”}), \textit{h, j} (as in \textit{“job”}), \textit{k, l, m, n, s, t, w, y, sh} (as in \textit{“she”}), \textit{th} (as in \textit{“thin”}). The digraph \textit{dh} should be read as \textit{th-} in the English word \textit{“the”}; \textit{kh} as \textit{ch} in Scottish \textit{“loch”}; \textit{gh} is somewhat akin to French uvular \textit{“r”} but may be spoken simply as hard \textit{g} in casual readings. \textit{h} is a back, heavily aspirated \textit{“h”}; it may be approximated with the \textit{“h”} of English.

The so-called emphatic consonants \textit{s, t,} are spoken like their non-emphatic counterparts but with the tongue retracted toward the palate. In casual reading they may be spoken as the non-emphatics. The emphatic \textit{dh}, which I write as \textit{d}, may be pronounced as its non-emphatic counterpart (described above). \textit{(the Arabic letter \textit{‘ayn}) is best ignored by non-Arabic speakers or pronounced as its associated vowel. Doubled consonants must be pronounced doubled.

\section{Working Procedures}

Working procedures on nearly all occasions took the form of informal interviews. My consultants would generally work with me for a few weeks at a time, then would often be
absent for some weeks or even months visiting their home tribal areas and families. All work was conducted in Arabic without use of interpreters. Names were checked with several consultants whenever possible, and the tribe of the consultant was recorded with each name. Formal lists from multiple consultants were compiled only in a few cases, such as for investigation of the concept of "the seven hamd plants" (section 9.3). No attempt was made to explore the total plant name inventory of any one person, and my data represents the set theoretical union of names collected from all sources. I nevertheless feel that my inventory of folk generic and higher order names, after the deletion of synonyms, would approximate the repertoire of an average elder, field-experienced Bedouin that might have been encountered during the years of data collection (1960-1975). Inasmuch as all of these consultants would have gained their knowledge of plant life well prior to any significant economic changes stemming from development of the Saudi Arabian oil industry, I am confident also that resulting changes in Bedouin life would not have truncated this knowledge to any significant degree.

Plant names were elicited through identifications in the field by consultants acting as guides or by my presentation of fresh or, very rarely, pressed specimens in the office. On a few occasions consultants traveling alone brought in specimens from remote areas at my request. Much of my spare time between the years 1962 and 1988 was devoted to learning and recording the flora in scientific taxonomic fashion as the basis for a flora of eastern Saudi Arabia that was published in 1990. This work was based on the collection of several thousand specimens deposited mainly in the Natural History Museum, London with smaller collections going to Kew, Edinburgh and Washington. My plant identifications were checked (or my unknowns determined) by Middle East plant specialists at these institutions. I made no formal voucher collection for the vernacular name work. I can, however, attach with confidence specimen numbers and their
herbarium locations to each folk name, and such data is provided in my inventory of folk
generics.

My greatest regret now with regard to work methods was my inability to include
information from female consultants. Cultural restrictions in this very conservative
Muslim environment, as well as the location of my usual office workplace, made it very
difficult for a male investigator to consult with women. This might have been possible in
a situation where one could gain family confidence by living in the field for long periods
in the company of a Bedouin group. My field trips, however, never included stays of
more than a weekend with any one family. By far the most important Bedouin use of
plants is for livestock grazing, and herding is primarily a male activity. There was some
indication, however, that the women might have been more knowledgeable about food
and medicinal uses of wild plants, as limited as these uses appeared to be. I hope another
investigator, preferably a female, will find an opportunity to study the entire gamut of
Bedouin-plant relationships from the women's viewpoint and tell us of the results.

As is always the case in ethnobotanical field work, we teeter on the shoulders of
our consultants, and some have broader shoulders than others. The following partial list
of names is provided both as some basis for future gauging of the accuracy of my data
and in gratitude to these who gave most generously of their patience:

‘Alī ibn Sa‘īd ibn ‘Alī of al-Makhaḍibah of Bānī Hājir
‘Alī ibn Ḥamad ibn Fāri‘ah al-Ḥurayrī, of Āl Ḥurayr of al-Ghayāthīn of Āl Murrah
Sālim ibn Ḥamad ibn Miznah of al-Ghayāthīn section of Āl Murrah
Juḥaysh ibn Muṭlaq al-Ghuyaythī of al-Ghayāthāt of ad-Dawāsir
Muḥammad ibn Ḥurṣān of Qaḥṭān
Khulayf as-Shammari of Shammar, of whose full name I can now find no record but whose counsel on northern plant lore was invaluable.

Sāri ibn Mukhaylil of ar-Ruwalah

Muḥammad ibn Ma‘wīd ibn Sa‘īd of Bayt al-La‘bah of Bayt Yamānī of Āl Rāshid, who spoke a southern, non-Najdi, dialect and taught me more of camels than of plants, but whose knowledge of the sparse Rub‘ al-Khāli flora seemed unrivaled.
5. STARS, LAND AND PLANTS

The story line -- the single-spaced parts in this somewhat unconventional chapter -- involves fictitious names and imaginary events but is based on personal experience. Its objective is to describe some practical aspects of Bedouin life and its interactions with the environment that are not covered elsewhere in the paper. Plant uses and terminology are treated here only in brief, as these are discussed in other chapters.

It is mid-September, three hours after sunset, in a small Bedouin encampment situated some 70 kilometers from the Persian Gulf coast in eastern Saudi Arabia. A fire is burning in front of the eastern, guest end of one tent that is a bit larger than the others. Men's voices, a little excited, are heard, and someone puts another piece of brushwood on the fire, raising sparks. Only a young boy in the group is standing, and in the reflected light of the fire one can see the brass coffee pot in one of his hands, the stack of small, handleless porcelain cups in the other. It is his job to keep the elders supplied with the cardamom-flavored brew, and he takes his task seriously.

There are six families in six tents here, all of the Ghayathin section of the tribe of Al Murrah. A few years ago their summer camp would have been at one of the hand-dug groups of wells farther inland, perhaps among the clean white sand domes of Irj, over against the edge of the Summan. This year they had moved east on the advice of a kinsman who had taken a job as a watchman at a new oil facility built by the Americans. He had told them that a new water well was drilled here last winter and that if they got there early, they could choose the best place to pitch their tents for the summer near the new steel water trough. (The oil company operations people had learned years ago to install a camel trough at all new remote facilities. Whenever they hadn't, the local Bedouins would appeal to their paramount shaykh; he in turn would visit the Government’s Amir of the Eastern Province, Ibn Jiluwi, who would politely request the company Government Relations man to see to the necessary. The relations man, using the Amir’s magic name and with his contacts with higher management, never failed to convince the construction crew.)

The Bedouins call this place "Nimrat Ithnen" ("number two," having simplified the formal English name, "‘Ayn Dar Gas-Oil Separator Plant...
Plate 5.1. Consultants, from left, Khulayf, of the Shammar tribe, and Muḥammad ibn Khurṣān, of Qaḥṭān, at the coffee fire. Photograph courtesy of the Saudi Arabian Oil Company (Saudi Aramco).
Number 2"). The water from the deep well here is warm and brackish, but it's more than good enough for camels and most important, it's virtually inexhaustible and delivered through a pipe to a watering trough. No long hours this year hoisting hundreds of leather buckets of water in the summer sun. Another advantage was that the summer people's cousin, the watchman, had access to a telephone. He was supposed to use it only for "official" purposes, but no one complained if once in a while he called up one of the few other Marri employees in the company -- most of them drivers of oil exploration vehicles -- for tribal news.

The talk around the campfire this night was sparked by an important event of the early morning. Before first light, after the little group had chanted their pre-dawn prayers on the sandy rise near the tents, they turned left to look south as they had every morning for the past week. Raising their hands to shield their eyes from the glare of the Nimrat Ithnên's gas flare less than a mile away, they had finally seen it. It was a star very low in the sky. It was bright but flickered deeply through the thick atmosphere near the horizon. True, they had already heard about it from fellow tribesmen camped farther south and inland, where the air was clearer. But that's never quite the same as seeing it oneself. The new year had truly begun.

For these Bedouin households the "beginning of the year" meant the beginning of the annual pursuit of desert vegetation, essential for their herds and livelihood. The official Islamic calendar used by the Saudi Arabian government is based on lunar months, leaving their year 11 days short of the Western calendar year based on solar time. A given lunar date thus falls 11 days earlier each year on the solar calendar and moves through the seasons, repeating the cycle every 33 years. This system is of little use to people concerned with plant life linked to the seasons by rainfall, day length and temperature. The official calendar has thus always been largely ignored by the Bedouins except for the observance of religious obligations such as the fast of the month of Ramadhan and the Pilgrimage. Even before the transistor radio, these requirements could easily be met by occasional checks during town market visits and by glances at the phase of the moon.

The Bedouin year has always been reckoned by the stars and thus remains synchronized with the seasons and the annual march of desert plant and animal life. The
year consists of four seasons, called *as-sfarī* (corresponding approximately to 15 September - 15 December), *ash-shiūā* (15 December to 15 March), *as-šēf* (15 March to 15 June) and *al-gēd* (15 June-15 September). Each of these seasons is subdivided into shorter periods marked by the heliacal rising (or more rarely risings or settings at sunset) of single stars or asterisms. Some of these named periods or stellar events correspond to the ancient *manāzil al-qamar*, or "mansions of the moon," which divided the year into 28 named periods of 13 days each and which are still observed by seafaring folk of the Persian Gulf (Sergeant 1968).

The numbered years that are part of the Islamic calendar system were also little known to the Bedouins, who related events to mnemonic year names based on widely known happenings. Some of these names refer to important historical events, others to unusual weather phenomena. Given the importance of grazing conditions in the Bedouin economy, it is perhaps not surprising that many are also concerned with unusual developments (or failures) of wild plants. Actual year names quoted by my consultants, always given in the form "*sanat ...."", "year of ....," have included:

**Sanat Sbilah**  Year of the 1929 battle at Sabalah, where Ibn Saʿūd defeated the rebellious Bedouin *Ikhwān* forces of Muṭayr and their allies

**Sanat as-skhūnah** "Year of the fever," when sickness was widespread

**Sanat al-jrād** A year in which there were many swarms of desert locusts (*jīrād*)

**Sanat al-khāmā** A year, about 1950, in which the annual plant *khāmā* (*Horwoodia dicksoniae*, Cruciferae) was unusually prevalent

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1 Some northern tribes add one or two additional season names, using terms derived from important star signs of the periods.

2 The first appearance of a star during the year as it is seen to rise above the eastern horizon before sunrise. Each day thereafter it will appear higher in the sky.
Sanat rabī‘ al-‘arfaj  A year when there were no annual plants in the spring period but the ‘arfaj shrublets (*Rhanterium epapposum*, Compositae) flowered profusely.

Sanat al-ḥalam  A year in which the dwarf shrublet, halam (*Moltkiopsis ciliata*, Boraginaceae), germinated and grew in great numbers.

Sanat aṣ-ṣīffār  A year in the 1960s when the annual plant growth consisted largely of the cruciferous annual, ṣīffār (*Schimpera arabica*).

Sanat ḥājj al-ghanam  "Year of the pilgrimage of the sheep," a year in the 1960s when grazing was so plentiful in the northern plains that scores of truckloads of sheep were sent northwest on the Trans-Arabian Pipeline road, reminiscent of the great bus caravans seen each year taking pilgrims to Mecca.

The star for which the Āl Murrah were watching at *Nimrat Ithnēn* was sīhēl, or Canopus. Throughout much of Arabia the appearance of sīhēl marks the end of the severest part of summer and the beginning of the season called aṣ-ṣfarī. In central Arabian latitudes Canopus is above the pre-dawn horizon before the end of August. But it usually takes two or three weeks more for it to become visible above the haze and obstructions near the horizon. Nothing dramatic happens with the weather at that time. In fact high heat, and in the Gulf coast region high humidity, continues into October. In everyone's mind, however, summer heat is now "downhill" and thoughts turn to autumn travels in search of the first rains and early grazing. One of my consultants of Banī Hājir provided the following couplets celebrating the rise of this star:

\[
\text{tbayyan sīhēl wa rāḥ albil 'adā il-mafrūd}
\text{walā 'ād rāḥ i ʂ-ʂēd yagnaš al-mishrābah}
\]

Canopus has appeared and the herdsman keeps away the young camel [from its mother]
And the hunter has not returned seeking drink
(This is the time to wean the young camels of the previous season; and the hunter need no longer interrupt his expeditions to return for water)

**ya sīhēl al-jnūbī bardak yīfī nasnās**
**ya ḥabbnī līṭ-ṭayyib law min baʿīd an-nās**

Oh Canopus of the south, your cold comes as a cool breeze
You who have loved me as a good [man] though so far from mankind

Yet this was traditionally also the time of *dhalgat sīhēl*, "the sword point of Canopus," the time when a visit to the oases of al-Qaṭīf or al-Ḥāsā could result in infection by *al-wubāḥ*, "the pestilence" (probably a reference to the endemic malaria that afflicted those areas until about the 1960s).

The men around the campfire at *Nimrat Ithnēn* that September evening were also discussing plans for their annual migration to the northern plains, where the autumn rains, *al-wasml*, usually came earliest (if they came at all). The *wasml* seldom arrived even in the north before the latter part of October, so there was plenty of time for preparations -- overhauling the camel gear, resewing the seams of the black hair tents and purchasing supplies. Sālīm, one of the younger men, said he would move out by the time of the first possible *wasml*, firm news or not. He would act as the group's *ʿassās* (pl. *ʿawāṣīs*, a rain and pasturage scout) and get back word as soon as he had firm knowledge of any northern rains.

The elder brothers, ʿAlī and Faysāl, remembering the hardships of the previous year when there was no *wasml* rain at all, said they would stay put until they had sure news. Their herd of 50 big *majāhim* (sing. *mījīm*; the strain of heavy, near-black camels known for their high milk production) could still make do with the remaining dry stubble of *thmām* grass and occasional moves over to the saltbush grazing in the lowlands ten miles to the east.

The womenfolk started getting the tents ready for the move north, making plans for a communal tent-sewing session to strengthen the seams that joined the *faljān* (strips of tent material) into larger pieces. They also checked the poles and ropes so they could tell their husbands what needed buying in the
Plate 5.2. Erecting the "house of hair." Young daughters of an Al Murrah consultant pull on a guy rope while their mother drives a stake.
The *wasm* rains could come up north as early as late October if they were lucky, and by the middle of that month, with the rise of the Pleiades (*ath-thrayyā*) above the eastern horizon at evening prayers and the *wasm* season officially begun, they were eagerly questioning any travelers from the north.

The Pleiades are always associated with the winter rain season and auspicious times by the Bedouins. Their rise at the time of evening prayers, about two hours after sunset, heralds the coming of the cool season, and their setting at that time in May marks the beginning of summer heat. A proverb of Āl Murrah says:

*ila* [sic] *badat ath-thrayyā* *i'shā dawwir li'yālak ad-dīfā*  
*wa idha ghābat ath-thrayyā* *i'shā dawwir ladhōdik ar-rishā*  
*hidd ya rā'ī ash-shiyāh*

If the Pleiades start their course at evening prayer, look for warm clothing for your family  
And if the Pleiades are setting at evening prayer, look for the well ropes for your camel herd  
Oh, herdsman, get the ewes in [and ready to be bred]

*Wasm* rains in October or November bring special excitement and much praise of Providence among the Bedouins, as they are an essential (although not sufficient) condition for the fullest possible development of grazing vegetation. Additionally, they are considered essential for the growth of *fag*, the prized desert truffles collected by the Bedouins to eat themselves. After autumn rains, the desert annuals germinate but grow only a little. Their growth is then interrupted by low winter temperatures even though additional rain may, hopefully, fall in December and January. The warmer days of spring lead to rapid growth of both annuals and perennials, and if additional rain falls then to keep the ground moist, the annuals develop great density and stature. If there are no rains
until late winter or spring, the annuals are not able to grow to full size before they are withered by the quick rise of temperature in late spring and early summer.

It was the first week in November, just after the first cold front moved in from the northwest bringing a temperature drop and the first real change in the weather. The group at Nimrat Ithnên was again at the evening coffee fire and well settled after the first three cups when Sâlim, having saved his words for best possible effect, said simply: "News from the north."

All eyes turn. "What news?"

"albarakah. 'ulûm min Fêsal. jûhum sêl fil gra'ah" ("Blessings. News from Faysal. They've had heavy rain in the Qar'ah")

"alhamd lillhî. waysh hafrathâ?" ("Praise be to God. How deep is it?")

"dhîra', alhamd lillhî" ("Arm-deep, praise God").

The question "how deep is it" did not refer to a depth of standing or running water but to the depth of moisture in the ground. When rain falls on sand it percolates downward until a well defined front of wet sand reaches an equilibrium depth, a depth directly proportionate to the amount of rain that has fallen.¹ The standard Bedouin method of measuring and reporting a rainfall is to dig a hole straight down with one hand until the finger tips reach the front with dry sand. The depth is then reported (in terms of higher and higher marks on the hand and arm) as asâbi (to the base of the fingers), kaff (the middle of the palm of the hand), mi'sam (to the wrist), ma'tlâ (to the place where a woman's bracelet is worn, about 8.5 cm above the wrist), dhîra (to the thick part of the

¹ Cloudsley-Thompson and Chadwick (1964:23) state that the depth of such percolation in dry sand is "something in the order of eight times the immediate precipitation." This closely approximates my own experience. On 27 November 1967 I dug ten test holes in fairly flat, medium-textured sand terrain near Abqaiq (Buqayq), Saudi Arabia after four days of moderate, intermittent rains, the first of the season. The total precipitation gauged at Abqaiq by the Arabian American Oil Company was 0.51 inches. The depth of the moist-dry boundary ranged from three to six inches, apparently depending on local slope. Six of the ten measurements fell within the range 3.5-4.5 inches, and the average of all was 4.0.
arm), kursū (to the elbow), maḍad (to the upper arm between elbow and shoulder) or even mankib (to the shoulder).

As might be expected, the Bedouins also have a well developed terminology of rain types. The term sēl, used above, means the flow of water in rivulets and runnels across the ground in amounts up to and including flash floods and indicates that rainfall was heavy enough to cause such effects. Rains are classified according to season, such as: wasmi (of the wasm, autumn), shitwi (of the winter), and maṭar as-smāk (of spring, of the star sign, as-smāk). A light early rain in the fall is a da’th. According to intensity it may be a thinnī (a drizzle), a rishshah (a sprinkle), a hamlah (heavier but without thunder), a mkhīlah (thunderstorm cell), or a waddān or wādish (a long, slow rain). A rain of restricted areal extent is a shakhat.

The place where Sālim reported the rain had fallen, in al-Qar‘ah (literally, "the bald lands"), is a wide area up in the northern gravel plains where there are no perennial plants except for thinly scattered ḥalam, a rough-textured dwarf shrublet seldom reaching 20 cm in height.

The Qar‘ah is not a favorite grazing ground. Firewood has to be carried in from other regions, and the dominant plant in spring is the coarse annual șamʿā grass, the ripening heads of which have barbed awns that catch in the mouths of livestock. Nevertheless, the group at Nimrat Ithnēn decides to move up there immediately. They will camp on the boundary between al-Qar‘ah and the rimth saltbush country, along the old automobile track to Kuwait. They can use rimth for fuel, and the young șamʿā and other annuals will soon provide some fresh grazing. Hopefully they will learn about other rains in areas with more productive vegetation.

Three days later the families of Sālim and ‘Alī, having packed the tents and all belongings on several of the larger male camels, moved off to the northwest. The first day would be an easy one, and they’d stop after covering some 35
kilometers in the area called al-Ḥabl. The camels would not need water for another two days and they could graze on what little was left of last year's thmām grass. The women liked the area not only for the grazing but for the scattered ʿabal shrubs that provided excellent, clean-burning firewood. Collecting fuel was one of their jobs. They did not put up the heavy, main goat hair tents. For this brief stop they'd use a light canvas fly over two poles. They covered nearly 50 kilometers the next day, still in al-Ḥabl. The following day found them camping within the southeastern edge of the broad lowlands known as Wādī al-Miyāḥ ("Valley of the Waters," so-called although it was not a true wādī, or seasonal watercourse, because of its shallow water table with many brackish wells). This was the home territory of the ‘Ujmān tribe, but these were ancient kinsmen of Āl Murrah and the traveling party made a point to call at tents for coffee and gain intelligence. These lowlands had rimth saltbush as the dominant shrub cover, and the rimth was now in November just passing its peak of flowering development. It provided excellent camel grazing as well as fair firewood, although it was still greenish and generated considerable smoke.

The next day was a long one, again covering nearly 50 kilometers and putting them into the southwestern edge of the tract called ar-Radāʾif. After rains this was prime grazing country in the spring, but the dominant ʿarfaj shrublets were now only bundles of dry sticks. The camels would have to make do with bits of dried annuals left over from the previous season. In the campfire ʿarfaj flames up like tinder and is useless as a long burning fuel, but it is good for starting dried camel dung that would soon be glowing like charcoal. The end of the next day put the party within sight of the desert village of Qaryat al-ʿUlya, a settlement of the Muṭayr tribe. ‘Alī decided he would go in to the little market the following day seeking any news of rains. He took along his slūġī hunting hound in hopes of starting a hare and carried his single-shot shotgun, hoping to spot an early bustard (ḥārāḍ).

The slūġī, a slim, light-colored, greyhound-like hound, is part of many Bedouin households. It is swift enough to run down the desert hare (Lepus capensis). In Bedouin animal terminology the slūġī is not classed as a dog (kalb), which in Arabia is considered a coarse and unclean animal good only for watchdog duty and never made a pet or taken into the tent. The salūġī, however, is a hunting companion regarded with some affection by the family and is often found in and around the household precincts. The differences between a slūġī and a dog is emphasized in the following rhyming couplet, used among Āl Murrah to make fun of anything improperly mixed or impure:
Eastern Arabia before about 1955 had larger game, including two species of gazelle and, in the Rub‘ al-Khali, the Arabian oryx (*Oryx leucoryx*). Hunting from motor cars with semi-automatic rifles soon drove them to virtual extinction. The ḥbārā (houbara bustard, *Chlamydotis undulata*) is the prime feathered quarry, often hunted with falcons. It is a migratory species, arriving in Arabia in the fall for the winter season.

Everyone in the market knew of the rains in al-Qar‘ah, now only 50 kilometers away, but so far there had been nothing else. The two families reached the edge of the gravel plains late the following day. The next morning, their having passed the ridge of al-Warî‘ah and the deep wells of Khubayrā‘, ‘Alî decided to check one of his favorite spots for hunting *fag*‘, the desert truffle. There would be none to find at this time of year, but he could check for soil moisture. If it had rained here he knew it would be worthwhile looking again in the spring; if not, it wouldn’t be worth the trouble. He smiled as he dug into the gritty earth. It had, indeed, rained, and pretty hard. He had told the family not to divulge the location to outsiders.

By late afternoon they had found Faysal’s tent, north of the oil pipeline road. The families greeted each other in standard Āl Murrah fashion, putting their hands on each other’s shoulders and with faint smiles, gently touching noses three times and asking many times over: “How are you? How are the herds”? The new arrivals pitched their tents near Faysal’s and gathered to discuss the water situation. Was the standpipe very crowded?

In the cooling days of autumn, camels can go for several days without watering, but they must drink occasionally, and the families would need their own tent supply. The few hand-dug wells on the northern plains are very deep, and much work would be required to draw enough for the herd. The Āl Murrah group had therefore decided to water at the pipeline motor pump and trough, some three hours’ ride to the south of their location.
Salim's family had two kinds of water bags that could be carried on camels. One was the traditional *girbah*, a goatskin bag made of a whole hide with the legs and other openings tied shut with thongs. When full of water, the leather would sweat continuously, keeping the contents cool by evaporation. The other containers were made of the inner tubes of large truck tires, cut into halves and the ends tied off. The water in these tubes got hot in the sun, but they were less prone to loss by evaporation or leaks.

Sālim's family experienced an emergency midway into their first week at the new camp site. Miznah, their 12-year-old daughter, had been bitten by a *hayyah*, or sand viper, while walking barefoot behind the tent after dark. Sālim was worried, as Miznah was in considerable pain and such bites could, he knew, become infected and go bad. The next morning Miznah's mother walked about a mile to a shallow runnel where some sparse bushes grew to get some leaves of *ramrām*, a traditional snakebite remedy to be used as a poultice. She was back an hour later and immediately mashed up the rough-haired, slightly succulent leaves and tied them over Miznah's wound. Miznah said she thought it felt better then, but Sālim said he would take her on camelback down to the pipeline road, where they could catch a ride to the oil company clinic. As it turned out, Sālim and Miznah did not return for another week as they had been sent on to the company hospital in Dhahran, where some minor surgery was required.

The common sand viper of eastern Arabia, *Cerastes cerastes*, is responsible for virtually all cases of snakebite in the region. It is the Old World analog of the American sidewinder, which it closely resembles in size and habits. It injects rather small amounts of venom, and its bite is seldom life-threatening except to small children. The only other dangerous snake of the area is the black, hoodless cobra, *Walterinessia aegyptia*, called the *yaym*, sometimes believed to have the power of flying like a bird. Fortunately, it is extremely rare. By the time the coldest weather arrives in December, snakes are no longer abroad at night and pose little danger.
Meanwhile, the grazing was not going very well. The camels were nibbling off the thin haze of green as fast as it grew, and Sālim knew that when the really cold winds came in a few weeks, growth of the annual plants would all but cease until early spring. The stock was not losing weight any more, but neither was it gaining. Finally in December, with the Bedouin season of shītā beginning, came some good news. Heavy rains had fallen in the heavy sand belt of the Dahna', some 185 kilometers to the southwest. Water was hard to come by in that area, but large, long-lasting rain pools, *khbara* (sing. *khabrā*), had formed in the rocky Summān country bordering the sand on the east. Sālim and Faysal talked together and with their wives about this new opportunity. Crossing the rocky Summān to the Dahna' would be a rough trip in the cold weather. When they got there they could expect no new plant growth until early spring. But when it did come up, they knew, it would be really lush. Better to stake out a good area for their herds now rather than wait for the huge influx of tents that was sure to come in spring.

The families did not discuss it, but in the back of their minds they were also thinking of the comfortable sand country. The lower, more stabilized dunes of the Dahna' would provide good *‘abal* firewood for the coldest days yet to come. The camels could winter-graze on dry standing *sabat* grass on the stabilized dunes and on the dry *nuṣf* grass on the gravely strips between the linear sand forms. A week later the two families had packed the baggage camels and moved off westward.

Tribes that spend much of their time in the great sand bodies of Arabia, such as Āl Murrah, al-‘Awāmir and al-Manāhil, always prefer traveling and camping in sand country rather than on rocky or otherwise hard ground. In the more arid regions the sands generally provide the best grazing vegetation, and they are considered soft, "comfortable," and "clean." Camels raised in sand country, for which their feet are specially adapted (Plate 6.7), may go lame with tender feet if suddenly forced to work on rocky ground. A sand area in the most general sense is called a *ramlah*, but a general term for "dune" hardly exists in Bedouin speech, which prefers more specific nomenclature. The barchan (the crescent shaped dune that marches downwind alone or in groups with a steep, cascading slip face in its mouth) is a *ti‘is* (pl. *ti‘ūs*). The rounded dome or whaleback without slip face is a *zbārah* (pl. *zbāyir*). Linear dune forms are known as *‘irūg* (sing.
'īrɡ), a word that means literally "vein" or "nerve." The "sandstorms" beloved of Hollywood Saharan scenes seldom pose problems to Bedouin camp life in the sands; even quite strong winds in fact lift the grains only a foot or so above the streamlined dune surfaces. On the other hand, one does avoid pitching a tent immediately in the wind shadow of dune slip face, as only moderate breezes will lead to an irritating rain of fine grit from the upper lip, and the slip face itself can move forward toward the tent. All things considered, our two Āl Murrah families were looking forward with keen anticipation to setting foot again in the sandy comfort of the Dahnā', named for the reddish color of its fine, iron-oxide coated grains.

The group moved off to the west the following mid-morning, driving the camels ahead across the smoothed pebbles and cobbles of the Dibdibah. They headed back toward the country of the Mutayr tribe, whose deep wells at al-Liṣāfah, within the eastern edge of the Ṣummān, would provide the last fill of the water skins before before they set off across the dry, limestone plateau. It would be a job raising enough water, as the wells are over 200 feet deep. They reached al-Liṣāfah on the third day and were glad to find the wells deserted; they would not have to wait for their turn. They spent the following morning raising water by hitching camels to the long well ropes over pulleys, driving them down the big mound of dung around the well mouths and out on the straight runways worn by long use, until the leathern buckets finally reached the surface.

After camping for the night at the wells, they were off to the west the next midmorning. Their trip to the edge of the Dahnā' sands would take the most of five days at a fairly easy pace. Their route would parallel the ancient track leading from al-Lihābah to the wells of al-Qā'iyah beyond the Dahnā' in Najd, but keeping north of that trail. Their track was seldom a straight line, as they preferred to keep as much as possible to the silt basins that dot the Ṣummān, with their softer and more vegetated floors, avoiding the barren and hard limestone ridges as much as possible. There was much excitement when, on the afternoon of the fourth day, they sighted ahead of them, from the top of a rise, what appeared to be a desert lake hundreds of meters across. They had reached the first of the khbārī, or rainpools, that had been reported in this area. The water was fresh, cool and clean, and the two families decided immediately to camp for the night near its edge. In the morning all took advantage of the chance for a fresh wash, the men and boys going to one corner of the pond, the women and girls to another some distance away. They also topped off their
water skins, although it was slow work skimming these shallows with buckets. Two containers were filled with rainwater only; they would provide the extra-sweet water preferred for brewing tea and coffee.

Rain pools can be important water sources in Arabia's northern plains, where wells are few but where rainwater can stand for weeks or even months on rock or clay-floored natural basins. The water in such pools is usually quite fresh although its quality diminishes over weeks as it is fouled by drinking livestock and human use for washing. The locations of rain pools are a function of local topography and of course require the presence of a relatively impervious stratum at or near the surface. Despite their existence for only a fraction of the year, many of these pool sites have developed populations of small crustaceans (I have seen at least two genera, including *Triops*) that hatch from drought-resistant eggs in a matter of hours after soaking by rain and that grow rapidly to adult form within a few days or weeks to complete their life cycles.

It was not long after noon prayer the following day that Miznah's young eyes had spied the faint reddish line on the western horizon. "I think I see the sand," she said. The younger children had been asking for hours now, "Are we there yet?" "How much farther?". Sālim turned his camel toward slightly higher ground and unwrapped the cloth from a battered pair of binoculars. "It's *‘īrēg ad-dhūl*. We should get there by sunset."

The Dahna' is a curving sand belt that forms a natural boundary between the eastern lands sloping very gradually down to the Gulf and the inland plateau called Najd. It looks narrow on the map but has its own internal structure: a parallel series of some seven *‘īrūg*, or linear sand ridges, each with its own name. What Sālim called *‘īrēg ad-dhūl* was the easternmost of these ridges, called "little sand ridge of the *dhūl*." *Dhūl* (sing. *dahēl*) means "sink holes," which are well-known features of the limestone Șummān country on the eastern edge of the Dahna'. They are narrow openings or natural shafts in
the limestone, going down sometimes tens of meters and usually with horizontal passages. Lying as they do in low spots of the rocky surface, they tend to collect rainwater. These water sources are usually used by the Bedouins only in special need, as the usual well bucket and rope cannot be used from the surface in these contorted shafts. Using them involves a dangerous climb down with a bucket into the dark interior of the sink and sometimes crawling for a hundred meters or more along pitch-black horizontal passages to reach the end-pool.

The families put up only a tarp for the night when they camped just inside the edge of the sand. ‘Ali, kneeling in the sand, had already dug a test hole to check the local rainfall and had found it very satisfactory. In the morning Sālim and ‘Ali moved off alone on camels to scout the surrounding country. They were back by noon, having found a good spot behind the second ridge for their first camping place. The women smiled when they got there to see the hefty bases of large ‘abal bushes that would make good firewood. They would be needing a great deal of fuel in the coming weeks, which might at times bring frost.

Bedouins, especially those from the south such as Āl Murrah, say they suffer more from the cold of winter than the heat of summer. Farther north, on the high plateau lands ranged by northern tribes like the Ruwalah and Shammar, even sleet and brief snowfall are not unknown. Winter dress usually includes the farwah, a heavy sheepskin coat with the fleece inward, and the boots known as zarbūl (pl. zarābīl), made by craftsmen in the oases such as al-Ḥasā. These have leather soles and partial uppers, with coarsely woven camel hair tops about 20 cm high. A family, however, seldom has enough of this winter gear for all its members, and some may have to go barefoot and with thin cloaks through the cold season.

The two-family encampment got down to a quiet routine for the following cold weeks, with the camels grazing on the dry tops of grasses poking out of the
sands and running along the edges of the inter-dune flats. The only excitement came in mid-January, when a convoy of oil company vehicles worked its way along the eastern edge of the sands, stopping from time to time to send up showers of earth with explosives placed in drill holes. Miznah asked her father what that was, and Salim replied that they were Americans looking for oil. They put bombs of děnamit in holes and blew them up. This made the oil deep down in the ground shake, and when it shook they could see it with a special kind of darbil (binoculars). His explanation would not make the grade in Geophysics 101 but it served his purpose well enough. When the trucks had left he walked over to the seismic line with the children. They marveled at the size of one pair of footprints. Workmen had put pipes with welded numbers at long intervals along the line and between them were little wooden stakes with red flags. The word had gone out from the Amir of the Province that no one was to touch those markers, but the family group picked up lengths of insulated electrical wire abandoned by the shot crew. It was useful for mending broken saddle frames and sewing leather goods. There were also some nice tin cans with tight lids, good for storing sugar and tea.

After supper, both families gathered around a fire at one tent. A pile of ‘abal firewood helped to break the cold shamāl wind. The grownups drank coffee and everyone had hot tea with milk. Miznah's little brother begged his father to tell the story about how saʿd (Orion) had fought al-gamar (the moon) over who would get to marry ath-threyyā (the Pleiades). He had heard the story the first time last year and he never tired of it, especially the part about how Orion had his head cut off and how the moon got a black eye in the fight. If the moon was up and anywhere near full at story time, he would run outside the tent and look for the black eye on the moon, which was still there for anyone to see. His older brother preferred stories about Ghēhabān, a hero of Āl Murrah who rose from obscurity to lead his tribe. One of the stories ended with a poem that the children didn't fully understand. Sālim explained the meaning of the words.

Once, when the weather was still cold, the wind changed and came from the southeast and clouds began to build up in a warm spell. It rained for half a day, not very hard but a nice slow soaker. Then it got cold again.

The campfire stories mentioned here are only brief examples of the rich oral literature that have always been a feature of Bedouin culture. I was told the story of the battle between Orion and the moon by a consultant of Āl Murrah. There are doubtless many other such star tales yet to be recorded. Ingham (1997:101-111) transcribed and translated two Ghēhabān tales as examples of Marrī speech.
The sands didn’t begin to change until almost the end of February, when the days began to warm a bit. But then things happened fast, almost like magic. Patches of lawn-like greenery sprouted along the lower banks of their sand ridge as the annual plants pushed upward. Many patches seemed to be all the same thing: *ribl*, the *Plantago* whose narrow leaves were already showing their covering of fine downy hairs. Other areas had different plants mixed in, not yet recognizable to the average school botanist but which ‘Ali could name immediately: *ghrērā, šmēmah, šīffār, tarbah, gahwyān* and *ḥurbuth*. The camels nibbled off these seedlings as fast as they appeared immediately around the tent and out along their usual daily grazing places, but ‘Ali knew there would be plenty to last the spring within a few hours’ walking time. By mid-March most of the annuals were in flower, and the sweet perfume of the *khzāmā* blossoms was scenting the milking bowls, which now seemed to be inexhaustible. Some of the flowering plants bore bright crimson, spider-like creatures, *umm al-matār* ("mother of the rain"), the giant velvet mites that seemed to hatch only in times of plenty. The two families could not use all the milk, even after the 25 newborn camel calves had all they needed. The women and older girls worked together to make *īgt*, the dried sour milk cakes that could be kept and nibbled throughout the coming year. Miznah took her little brothers out to collect salad plants: the sour but refreshing reddish leaves of the wild dock, *hambašīs*, and the peppery leaves of a yellow-flowered crucifer, *šīffār*, which they brought back in handfuls to the tent.

Indeed, everything seemed to be going well. The nights were no longer so cold, the days were balmy, and the rising voice of *umm sālim*, the lark, could be heard in his spiraling spring courtship display. Other Bedouin groups had moved in to the greenery of the sands now, many of Muṭayr, even some *shawāyā*, sheep-herding groups from southern Iraq with donkeys instead of camels. They kept their distance from the Āl Murrah early birds, however, and there was no bickering beyond a bit of campfire muttering. The camping place was moved twice as the spring season progressed, each time to areas with less grazing pressure and farther from other tents. There was another rain in mid-March as a squall line moved over the Dahnā. It lasted only half an hour, but it came down in buckets with lightning and thunder nearby. Some of the rain pools out on the limestone were replenished, even doubling in size, while others, outside of the rain spots, got nothing and continued to shrink. The Bedouin families made periodic trips out to the pools, mainly to bring in water for tea and coffee making. The camels needed no water at all while grazing on the now-lush annuals, and the families were drinking mainly milk, not water.

‘Ali had not forgotten his truffle ground back in the Dibdibah. If he waited until the families’ return trip at the end of spring, the *fag* would be tough and dried out, and somebody else might have found the spot. He’d better
Plate 5.3. Sister and brother of the Āl Murrah tribe return to the tent with handfuls of the cruciferous annual, *sīffār* (*Schimpera arabica*) to be eaten as salad greens.
make a quick trip over there now. He was off before dawn one morning with two of the older boys, all on their best riding camels. This would be a good lesson, he thought, for the lads, this fast travel without the whole household coming along.

They reached the spot at sunset, after two long days and part of one night in the saddle, covering 150 kilometers. No one else seemed to have been there, and in the morning they walked slowly through the spring growth of ragrūg and umm as-swēgah, knowing that the truffles would be found only where those plants grew. They looked for the tell-tale cracks in the slowly drying earth, often with little humps that marked the hiding places of the swelling fungus. They found some almost immediately and were happy to discover they were in good time; they hadn't yet hardened or dried out. They worked all morning in the hunt, and by the time they were finding no more they had two saddle bags full of the earthy-smelling truffles, many of them of the large zbedī variety as big as their fists. Both households were out to greet them when they finally got back to the tents, exhausted but proud of their trophies. They poured out the truffles on a tent mat amid oohs and aahs, and several handfuls were selected immediately for fireplace roasting that evening.

Such are the delights of the Bedouin rabī', that rare, brief outpouring of desert productivity that usually happens only at intervals of several years when the rains are not only plentiful but come with good timing. As often as not, there may be only one rainfall in a given area. This may not be great enough for the germination of annual plants at all. Or the 'ishb may spring up from one rain but then go thirsty. Then, as in the advertising understatement, "some restrictions may apply." As the still-tiny plants sense a continued lack of water they may struggle into bloom when only a centimeter or so high, with hardly any leaf, and from these depauperate flowers produce a few seeds for the next year when conditions might (or might not) be better. When chance brings repeated rains at intervals of several weeks, however, the annuals can reach full development, blooming with profuse greenery in luxuriant meadows that nourish all animal life in the desert as well as Bedouin livestock.
By late April, however, the annuals had finished flowering and were beginning to dry up. By early May the days were becoming hot, and the camels had to be taken again out to the rain pools, many of which were now reduced to cracking mud spots. Miznah's nine-year-old brother Ḥamad had been watching the ḍubbān, the big, spiny-tailed lizards that had their burrows down on the flats between the sand ridges. Now that the days were warmer they tended to be less skittish, lying out in the sun farther from their holes around midday, becoming bright yellow in color. Ḥamad found that he could carefully creep up on them almost to within catching range, and one morning he came back to the tent triumphantly carrying a fat-bodied ḍabb almost half a meter long. He knew they were good to eat and asked his father if he, since he had "hunted" it, could slaughter it himself and have the meat for supper. Sālim smiled and said yes, but that he should share it with his brothers and sisters. Later, before supper time, Ḥamad took the ḍabb off to one side of the tent. He gravely recited the blessing formula, bismallah ar-raḥmān ar-raḥīm, "in the name of God the Compassionate, the Merciful," just as he had seen his father do while killing the lamb for their īd feast a few months ago, and quickly dispatched his quarry in the correct fashion, using a small knife. Curious about the distended stomach he found inside he cut it open to see what was within. He was amazed at all the 'ishb that was still recognizable. "Look, bābā, see all the plants: ḫzāmā, ḥurbuth, sa'dän, and rībî". Sālim explained that that was why the ḍabb was good to eat -- because it ate only plants just as a sheep or a camel does, while the waral (the desert monitor lizard -- the other large lizard of these habitats) was not edible because it ate animals including poisonous snakes.

In 1964 I took six specimens of ḍabb (Uromastyx aegyptius microlepis Blanford) and reported 8 species of plants from stomach contents (Mandaville 1965b). The tails and hind legs of two specimens were roasted and the flesh found tasty if somewhat fibrous and stringy. There was no "gamy flavor," and the meat seemed more like lamb than the chicken or fish to which it has been compared.

Toward the end of May, all the annual plants had turned to brown. Our now-happy families, having seen the Pleiades setting at evening prayers, knew it was time to begin the move back toward their summer home, the sandy downs of Nimrat Ithnēn. They would move slowly, having now a group of mother camels with calves that might have trouble keeping up with the herd, and they
would use a route heading back in the general direction of Qaryat al-‘Ulyā, which lies in the midst of excellent ‘arrafj grazing.

The female camel generally calves only every two years, so about 50 percent of a herd of females will drop young in any given year. The gestation period is roughly 12 months. The young are generally weaned by 12 months or less. Wilson (1984: 97-99) provides useful data on conception and reproductive rates.

Although annual grazing plants are generally dead and gone by the end of May, some of the perennials continue to thrive, with flowers and providing green forage, well into June. The yellow-flowered composite shrublet, ‘arrafj (Rhanterium epapposum), is one of these later bloomers. Several important grazing grasses, including nuṣī (Stipagrostis plumosa), also fall into this group.

The party moved off slowly the following midmorning, stopping to top off their water bags with the rather muddy remnants of the last rain pool on the rocky Șummān beyond the edge of the sands. ‘All took the lead on a course a bit north of due east, with all looking forward to the rich ‘arrafj grazing that they would reach in about six days. On the way they hoped to water again at the deep wells of al-Lihābah before the Muṭayr tribe was settled in for the coming summer, filling the broad hollow with hundreds of tents and causing delays at the well mouths. In this they were successful, and they soon found themselves crossing alternating stretches of ‘arrafj shrublets and rimth saltbush. The camels were choosing to spend more time on the rimth after their long winter and spring salt-fast, although that bush was just beginning to revive from its winter dormancy. They enjoyed even richer saltbush fare three days later as they moved across the upper part of Wādī al-Miyāh and its scattered saline flats. A strong shamāl wind came up out of the north-northwest, and increasing dust in the air reduced visibility. This was not unexpected; it happened every year.

The strong northerly winds of early summer are a usual feature of eastern Arabia as a regional low pressure establishes itself over central Asia with counter-clockwise
circulation over the Gulf and its Arabian hinterland. These "shamāls" can blow for days or weeks on end (traditionally it is a 40-day event), leading to dusty skies and gritty conditions for both the Bedouins and townsfolk. Uncomfortable as it may be, it is considered preferable to the doldrum days that follow in mid and late summer, when winds fail completely or are replaced by southeasterly breezes off the southern Gulf. Oppressive humidity then creeps in and hangs over the Gulf coast for its infamous later summer period that, particularly for those without modern air-conditioning, is a strength-sapping and debilitating time. Our families' camping place at Nimrat Ithnēn is far enough inland to escape the worst of the late summer humidity, but it can still be very uncomfortable there from August to October.

From Wādī al-Miyāh it was on to the southeast, with the wind on their backs, into the tract known as ar-Radā‘īf, with its low rounded hills amid dense stands of ‘arfāj still blooming in yellow. Ar-Radā‘īf was crowded with other tents. The excellent grazing was sufficient for all, although good firewood was in short supply. ‘Alī cautioned the children to be careful, as desert animal life was now at its peak, and the sand viper and the scorpion were again abroad at night as well as the early and late daytime hours. The two families continued to move their light camps every day, but only short distances, taking a full week to work their way through ar-Radā‘īf. On the eighth day they smiled to find before them a wide sandy tract where ‘arfāj was supplanted by extensive stands of shrubby thmām grass and scattered ‘abal bushes, now with their hanging, fringed, red or yellow fruits, like Christmas tree decorations (of which our travelers had never heard). This marked the northern edge of al-Ḥabl, the familiar summer grazing ground adjoining their summer camp site at Nimrat Ithnēn. Three days later they were busy putting up their main tents again, with backs to the continuing wind, within easy reach of the now-familiar camel trough. It was not their tent site of the previous year, but another spot nearby where the sand was fresh and clean and a slight elevation gave a good view of the nearby countryside. Everyone had a good wash with the plentiful, naturally warm, deep well water. Except for the camel mothers with new calves, the herd would soon be given new freedom.
It is not unusual, in Bedouin practice, particularly with a herd that knows a particular area as "home," for the camels to be left largely unsupervised during the summer encampment. They wander the countryside on their own, never straying to great distance from the home well, coming in by themselves every two days or so for watering. The end of summer may thus require something of a "fall roundup," bringing the herd back together and under control, preparatory to the supervised move out again for the next season's winter and spring rounds of grazing.

One of the first things Miznah's mother did after the tent was set up for the summer was to visit her own mother and father, who were only about half a kilometer away. Her father and her husband's father were brothers. When she returned before evening she was carrying a heavy bundle. It was her hand loom, which she had left in safekeeping. On it, now rolled for easier carrying, was a half-finished strip of work that would become part of a new tent divider. She had told Miznah that she could start her own sāḥah this summer, and she had brought along a smaller loom for that project, which would involve a great deal of mother-daughter instruction. Such projects would help fill the long summer hours until things became busier again with next season's move in the fall.

First cousin marriages are common in Arabia, in fact are formally considered the norm. In practice it is far from an iron-clad rule, although frequent Bedouin marriages within the clan help maintain tribal solidarity. It also means that near relatives will often travel together and enhances family contacts and ties in the summer encampment. The hand loom used by this family was of the usual Bedouin horizontal type, with the warp stretched between wooden poles staked at each end in the sand in front of the family part of the tent, sometimes with the working end under the tent roof edge to provide shade for the weaver. The product is a truly woven piece, not the knotted type of carpeting.
produced by some tribes in Iran. It can be a *sāḥah*, a rug-like ground mat, or several strips that are joined together to form a tent divider. Narrower strips are produced to reinforce and decorate parts of the tent. A typical *sāḥah* is some 250 cm long by 120 cm wide, made of two 60-cm wide strips sewn together lengthwise. The pattern, almost invariably geometric and of traditional designs passed down in the families, often involves three or four colors, such as black, brown, white or off-white, and red. A skilled weaver produces work of almost machine-like neatness, giving careful attention to the tightness of the weft and using, traditionally, the hooked horn of a gazelle to pull up the threads when required.\(^1\) I was told that vegetable dyes were once used for yarns, but examples I saw were chemically colored with market-bought imported dyes.

All family members looked forward to the more frequent summer visits to the oasis town of al-Hufūf, with its colonnaded and shaded market stalls. Sālim and ‘Ali often encountered old friends there, and Miznah's mother hoped to get spousal approval to spend a few days at the open-air women's market, at the south end of the covered area, where she could sell some of this season's *igt* production and some excess balls of black wool yarn spun by her and the girls over the past few months. The pin money could be used for trinkets. This was also her favorite place to buy the few herbal remedies she kept in her personal chest in the tent. The sellers, she knew, were not "real doctors," but they always seemed to understand the symptoms she described. ‘Ali planned to visit the camel market of al-Hufūf to sell some of the remaining young male camels of the previous season, now more than a year old. Miznah's little brother, during his first visit to the oasis, marveled at the thick forests of date palms, which looked cool but a bit spooky compared to the open desert where he was growing up.

We leave our Bedouin friends here, with the herds still in near-peak condition and the camels grown in number -- the best possible beginning for the coming hard times of mid-

\(^1\) Such a tool has become in short supply since the near-extinction of the desert gazelle by the 1960s. They were still in use as hand-me-downs, however, and I was given an example by one Bedouin family.
and late summer when forage around *Nimrat Ithnēn* will diminish to slim pickings. The livestock will again lose weight. The hot weather will bring discomforts but also welcome social occasions, as fellow clan members visit tents pitched close together. All know that nearly three months will have to pass before they can again look to the south for the rise of *sihēl* and the making of plans for another round of desert grazing.
6. PLANT USES

6.1. Plants for Grazing

For the Bedouins of Arabia the quest for wild plants as livestock forage, defining as it does their very subsistence mode and ruling virtually all aspects of their annual cycle of movements and activities, obviously constitutes their most important use of desert plant life. During my data gathering I did not follow grazing field activities per se at length or in great detail but had occasions for field observations of many aspects of grazing practice. These, in general, confirmed descriptions of other observers (Musil 1928a; Cole 1975; Lancaster and Lancaster 1999).

My consultants classified their livestock in the following manner:

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ghanam (sheep and goats)
iban (sheep)
ma'az (goats)
dibash (all ruminant livestock)
ibu (camels)
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Fig. 6.1. Bedouin classification of livestock.

Bedouins that I worked with represented primarily camel herding groups. A few of them kept some sheep and goats when camped for longer periods near Dhahran for part-time
employment, while relatives in the hinterland cared for their camels. The favored breed of sheep in Eastern Saudi Arabia is the all-black, fat-tailed 'arabīyah (pl. 'urb), which was said to provide the best wool for tents and cloaks as well as milk for household use. It has a reputation for requiring less attention as it tends to wander less than other breeds. More common in commerce as a meat animal, even in the east, was the najīyah (pl. najad), black with white face, with less fat in the tail and with thinner wool. Another breed, the light-colored 'ūsīyah (pl. 'awasā) of southern Iraq, was seldom seen except in the far northern reaches near the Iraq border. Goats were of a long-eared variety with the straight black hair favored, along with wool, for use in the weaving of tent material. Such small household flocks of sheep and goats that I saw around the tents of some of my consultants were cared for largely by the children of the family under the direction of the mistress of the household. The area of their grazing was generally around the main camp area and seldom beyond sight range of the tent. Camels (dromedaries; the single-humped species), however, were by far the most important Bedouin grazing animal among my consultant groups.

6.1.1. The Camel

Sprenger (1891:361) called the Bedouin "a parasite of the camel," although a biologist today would no doubt prefer to describe the relationship as one of mutualism or symbiosis. Given the significance of the camel in the Bedouin economy and in many aspects of everyday life, one is tempted to postulate a Bedouin "camel complex" parallel to the African cattle complex of Herskovits (1926). Herskovits himself (ibid.: 644-649) suggested that the camel among some African groups outside the cattle regions carried some of the cultural attributes of the cow in his complex area. Possible earlier ritual
Plate 6.1. Camels watering at a drilled well along the Trans-Arabian Pipeline, northern Saudi Arabia.
aspects of a camel-based culture in Arabia have probably been suppressed by the 
overriding strictures of conservative Islam. I found numerous ceramic camel figurines 
among surface artifacts at the Hellenistic-Sassanian period archaeological site at Thāj in the 
Eastern Province of Saudi Arabia (Mandaville 1963:13). Musil (1928a:245), writing of 
the early twentieth century when northern Arabia was much less influenced by orthodox 
Islam than today, describes circumcision customs among the Ruwalah that involved the 
slaughter of a camel. Today camels, among other livestock, are still slaughtered annually 
on the occasion of ‘Īd al-Aḍḥā’ as part of the annual Muslim pilgrimage ceremonies. A 
consultant of the Āl Rāshid tribe told me that among his group, of the southern Rub’ al-
Khālī, a camel is slaughtered at a funeral feast by the relatives of the deceased and that a 
male camel calf is often killed for a feast at the birth of a boy.

Camel breeds and varieties in Arabia vary as much as horse breeds do in Western 
countries, ranging from coarse baggage types to high milk-yielding breeds and the fine-
featured, thoroughbred riding animals called ‘umāniyāt because they originated largely in 
the region of Oman or its hinterland in southeastern Arabia. The most common type in 
the herds of my consultant groups were the all-black or dark brown animals called 
mjāhīm (sing. majham). The name is basically a color term meaning "black," but it also 
identifies a recognized breed well known for its high milk production. Every tribesman 
knows the names of individual famous camels, and a number of tribal groups or families 
maintain special herds known by name throughout the country. The Muṭayr tribe of our 
north-central area kept a famous herd of black camels known as ash-shurf, or "the noble 
ones," until they were confiscated by King Ibn Sa‘ūd as a penalty for their rebellion 
against the royal family. The brother of one of my Āl Murrah consultants had in the early 
1960s been appointed keeper of the renowned herd of thoroughbred riding and racing 
camels belonging to the Governor of the Eastern Province, a member of the royal family.
This prize collection of animals, called *al-mingiyah*, "the selected ones," was the cream of the Governor's large herds and carried, in addition to his family brand, a special brand of two circles on the side of their necks. The possession of camels remains a mark of high prestige, and wealthier individuals often keep herds of hundreds, far beyond subsistence requirements.

Camels, usually, are slaughtered only on special occasions and those are almost invariably young male animals. There is some random slaughter or selling, also, of male calves to save milk for household use and to maintain the high female-to-male ratio favored for Bedouin herds. Camels were still being used for transport, both to carry goods and for tribal household movements, at the time of my earlier data collection in the 1960s. Such use has since been almost entirely displaced by motor vehicles. There was formerly also a large export trade in camels, carried out by members of the merchant gild known as *al-iggēl*, from northern and central Arabia to Syria and Egypt. According to an elder Shammarī consultant, the purchased herds were taken through Damascus or Palestine for resale to Egypt. By the time of the Arab-Israeli war in 1948 the markets were closed off, and by about 1955 the Kingdom had become a net importer of camels. Before intertribal conflicts were suppressed by the Saudi regime in the 1930s, thoroughbred riding camels were also an essential tool in long-distance raiding. There is still interest in high-bred animals for the sport of camel racing, which continues to be popular in Saudi Arabia and other Arab states of the Persian Gulf region.

In the main, however, it is for milk that the Bedouins keep camels, and camel milk has always been the traditional staple of their nutrition. The milk is used fresh, when it is termed *halīb*, or soured for longer keeping in the form called *laban*. *Laban* is made by pouring the fresh milk into a sheep or goatskin bag kept for the purpose and which maintains the inoculant required for controlled souring. Some plants on which camels
graze tend to scent or flavor their milk. I found that the highly fragrant cruciferous annual *khzāmah* (*Horwoodia dicksoniae*) lent a discernible perfume to the milk of camels grazing on it among spring annuals. The dune land perennial *‘ādhīr* (*Artemisia monosperma*) is said also to lend a slight aromatic quality to milk. The milk of camels grazing on saltbushes seems to develop a slight flavor reminiscent of the smell of crushed chenopods. A Hājīrī consultant advised that camels are fond of the thistle *Centaurea pseudosinaica* but that this plant taints the milk with bitterness (the plant's vernacular name, *mrār*, is derived from the word for "bitter," *murr*). According to a Marrī Bedouin, a plant called *khimkhim* gives the strongest scent, "not very good," to camels' breath and milk. I was not at the time able to identify the species botanically with certainty, but there are good reasons to think it refers to the crucifer *Matthiola longipetala* and the very similar *M. arabica* (see entry *shgārah* in the generic list, Chapter 10).

The only other milk processing method used is the preparation of *igt*, which is made by boiling soured milk until the water content is almost entirely evaporated and it thickens into a heavy paste. It is then formed by hand into flat-bottomed cakes 8-10 cm in diameter and about 1.5 cm thick, each bearing across the top three parallel grooves made by the longitudinal pressure of the fingers of the maker. These cakes are dried in the sun, sometimes laid out on top of the tent roof, until they harden. They will then keep up to a year and can be nibbled as they are or crushed up with water to form a sort of reconstituted milk. Wild plant materials are sometimes added to the *igt* during preparation (section 6.3.7). Camel milk is low in separable fat, but a form of butter called *jbāb*, generally considered inferior to that from sheep or goat milk, is sometimes made from it. A greasy oil called *widak* can be rendered from the camel's hump on the rare occasions that the animals are slaughtered. This can be used in food or for application to leather as a softener and preservative.
Other camel products include the hair (generally called wabar, "fur") and leather from the hides. Camel hair, along with goat hair and wool, is used in making siyāh (sing. sāḥah), the decorative woven rugs made by the women, and for the woven divider curtains (arwigāh) of the tent. Camel hair is considered to be too weak for making the roof and main side curtains of the tent, and goat hair is used for those parts. Camel leather, now generally made by craftsmen in the towns from purchased hides, is used to make the large bags called 'iyāh (sing. 'aybah) for carrying family property when on the move. It is also used in making the portable troughs (ḥūd, pl. ḥūdān) used in watering livestock, the leather bucket (dalū, pl. dalī) used in drawing water from wells, and for a kind of skin bag for water called mzādah (pl. mzād), larger than the more common type made from goat skins.

Camel dung, jallah, is collected when dry and used for cooking fuel when the family is camping in country with little perennial vegetation or in areas where shrublets have weak, fast burning stems that do not form good coals. Dried jallah is also pounded up into a powder and used to make diaper packs for babies (Dickson 1951:179). Camel urine (that from the females is always preferred) may be caught in bowls and used as a hair wash said to make the hair shiny and rid the scalp of vermin. I once saw one of my consultants run up behind one of his female camels and catch a double handful of fresh urine which he used as an immediate mouthwash, saying this was good "to make the mouth clean." Camel urine was also used to bathe new-born infants (Musil 1928a:243). In dire emergency, when a Bedouin finds himself with empty water bags and in danger of dying of thirst, he may sacrifice a camel and drink the semi-liquid contents of its rumen after filtering through cloth. A consultant of the Qaḥṭān tribe told me that it is also possible to induce a camel to vomit the contents of its rumen and thus obtain liquid without killing the animal.
The physiology of the camel is remarkable in several ways. Its power to go long periods without drinking is due not to any special ability to store excess water in the body but rather to economy in its use. The camel sweats less than other ruminants and thus expends less water for cooling. It can do this by virtue of its tolerance for high body temperature. Schmidt-Nielsen (1964) found that the camel's body temperature goes through wide diurnal swings, rising as high as 40.7° C during the day and falling to 34° to 35° C during the night as the previous day's heat load is shed to the cooler environment. The camel can also tolerate great water loss, to at least 27 percent of its body weight, while 12-14 percent loss is fatal for most other mammals (ibid.). The camel's kidney can produce urine considerably more concentrated than sea water (ibid.), and it thus can drink water of high salinity. I have notes of camels in the Rub' al-Khali drinking readily from an oil company-drilled water well with a measured total dissolved solids of 10,900 mg/l. I have also seen camels drinking sea water on the Persian Gulf coast near Dammam, where the salinity was at least 38 and probably above 40 per mille [40,000 mg/l] (Basson et al. 1977). This faculty is extremely valuable to the Bedouins, who are able to drink the milk of their camels even when traveling in country where the wells are far too saline for human use. The lactating camel thus becomes the equivalent of a walking and self-fueling deionization apparatus. Camel milk may also be mixed with well water of salinity above human tolerance to make a mixture called shanin, in which the salts are diluted to a drinkable level.

The drinking volume requirements of the camel range between wide extremes. In the hottest season of the year, she must be watered at least every 2-4 days. On the other hand, when good spring rains have come and the desert is covered with lush annual vegetation, she can go entirely without drinking for weeks or even two months, deriving all her water needs from the fresh herbage. This latter situation is call the jazū, and
camels going thus without free water are said to be majziyah. Under such conditions the grazing ranges of camels are greatly extended, often into areas entirely without sources of free water.

There appears to be no evidence that the nutritional requirements of camels are much different from those of other animals, with the exception of one important mineral: camels require between 6 and 8 times the amount of common salt considered adequate for other livestock (Wilson 1984:109). The camel veterinarian Leese [ca. 1927] recommended a salt supplement of 1.5 to 2.0 oz apoth. (45-60 grams) per day for camels not on saltbush grazing, but Wilson (1984) quotes evidence that the actual need from all sources is in the range of 120-140 g per day. My Bedouin consultants were all well aware of their camels' physiological requirements for salt, and some of their grazing practices are aimed specifically at meeting it. A Rāshidi consultant told me that if camels in the Rub‘ al-Khāli go as much as a full year without saltbush grazing they become afflicted with a condition called ḥalas or ḥiṣṣah. They become weak and thin and have a tendency to eat bones and carrion. Inasmuch as bone material is not rich in salt, it is perhaps rather a lack of other minerals such as calcium, phosphorus or other trace elements that leads to this behavior (cf. Gauthier-Pilters 1961:213) and the acquisition of these, too, may be an advantage of saltbush grazing. Lack of salt in camels is also associated with the development of contagious necrosis of the skin (a bacterial disease) and arthritis. On the basis of experimental treatments in British Somaliland, the veterinarian Peck (1939) recommended a normal daily salt ration of 5 oz (150 g) to prevent both of these conditions. I was told that Bedouins may occasionally dig salt for their camels from natural salt flats (sbākh, sing. sbakhah) which are not uncommon in some parts of the study area, particularly near the coast. This is an infrequent practice, however, and camels much more commonly obtain their salt requirements from two
sources: grazing on saltbushes (I use the term "saltbush" for all subshrubs of the family Chenopodiaceae) and the consumption of saline well water. Good stands of saltbush grazing can be found in most parts of the study area, with some genera such as *Haloxylon* leading well-defined communities extending over thousands of square kilometers. Herdsmen are careful to take their camels to such areas for several months of the year. An appreciation of the camel's requirement for salt and the grazing practices to meet it are essential, as I shall explain in Chapter 9, to an understanding of the Bedouins' classification of plants above the folk generic level.

The number of camels required to meet basic family needs is some 15-20 animals (Lancaster and Lancaster 1999:235, who point out that such a figure can be only theoretical because few if any pastoral societies live in a purely subsistence economy), but the majority of Bedouin households have larger herds. Cole's (1975:36) reckoning of an average herd size of 40-75 adult females among his Āl Murrah group jibes well with my own observations, although his number of 20-25 for the male riding and baggage camels appears quite high. It is my impression that male camels are used for transport not because of any greater strength they might have but rather to spare the more valuable females from work; it would in any case be inconvenient to use females with young for baggage work. The number of male baggage camels kept has no doubt decreased with the increased use of motor vehicles for transport. Female camels, particularly those with young, are usually managed in groups separate from the males because of their special needs or to avoid undesired interaction.

6.1.2. Grazing Practice

The choice of what general grazing area is to be exploited, i.e. where the camping unit is placed geographically, is made by the herd owner on the basis of any particular needs his
herd might have and after careful intelligence gathering as to the state of the vegetation and rainfall in various parts of the country. Such information is obtained from kinsmen and travelers as part of the intense daily social interaction always taking place in the tents, and sometimes from reports of scouts sent out by clan groups specifically to assess range conditions. Grazing, in general, is called riṭ, and the active participle, rāṭ, is a common noun meaning basically "herdsman" but often used in an extended sense for anyone "in charge of" or "taking care of" something. (Someone who makes a business of repairing punctured automobile tires in a small village will thus be referred to as rāṭ al-banshar, from the English word "puncture"). My consultants also used a verb falā (3rd pers. sing. perf.) for "to graze," from which is derived mafālā (pl. mafāli), a noun of place meaning "grazing ground." An intransitive form of this root, istafālā (3rd pers. sing. perf.) means "to graze" (livestock) while another form, mafāliyah (fem.) is an active participle, "grazing."

The grazing day begins soon after sunrise, as the camels couched near the tents are untied, roused and, if required, formed into separate grazing groups. The herdsman drives out (yisrah or yisarrah, 3rd pers. sing. imperf. "to take to graze") the camels, often riding one of them with the others in front and singing a herding song to encourage them on. He dismounts in the middle of the chosen area and watches the herd. Grazing may continue throughout the daylight hours in cool weather but is usually interrupted spontaneously by a rest period during the hotter middle of the day when the weather is warm or hot. During this time the animals adopt a couched position with (as described by Gauthier-Pilters 1961) their heads always facing the sun, a posture explained by Schmidt-Nielsen (1964) as a means of minimizing areal exposure to the sun and the consequent heat load. During this time, which is shorter or longer depending on seasonal temperatures, the animals chew their cuds. Grazing is afterwards resumed until near
sunset, when the animals are driven back to the tents by the herdsman. The udders of the lactating cows are often covered during grazing with a loosely woven or knotted yam mat, with ties at each corner, called a shmālah. This "brassiere" temporarily prevents the calves from nursing and conserves milk for household use. After being taken back to the tents in the evening, the females in milk have these udder covers removed and are milked, usually by the men folk. The calves (ḥirān, sing. hwār) also have a turn. The animals are then bedded down, usually quite near the tents and with their forelegs tied in folded position to prevent rising. The camels chew their cuds while bedded down, and the Bedouin night is regularly punctuated by the various loud growlings, rumbles and belches of ruminant digestion.

In midsummer, when the herd owners are camped continually near the water wells that usually lay at the heart of their home tribal territory, or dirah, the herd is often managed quite differently. At this time the camels may in effect be left on their own in the country surrounding the wells and not supervised or brought to the tents at all. The camels must make do with the sparse, dry forage they can find in an area that is always overgrazed. They come in on their own every 1-3 days for water, then go out again. At this time of greatest heat they often prefer to graze at night, particularly when there is good moonlight. Camels become quite attached to their home wells and usually do not wander beyond fairly easy reach of them. Problems sometimes arise, however, with camels recently purchased from a distant area, and such animals may try to return "home" on their own over distances of hundreds of kilometers. Feeding and watering tends to establish a base to which the camel becomes attached, and I was told that feeding dry dates, particularly, creates a tie to the feeding location. During this difficult summer period the herds often lost condition and weight and became very thin by the time the autumn move got under way. In more recent years camel owners have adopted the
practice of providing Government subsidized commercial feed, such as sacked barley, to their herds during the summer.

The camel is both a browser and a grazer, grasping tufts of grass or bunches of leaves and shoots with its prehensile lips, usually moving continually. Gaulthier-Pillets (1961, 1981) emphasizes that the camel by nature forages in a manner that avoids overgrazing, taking few bites from the distal parts of each shrublet and avoiding taking entire plants except sometimes in the case of annuals. This is true, but I have seen areas seriously denuded by camels where herd pressures obviously exceeded the carrying capacity of the land.

It is not usual for Bedouins to cut and collect wild plants by hand (yihashshün, 3rd pers. pl. imperf.) for camel feeding, but they say they do this under certain conditions, for example, in caring for a sick camel that cannot go out and graze. Probably the most common plant so cut is the grass, nuṣṭ (Stipagrostis plumosa), but broad-leaved plants such as ʻarfaj (Rhanterium epapposum) may also be collected and used in the same way. The tool used is a largish common knife or a small curved steel knife with filed serrations on the edge and a wooden handle, made by blacksmiths in the towns and called a mahashsh. I have seen fodder cutters in the Ḥijāz carrying in loads of cut Stipagrostis, the grass all woven neatly into long braids, for use or sale in the town. My consultants said that the only plant too spiny for the camel to eat was the kidād shrublet (Astragalus spinosus), a strong range increaser usually marking severely overgrazed land. In times of great drought the Bedouins may be reduced to collecting these bushes and burning off the spines (yishawwataṭun, 3rd pers. pl. imperf.) to provide some fodder for their animals. A Shammarī Bedouin used the collective term ‘alig for cultivated fodder, such as barley or dried dates, sometimes given to camels. Bedouins from the more southern part of our area, Bani Ḥājir and Āl Murrah, said they did not use that term.
For quantitative data on camel grazing we are greatly indebted to Gauthier-Pilters (1961, 1965, 1981) for her collection and analysis of camel grazing records in the western and northwestern Sahara. This is all the more valuable in that the environment and plant communities there are directly analogous to conditions in the central and southern parts of our study area. Many of the plant species she cites, in fact, are identical to those in our area. This work involved the monitoring of 150 normally grazing camels for a total of 500 hours, sometimes observing a single individual eight hours at a time. The study showed that in most pastures the camels consumed 10-20 kg fresh weight, corresponding generally to 5-10 kg dry matter, of plant material per day. When grazing on the most succulent plants, halophytes or spring annuals with a water content of up to 80 percent, the camels ate 30-40 kg green weight, corresponding to 8-12 kg dry matter. Some individuals were found to do well for several months on a daily intake of 5 kg dry weight of the grass *Aristida pungens*, found in the western Saharan dune lands (Gauthier-Pilters and Dagg 1981). This grass is closely related to the *Stipagrostis draria* of sands in our study area.

Bedouin herdsmen, because of the camel's special needs for salt, are always strongly concerned about achieving the proper balance in grazing between the plants known as **hamδ** (the saltbushes), and **khilla**, non-saltbush grazing. Bedouins make the analogy: "**hamδ** is to camels what meat is to men, while **khilla** for them is like our bread." As one consultant explained: "Camels can live on **hamδ** alone almost indefinitely if they have enough water [saltbush grazing always increases water consumption], but on **khilla** alone they eventually lose vigor and weight and get sick." A Bedouin describing a desert water well to another may say that the well is **gābiδ al-** **hamδ** or **gābiδ al-khilla**. "grasping the **hamδ** or the **khilla**, conveying the important information that those plant types are dominant in the area, or within easy reach of that
water source. Good grazing land with **hamd** is said to be **msās** (or among northern tribes such as ar-Ruwalah, **marī**); the opposite, land without the necessary **hamd**, is said to be **wkhām**. The two opposing terms, while apparently linked in most of my consultants' minds with the groups of plants called **hamd** and their opposite, **khilla**h, are also used more loosely in the sense of "good" and "bad" grazing areas, respectively. Always ranked among the best **hamd** species are **dumrān** (**Traganum nudatum** Del.), **rimth** (**Haloxylon salicornicum** (Moq.) Bge.) and, in the north, **rūth** (**Salsola vermiculata** L.).

The importance of **rūth** to the northern tribes is suggested by a folk anecdote that relates how a Ruwalah tribesman, upon death, asked his heavenly judge whether **rūth** was to be found in paradise. When told that it was not, he replied that in that case, he would simply prefer to go elsewhere (Mandaville 1990). A tract of land with good **hamd** grazing is called an **'afjah** (pl. **'ifjah**), a term that usually implies the presence of a variety of saltbush species. Some saltbush species, however, are considered to be of little worth. These comprise the stands of extremely succulent chenopods found around the lowest zones of salt flats, often near the sea but sometimes inland. These, referred to collectively as **tahāmīj** (sing. **tihmāj**) by a consultant of Banī Hājir, include **khirrayz** (**Halopeplis perfoliata**), **thillēth** (**Arthrocnemum macrostachyum**), **suwwād** (**Suaeda vermiculata**), and **shinān** (**Seidlitzia rosmarinus**). Camels that graze on such obligate halophytes are said to scour excessively, dehydrate and to gain little in nutrition.

Grazing land in dry, poor condition (or the time of such condition) is called **maḥl** or **dahr**, "drought." An area of dead plants caused by drought is referred to as **malas**, "barrenness." The other extreme, where grazing is at its very best, is called **rbī**. This is the word used in modern written Arabic and non-Bedouin spoken dialects to mean "spring" (the season of the year). Among the Bedouins, however, it is a pasture condition term denoting only the time of lush grazing when bushes are not only in leaf but
are surrounded by a rich cover of the short-lived desert annuals known collectively as 'ishb. When grazing on such vegetation, the camels can go entirely without drinking. Such conditions, when they occur, invariably do so in the spring season, yet there are spring seasons (in fact the majority) where rains have not been copious enough to produce a rabī' at all (mā jāna rabī' has-sanah, "we didn't get a rabī' this year").

Apart from the "saltbush question," herdsmen are also conscious of the results, for camel nutrition, of grazing on different combinations of other dominant plants. This seems to be of special concern in country, such as the Rub' al-Khāli, where the number of grazing species is very limited, thus offering a more restricted range of nutrients. Thus a consultant of Āl Rāshid described a sometimes fatal disease of camels called giswār caused by long pasturage on the saltbush ḥādh (Cornulaca arabica) together with a non-saltbush perennial, zahr (Tribulus arabis). Grazing on zahr alone may cause a loss of condition called zahr ḥamrā', while zahr with harm (Zygophyllum mandavillei) or with 'andab (Cyperus conglomeratus) are considered healthy combinations. A Bedouin of Āl Murrah, speaking also of the Rub' al-Khâlî, said that a specific name, musšēkh, is given to an especially good grazing combination comprising the grass sabat (Stipagrostis drarii), the sedge 'andab (Cyperus conglomeratus) and a boraginaceous perennial, ḥalam (Moltkiopsis ciliata).

The growth stage of grazing plants, also, is considered an important factor in their usefulness at any given time. New young growth on perennials, called hshēyish (from hshīsh, "soft, tender") is, as would be expected, said to be good grazing. When the ḥādh saltbush of the Rub' al-Khâlî (Cornulaca arabica) is in its flowering stage (its flowers are apetalous but the yellow anthers are visible in the distal stem joints) it is said by Āl Murrah and Āl Râshid Bedouins to be wâris or mwarras and better for camels than when without flowers. It is even better in the succeeding stage, called jādir, when the young
fruits are forming. After the seeds have fallen, it is called *mraykhī* (a name likening it to the *markh* bush, *Leptadenia pyrotechnica*, which usually appears virtually leafless and smooth), and it is then said to be of less grazing value. My consultants also volunteered a number of specific "growth-stage names" for important grazing plants that everyone knew in addition to their more common, general-purpose names. I believe these names exist (and they are specifically applied names, not just adjectives) because of their usefulness in conveying information about range condition; they will be discussed more fully in section 9.7.

Rainfall in the desert tends, at least in the spring season, to be very spotty, often resulting in isolated areas of good grazing surrounded by dry vegetation that is of little use. A consultant of Āl Murrah described such good grazing patches as a *rug‘ah* (pl. *rigār*) if it were large and rounded, as a *faţkhah* (pl. *faţkhat*) if smaller and irregular or as a *khafītah* (pl. *khṭāyiit*) if narrow and elongated.

6.1.3. Important Pasture Communities

Different plant communities in our study area of course provide various qualities and quantities of grazing resources. Certainly one of the best is what I have called *‘arfaj* shrubland (Mandaville 1990), dominated by the composite shrublet *Rhanterium epapposum* (*‘arfaj*) and found on well-drained sandy soils overlying limestone in the northern plains of our area. A quantitative analysis of a stand, one probably of above-average productivity, is provided in section 2.3 (above). *Rhanterium*, *‘arfaj*, is considered to be one of the best kinds of *khillah* (non-saltbush) grazing, and it is especially valuable when accompanied by annual plants following good rains.

An important saltbush grazing community is *rimth* saltbush shrubland, often consisting of extensive pure stands of *Haloxylon salicornicum* (*rimth*) but sometimes
mixed with other chenopods. Some quantitative data for a representative stand are provided in section 2.3 (above). *Haloxylon* provides saltbush grazing essential for maintaining the health of camel herds. The prominence of *Plantago boissieri* among the annuals of both the *Rhanterium* and *Haloxylon* communities is noteworthy. This *Plantago* species, known to the Bedouin herdsman as ribl, or yanam, is in our study area probably the single most important contributor to biomass among the annuals and is consumed in great quantities by livestock whenever annual rains are copious enough to lead to its germination and growth.

A third important grazing community is thmām grass-shrubland, (Mandaville 1990) led by the perennial, semi-woody based tussock grass *Panicum turgidum*, thmām, and characteristic of our central coastal lowlands. This community is well-known in Africa as well as parts of Arabia for its grazing potential. Gauthier-Pilters and Dagg (1981:48) found it among the most productive extended pastures of the western Sahara, where it exhibited cover on the order of 8 percent and a yield of some 1,400 kg and 800 kg fresh and dry weight per hectare, respectively. This was in a rainfall regime of 50-100 mm/yr, very similar to our study area.

The governor of Saudi Arabia’s Eastern Province for many years maintained for his personal camel herds a private grazing preserve, himā, in an extensive *Panicum* area called al-Ḥabl, centered about 75 km inland from ad-Dammām. This area is considered a prime pasture area by the Bedouins because the thmām provides excellent grazing both when green and as standing hay. It is accompanied here by the woody shrub, *Calligonum comosum*, ‘abl, which is not only grazed but provides excellent firewood for the tent camps (*Panicum* is nearly useless as a fuel). The area also has good saltbush stands a few kilometers to the south, and water is available from several good wells at
moderate depths. All these factors combine to provide a good example of what the 
Bedouins consider a near-ideal grazing area.

Along the central Gulf coast in Tārūt Bay camels are occasionally seen to walk out 
into the intertidal zone and graze on gurm (the mangrove, *Avicennia marina*). A 
Bedouin of the coastal tribe of Banī Khālid told me that such grazing *yisamman al-bil 
wal-ghanam* ("fattens the camels and the sheep"). A consultant of Bani Hājir (also a 
camel owner in the coastal area) demurred, saying mangrove was actually not very good 
grazing.

Many of my consultants agreed that certain plants were especially liked by camels, 
and some of these are identical with, or very closely related to, camel-preferred species 
listed by Gaulthiers-Pilters in the western Sahara. Among the dozen or so common 
saltbushes, *ḏumrān* (*Traganum nudatum*) is often mentioned as being strongly sought 
after by camels. On several occasions I was told that *ḥazzā* (Deverra triradiata) was 
also a favorite, indicating a camel line penchant for an aromatic umbellifer. According to 
Āl Murrah consultants, milk camels have a great fondness for *kari* (*Heliotropium 
digynum*) and camels in general seek out *msēkah* (*Haplophyllum tuberculatum*). They 
are said to be able to locate the last by smell (which is strong and unpleasant to the human 
nose) from considerable distance.

On at least one occasion I heard Bedouins describe some plants as *ḥārr* ("hot"), 
saying they were not very good grazing. A specific example was the shrublet *ʿalğā 
(Dipterygium glaucum*) which was said to be "hot" and not very good fodder, like 
*jathjāth* (another perennial, *Pulicaria undulata*). *Dipterygium* does in fact have a rather 
mustardy taste.
6.1.4. Toxic Plants

Toxic plants are a minor problem for camel herders in eastern Arabia, as camels tend to naturally avoid those that are dangerous. Plants pointed out to me as poisonous or dangerous to livestock were:

*shajrat ad-dābb* ("snake bush"), *‘ishrig* (a senna, *Cassia obovata*). This is a low, bushy legume found occasionally on heavier silt soils.

*‘ushar* (*Calotropis procera*). A milkweed family perennial of near-tree stature found around the edges of towns and sometimes on inland shallow sands and *wādīs*. An elder Qaḥṭānī consultant said this plant, although avoided by camels, is sometimes eaten by sheep or goats without ill effect.

*libnah, ḥillab* (both names derived from words referring to milk, which the sap resembles (*Euphorbia granulata*). This is a prostrate euphorbia not uncommon on disturbed ground and on the floors of some inland *wādīs*. Dickson (1955:42-43) reported two other euphorbias from the Kuwait area which are said to be poisonous: *ghazālah* (*Euphorbia retusa*, for which I recorded the name ‘*īdat al-ḥāyish*’) and *Euphorbia* sp. cf. *hieroglyphica*. At least the former occurs in our territory.

*jār* (unidentified). Described by a Qaḥṭānī consultant as a "plant with white milk, avoided by camels. If they should eat it they would die." Said to have strongly green leaves "like a fig tree." A plant that apparently does not grow in our study area but which might be found in Qaḥṭān territory in western Arabia where there is a greater admixture of the African flora.
**hanwah** ("crookweed," referring to the curved achene of this wild marigold, *Calendula tripterocarpa*). Bedouins of Bani Hajar and other tribes say this plant is injurious to camels when grazed in any quantity, leading to bloat and other disorders.

**nifl, shmaṭrî** (*Trigonella stellata*). This fragrant annual legume, while not considered poisonous, is said to sometimes cause bloat in livestock. *Trigonella anguina* is known by the same names and may also be implicated in this problem.

Dickson (1951:418) reported a herdsman’s belief that overgrazing on **thilīṭḥ**, the salt marsh succulent *Halocnemum strobilaceum* (Chenopodiaceae), could cause a lung disease in camels.

The **oleander** (*Nerium oleander*) is strongly toxic to the camel as to most other mammals (Leese 1927; Gauthiers-Pilters and Dagg 1981). Within our study area it occurs only around towns and the oases and is unlikely to pose a threat to desert grazing camels. An oasis dweller gave me the name **ward kadhdhdb** ("false rose," literally "liar rose") for the plant.

Other plants which camels are said to avoid although they are not described as strongly poisonous are:

**hārmal** (*Rhazya stricta*). An inland desert shrublet, a medicinal, of the same family as the oleander (Apocynaceae) and somewhat resembling it, sometimes forming pure stands. It is generally acknowledged to be somewhat toxic but not really dangerous as camels avoid it.
shārī, ħanḍāl (Citrullus colocynthis, the colocynth gourd). This creeper of silty wāḍī bottoms is said to be avoided by camels but to be eaten sometimes by sheep, goats and donkeys.

jathjāḥ (Pulicaria undulata). A composite shrublet somewhat resembling the highly palatable Rhanterium epapposum. Found on inland silt basins.

kirrāth, kirrēth (Allium sphaerocephalum). Camels are said to avoid this strong tasting wild onion.

‘inṣēl (Gynandriris sisyrinchium). Dickson (1955) notes that in the Kuwait area this wild iris is considered bitter and seldom grazed by livestock.

barwag, bērag (Asphodelus tenuifolius). Āl Murrah consultants say livestock generally avoid this asphodel, common around disturbed ground such as abandoned desert campsites.

sāf, also called sakhar, idhkhir (Cymbopogon commutatus). This fragrant grass, discussed as a medicinal in section 6.4, was said by a consultant of ad-Dawāsir to be generally avoided by camels.

Some plants present mechanical problems to livestock. For example, the annual grass šam‘ (literally: "sharp grass," Stipa capensis) is considered noxious when its long, sharp awns have fully formed and dried, when they may penetrate the mouth parts of grazing animals. When the grass is young and green, and after the awns have fallen, it may be grazed safely. The succulent-leaved bush, harm (Zygophyllum qatarense, Z. mandavillei) was said to have rather indigestible stems that are liable to cause puncture or obstruction (the last called ‘ikām by a consultant of Āl Rāshid) to the intestinal tract
leading to death. Not all camels will graze on this plant; those that do so are sometimes referred to as hwārīm (sing. hārimah, grammatically an active participle derived from the plant name). A viscid annual, tirbah (Silene villosa) is often covered with adherent sand and can cause sand colic in sheep that graze on it heavily. The same name, which is derived from the word for earth or dust (tarb, trāb) is applied to another plant that tends to be covered with sand: the dwarf annual composite, Ifloga spicata.

6.2. Fuel and Fire making

Next to grazing for livestock, the collection of firewood, ḥaṭab, is the most important use the Bedouins make of plants. True, in recent decades utility has begun to reign on the women's, or family, side of the tent, where cooking may now be done on low, cast iron burners fed by bottled petroleum gas obtained in the town. On the men's, or guest side of the divider, however, only a traditional fire using ḥaṭab is still considered proper for the brewing of coffee and tea and the general entertainment of guests. Until about 1960, even some traditional houses in the towns maintained a small, wood burning coffee hearth in the majlis, or men's room, which had some means of venting smoke to the outside.

It should be noted at the outset that the Western notion of "firewood," that is, a neat stack of cut and split sections of tree trunks and limbs, is unknown to the Bedouins. Tree forms being virtually absent in the natural vegetation of eastern and northern Arabia, the Bedouin depends entirely on bushes and shrubs for fuel. A Bedouin tent normally has a large, irregular pile of shrublets against its side, just to one side of the men's section, where it often serves also as a windbreak for both man and livestock. The stack is often replenished from its back, while immediate fuel needs are taken from its front. This allows a certain amount of drying to take place, reinforced by the nearby fire, of bushes that are sometimes collected rather green. The arrival of an unexpected guest usually
results in an immediate cry of *jīb ḥatabl*, "bring firewood!", often responded to by a younger son of the family bringing additional branches to the shallow fire pit, which is kept banked or smoldering at all times. Small pieces, then larger ones, are piled on, and the old coals are fanned until the new fuel bursts into flame. When good, woody chunks of favored shrubs like *ʻabal* or *ghaddā* are at hand, they can be put directly on the fire after some preliminary breaking. Often, however, smaller shrublets have to be used whole, and these have to be crushed down, usually by foot, to increase their density; otherwise they will not burn completely.

Different kinds of firewood are valued, as might be expected, roughly in proportion to the amount of heavy woody material that they can provide. The larger, woody shrubs are thus always chosen, if available. Thin-branched bushes are burned only if nothing else is at hand or to act as kindling for the starting of a camel dung (*jallah*) fire. Camel dung is not usually used if good fuel shrubs are available. Being composed of compressed bits of finely divided plant material, like the charcoal briquettes of the American barbecue, dung has some of the burning characteristics of briquettes (including the formation of coals). It is smoky and smelly when first started however, and does not produce light at night in the form of cheery flames. Providing light at night for the entertainment of guests, story telling and other social functions is another function of the *majlis* fire. In the 1960s my Bedouin hosts also usually had a kerosene lantern or two at hand, and also a battery flashlight (called by my friends of Āl Murrah a "*bajli*," a term which I can interpret only as a twist on the English word, "battery").

The collection of firewood is considered women's and children's work, although men will pitch in to meet special needs. The portion of a shrub favored for firewood use is that part called the *jirm* (pl. *jrūm*), the root crown at the base of the bush that includes parts of the larger roots as well as the bases of larger branches. The term *jirm*, in fact,
seems to be used only in connection with firewood; another name is used for that part of
the shrub in general purpose anatomical nomenclature. The shrub, or its base if it is dead,
may simply be pulled out of the sandy ground with the hands. Either of two tools usually
found at any Bedouin tent may also be used. One is a short-handled hoe, called a

*mishāh*, used to grub out the bases of shrubs (and for other purposes, such as digging
drainage channels around the tent when it rains heavily). The other, called by some
groups a *fārā‘*, is a mattock-like, double-headed implement with a wooden handle less
than a meter long; the iron head is a light ax, and this is opposed by a narrow-bladed hoe
or chopper with blade at right angles to that of the ax. I have rarely seen the ax end used
for chopping, although a woody branch may be struck simply to break it. More usually
the other end is used like the hoe to dig out the woody bases of shrubs or as a hook to
extend one’s reach. Fuel gathering is easiest when the collector happens to be in an area
where the bushes have died as a result of local drought, but recently enough that the shrub
bases have not yet decayed or become riddled with termites. The bases then pull out
easily and are almost entirely burnable fuel without green leaves.

The availability of firewood is always a factor in the choice of camp sites, but
there are times when the spotty distribution of spring annuals or special grazing needs
require camping in areas without good fuel. In such cases, and especially when the
family is moving by truck as is now usually the case, stops are made during travel to the
new site to pull up good firewood and pile it on top of the household load. Additional
loads can be picked up along the way on trips to town, or special trips for wood gathering
can later be made from the camp.

The favored firewood shrubs in northeastern Arabia are *‘abal* (called *arțā* in the
farther north) and *ghaḍā*, both good sized shrubs with bases, roots and lower branches of
Plate 6.2. Consultant ʿAli ibn Ḥamad of the Ghayāthin section of Āl Murrah makes coffee using dried camel dung for fuel. The thin-stemmed perennials at this site, background, provided little more than fine kindling. He grinds the roasted coffee beans with a brass mortar and pestle.
fairly heavy wood. The first, ‘abal, is the polygonaceous Calligonum comosum, which has a similar counterpart of the same Arabic name and use in the Rub' al-Khali sands, Calligonum crinitum subsp. arabicum. Calligonum is often particularly useful because it may be found scattered in plant communities otherwise dominated by perennials of high grazing value but which are poor firewood, such as the thmām tussock grass (Panicum turgidum) and ‘arfaj, (the composite, Rhanterium epapposum). In large parts of the Rub' al-Khali, Calligonum is virtually the only woody plant available at all. The large woody saltbush sometimes reaching almost tree stature, ghaḍā (Haloxylon persicum), is always chosen for firewood when available, but it does not have a very widespread distribution and is found only in certain deep and mobile sand environments where good grazing is often not available. It burns long with a clear flame and little smoke, and is used particularly in parts of the northern Rub' al-Khali and in the Great Nafūd and adjoining sands of northern Arabia.

Nearly any of the other saltbushes, except some very succulent species found around salt flats and other saline grounds, are considered fairly good firewood. Rimth (Haloxylon salicornicum) is often used when Bedouins camp in the extensive grazing lands dominated by this shrub.

Some bushes are generally avoided for firewood use. An example is harm (Zygophyllum mandavillei and Z. qatarenae), which has highly succulent leaves and small, weak branches and stems. It is considered virtually useless as ḥataḥ. The tussock grass thmām (Panicum turgidum) bears little material that is solid wood and when dry burns too quickly for practical use, but its culms are used as kindling to start fires of better wood or of camel dung. The ‘arfaj shrublet (Rhanterium epapposum) dominates thousands of square kilometers of good grazing land, but its stems are weak and thin. When green it produces thick clouds of smoke and when dry it burns too quickly for
cooking or even for persistent light. Like thmām, it is used when dry as kindling to start fires of better ḥaqāb or of dung. Dickson (1955) speaks of the use of ʿarfāj as firewood in Kuwait, both by Bedouins and in the town, and reports the denuding of the country around Kuwait town by this use. I think this was only because no better shrubs were within easy reach. Excessive use is easy to understand, for it takes great quantities of ʿarfāj shrublets, which burn like tinder when dry, to maintain a useful fire.

Fires are also used by the Bedouins as signals. Once while hunting hares on the northern plains on a cloudy and rainy night with friends of Āl Murrah, after continuous zigzagging in the car after our quarry, and with no stars in view, even my guide lost the precise direction of the home tent. He directed me to a raised piece of ground and built a quick big fire of rimth bushes. As I remember he did not even pull the shrubs out of the ground, but just stamped each one down to compact it and lit several in place. Our light was seen by people at the tent several miles away, and they responded by building a fire beacon for our easy return.

Before the use of matches in Arabia, certain plants were also used as tinders in the starting of fires, which was generally accomplished with flint and steel. In the 1960s one of my consultants of Āl Rashid, of the southern Rubʿ al-Khali, still had a flint and steel set (the steel being a triangular shaped implement called a zmad) that he gave me as a gift and taught me to use by catching the spark in a wad of charred cotton wool or cotton cloth. Several other tinders were commonly used in earlier times. Use of the fine, silky hair tufts on the seeds of the markh shrub (Leptadenia pyrotechnica) for this purpose has been widespread in Arabia. It was the basis for the specific epithet pyrotechnica given the plant by Forsskal, who probably saw it in use during his botanical explorations in southwestern Arabia in 1762-63.
A Shammari consultant told me that the cottony indumentum on leaves of the spiny thistle called *kharshaf* (probably *Echinops blancheanus* or *E. mandavillei*), a plant of the Great Nafūd sands in northern Arabia, was also used as tinder for fire making. It no doubt corresponds to the plant called *harshaf* by the Ruwalah and attributed by Musil (1927:603) to *Echinops ceratophorus*. The leaves, my consultant said, were pounded when still green to loosen the "cotton," which was then separated and saved for use as tinder. He added that gunpowder was often added to this material to better catch the spark and start combustion. Musil notes that the Ruwalah of northern Arabia used for tinder "powdered" material from the gray-tomentose composite, *shīḥ* (*Artemisia sieberi*). They also used an unidentified "mallow-like" herb called *gtēn* or *gtēyyin* (my transliteration; Musil 1928a:128, 700). My consultants used this name (which means "little cotton, cotton-wort") for *Bassia eriophora*, a chenopodiaceous annual that has dense, cotton-like fleece around its flowering perianth and is probably the plant referred to. Musil (1928a:100) also describes how the smoldering tinder, after it has caught a spark, was placed in a piece of dry *shīḥ* and whirled above the head until it bursts into flame. *Shīḥ* is highly aromatic, which must have added a pleasant touch to the procedure. Also, in describing a piece of Bedouin poetry, Musil (ibid.:473) mentions how fire is passed around among tents of the Ruwalah, presumably when arriving at a new camp site. When a fire is started by one woman, other families send a girl or servant over to fetch a starter for their own hearth. Each girl puts a glowing coal into a wisp, *migbās*, made of the dry plants *shīḥ*, *ghaḍā* or *artā* and swings it in the air until it ignites.

A Rashidi consultant told me that before matches became common, the desert Arabs also used to make fire by twirling a stick between their palms in a small depression in a piece of *‘abal* wood (*Calligonum comosum* or *C. crinitum* subsp. *arabicum*). This
was the only reference I heard to making fire by friction. My notes unfortunately do not mention what the twirling stick was made of; it was presumably a harder wood.

The collection of firewood by Bedouins no doubt appears to be environmentally destructive, involving as it does the complete uprooting and virtual eradication of individual shrubs. In my experience, however, this use seldom has great impact on plant communities. This is mainly because Bedouin grazing camp groups are usually of small size and move frequently, thus diffusing the pressure of use and minimizing the extent of shrub destruction at any one site. Bedouins are also selective in their fuel use, preferring shrubs already dead or poorly growing from natural causes, such as local drought. This is not the case, of course with summer camps, where groups of hundreds of tents would be pitched around the tribal home wells, such as the great summer camps of Muṭayr gathered in the Ṣummān at al-Liṣāfah and al-Lihābah. Today, many of these sites are occupied by shack settlements or even well-built houses of the same tribal groups. Woody plants would be heavily impacted around such sites. Even these, places, however, have reduced populations during much of the grazing year, and the collection of firewood by people of the villages and towns was more destructive. When I was living in Riyadh in the 1960s firewood was still being used in parts of the city for everyday cooking and heating, and the city had a permanent and active firewood market area. Here, huge truckloads of *Acacia* and other wood were brought in from the uplands of central and southern Najd to meet the demand. Most of such household use, fortunately, has ceased with the widespread substitution of petroleum fuels.

6.3. Wild Plants for Food

Bedouins in Arabia gather and use wild plant foods primarily as seasonal dainties to enliven a diet that is otherwise rather tasteless and bland, historically consisting mainly of
milk products and one or two staple grains. They no doubt have also played a nutritional role by their provision of vitamins or other nutrients that might be lacking in staple foods. There is some evidence of the earlier use of a few wild plants in times of famine, but availability of such famine foods in our desert vegetation is limited by the fact that the drought conditions that lead to livestock losses through poor grazing also limit the development of wild food plants. Usable drought-resistant perennials are very few. Exceptions are plants producing seeds that can be saved "for a rainy day," or rather for a "rainless day," an example being *samh* (described below). A third use of wild plants is their small-scale employment as additives for the spicing or preservation of other food items.

At the time of my data collection in the early 1960s knowledge of wild food plants was still widespread among the Bedouin population. And I saw children out collecting wild edibles, indicating that this knowledge was being passed on to the younger generation. In fact the number of edible species that I recorded was greater than that noted by Musil (1928a) in his ethnographic work describing the Ruwalah Bedouins of northern Arabia in the first decade of the twentieth century. There does, however, appear to have been a decline in the number of plants whose greens are eaten raw, as indicated by some references (below) in earlier literature compared to present practice. Such salad plants tend to have some characteristics in common, such as glabrous, somewhat succulent leaves and annual habit.

Without doubt the most important wild food plant for the Bedouins has been (if we accept fungi into the plant kingdom) the desert truffle. Truffles are the only wild food plant that I have known to be collected for sale to the settled population. They are also the exception to the general trend toward a diminishing interest in wild plant foods as the
burgeoning economy of the Arabian Peninsula has made available an increasing market variety of vegetables and fruits to which today's desert dweller has easy vehicular access.

The following list of edible plants fairly represents, I believe, the range of knowledge of an average Bedouin of any tribe in my greater study area, although a few items are specific to the southern or northern extremities of this area. I include uses noted in literature that are in some cases at variance with my findings. The arrangement is by plant parts, setting aside the important fungi for the end.

6.3.1. Roots, Tubers and Bulbs

ʻanṣalān, *Dipcadi erythraeum* Webb. et Berth. (Liliaceae). Dickson (1955:38) says that the bulb of this plant is juicy and sweet and that it is eaten by Bedouin children. My experience is quite different; consultants said the plant is not edible and I found the bulb extremely bitter.

ḥambzān, ḥimbāzah, ḥimbēz, ʻambaṣīs, *Emex spinosa* (L.) Campd. (Polygonaceae). All Bedouins know this spring annual for its sweet, carrot-like taproot. The plant has a basal rosette of petioled leaves and is sometimes tinged with red. The taproot is thickened, whitish, and carrot-shaped, and usually ranges between 2 and 15 cm long. It is dug up, washed, and eaten raw. I frequently ate it myself and found it sweet, with a pleasantly crisp texture. According to Vesey-Fitzgerald (1957: 791) the petioles of this plant are also plucked and eaten by the Bedouins.

kurrāṭh, kirēṭh, baṣal, *Allium sphaerocephalum* L. (Liliaceae). The synonym baṣal, used by Āl Murrah, is generally applied to the cultivated onion. This is a wild onion with a tall scape up to a meter high and a large spherical umbel 3-5 cm in diameter. It is usually found on sandy ground. Consultants of Āl Murrah told me the leaves are eaten
but not the bulb. I have tried the bulb and found it excessively strong. Musil (1928a:15) says the bulb was collected and eaten among the Ruwalah. A member of that tribe told me, however, that the bulb is not eaten but that the fresh, fragrant flowers are used with rice and are sometimes dried for use as a spice in other food. A Shammarî consultant agreed. The same inflorescence, called a *zirjah* (pl. *ziraj*) was said by others to be dried and put into *samn* (liquid clarified butter) for flavoring.

*mhārūt*. Attributed by Musil to *Scorodosma arabica* Vel. (Umbelliferae). That botanical name did not persist, and it is probably now classed as a *Ferula*, perhaps *F. blanchei* Boiss. or *F. rutbaensis* C. Townsend. This Bedouin food plant does not occur in our core study area, and I have no record of its use, but Musil’s description is too interesting to neglect. He describes his finds of the plant in the northern desert in the borderlands of present Saudi Arabia and Iraq: "The leaves of this plant are a greenish vermilion in color and look as if they were covered with a white veil; the blossoms grow in yellow clusters, the root is long, black, and as thick as one’s hand. The new plant emits a peculiar odor, which also emanates from camels after they have grazed long upon it. The Bedouins drive milch camels away from it as it would also give their milk the unpleasant smell. At first the camels enjoy the *mhārūt* but soon they seek *rate* or *sīḥ*" (Musil 1927: 270-271). He describes the digging up of three roots: "These were of the thickness of a hand, forty to sixty centimeters long, and had a black rind. Miz’el discarded two of them, explaining that they were males and had a bitter taste; the third root, a female, we took along." Describing the eating of the root, which was baked laid near a fire: "Underneath the black rind was a white edible substance with a somewhat pungent taste and as dry as flour" (ibid.: 222-223). The attribution of gender to the roots (although the plant is not dioecious) is of interest. I did not find such a practice in our study area but noted it in Dhufar, southern Arabia, where tribesman showed me their
(non-dioecious) frankincense trees (*Boswellia sacra*), saying the "female" trees were "fatter" and produced more resin.

**rubahlah** *Scorzonera papposa* DC. (Compositae). Very well known to all Bedouins, this small perennial with showy pink flowers has an edible, dark brown-skinned tuber on its root. Dickson (1955:86) likened its flavor to that of a Brazil nut. The plant is usually seen on elevated, rocky ground, and I found that digging up the tuber can be difficult. It is often at considerable depth, and the root leading to it is often wedged in rock cracks and difficult to follow without breaking. The tubers are generally dug in the spring, when their locations are well marked by the plant's pink flowers. A consultant of Āl Murrah recited for me the following short rhyming couplet about this plant: *ar-rubahlah wat-tamr ahlā*, "the rubahlah and [but] dates are sweeter."

**shahhūm**, *Gagea reticulata* (Pall.) Schult. et Schult. f. (Liliaceae). A yellow-flowered dwarf lily usually found on rocky terrain. Musil (1928a:95) lists it as a plant (presumably the bulb) consumed raw by the Ruwalah but I was told by consultants in our area that it is not eaten. I tried a bulb once and found it bitter. The economic botanist Carter (1917: 179), describing this species collected in the Kuwait hinterland, said "Men have no use for it and animals do not graze on it so that, in spite of its being so common, few Bedouins can name it."

**ṭūt**, *Allium sindjarense* Boiss. et Hausskn. ex Regel (Liliaceae). This small wild onion of silty soils is well known as an edible plant. Musil (1928a:15) describes how, among the Ruwalah, mothers send out their boys to collect the bulbs, saying "My little sons, O sonnies! go bring me at-ṭīṭa I will prepare for you muṭṭa (a dish of mashed bulbs) ... ."
6.3.2. Edible Stalks or Stems

'abal, Calligonum comosum L'Hérit. and Calligonum crinitum Boiss. subsp. arabicum (Sosk.) Sosk. (Polygonaceae). The latter species is referred to here, but the use may extend to the former. Both are virtually leafless shrubs with very fine terminal stems. One of the British explorer H. St. John Philby's traveling companions of the tribe of al-Manāšir, during Philby's crossing of the Rub' al-Khālī in 1932, cooked green sprigs of 'abal with rice to make a dish called makikah for the company. Philby noted that it made a "tolerable substitute for fresh vegetables -- rather tasteless but in no way disagreeable."

He added that another tribe of the Rub' al-Khālī, Al Murrah, do not ordinarily know this use (Philby 1933:171). He added later that at the suggestion of his Manṣūrī guides he had "browsed freely on the white blossoms and tender green sprigs of the Abal as we marched" and that he could vouch for its claimed medicinal properties; it is to some degree constipating and acts thus to offset the purgative effect of drinking mineral-laden well water (ibid.:195-196). Philby's guides also advised him not to eat 'abal along with meat, which they claimed was "liable to harden to the consistency of leather" (ibid.:278). This was probably in consideration of another use of the plant, for tanning (see section 6.5). The party also made use of the twigs for brewing a tea substitute. Philby noted that "Its colour was all that could be desired but the liquid was somewhat bitter to taste and constipating in its effect -- an antidote, as I was to learn, to the powerful salts of the Naifa water" (ibid.:278-279).

ţarthūth, zibb al-ard, Cynomorium coccineum L. (Cynomoriaceae). This striking club-shaped, crimson parasite appears as fleshy, leafless stalks topped by a dense inflorescence of closely packed dark red flowers. The stalk extends 30 cm or more underground and is the edible part. It is prepared simply by washing and peeling off the skin to expose the
fleshy interior. Bedouin elders of the Dhahran area told me that villagers from al-Qatif, in pre-oil days, used to go out in the neighboring desert in spring and dig up donkey loads of *tarthūth* to sell in local markets as a seasonal delicacy or tonic. R. E. Cheesman, describing the natural history of the oasis of al-Hasa during his travels in eastern Arabia in 1923-24, noted that on 4 February "the fat, succulent underground stems of the *Tarthuth* are on sale in the bazaar every day. The badawin women bring them in, and the townspeople buy them freely and eat them raw" (Cheesman 1926:199).

The plant was generally described to me as edible, but my own experiments with it had mixed results. Some plants had a sweetish taste and pleasantly crisp, succulent texture. These, however, were growing randomly with other individuals of the same age that were quite bitter, astringent and for me, inedible. Musil (1928a: 95) says this plant was eaten baked by the Ruwalah. Dickson (1955:37) said it was much eaten by children in Kuwait and has a sweet taste as well as a slight purgative effect.

The phallic form of this plant has led to a Bedouin repertoire of associated ribald names and stories, the quaintest of which is perhaps the one told the English explorer H. St. John Philby by one of his travel companions during his trip in 1918 down to Wadi ad-Dawasir, in southern Najd (Philby 1922: 2:215-216). According to this campfire tale, which I paraphrase, a Bedouin chief of a tribe highly skilled in the art of tracking both livestock and people in the sands was riding with some companions when he spotted the foot-tracks of his daughter, who had gone out from the tent that morning to gather *nuṣī* grass for the camels. As the men were returning in the evening the chief spotted his daughter's tracks again, this time returning to the tent. At the sight of this second set of tracks the chief threw up his hands in consternation, saying "See how my daughter went out in the morning a virgin, but when she returned she was no longer so!" [It is still said by Bedouins today that good trackers can tell a virgin from a non-virgin by a glance at a
girl's tracks. This is probably an exaggeration, although the difference between the tracks of a girl and a mature woman are probably evident enough.] "Now," said the chief, "I will have to hunt down the man who dishonored her and kill him, and she herself," he added sorrowfully, "will have to die to save the honor of the tribe. Let us ride back along this trail and pick up the tracks of the perpetrator." They did so, following them back until they ended at a patch of *tarthūth* plants, growing in the sand, some of them pulled out. The distraught father stopped, reading the sands carefully, then smiled with relief and raised his hands to heaven in thanks. He had interpreted the earlier tracks correctly, but -- as he then declaimed -- he had wronged his daughter, not only by assuming her guilt but by keeping her too long unwed. As the repeater of this tale, I can only second Philby's own epilogue to it: *si non è vero è ben trovato*.

**dhnūn**, *Orobanche* sp. (Orobanchaceae). Musil (1928a: 95), under the synonym *zibb adh-dhlkh*, lists this among other plants eaten baked by the Ruwalah in northern Arabia. There are four species of this parasitic genus in our study area, and this is probably one of them. I have never, however, heard of any of them being considered edible. Musil's name is also unknown to me from the more restricted study area, but it was collected in the Eastern Desert of Egypt by Hobbs (1989:126) for *Cistanche phelypaea* (= *C. tubulosa*), another columnar root parasite of the same family and of generally similar appearance. Musil, however, gives one of the usual variants of the name *dhānūn* for *Cistanche*. *Cistanche* is not eaten by the Bedouins (I can confirm that it has a bitter taste), although there are records of its consumption in the Sahara, where the Tuareg of Ahaggar dry and pound it for bread (Nicolaisen 1963:178).
6.3.3. Greens Eaten Raw

*basbāś, Anisosciadium lanatum* Boiss. (Umbelliferae). Dickson (1955:19) reported the young green leaves of this plant eaten by Bedouin children. I have not heard of it being considered edible.

*gurrēš, garrāš, Aaronsohnia factorovskyi* Warbg. et Eig. (Compositae). Musil (1928a: 700) also lists this name for *Trigonella hamosa* L., but I believe this might be an error; the same name is seldom given to plants from families as different as legumes and composites, and there are semantic reasons (see Chapter 10) for thinking it belongs to *Aaronsohnia*, or another composite resembling it. Carter’s (1917:203) ascription of the name to "*Matricaria* sp." is probably an error of plant identification. *Gurrēš* is said to be eaten raw by the Bedouins and to be one of the several plants used as a spice or other additive in the preparation of the dry soured milk cakes called *igt* (Dickson 1955:11, perhaps following Carter 1917:203).

*ḥambāšīš, ḥamsīš, Rumex pictus* Forssk. (Polygonaceae). The leaves of this low annual dock are eaten uncooked. *R. pictus* is usually found in sand terrain and differs from *R. vesicarius* (see below, under *ḥummēḏ*) by its pinnately parted leaves.

*ḥārrah, Sisymbrium irio* L. (Cruciferae). Musil (1928a:95) reports this plant as one of those eaten raw by the Ruwalah. It is a weedy species usually found only on disturbed ground around campsites.

*ḥummēḏ, ḥammāḏ, ḥambāḏ, Rumex vesicarius* L. (Polygonaceae). A glabrous, somewhat succulent-leaved annual up to about 30 cm high. The fruiting perianth of the flowers grows to become quite showy, the bright pink to reddish valves winged with red nerves. Use of the plant as a sour-tasting salad vegetable is well known to all Bedouins.
According to a consultant of Banī Hājur, the plant is sometimes added during the preparation of īgt (shards of dried, soured milk) to increase its acidity. Carter (1917:181) reported that it is also eaten cooked, with meat. A Shammarī consultant told me the story of a raider of his tribe who was wounded in one of the battles of Ibn Rashid, the former Shammar chief. He was said to have spent six days sheltering in a waterless dahl (a natural solution cave in the limestone floor of the desert), living entirely on the wild ħummēd plants that grew in the vicinity. He survived but was said to have entirely lost his power of speech due to the astringency of the plants.

ḥuwwā, Launaea capitata (Spreng.) Dandy, L. nudicaulis (L.) Hook. f., L. procumbens (Roxb.) Ramayya et Rajagopal, and possibly other species of low, annual, yellow-flowered composites of the section Liguliflorae (Compositae). Musil (1927: 603) attributes this name to Lagoseris bifida, which is probably identical to our Crepis asper L. His description of ḥuwwā ("al-ḥawwa") as a variety of samh (1928a:15) may be an error. Ḥuwwā as a raw salad herb is well known to all Bedouins and references to it often involve some aspect of disdain, as if it were resorted to only by the poorest folk in dire need. One of my Marri consultants, whenever he heard the name mentioned, would smile and recite a fragment of a song:

man kal al-ḥuwwā talawwā; awja' baṭnah wa māt
"Whoever ate the ḥuwwā writhed; his stomach ached and he died"

hwērirah, Leptaleum filifolium (Willd.) DC. (Compositae). This fine-leaved dwarf annual is, according to Dickson (1955: 59-60) eaten by the Bedouins for its peppery taste.

khinnēz, ǧurrēt an-naʿām, ʿifēnah, Cleome amblyocarpa Barr. et Murb. (Capparaceae). Musil lists this plant (as a synonym, C. arabica) among those eaten raw (1928a: 95).
think this is at least questionable, for the plant is generally considered noxiously fetid as indicated by its names above, which mean, respectively, "stink weed", "ostrich fart", and "stench weed".

krā' al-ghrāb, rijlat al-ghrāb, shkhīs, jirjīr, Senecio glaucus L. subsp. coronopifolius (Maire) Alexander (Compositae). This ascending, annual herb has somewhat succulent, tender leaves eaten raw as a salad green.

liḥyat at-ṭēs, liḥyat ash-shēbah, dhignūn, dhuʿlūḡ, thuʿlūḡ (the last clearly pronounced by a Qaḥṭānī; Philby, 1922, also found that form in south central Arabia), Koelpinia linearis Pall. (Compositae). A Bani Hajir consultant told me that this fine-leaved annual is eaten raw, and both Carter (1917) and Musil (1928a) list it as edible.

masḥā (Musil 1928a:702), dhuʿlūḡ, dhuʿlūḡ al-jamal (Musil 1928a:95, 1927:595), Scorzonera tortuosissima Boiss. (Compositae). Velenovsky's S. musili, as listed by Musil, is probably conspecific with our plant. Musil lists this yellow-flowered perennial as edible, but there may be confusion here with Koelpinia linearis, which is also given the name dhuʿlūḡ and rather closely resembles this Scorzonera except when in mature fruit. It is possible that masḥā is really the proper name for this plant in the north; it was given me in an oral list of edibles by a Shammarī knowledgeable about the northern flora.

Ophioglossum polyphyllum A. Braun. (Ophioglossaceae). Dickson (Burtt and Lewis 1949: 279) reported that this dwarf annual fern of sand terrain was eaten by Bedouin children. I have collected it in our study area, but it does not appear to have a recognized vernacular name.

ragam, ūmmēr, bkhāṭrī Erodium spp. (Geraneaceae). Musil (1928a:95) notes such use of four species under two vernacular names, as follows: ūmmēr, Erodium bryoniifolium
Boiss., *E. ciconium* (L.) L'Hér; *bkhatrī, Erodium cicutarium* L., *E. pulverulentum* (Cav.) Willd. *E. cicutarium* was probably in fact *E. deserti* Eig, which rather closely resembles *cicutarium*; *E. pulverulentum* is now considered a variety of *E. laciniatum* (Cav.) Willd. Carter (1917:193-194) notes that *E. cicutarium* (again, probably in fact *E. deserti*) collected in the Kuwait hinterland was eaten raw by people there. My own records show the name *ragam* commonly applied in much of our area to *E. deserti* and *E. laciniatum*. I never observed my consultants eating or collecting any of the various species of *Erodium* that are relatively common in the desert flora. Nor did they list them when questioned about edible plants. In the more northern Arabian desert, however, at least in earlier times, *Erodium* was apparently treated as a salad herb eaten raw.

*rghēlah*, *Atriplex dimorphostegia* Kar. et Kir. (Chenopodiaceae). Musil (1928a:95) lists this fleshy-leaved annual among plants eaten raw by the Ruwalah Bedouins of northern Arabia. It occurs in the more southerly parts of our area and does have some characteristics of annuals eaten raw (such as smooth, fleshy leaves), but I have no record of its use there as a food.

*sīffār, sīfār*, *Schimpera arabica* Hochst. et Steud. (Cruciferae). I have seen Bedouin children gathering handfuls of the leaf rosettes of this yellow-flowered annual to nibble raw as a mustardy herb.

*uṃm rweṣ*, identified by Musil as *Scabiosa palaestina* L. (Dipsacaceae). It is listed by him (1928a:95) among those annuals eaten raw by the Ruwalah Bedouins. I have not found any reference to such use in more recent times.
6.3.4. Edible Fruits and Flowers

_kurrēši, āitr, kubbēsh, kabūsh, ‘antar_, Glossonema varians (Stocks) J. D. Hooker (Asclepiadaceae). The numerous vernacular synonyms for this plant indicate its wide recognition and use, and its edible qualities are vouched for even by its botanical synonym, _G. edule_ N. E. Br. The consumed parts of this smallish perennial herb are the young fruits and to a lesser extent the young leaves. It is used, as far as I know, only in the raw state. The fruits have specific names varying among tribes: āitrī (Qaḥṭān), kabash (Āl Rāshid) and _jarū_ (Bānī Hājīr). Even after being assured of its palatability I tried eating this plant myself with some trepidation after eyeing the potent-looking latex that oozed from its wounds. But I found the very young fruits quite tasty and harmless, with a flavor somewhat like sweet cabbage. They become inedible with maturity because of their tougher texture and comose seeds.

_ṃarkh_. Leptadenia pyrotechnica (Forssk.) Decne. (Asclepiadaceae). This large, virtually leafless shrub of our southern coastal areas, sometimes more than 3 m high, has edible flowers and young fruits that are together called _ma‘ālūt_ by Bānī Hājīr. A consultant of Āl Rāshid gave the names _‘uthrab_ (pl. _‘atharīb_) for the edible flower bud and _‘ālūt_ (pl. _‘awālūt_) for the young fruit.

_ṃṣa‘, ghardag_. Nitraria retusa (Forssk.) Aschers. (Zygophyllaceae). I have found this stiff-branched shrub of saline soils at only one place in our study area -- a coastal site near the Saudi Arabian border with Kuwait -- and I have no record of its use there as an edible plant. It also occurs in the far northern desert, where Musil (1928a:95) describes the Ruwalah’s collection of its "dark-red ripened fruit" called _ṭal‘_, which he says are very sweet, with a bitter after-taste, and which are also boiled into a thick syrup. William
Palgrave, passing through the Sharārāt country of northern Arabia in 1862, described the *mṣaʿ* fruit:

Its shrub attains two or three feet in height, woody and tangled, with small and pointed leaves of a lively green, and a little red star-like flower. This, in June, gives place to a berry much resembling in size, colour, and taste our own red currant, though inferior to it in flavour, while its sweetness predominates too much over its acidity. The Bedouins collect and greedily devour it, or, boiling it down with a little water, procure a sort of molasses, much esteemed by them, but by them alone (Palgrave 1865:1:30).

‘ōṣaj, ʿōṣaj, ʿōṣaz, *Lycium shawii* Roem. et Schult., *L. depressum* Stocks. (Solanaceae). The two species of this large, intricately and stiffly branched shrub look much alike; *L. shawii* is more common. The edible berries of the plant, well known to all Bedouins, are globose, red, and about 4-5 mm in diameter. The taste is sweetish, but the seeds are inconveniently large for the size of the edible portion. A Banī Ḥājir consultant gave me the name *dōm* for the berries. In early times they were called *maṣaʿ* (Hamidullah 1973:274), the name used today for *Nitraria* (above), which also has edible red fruits. Dickson (1955:62) records that the berries were eaten by one "Flt. Lt. Stevenson [presumably of the RAF] when stranded for five days without food or water at Um Kasr [in southern Iraq] in July 1941, and did him no harm."

*rāk, arāk, *Salvadora persica* L. (Salvadoraceae). There are only two stands of this large shrub in our study area, but it is well known among all tribes as the source of the root and stem pieces used to make toothbrushes (described in section 6.6, below). Bedouins from the farther south, who range out of the southern and eastern Rubʿ al-Khālī into nearby area where *rāk* grow more plentifully, eat the fruits of this plant, said to be sweet. A consultant of Āl Rāshid familiar with the practice used the synonymous names *mard* or *mushg* for these fruits.
sidr, *Ziziphus spina-christi* (L.) Willd. (Rhamnaceae). This well-known tree is found in the stricter confines of our study area only in cultivation or on abandoned habitation sites. Tribes of the southern Rub' al-Khali, however, sometimes range into parts of southern Arabia where the tree grows wild. Its fruit, a short-pedicelled ovoid or globular drupe 0.8-1.5 cm in diameter, is called *nabag* and is edible.

sa'dan, *Neurada procumbens* L. (Rosaceae). I had no evidence from my consultants that this plant was edible, but I tested Dickson's (1955:67) report that the young fruits were eaten by children in the Kuwait area. I found that the fruits when very young were tender and not unpleasant to taste, if somewhat mucilaginous. They very soon become woody and inedible, however.

6.3.5. Seeds and Grains

samh, the fine seeds of the annual herbs *Mesembryanthemum forsskalei* Hochst., *M. nodiflorum* L, and *Aizoon canariense* L. (both genera are aizoaceous), has been an important food among the Shararat, Ruwalah and Shammar in northwestern Arabia, providing what is in effect a "poor man's grain" for those unable to afford the wheat or rice available only by purchase. The English traveler Charles Doughty, in his classic style, described his encounter with *samh* in the late spring of 1877 outside the southwestern fringe of the Great Nafūd sand desert:

I saw often the *samhh* plant growing, but not abundantly; now a leafless green wort, a hand high, with fleshy stems and branches full of brine, like samphire. At each finger end is an eye, where the plant drying up in early summer, a grain is ripened. In the Sherarat country, where the *samh* grows more plentifully, their housewives and children gather in this wild harvest. The dry stalks are steeped in water, they beat out the seed with rods; and of this small grain their hareem grind flour for the daily mess. I had eaten of this wild-bread at Maan; it was black and bitter, but afterward I thought it sweet-meat, in the further desert
of Arabia. The samhh porridge is good, and the taste "as camel milk": but the best is of the flour, kneaded with dates and a little sann [clarified butter], to be eaten raw: - a very pleasant and wholesome diet for travellers, who in many open passages durst not kindle fire (Doughty 1936:1:357).

Another Englishman, William Palgrave, had passed through the Sharārāt country referred to by Doughty 15 years earlier, in 1862. Palgrave's Arabian geography has often been questioned, but his description of samh seems genuine enough and gives an indication of the importance of this plant in earlier times. He calls it "a main article of subsistence to the Bedouins of Northern Arabia" (Palgrave 1865:1:29).

Throughout this part of the desert grows a small herbaceous and tufted plant, with juicy stalks and a little ovate yellow-tinted leaf; the flowers are of a brighter yellow, with many stamens and pistils. When the blossoms fall off, there remains in place of each a four-leaved capsule about the size of an ordinary pea, and this, when ripe, opens to show a mass of minute reddish seeds, resembling grit in feel and appearance, but farinaceous in substance. The ripening season is in July, when old and young, men and women, all are out to collect the unsown and untoiled-for harvest. The capsules are gathered, the seed separated from them, and kept like a stock of flour for the ensuing year. These seeds, when wanted for use, are coarsely ground in a hand-mill, then mixed with water, and boiled into a substance which we now had before us. Its taste and quality were pretty well hit off by Salem, who described it, "not so good as wheat, and rather better than barley-meal" (Palgrave 1865:1:29-30).

The name samh applies both to the seed product and the plants themselves although a more specific name for the seeds is used in some contexts. An elder consultant of Shammar confirmed that the Sharārāt tribe is particularly known for their use of these seeds, which are treated much like wheat grain, ground into flour and made into bread, or cooked into a sort of porridge. It was still being collected in the 1960s, and I was brought
a specimen of the seeds by one of my consultants who had traveled to the northwest for a home visit.

According to the same Shammarī elder, there are three varieties of \textit{samḥ}, each from a different plant and each of different quality: (1) \textit{hurr} (meaning "pure, true") from \textit{Mesembryanthemum forsskalei}. This is the largest and best plant, with the largest pods, and grows on the wide plain of al-Busaytā' around the southern end of Wādī as-Sirḥān and also near al-Jawf and in Wādī Sirhān itself. (2) \textit{ḥamar wāgif} ("standing red," the "g" of the second component usually pronounced as the fronted affricate "dz"), from \textit{Mesembryanthemum nodiflorum}, a smaller plant that tends to turn dark red when maturing under drying conditions, and which grows in the Jabal Shammar district of Najd in Baqṭā' and near the village of al-Kahfah, and (3) \textit{da'ār}, which grows in the same areas as does \textit{ḥamar wāgif}. Ruwalah and Shammarī consultants gave the name \textit{da'ār} to a fresh specimen of \textit{Aizoon canariense}, saying it provided "samḥ of poorer quality." This data is somewhat at variance with that of Musil (1927:464), who said the Ruwalah recognized only two kinds of \textit{samḥ}, one called "hurr" or "hamr wāgif" [transliterations revised] and the other called "da'ā." He equates the first with \textit{M. forsskalei} and the second with \textit{M. nodiflorum}. It is not clear whether these differences reflect different tribal usages or incomplete information on the part of Musil. It is in any case clear that \textit{M. forsskalei} is the prime source of this edible seed. My record of \textit{Aizoon canariense} as a third \textit{samḥ} plant in Arabia does seem confirmed by evidence elsewhere: Osborn (1968:175) found the seeds of that plant being used in Egypt's Eastern Desert for cooked gruel under the names "hadaq", "hudak", and "samḥ".

In Shammarī (and probably other northern) usage, the seed-bearing capsules of the \textit{samḥ} plants are called \textit{ka'bar} while the seeds themselves are \textit{sībīb}. The collection process was described to me as follows: Arabs camp in the plain of al-Busaytā' during
the hot season. The *samḥ* plants, growing in clumps, are beaten with sticks and iron rods to knock the capsules loose. Then the capsules are broken on the ground and the whole lot scraped into a pile and carried off to a *miṣwāl* (pl. *maṣāwīl*), a trough made of (or in) clay and lined with camel hide. Water is then poured on and the seeds sink while the empty capsules and other chaff floats off. Finally the seeds are collected, dried and put through a sieve to remove stones.

Musil (1927:464) notes that the *samḥ* plants "shoot out as late as March but only after the soil has been thoroughly soaked by the *ath-threīyāwī* [transliteration revised] (Pleiades, November) rain." The seeds of *samḥ* can be considered a famine food; according to Musil (1928a:16) they may be kept "so that they may serve as an article of food in a poor season." Musil (1928b:6) also described an interesting northern dish called *bakīr* [transliteration revised], which is prepared from dates and *samḥ* seeds. The *samḥ* is roasted, ground, mixed with fresh dates and kneaded into a paste. The *samḥ* flour, he says, absorbs all the juice of the dates, and the food keeps good for a year. "Its taste is insipid but recalls that of chocolate."

**thmām**, *Panicum turgidum* Forssk. (Gramineae). Elder consultants reported that the grains of this important perennial fodder grass used to be collected and pan roasted for food during hard times. It has been used as a wild plant food in recent times in the western Sahara, and Williams and Farias (1972) cite views that such use may be considered a prehistoric survival. In fact I had speculated earlier that it was the grain of wild *thmām* that was used by the people responsible for the many Neolithic habitation sites associated with prehistoric lake beds in the northern and western Rubʻ al-Khali (see McClure 1984 for a description of the environments of these finds). I found numerous saddle querns at these sites like those described by Nicolaisen (1963:235, 242) in use by the Tuareg of the central and southern Sahara. In the Sahara, according to Williams and
Farias (1972:15-16), the grains of *Panicum turgidum* are usually ground into flour, and this is used to make porridges. Nicolaisen (1963:175) says that the Tuareg of the Ahaggar massif collect the grain of *Panicum turgidum* "by beating the ears of the grass with a stick." He adds that the seeds are not suitable for bread but are used for porridge and for eating raw after pounding in a mortar. The seeds are also used by the Tuareg of the Ayr region, where they are collected by "beating with the hands so that the seeds fall into a plaited bowl", to be used as porridge (ibid.: 180).

Experimenting myself with this plant, I found that the grains, which grow in open panicles, can be stripped quite easily by hand. The reference to "roasting" the grains by my consultants suggest they might have been preserved by parching. The grain might thus have been held in store for famine times. I saw no evidence that *thmām* grains were used in the 1960s or later.

6.3.6. Gums and Other Exudates

*aqdris, āqdris*, *Convolvulus oxyphyllus* Boiss. subsp. *oxycladus* Rech. f. (Convolvulaceae). Dickson (1955:33) reported that "a gum comes out from the stem which children suck like chewing gum." I am not acquainted with this practice, and my eight specimens of this pink-flowered, woolly-tomentose shrub do not show any sign of such an exudate. It may, however, be a seasonal phenomenon.

*rinth, Haloxylon salicornicum* (Moq.) Bge. (Chenopodiaceae). Musil (1928a:95) says that the Ruwalah collected a sweet juice that flows out of the stems of this shrub in summer. I have seen drops of such exudate on the stems of *rinth* and have a vague memory of one of my Marrī friends nibbling at this. It did not, however, appear to be a significant plant food in the 1960s.
6.3.7. Flavorings and Food Additives

*Asteriscus pygmaeus* (DC.) Coss. et Dur. (Compositae). Dickson (1955:68) reported that Bedouins put this dwarfish, yellow-flowered annual into sacks of rice to "keep it sweet." For this plant she gives the vernacular name "burkat," which I have not encountered.

*barwag*, *bērag*, *Asphodelus tenuifolius* Cav. (Liliaceae). This asphodel, common on disturbed ground around old campsites, was reported used by the Bedouins as an additive in making the dried sour milk cakes called *igt* (Carter, 1917:179; Dickson 1955:20). Exactly how the plant was so used was not described, and I have no record of the practice.

*bēthirān*, *Artemisia judaica* L. (Compositae). According to Musil (1928b:6), the Shammar mixed dates with pieces of this aromatic plant, boiled the mixture until the juice evaporated, then dried and preserved it.

*ribl*, *yanam*, *Plantago boissieri* Hausskn. et Bornm. (Plantaginaceae). A consultant of Bānī Ḥājir said that this plant is sometimes used as an additive in the preparation of *igt*, dried cakes of sour milk.

6.3.8. Truffles and Mushrooms

*fag‘* (a plural form of the name, *fag‘ān*, is also sometimes used), the desert truffles *Tirmania nivea* (Desf. ex Fr.) Trappe, *Tirmania pinoyi* (Maire) Malençon, *Terfezia boudieri* Chatin. Truffles are the ascocarps, or spore-bearing bodies, of an underground fungus. Those found in the desert differ from those of European gourmet cookery
(Tuber spp.) in being generally lighter in color, often of larger size, and of lesser flavor and odor (although they do have their own characteristic odor). The same species are found across the Saharo-Arabian region as far west as Morocco. Fag' externally look much like potatoes, although they are of generally rounder shape rather than elongated. They range in size from that of a pea to that of a grapefruit. Fag' are the Bedouin wild food par excellence. Their use has not declined and in fact has probably increased since widespread use of motor vehicles has made search and collection more efficient. Truffles are also well known and liked by the settled population of Arabia, at least those parts north of the Tropic, and it is not uncommon for families from towns to drive out for a day or weekend outing to truffle-hunt.

As is generally believed throughout Arabia (and as confirmed by my own experience) truffles are found only in years favored by relatively early rains in the wasm (autumn) period and which have a continuing good distribution of rainfall leading to February and March, when the truffles develop fully and can be collected. Such years are rather uncommon, so truffle collecting generally can be done only at intervals of several years. Some Bedouins say the early rains must occur as thunderstorms, that lightning is required or that truffles are even "caused" by lightning striking the ground. Good truffle years thus coincide with those luxurious periods of spring herbage known to the Bedouins as rabi' and share in all the associations of good living, free-flowing milk, general abundance and hospitality associated with that term. It is not unusual for a Bedouin finding an unusually big, early truffle to go to the nearest large town and make a gift of it to the amir, or chief government official. He can be assured of receiving a more generous return gift.

Also well known to all Bedouins is the association between the truffles and certain other wild plants which act as truffle ground indicators. These indicators are all
species of the genus *Helianthemum* (Cistaceae), known to the Bedouins under several names, the most common of which is *rugrūg* but which also include *umm as-swēgah*, *swēgah*, *jirrēd* and *argā*. Judging from my records, any or all of these names can be used for any of the following plants, all of which are considered truffle indicators: *Helianthemum ledifolium*, (L.) Mill. (annual), *H. salicifolium* (L.) Mill. (annual), *H. kahircum* Del. (perennial), and *H. lippii* (L.) Dum.-Cours. (perennial). The annuals often grow only a few inches high and the perennials are dwarf shrublets; all are easy to recognize by their grayish pubescence and revolute-margin elliptical leaves. There is a definite micorrhizal symbiotic relationship between truffles and plants of this genus (Bokhary 1987:251), and the relationship appears to be obligate for the truffle but not so for *Helianthemum*. Thus truffles are found only where one sees *Helianthemum*, but *Helianthemum* can often be found without any associated truffles. One general area known for its truffle production is the dead-flat and nearly shrubless country known as al-Qar‘ah ("the baldlands") up along the Trans-Arabian oil pipeline in the northern part of the Eastern Province of Saudi Arabia. I collected specimens of three of the four *Helianthemum* species from the gritty soil there where truffles are found. Consultants say also that truffles with *rugrūg* are often found on basins in country dominated by ‘arfaj, the composite shrublet *Rhanterium epapposum*. Truffles have been found to be associated with sandy soil (but in my experience not pure sand; a silt component is usually present) that may be gypsiferous or saline. The soil tends to be alkaline, with pH of 9.5-9.8 (Bokhary 1987:252-253). Truffles appear on a given site over a period of (at least) years, and Bedouins who know these locations tend to keep them secret within the family.

Bedouins in our study area recognize four folk specifics of *fag*: 
az-zbēḍī  whitish in color and the largest
al-khlaṣ  brown ("red")
al-jbēy  brownish ("red") said often to contain sand
al-hbērī  small, pea-size; eaten by birds

The first two kinds are considered the best eating. One consultant on one occasion said the zbēḍī was the best, on another that the khalāṣ was preferred. The name zbēḍī comes from zibd, "butter," referring to its cream-white color, the color of fresh butter. Khlāṣ means "choice, pure," a name applied also to a premium variety of dates grown in the oases of eastern Saudi Arabia.

Nearly all Bedouins can recite four internally rhymed lines giving the names of these truffle folk specifics, and the piece may have a mnemonic function. In our area it generally takes the following form:

az-zbēḍī lil-wlēḍī  The zbēḍī for the little boy
al-jbēyāh lil-bnēyāh  The jbēyāh for the little girl
al-khlaṣī ḥagg rāsī  The khlāṣī for myself (lit. "for my head")
al-hbērī lit-ṭuwērī  The hbērī for the little bird

Musil (1928a:15) said that the Ruwalah of northern Arabia recognized three kinds of fagʿ (revised to my transliteration): al-kama, az-zbēḍī, and al-khlaṣī, sorting them with the rhymes: al-kmēyāh l-umm al-bnēyāh, az-zbēḍī l-umm wlēḍī, wal-khlaṣī l-rāsī ("al-kmēyāh for the mother of the little girl; az-zbēḍī for the mother of my little boy, and al-khlaṣī for myself"). The first Ruwaylī name, al-kama, corresponds to the term usually used for truffles in classical Arabic, al-kamaʾ (al-kmēyāh of the Ruwaylī rhyme is in the form of the diminutive singular). It appears to correspond to the variety called al-jbēy (or al-jbēʾ as pronounced by one Marrī consultant) among the more southern tribes.
A consultant of the Shammar tribe gave me as specifics: *az-*zbēḍī (which he said was white-colored) *al-jibā* (of "medium red" color), *al-ghlāṣi* (sic; reddish, heavy and dense and said to grow in heavy silts), *al-hōbar* (small and eaten by birds) and *al-blūkَh*. The last kind was said to be found only in the Syrian desert, including parts of al-Ḥamād region of Saudi Arabia's far north. Its color was said to be *asḥhab*, or grayish.

The relationship between the folk specific names for truffles and the scientific species that have been identified is clear in part. The *zbēḍī* corresponds to *Tirmania nivea* and possibly to *Tirmania pinoyi* as well. The latter is scientifically described as being very similar to *T. nivea* except in the microscopic characters of spore shape and size (Alsheikh and Trappe 1983:88). The folk specific called *khlāṣ* or *khlāṣī* corresponds to *Terfezia boudieri*, and the specimens studied by Awameh and Alsheikh (1980) were given that name. Dickson (1955:103) also had *khlāṣ* specimens identified as *Terfezia* sp. at Kew. On the other hand, it is not clear whether the folk specific *al-jbēy* and *al-hbērī* are also scientific species or just size or form variants of the three species mentioned above. Alsheikh and Trappe (1983:88) refer to the apparent involvement of birds in the spore dispersal of "the small desert truffle, *Phaeangium lefebvrai* Pat.", but it is not sure from their context whether or not this corresponds to our *hbērī* folk specific said to be small and eaten by birds.

Truffles often figure in the oral literature of the Bedouins. Something may be described as *abyad faggārī* ("as white as a truffle"). Or a maiden's breast may (as in a Bedouin poem recorded by Musil (1928a:322-323) be likened in verse to a *zbēḍī* (truffle) "growing in an overflowing vale." I was given the following riddle by a Hājirī consultant. It begins with the regular introductory expression of the Bedouin riddle genre, *ḥājīk* (literally "your wit", loosely "What is it that ... ");
The "building of a house" refers to the way truffles, as they grow and mature, crack the soil that lies over them (Plate 6.3) and sometimes push it up into a tent-like hump. It is only by these cracks and little mounds in the earth that truffles can be found. The best collector is the one who has the best eye for these ground surface disturbances, which range from the obvious to the most subtle. The "drinking of water" describes the truffles' growth by absorbing soil moisture from the earlier rains.

Truffles are prepared for eating by simply boiling in a pot by themselves, roasting them in the ashes of a fire, adding them to a larger dish such as a stew or rice, or by slicing and frying in *samn* (clarified butter) or other oil. I found the frying-in-butter approach by far the best to my Western taste, resulting in a flavor much like fried mushrooms. Once when served boiled *faga‘* by a Bedouin family I had to force myself to finish them to maintain politeness. I was told by several consultants that they can also be dried in the sun, after which they are called *shībib* and will keep "for years" and taste "just like fresh" when later rehydrated. More recently a tribesman of Banī Ḥājir who lived in town and had a freezer said that they may be kept frozen, and I have kept them successfully that way myself.

Use of motor vehicles by both Bedouins and settled people in Arabia has without doubt put increasing collection pressure on desert truffles. I do not, however, have any data indicating whether there might be a conservation problem with respect to this widely
Plate 6.3. A desert truffle cracking the ground, *right of center*. Such signs may be obvious, as in this case, or very subtle. Sometimes the earth may be pushed up into a hump.

Plate 6.4. A truffle excavated, in place. This biscuit-shaped example would be considered to be of small to medium size.
Plate 6.5. Hunting truffles. Keen-eyed consultant 'Ali ibn Sa'id of the Bani Hajir tribe, right, points out locations to be dug by his sons.

Plate 6.6. Desert truffles for sale in an open market at Ḥafar al-Batin, northeastern Saudi Arabia (see Map 2.2). Such scenes are found very rarely, only in years when rains are early, plentiful and well-timed.
exploited wild resource. Reportedly work has been underway in some quarters in Saudi Arabia to devise techniques for the artificial culture of desert truffles on a commercial scale. Such a program in Kuwait was reported by Alsheikh and Trappe (1983:89), who note that both spores and cultured mycelium have been used successfully there as mycorrhizal inoculum on species of Helianthemum.

*iftarah, futur, hobar.* Capped mushrooms (unidentified). Musil (1928a:15) says that mushrooms called hobar (the same name given me by a Shammarî for the smallest kind of truffle) were collected and eaten by the Ruwalah. I was given the name *iftarah* for mushrooms by an elder of Banî Hājîr, a form related linguistically to the name "ftur" recorded for mushrooms in Kuwait by Dickson (1955:103). I did not find evidence of consumption of mushrooms in our more southern study area; in fact capped mushrooms are rarely seen in those parts.

*ʿarjûn, Podaxis pistillaris.* This white, club-shaped (non-capped) mushroom or toadstool is by far the most common emergent fungus seen in the desert and may be found in extremely arid habitats, having grown during brief rains then remaining standing dried for many months. I found it even in the middle of the Rub' al-Khâli. Dickson (1955:104) reported that Bedouin children in Kuwait collect them, bake them in hot ashes, then eat them peeled. I was told by one consultant in our study area that they were not eaten. In any case they obviously must be collected when quite young, as they become pithy or woody with maturity and release unappetizing black, powdery spores.

The English explorer Wilfred Thesiger, traveling the sand country between Abu Dhabi and al-Buraymî (in the present United Arab Emirates, eastern Arabia) in the spring of 1948 noted that he ate "toadstools" roasted by his guide and described them as "creamy and delicious" (Thesiger 1959:249). These were almost certainly *ʿarjûn, Podaxis,* as
Thesiger elsewhere (1950-51:164) refers to "edible toadstools (Podaxon)" in the same geographical area.

6.4. Medicinal Uses of Plants

My consultants pointed out a number of local desert plants said to have medicinal uses, but my impression was that they actually made little use of them, even during the period of my data collection in the early 1960s when modern medical services were still largely unavailable to the rural population. The Bedouins seemed rather to use the same herbal remedies that villagers did. These consisted largely of the traditional materia medica long utilized in the Persian Gulf region, comprising many plant drugs imported from neighboring lands such as Iran and India. I remember one occasion when I was invited by a Marri acquaintance to view the medicines that his wife used. Her chest contained only ḥabbah sōdā (lit. "black seed," seeds of Nigella sativa L.), murr (myrrh, oleo-resin of Commiphora myrrha Nees, and ḥaltīt (asafetida, the pungent resin of Ferula assa-foetida L.), all commonly found in village herbalist shops and imported, respectively, from the Mediterranean region, Somaliland or southern Arabia, and Iran, where they have long been produced as medicinals. The list of reputed local desert plant remedies is nevertheless of interest, and I present it below (section 6.4.1) with notes on uses. Some of these medicinals appear in village herb shops, but I have not heard of Bedouins in the study area collecting plants for sale. I suspect, rather, that the town herb specialists collect their material themselves or acquire them from other dealers or relatives. Many shopkeepers in eastern Arabia have family tribal connections; there are quite a few Dawāsir settled in ad-Dammām and al-Khubar, and I noted that several items in herbalist shops were said to have been brought in from Wādī ad-Dawāsir, the heartland of that tribe.
Wild plants of narcotic or hallucinogenic reputation seem to be very few in our area. A Shammari Bedouin told me, however, of a plant called **harj**, "a low shrublet with leaves like tobacco," said to grow in the area of Sakakah in northern Arabia and that reportedly affected people's minds. He said that "a man who ate some leaves about 15 years ago [i.e. around 1951] became incoherent and talked like a crazy man. A woman who ate some ran around like a locust, riding an imaginary donkey and shouting that so-and-so had had sex with her." One might suspect a Solanaceous plant such as *Withania somnifera* or a species of *Datura*, *Solanum* or *Hyoscyamus*, but I have so far not been able to identify it. The Arabic name, **harj**, is derived from a root meaning "confusion, disorder." Hobbs (1989:40) reports the collection of *Hyoscyamus boveanus* (locally called *sēkārān*, "drunk weed") as an intoxicant by the Ma'zah Bedouins of northeastern Egypt, but I can find no record of that species in our study area. I have never heard such qualities attributed to our *Hyoscyamus pusillus*, but other species of the genus are found in other parts of Arabia. The Shammari account recalls the story told by William Palgrave, who claimed to have encountered a hallucinogenic plant during his travel in the fall of 1862 in the central Arabian region of al-Qaṣīm. Its seeds, he says, "when pounded and administered in a small dose, produce effects much like those ascribed to Sir Humphrey Davy's laughing gas; the patient dances, sings, and performs a thousand extravagances, till after an hour of great excitement to himself and amusement to the bystanders, he falls asleep, and on awakening has lost all memory of what he did or said while under the influence of the drug" (Palgrave 1865:1:254-255). His description of the plant suggests a legume but does not make full botanical sense, and Palgrave's veracity in such details has often been questioned. The British explorer St. John Philby tried without success to verify the story when he visited the same area in 1918 (Philby 1928:281).
6.4.1. List of Medicinal Plants

The following list comprises folk generics said to have medicinal uses. Arrangement is by what appears to be their primary use although some reportedly have multiple applications:

**Arthritic Complaints**

*ḥarmal*, *Rhazya stricta* Decne. (Apocynaceae). The leaves of this shrubby perennial, according to some elder consultants, are smoked in a tobacco pipe and inhaled as a remedy for arthritis. Others said that a tea made from the leaves is "good for the liver" and that it is also applied to boils and wounds. According to Ghazanfar (1994:26-27), *Rhazya* "has been one of the chief medicinal plants in Arabia." She notes that it has been used in southwestern Pakistan to treat skin eruptions and boils, and as a febrifuge, and that it is used in Oman to treat chest pains (by smoke inhalation) and externally for skin rash and as eye drops. According to Miller and Morris (1988:34) an infusion from the leaves of *Rhazya* was drunk in southern Oman as a febrifuge and to relieve stomach pains. Mossa, Al-Yahya and Al-Meshal (1987:212) cite reports of the isolation of more than 50 indole alkaloids from this plant and of anti-microbial activity in extracts. The Arabic name, *ḥarmal*, is also applied, mainly in other parts of the Arab world, to the zygophyllaceous plant *Peganum harmala* L., also an important medicinal but rarely seen growing in our area.

*ṣīḥ*, *Artemisia sieberi* Besser (Compositae, in literature as *A. herba-alba* Asso). This ascending, strongly lemony-sweet aromatic shrublet is found on silty floors of rocky country in our northern plains and wadis. Bedouins report its use as a medicinal for rather vague indications by inhalation of its smoke or by drinking a water infusion.
sakhbar, idhkhir, khšāb, ḥamrā, Cymbopogon commutatus (Steud.) Stapf. (Gramineae). This perennial grass of rocky wādi channels is easily recognizable by the distinct, sweet lemony odor of its crushed foliage. It is a close relative of the several other species of Cymbopogon exploited in tropical countries as a source of aromatic oil (lemon grass oil) and perfume essences, including C. flexuosus Stapf., C. nardus (L.) Rendle, and C. schoenanthus Spreng. (Uphof 1968:167-168). It may be used in Arabia primarily for its aromatic qualities, but I found it for sale in an herbalist's shop in ad-Dammām where it was said to be used medicinally by inhalation of its smoke. It is placed provisionally in this category on the basis of its use by smoke inhalation, a route that tends to be used for rheumatism remedies or for lung disease. I have no record of its specific indications.

Cold Remedies

ţagtaj, a kind of mushroom (not identified). Musil (1927:254) described mushrooms that "grow under the sand" (but are not truffles) which are not edible but which were used by the Ruwalah Bedouins of northern Arabia as a remedy for colds. They were also dried and smoked in a pipe as a treatment for rheumatism.

Emetics

‘iḍat al-hāyish, Euphorbia retusa Forssk. (Euphorbiaceae). According to an elder consultant of the Qaḥṭān tribe, the milky sap of this plant is mixed with water and drunk as an emetic.
Eye Conditions

jalwah, *Atractylis flava* Desf. (Compositae). According to a Qahtāni tribesman, the stem of this plant is peeled and the inner portion applied directly to the eye to cure eye ailments. He said it creates a burning sensation in the eye and makes it red “but is very good for it.”

faga’, *Tirmania* spp. Alsheikh and Trappe (1983:89) reported that desert truffles, *faga’*, of the genus *Tirmania* (known to the Bedouins as the *zâdî* folk specific) were used by Bedouins in Kuwait, in some unspecified way, to treat eye diseases.

Female Conditions

kaftah, kaff maryam, birkan, barukân, jmē’ fâtimah, kaff al-‘adhrā, kafn, gfe’ah, gnēfidhah, *Anastaticua hierochuntica* L. (Cruciferae). This annual is well-known throughout Arabia by Bedouins and townspeople for its use as an easer of childbirth given in the form of a tea or used as a charm. The plant is inconspicuous when green, extending its radial stems horizontally on the ground. When it dies and dries, its somewhat woody stems curl inwards forming a characteristic ball usually 4-7 cm in diameter that is likened to the clutched fingers of the Virgin Mary (recognized in Islam as well as in Christianity) in pain at childbirth, a symbolism that obviously plays a role in its reputed medicinal effects. Several of its vernacular names mean ”Mary's hand” or ”the Virgin's hand.” The plant is widely distributed in our study area and is often collected and sold in herbalists' shops for use in towns.

‘abal, arţā, *Calligonum comosum* L’Hér. (Polygonaceae). I found Bedouin women in the Thursday market at al-Hufūf selling fine twigs of this common duneland shrub for use,
mixed with milk they said, as a tonic "for women." It was sold both in the form of twigs and as already pounded to a fine powder, ready for use. I also found the twigs for sale in an herbalist's shop in Dammam. This plant may also have anti-diarrheal applications (see section 6.3.2).

Fevers

ja'dah, Teucrium polium L. (Labiatae). This sweetly aromatic perennial of rocky terrain is known to all Bedouins for its use (at least in former times) as a remedy for fevers, including malaria. A Qaḥṭānī Bedouin from central Arabia told me that the plant is used by putting it into the hollow shank bone of a sheep and smoking it like tobacco. According to a Ruwalah tribesman, it is made into a tea. Dickson (1955:89-92) cites reports of its former use in Europe and India. Uphof (1968:517) says that a liquid extract of the plant was used in India for the treatment of fungoid diseases and abscesses. Ghazanfar (1994:126, 128) notes that eight diterpenoids have been isolated from the plant, that the percentage of essential oils varies from 0.05 to 0.09 percent and that a sapogenin has also been identified.

gēšūm, Achillea fragrantissima (Forssk.) Sch. Bip. (Compositae). This extremely fragrant-foliaged perennial of silt bottoms in the northern part of our study area is said to be used, probably in the form of a tea, for fevers. I found it also in town herbalist shops sold for that purpose.
Kidney Ailments

‘āgūl, *Alhagi maurorum* Medik. (Leguminosae). Seldom found in the desert but sometimes seen on disturbed ground around the margins of cultivated areas, this shrublet is said by some to have roots used in making a tea for treating kidney or liver ailments.

Laxatives

*saharī, ẖanḍal, *Citrullus colocynthis* (L.) Schrad. (Cucurbitaceae). This plant is well known among Bedouins and villagers for its laxative qualities. A few seeds are said to be an effective dose. According to one consultant who asked me to give him a modern laxative, *saharī* is effective (*yimashshā -l-baṭn*, literally "it makes the belly walk") but can cause painful cramping.

*shajarat ad-dabb, ẖishrig,* *Cassia italica* (Mill.) F. W. Andr. (Leguminosae). An elder of Qaḥṭān said that this plant is sometimes used as a strong purgative, "stronger than *saharī* (*Citrullus colocynthis*, above)." He added that livestock avoid the plant as they do not like its taste. Other consultants considered it dangerously poisonous to grazing camels.

*gretāḥ, *Plantago ovata* Forssk. (Plantaginaceae). According to Carter (1917:201) the seeds have been used by the Bedouins as a laxative.

*‘ušhar, *Calotropis procera* R. Br. (Asclepiadaceae). This erect, glaucous shrub, woody below, sometimes assumes treelike forms up to 5 m high. The foliage bleeds copious milky latex at the slightest wound. It is often considered poisonous, but available evidence from experiments on small mammals suggest that the toxicity of the raw latex may be somewhat exaggerated (Verdcourt and Trump 1969). Bark extracts, however, are
reportedly used in some tropical countries in the preparation of arrow poisons. Various toxic alkaloids have been isolated from the plant, and a powerful cardiac poison, gigantin, has been extracted from a related species, *P. gigantea*, of India (UNESCO 1960).

Masso, Al-Yahya and Al-Meshari (1987:214) state that our plant contains a bitter principle, calotropin, which is a cardiac poison of the digitalis type. They note that the latex is purgative and caustic and is used topically in some cases as a counter-irritant. Bedouin tradition in eastern Arabia does hold it to be poisonous, and livestock are said to avoid it. There is good evidence for this in the plant’s persistence on ruderal sites around villages and towns where household goats and sheep would otherwise be expected to browse it to destruction. As I have reported earlier (Mandaville 1990:237): "Small doses of the latex are sometimes used medicinally by Bedouins, although its specific indications are usually rather vague. An elder of the Bani Hajir tribe told the author that a safe but effective dose can be obtained by scooping out the seeds and pulp from a halved ripe follicle and drinking a full measure of sheep, goat or camel milk from the resulting hollow, cuplike, still-green skin. Enough of the active principle is said to be absorbed from the fruit wall to be effective, and not enough of the latex will be consumed to pose any danger." The object in such use was probably a purgative effect. Miller and Morris (1988:42) report use of the latex in southern Arabia to treat skin ailments. Ghazanfar (1994:31) reports its use in Oman to relieve pain by the application of heated leaves with oil.

Skin Afflictions and Wounds

*‘ifēnah, Cleome amblyocarpa* Barr. et. Murb. (Capparaceae). Musil (1927:48) reports use of this plant as a water infusion among the Ruwalah of northern Arabia for application to wounds to prevent inflammation.
**basbās, Anisosciadium lanatum** Boiss. (Umbelliferae). Used for skin sores and boils, probably as a water extract.

**Snakebite and Scorpion Stings**

**ramrām, Heliotropium ramosissimum** (Lehm.) DC., *H. bacciferum* Forssk. (Boraginaceae). My consultants confirmed reports that *ramrām*, comprising these two very similar species of heliotrope, both low, somewhat shrubby perennials with rough foliage, has long been used for the treatment of snakebite in Arabia. Dickson (1951:467) reported from Kuwait the desert folklore that the *waral* (the monitor lizard, *Varanus*) rolls in the plant’s foliage and eats its leaves as an antidote to snake venom. Human snakebite victims were given tea from the leaves of *ramrām* while a leaf poultice was tied to the wound. By far the most common species of venomous snake in eastern Arabia is the sand viper, *Cerastes cerastes*, and adult victims usually recover from bites without treatment. Dickson (1951:160) also reports use of this plant as an infusion or paste to treat mouth sores. A closely related heliotrope of Dhufar, in southern Arabia (*H. fartakense*), also called *ramrām*, is reported used there not only for snakebite but to treat skin sores, as an antipruritic, and for colic (Miller and Morris 1988:74). One of my consultants from northern Arabia attributed lizard-immunizing power like those of *ramrām* to a rather different plant, *janbah, Fagonia bruguieri* DC. (Zygophyllaceae). This suggests the possibility of a similar use by that plant.

**msēkah, zgēghah, frēthah, zifrah, Haplophyllum tuberculatum** (Forssk.) A. Juss. (Rutaceae). This strongly and unpleasantly odiferous perennial was used, according to Dickson (1955:48-49) as a remedy for scorpion stings. The harvested plant is put into a pocket or bag to dry, then pounded up, mixed with a little hot water, and bound onto the
site of the sting. Ghazanfar (1994:188) reports its use in Oman as a water extract to treat painful joints and in a compound suppository given to mothers post partum to strengthen the back muscles. She also notes its use as a sedative. Miller and Morris (1988:248) report its use in southern Arabia to treat epilepsy and hysteria as well as gout.

**Stomach Ailments**

*bābūnaj, Matrcaria aurea* (Loefl.) Sch.-Bip. (Compositae). This fragrant annual, a close relative of European chamomile (*Matricaria chamomilla* L.), is found on inland silt basins of our north-central area. It is known to both Bedouins and villagers, who use its flowers to make a tea for digestive ailments and as a general tonic.

**Tonics**

*tarthūth, Cynomorium coccineum* L. (Cynomoriaceae). Bedouin elders of the Dhahran area said that villagers of al-Qaṭif Oasis used to collect donkey loads of this plant to bring in for sale to be eaten as a spring tonic (see above, section 6.3). The crimson pigment of the epidermis was also used as a dyestuff.

**Toothache**

*kurrāth, kirrēth, Allium sphaerocephalum* L. (Liliaceae). According to a consultant of Bani Ḥājir the *zibrij*, or spherical inflorescence, of this coarse wild onion is used to treat toothache by placing it on a heated knife blade and inhaling the smoke into the mouth.
6.4.2. Veterinary Medicinals

As might be expected in a pastoral society, plant remedies are sometimes used to treat livestock ailments. The following folk generics were reported useful in traditional veterinary medicine:

Mange Remedies for Camels

*makar* (Āl Murrah), *la’la’ah* (Āl Rāshid, non-Najdī Arabic), *rgēyigah* (Shammar), *Polycarpaea repens* (Forssk.) Aschers. et Schweinf. (Caryophyllaceae). This small-leaved prostrate perennial of sand terrain has been used to treat sarcoptic mange of camels, which is the most frequent and troublesome ailment suffered by that animal. Before lindane and other modern arachnicides became available in Arabia, camels with mange were treated with lime, arsenic and sulfur in a lengthy procedure described for me by an elder of Bani Hajir as follows: First day: mix *nūrah* (quicklime) with *samn* (liquid clarified butter) and rub all over the camel’s body to remove hair. Second day: leave lime mixture on the animal. Third day: scrape off the hair with the lime and rub down the skin with a mixture of *samn, kibrū* (sulfur) and *zirnīkh* (yellow arsenic, arsenic trisulfide, the sulfur and arsenic purchased in village markets).1 Next, feed the camel a mixture of pounded sulfur and water (or *samn*) and pour some of the mixture down the animal’s upheld nose. Fourth day: Leave the mixture on to work. Repeat the above procedures once or twice, leaving a day or two between treatments. After 10-14 days wash down the camel with saltwater or sea water and rub in *samn. Makar* was used mixed with arsenic in this procedure or simply mixed with arsenic and applied. According to Āl Murrah consultants, *makar* can also be used alone, either after burning in the form of ash or as

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1 Hooper (1937:190) describes arsenic trisulfide, or orpiment, as sold in Middle East bazaars and obtained from the Hayana Mountains of Iran.
crushed leaves. Dickson's (1955:61) report that the leguminous annual *Lotus gircinii* DC. was called "makkar" and used to treat camel mange may have been based on a plant identification error or a different northern usage.

ʻalandā, *Ephedra alata* Decne. (Ephedraceae). A consultant of Āl Murrah said this shrub was used to treat sarcoptic mange of camels in the same way that *tarfā* (*Tamarix* spp.) is used (see below): by burning to ashes which are rubbed into the animal's skin.

*tarfā*, *Tamarix arabica* Bge., *T. aucheriana* (Decne.) Baum, *T. macrocarpa* (Ehrenb.) Bge., *T. mannifera* (Ehrenb.) Bge., *T. ramosissima* Ledeb. (Tamaricaceae). Tamarisk was used to treat sarcoptic mange of camels by burning the wood "all night," then rubbing the ashes into the diseased skin of the animals.

According to an elder Qaḥṭānī, cruciferous herbs that are hot to the taste (examples given were *ṣīffār*, *Schimpera arabica* Hochst. et Steud. and *khzāmah*, *Horwoodia dicksoniae* Turrill), when grazed by camels, bring what he called *jarab al-kirsh*, "mange of the rumen," to the surface of the skin where it can be treated more easily. Camels were said to graze on such plants mainly at night. I do not have any evidence that camels were purposely induced to eat these plants.

**Lung Diseases**

*murr*, *Commiphora myrrha* Nees. (Burseraceae). This oleo-gum resin, myrrh, is not native to our study area but is a commonly used import from the Somali coast of Africa or from southern Arabia. According to a consultant of Bani Hājir, a serious lung disease of camels called *nihāz* is treated by giving the animal water containing powered myrrh. At the same time, the camel is made to inhale smoke from burning camel dung.
Eye Inflammations

\textit{thmām}, \textit{Panicum turgidum} Forssk. (Gramineae). A consultant of Banī Häjir described how the roots of this shrubby perennial grass, an important grazing plant, are used as a remedy for inflammation of the eye in sheep and goats. The roots are well chewed by the herdsman and the mixture of plant juice and saliva is spat into the animal's eye, which is held open with the fingers.

Galls and Wounds

\textit{‘ushar}, \textit{Calotropis procera} R. Br. (Asclepiadaceae). A Qaḥṭānī elder said that the somewhat caustic milky sap of this plant was used to treat camel galls and wounds.

Nervous Conditions

\textit{shīḥ}, \textit{Artemisia sieberi} Besser (syn. \textit{A. herba-alba} Asso). (Compositae). Musil (1928a:383, 408) reported its use by the Ruwalah Bedouins in northern Arabia as a smoke inhalant to cure glanders in horses and to treat "bewitched" animals.

6.4.3. Medicinal Plants Sold by Herbalists

It was my experience that the Bedouins of eastern Arabia, following the practice of the settled folk in the same region, sometimes purchased remedies from herbalist shops in the towns. I do not, however, have any record of which of these (apart from the examples mentioned in the first paragraph of section 6.4) the Bedouins actually use. I gathered a collection of such medicinals in herbalists' shops in al-Quṭīf and ad-Dammām and present
a list below of the plant products that I was able to identify. In the main, these were similar to a list of useful plants and drugs collected in Iran and Iraq and identified and described by Hooper (1937). They are known to the shopkeepers and labeled (if at all) only by their Arabic names. Plants sold in shops that are native desert plants in our area, or closely adjoining regions, are marked with an asterisk. The proprietors of herbalist shops sometimes seemed to be purposely vague or secretive about the uses made of the herbs they handled, and some of my specimens lack notes on local indications. I use classical Arabic transliterations for the names which were given me in the herb shops.

‘afs, Quercus sp. (Fagaceae). Oak galls. Probably used as an astringent or in tanning.

*artā. Calligonum comosum L’Hér. (Polygonaceae). Dried twigs. Said to be used for women’s ailments.

bahilaj, Terminalia bellerica Roxb. (Combretaceae). Dried fruit, belleric myrobalans. This staple of traditional medicine in Southwest Asia is used as an astringent and a digestive (Hooper 1937:177).

*babsās, Anisosciadium lanatum Boiss. (Umbelliferae). Dried upper stems and fruits. Used, probably as a water extract, for skin sores and boils.

dam al-akhawayn Dracaena cinnabari Balf. (Agavaceae). Lumps of very dark red resin generally referred to in the West (as in Arabic) as "dragon's blood." The drug is imported from the island of Socotra, off southwestern Arabia, and used as an astringent and stiptic (Hooper 1937:114).

dayram, tentatively identified as bark from the walnut, Juglans regia L. (Juglandaceae). Strips of tree bark, dull reddish brown in color, generally 2-3 cm wide and 8-12 cm long,
sometimes folded double. Also sold in local spice markets and said to be used by women to cleanse the mouth and redden the lips. Possibly brought in from India. Ghazanfar (1994:120) says that in Oman walnut bark is "soaked in water and rubbed on the teeth and gums for cleaning; it gives a reddish tinge to the gums which is found attractive." She says that the bark is called *bambar* in Saudi Arabia, but in our area I found that name applied only to the oasis tree, *Cordia myxa* L., the fruits of which are said by villagers of al-Qa‘īf to be a vermifuge.

*fīlīfī* *mabārad*, *Piper retrofactum* Vahl., syn. *Piper longum* L. (Piperaceae). Long pepper. Dried spikes of unripe fruits. According to Schopen (1983:55) this spice imported from India is used in Yemen as a tonic, stimulant and aphrodisiac. It is called there *dār* *fīlīfī*.

*Bhīsl*, *Myrtus communis* L. (Myrtaceae). Myrtle. Sold both as whole dried leaves and as a fine powder (from the leaves). Used, among other things, as baby powder. Some similar-appearing powder of the same name probably comes from *Ziziphus spina-christi* (L.) Willd.

*ḥabb ġharmal*, *Peganum harmala* L. (Zygophyllaceae). Seeds. One of the better known traditional drugs in Southwestern Asia, where it is used to treat colic, kidney stones and as a vermifuge. The active alkaloids include harmine, harmaline, harmalol, and peganine. The seeds also have antibacterial activities (Ghazanfar 1994:218).

*ḥabbah sawdā’, samrā* ("black seed"), *Nigella sativa* L. (Ranunculaceae). Seeds. This remedy is as well known in Arabia as aspirin is in the West and is used by both Bedouins and villagers for a wide variety of ailments ranging from nasal congestion to constipation and (mixed with other remedies) for childbirth recovery.
**halilaj, hulayhilah, Terminalia chebula** Retz. (Combretaceae). Dried fruits (black myrobalans). Found in all traditional drug shops in the Middle East, black myrobalans are used as a purge and to relieve stomach pains (Hooper 1937:177). It is used in Oman for treating constipation, flatulence and acid stomach (Ghazanfar 1994:87).

**haltit, Ferula assa-foetida** L. (Umbelliferae). Asafetida. Lumps of the oleo-gum resin, of very strong, somewhat unpleasant alliaceous odor. One of the important traditional drugs exported from Iran and neighboring regions; used to treat flatulence and, at least formerly, hysterical conditions (Trease 1961:441-442).

**hard, Curcuma domestica** Val. or *C. longa* Trim. (Zingiberaceae). Turmeric root pieces. Said used, after pounding to powder, for children’s ailments.

**harmal, Peganum harmala** L. (Zygophyllaceae). Dried leaves, said to be used by smoking in a pipe. Ghazanfar (1994:218) reports that the leaves are used in Yemen to treat arthritic pain by rubbing on joints and that an antihelmintic tea is made from them.

**hayl habashi** ("Abyssinian cardamom"), *Amomum subulatum* Roxb. (Zingiberaceae). Hill cardamoms. Dried fruits. Said to have been imported from (or through) Iran and India. They are used both as a spice and as a carminative and stimulant (Hooper 1937:84).

**hulbah, Trigonella foenum-graecum** L. (Leguminosae). Fenugreek seeds. Grown locally in oasis gardens. This well known remedy is used in Oman to treat bronchitis and coughs and for post partum treatments of mothers. The seeds contain a steroidal saponin, diosgenin, as well as the alkaloid trigonelline (Ghazanfar 1994:117).


‘irq as-sūs, *Glycyrrhiza glabra* L. (Leguminosae). Licorice root. Long used in Asia for cough and chest complaints, also to relieve indigestion from eating fruit (Hooper 1937:122).

*ishriq, *Cassia italica* (Mill.) F. W. Andr. (Leguminosae). Dried leaflets and fine stems. Used as a strong purge.

izāfar al-jānn ("finger nails of the jinn"), *Astragalus hamosus* L. (Leguminosae). The dried, curved fruits. Probably from Iran. Said to be used by inhaling the smoke.


jāwā, *Styrax benzoin* Dryander (Styracaceae). Crude benzoin, sold in the markets as large lumps of fragrant dark resin with whitish inclusions. Probably used mainly as an incense but noted in the literature for having medicinal properties as an expectorant, antiseptic and as an inhalant for lung diseases.
jawz, *Myristica fragrans* Houtt. (Myristicaceae). Dried whole fruits of nutmeg. According to Trease (1937:261), nutmeg has been used as a carminative.

jawz fūfal, *Areca catechu* L. (Palmae). Areca (betel) nuts. The nuts contain an alkaloid, arecoline, which is active medically. Powdered nuts are used as a vermifuge for dogs (Trease 1961:166).

kabdah, *Entada gigas* (L.) Fawc. et Rendle (Leguminosae). Seeds (which are remarkable and unmistakable in both size and form). An import from India. Hooper (1937:117) cites reports that these seeds have been exported from India to Iran for medicinal uses, one of which was externally for back pain.

*kaff maryam, Anastatica hierochuntica* L. (Cruciferae). Small dried whole plants of characteristic spheroidal shape. Used to make an infusion drunk to ease childbirth.

kuzbarah, *Coriandrum sativum* L. (Umbelliferae). Coriander seeds. Hooper (1937:106) reports its use to relieve headache and (as smoke) for toothache.

*lawz bahri* ("sea almonds"), *Avicennia marina* (Forssk.) Vierh. (Verbenaceae). Dried capsules. Identified by comparison with my specimens of *Avicennia* collected in Tārūt Bay. Sold in an herbalist’s shop in ad-Dammām and said to be used, pounded up in milk, to "strengthen the male faculties."

lisān at-ṭayr ("bird's tongue"), *Holarrhena antidysenterica* Wall. (Apocynaceae). A product of India.

lubān, *Boswellia sacra* Flueck. (Burseraceae). Frankincense. Lumps and drops of oleogum resin. Used primarily as incense but also has medicinal uses. Imported from Dhufar, southern Oman or from the Somali coast of East Africa.


qajarāt, *Hibiscus sabdariffa* L. (Malvaceae). Dried red flower parts. This material is also sold in spice markets and is used in hot water to brew an acid-tasting reddish tea. Its presence in herbalists’ shops suggests that it is also considered medicinal in some respect, but I have no information on such use.

*qayšūm, Achillaea fragrantissima* (Forssk.) Sch. Bip. (Compositae). Dammam. Dried upper stems and flowers. Said to be used for fevers.


quṣṭ, *Saussurea lappa* C. B. Clarke (Compositae). Root pieces. According to Hooper (1937:170) this staple of Middle Eastern traditional medicine was exported from Kashmir, India.

rashād, seeds of *Lepidium sativum* L. (Cruciferae). Hooper (1937:136) notes their use in the Middle East as a tonic, aphrodisiac and diuretic.
ṣabr. *Aloe perryi* Baker (Liliaceae). Small, nearly black pieces of resin-like dried juice. According to Trease (1961:177) *Aloe perryi* is found on the island of Socotra off southwestern Arabia, and in East Africa. It is widely known as a purgative.

*sāf, idhkhir, Cymbopogon commutatus* (Steud.) Stapf. (or possibly *C. schoenanthus* Spreng.). Gramineae. Said to have been brought in from the area of Wādī ad-Dawāsir, in central Saudi Arabia. Used as a smoke inhalant.

ṣamagh, gum of *Acacia senegal* (L.) Willd. (Leguminosae). Gum Arabic.

sannā makki, ‘ishriq, *Cassia acutifolia* Del. (Leguminosae). Leaves, used as a laxative.

shadhāb, *Ruta chalepensis* L. (Rutaceae). Broken stems and leaf pieces. Said to have been brought in from ʿAsīr, southwestern Saudi Arabia. Used to treat mental diseases and for those "possessed by devils or jinn."

*shayʿah, probably Vernonia cinerascens* Sch.-Bip. (Compositae). Dried stems, leaves and flowers. Said to have been obtained from the area of Wādī ad-Dawāsir, central Arabia. Ghazanfar (1994:50) notes that *V. cinerea* (L.) Less. is used in Oman to treat scorpion bites, fevers and as an antihelminthic.

*shīḥ, Artemisia sieberi* Besser (Compositae). Ghazanfar (1994:40) writing of this plant's use in northern Oman, says that it is used as an antihelminthic and that its essential oils are reportedly toxic to *Ascaris*.

samm as-samak ("fish poison"), *Anamirta paniculata* Coleb. (Menispermaceae). Dried fruits. Used by the coastal people for catching fish in shallow waters of the Persian Gulf. Broken pieces are put into small bread balls and thrown into the water. Fish that take the bait are partly paralyzed and can be collected from the water surface. I have tried it with
success. According to Hooper (1937:85) it is also used in the Orient for poisoning dogs and making skin ointments.

*ṭurthūth, *Cynomorium coccineum* L. (Cynomoriaceae). Sometimes eaten as a tonic or used in dyeing to obtain a crimson color. Said to be used medicinally for women's complaints.


*ushnān, *Seidlitzia rosmarinus* Ehrenb. ex Bge. (Chenopodiaceae). Dried leaves and stem pieces. Crushed up in water and used as a soap substitute for washing.

washaq, *Dorema ammoniacum* Don (Leguminosae). Rounded lumps of reddish-brown gum resin said used on wounds, sores. My specimens form the characteristic milky emulsion in water described by Hooper (1937:113), who says the plant is native to desert regions in Afghanistan and Iran and that it is used as a plaster for wounds as well as a stimulant and expectorant.

Pods of *Cassia fistula* L. (Leguminosae) were purchased in an herbalist shop, but I have no record of the vernacular name. According to Uphof (1968:111) it is used primarily as a laxative.
Unidentified Medicinals

The following specimens, obtained from shops in al-Qaţīf or ad-Dammām, have not yet been identified:

irm, leaves of a labiate plant, perhaps *Lavandula* (lavender) said to come from the Hījāz (the western, mountainous region of Saudi Arabia) and to be used mixed with *qayṣūm*, *Achillea frangrantissima* (Forssk.) Sch.-Bip., for treating fevers.

far‘ah, broken pieces of a yellow, clearish resin with a smooth, glassy fracture. Somewhat soluble in alcohol but not in water. Resembles pine resin but the odor and taste of a freshly fractured piece seem too mild for that.

jift, thin, dark brown pieces of apparently tree bark mixed with broken pieces of almond-shaped seeds. Possibly an oak bark, *Quercus* sp., and probably used for tanning or as an astringent.

mumthalah, dark brown hard nuts, somewhat of walnut shape, mostly 2-3 cm in diameter, each containing a pair of "meats" obtainable by cracking the shell. Said to be used as an emetic. It is not *Strychnos nux-vomica* L.

qarab, broken sections of what appear to be leguminous pods, very thin and flat and strongly constricted between the seeds. Possibly the pods of *Acacia nilotica* Del.

6.5. Tanning and Dyestuffs

During my data collection I did not come across much detailed information about plant uses for tanning and dyeing. This was probably a result of my lack of female consultants as well as the fact that commercial chemical agents had largely supplanted traditional plant
materials for these purposes, even by the 1960s. There appears to be a dearth of such information for the greater part of the Arabian Peninsula.

Several of my consultants said that 'abal or (in the north) arță, *Calligonum comosum* L’Hér., but for tribes of the Rub’ al-Khali *Calligonum crinitum* Boiss. subsp. *arabicum* (Sosk. ) Sosk. (Polygonaceae), was used in tanning without describing the method of use. I personally had found that chewing on twigs of this shrub gave a strongly astringent taste, as of tannins. Musil (1928a:70) provides some insight into its probable use when describing the tanning of camel hides by women of the Ruwalah early in the twentieth century. He says they took a half hide of camel, then treated it first by rubbing in salt and wheat dough. After curing five days rolled in the shade, the hide is unrolled again and the hair and any remaining flesh are scraped off. They then "lay it in a tanning mixture of arță [Calligon comosum] or najib roots." There is no doubt about the identity of the first material, arță. Musil says it was collected by the women themselves, while the second was purchased. The najib may have been an Acacia product, possibly bark (despite Musil's reference to "roots"). The basic meaning of najab is "bark," and Hobbs (1989:52) found the name najub used for *Acacia* bark among Bedouins in eastern Egypt who a few generations earlier had migrated from Arabia. *Acacia etbaica* Schweinf. is a possible source species, as that is called garad today and classical Arabic sources refer to qaraẓ as an important tanning tree. Probably not found in the usual migration range of the Ruwalah, it would have been purchased in town markets. Finally, Musil continues, the leather is finished for use as large water bags by rubbing with camel bone marrow or camel fat, widak.

The English explorer H. St. J. Philby, during his crossing of the Rub’ al-Khālī in 1932, found man-made, circular depressions in gypsum rock, three feet in diameter and four inches deep, which he says his guides described as the dye pits used by Bedouin
women for leather goods, the "dye" coming "from the juicy shoots of the Abal bush
[Calligonum crinitum subsp. arabicum], pounded on sheets of leather laid over the pit,
until they yield their tannin" (Philby 1933:227). It seems much more likely that the use
here was for tanning rather than dyeing, although I had a consultant's report of ‘abal used
also for dyeing (see below).

An elder Āl Murrah consultant told me that ḥarmal, Rhazya stricta Decne.
(Apocynaceae), presumably the leaves, was used to tan hides. This shrub, considered
noxious to livestock, also has medicinal uses (section 6.4).

Another plant used for treating hides was, according to an elder of Bani Ḥājir,
‘ādhir, Artemisia monosperma Del. (Compositae). The leaves of this somewhat
aromatic, densely-leaved perennial of deep sand terrain were said to be pounded up and
put on skins to cure them. It is not entirely clear whether this use was for the basic
tanning operation, or for some subsequent special curing step.

Musil (1927:229) reported that Iwēzah, Prunus arabis Oliv. (Rosaceae), was
used by the Ruwalah for the tanning of hides. I have collected specimens of this wild
almond shrub in northern Arabia on the banks of Wādī ‘Ar‘ar, in the Iraq border region of
Saudi Arabia. Its distribution does not extend into our study area proper.

My consultants told me that the twining, lactiferous shrub ghalgah, Pergularia
tomentosa L. (Asclepiadaceae), was used in earlier times for the removal of hair from
hides preparatory to tanning. They did not have a clear idea of how it was used but
attributed the depilatory activity to the plant’s milky sap. Nicolaisen (1963:275) describes
how the same plant is used in North Africa by the Tuareg for dehairing hides for tanning:
a bundle of the plants is dipped in hot water and rubbed over the inner side of the hide,
which is spread out over rock or other firm support. Within a day the hair loosens and
can be plucked out with the fingers.
With respect to dyestuffs, I found good evidence of fairly recent use of the root parasite *tarthūth*, *Cynomorium coccineum* L. (Cynomoriaceae), for the dyeing of cloth. A Bedouin elder said that the crimson pigment (on the epidermis) of this plant stains fast and was used by Bedouin women of the Manāšir tribe (southeastern Arabia, including parts of the Rub' al-Khāli) to dye clothing the dark red color called *damī*, "blood-colored."

Dickson (1955:104) reported that a yellow dye was made by Bedouins (or townsfolk) in Kuwait from *ʿarjūn*, the toadstool *Podaxis pistillaris*, which has an upper part in the form of a vertical club rather than a cap. This snow-white fungus is found virtually everywhere in Arabia. This use fits Doughty's account of finding, during his north Arabian travels of 1876-78, "... certain tall white toadstools; some of our fellowship gathered them, and these, being boiled with alum in the urine of camels that had fed of the bush el-humth, yield they told me the gay scarlet dye of the Beduin wool-wives" (Doughty 1936:1:402). The color described fits the dye from *Cynomorium*, described above (which also grows in northern Arabia), but his eye witnessing of "tall white toadstools" can hardly be doubted. The use of "el-humth", our *hamd*, here is of special interest. The name applies not to any individual species of plant, but rather to that group of chenopodiaceous perennials known to play a special role in the nutrition of the camel through their content of salt and other minerals (sections 6.1.1 and 9.3). The excretion of such minerals in the camel urine presumably could play a mordant (or pH-raising) role in the dyeing process.

Some other plant sources of coloring matter:

*tannūm*, *Chrozophora oblongifolia* (Del.) A. Juss. ex Spreng. (Euphorbiaceae). This plant is traditionally associated with the making of writing ink in Arabia, and I was told
by a resident of Riyadh, in central Arabia, that it was used for this purpose. He said that
the capsules were "cooked" in its preparation. Villagers in Najd told me similar stories. I
have no evidence that it is used this way (or for any other staining purpose) by Bedouins
in our study area, although the plant occurs there and many of them knew that the plant
contained a dark stain of some kind. I found that the juice from capsules of this plant,
apparently upon oxidation, frequently leaves strong blue-black or reddish stains on
herbarium dryers. Another species of Chrozophora, C. tinctoria (L.) Raf., which is the
tournsole dye plant of southern Europe and the Mediterranean, also occurs in a few desert
parts of our study area. Some authorities consider C. oblongifolia to be conspecific with
that rather variable, better known plant.

‘abal, arţă, Calligonum comosum and C. crinitum subsp. arabicum (Polygonaceae), was
said to be used, not only for tanning (as described above), but to produce a red dye used
for clothing. The twigs and leaves (the latter are very fugaceous) are said to have been
used. Abū Ḥanifah ad-Dinawari, an excellent classical Arabic source of the late ninth
century A.D., says however, that the dye was prepared from the rind or epidermis
(qushur) of the roots of this plant (Lewin 1974:173). I have seen exposed roots of ‘abal
that are dark red in color.

gurūf, the dried rinds of the pomegranate, Punica granulatum L. (Punicaceae), sold in
village markets, are used to obtain a yellow color.

jift, a plant substance (unidentified but said to be imported from Iran) is purchased in
village markets and used to obtain a red color.

‘arfaj, Rhanterium epapposum Oliv. (Compositae). The bright yellow flowers of this
common grazing shrub are said to have been used in some way for yellow coloring.
**athl, Tamarix aphylla** L. (Tamaricaceae). Philby (1922:2:181) during his visit to Wādī ad-Dawāsir, southern Najd, in 1918, described the **athl** trees there, "... in full bloom with the *Kurma* or pinkish clusters of tiny berries, which enjoy a great reputation as a dye and are said to be found only in the south, the *Ithils* of Upper Arabia being entirely barren." Subsequently, in the Qaṣīm region of northern Najd, he described **athl** trees, "well grown and tipped with the russet flowering which I had noticed in Wadi Dawasir. But here apparently the flower does not mature sufficiently to be used for the making of dyes, though, according to Tami, further north at Ha'il some use is made of it" (Philby 1928:185-186). It is not entirely clear whether it is the flowers of this plant (which are not a very strong pink) or the capsules (which become rather strongly red in some species of *Tamarix*) that were used for dyeing.

**Soaps, Cosmetics and Dental Hygiene**

Bedouins in our study area do not make (and apparently did not historically make) true soap, that is, fats saponified through the use of lye obtained from plant ashes, although Philby (1933:14) refers to the ashes of *shnān* (*Seidlitzia*, see below) being used for making soap. They do, however, wash with fresh or dried, untreated material from at least two alkali-rich, succulent shrubs of the family Chenopodiaceae. The main active substance is probably sodium carbonate (soda ash, washing soda), which has historically been extracted in several parts of the world from salt marsh chenopods such as *Suaeda* spp. (Mabberley 1987:562; Dymock, Warden and Hooper 1890:3:141-142). The two plants listed below are of this type.

**shnān, Seidlitzia rosmarinus** Ehrenb. ex Bge. (Chenopodiaceae). Among the Sharārāt it is called **duwwēd**, "worm-bush," probably in allusion to its terete, succulent leaves. All
my consultants knew the use of this saltbush as a kind of "soap" for washing, although I saw no evidence that it was being used in the 1960s. This rounded shrublet, which grows to about 80 cm high, is usually found on hummocks on saline ground near *shākh*, or salt flats. The leaves are stripped, dried, then pounded up for use. Musil (1928a: 134) indicates that it was the only washing aid used by the Ruwalah of northern Arabia early in the twentieth century. I have not tried *shānā* as soap, but Dickson (1955:86) says that the dried leaves, pounded up, "produce quite a nice lather."

*‘ujram, ḥurḍ, ghaslah*, *Anabasis lachnantha* Aellen et Rech. f. (Chenopodiaceae). This saltbush with jointed, virtually leafless stems is used just like *shānā* in northern Arabia as "soap" for washing clothes, according to Shammarī and Hutaymī consultants. In our more southern study area the bush is called *‘ujram*. The Shammar use the name *ghaslah*, from the verb *ghasal*, "to wash." The Sharārāt call it *ḥurḍ*, which means "lye, alkali."

*harm*, *Zygophyllum qatarense* Hadidi, *Zygophyllum mandavillei* Hadidi, of a different family (Zygophyllaceae) but also of saline habitats, was also reportedly used as soap. But it was said to be inferior to *shānā* for that purpose and to damage clothing (Philby 1933:14).

*sird*, *Ziziphus spina-christi* (L.) Willd. (Rhamnaceae). This tree, which grows up to 12 m high and is found in both spinous and unarmed forms, is usually seen only as a cultivated plant of the oases. It does grow wild in southern parts of Arabia, and I found it in the desert once in our study area, possibly associated with an abandoned well nearby. The use of the leaves for washing is well known throughout Arabia, and leaf powder is still sold in the spice and medicinal sections of traditional markets in our study area. The leaves are collected, dried, and pounded up to a fine powder. This material is usually used as a hair wash; traditionally it was also used to wash the dead. I have experimented
myself with the powder as a shampoo, which is said to soften the hair and strengthen the roots. My experience with this product, which I found very effective even in hard water, was as follows:

Finely powdered leaves should be chosen in the market; flat leaf bits are more difficult to rinse out of the hair and provide less lather. A half cup of leaf powder well covered with warm water will begin to produce thin suds within a few minutes with little stirring. This mixture has a vegetable odor, but none is left in the hair. Two liberal applications, well rubbed in and rinsed between, leaves the hair soft and lustrous. It is superior to chemical shampoos in leaving the hair straight and more manageable (Mandaville 1990:207).

ḥinnā, Lawsonia inermis L. (Lythraceae). The henna shrub or small tree grows to about 2-7 m high with opposite, elliptical-oblanceolate leaves. It does not grow wild in our study area but is frequently cultivated in the oases (where I have also seen it spontaneous along roadsides) and as a decorative shrub in towns. The powdered dried leaves are widely used in the Middle East as a dyestuff giving a characteristic orange-brown color. It is used cosmetically by women of both the desert and towns for making decorative patterns on the body, usually the extremities. Dickson, whose wife Violet had a close association with Bedouin and town women in Kuwait, reported (1951:158-159) that Bedouin women used henna only to decorate their hands, fingernails and toenails, while the settled folk used it more widely. The powdered henna is mixed with water to make a paste, then applied carefully in the desired pattern. It is then allowed to dry until it falls off. This is repeated several times to obtain a dark enough color. I was told that mixing into the paste an aqueous infusion of crushed dried limes would strengthen the coloring action and that recent practice was to add a small amount of motor gasoline to the paste to intensify the color. There is a general belief that henna also toughens the hands and feet against abrasion, and elderly men (including one of my consultants of the Qaḥṭān tribe)
sometimes use it to dye their white beards reddish brown. It is also used by people of the oases to decorate their white donkeys with geometric patterns.

**nifal. Trigonella stellata** Forssk. (Leguminosae). This small, prostrate, sweet-smelling annual is, according to Dickson (1955:93) dried, pounded up, and used by women of the Shammar tribe as a hair dressing after washing.

**kaḥal, kḥīl, kahlā. Arnebia decumbens** (Vent.) Coss. et Kral., *A. linearifolia* DC., *A. tinctoria* Forrsk., *A. hispidissima* (Lehm.) DC., *Echium horridum* Batt. (Boraginaceae). Plants in this group are all characterized by a crimson pigment present on the surface of their taproots. This coloration can be easily rubbed off, and Bedouin women sometimes rub the fresh root on their face as a sort of rouge. Dickson reports the same application in Kuwait from *Arnebia decumbens* (1955:19).

**rāk, arāk, Salvadora persica** L. (Salvadoraceae). The roots and twigs of this large woody shrub, which grows 1-3.5 m high, are made into toothbrushes (*msāwīk*, sing. *miswāk*) used throughout Arabia by both Bedouins and people of the towns. The rāk shrub grows today at only two places within our study area, one of which is near the small port (and ancient ruins) of al-'Uqayr opposite Bahrain Island on the Persian Gulf. The other lies farther to the north and inland at a place called ar-Rakah, southwest of the settlement of 'Awāzīm Bedouins known as Thāj (also an archeological site). It probably also grew, historically, at the village called ar-Rakah between the coastal towns of ad-Dammām and al-Khubar. I have visited the two rāk sites in our study area on several occasions and always found evidence of recent digging and collection of the plant for toothbrushes. The miswāk toothbrush is also sold in all towns, often by sidewalk vendors, and much of this market material probably comes from western or southwestern Arabia, where the shrub is found much more commonly than in the northeast.
The *miswāk* is collected, stored and sold in partially unfinished form as washed and dried lengths of yellowish-white roots or twigs about 15-20 cm long and 1-1.5 cm in diameter. They are prepared for use by cutting back the epidermis and cortex from one end for about 2 cm. This exposes the fibrous stele, which after soaking and preparatory rubbing forms the "bristles" at the end of the stick. The bristles at the distal end of the stick thus extend and are parallel to, the "handle's" long axis, rather than at right angles to it as with a Western toothbrush. As the fibers become worn with use they are cut off and a new section prepared, and this procedure is continued until the handle becomes inconveniently short. In use, the *miswāk* has a somewhat medicinal and astringent flavor which is said to act as a dentifrice and general mouth cleaner. Normally, no additional dentifrice is used with it. A commercial toothpaste containing *Salvadora* extract has been marketed in Saudi Arabia under the trade name "Fluoroswak."

*Salvadora* is not the only shrub or tree used in Arabia as a source of toothbrushes. I purchased some *msāwīk* in the Eastern Province city of ad-Dammām made from *bashām*, the balsam tree, *Commiphora gileadensis* (L.) Engl. (Burseraceae) of western Arabia. According to Groom (1981:126), and despite its name, it is probably not the Biblical "Balm of Gilead." My specimens are twigs 15-19 cm long and about 0.8 cm in diameter, with the thin, reddish-brown bark still on. The *bashām* sticks have a somewhat bitter, resinous flavor and are said to give the breath "a good smell." They were said to have come from the western highland town of at-Ta'īf and were sold at the same price as the *rāk* sticks (Saudi riyals 2 for smaller ones, Saudi riyals 4 for the larger ones, corresponding to about US$ 0.60 and $1.20 respectively -- as a foreigner I may have been overcharged).
6. 7. Gunpowder

I had heard many reports from Bedouins of the use of ‘ushar, the giant milkweed Calotropis procera (Ait.) Ait. f. (Asclepiadaceae), for the preparation in earlier days of black gunpowder, bārūd. Nobody, however, seemed to have had firsthand experience with the process, and some, particularly younger, consultants had some obviously fanciful ideas about it. A Bedouin of Bani Khālid, for example, told me that the large, round fruits of ‘ushar were squeezed to produce their milk-white sap and that the latex was then mixed with gunpowder and dried to make it "stronger" and to make "the bullets shoot straighter." Others thought that gunpowder could somehow be made from the plant without any other ingredients. I finally met some older and more experienced men who had actually made gunpowder or had the information from their parents. They confirmed that it was actually only the charcoal from ‘ushar that was used in gunpowder making.

The plant, a tall, glaucous tree-like perennial with leaves like opened leaves of cabbage, can be found growing in many parts of Arabia, although it is not encountered very often. I found it both in remote desert locations and as a ruderal around towns, including the oil company community at Dhahran and on vacant lots in the Red Sea port of Jiddah.

Crude muzzle-loading guns were widely used in Arabia. I remember seeing old men carrying them for bird hunting in the 1940s and 1950s in eastern Saudi Arabia. Even at this time the powder they used was probably imported and purchased. Many gun supplies, including powder and pre-loaded shot shells for more modern shotguns, were brought in from England during that period. A few old timers also still used old factory-made European rifles requiring black powder cartridges, such as the British single shot Martini carbines, which used huge cartridges and .45 caliber bullets. Used cases for these were sometimes reloaded by the Bedouins themselves using black powder.
Black gunpowder everywhere was (and still is) normally made from three ingredients: saltpeter (potassium nitrate), sulfur, and charcoal. In Arabia, it was the charcoal from ‘ushar that was favored above all others for such use. This was probably because the wood of this tree-like milkweed is of a cork-like low density, fine textured and porous, and thus burns completely to a pure carbon and is easy to crush up into the required powdered form used in the mixture. A consultant from Oman said that the other ingredients of gunpowder, sulfur and saltpeter, "came from the ground." An elder Qaḥṭānī who had made gunpowder himself told me that the wood of ‘ushar was cut up into pencil-size pieces, then burned. The resulting charcoal is mixed with saltpeter (which he called malāḥ, a name related to that for common salt, milḥ) and khaffān, a form of yellow sulfur (the more usual name for sulfur in general is kibrīt). Asked what proportions were used of each component, he said that as he could remember a larger amount of saltpeter was used (which conforms with usual practice in powder manufacture).

Sulfur, being used medicinally, particularly for the treatment of camels afflicted with sarcoptic mange, jarab, is sold in all village markets. The saltpeter was imported or, in earlier times, made by the Bedouins themselves. The English traveler Charles Doughty gave an interesting account of how this was done at the time of his visit to northern Arabia in 1872-73: The Bedouins knew that "salts" (nitrates) were found in the excrement of livestock (either dung or urine, or both), so they extracted it from the earth at places where sheep and camels were concentrated and sheltered, such as in rock shelters, around watering places, and around old buildings. They would test such deposits by taste (presumably the ground tasted salty there), dig out the earth and boil it with water in kettles. Then, Doughty says, they "let the lye of the second seething stand all night, having cast in it a few straws: -- upon these yellow nitre crystals will be found clustered
in the morning. With such (impure) nitre, they mingle a proportion of sulphur, which is purchased in the haj market, or at Medina. Charcoal they prepare themselves of certain lighter woods, and kneading all together with water, they make a cake of gunpowder, and when it is dry, they cut it with the knife crosswise into gross grains; such powder is foul and weak, and they load with heavy charges” (Doughty 1936:1:410).

Doughty (1936:2:165) also once directly observed the making of gunpowder by the Bedouins, on which occasion his subject used charcoal not from ‘ushar (a usage Doughty mentions) but from wood of the castor oil tree (Ricinus communis L.), which grows in Arabian oases. I was given the name khirwa for that plant by a Hájirí Bedouin of the east.

6. 8. Crafts and Construction

Bedouins in our study area did not make baskets or mats from plant material but purchased and used those made by the oasis folk and sold in village or town markets. Most of the handicrafts of the Bedouins focus rather on the use of animal hair and wool in weavings and braided goods, and on leather. The usual material of purchased baskets and mats is leaves of the date palm (Phoenix dactylifera L.) or stems of the rush called nimas or wasal (Juncus rigidus Desf.), commonly found in oasis wetlands. Bedouins often keep some lif, or date palm fiber on hand for making small cords or rope or for other uses, such as the small wad always stuffed in the spout of the brass coffee pot to act as a filter that keeps grounds out of the cups. The fiber is purchased in village markets or simply taken from some of the date palm clumps that grow wild in coastal districts. Some tribal groups, such as sections of Āl Murrah at Yabrīn, also own date groves that are visited periodically or in which they have even settled. Palm fiber occurs in sheets, almost like woven cloth, around the trunk of the palm, behind the leaf stalk bases. Small
Plate 6.7. A consultant of Banī Hājjir demonstrates how he hobbles his camel using small rope of unidentified material. Four turns are taken around each leg to distribute pressure and provide sufficient strength. The camel's broad, cushion-like feet are an aid in traversing soft sand terrain.
cordage is made of *līf* by rolling on the thigh. Some other plant materials may also be used. Ferdinand (1993:94) has a photograph of an elderly Bedouin man in Qatar making light rope of an unidentified plant fiber that appears to be other than *līf*.

Dickson (1955:98-99) reported use by the Shammar tribe of culms from the common desert sedge called ‘*andab* (or in the north, *musṣēr*), *Cyperus conglomeratus* Rottb., for making ropes. "It was first soaked in water," she said, "then beaten out between boards, and twisted up." I did not hear of such use in our study area, and the heavier rope that I saw in use by Bedouins, such as for tent guys, was purchased, imported, commercial rope of natural or synthetic material. The poles for tents were also purchased items from the towns, being either rounded natural pole shapes or planed and smoothed commercial lumber.

Wood is used in the construction of essential Bedouin hardware such as the frames or trees of riding and pack saddles but these, also, are normally purchased in the towns, all of which usually have a special hardware market area dealing in Bedouin supplies. The camel stick, which is almost a required dress article among elder Bedouins, is made of a kind of cane and is said to be imported from India (Ferdinand 1993:238). The majority of the ones I have seen appeared not to be made of local oasis reeds, ‘*agrabān* (*Phragmites australis* (Cav.) Trin. ex Steud. or *Arundo donax* L.). This was apparently true even in earlier times; Musil (1928a:127) says the rattan camel sticks of the Ruwalah were purchased from peddlers, although one type was made by the Bedouins themselves from selected saplings such as of almond, presumably obtained during visits to settled areas or from the small, wild desert almond of the north, *lwēzah* (*Prunus arabicus*). There is, however, one kind of camel stick, called the *mishṭāb*, that may apparently be made from wild desert shrubs. Dickson (1951:652) says that this type was cut from wood of the *sīdr* shrub of the Šummān (*Ziziphus nummularia*). The form of
this stick, which has a hook-like end piece at angles to the main shaft but intrinsic with it, can be made easily only from the junction of a main and side branch of a woody shrub or tree.

Some wild plant materials have uses (at least historically) as stuffing material, such as for saddle pads and tent cushions. Such is the case with the amaranthaceous shrub ṭā or ṭuwwēm, *Aerva javanica* (Burm. f.) Spreng., which has thick fleece in its dense flowering spikes. It was used to provide stuffing for saddle pads, according to a Hajirī consultant. Shammarī and Rāshidī Bedouins said that the cottony fleece of ḡtēnah (also of other names such as ra‘, tirf), *Bassia eriophora* (Schrad.) Aschers. (Chenopodiaceae), was once used similarly.

### 6.9. Incense

Bedouins in our study area, like people of the towns, use incense on more formal social occasions, usually after a meal that is considered a special occasion, or sometimes just after tea and coffee for guests. The incenses used are plant materials not native to the study area but are nevertheless of some interest. Incense is always used in a special burner called a *midkḥān*, or *mibkhr* (both grammatically nouns of instrument meaning, respectively "smoker" and "censer") usually tall and square in shape and made of decorated wood. The incense is not actually burned as a flame, as doing so would not produce the desired aromatic effect. It is rather laid on glowing charcoal taken from the coffee fire so that it vaporizes with a whitish "smoke" but does not burst into flame. The *mibkhr* is brought out at the end of the meal after the guests, having eaten with the fingers of the right hand in traditional Arabian style, have washed up. Its appearance is a social signal that says, loosely, "This affair is finished now. Thank you for coming. Take this perfume with you (and thus let anyone you meet know that you have been our
honored guests)." The censor is passed around the circle of guests, each fanning its contents a bit and holding it briefly under their chins or beards and within the folds of their cloaks to capture perfume. The incense materials used in this little ceremony are usually one, but sometimes two of the following:

‘ūd, Aquilaria malaccensis Lam., A. agallocha Roxb. (Thymelaeaceae), sometimes called in English aloes wood, although it has nothing to do with the medicinal liliaceous genus, Aloe. The name ‘ūd basically means simply "stick [of wood]" but it is also the specific name for this costly plant product, which is sold as small, irregular pieces, lumps or splinters of wood, the most active parts of which are of darker color. It is imported from what is now eastern Bangladesh and from Southeast Asia, where it has been collected since ancient times. It is a pathological product of the Aquilaria tree, and its high price is a consequence of its rarity and the labor intensive process of collecting. Large trees have to be literally hacked to pieces by hand to discover the bands and spots of resinous material hidden in or near the heartwood (Dymock, Warden and Hooper 1890:3:217-224). When ‘ūd is placed on glowing charcoal, it emits a whitish smoke of sweet, pleasant odor, and it is considered to be the best incense material of the several kinds used in Arabia. In the 1970s I purchased a half tola (6 g) of Cambodian ‘ūd for 50 Saudi riyals (about 14 US dollars). It was considered high quality material, but even more expensive grades are available. Its use is considered a more opulent show of hospitality than that of frankincense.

lubān, Boswellia sacra Flueck. (Burseraceae). This is frankincense, which is the drops or lumps of resin collected from the trunk and limbs of (or ground beneath) the Boswellia tree of Dhufar, southern Arabia and the northern Somali coast of East Africa. It is used, like ‘ūd, vaporized on glowing charcoal in the midkhān.
Another kind of incense, called *bākhūr*, is sometimes also used. This is a commercially compounded product, usually from India or East Asia, consisting of finely divided material that is probably largely of plant origin and sold as pieces of dried paste. It is somewhat similar in appearance and odor to the active ingredients in Chinese joss sticks. It also is used by vaporization on glowing charcoal. I have not observed Bedouins using the crude benzoin resin sold in the markets and called *jūwā* (named for its Javanese origin).

6.10. Insect Repellents

*jaʿdah*, *Teucrium polium* L. (Labiatae). Another use for this fragrant medicinal plant — dating back to the days when inter-tribal raiding and warfare prevailed in Arabia — was for the preservation of the leather parts of body armor. Commonly used Bedouin armor, at least in northern and central Arabia, included helmets and chain mail that often had leather and cloth backing or straps, and it was the custom to store such implements in leather bags with dried *jaʿdah* to prevent insect damage or other deterioration of the leather parts. It thus appears to have some insect-repellent properties. Musil (1928a:53-54) recounts, from Ruwalah sources in northern Arabia, the story of how some Bedouin defenders hiding in ambush were given away by the sweet *jaʿdah* odor of their recently donned armor. Some of their enemy approaching from downwind caught the scent, realized its significance, and were able to escape. Those who disregarded the aromatic warning were massacred. I have a large jar of dried *jaʿdah* flower tops that I collected some 25 years ago, and bits of these crushed between finger tips still give off the sweet characteristic odor of the plant.
6.11. Children's Games

Some desert plants are associated with play activities of children. One curious example is the cruciferous perennial *Farsetia aegyptia* Turra called *haltā* ("scratchweed") by Āl Murrah and *hamāh* ("hotweed") among the Qahtān. *Haltā* is a many-branched shrublet, 15-50 cm high, grayish with an indumentum of appressed hairs and narrowly linear leaves. Children use it to play "itching powder" jokes on one another. If a dried bush is rubbed briskly between one's hands they pick up near-microscopic hairs that can then be transferred to someone's face (or other tender-skinned part of the body) where they cause an intense itching, burning sensation. A hand lens shows fine downy hairs of a pink-white color that are no doubt responsible for the effect.

Bedouin children are told by their parents about many edible wild plants, which leads to much "nibble experimentation" with parts of spring annuals, such as the roots of *ḥambizān* and the leaves of *ṣifār*. Such "tasting games" are probably responsible for the many reports by Dickson (1955) of plants "eaten by children." These activities no doubt serve an educational role and help pass down information about edible plants to the younger generation.

Some annuals are used in play in other ways, such as the collection by young girls of the pigmented roots of *Arnebia* spp. to rouge their faces (see section 6.6) in "dress-up" games. Another example is the collection of the ring-like fruits of the annual vetch, *Astragalus annularis* Forssk., which is called *abū khawātim* ("father of signet rings") by Āl Murrah and *aṣābiʿ ʿal-ʿarūs* ("bride's fingers") by some other groups. The last name alludes to the reddish flecks found on the tapered pods, which thus resemble the fingers of a bride whose hands are decorated with geometric designs of henna. The pods of this plant are strongly compressed dorso-ventrally and are usually curved strongly into a nearly complete ring-shape. They are picked and worn by children as play finger rings.
7. THE ORIGIN AND PURPOSE OF PLANT LIFE

My Bedouin consultants expressed a clear belief that plants were formed in all their kinds as an act of creation by God and were intended for the benefit of man. Both of these ideas clearly reflect the tenets of orthodox Islam, expressed in the Qur'ān in such verses as "It is He who created for you all that is on earth" (2:29); (and after a description of the creation of domestic animals for the use of man) "It is He who sends down from the skies for you water to drink and from which [grow] shrubs and trees to which you send your livestock to graze" (16:10); and "It is He who sends down for you from the skies water whereby we bring forth vegetation of all kinds ... " (6:99).1

Consultants interestingly also expressed the idea that every kind of plant has a created name although "we don't know them all as some were forgotten or known only to the ancients (al-awwaln, 'those who came first')." This idea also has precedent in the Qur'ān, which describes how God gave to Adam the names of all things: "And He taught Adam the names [of things], all of them ..." (2:31). The language of these created names is presumed to be Arabic, the language in which the Qur'ān was revealed. Names for plants (as for other things) thus take on a revelational aspect that contrasts rather pointedly with Judaeo-Christian tradition, where God gives to Adam the opportunity to himself name the animals and birds of the earth (Genesis 2:19-20). This may account in part (as described in Chapter 13) for the long persistence of Arabic plant names with little change.

1 It is of interest with respect to arid lands cognitive ecology that Qur'ānic descriptions of the generation of plant life are virtually always expressed not as direct acts of God but through the effects of rain sent down by Him. Even animals are described as having been created from water (24:45).
and, with respect to the written language, the insistence of the early philologists on keeping them "correct."

Asking once on a whim whether plants might change form or "kind" over time, I was answered strongly, with a tone of surprised amusement, in the negative. This response, while not unexpected, might be considered to lend support to the view that "kinds of living things" seem to be universally assumed to have an innate, unchanging "essence" (Atran 1990:58; see also remarks on this concept in section 1.2).\(^1\)

\(^1\) I thank Prof. Cecil Brown for pointing out this possible aspect of "fixed" names.
8. PLANT ANATOMICAL TERMS

The Bedouin vocabulary of plant anatomy is simple and generally confined to gross morphology. The roots of any plant are ‘irūg (sing. ‘irg), a term used also for the veins or nerves of animals. The root crown, or ground-level base of a shrub from which spring both roots and branches is given several synonymous names, varying by tribe or geographical region. The most generally used term is jīdh‘ (unit. jdha‘ah; pl. jdhu‘), although one consultant of Āl Murrah said that this name was really only properly used for the date palm and that the preferred general term for this part of desert shrubs was gā‘ah (pls. gā‘āt or gā‘). A Qaḥṭānī used the term gā‘dah. Jdhii‘ are the parts of a shrub generally preferred and collected for firewood, in which case they are often dead or with few branches and are then called jām (sing. jirm).

When speaking of true trees with boles, as with some Acacia species (such forms are in fact very rare in our study area), the trunk is called a sāg (pl sīgān) or (among northern tribes) an ‘aql (pl. ‘iqlūd).

A main branch of a shrub, that is, one of the few lower ones springing from the root crown that do not normally bear leaves, is a fand (pl. fnūd). Upon the fnūd are attached the more terminal branches referred to as ghṣūn (sing. ghṣūn). As an elder Qaḥṭānī explained, "al-ghṣūn taṭla‘ fil-fnūd" ("the ghṣūn come out on the fnūd"). The same consultant offered as a synonym of fand, ‘aṣā (pl. ‘iṣā), a word that means simply "stick (of wood)" in the majority of Arabic dialects. The term seems to imply a degree of stiffness that is not found in the more terminal branches, the ghṣūn. Leaves are, in collective form, warag (sing. waragah, pl. ōrag). The term implies a flat form; the word is used in general Arabic for both plant leaves and the pages or "leaves" of a book, and
my impression is that it is not used by the Bedouins for structures that botanically are leaves but which have been modified to terete or other thickened shapes, as in many chenopodiaceous shrubs. All that part of a shrub that is above ground is sometimes referred to collectively as a shūshah (pl. shawash). The same term is used among some southern tribes for a form of haircut given young boys, where the hair is shaved close except for a long, thick central tuft growing upward from the top of the head.

Flowers are generally called nuwwār (the same form in plural and singular), from a linguistic root denoting "shining, glowing", and from which are also derived the terms for "light" (nūr) and fire (nār). A consultant of Bani Hajir regularly used the term zibrij for some intricate inflorescences, specifically the globose umbel of the wild onion, Allium sphaerocephalum, and the dense racemes of Tamarix spp. Zibrij, with the literal meaning of "ornament, a kind of jewelry" is reported by lexicographers to be a Persian loan word. The fruits of a plant (in the botanical sense) are called thamar, but the term is used only when the ovary is visibly enlarged and fairly conspicuous.

For annual plants the terminology is restricted to ʿirūg (roots), warag (leaves), nuwwār (flowers), sometimes thamar (fruits) and possibly ghšūn (for a branched stem). When discussing the status of vegetation Bedouins sometimes use the terms waragah ("leaf") and nuwwār ("flowers") respectively as informal synonyms for plants putting out new growth, particularly annuals, and for ʿishb, annual plant growth in general. "Fīh waragah ʿindakom? Fīh nuwwār?" ("Any new growth where you are? Any annuals?").

Some anatomical terms are family, genus, or even species specific. The dense spicate or paniculate inflorescence of grasses is a sanbalah (pl. sanābil). Among the Shammar (and perhaps others), the papery winged fruits of many perennial chenopods are jrūs (sing.) jirs. The word jrūs means "bells," not the form usually thought of as
bell-shaped in the West but the spherical ones of slit brass or with multiple teeth descending from an apex, of the types used around the necks of livestock or made for decorative use in India. Tribes of Najd, where there are many Acacia trees, call the inflorescence of that genus (it is usually spherical or spicate) baram or ballah (pls. blūl, ballāt) while its fruit pods are ḥibl (sing. ḥiblah) or hanbal (sing. ḥanbalah). The flowers and fruits of some individual species sometimes have names, restricted only to that plant, when they have uses such as for food. Several examples are given above in section 6.3. A special name may be used even in the absence of use (or presently known use) when a structure is particularly conspicuous, as in the case of the bright red or yellow, densely fringed hanging fruit of ‘abal (Calligonum spp.), called by Āl Murrah natharah (sing. and pl.).

Brown (1984a:60-62) discusses the relationship between words for "tree" and "wood" (the material) in many languages, and refers to work demonstrating that in some two-thirds of the world's languages, the same term is used for both. In such cases of polysemy, he argues for "wood" as usually the more basic term, which becomes extended to mean "tree." The material, "wood," in Bedouin (and town) Arabic is khashab, a term implying some aspects of "lumber," a product found in towns and either of local cultivated origin or (more usually) imported from other countries. The term khashab might be applied by a Bedouin to the material of which his camel saddle frame is made by village craftsmen, even if he knows it comes from an east Arabian tree such as the sidr (Ziziphus spina-christi). Khashab is not generally thought of as a desert product, and the word is not linguistically related in any way to the Bedouin term for shrubs and trees, shajar or, apparently, to any other plant-related item in their lexicon. This is perhaps not surprising, considering the little use that Bedouins make of desert plant materials in crafts and construction.
9. CLASSIFICATION AND NOMENCLATURE

My general approach here with respect to both classification and nomenclature is to follow Brent Berlin's (1992) framework and terminology, which has now become something of a standard. My findings will be treated largely with respect to how they conform to or vary from his "general principles" (ibid.:20-35). Remarks on nomenclature are provided with the discussion of each classification category, proceeding from the most inclusive rank to the least.

9.1. Plants as a Kingdom

It is a generally accepted theoretical view that the single taxon occupying the rank of kingdom (formerly called the "unique beginner," Berlin, Breedlove and Raven 1973:215) is usually unlabeled (Berlin 1992:27). It is thus a fact, however counter-intuitive, that the majority of natural languages studied to date (or at least their everyday, non-scientific versions) have no name for "plants" or "animals" in general. It is my impression that this is also the case with Bedouin Arabic, although the situation calls for some discussion.

There is a term for "plants" (all kinds of plants in the plant kingdom sense) in both modern written Arabic and in some examples of early Classical Arabic. This is nabāṭ, derived from the root ṭa
bāt, which carries the general semantic field of "sprouting, growing out." The verb form, nabata, can be applied not only to plants but to situations such as the sprouting of human hair. It thus provides a natural base for expressing the idea of "things that grow out of the ground," although nabāṭ is basically a verbal noun rather than a substantive.
There is no question as to the plant kingdom-wide application of this term in modern written Arabic. Botany is "ilm an-nabāt", "the science of plants," obviously all kinds of plants. I would argue, however, that the semantic field of nabāt in Qur'ānic and some other early classical usage is rather different. In several cases it seems to be used primarily as a verbal noun in the sense of "plant growth" rather than as a substantive, e.g. "ka-mathali ghaythin a'jaba al-kuffāra nabātuḥu" ("Like rain, of which the [plant] growth pleases the tillers ..." Qur'ān 57:20), and ".. ka-mā'īn anzalnāhu min as-sāmi'ī fa-akhtalaṭa bihi nabāṯu-l-ardī ..." ("Like water that we send down from the sky and with which then mingles the [plant] growth of the earth," 10:24). The term is used as a verb and intensive verbal noun even with reference to the creation of man in 71:17 (my literal translation): "w-allāhu anbatakum min al-ardī nabātan" ("And God caused you to sprout forth from the earth"). The close association in the majority of these references of plant growth with rain suggests that they indicate primarily annual plants (or crops) rather than shrubs or trees. It is thus perhaps not surprising that the well-known early philologist al-Asma'ī (d. 831 A.D.) titled his botanical monograph "kitāb an-nabāt w-ash-shajar" ("The Book of Plants and Trees"), as if the term "nabāt" were itself not sufficient to convey the inclusion of woody perennials. It is true that Abū Ḥanīfah ad-Dīnawārī (d. ca. 895 A.D.), probably the greatest early writer on plants, called his work simply "kitāb an-nabāt" ("The Book of Plants"), but Abū Ḥanīfah could almost already be considered a specialist using the term in a quasi-scientific sense.

The renowned historian of Tunis, Ibn Khaldūn (d. 1406 A.D.), provides clear examples of both classical Arabic usages of the term "nabāt" in the second chapter of his Muqaddimah (Prolegomena), comparing Bedouin and sedentary cultures. First, in a practical description of the pasture needs of the camel:
... li'anna masāriha at-tulūlī wa nabātahā wa shajarahā lā yastaghñī bihā al-ibalu

... because the pastures of the hills, and its plants and its shrubs, do not satisfy camels (Ibn Khaldūn n.d.:121; my translations)

Then, a few pages later in a more abstract reflection on created things:

... fal-mukawwanātu min al-ma'dini wan-nabāti wa jamī‘i al-hayawānātī al-insānī wa ghayrihi kā‘inatun fāsidatun

... and created things: minerals, plants and all the animals including humans and others are existing and decaying (ibid.:136)

I would thus claim that the semantic field of nabāt in non-specialist, classical Arabic often parallels that of the word "plant" in everyday (non-scientific) English. Wierzbicka (1985:154-156; 1996:364) argues persuasively that "plant" in English folk classification, as opposed to scientific classification, does not denote "any plant" (in the biological sense) but rather a green, leafy plant smaller than a person and is thus something like a life form.¹

I used the term nabāt occasionally in discussions about plants with non-literate Bedouins, and they obviously understood it. I never heard them volunteer it or use it among themselves, however, and it appears not to be a part of their active vocabulary.

One obvious basis for their understanding of the term is simply its existence as a verbal noun of the verb nabata, which I presume does exist in their speech. They could also

¹Brown (1977:334; 1984:65) had earlier recognized the use of "plant" in this sense in modern, everyday English. He points out (personal communication) that this appears to be true for some less educated speakers of the language but that for many speakers the term is polysemous, denoting both the Kingdom and the more restricted class.
have heard it in quotations of the Qurʾān by religious leaders or in such recitations that emanate night and day from the radio broadcasting systems of Saudi Arabia and neighboring states, or even from radio programs about popular science.

The word "nabāt" is found at least occasionally in recent Bedouin poetry. Kurpershoek's wonderful compilation of Najdī Bedouin verse provides three examples, two of which were in poems composed by ʿAbd Allah ibn Muḥammad ibn Huzayyīm of the Rijbān section of ad-Dawāsir, better known as ʿAbd Allah ad-Dindān. Ad-Dindān (who is illiterate) gives a half-line in a description of camels (Kurpershoek 1994:118; my modified transcription and literal translation):

\[
\text{w-kabbab hasāyirha nibāt al-marbī'i}
\]
And plants of the spring pastures make their sides bulge

Again, in another poem, describing a rainstorm (Kurpershoek 1999:222):

\[
'\text{asa illi difag selih w-wablih ybārik fiḥ}
\text{nibāthīh min al-jiddah khazārīf w-anwā'ī}
\]

Would that He who pours out his flood and torrent bless it [all]
Its new-sprung plants as embellishments, of many kinds

The contexts of these lines suggest that the plants involved are new annuals arising from recent rain rather than plants in general, and in both cases nabāt could as well be translated as "growth" or "sprouting" of spring pastures or "new growth", i.e. as verbal nouns. The last line could also involve an element of Qurʾānic imitation (even if unconscious), as the association of the term "nabāt" with the rather unusual word zukhruf occurs in Qurʾān 10:24, where from plant growth (nabāt) the earth "has taken its
adornment (*zukhruf*) and is beautified" as a result of God-sent rain. It also seems likely that the poet, whose meter required a stressed syllable at this point in the line, chose the term *nibāt*, with its long ā rather than the more common Bedouin term for annual plants, *‘ishb*, for prosodic reasons.

The other poet using *nabāt* is Fāliḥ bin Ḥamūd ibn ‘Ubayd of al-Makhārim section of ad-Dawāsir, better known as Ibn Batlā. Ibn Batlā has been blind since boyhood (Kurpershoek 1999:9) and can be presumed non-literate. His poem, a description of a Bedouin migration following heavy rains, includes the double line (ibid.:144), with revised transcription and my own more literal translation:

\[
\begin{align*}
tanaṣṣaw marāṭi‘ dīrtin nabl‘ha zāfāt \\
nibātin zakhārīfīhī t‘īshik nuwāwīrīh
\end{align*}
\]

They headed straight for the rich pastures of a land growing flowers
Plants whose adornments and blossoms will give you life

The first half-line contains the form *nabt*, clearly a verbal noun meaning "growth, sprouting up." Again, the preceding context of heavy rains implies that *nibāt* refers to new annual plants. Kurpershoek in fact translates the word *nibāt* here as "annuals," conceivably after discussing the meaning with the poet himself. Also again, we have the Qur'anic combination of *nabāt* with the term *zukhruf*, this time the plural being in its non-transposed classical form.

To sum up: The kingdom "plants" is most probably unlabeled in Bedouin Arabic although my consultants understood (in some sense) the word *nabāt*, which is sometimes used in written Arabic for the plant kingdom. Some Bedouins use *nabāt* in poetry,

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1 As pointed out by Kurpershoek, the word *khūzārīf* in this poem is a variant of classical *zakhārīf* (the plural of *zukhruf*).
possibly having picked up the term from its several occurrences in the Qur'ān or from other poetic usage. In the Qur'ān and in some other early written contexts, however, *nabāt* appears to connote primarily herbaceous, annual plants rather than all plants in the kingdom sense.

9.2 Life Forms

My consultants partitioned their plant world into two strongly contrasting categories that together were inclusive, directly or transitively, of nearly all generics. Exceptions are seven unaffiliated plants of high cultural salience or of atypical morphology, which will be discussed in section 9.4 with other generics. These two life form classes are *shajar* (perennial plants) and *‘ishb* (annual plants). I gloss these as "perennials" and "annuals" rather than "woody" vs. "herbaceous" because consultants describing for me the difference between these two classes did so in terms of seasonal duration, not of stem texture or size. A *shajarah* (using the singular form) was a *shajar* because "mā yihtarag fil-gēd", that is, "it doesn't burn up in the summer time". A *shajar* is *dāyimah* ("lasting, continuous"). One consultant added a morphological criterion: "It has a big root," referring to the taproot and probably the otherwise extensive root system that is characteristic of many perennial plants. An *‘ishbah*, on the other hand, "burns up", referring to the browning and death (and virtually complete disappearance) of the annuals when the ground dries out after their winter and spring growth. Some workers (Brown 1984a:10) exclude the perennial/annual contrast as a basis for a universal folk life form because it is a "special purpose" distinction based on a single criterial attribute. This argument may be valid in many environments where life cycle contrasts cut across life forms of greater salience. However, Brown (1984a:101) also points out that the encoding of botanical objects through binary opposition will be greatly enhanced if a discontinuity
in nature is also pertinent, and that this is especially true if the discontinuity is underlain by feature clustering. All of these factors, in fact, are present in the *shajar*/*ishb* opposition. In the hyper-arid environment of our study area there is a real and highly perceptible discontinuity wherein virtually all plants are either "drought withstanders", that is, they have evolved morphological or physiological mechanisms enabling them to survive the extremes of summer dryness, or "drought evaders," surrendering their vegetative body completely in exchange for survival as drought-resistant seeds during the rainless summer. The life cycle contrast is underlain by larger size and woodiness on the side of "perennials" and by smaller size and herbaceousness with the annuals. These correlations, although certainly not perfect (as will be seen below) do lend added strength to the binary opposition of *shajar* vs. *ishb*.

With respect to the category *shajar*, we find that it applies to forms differing as greatly as 10-meter-high boled trees and individual tufts of perennial grass. I remember the incredulous look I was given by one consultant when I asked whether a tuft of *Stipagrostis* grass was an *‘ishbah* or a *shajarah* (it obviously was there and *alive* in midsummer!). But differentiation of this broad category is possible through a second life form level. This involves use of the term *shima‘* or (among the northern tribes) its synonym *gish‘*.

All *shima‘* are considered to be *shajar*, but they are constrained in size, being not more than about man-high and usually in the range of about 50-100 cm. They can be woody shrublets or shrubby perennial grasses. They contrast directly with a third group, also called *shajar* but in a more restricted usage of that term (which I here label as *shajar*₂). *Shajar*₂ correspond with what in English are normally called trees or large shrubs. This polysemous use of *shajar* became apparent when I was asking consultants about what kinds of *shajar* were not *shima‘* (bushes). They explained by referring to
what they called *ash-shajar al- iqām* ("the grand, big *shajar*") and naming examples of that class (*shajar*₂): *salam* (*Acacia ehrenbergiana*) *talh* (*Acacia gerarrdi*, *A. raddiana*), *sidr* (*Ziziphus nummularia*, *Z. spina-christi*), and *'ōsaj* (*Lycium shawii*). In *shajar*₂ the quality of "woodiness" as well as size (height higher than a man) are implicit. *Shajar*₂ refers to only some ten generics, but I cannot conceive of calling it anything but a life form or sub-life form. The rather small number of referents in our study area is basically an ecological accident. At least three of my main consultants' tribes have a strong tradition of having migrated from western Arabia, where tree forms (principally *Acacia* spp.) are frequent even in highly arid zones. *Acacia* diversity there, in a scientific sense, is also much greater than in our study area. It is thus not surprising that their speech has maintained ethnobotanical categories useful for dealing with tree forms. There is further evidence of this in the intermediate category, *iqāh*, to be described in section 9.3. Our situation with respect to life forms is shown in Venn diagram, Fig. 9.1.

Fig. 9.1. Plant Life Forms
I consider shajar$_2$, the "grand" shajar, to be the prototype of shajar$_1$ with its extended sense of "all perennials". Shajar$_2$ are not only the "woodiest of the woody." Because the great majority of them are phreatophytes, they are also the "most perennial of the perennials," being nearly independent of seasonal rainfall and the most resistant to summer drought. Berlin (1992) applies the concept of prototypicality primarily to specific/generic relationships but concludes (ibid.:152) that intermediates can be generated by extension of the semantic ranges of generics. Brown, who has concentrated much attention on the analysis and development of life form categories, gives examples of life forms or even kingdoms arising through extension of less-inclusive classes, e.g. the extension of the American everyday sense of "plant" as a group of small, herbaceous taxa to the sense of "all plants," the plant kingdom (Brown 1984a:65). Randall does not hesitate to carry prototypicality to the life form level (although he eschews use of the term "life form" for "highly inclusive category"). His basic concept of highly inclusive categories is in fact one in which "attributes are combined to create prototypic (focal, exemplary) categories with ranges (extensions) lacking one or more prototypic attributes ... " (Randall 1987:143). Our "tree or big shrub" (shajar$_2$) thus extends to the broader shajar$_1$ sense, which maintains the attributes of perennation and perhaps some degree of woodiness but lacks the attribute of great size.$^1$

The Bedouin concept of 'ishb for the annuals is, by contrast, straightforward. It comprises all (and only) plants that appear as annuals. I say "appear" here because 'ishb includes a few generics that do not grow from seed every year but grow up after rains from a perennating bulb or corm, as in some liliaceous species. Inasmuch as these

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$^1$My acceptance of Randall's analysis for shajar is not, I should add, to imply my agreement with all of his ideas with regard to highly inclusive categories. I do not, for example, accept his view regarding the basic functional (utilitarian) aspect of life forms in a universal sense (although such examples may in fact appear in some systems).
disappear from view completely, losing all above-ground parts during the drying and windy summer period, they maintain no continuing identity and are, in a perceptual sense, also "annuals."

Annual grasses are also simply *'ishb*. There is no labeled Bedouin category for grasses as such. The term *hashish*, often glossed "grass" in dictionaries of written Arabic or in dialects of settled folk, was used by my consultants in the sense of plant material, often but by no means exclusively true grasses, cut by hand for feeding to livestock as supplementary fodder. It is thus more or less equal to the English term, "hay" (of a wild sort). The "having been cut" aspect of the term is paramount, and the lexeme is in fact a deverbal from *hashsh* with the basic meaning of "to cut standing plants." I would mention with respect to this lack of a "grass" term (although I would not claim it to be the only explanation) that for the Bedouins true grasses are not the primary grazing resource that they are in many other pastoral societies and environments. Our study area does not include "grasslands" even of arid type, and the grasses of the area grow as isolated tufts without forming sod. Stands of the grass *Panicum turgidum* are an important pasture type, but these, even to the Western eye, appear to be "bushes", just as they are classed by the Bedouins, not "grass". Bedouin ethnobotanical classification also has no term for "vines," which exist in the study area as virtually a single generic, the creeping gourd, *Citrullus colocynthis*.

The Bedouin concept of *'ishb* (annual plants) is highly significant culturally as shown, among other ways, in their highly developed oral poetic literature. The term is strongly symbolic of the material ideas of *rabīr*, that brief and often elusive period of milk.

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1 Non-Bedouin village cultivators of the al-Hasa and al-Qatif Oases do appear to recognize *hashish* as a suprageneric category but with the meaning "weed", or any plant, graminaceous or not, that is undesired in cultivation and that would therefore be "cut" out with the *mahashsh*, the curved, serrated knife they use for such work. The name *hashish* is of course applied also to *Cannabis sativa* (a non-grass) in parts of the Middle East, whence it entered English as "hashish" (*Cannabis, marijuana*).
and plenty resulting from good rains, when the herds feast on green spring herbage. It is also associated with the prized quality called *khēr*, connoting the Bedouin ideal of natural bounty, hospitality and generosity with the lavishing of one’s riches upon guests.

Annual plants as individuals, however, appear to be less salient than individual perennials. This is demonstrated, for example, in the smaller proportion of scientific species labeled among the annuals (53 percent) compared to the perennials (76 percent). Issues of ecological salience, the size factor, and cultural salience as described by Hunn (1999) are certainly at work here. As Hunn (ibid.:48) points out, annual plants are temporally restricted and less likely to obtain the cultural recognition afforded perennials of otherwise equal salience. Our annuals are also, of course, decidedly smaller, as individuals, than our perennials.

The explanation for this apparent contradiction between cultural significance and lesser perceptual salience, I suggest, lies in the way Bedouins look out on the plant world. They view this domain above all with the eyes of the herdsman, not the flower-picker or herb-gatherer. The desert camel keeper sees annual plants primarily *en masse* because it is their mass that is significant to its grazing value. The species composition of a patch of ephemeral greenery (apart perhaps from the rare presence of a toxic plant) is essentially neutral and of little interest. All of its generic components have about the same nutritional value for livestock, or at least this seems to be presumed by Bedouins to be the case. It is the lush mass of the annuals, not any generic component, that allows camels to go entirely without drinking throughout a good spring season. Even in a purely perceptual sense, for *‘ishb* the Bedouin pastoralist’s eyes seem to be those of someone on camelback or in a pickup truck, not of one stooping to examine flowers or leaves. Decisions on moving livestock and the family camp may be made on the presence or density of *‘ishb* in a given place but not, as far as I have seen, on its composition.
This attitude toward the smaller plant life forms used seasonally may be characteristic of herders generally. After writing the above paragraph, and while scanning through Myrdene Anderson's study of Saami reindeer herders in the Norwegian Arctic, I found the following, strikingly parallel statement of Saami attitudes toward the low-growing lichens that are all-important for reindeer grazing during the winter:

Lichens, even the economically important species, generally grow in mixed ground cover with other lichen and non-lichen species. In this context it is impertinent to single out particular segregates, and to remove specimens for closer identification only takes them from substrate and context. Any such handling and close inspection of any small object is unusual; even the herder is not apt to have noticed lichens at closer range than standing or sitting distance.

The choice of forage plant is the reindeer's business; the herder makes sure that there is other than bare rock beneath the snow and takes care of the coarser-grained strategy of management, including considerations of predators and poachers. Herders assert that reindeer eat everything, or that they assume this to be the case (Anderson 1978:524-525).

For perennial plants, on the other hand, species composition is often a deciding factor in grazing decisions of the Arabian Bedouins. Some perennials "have more green" than others and some are known to provide specific essential nutrients, such as the salt minerals found in the shrub chenopods. It is for all these reasons, I think, that Bedouins are far more likely, probably by a factor of a hundred, to use the inclusive term 'ishb in everyday conversation rather than any of the generic names for annuals. It is also why I question, in my discussion of generics below, whether with respect to the annuals generics may not be (as is generally assumed elsewhere) the most salient category of Bedouin plant classification.

This is perhaps a place to mention, also, that Bedouins in our study area generally seemed quite insensitive to the intrinsic beauty of plants. This might of course be
characteristic of many other societies that live outdoors and make their livings directly from nature. Plants figure in oral poetry but seem to be used mainly as sources or symbols of "good grazing", "plenty" and satisfied camels rather than as objects of beauty by themselves. A plant generic may be mentioned in poetry, but often seemingly just as a handy simile for describing the beauty of something else, as in likening the whiteness of a beloved's teeth to the ray petals of *gahwīyān* (*Anthemis* spp.), in the way English speakers might say "lily-white."

Bedouin life form names are all simple primary lexemes, and they all take the pattern of the Arabic *nomen generis*, the special noun form used for virtually all names of wild plants, and of wild animals found normally in groups (discussed in more detail in section 9.5, below). In my view, for reasons also discussed below, they are essentially unanalyzable.

With respect to Brown's (1977, 1984) evolutionary hypothesis for the development of universal life forms (see section 1.2), I believe that my data fit his constraints on life form combinations and (after ignoring the anomalous annual/perennial contrast) place Bedouin Arabic in stage 4 of his scheme with the three life forms "tree", "grerb" and "bush". Brown states pointedly (1984b:589) that his hypothesis does not deny the possible presence of life forms other than his basic five for plants, and the Bedouin placement of annual grasses in "grerb" and perennial grasses in "bush" does not, in my view, violate his basic life form concepts. Furthermore, the historical data presented in Chapter 13, describing the Bedouin Arabic plant classification as recorded in literary accounts written a millennium ago, lend support to the actual evolutionary steps postulated by Brown. Those early records included all the Bedouin life forms presently

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1This does not appear to be the case in the more mesic mountain environment of southwestern Arabia. Tribesmen there (who are sometimes villagers) may on some occasions be seen wearing twisted wreaths of flowers or leaves on their heads. The aromatic qualities of the plants used seem to be at least as important as the visual effect.
recognized with the conspicuous exception of *shima‘* and *gish‘*, or any other term, for "bush." It is "bush" that is the theoretical follower of "tree" and "grerb," and in our case it actually does appear to have been added later than the other two. Brown's other language cases of stage 4 with "tree, grerb and bush" number six (1984a:174-175). It would be satisfying to find that these were all representatives of desert environments similar to that of the Arabian Peninsula, although such ecological agreement is not by any means a requirement in Brown's system. Three of them are in fact languages spoken in the wider Sahel area of northwestern Africa that experience significant aridity at least seasonally. The other three (Ghana, South Laos and Puerto Rico) appear not to be ecological matches.

Finally with respect to life forms, I will describe a tantalizing glimpse I got of a possible second, alternative Bedouin plant classification at this level among tribes of northern Arabia including, at least, Shammar. This places a third major life form category, called *aţ-tawālī‘*, between *shajar* (perennials) and *‘ishb* (annuals). In this classification, which is based on stem texture as well as plant duration, *shajar* are conceived as all woody bushes, large shrubs and trees; *aţ-tawālī‘* as non-woody perennials; and *‘ishb* (as elsewhere) the annuals. Generics offered as good examples of *aţ-tawālī‘* were: *ḥamāţ* (*Moltkiopsis ciliata*), *makar* (*Polycarpaea repens*) *karī* (*Heliotropium digynum*), *rakhkhāmah* (*Convolvulus cephalopodus*), *ramrām* (*Heliotropium bacciferum*), *janbah* (*Fagonia* spp.), *thmām* (*Panicum turgidum*) and *nasī* (*Stipagrostis plumosa*). The last two indicate that perennial grasses are included. All of these generics are perennial plants with stems not, or hardly, woody. The few consultants I had available to describe this system (the main one was a single Shammar) did not dispute the basic classification that I portray in this study. They considered theirs, rather, a kind of refinement. Their middle category, *aţ-tawālī‘*, is definitely less salient,
even in their own usage, than the other two life-forms. This is reflected in the grammatical form of the term, which is a "broken plural" rather than the usual plant/animal collective. The lexeme is derived from the root *l*āt, associated with the idea (among others) of "growing out, up" and seems to refer to the fact that this class has "grown up" (in the physical, not maturation sense) and become larger than the annuals. Consultants asked for the singular gave *tālū*, but the plural was clearly the form normally used. Consultants from our core study area and from central Arabia, such as Banī Hájir, Ál Murrah and Qaḥṭān, said they did not recognize any such a category. For them *tawālt* meant simply *"ishb that has grown up and gone to seed" or was applied only to "the young shoots that grow out of the base of date palms" (Ál Murrah). In any case, even for the north, I would hold this life form interpretation in a strictly provisional basket until data is obtained over a broader base.

9.3. Intermediate Categories

Bedouins group part of their *shajar* (perennial plants) -- and the great majority of these are *shima* (bushes) -- into two labeled intermediate categories which contrast directly with each other. The first and clearly more salient of these two is *hamd*, with a referential range that in our study area coincides almost perfectly with the scientific plant family, Chenopodiaceae. These are what I refer to as the saltbushes, including some 28 folk generics, several of which lead important monospecific shrub communities, while others are important constituents of mixed stands. These are all genera highly adapted to the arid environment, and they are characterized not only by the inconspicuous, apetalous flowers and often papery winged fruits of the family but by highly modified, often succulent or reduced, leaf structures. The group is slightly cross-cutting with respect to life form in
that four annual scientific species of Chenopodiaceae, folk generics classed as ‗ishb, are also included.

Close correspondence to a scientific family, or part of one, is of course one of Berlin's general characteristics of intermediate taxa, which he describes as "small numbers of folk generics that show marked perceptual similarities with one another " (Berlin 1992:24). Our intermediates are an exception to his generalization that such taxa are usually unlabeled. Our chenopods do share many perceptual characters, some of which are mentioned above. I must say I thought it rather amazing, however, that an annual Atriplex, with its herbaceous habit and flat "normal" leaf form so different from those of its highly modified relatives, should be placed by Bedouins unerringly into the same category.

The Bedouin perception of the unity of hamd, however, is in no way a celebration of a Western taxonomic family. It serves, rather, to recognize an all-important aspect of the physiology of the camel: its unusual need for salt, probably of more than one kind, to maintain health and the production upon which its herders are dependent (section 6.1). Turning camels out to forage on the plants called hamd is the herdsman's way of ensuring that the need for these essential mineral nutrients is satisfied. Camels also require for optimum health periodic grazing on non-hamd shrublets, collectively called khillah, although this requirement does not have quite the obligate nature as that for saltbushes. It is perhaps of interest to note that whatever the cultural significance of the hamd/khillah contrast, it is occasioned by the plant ecological fact that the two kinds of shrubs, probably because of different needs in soil chemistry, do not generally coexist in the same habitat. If they did, camels could take their pick at any time, would not have to be moved from one type to the other, and (we might speculate) the intermediate labels might not then exist.
At this point I hear remonstrations that by treating \textit{hamd} as an intermediate taxon I am confusing two different universes, two different classifications: one called "plants" and the other called "grazing types." I would argue with the following points, however, to the contrary.

1. \textit{Hamd} is said to be a kind of "bush" rather than of some more inclusive "pasture type", and to be composed of individually named generics rather than of other kinds of more specific pasture types, (although I grant that a pasture type might be described by the kinds of plants found in it.)

2. My consultants have a clearly different and often used term, \textit{‘afjah}, meaning "grazing land consisting of \textit{hamd} bushes."

3. The name, \textit{hamd} takes the form of the Arabic \textit{nomen generis}, which is used to label plants as well as wild animals, birds and insects normally found in groups, and ethnobiological life forms.

4. Consultants' use of the counting plural \textit{ḥamaḏāt} in phrases like "as-sab‘ al-ḥamaḏāt" (described below) indicate that it is composed of individual generics and that each of these can be referred to as a singular "\textit{ḥamḍah}", although the collective form of the label is generally used.

Apart from these considerations, a strict adherent of the "general purpose" school of folk classification would no doubt object that I am dealing here with a "special purpose" or utilitarian grouping of generics and that it should therefore be excluded or dealt with separately. I will affirm the utilitarian basis for the \textit{hamd/khillah} contrast yet feel strongly that it should be described as an integral part of our classification. Without belaboring the long-standing arguments of the "general purpose, or intellectual" school vs. the "utilitarian" (see section 1.2 for background), I will simply say that I am a
comfortable functionalist in agreeing with Hunn's view (1982:844) that we "should be
guided by the premise that cultural knowledge is adaptive ..." and that "students of folk
biological classification must systematically investigate the practical significance of folk
biological knowledge." And while I would not adopt all of the more relativist positions
of Ellen (1993), his warning remarks about the downgrading of non-morphological
characters in classifications (ibid.:110) are very much apropos. To do so here, whatever
logical conveniences it might provide, would do violence to what I perceive as an
integrated Bedouin view of the plant world.

It soon became clear through discussions with my consultants that not all ḥamd plants were perceived to have been created equal with respect to grazing value. There was
a pecking order, and certain generics tended to be placed always near the top although the
order varied somewhat from one account to another. Some of this variation was
ecologically based: the generic rūth for example, was considered the very best ḥamd
grazing among tribesmen in the far north of our study area, but this plant's distribution did
not extend at all to our middle or southern parts. There, ḍumrān seemed to be the
favorite, or always near the top. This selective aspect was also apparent in an often heard
expression that seemed to cut across all tribal lines: references to as-sabʿ al-hamaḍāt,
"the seven ḥamd plants."¹ No one could explain where this expression came from, or
why there were "seven," saying only that "everyone knows about the seven" and "the
seven are the most important ones." The expression does not occur in religious literature
or tradition as far as I could determine (although the number seven figures prominently in
the Qurʾān, with its "seven heavens", "seven gates of hell", "seven hard years", etc.), nor

¹ Linguist Bruce Ingham interestingly records the phrase in one of his transcribed samples of Najdī Arabic. He glosses it, without comment, as "the seven hamudāt" (Ingham 1997:58-59). His informant, of the Mutayr tribe, was describing vegetation in Wāḍī ar-Rishā, an important wāḍī in central Arabia that drains the uplands between 'Afīf and ad-Dawādīmī and runs north-northwest down to the edge of Nafūd ash-Shuqayqīqah. Its middle reaches pass through 24° 45'N, 44° 02'E.
does it seem to be a quote from folk literature, poetic or otherwise. Consultants asked to list all the kinds of ḥamd (even sometimes when asked for just the "seven") invariably came up with some 10-15. Rimth almost always headed the list, probably because it is the most familiar, widespread and commonly encountered ḥamd generic. It is usually followed by the two or three generics considered to be best for camels. The lists vary by geographical area, primarily because some ḥamd generics are not found in all regions or are more prevalent in others. Table 9.1 is my construction of three "sevens", based on the list frequency patterns of consultants from tribes frequenting, primarily, the areas indicated:

Table 9.1
"The Seven Ḥamd Plants"

<table>
<thead>
<tr>
<th>Northern Arabia</th>
<th>Central East Arabia</th>
<th>The Rub' al-Khālī</th>
</tr>
</thead>
<tbody>
<tr>
<td>rimth</td>
<td>rimth</td>
<td>rimth</td>
</tr>
<tr>
<td>rāth</td>
<td>ǧumrān</td>
<td>ḥāḍh</td>
</tr>
<tr>
<td>ǧumrān</td>
<td>‘arād</td>
<td>ghaḍā</td>
</tr>
<tr>
<td>ʿuẓram</td>
<td>shinān</td>
<td>ʿarād</td>
</tr>
<tr>
<td>ʿarād</td>
<td>ghaḍā</td>
<td>harm</td>
</tr>
<tr>
<td>ghāḍā</td>
<td>suwwād</td>
<td>ǧumrān</td>
</tr>
<tr>
<td>shinān</td>
<td>harm</td>
<td>shinān</td>
</tr>
</tbody>
</table>

The category ḥamd also has within it a labeled "junk group," comprising a series of highly succulent chenopods, obligate halophytes found only in salt marsh habitats along the coast or along the inner margins of inland salt flats. These are not considered good grazing for camels because they are thought less nutritious and because their consumption leads to excessive scouring. Consultants of Banī Ḥājir and Banī Khālid, whose ranges include littoral habitats, grouped these into the category tahāmīj, which is normally used in its plural form but has the singular tuhmāj. The name appears to be
related to a generic synonym, *ṭaḥmā*, given by Ruwalah and Shammar consultants for the succulent saltbush *Suaeda vermiculata* (although I consistently heard *ṭahāmīj* with *ḥ* rather than *ḥ*). The form *ṭahāmīj* was used, in the sense followed by Banī Ḥājir and Banī Khālid, also by a consultant of the Hutaym tribe of far northwestern Arabia. Āl Murrah consultants said they did not use it in that way. A Sharārī, also of the northwest, preferred the name *ghardag* (a name used nearer our primary study area for a specific shrub of saline habitat) for the same group. Salt marsh plants in general, including *ghardag* and several non-ḥamd generics, he called *ḥūr*. Generics listed as examples of *ṭahāmīj* included; *ḥatallaš* (*Bienertia cycloptera*), *khirrēz* (*Halopeplis perfoliata*), *shū* (*Arthrocnemum macrostachyum*), *thililēth* (*Halocnemum strobilaceum*) and *suwwād* (*Suaeda vermiculata*). The generic *suwwād* also appears in some lists of "good" ḥamd plants. I rank the taxon *ṭahāmīj* as a "sub-intermediate" group. It is decidedly less salient than ḥamd, a fact perhaps reflected in its taking the form of the Arabic "broken plural" rather than of the collective noun used for the majority of plant generics and more inclusive categories.

As already pointed out, the category ḥamd maps closely on the scientific plant family Chenopodiaceae. The fit, however, is not perfect. The most conspicuous exceptions are the zygophyllaceous generics *ḥarm* (*Zygophyllum qatarense*, *Z. mandavillei*) and *garmal* (*Zygophyllum simplex*), the first sometimes even figuring in lists of "the seven ḥamd plants." The acceptance of *ḥarm* and *garmal* as kinds of ḥamd is easily understandable on grounds of morphology and habitat. *Harm* is often found in saline terrain, like other ḥamd generics, and it is the only widespread and common non-chenopod shrub with highly succulent foliage. In terms of succulence, in fact, it is even more ḥamd-like than many chenopods. It has petalous flowers, but they are very inconspicuous. Its sap has a salty taste, and it is probably a mineral-supplier for livestock.
like its saltbush companions. *Garmal*, a smaller, low-growing *Zygophyllum*, is not frequently seen in our core study area, but it shares the same morphological and probably physiological features. The only other family exceptions among the *ḥamd* perennials are *gurm*, the coastal mangrove *Avicennia maritima* (Verbenaceae) and *gataf*, two small species of *Limonium* (Plumbaginaceae), also of coastal salt marsh habitat. Both of these are known only to tribes ranging to the coast; they are treated as *ḥamd* on the basis of their saline habitat, perhaps also for some grazing characteristics, but are seldom volunteered as examples of that class. A consultant of Bani Hájir referred to them as *ḥamd al-bahr*, "*ḥamd* of the sea."

The category *ḥamd* (as mentioned above and as indicated in Fig. 9.2, below) is to a slight degree cross-cutting into the life form *‘ishb*, the annual plants. Of this small group of annuals, *rghelah* (*Atriplex dimorphostegia*) and *gṭēnah* (two species of *Bassia*), are both chenopods. The second has a synonym, *ḥmēḏ* or *ḥmēḏah*, which is simply the diminutive of *ḥamd*, thus "little *ḥamd*. The only annual *ḥamd* exception with respect to family is *milleh*, a small aizoaceous annual (*Aizoon hispanicum*), a papillose succulent herb often of saline habitat. Its generic name is from *milh*, "salt", and it is its "salty" nature that doubtless leads to its consideration as a kind of *hamd*.

With respect to nomenclature, *ḥamd* is a simple lexeme with some degree of semantic transparency. It is closely related to the root *ḥ mḏ*, denoting the idea of "sourness" (a sour tasting thing is said to be *ḥāmiḏ*). That root figures in the names of at least one, non-*ḥamd*, annual: *ḥummēḏ* or *ḥammāḏ* for *Rumex vesicarius*, a dock which does have a very acidic taste. The *ḥamd* group of perennials do not have a sour taste in the traditional acidic sense. To me their taste is salty-bitter. I recall a consultant saying that *hamd* bushes taste *ḥāmiḏ*, however, and that taste term may include saltiness in its extended range.
The category which contrasts directly with ħamḍ is khillah. This is basically a residual slot to which are assigned bushes that are not ħamḍ. Khillah is said to be ḥalwah, "sweet", as opposed to ħamḍ, which is ħāmiḍ or māliḥ, "salty." The ħamḍ/khillah contrast (like the annual/perennial dichotomy of life forms) expresses another bipolar Bedouin view of plant types, in this case along a dimension of salinity important to decisions in camel grazing. Consultants repeatedly and independently made statements along the following lines: "Hamḍ are the following bushes: (giving a detailed list, by generic name, of many of the ħamḍ plants). "All the rest are khillah." Yet when they were questioned more closely it became apparent that significant numbers of non-ḥamḍ shajar could not be grouped with the khillah. True trees and the largest shrubs (shajar) cannot be khillah, nor are any perennials (of any size) that are not palatable to livestock, such as ʿushar (Calotropis procera) or ḥarmal (Rhazya stricta). In our study area ʿarfaj (the composite shrublet Rhanterium epapposum) is always given as the prime example of khillah. Also prominent among khillah examples is ʿhmām, the perennial grass Panicum turgidum that grows in shrublet form. Both of these plants lead important and widespread non-saltbush plant communities important for grazing.

The essential nature of khillah is somewhat problematic: unlike the case with ħamḍ, which clearly labels a group of bush-form generics, khillah sometimes takes on the aspects of a name for a pasture type rather than a group of specific plants. Consultants will say "plant X is (or is not) a kind of khillah." But they will also sometimes say "khillah is land with no ħamḍ growing in it" (my emphasis). The direct contrast of ħamḍ (as an intermediate rank plant category) with khillah (considered as a pasture type) is to some extent illogical but nevertheless seems to exist.

With respect to nomenclatural features, khillah is rather opaque semantically, although I would note the surprising fact that the general Arabic word for "vinegar"
(which seems closer to ḥamḍ in its sense of "sourness") is khall, derived from the same root as khillah. Arabic has a number of adjectives that can have directly opposite meanings. The term khillah, having the -ah termination in both the plural and singular, appears not to be a collective noun of the type used generally for plant names, as is ḥamḍ. Consultants supplied the plural khilal (which I never heard used spontaneously), but collectives can have such plural forms.

The only other labeled Bedouin suprageneric category that I would formally call an intermediate is ʿiqādā (for which consultants gave a counting plural ʿaqūl, sic), which comprises those members of the shajar2 (large shrubs and trees) that have conspicuous spines. This group has a focus on the genus Acacia, all our members of which are strongly spinous, but it also extends to the rhamnaceous shrub sidr (Ziziphus nummularia). A consultant of Āl Murrah recognized this category but used also a term with similar content, tirf. He defined this as "all thorny big shajar that livestock eat." All his examples were Acacias, and further study might reveal that tirf is in fact another valid intermediate focused on the genus Acacia. I was once given the name tirf by ʿAwāzim tribesmen for Prosopis koelziana, which morphologically closely resembles an Acacia. I tend to consider ʿiqādā a sort of relict category that was probably much more important to the ancestors of several of our tribes that have migrated from western Arabia, where Acacias are a very important component of the vegetation. It is a seldom used and not very salient term in our virtually treeless study area.

There were a few other labeled Bedouin generic clusters that I do not consider well enough defined to be called intermediates but that gave evidence of more-inclusive concepts. One of these was called ḥawārr al-ʾishb, literally "the hot [ones of the] annuals." This category did not appear spontaneously in speech but arose after I had read of a class called aḥrār al-baql in early classical Arabic botanical literature. I asked
consultants if they had ever heard of anything called "the ahrār" and they replied no but volunteered ḥawār al-ʾishb (ḥawārr being of the same linguistic root but of different meaning). It appears from the examples they offered of such plants that the term "hot" was being used in two different senses. It applied to cruciferous plants that had a literally "hot" (or mustardy, peppery) taste, examples given including khzāmah (Horwoodia dicksoniae), ṣhğarah (Matthiola spp.) and ṣiffār (Schimpera arabica). The term "hot" was also applied to some plants, such as the thistle, mrār, in a more metaphorical sense, much like the "hot"/"cold" characterization of food in some societies. Different date varieties are so-classed among settled Arabs of the oases. In the case of mrār, the idea of "hot" seemed to be associated with its bitter tainting of the milk of camels that feed on it. Other composites placed among the ḥawār by a Mārī consultant included a lactiferous Launaea, ʿaḍīd, the wild marigold ḥanwā (considered toxic to livestock) and nigd (Anvillea).

I also found some evidence for another, more interesting, suprageneric cluster involving several generics that I describe formally as non-affiliated. While discussing with a consultant of the Banī Ḥājir tribe whether certain anomalous generics could be considered to be kinds of ʾishb, I found him referring to a group including truffles and all of our other fungi and root parasites as al-ʾfitnīyāt, literally "those that break (or split) [the earth]". He explained that this group grew in an unusual way: they all appeared suddenly -- sometimes seemingly overnight -- by cracking their way through the earth after a good rain without going through a slower growth stage in the manner of other plants. This discussion, unfortunately, took place when I was no longer in reach of other consultants, and I have no other evidence of use of the term or of a complex with similar components. I did, however, find a remarkably parallel statement in The Book of Plants by the ninth century A.D. botanist and lexicographer Abū Ḥanīfah ad-Dīnawarī (see Chapter 13).
Abū Ḥanifah quotes a well-known lexical consultant of Bedouin background as saying that truffles, and the ʿarājīn (edible club mushrooms) and the dhānīn (the root parasites Cistanche and Orobanche), the ārāthīth (the root parasite Cynomorium), along with several kinds of apparent fungi, were all called fuqūʿ because "the earth cracks open from them and they are without root, green herbage, or fruits" (Lewin 1974:74). The term fuqūʿ is a plural form of the name faqʿ (Bedouin faqʿ) applied today to the desert truffles. It derives from the root f q ʿ, with a basic sense of "to crack, burst open", and is thus a close synonym for "al-fūṭīyāt". If I had more evidence for such a conceptual grouping at the present time I would be tempted to call it a life form, either covert (Waddy 1988:1:88; Berlin 1992:175-176) or given more evidence for broader use of a name, at least "incipient." As things stand I will refer to it simply as an "unaffiliated cluster," maintain the term in quotes, and diagram it with a dotted circle as in Fig. 9.2.
9.4. Folk Generics and Subgenerics

It is now widely accepted that the folk generic represents the most salient category of ethnobiological classification, both psychologically and in linguistic expression. My experience is that this is true of part of the Bedouin Arabic data set, comprising those generics included in the primary life form category of *shajar* (perennial plants), but that it is to some extent questionable with respect to the annuals. This appeared to be the case.
whether my consultants were speaking in general purpose terms or with respect to a special kind of plant use, such as livestock grazing (if such a distinction for them is really possible at all). This situation was discussed at more length in section 9.2.

Generics number about 209, excluding synonyms. They, with their subgenerics, label 258 (65 percent) of 400 scientific species occurring in the core study area. Given the restricted species diversity of the hyper-arid habitat, with a high proportion of monotypic genera, it is not surprising that a large number (172 out of 209, or 82 percent) of the generics correspond to scientific species. The remainder, 37, or 18 percent, correspond to more than one species. A few (2 of 209, or 1 percent) correspond to more than one genera of a family. This last group comprises ḥurbuth (northern syn. gafā) which includes at least 4 genera of annual legumes, all sharing papilionaceous flowers, compound leaves, and a fruit form more or less corresponding to a common "bean pod," and ṣmēmā, which applies to several genera of small annual grasses.

All but seven generics are immediately included in more inclusive categories, the seven unaffiliated ones being nakhl (the date palm), jag (desert truffles), ‘arjun (the club-shaped mushroom Podaxis), iftarrah (capped mushrooms) and three referring to flowering root parasites. There is some evidence, as described in our preceding section dealing with intermediate taxa, that all but nakhl may figure in a conceptual complex, itself unaffiliated to our formal life forms, but for which data is still sparse. Whatever the case, all of these seven generics exhibit Berlin's (1992:23-24) two generalized characteristics of non-affiliates: economic importance or unusual morphology. The date palm and desert truffles (the latter as a highly-valued wild delicacy) are two of the more

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1The scientific flora of our study area is defined as all uncultivated species in Mandaville (1990) with the exception of those found exclusively outside the normal Bedouin habitat. Such exclusions include many weeds of cultivation and ruderals or opportunists found only in villages and towns. The Bedouin floral universe also includes some fungi not covered in the above work, which deals only with vascular plants. I have also added one genus (Ferula) that does not occur in the geographical coverage of Mandaville (1990), our primary study area, but that is important culturally to some northern tribes.
important food plants in Bedouin life. Truffles are also unique in being non-green, growing underground and not being eaten by livestock. *Podaxis* and the capped mushrooms are not important as food plants, but they, like truffles, exhibit unusual, non-green morphology, as do the flowering root parasites.

Bedouin Arabic generics are overwhelmingly monotypic, the only exceptions being three taxa of special cultural salience: *nakhl* (the date palm), *fag* (desert truffles), and *samh* (*Mesembryanthemum* spp, and an *Aizoon* with edible seeds) plus one marginal case (*hurbuth*). Bedouins recognize and label at least five folk specifics for dates (I say "dates" rather than "date palms" because, as noted in the generic list (Chapter 10), this recognition is based on fruit forms) and four to five specifics for truffles. *Samh* includes three specifics, one of which is a type-specific. I found no evidence among my consultants for the existence of any folk varietals.

The unique morphology of the group *fag*, desert truffles, along with its unaffiliated status, raises the familiar question as to whether it should be classed as a generic with included specifics or a life form including several generics. Truffles do exhibit a unique life form, but I feel they are better treated as a generic in view of the small number of labeled taxa they include as well as my subjective impression of the Bedouin use of the term, which seemed to be in contrast with other plant names at the generic, not the life form, level.

The only other generic (if it is a generic) exhibiting any tendency toward polytypy is *hurbuth*, referring to some eight biological species of annual legumes. Given that these range over four scientific genera, a tendency toward splitting is perhaps not surprising; *hurbuth* might be ripe for differentiation. I recorded, for one of its members (*Astragalus annularis*), the name *abū khawātim*. This refers, as does the scientific epithet, to the unusual ring-like form of the flattened fruits of this little vetch. It would
thus be described by my consultants as "the kind of ḫurbuth that has flat, ring-shaped pods." The other scientific species included in ḫurbuth have no folk labels, each being referred to simply as ḫurbuth. The situation here is essentially that with Hunn's Tzeltal butterflies, where a generic corresponding to adult Macrolepidoptera including perhaps "several thousand" scientific species has only five labeled subgenerics, leaving a huge residual number of them specifically unnamed (Hunn 1977:280-281). Berlin (1992:114-117) has counseled persuasively against portraying the members of such a residuum in a way that implies they are conceptually grouped on the basis of some affinity or relationship that may well not exist. In our case, for example, one might logically be tempted to contrast the labeled plant *abu khawātim* (having flat, ringed pods) with a hypothetical residual category conceived as "those ḫurbuths that do not have flat, ringed pods." They are more likely, however, to be viewed individually, even if unlabeled, on the basis of the special characteristics of each. There is perhaps some evidence for this in the existence, among more northern tribes in Kuwait, of a name for another kind of ḫurbuth, *Hippocrepis biconcorta.*¹ This is *umm al-ğrēn* (Dickson 1955:50), "mother of the little horn," referring to a fruit form anomalous in a different way. I thus follow Berlin's lead (1992:117) in diagramming our situation as in Fig. 9.3:

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¹ I do not take the tempting step here of making *umm al-ğrēn* a folk specific along with *abu khawātim* within a generic ḫurbuth, mainly because Dickson's informants apparently use a different term (gafā) for ḫurbuth, and it is not known whether it is inclusive of *umm al-ğrēn.*
The rank assignment of ḥurbuth is problematic. It might be considered a generic including one labeled specific (abū khawāṭīm) and an unlabeled residual group in the manner of Hunn's butterflies, although those had more than one labeled subcategory, or it could be treated as a labeled suprageneric complex having one labeled generic (abū khawāṭīm) and again, an unlabeled residuum. It could also be considered a labeled intermediate; it in fact has one often accepted characteristic of an intermediate: clear correspondence with part of a biological family (Berlin 1992:143). Brown's (1987) proposal for a new rank called the "folk subgenus" (the subgeneric being monomially labeled and immediately included in a generic) does not, I feel, solve the problem, although I would agree that that proposed term gives a good feel for the apparent salience of abū khawāṭīm. I place ḥurbuth among our generics, mainly on the basis of how I see the label used in contrast with other names of that rank.
Turning now to the nomenclature of generics and subgenerics (for which I include in data counts all recorded synonyms), Bedouin Arabic generics exhibit a very high proportion of simple primary lexemes. Only 12 generic names are complex, and these fall into three groups:

1. **Productives.** These are names having as one constituent the name of the superordinate category to which the generic belongs. Our three examples all consist of the life form name followed by the name of an animal or bird, the two linked in the Arabic grammatical relationship technically called the "construct form." Example: *shajarat ana’äm*, lit. "bush of the ostrich", glossed "ostrich bush," for the leguminous shrublet *Psoralea plicata*. Consultants said that ostriches, before they were hunted to extinction in the Arabian Peninsula by the 1930s, liked to eat this shrublet. Names of this category may be, at least indirectly, utilitarian. Marking a favorite food plant of the ostrich would be of rather obvious utility to its hunters. Another example is the Leguminous shrublet *Cassia obovata*, called *shajarat ad-dābb*, "snake bush," which has nothing "snaky" about it in appearance or as a habitat. It is, however, one of the few plants poisonous to livestock just as snakes in general are considered by the Bedouins to be poisonous to man, and I would suggest that the name could thus have a mnemonic and warning function. Overall, judging from the examples provided by Musil (1928a), names of this category appear to be more frequent among tribes of northern Arabia than with groups of our study area heartland.

2. **Non-productives with abū or umm.** These three cases are forms consisting of a noun or verbal noun preceded by *abū* ("father [of]") or *umm* ("mother [of]"). Such constructions, particularly the *abū* form, are commonly used in Arabic (and not only in Bedouin speech) to express the idea of a thing possessing the characteristics of something
else, much in the fashion of the English suffix "-like." An example is the name for the rough-surfaced annual *Galium certatopodum, abū nashr*, meaning literally "father of sawing," which I gloss "saw-like wort" or simply "saw-wort." The reference is to the minute scabrous projections on the epidermis of the plant, which catch one's fingers in the manner of a fine saw blade.¹

3. Other non-productive noun phrases. These are descriptive of the plant concerned with respect to physical characteristics or to ecological relations. All of our six cases, like the productive lexemes of (1) above, involve the name of an animal or bird. Example: *mīshṭ adh-dhib*, "wolf's comb," for the spinous perennial legume, *Astragalus sieberi*. The plant's spines do resemble the teeth of a comb, but consultants had no explanation for the association with the wolf although one might speculate about the "savage" qualities of wolves' teeth and plant spines. Another example, *liḥyat at-tēs*, "goat's beard," for the annual composite *Koelpinia linearis*, is obviously descriptive of the plant's fascicled and finely linear leaves.

Bedouin folk specific names (Table 9.2) all take the appearance of primary lexemes. Completely labeled binomial secondary names are, in my data, totally absent. This is of course unusual, considering the prevailing use of secondary lexemes for the specific rank in other folk biological systems (Berlin 1992:29). The Bedouin specific name sets do, however, fall in Berlin's (ibid.:29-30) two categories of names in which

¹ These constructions are quite distinct from the tendency of informants in many societies to indicate conceptual relations between different ethnobiological taxa, often at the level of generics, through the use of terms expressing human family relationships (Berlin 1992:145). In ethnobotany such expressions take the form of "plant X is the brother (or father, mother, sister) of plant(s) Y." I have one example of such a usage in Bedouin Arabic: the reference by an elder of Bani Ḥājir to the perennial grass *thēmām* (*Pennisetum divisum*) as the *ukhṭ* ("sister") of *thmām* (*Panicum turgidum*), another grass of shrubby habit. I will not resist mentioning yet another Arabic general speech metaphor form using a parental term with rather different semantic effect. This is umm ("mother [of]") + pl. noun, which denotes a particularly large or important example of the thing concerned. Thus umm al-maʿārik, "the mother of [all] battles," which was of course Iraqi President Saddam Hussein's prediction for the hostilities of the (first) Gulf War.
such exceptions have been found to occur in other systems. These are: (1) generic-specific polysemy involving a prototypical relationship, and (2) cases where the plants concerned are of major cultural importance. The generic *samḥ* fits both of these classes. It includes two species of *Mesembryanthemum* and one species of *Aizoon*, all of which produce edible seeds. These plants are, or at least historically have been, one of the two most important Bedouin wild food sources in northern Arabia.

**Table 9.2**

Bedouin Polytypic Folk Generics

<table>
<thead>
<tr>
<th>Generic:</th>
<th><em>nakhl</em> (date palm)</th>
<th><em>fak</em> (truffles)</th>
<th><em>samḥ</em> (edible seeds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>specific:</td>
<td><em>khlaš</em></td>
<td><em>khlaš</em></td>
<td><em>samḥ</em> (<em>ḥurr</em>)</td>
</tr>
<tr>
<td>specific:</td>
<td><em>hshēyishī</em></td>
<td><em>zbedī</em></td>
<td><em>ḥamar wāgif</em></td>
</tr>
<tr>
<td>specific:</td>
<td><em>ḥalwāh</em></td>
<td><em>jbēy</em></td>
<td><em>daʾā</em></td>
</tr>
<tr>
<td>specific:</td>
<td><em>khnēzī</em></td>
<td><em>hbērī</em></td>
<td></td>
</tr>
<tr>
<td>specific:</td>
<td><em>rzēz</em></td>
<td><em>blūkh</em></td>
<td></td>
</tr>
</tbody>
</table>

Bedouin specifics are in appearance primary lexemes. The presence of the adjectival suffix -ʾ, as well as the name elements *khlaš* ("pure, genuine") and *ḥurr* ("noble, genuine"), indicate that some of them are functioning as abbreviated secondaries.

The generic, *samḥ*, is polysemous with the largest and most important of its three specifics, *Mesembryanthemum forsskalei*, which is the clear prototype. Of the two other specifics, one is labeled with a simple primary lexeme, *daʾā* (*Aizoon canariense*), the other with a complex lexeme, *ḥamar wāgif* (*Mesembryanthemum nodiflorum*). As is commonly the case in other systems (Berlin 1992:29), an adjective with the meaning of "real, genuine" is added to the prototype in situations where it is compared directly with its sister specifics. With *samḥ*, this adjective is *ḥurr*, which means "noble" or "genuine" (as well as "free"). Thus, discussing contrasts at the specific level, a Bedouin will use the
term *samḥ hurr* or, more commonly, simply *al-ḥurr* ("the pure, real one") to single out *M. forsskalhel*, the prototype.

Our other two generics that include specifics labeled by lexemes of primary appearance, *nakhl* and *fag‘*, do not involve polysemy, but they clearly can be classed as highly salient culturally. Additionally, many of their specifics -- 6 of 10, and this proportion would be much greater if the large number of other specifics of *nakhl* were added in -- share a significant feature: they are clearly adjectivals of forms not seen in any other of our names at any rank. Thus four of them carry the suffix -ī, indicating the nisbah or Arabic relative adjective, which can carry a meaning similar to the English suffix "-like" or "a member of." One specific in each of the two consists of the adjective *khlaṣ*, meaning "pure, unmixed, genuine" and corresponds to the epithet "genuine" often attached to prototypical folk specifics. The *khlaṣ* date is in fact considered by many to be the best date cultivar in eastern Saudi Arabia. With respect to truffles, my experience is that the large, whitish *zbēṭi* may be the most highly regarded, yet in the mnemonic verse about truffles (section 6.3.8) it is the "*khlaṣī*" that the finder keeps for himself! In any case the use of such forms suggests that although these specifics are primary lexemes in appearance, they are in fact conceptually secondaries, with the generic terms of the binomials assumed. Thus, when a Bedouin uses the term *zbēṭi*, he and his listeners have in mind [*al-fag‘*] az-zbēṭi ("the *fag‘* that is white like butter"; when he says *khlaṣ*, he has in mind [*al-fag‘*] al-khlaṣ ("the true, best kind of *fag‘*). I would suggest therefore that such forms are in fact abbreviated secondary lexemes. The abbreviation of secondary names has been recognized elsewhere (Conklin 1962:122; Berlin 1992: 29). Headland (1983:114-115), presents a similar interpretation as one of the hypotheses offered to explain the dearth of secondary names for folk specifics among the Agta, a hunter-gatherer group in the Philippines. There, he suggests, because of the ability of Agta
adjectives to serve as nouns, originally binomial names became truncated to the bare
epithet, which then served as the formal name of the specifics. In our Bedouin Arabic
lexicon, the adjectival forms in such abbreviations tend to be unique either in grammatical
form or semantic content and thus act as "tip-offs" to their basically secondary nature.

9.5. Mainly Linguistic

9.5.1. Form Patterns in Plant Names

Bedouin plant names of generic and subgeneric rank may take a number of common
Arabic noun forms. Overall, however, they display some unusual characteristics. First,
as noted in Chapter 4, those which are simple primary lexemes are generally treated
grammatically as the Arabic *nomen generis* (using the Latin jargon of the nineteenth
century European grammarians), a kind of collective used in Arabic for the names of wild
animals, including birds and insects, which are normally found in groups of large
numbers, herds or flocks. They are also used for the names of plants, which when they
take the form of simple primary lexemes seem to be totally accepted as "social" or
"group" forms of wildlife, and for some other classes of natural objects, including stones
and metals. These collectives are fundamentally different from plurals in that they
represent not a number of individuals but rather an abstract notion of their referent as a
"kind," all members of which share a common essence. The form denoting single
individuals of these "kinds" technically is not referred to by the classical (or modern
Western) Arabic grammarians as a "singular" but by the special term of "unitative." (For
convenience, inasmuch as both "singles" and "unitatives" refer to specific, single
individuals, in other parts of this study I use the term "singular" to refer to individuals of
both the common plural and of the collective.)
The collective is not marked morphologically and may take various Arabic noun patterns. The unitative, however, is regularly marked by the feminine singular suffix -ah added to the collective term. Thus ُhamām, "dove, pigeon" as a "kind" of bird, and ُhamānah, a single, individual dove; from our lexicon: ُ'arfaj, a kind of shrublet (Rhanterium epapposum), and ُ'arfajah, an individual shrublet of that kind. The investigator's test for the presence of the collective is thus to ask the consultant for "the name for just one" of the generic concerned. Virtually the only simple primary names that do not follow the common collective/unitative pattern are some that take the unitative suffix -ah in both the singular and the plural, such as ُuwēnah, rubahlah, and ُhanwah.

Plant names in the form of complex lexemes do not belong to this class. In the name misḥt adh-dhib, "comb of the wolf", "wolf's comb" (Astragalus seiberi), "comb" is not a collective noun and, in any case, we are not talking about combs here. In such a case, the singular form of the name is the same as the name of the general "kind."

Virtually all Arabic ethnobotanical categories above the generic rank also are collective nouns. When they occur in productive complex lexemes they take the form of the unitative, not the collective, presumably because a single sort of, say, the life form, is being singled out as a special kind with a special label. Thus, in our lexicon, we find ُshajarat ad-dābb, not /shajar ad-dābb/ for "snakebush." In such a case, the singular and plural of the plant name are again the same. This is hardly a problem in most situations, but if one wanted to make clear that one is talking about more than one individual snakebush, rather than snakebush as a kind, one could make use of one of the non-collective plurals that exist for the word, "bush/tree," such as ُashjār or ُshajarāt.

Diminutives occur at a much higher frequency in plant names than in common speech overall except perhaps with respect to place names and personal names. The diminutive is generally marked in Najdi Arabic by the appearance of the vowel -ē- in the
second syllable of a word (or in the first syllable when a consonant cluster is word-initial). In Arabic in general, the diminutive may also indicate, as in Spanish and other languages, something regarded with affection. It may also act, counter-intuitively, as an "augmentative," indicating a characteristic that is particularly strongly marked or habitual. In the last regard Fleisch suggested (1961:393) that it would better be regarded as a form that indicates a departure from the mean, or the usual, in either direction. Overall, "diminutive" forms in our plant names appear to have the primary function not of indicating small physical size but rather of attributing the characteristics of a root noun to its referent and probably, to some extent, of marking it as a plant name. Diminutives are more frequent among the names for annual plants than for perennials. It does not occur at all among perennials that are highly salient perceptually by virtue of size or form or among those that are important grazing species.

Apart from the common diminutive, Fleisch (ibid.:390-392) lists several other noun forms in classical Arabic that he classes as "affectives." One of these, Ca/iuCCaC occurs several times in our lexicon. It has the effect of intensifying the meaning of the root and giving a superlative effect, as in our siffär for Schimpera arabica (the Bedouin -i- replacing the -u- of the pattern), based on the root sfr connoting "yellow," "yellowness," and referring to the very strong yellow signature of the flowers of this cruciferous annual. A closely related form, CuCCaC, is so frequent among our names that I have been tempted to dub it, in Latin fashion, a "nomen plantarum." Examples among our generics are shuwwēl, tummēr, gurrēş, guṭṭēnah, and ħummēd. Littman (1926:31-41) described this pattern as occurring in personal names recorded in pre-Islamic Arabic dialects such as Nabatean and Palmyrene. He described it also as a

\[1\] In classical and modern written Arabic, the basic pattern is CuCayC (where "C" represents a consonant). In our Bedouin dialect the short "u" of the first syllable may be absent completely, forming a word-initial two-consonant cluster, or replaced by a very short -i-. In some environments the classical -u- may be "preserved." The written diphthong -ay- is represented by the Bedouin pure vowel, -ē-.
favored form for the name of plants, giving some 85 examples (largely from regions well outside our study area but including several of our generics).

A fair number of generics exhibit the suffix -ān attached to root forms. In Classical and general Arabic this often occurs in adjectives denoting a human condition or habitude, with semantic content indicated by the root. Thus kaslān, "lazy" (from kasal, "sloth", laziness"), ʿatshān, "thirsty" (from ʿatash, "thirst"). For some nouns in everyday speech it simply marks a plural. In Bedouin plant names it attributes the characteristics of a root verb or noun to the referent somewhat in the manner of the English suffix "-like". Thus: shaʿrān (for the Chenopod Anabasis setifera), referring to the terminal bristles on the modified leaves that resemble shaʿr, "hair"; dhanabān (Reseda spp.), referring to the characteristic spiciform raceme of these plants which resemble a dhanab, "tail". I found the suffix -ān occurring in several interesting cases of a sort of what Berlin (1992:31) calls generic name extension. Here, it is combined with the form of the diminutive to liken one kind of plant to another while maintaining a difference. Thus for the composite perennial generally called jathjāth (Pulicaria undulata), an Āl Murrah consultant gave the synonym ʿrifjān, which is the name of another, quite similar (and more useful) shrublet, ʿarfaj, made diminutive with the suffix -ān added. Similarly, Muṭayr consultants called the weedy (and rather useless) Artemisia scoparia ʿwēdhirān, a plant which resembles the more widespread and useful species called ʿādhir (Artemisia monosperma). The use of this "likening form" seems to convey the idea that "this plant looks very much like plant X, but it is different and should not be confused with it." I should add that I am not entirely convinced that these are not nonce forms. The format is certainly convenient for such use. The semantic interpretation would apply whether or not it is a "good" name.
Another plant name form that catches the ear and eye is the use of modified syllabic reduplication with the second syllable carrying an infixed long vowel, usually -ā-. Examples: *ramrām, bastās, raqrūg, jathjāth, gaḍgāḍ*. These are apparently formed by reduplication from biliteral roots (which are overall rare in Arabic¹), although the semantic relationships with the respective roots are in many cases vague.

Nouns with quadriliteral roots (those with four root consonants) are rather rare in Arabic. Moscati (1969:84) has noted that in the Semitic languages overall, animal names figure prominently in such forms, and I had long wondered about the high frequency, in Bedouin, as well as classical Arabic, of quadriliteral animal names like *tha'lab* ("fox"), *agrāb* ("scorpion"), *gunfūdh* ("hedgehog"), *ḏirmān* ("ratel"), and *jarbūč* ("jerboa"). Our data shows that quadriliterals occur in plant names with equally uncharacteristic frequency. Just a few of our examples: *khīdrāf* (*Salsola volkensii*), *ʿujram* (*Anabasis lachnantha*), *ʿandāb* (*Cyperus conglomeratus*), *ʿishrīg* (*Cassia italica*), and *bīṭhirān* (*Artemisia judaica*).² At least one of our names, *ḥartallas* (*Bienertia cycloptera*) seems even to involve a quinqueliteral. My impression is that all of these names have a peculiarly archaic look. The origin of some four-consonant forms have been explained in terms of simple phonetic processes, such as the dissimilation of geminates, with one of the pair becoming n, or fluctuations of liquids such as *sirḥān* ("wolf") becoming *sirḥāl* (Fleisch 1961:502). I saw such phonetic shifts in a few cases of intertribal variation in name forms. Āl Murrah consultants, as an example, gave the variant *gungulān* for a name widely accepted (and semantically confirmed) as *gulgulān*. Some quadriliterals may have an origin in early Semitic prefixes. Fleisch (ibid.:503) gives Nyberg's example

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¹ When they occur, they tend to be in very basic nouns, such as those denoting family relationships and parts of the human body. This has led some to theorize that in the Semitic languages all basic roots were originally biliteral rather than triliteral.

² I do not include here names quadriliteral in form but probably derived by syllabic reduplication, that is, forms such as *ramrām* and *raqrūg*, noted above.
of an old demonstrative ṣ (ṣa in Akkadian) becoming prefixed to a triliteral with the semantic effect of Arabic dhū ("that with, that which has"). Thus Arabic saʿtar ("thyme") from s + ʿitr ("perfume"), meaning "that which has perfume." The high frequency of the phoneme ʿ (ayn) in Arabic plant and animal quadriliteral names has led me to speculate about a possible relict, proto-Semitic "name of living thing" determinant. Fleisch, however, considers a shift from hamzah to ʿayn as a phonetic process, and this could account for some of the ʿayns we see in plant and animal names, particularly those in word-initial positions.

Some common Arabic noun and adjective forms are conspicuously absent from our plant names. Forms with prefixed m- denoting participials, both active and passive, very common in everyday speech and in written Arabic, are absent in our lexicon. The only possible exception is maharūt for Ferula spp. in northern Arabia, which in form is close to a standard past participle of Classical pattern mCCūC. I would suggest that it is just as likely that the terminal -ūt is a relict of some early Semitic feminine -t suffix. In general spoken and written Arabic the m- prefix also marks two other important noun types: the "noun of instrument" and the "noun of place." An example of the first is minshār ("an instrument for sawing", "a saw") from verb nashar ("to saw wood"); of the second, majlis ("place of sitting", "sitting room") from jālas ("to sit"). I think that the absence of the noun of instrument, which seems ready-made for naming a plant by its use, is significant in two ways. First, it underscores the perceptual over the utilitarian as the primary "coining motive" for our plant names; secondly (along with the lack of the other m- constructions), it confirms the basically substantive rather than verb-derived nature of these names, as discussed in the following section.
9.5.2. The Question of Semantic Transparency

One might well question, given my comments in Chapter 4 about the theoretical derivation of Arabic nouns from triliteral roots with established semantic content, why I provide English glosses for only about 116 (39 percent) of our some 297 plant generics including synonyms. This might be accounted for in a few cases where, for names of non-obvious content, I failed to inquire about meaning. In the great majority of cases, however, I did ask consultants about the meanings of names. I was struck, early on and rather naively I now think, by the frequency of cases where Bedouins did not know the meanings of generics. Consultants, for example, when asked about the meaning of the name ‘arfaj (the well-known composite shrublet), would at first not understand what I intended. After I explained, usually by analogy using a well-known plant name that was obviously transparent, they gave responses like the following: "Well, it doesn't mean anything. It just means 'arfaj, you know, that bush." In other words, it had no more meaning for them than the names "oak” or "pine” have for me. If I persisted in my request, consultants would sometimes obviously start thinking hard to come up with some kind of meaning and would throw out some explanation like "Well, maybe it has to do with X,” or "it might mean Y.” Sometimes such explanations were based on some semantic content of the linguistic root concerned; they could apparently feel see some kind of root connections. But their answers were obviously nonce responses and varied from consultant to consultant.

The relationship between Arabic plant names and linguistic roots, I now think, was admirably summed up in a statement by one of the great Semitic linguists, Gotthelf Bergsträsser. He says, speaking of proto-Semitic (the hypothetical ancestor of all Semitic languages, of which Arabic is accepted as the closest descendant):
The opposition between noun and verb differs notably from that in most other languages. On one side stands a relatively small number of what are strictly substantives proper, not further analyzable, originally not obeying the rule of a consonantal root, which name things (kinship terms, animals, body parts, tools, etc.); on the other side is the large group of nominal-verbal roots, which designate attributes, states, or actions. The gulf between the two kinds of root is bridged only at a later stage through the formation of denominal verb stems on the one hand and deverbal names of things (e.g., nouns of instrument, *miptâh 'key' from pth 'open')." (Bergsträsser 1983 [1928]:10).

In other words, many plant names may well have appeared first as unanalyzable substantives and were then attributed to a verbal root only at a much later stage through the manipulations of the early Arab lexicographers and grammarians. This could lead to a situation, which I have long suspected, in which dictionary-declared meanings of linguistic roots associated with plant names are derived from the attributes of the plants themselves, as opposed to plant names developing in response to "basic" verbal root semantics. It is thus quite possible, to give one example, that dictionary meanings associated with root *rimth of the nature of being "disorderly" or "mixed" stems from the physical characteristics of our rimth bush (*Haloxylon salicornicum*), which is finely branched and tangled, rather than vice versa. An even more telling example is Lane's entry for the root *shj r* in his monumental Arabic Lexicon, which begins (using my transliteration): "*shajar‘un* is an inf. n. of *shajara*, and signifies The being or becoming, intricate, complicated, perplexed ... hence the word *shajar‘un*, ['trees,' and 'shrubs,'] because of the intermixing, or confusion, of the branches ...." (Lane 1872:4:1506).

For the above reasons, dictionary speculations (all too easy because words are arranged in the order of their root consonants) about the "meanings" of Arabic plant names can be misleading if not entirely circular and should generally be avoided. Also,
for many dictionary roots, multiple meanings are offered, none of which apparently have anything to do with the plant that is theoretically "derived" from them. For these reasons, in the list of generic names that follows this section, I have resisted the temptation to supply speculative interpretations for many names that appear to be opaque semantically. In some cases, I have found dictionary roots or words that are obviously or very probably closely related to otherwise unexplained plant names in some interesting way, and have noted that relationship in hedged terms. That is not to imply, however, that I believe that a name is derived from a given root or even that Bedouin consultants would necessarily offer the same explanations.

9.5.3. Attributes in Analyzable Plant Names

All of the above is not to say that Bedouin Arabic plant names cannot carry clear meaning. Many of them, particularly the complex lexemes, obviously do, and I have not hesitated to offer glosses for them. This leads to questions of what kinds of meanings are generally associated with our glossable plant labels. First, it is obvious that the overwhelming majority of them can be classed as physical descriptives concerned with perceptual characteristics of their referents. The means of description, however, are wide-ranging, from simple color or texture attributes to references to inanimate objects and animals. There is only one name that is patently and directly utilitarian: dabghah, "tanweed," for Erodium glaucophyllum. I have no data indicating a use of this plant for tanning at the present time, but there is evidence for earlier use of Erodium for that purpose (see entry kirsh in Chapter 10). A few names can, I believe, be classed as indirectly utilitarian in that they act as what I would call "herdsman's markers," indicating dangerous or noxious species with regard to grazing livestock. In this category are two names referring to "earth, sand" which apply to plants that can cause sand colic when
ingested by livestock (although this could also be interpreted as being perceptual, referring to the adherent sand always seen on their viscous surfaces). Another is the plant (mentioned above) that is poisonous to livestock and called "snakebush". One plant is called *mrâr* ("bitterbush") only because its consumption by camels causes bitterness in the camel's milk. Another is labeled *kirš* ("paunch, rumen") not because it resembles that ruminant organ in any way but because it can cause bloat in livestock. Some names involving animals or birds, such as *shajarat an-na‘ām* ("ostrich bush," (mentioned above) might be said to have some utilitarian value in marking promising habitats for hunters. The following descriptive categories cover the great majority of our names (their added numbers exceed the total of glossed names given above because of overlaps into more than one group):

**Shape of overall plant or main stems** (16 generics): These names range from simple adjectives such as "thick", "slender" or "fine" through form analogies like "net-like" (for the parasite *Cuscuta*) to the use of human anatomical terms such as "fist-like".

**Shape of inflorescence or fruits** (21 generics): Shape names ranged from anatomical analogies such as "tail-like" (for the inflorescences of Resedaceae spp.) to inanimate object forms such as "little bell."

**Color** (13 generics): Colors comprised "yellow" (3), "milky" (2, referring to plant sap), one each of "black", "pearly", "gray", "dark green", "red/blonde" and "white"; and "horse-blaze," (2) in reference to mixed white and reddish. The color names were applied in about equal numbers to flowers on one hand and to other plant parts on the other.

**Surface texture** (14 generics): Texture names comprised "cottony/feltlike" (3), "rough, scabrid" (2), "itchy/hot" (2, in reference to irritating hairs), "sandy" (2, referring to
adherent sand), and 1 each of "mangy" (bullate), "woolly", "furry", "hard", and "wet" (viscid).

**Taste** (4 generics): one each of "sour", "bitter", "salty" and "hot". The term for "bitter" was in reference to the taste of milk from a camel that grazes on the plant referent.

**Odor** (9 generics): "stinky" (8) and "sweet, fragrant" (1). Unpleasant odors are obviously more salient here than sweet ones, and the labels for "malodorous" are in most cases based on strong words such as "turd", "offal" and "rotten". Only one of the numerous desert plants with sweet, fragrant flowers was labeled for odor. Names denoting unpleasant odor perhaps have some utilitarian significance in that they tend to be noxious with respect to livestock grazing. One of them, however, *musaykah* (*Haplophyllum*), is said to be liked and sought by camels.

**Armament** (6 generics, names referring to spines or tooth-like appendages). Use of the term *dirs*, "tooth" occurred several times. References to spines were through analogous nouns such as *mishš*, "comb", and the term for spine itself (*šōk*) did not occur.

**Extensions of other plant names** (7 generics): These are names based on the generic names of other plants, usually more common or useful species, which they resemble. The extensions seem to take a limited number of forms, one of which is simply the diminutive of the model, another the combined diminutive and -ān suffix (as described above in section 9.5.1).

**References to animals and birds** (15 generics): Both wild and domesticated animals occur here, with one each of the following: "hare", "wolf", "ostrich", "bifasciated lark", "jerboa", "scorpion", "hedgehog", "snake", "camel", "donkey", "pig" (or "carnivore"; see entry *khiyyēš* in the generic list) and "goat". There were 3 names referring to "raven".
Several of these were productive complex names like "shajarat an-na‘ām", "ostrich bush". Others referred to specific parts of animals such as idhn al-ḥimār, "donkey's ear", liḥyat at-tēs, "goat's beard", and krā‘ al-ghurāb, "raven's shank." All plants of this latter name form had stems or leaves physically resembling the animal parts referred to.

**Names with human anatomical terms** (13 generics) These likened plants or their parts to the "hand/fist" (3), "beard" (2), "head" (2), "hair" (2), "penis" (2), "fingers" (1) and "eye" (1).

**References to specific people** (2 generics). The only two names in this category referred to the same plant (Anastatica hierochuntica), generally known as kaftah, or kaff maryam ("Mary's hand", a reference to the mother of Jesus). It has the synonym jmē‘ fātmah ("Fatimah's little fist", Fatimah being the daughter of the Prophet Muḥammad by his first wife, Khadijah). It is a plant associated with and used only by women, being considered a medicinal that eases childbirth.

**References to motion** (1 generic): The one referent was gulgalān, the crucifer Savignya parviflora, having thin flat fruits on longish capillary pedicels. These, particularly when ripe and drying, dance and shake (tgalgal) in the slightest wind.

9.6. Variation in Generic Names

As indicated by the rather large number of synonyms in our data, there is a fair amount of variation in the names given for particular plants. Single consultants in a few cases gave different responses for the same plant on different occasions, but such differences tended to be very slight and were almost always variations on what was obviously the same name, such as using the diminutive on one occasion and the standard form on another.
Intertribal variations often also seemed to be of the same order of magnitude, with one group regularly preferring the diminutive, the other the standard.

Sometimes, however, completely different names were given for the same plant by consultants of different tribes. Looking at this variation overall, it became apparent in many cases that these differences were appearing on a geographical basis rather than along tribal lines. For example, several different tribes of northern Arabia used the term *ḥamāt* for the well known boraginaceous dwarf shrublet, *Moltkiopsis ciliata*, while more southern groups closer to our study area center used *ḥalam*. Likewise, northerners labeled the important shrub *Calligonum comosum* as *ʿartā*, while southerners used the name *ʿabal*. There seems to be some correlation here with the northern and southern subdialects of Najdi Arabic. Both northern and southern groups were aware of the practice of the other, and I would sometimes get responses like “This plant is X, but Shammaris call it Y.” It was sometimes the case (as will be discussed in section 9.7) that one of the two groups employed *both* of the names for one plant, not in a general purpose sense but for different growth stage or condition states of the same generic.

Major differences between both the above northern and southern groups on one hand and far southern groups say, of the southern Rubʿ al-Khāli, on the other, was another matter. These far-southerners came up with names, even for well known plants found also in the north, that were clearly exotic and often not recognized at all by the more northern groups. Tribesmen of Āl Rāshid, for example used the name *ḥardhā* for one of the most common Acacias of the Peninsula (*A. ehrenbergiana*), a tree known elsewhere by the very stable name, *salam*. Such forms were in fact used by groups that do not speak Najdi Arabic at all, but rather one of the subdialects of southern Arabia that have as one characteristic the substitution of *y* for the phoneme *j* (my Rāshidi consultant that used *ḥardhā* also said *yibāl* for *jibāl* ("hills, mountains")). I have included some of these
names in my generic list (with the tribes of consultants indicated), although they do not strictly belong to our study area.

I would add that of all my consultants, those from the tribe of Āl Murrah provided names closest to plant name forms recorded in Classical Arabic early in the Islamic era. This was particularly true with respect to vowel sounds. With Marrī speakers, syllables voweled with short \( u \) in early records appeared, at least in some contexts, as clearly that vowel rather than the \( i \) or the complete elision characteristic of other subdialects. A long terminal \( ā \) was also audible (especially when consultants repeated names carefully to correct the investigator’s pronunciation) on words that were often recorded classically with the termination \( alif maqṣūrah \), such as \( ḥulūwā \) and \( khuzūmā \). Ingham (1997:98) also noted terminal \( ā \) on words spoken by Marrī consultants; his five examples of such forms are in fact plant names. The terminal vowel on the same names spoken by my consultants of other tribes were usually not distinguishable from the common short feminine \(-ah\).

Bedouin plant names, in general, appear to be very conservative, even archaic forms, and intertribal comparative studies could well provide insights into historical tribal relations and geography. For example: Is the traditional genealogical connection between the Āl Murrah and ‘Ujmān tribes, or at least a common original homeland, reflected in common aspects of their plant nomenclature? Ingham (1997:87-88) has already found their dialects to be "almost identical" at the structural level. I have records of the tribal affiliations of the sources for virtually all of my recorded names, but the tribes in my study were not selected for particular hypothesis testing, and the number of consultants for some tribes was too small for statistically sound comparisons. But this could be an interesting field for future research.
9.7. Growth Stage Generics

Another feature of Bedouin plant nomenclature is the use of specialized sets of generic names that are substituted for the general purpose names of important grazing plants when it is important to convey growth stage or condition information about them. These are not descriptive phrases or adjectivals. They take the form of alternative generic name sets, each of which can be applied to only a single, general purpose generic. The following are examples, with tribal sources as indicated:

For ‘andab (the sedge, Cyperus conglomeratus): when small: thiddah (Ál Murrah); when dead and dry: damdim (Ál Murrah). Thiddah is a phonetic variant of thundah, used as a general purpose name for this sedge in northern Arabia. Thus, general purpose regional synonyms may sometimes contrast with one another as growth stage names.

For thmām (the perennial grass, Panicum turgidum): when with new leaf and stem growth: ḥajnā (Qaḥṭān).

For ḥalam (the dwarf shrublet, Moltkiopsis ciliata): when dry: khashin (Ál Murrah); when small: ligat (Banī Ḥājr). For a Qaḥṭānī consultant, however, ḥalam was a growth stage name used for "small, young” ḥamāṯ (hamāṯ being a general purpose synonym for Moltkiopsis used generally by some tribes.) This is another example of general purpose synonyms sometimes contrasting as growth stage terms for the same referent.

For nuṣī (the perennial grass, Stipagrostis plumosa): when newly sprouted from seed: gšām or shatīl (ad-Dawāsir); when growing as depauperate plants on hard ground: tbēnī (diminutive nisbah form from tīn, "straw,” Ál Murrah); when very large: ʤa’wīṯ (Ál
Rāshid and other southern tribes speaking Southern Arabic); after it has dried and gone pale in color: *thghām* (Banī Hājir).

For *zahr* (*Tribulus arabicus*): when small seedlings, in their first year of growth: *zrēgah* (Āl Rāshid); when more than two years old but not yet fully grown: *īthwah* (Āl Rāshid).

For *hādh* (*Cornulaca arabica*): when small, as seedlings: *jarū* (Āl Murrah, Āl Rāshid); when flowering (with yellow anthers protruding from joints): *wāris* (Āl Rāshid); when in seeded stage (with woolly stem joints): *jādir* (Āl Rāshid); after seeds have fallen: *mrēkhī* or *silli* (Āl Rāshid). The last name, *silli*, is probably the consultant’s southern Arabic pronunciation (the *j* shifting to the terminal form of the semivowel *y*) of *sillaj*, a name applied in our central area to a different species of *Cornulaca* -- yet another example of a general purpose generic becoming elsewhere a growth form generic (in this case for a different but related species).

Growth stage generics are of obvious utility in a pastoral society, providing a common code for concise description of vegetation conditions. They appear to reach their greatest development among groups frequenting the more southern and hyper-arid parts of our study area, such as the Rubʿ al-Khālī. Here, species diversity is highly restricted, and information on the precise growth stage and condition of the available few becomes the vital intelligence of the range scout. Growth stage names also appear to be used among Bedouins in North Africa. Gaulthier-Pilters, describing grazing practices of the Reguibat Bedouins in the highly arid western Sahara, reported the use of three such names for *Stipagrostis pungens*¹, a perennial grass similar in habit and habitat to our *Stipagrostis*.

¹ The name was given as *Aristida pungens*, the publication occurring before the revised genus name, *Stipagrostis*, had come into wide use.
*drarit* and in fact bearing the same Arabic general purpose name, *sabat*. When in flower, it is there called *eilag*, the camels then cropping only the flowering parts. When the inflorescences are gone, leaving the green vegetative parts, it is called *azaran*. When the plants are dried and overgrazed, the camels preferring the small dry leaves near the plant base, it is called *halfoe*. These names are used only for this one generic (Gaulthier-Pillers 1965:1541,1573).

9.8. Classification and Subsistence Mode

In the early 1970s, at the time Berlin and colleagues were describing their general principles of ethnobiological classification, the greatest part of the folk classification work done on a modern theoretical basis had dealt with small-scale horticulturists. Later in that decade, however, and particularly in the following one, a number of workers had extended such studies to another subsistence type, that of hunter-gatherers or foragers. These investigators (e.g. Hunn and French 1984) were discovering that their data differed in several respects from that obtained from small-scale farmers. Two of the most significant differences concerned the breadth of the classifications, expressed as the number of labeled taxa, and its depth at the subgeneric level. Hunter-gatherers appeared to label significantly fewer taxa overall and to have fewer (in some cases zero) examples of subgeneric categories.

Brown's work (1985) was a first, broad-scale comparative study dealing with both numbers of generics and the presence of binomial labeling, which is closely correlated with subgeneric categorization. He showed that of the classifications studied, cultivators had more than four times the number of labeled plant categories than did hunter-gatherers. With respect to classifications of animals, they had nearly twice as many. Among the farmers, binomial names comprised on average some 36 percent of
their plant labels, while those of the foragers ranged from zero to about 7 percent. Figures for animal names were similar. Brown's analysis was the subject of some criticism, largely concerning the comparability of the data he amassed. There is general recognition now, however, that his qualitative conclusions were correct. Berlin (1992:98), counting only from ethnobotanical descriptions that were relatively complete, found an average of 520 labeled generic taxa for 17 traditional cultivator groups and 197 for 7 societies of noncultivators, virtually all of the latter being hunter-gatherers. He qualifies this finding, however, by pointing out that the foragers studied generally occupied habitats of less biological diversity than did the cultivators and that a properly controlled comparison would have to involve studies of the two subsistence types living in the same environment (Berlin 1992:99). Thus the smaller and shallower inventories of the hunter-gatherers could be the result of a more restricted expression of nature.

Assuming, however, that a significant difference between the two subsistence modes by either of the above counts actually existed, an explanation was called for. Brown (1985) and Hunn and French (1984) independently suggested virtually the same one, based on observations by Lee (1979): In brief, small scale cultivators are subject to crop failure and have to maintain a broad and deep knowledge of wild plants as famine foods. Their higher population densities call for the broadest possible famine use of wild plants. Foragers, on the other hand, deal continually with wild species that by virtue of long natural selection are already drought-resistant. Expanded and binomial labeling follows from the agriculturists' need to classify this wider inventory, according to Brown (1985:49-50), who also points out the increased need of cultivators for medicinal plants.

I have always felt that this explanation was a bit strained. For one thing, the subsistence agriculture widely practiced in tropical climates would seemingly seldom suffer from drought (although crop disease or pests can be a factor in such horticulture).
Berlin (1992:283-285) objected to the Hunn-French and Brown argument by pointing out that a real difference in inventories of generics between cultivators and foragers in the same habitats (emphasis in original) had not yet been proved and that there was evidence that uncultivated plants recognized by two New World horticultural groups did not correlate with edibility, as would be expected by the famine avoidance explanation. He thought, rather, that the development of subgeneric labels, among cultivators, would come "as part of the process of human beings' conscious construction and manipulation of new and perceptually different forms of life" (Berlin 1992:286).

I think Berlin's explanation is highly plausible, but I would give it a bit of utilitarian spin, speculating as follows: Horticulture always involves some degree of artificial selection, as particular cultivars are found to vary and to be preserved for some valuable feature, such as increased size or edibility, while less useful ones are dropped. These new cultivars, for obvious practical reasons, require labels, and the most natural process for marking them is simply the throwing on of some adjective to the original generic (they are already and obviously a form of that kind). These secondary lexemes develop not through any christening process but simply through repetitions of handy binomials that "catch on." Once a few such names enter the lexicon, a speech pattern is established and leads to imitations of a handy model. Small-scale cultivators are generally well in touch with the wild flora as a source of medicinals, specialty foods and construction materials. Plausibly here also, this "more detailed way" of looking at plants will be extended, and more taxa will become labeled (and more of them binomially) in that domain.

Whatever the real situation of the discussions above, a natural question arises as to how a famine scenario would affect our pastoral nomads. It is well known that pastoralists, like horticulturists and particularly in arid environments, can suffer from
devastating production losses, mainly from droughts. Could our Bedouins, having lost their camels, resort to wild famine foods to save their own hides? The answer, probably, is no. The cultivators have the choice of moving from the fragile, man-made environment of the fields to the more robust and naturally selected world of drought-resistant wild plants. The Bedouins have no such option. The wild plants that they might eat are even more dependent on rainfall than the vegetation serving as input for their herds. As I have seen on many occasions, the edible plants *rubahlah* and *siffär* and the *fag* (and all the rest) simply don't appear at all when the rains fail. This is the main reason why I believe (as suggested in section 6.3 and with two possible exceptions) that edible wild plants have been collected by Bedouins primarily as dietary supplements rather than for famine relief.

Returning to numbers: The Bedouins are neither cultivators nor hunter-gatherers (although both aspects of the latter have traditionally supplemented their herding to some extent). How do they stand with respect to numbers of labeled taxa and the proportion of polytypic genera? Clearly, as seen from our account of generic and subgeneric names in section 9.4, they appear to lie nearer the camp of the foragers, at least as the latter have been described so far. Our total of 209 labeled generics is quite close to Berlin's average of 197 plant names for well-studied hunter-gatherers, compared to his 520 for horticulturalists. With respect to the proportion of polytypic generics, we have an exceedingly low figure, hardly more than 1 percent, compared to Berlin's (1992) mean of about 20 percent for cultivators and close to the low figures of hunter-gatherer cases quoted by Berlin (1992:275-280).

Any absolute number for labeled taxa is of course a function not only of culture but of habitat ecology. Our east-Arabian environment is an arid to hyper-arid desert, and the maximum number of plant folk labels (particularly in view of our very low number of
specific names) can hardly exceed 400, the approximate number of scientific plant species in the Bedouin desert universe. At the other extreme, in tropical environments with thousands of plant species, limitations of human memory become operative. Thus even there (according to Berlin 1992:98), the maximum number of labeled taxa generally lies in the order of some 500. Even relative figures for labeled taxa can be skewed by environmental considerations. Surely it is easier for our Bedouins to name and remember their 65 percent of 400 scientific species than it is for a group of tropical cultivators to keep track of half of 2,000.

Despite the above limitations (and entering again the realm of speculation), I would venture some ideas on the relationship of plant classification to the pastoral nomadic subsistence mode. First, if small-scale cultivators are highly manipulative of their plant environment, their crops requiring not only planting but constant care, observation and protection, and the labeling of cultivars, then hunter-gatherers are less manipulative, having only to lift their naturally nurtured produce at the right time and in the right place. Nomadic pastoralists, such as our Bedouins, are least of all manipulative of plants, as they have only to lead their herds to the right place, then retire to an overlooking knoll and (these days) open a Chinese-manufactured thermos for a cup of coffee. This is of course an oversimplified picture of pastoralism, but the point is that the relationship with plants here is generally very much at arm's length, buffered by domestic animals. It is even the herded ruminants, not the herder, that perform the final selection, harvesting, and processing. Given this degree of insulation, I would expect Bedouins to have less concern for the fine points of plant differences and therefore a low proportion of specific level taxa, and this is the case. The low number of labeled generics might also be smaller than among cultivators. The latter supposition also fits our data, but the limited diversity of our desert flora may very well also play a role there.
A larger question is whether any such generalizations might be made about the pastoral subsistence mode, anywhere. Comparative data are very sparse, but I found useful four ethnobotanical surveys carried out in East Africa by Bernd Heine and colleagues between 1985 and 1988, having as subjects pastoral groups in the northern part of Kenya. They deal with areas ranging from arid to dry subhumid on the UNEP aridity scale (UNEP 1997) and thus provide some spread of plant environments. Much effort was put into describing plant uses in these studies but, as pointed out by the authors, a survey of overall plant classification was also carried out for each group following the framework of Berlin, Breedlove and Raven 1973 and 1974. A comparative plus is that the languages are non-Semitic and thus not related to Arabic.

Some differences between Heine's study areas and subjects, and ours, are noteworthy. The climate regime is different, with the African area having rains more evenly distributed throughout the year and lacking the single long rainless period found in our less tropical and more arid region. One group, the Samburu, exploits an area that is decidedly more mesic -- a plateau of about 2000 m elevation with scattered trees on grassland and rainfall of some 500 mm, falling mainly in spring and summer (Spencer 1973:5-7). They do not, however, engage in cultivation. The climate is of course reflected in the flora, in which there are more tree forms, with the annuals (the drought evaders) being less prominent. Grasses constitute a much more important part of the vegetation, and the extensive subshrub communities of our parts are absent or attenuated. Our saltbush group, important both floristically and in our Bedouin classification, is for the large part absent. East African livestock practices are conditioned by the need for salt by ruminants, but the mineral sources are natural salt licks, often associated with watering points (Spencer 1973:8). One group, the Rendille, have camels as their large livestock type; the others are raisers of cattle and smaller stock. Some of these African groups are
described as "pastoral nomads," but their degree of nomadism appears to be significantly lower than with the Bedouins. The Samburu and the Chamus, in a region favored with higher rainfall, would appear to be the least so, although they do move around seasonally (see Spencer 1973:20-24 for the Samburu).

Except in the case of the Chamus, Heine does not offer an estimate of the completeness (in terms of recording all labeled folk taxa) of these studies, but they appear to be reasonably exhaustive. The interpretation of someone else's data has pitfalls, particularly as here where counting data is not provided by the original authors, some generics and subgenerics are not linked to scientific taxa, and rank is not always clearly indicated. Overall I would guess that my generic counts may be on the high side and that the proportion of polytypy may also be too high because of the misinterpretation of some binomials that might be only generic extensions or synonyms. My approach, in what follows, will be to summarize the plant classifications of each of the four groups, then compare their characteristics with our own and suggest what extrapolations might be viewed as possible traits of the pastoral subsistence type in general. I will begin with the Rendille, who as arid land camel herders, seem closest to our Bedouins in way of life.

9.8.1. Data Summary: East African Pastoralists

All of the following Rendille information, or basic data leading to my own conclusions, is from Heine and Heine 1988b unless otherwise noted. The Rendille language belongs to the Sam group of Lowland East Cushitic and is therefore related to Somali. The Rendille (like the other three groups below) do not label plants as a kingdom, and they divide all plants exhaustively into two life forms: (1) "tree" (which also includes all other non-grasses although exemplary forms are large and woody), and (2) "grass", which refers only to true grasses defined as having long narrow leaves and jointed stems. There are "a
number of intermediate categories" (I did not attempt a count), which may be labeled or unlabeled. None of those described appear to have their salience related to grazing utility. Generics total approximately 240, of which 12 (or 5 percent) are polytypic. Generics include a rather high number (36) of productive complex lexemes including the life form "tree." Many of the specific contrasts consist of only two members, of which one is a monomial polysemous with the including generic. The total number of secondary specifics is 18.

The Borana (as described in Heine and Brenzinger 1988) are one group of the Oromo, an Eastern-Cushitic speaking people inhabiting large parts of Ethiopia, northern Kenya and western Somalia. The present data pertains only to the pastoral Borana of northern Kenya. Kirby (1968:88) describes them as cattle raisers. Heine and Brenzinger (1988) make grazing use references to cattle, goats, sheep and also camels. The generic list for the Borana is complicated by a strong admixture of names quoted from other literature. Inasmuch as these are said to come from Oromo-speaking sources outside the authors' study area, I thought it best to disregard them. Three different versions of life form classes were recorded from Borana consultants. The one followed here was that claimed to be "correct" by the majority and includes: (1) "tree," comprising plants with woody stems and branches, typically of "tree" size [presumably by European concept],

(2) "gerb," grasses and other small herbaceous plants eaten in toto by livestock. A third category, intermediate between the first two and glossed approximately as "small trees" or "extremely large herbs," is also presented but with doubts about its validity as a life form. True grass is recognized as a life-form category in one of the other two, alternative, classifications, and the name for that class appears some 16 times in productive complex generics referring to grasses. There are a number of unaffiliated generics, although consultants differed on their identity. A number of both labeled and unlabeled
intermediate categories are recognized, some of which are described as "sub-life forms" (examples being trees grouped by shape of thorns) and others as "super generics" (generics grouped by common characters such as presence of latex). My count of generics totaled about 446, of which some 23 or 5 percent are polytypic. The count for binomial specifics was about 93. Contrast sets of folk specific rank tended to be larger than in the other three groups studied.

The Chamus (Heine and Heine 1988a) have an economy more "mixed" than of the other three described, engaging in animal husbandry (cattle, goats and sheep) but also farming and fishing. They are also the one group of the four about which the authors express any reservations about inventory completeness. They say that the data presented is far from being exhaustive but "is likely to include the majority" of Chamus-known plants and to be "representative of the plant knowledge an average adult Chamus has" (ibid.:41). The Chamus language, along with that of their neighbors the Samburu, form the northern branch of the Maa group of Eastern Nilotic. The Chamus "tend to classify their plants into two mutually exclusive groups": (1) "trees," which includes not only trees but vines and bushes down to dwarf shrub size, with the most exemplary examples being trees several meters high, and (2) "grass," which includes not only true grasses but any small plant useful for grazing livestock. Another taxon, glossed "weed," is used "occasionally" in reference to "grass"-size plants that are considered useless. The name is taken from that of a labeled plant but is said by some consultants to be only a term for "rubbish" or "waste material." Intermediates are represented by several labeled groups, including "trees with straight thorns" and "trees of milk" (latex), and some unlabeled groupings of generics. There are a few unaffiliated generics, the basis of which appears to be anomalous life form, not high cultural salience. Generics total 225, of which 5, or 2
percent, are polytypic. The number of binomial specifics is 12. Many of the specifics are contrasts of two, with one member being monomial and polysemous with the generic.

The Samburu (Heine, Heine and König 1988) are Maa speakers like their related neighbors, the Chamus. They are above all cattle herders but also keep some goats and sheep. They recently also acquired some camels. The Samburu group their plants into three life forms: (1) "tree," referring to true trees but also to shrubs, vines, and even some epiphytes -- in general to all plants "taller than one foot," (2) "grass," referring to plants "less than one foot tall and considered to be useful as livestock fodder, and (3) "weed", described as generally herbaceous plants of "grass" size but useless as livestock fodder. The category "weed" is said by the authors to be the most difficult to define and to be surrounded by controversy as to its membership. Intermediate classes can be what the authors call "sub-life forms," such as trees grouped by thorn type or by presence of latex (these being labeled with descriptive phrases), or unlabeled small clusters of generics. An important labeled intermediate class maps closely on the scientific genus Commiphora. The generic list includes a good proportion of names taken from other literature, and I have generally not counted those. Even so, the Samburu generic inventory appears to be very large, totaling some 650. Of these, some 27 or 4 percent, are polytypic (but may be overcounted by me). The number of secondary specific names is about 42 (perhaps also overcounted).

9.8.2. Discussion

The first striking characteristic of all four African pastoral systems is the strong binary break at the life form level between "tree/grass" or "tree/grerb". This is the binary opposition analyzed by Brown (1984) and is closely analogous to our Bedouin
"perennial/annual" set, although the main criteria appear to deal with the more usual qualities of stem texture and size rather than with perennation. The third category of the Boran, intermediate between these two, is decidedly more vague and less salient, and the "weed" category of the others is really a residue class based on utility. With respect to life forms, they all thus resemble our Bedouin classification. Two of them give greater prominence to true grasses than is the Arabian case, but true grasses are not so important for the Bedouins as a grazing resource and the majority of them in our study area are of somewhat anomalous, shrub-like form. The general absence of a specifically African "bush" category probably reflects the lesser salience of that life form in their environment. The savannah vegetation there is characterized by strong tree-level and grass-level plant communities. This bipolar life-form tendency thus appears to be ecologically based and may not necessarily be characteristic of pastoral societies in general.

The presence in the Samburu and Chamus classifications of intermediate level groupings of trees by thorn type is an interesting parallel to our Bedouin Arabic class 'īdah ("trees or large shrubs with thorns"). It is clear in both cases that the primary focus is on the genus Acacia. I have already noted how several of our major Bedouin consultant tribes have migrated from southwestern Arabia, which has a distinctive Acacia vegetation, and the presence of these "thorn" groupings can be attributed to the obvious practical salience of these heavily armed trees.

We see a wide spread in the generic inventory sizes of the African groups, ranging from the 240 of the Rendille, comparable to the Bedouin case, to over 600 for the Samburu, putting the latter well into the range of horticultural societies. They appear to form a cline correlated to some extent with environment, the Samburu on the least arid lands having the largest number. The Chamus data is not complete enough to consider here. The Borana, out on the more arid lowlands, also have a rather large inventory, but
this could be an effect of the huge territorial range of the Oromo speaking peoples, who range from southern Kenya northward deep into central Ethiopia and over varied plant communities. Whatever the forces at work here, it would appear that the pastoral subsistence mode, per se, cannot be said to be characterized by small generic inventory size, as appears so far to be the case with hunter-gatherers. The small number of generics among our Bedouins (209) may thus well be an effect of the low species diversity of their highly arid environment. Readily available data does not, unfortunately, allow estimates to be made of the proportion of total scientific species that are labeled by the African groups.

Turning now to an environment quite different from all of these (and from eastern Arabia), the Norwegian Arctic, Anderson's data for Saami reindeer herders (Anderson 1978) shows some similarities to, and some major differences from, our Bedouin Arabic situation. It should be noted here first that this author was obviously quite familiar with such works as Berlin, Breedlove and Raven (1973, 1974) but chose not to place her data in that framework, pointing out that "The Saami data did not lend itself to the assignment of categories to ranks based on lexical characteristics; instead, it was convenient to work simultaneously over more restricted parts of the taxonomic landscape (see Randall 1976)" (Anderson 1978:563). There are three major life forms: "tree", "fungus" and "small wild plant." "Tree" is subdivided into deciduous trees and conifers, while "small wild plant" includes labeled classes for "foliage plant", "bladed plant" (including true grasses and sedges), "lichen" and "moss" (ibid:421). According to Anderson's own accounting, there are 94 labeled folk taxa for plants (ibid.:564). This figure is also equated with "terminal taxa" of plants (ibid.:565). There is, throughout the classification, an unusually high number of productive complex lexemes. Conclusions as to degree of polytypy among generics are difficult to reach, given the presentation format, but my inspection suggests
that there might be five or six such cases. The low number of terminal taxa, as well as the
presence of life form classes for "lichens," "fungus" and "moss" obviously reflect
ecological aspects of the Arctic environment.¹

The proportion of polytypic generics in all five groups exceeds the Bedouin case
of 1.4 percent but extends only up to 5 or 6 percent (and this may be a high estimate).
This is well below the roughly 20 percent that according to Berlin (1992:33) is typical of
folk classification systems overall and falls into the range associated with hunter-gatherers
(at least those studied so far) rather than with small-scale agriculturists. This result
supports my suggestion that pastoralists have less concern for finer distinctions in plant
classification because of their "least manipulative" relationship with vegetation. It will be
of interest to see, as additional pastoral plant classifications are described, whether this
tendency is more widespread among herding groups.

¹ See also section 9.2 for an interesting parallel between Saami and Arabian Bedouin views of the smaller
life forms.
10. DESCRIPTIVE LIST OF GENERICS AND SUBGENERICS

This chapter comprises a list of all folk generic and subgeneric names arranged under the broader categories which include them. Its organization follows the following outline, with groups listed in the numerical order indicated:

1. Life form *shajar*₁ (all perennials)
   2. Sub-life form *shajar*₂ (true trees and shrubs over man-height)
      3. Intermediate: *iḏāḥ* (trees and large shrubs with thorns)
   4. Sub-life form *shima‘* (bushes, of well less than man-height)
      5. Intermediate *ḥamd* (saltbushes)
         6. Complex: *ṭahāmīj* (saltmarsh succulents)
    7. All non-*ḥamd* bushes
       8. Intermediate *khillah* (non-*ḥamd* bushes often grazed)
       9. Non-*ḥamd* bushes seldom or never grazed
   10. Residual group of perennials smaller than bush size

11. Life form *ʾishb* (all annual plants)
12. Unaffiliated generics
13. Generics of unknown life form

Within each category the arrangement is English-alphabetic, ignoring diacritical marks. Folk specifics when present, are listed under their respective generics. Constituents of each entry are:

1. The folk generic name is given followed, in parentheses, by the name of the tribes of the consultants providing it. The abbreviation "gen." indicates a name known with some confidence to be in general use by multiple tribes of the study
area. The provision of a tribal source for a name, however, does not preclude the possibility that it might be in more general use.

2. For analyzable names an English gloss of the lexeme and its constituents is provided. Added, in some cases, is a discussion of the range of application of the generic or subgeneric name. Variants and synonyms are listed, with glosses when analyzable. In general, forms based on the same linguistic root are called "variants"; those from different roots are treated as "synonyms."

3. The scientific names of the taxon or taxa concerned, and the botanical family, are provided. These are followed by a listing of the author's specimen numbers with standard herbarium designators for their locations. The great majority of these will be BM (The Natural History Museum, London) or K (Kew). Specimen numbers without herbarium designators are in the author's personal herbarium. The number of specimens cited for each taxon is limited to a maximum of three, although the number of collections for the majority of species is considerably greater.

4. There follows a brief description of the plant or plants, which will generally be a shortened version of the technical botanical description in Mandaville (1990).

5. A brief mention of the cultural significance of the folk taxon is made when applicable. More detailed cultural information will be found in other sections of this study.
Arabic names taken from the literature are rewritten in my transliteration system and will thus have spellings in most cases not matching the originals. Scientific nomenclature in older literature references has been updated to currently preferred forms without, in many cases, citation of the originals or of other synonymy.

It should be noted that the great majority of generics here are in the form of the Arabic nomen generis, the collective form regularly used for plant and some animal names. The singular (or technically the nomen unitatis) is formed from this by adding the feminine singular suffix, -ah. Thus: athl (the tamarisk tree Tamarix aphylla, in general as a "kind") and athlah (a single tamarisk tree). A few names (such as msēkah, gtēnah) tend to carry the -ah suffix in both collective and singular forms. There is some ambiguity about the vocalization of a few names that historically, in classical Arabic, have -ā terminations (alif maqsūrah) on forms based on "strong" triliteral or quadriliteral roots, such as khuzāmā, shiqārā, ‘alandā. I generally heard such terminations as a simple short -a, but there were sometimes indications of a lengthening, particularly from Āl Murrah consultants. In some cases I tested the suffix by asking consultants for the dual form ("how do you say two of them?"), in the answer to which the suffix -ah changes to a -tēn, and the suffix -ā or -á becomes -wēn or -yēn). In some cases ambiguity remains, and I write the few such terminations as a simple -a.

1. Life form: shajar₁ (perennial plants, often woody)

2. Sub-life form: shajar₂ (true trees and large shrubs)

athl (gen.) A widely used and stable name, attributed only to this cultivated species of tamarisk.
Tamarix aphylla (L.) Karst. Tamaricaceae. 1091. Cultivated tree, usually with a well developed trunk, up 15 m or more high. Leaves greatly reduced and vaginate, without normal blades. Flowers pink, in racemes usually 4-6 cm long. Fruits or flowers reported used in dyeing cloth.

khirwa‘ (Bani Hajir) Ricinus communis L. Euphorbiaceae. Erect, glabrous shrublike herb up to 5 m tall. Leaves alternate, peltate, 10-50 cm across and palmately 5-11-lobed, the lobes ovate-lanceolate, acute. Flowers ca. 2 cm wide, greenish yellow, in racemes. Capsules ovoid, 1-3 cm long and covered with thick prickles or spines. Not a plant of the desert but known to at least some Bedouins.

markh (gen.) Leptadenia pyrotechnica (Forssk.) Decne. Asclepiadaceae. 235, 1957. Ascending, dense, many-branched shrub with green, wandlike branches, 1.5-3(5) m high, virtually leafless except for small, soon deciduous, linear-lanceolate rudiments on young spring growth. Flowers yellow-green, subsessile, clustered in short axillary cymes. Fruits terete, linear, striate, 9-13 cm long, ca. 0.8 cm wide. Seeds comose. Flowers and young fruits edible; hair tufts on seeds formerly used for tinder in firemaking with flint and steel.

‘ōsaj (gen.) Name variants recorded from informants of northern tribes: ‘ōshaj, ‘ōshaz. Applied to two very similar species of Lycium (Solanaceae), the second of which, L. shawii, is the more common.

Lycium depressum Stocks. BM 3126. Dense glabrous shrub 1.5-3.5 m high with many rigid branches, becoming more or less spinescent. Leaves clustered, obovate-oblong to spathulate, 1-3(4) cm long, 0.3-0.8(1) cm wide. Flowers mostly in clusters of 3-8 on pedicels 3-10(15) mm long, with pale violet, funnel-
shaped corolla 8-10 mm long. Stamens equal or subequal, clearly exserted from the corolla. Berries globose, orange-red, 4-6 mm in diam.

*Lycium shawii* Roem. et Schult. BM 1108, BM 1205. Dense, stiff-branched, intricate shrub 1.5-2.5 m high, finely tomentose at least on younger parts. Leaves elliptical-oblanceolate to spathulate, 1-2(3) cm long, 0.3-0.8(1) cm wide. Flowers solitary or rarely two together, 13-16 mm long with corolla narrowly tubular, ca. 15 mm long, variably white through pink to purple. Stamens distinctly unequal, all included or two somewhat exserted. Berries globose, red, ca. 4-5 mm in diam. Both of these plants have edible berries, called *dām* (Bani Hajir), and both have supernatural associations, being considered by some to be the abode of the non-human beings called *jinn*.

*rāk* (gen.) *Salvadora persica* L. Salvadoraceae. BM 2959. Large shrub with opposite branches, 1-3.5 m high, often growing in dense thickets on sand hummocks. Leaves elliptical or broadly lanceolate, entire, 2-5 cm long, 1-2 cm wide, on petioles ca. 5 mm long. Flowers ca. 3 mm long, in paniculate racemes, with coffee-like odor. Fruits globular, fleshy, reddish, 3-6 mm in diam. Twigs and roots used for making toothbrushes. Fruits eaten by southern tribes.

*shibhān* (Āl Murrah) Synonyms: *ghāf* (villagers of al-‘Uyūn, al-Ḥasā Oasis), a name regularly used for a very similar plant, *Prosopis cineraria* (L.) Druce, found in southern and southeastern Arabia but not occurring in our study area; *tīrf* (al-‘Awāzim tribesmen at Thāj).

*Prosopis koelziana* Burkart. Leguminosae. BM 1048, BM 2896, BM 3949. Shrub to good-sized tree, 2-12 m high, scrubby or erect with well-defined trunk. Branches somewhat pendulous, with sharp prickles or unarmed. Found in our
study area at points on Hellenistic period caravan routes from southern Arabia and possibly brought in with camel traffic from that region.

тарфā (gen.) Applied to six species of Tamarix (Tamaricaceae) all characterized by their wild habit and shrubby form without boles, thus considered distinct from athl, the cultivated T. aphylla. All of these shrubs grow 1-3(5) m high, are very similar to each other in general appearance, and are separated scientifically mainly by details of flower and fruit characters. They all have leaves reduced to clasping, pointed scales, thus appearing to have jointed "needles" rather than normal twigs and leaves.

T. arabica Bge. DAO 3942, DAO 7846, DAO 7864. Large shrub with brown or red branches and leaves clasping with triangular blades. Flowers pale pink to white, 5-stamened, in dense racemes 1.5-4 cm long. Fruits pyramidal, tapering to apex, ca. 3 mm long.

T. aucheriana (Decne.) Baum. DAO 7443. Shrub with brown to purplish branches. Flowers pink to white, 12-13-stamened, in spiciform racemes 2-5 cm long. Fruits pyramidal, 4-6 mm long.

T. macrocarpa (Ehrenb.) Bge. DAO 7448. Shrub with brown to grey-purplish branches. Flowers pale pink, 10-stamened, in dense or somewhat open spiciform racemes 2-6 cm long.

T. mannifera (Ehrenb.) Bge. DAO 7817A, DAO 7856. Shrub with brown to red-brown branches. Flowers pink to white, 5-stamened, in dense racemes 0.7-3 cm long.

T. pycnocarpa DC. BM 1459, DAO 7092. Shrub with grey-brown to grey-purplish branches. Flowers pink-rose, rather showy, sometimes up to 20 mm broad in fruit, 12-15 stamened. Fruits 8-12 mm long.
T. ramosissima Ledeb. K, DAO 531, BM, DAO 1457, BM 650. Large shrub with grey-purplish branches, often forming large hummocks in sand terrain. Flowers white to pink, 5-stamened, in racemes 2-5 cm long. Fruits 2.5-4 mm long.

The ashes of any of these species are used in treating camel mange.

‘ushar (gen.) A Qaḥṭānī informant pronounced this name as ‘isharr, with stress on the second syllable.

Calotropis procera (Ait.) Ait. f. Asclepiadaceae. BM 1080. Ascending to erect, tree-like, glaucous shrub, woody below with pale, corky bark, coarsely succulent-herbaceous above, to 4 (5) m high, bleeding copious latex at any wound. Leaves opposite, oblong or obovate, sessile, 10-25 cm long, 8-17 cm broad. Flowers greenish white and purple-flushed, 1.5-2 cm across (3 cm with corolla lobes spread), in umbel-like, peduncled cymes. Fruit an ovoid follicle 8-13 cm long, with comose seeds. A toxic plant, used medicinally and for charcoal in the making of gunpowder.

1. Life form: shajar¹ (perennial plants, often woody)
2. Sub-life form: shajar² (true trees and large shrubs)
3. Intermediate category ʿidāḥ (spiny trees and spiny large shrubs)

salam (gen.) Tribes of the southern Rubʿ al-Khāli (speakers of a non-Najdī dialect) use the synonym ḥardhā, pl. ḥarādḥi (Āl Rāshid).

Acacia ehrenbergiana Hayne. Leguminosae. BM 2113, BM 2153, BM 2748. Large shrub or small tree, usually with multiple ascending branches from the base, in our area 2-4 m high. Spines straightish, white, 2-5 cm long. Leaves
compound, with only 1-2 pairs of pinnae; leaflets 6-9(10) pairs, 2-3 mm long. Flowers yellow, in globular heads. Pods up to 10 cm long, falcate, constricted between the seeds. By far the most common *Acacia* of our study area.

**samur** (gen.) *Acacia tortilis* (Forssk.) Hayne. Leguminosae. 8381. Large shrub or small tree, usually flat-topped with several main branches ascending from the base. Spines often in alternating pairs of longer (1-3 cm) straight ones and shorter curved ones. Leaves with pinnae mostly in 4-6 pairs; leaflets in 6-10 pairs. Flowers pale yellow, in globular heads. Pods more or less spirally coiled and contorted, torulose, weakly compressed, 3-9(10) cm long (when straightened).

**sidr** (gen.) A name applied to two species of *Ziziphus* (Rhamnaceae), the first a large woody shrub of inland silt basins, the second a large tree seldom seen outside cultivation.

*Ziziphus nummularia* (Burm. f.) Wight et Arn. 504, 2746, 8383. Ascending, many-branched spiny shrub, more or less rounded in outline and 1-3 m high. Stipular spines dimorphic: one straight, to ca. 1 cm long, the other hooked. Leaves ovate to orbicular, 0.8-2 cm long, 0.5-1.8 cm wide. Flowers axillary, greenish-yellow, 3-4 mm long. Drupe globose, reddish, 7-8 mm in diam. Reportedly sometimes used for making camel sticks. In northern Arabia said to be considered one of the abodes of the non-human creatures called *jinn*.

*Ziziphus spina-christi* (L.) Willd. BM 7004. Tree up to ca. 12 m high, spiny or unarmed, with pale grey branchlets. Leaves ovate to oblong, 2.5-6 cm long, 1.5-4 cm wide. Flowers ca. 3-8 together in axillary cymes, yellowish green, 4-6 mm in diam. Drupe ovoid or globular, 0.8-1.5 cm in diam., yellowish. The fruits, called
nabag, are edible. The wood is sometimes used in village construction or crafts. Leaves are powdered and used as a shampoo or for other washing purposes.

talh (gen.) Applied to two species of Acacia (Leguminosae) in our area, where the genus is poorly represented compared to country farther west and south, particularly in the Hijāz mountains of the western parts of the Peninsula. Both tend to have large and well defined boles as well as larger size and thus form a natural subgroup of our four eastern Acacia species.

Acacia gerrardii Benth. subsp. negevensis Zoh. BM 568. Tree, 3-10 m high. Spines whitish, straight, 2-5 cm long, sometimes reduced to hornlike spinelets 3-5 mm long. Leaves with 3-9 pinnae pairs; leaflets usually in 10-18 pairs, 3-4 mm long. Flowers pale yellow to white, in globular heads. Pods falcate, not constricted, compressed, 6-12 cm long. I found one of these trees to be a fairly copious producer of gum arabic, samgh, although I have no evidence of local exploitation. The tree is quite rare in our study area.

Acacia raddiana Savi. BM 1878, BM 2112, BM 2162. Tree, usually with distinct bole and rounded irregular crown, seldom exceeding 4 m in our study area but to 7 m or more in central Arabian wādī situations. Spines white, 2-5 cm long. Leaves with pinnae in 2-6 pairs; leaflets mostly in 6-10 pairs, 2-3 mm long. Flowers pale yellow to white. Pods usually strongly contorted, light reddish to brown, 5-12 cm long (when straightened), slightly constricted between the seeds.

1. Life form: shajar (perennial plants, often woody)
4. Sub-life form: shima (bushes, less than man-height)
5. Intermediate: hamd (saltbushes)
‘arād (gen.) Cf. classical ‘ard, "hard, thick, stiff"; the plant has hard, thick branches.

*Salsola cyclophylla* Bak. Chenopodiaceae. BM 327, BM 2932, BM 3191. Stiff shrublet 10-50 cm high, sometimes dwarfed but always woody at base, intricately branched. Leaves suborbicular, crowded into bud-like knots. Flowers in very dense, short lateral spikes 5-15 mm long, 3-7 mm in diam. Fruiting perianth 3-5 mm in diam., including wings.

‘aṣal (gen.) *Suaeda monoica* Forssk. ex J. F. Gmel. Chenopodiaceae. BM 1016. Shrub up to 3 m high (but smaller in our area) with densely leafy, sometimes drooping branches. Leaves linear, succulent, mostly 15-20 mm long, about 2 mm wide, flattened on both surfaces, approximate. Flowers axillary in loose, leafy spikes. Fruit perianth 1-2 mm long, reddish when ripening. A plant known from only one site in our area, in the northern Rub‘ al-Khāli, a place considered haunted by jinn. It is more common southwest of our study area and in western Arabia.

ḏumrān (gen.) Cf. classical ḍamr, "to be thin, slender" + -ān, denoting a likeness, lit. "slender-bush," the name in reference to the slender, wandlike branches of this shrub.

*Traganum nudatum* Del. Chenopodiaceae. BM 324, BM 2943, BM 2957. Diffuse shrub, 20-60 cm high with glabrous, whitish, rather virgate branches. Leaves triangular-lanceolate, subtriquetrous, sessile, distant, somewhat fleshy, up to 8 mm long, often decurved, usually with 2 smaller, rounded bracts at base. Flowers sessile in densely short-woolly axils. A favorite grazing plant of the camel, although never found in great abundance.

gadgāḍ (Ruwalah) *Salsola jordanicola* Eig. Chenopodiaceae. BM 512, K 508. Much-branched shrublet 15-60 cm high. Leaves 2.5-10 mm long, 0.4-0.7 mm wide,
long-triangular to linear, pubescent, longer in spring. Spring flowers axillary, in loose spikes up to ca. 12 cm. long; autumn flowers often shorter, more congested. Fruiting perianth 5-9 mm wide including the straw-yellow or pinkish wings.

garmal (gen.) Zygophyllum simplex L. Zygophyllaceae. K 372, BM 3179. Dense, procumbent, succulent perennial (sometimes perhaps annual), to ca. 30 cm across. Leaves simple, sessile, succulent ovoid to cylindrical, 3-15 mm long. Flowers mostly solitary in the axils, 4-5 mm in diam., yellow. Capsules obovoid to subglobose, becoming angled, 2-3 mm long.

gataf (Bani Hajir) Applied to two very similar species of Limonium (Plumbaginaceae) found on saline ground in or near coastal saltmarsh. Limonium axillare (Forssk.) O. Kuntze. BM 3807, 7093. Ascending shrublet 10-50 cm high. Leaves gray-green, minutely punctate and white-dotted with excreted salts, oblanceolate to spathulate, mostly 4-8 mm wide and up to 4.5 cm long. Flowers in dense spikelets in paniculate inflorescences. Bracts reddish with white margins. Corolla purple but soon deciduous, leaving the white calyx. Limonium carnosum (Boiss.) O. Kuntze. 7080, 8659. Ascending to suberect perennial to 40 cm high, woody at base. Leaves grayish green, linear-spathulate to cuneate, mostly 0.5-2 cm long, 1-3 mm wide, somewhat fleshy and covered with crystals of excreted salt. Flowers in spicate panicles; corollas white to pale pink, deciduous, about 4.5 mm long.

ghaḍā (gen.) Haloxylon persicum Bge. Chenopodiaceae. BM 322, 7026, 7599. Large shrub or small tree, 1.5-3(4) m high with thick woody base, sometimes with drooping terminal shoots. Leaves greatly reduced, the stems appearing naked, cylindrical, jointed. Flowers in short lateral spikes. Fruiting perianth ca. 8 mm in
diam. including the spreading membranous wings. A shrub important for camel grazing and as a source of excellent firewood.

**gurm** (Banī Khālid, Banī Ḥājir) *Avicennia marina* (Forssk.) Vierh. Verbenaceae. BM 1102, 7811. Erect-ascending shrub or small tree, 1-3 m high. Leaves opposite, lanceolate to elliptical, entire, 3-7 cm long, 1-3 cm wide. Flowers in dense, capitate cymes with corolla yellow, exceeding the calyx, with four subequal spreading lobes. Capsule almond-shaped, 1.5-2.5 cm long. This mangrove is found in the inter-tidal zone in a few protected bays of the Gulf coast. It is sometimes grazed by camels, and the capsules are used medicinally.

**hādh, hādhdh**, (gen.) Classical botanical works generally write this name *ḥādhdh*. My records indicate that I heard a single *dh* (although I might have missed the doubling, difficult to hear in terminal position). An Āl Murrah consultant gave the variant *ḥuwēhdhdn*, but the doubling there is required by the noun form. The name is applied to two species of *Cornulaca* (Chenopodiaceae): in the south, by tribesmen frequenting the Rubʿ al-Khāli, to *C. arabica*; farther north, among tribes that do not enter the southern sands, to *C. monacantha*. Southerners who know both species use the diminutive variant *ḥuwēhdn*, or *ḥuwēhdḥn*, for *C. monacantha*.

*Cornulaca arabica* Botsch. (considered by some botanists to be conspecific with *C. monacantha*, below). K 467, BM 1018, LE 1934. Rounded, gray-green, tangled and many-branched shrub 30-80 cm high. Leaves clasping, 1.5-4 mm long, triangular, pungent. Flowers solitary or few in the axils. Fruit subpyramidal, 3.5-4.5 mm long with 2 subequal hornlets or spinelets 0.5-1 mm
long, hidden in dense white hairs. An important grazing plant of the Rub‘ al-Khāli, where it is endemic.

*Cornulaca monacantha* Del. BM 642, BM 1136, LE 1932. Glabrous prickly shrublet 10-40 cm high, much branched. Leaves clasping, triquetrous, 3-10 mm long, spiny-tipped, short-woolly in the axils. Flowers clustered in upper axils. Fruits with 1 or 2, 4-6 mm-long, clearly exserted spines.

**ḥamd al-arnab** (Al Murrah) ḥamd, "saltbush" + al-arnab, "the hare," lit. "saltbush of the hare."

*Halothamnus bottae* Jaub. et Spach. Chenopodiaceae. BM 1052, LE 1132. Ascending, many-branched shrublet, sometimes dwarfed, 10-30 cm high, blue-green grayish when growing. Leaves reduced to triangular-triquetrous, subclasping rudiments 0.5-1.5 mm long. Flowers mostly solitary in the axils, distant. Fruits, including wings, 4-8 mm in diam.

**harm** (gen.) Applied to three species of *Zygophyllum* (Zygophyllaceae).

*Zygophyllum mandavillei* Hadidi. BM 2892, BM 3999, BM 4006. Ascending, many-branched highly succulent shrub, mostly glabrous, to ca. 80 cm high. Leaves predominantly 1-foliolate but sometimes 2-foliolate in seedlings or fresh growth, subcylindrical, succulent, 4-15 mm long, 2-3 mm wide. Flowers solitary, ca. 4.5 mm long, with white, spatulate petals. Capsules club-shaped, circular in cross-section, 12-20 mm long, 3-7 mm wide. An endemic of the Rub‘ al-Khāli, where it is grazed by camels.

*Zygophyllum migahidii* Hadidi. BM 7440, BM 7442, BM 7445. Ascending, much-branched succulent shrublet to ca. 75 cm high, with greyish-tomentose foliage. Leaves all or predominantly 2-foliolate, succulent, cylindrical or
somewhat compressed, to ovoid, 2-15 mm long. Flowers mostly solitary, 4-5 mm long with white or yellowish petals. Capsule cylindrical to somewhat obconical, 5-angled, truncate or retuse and weakly lobed at apex, 8-13 mm long. *Zygophyllum qatarense* Hadidi. Ascending, many-branched succulent shrublet to ca. 75 cm high, sometimes becoming yellow or reddish. Leaves 1-foliolate, succulent, terete, cylindrical to ovoid, 3-8 mm long. Flowers solitary with whitish petals. Capsules cylindrical or obscurely obconical, weakly 5-angled, truncate at apex, 4-9 mm long, 3-6 mm wide. Eaten by some camels but not considered a good grazing plant.

*khiḍrāf* (northern tribes) *Salsola volkensii* Aschers. et Schweinf. Chenopodiaceae. BM 314, 7452, 8809. Erect or ascending somewhat fetid annual, 10-40 cm high, blue-green when fresh, with erect white hairs. Leaves sessile, linear, 3-6 mm long; summer leaves smaller. Flowers in spikes. Fruiting perianth winged, 7-10 mm in diam. Mainly in our north and often on disturbed ground. Usually described as an annual but lives well into the summer.

*khirrēt* (gen.) The non-diminutive, non-intensive variant, *khari̇t*, was given by a member of the Muṭayr tribe.

*Salsola baryosma* (Roem. et Schult.) Dandy. Chenopodiaceae. BM 3817, BM 3118, LE 1942. Ascending shrublet, 30-60 cm high, glabrescent or mealy, or softly pubescent when young. Leaves varying seasonally, linear and hairy in spring, those of summer and autumn suborbicular and minute. Flowers in dense spikes 10-100 mm long, 5-10 mm in diam. Fruiting perianth 4-6 mm in diam. including the wings. The fresh plant is somewhat fetid, with an odor sometimes
described as "fishy." One Bedouin took me aside and said that "some say this bush smells like a woman."

**rimth** (gen.) This is one of the few plant names used as a component in Bedouin male personal names; the father of a well-known desert guide of the ‘Ujmān tribe whom I knew personally was called Rimthān (*rimth* + -ān), "resembling rimth". This later became the name of an oil field of the Arabian American Oil Company (now the Saudi Arabian Oil Company).

*Haloxylon salicornicum* (Moq.) Bge. Chenopodiaceae. BM 325, BM 2938, LE 1949. Diffuse, rounded, many-branched shrub, usually 60-100 cm high, often raised on sand hummocks. Leaves apparently absent, reduced to minute scales forming cupules at articulations of the cylindrical stems. Flowers in dense terminal and lateral spikes. Fruiting perianth with 5 membranous yellow or pink wings. A very important grazing plant for camels and dominant in a widespread shrub community covering wide areas in eastern Arabia.

**rughl** (gen.) *Atriplex leucoclada* Boiss. Chenopodiaceae. BM 240, LE 2953, LE 2926. Ascending shrub 20-80 cm high, pale greenish or yellowish mealy-canescence. Leaves to ca. 2.5 cm long, deltoid, sinuate-dentate, smaller in summer and autumn. Flowers both axillary and terminal, with fruit valves incised-dentate, ca. 4.5 mm long and broad.

**riith** (Muṭayr, Ruwalah) *Salsola vermiculata* L. Chenopodiaceae. BM 3093, BM 3907. Much-branched shrublet, 15-60 cm high, with fine-sublinear leaves 2.5-10 mm long, 0.4-0.7 mm wide, pubescent, longer in spring. Flowers axillary, forming loose spikes up to 12 cm long. Fruiting perianth 5-9 mm wide including the
yellow or pinkish wings. Considered a very important camel grazing plant in northern Arabia, where it is found in many of the large wādīs.

sha'rān (gen.) sha'r. "hair" + -ān, "resembling", lit. "hairlike" bush, probably in reference to the terminal bristles often seen on the modified leaves of this plant.

The variant sha'r was recorded from northern informants of the Ruwalah and Sharārāt tribes.

*Anabasis setifera* Moq. Chenopodiaceae. BM 2928, BM 2940. Glabrous, succulent shrublet 10-30 cm high with erect jointed stems. Leaves opposite, club-shaped and succulent, 3-9 mm long, sometimes ending in a deciduous bristle. Fruit perianth with 5 wings that are often laterally compressed.

shnān (gen.) The northern synonym duwwēd was recorded from Sharārāt and northern 'Anazah informants. It is an intensive, diminutive form from dūd, "worm", thus "little worm bush," in reference to the terete, worm-like, succulent leaves.

*Seidlitzia rosmarinus* Ehrenb. ex Bge. Chenopodiaceae. BM 321, BM 2956, LE 1962. Rounded, glabrous shrub up to ca. 80 cm high, often on raised hummocks. Branches mostly opposite, often white-glossy. Leaves opposite, terete, succulent and club-shaped, to ca. 18 mm long. Fruiting perianth ca. 10 mm in diam. including the unequal wings. Dried and pounded leaves used as a soap substitute.

sillāj (Al Murrah) The variant sillēj (the same name in diminutive form) was recorded from a consultant of the Qaḥṭān tribe.

*Cornulaca leucacantha* Charif. et Aellen. Chenopodiaceae. K 464, BM 1135, BM 1895. Coarse, very prickly, erect to ascending annual or perennial herb, 10-30 cm high. Leaves 4-6(9) mm long, partially clasping, very spiny. Fruits with a single spinelet ca. 5 mm long.
suwwād (gen.) From the root swd, connoting the idea of "being black." The name is an intensive, active noun form, thus "that which makes or becomes black." Stands of the plant appear very dark, especially when viewed from distance. This Arabic vernacular name was the source of Forsskal's genus name, Suaeda. A northern synonym, taḥmā (of interest in being related to the group name taḥāmīj, (see section 9.3) was recorded from informants of the Ruwalah and Shammar tribes.

*Suaeda vermiculata* Forssk. Chenopodiaceae. BM 3135, LE 1950, LE, BM 2924. Much-branched succulent shrub, 30-80 cm high. Leaves rather remote, glabrous, succulent, blue-green glaucous, oblong to ovate, flattened above, 4-15 mm long. Flowers axillary, in often loose terminal spikes.

‘uqrūm (gen.) Related to the root ‘jr m, associated by Bedouins with the idea of "being cut, cropped off on top". The plant is usually flat-topped in appearance. Synonyms include: from Āl Murrah: ‘uqrūmān (diminutive form + -ān), from ash-Sharārāt in the north: ḥūrd, "alkali" bush, and from Shammar: ghaslah, "wash bush", in reference to its use as a soap substitute.

*Anabasis lachnantha* Aellen et Rech. f. Chenopodiaceae. BM 320, BM 2951, 7600. Shrublet 20-60 cm high. Leaves virtually absent, reduced to cupules on the stems, which appear jointed. Fruit perianth 5-7 mm, including the 5 spreading, yellow to pink membranous wings which are often compressed transversely to the shoot axis. Bedouins recognize this plant at a glance although I had problems at first differentiating it from *Haloxylon salicornicum*. Leaves used, like those of *Seidlitzia*, as a soap substitute.
1. Life form: *shajar*₁ (perennial plants, often woody)

4. Sub-life form: *shima'* (bushes, less than man-high)

5. Intermediate: *ḥamḍ* (saltbushes)

6. Complex: *ṭahāmiṯ* (saltmarsh succulents)

**harṭallas** (Al Murrah) Synonyms: *haṭallas*, *ghiḏrāf* (Bani Hajir), *harṭabil* (northern), *hurṭumān, tarṯe‘* (Shammar). The variation in the name of this plant, based on roots of as many as 5 consonants, is very unusual. None of them appear to be highly specific and seem to be used for more than one of the highly succulent saltmarsh chenopods that are considered poor grazing for camels. A consultant of Bani Hajir applied *haṭallas* also to *Suaeda aegyptiaca* (Hasselq.) Zoh. (see immediately below).

*Bienertia cycloptera* Bge. ex Boiss. Chenopodiaceae. K 466, BM 319, 8815. Technically described as an annual plant but included in this complex by most Bedouins. Erect, glaucous, very succulent herb 20-50 cm high with linear leaves mostly 1-3 cm long. Flowers single or clustered. Fruit fleshy-orbicular, berry-like, surrounded by a fleshy circular wing. Found on highly saline ground in coastal or inland salt marshes.

**haṭlas** (Bani Hajir) Another variant of one of the members of the name group described above. The variant *haṭallas* (see above) was applied by the same Bani Hajir informant to this plant on a different occasion.

*Suaeda aegyptiaca* (Hasselq.) Zoh. Chenopodiaceae. BM 237, 1965. Shrubby, densely leafy, glabrous soft-succulent herb to ca. 60 cm high. Leaves teretish or somewhat flattened, to ca. 25 mm long. Flowers clustered in leafy spikes. Fruiting perianth top-shaped, becoming spongy-inflated, green, sometimes
ripening to purple or black. Usually seen on saline waste ground around settled areas and farms.

*khirrēz* (gen.) An intensive, diminutive form of *kharaz*, "string of glass beads," referring to the appearance of the succulent, red, perfoliate leaves "strung" on the stem.

*Halopeplis perfoliata* (Forssk.) Aschers. et Schweinf. Chenopodiaceae. BM 2925, LE 1936, 3811. Erect, glabrous, succulent shrublet 20-40 cm high, the succulent parts often becoming red in color. Leaves very succulent, subglobular to pyriform, perfoliate, giving the stem a swollen, jointed appearance. Flowers in dense terminal spikes.


*thillēth* (Bani Hajir) From root *th l th*, connoting the number "three", cf. *thlāthah*, "three." An intensive, diminutive form referring to the distinctive way the stems of this plant put out branches in three planes along the main stem axis. A synonym also used by Bani Hajir is *‘ujērimān*, referring to some similarity to the shrub called *‘ujrum* (*Anabasis lachnantha*).

*Halocnemum strobilaceum* (Pall.) M. B. Chenopodiaceae. K 610, K 716, BM 318. Low straggling perennial 15-40 cm high, often procumbent with stems spreading on the ground. Leaf rudiments forming opposite, decussate, bud-like structures. Flowering branches nearer extremities apparently leafless, cylindrical.
Flowers immersed in the nodes with the single stamen exserted, often leaving the stem yellow with anthers and pollen.

1. Life form: shajar$_1$ (perennial plants, often woody)

4. Sub-life: shima‘ (bushes, of less than man-height)

7. All non-hamã$^4$ bushes

8. Intermediate: khillah (non-hamã$^4$ bushes important for grazing)

‘abal (gen. south) The synonym used by northern tribes such as Ruwalah and Shammar is arîtã; both names are widely known. Applied to two (and probably a third) species of Calligonum (Polygonaceae) differing mainly in details of fruit form. The distinctive fringed fruits are called natharah (Al Murrah).

*Calligonum comosum* L’Hér. BM 2139, BM 2725, BM 2857. Ascending shrub to 120 cm high with whitish older branches. Leaves soon deciduous and mostly apparently absent, leaving flexible green shoots. Flowering perianth lobes white-pink or white-greenish with darker medial stripe. Fruits red or greenish yellow, covered in bristles from four wings. Important shrub of sandy terrain, furnishing camel grazing and excellent firewood. Also used medicinally and for tanning.

*Calligonum crinitum* Boiss. subsp. arabicum (Sosk.) Sosk. BM 4001, BM 4004, 7652. Ascending shrub to 2 m, closely resembling the above species but with fruit bristles sparser and not originating on wings. Important as a grazing and firewood shrub in the Rub’ al-Khali, where it is endemic.

The name ‘abal (or its synonym arîtã) can be predicted to be used also for

*Calligonum tetrapterum* Jaub. et Spach (my specimen 2844), recognizable by its fruit wings without bristles but very rare in our study area.
‘ādhîr (gen.) *Artemisia monosperma* Del. Compositae. 3205, 7608, 7918. Ascending, green to silvery-green somewhat aromatic shrub, glabrous to very finely appressed-silky, 50-100 cm high. Leaves linear-ob lanceolate, solitary or clustered, entire or with linear lobes 3-7 cm long, tapering to base. Heads in somewhat 1-sided racemes forming an elongate compound inflorescence up to 40 cm long. Heads ovoid, 3-4 mm long, with 3-6 florets. The plant is characteristic of the red sands of the Dahna’, and is hardly seen outside that habitat. Grazed by sheep and camels but not considered particularly good fodder. Reportedly used for the tanning (or other treatment) of hides used as water skins.

‘algā (gen. south)

*Dipterygium glaucum* Decne. Capparaceae. BM 1430, 7615, 8424. Yellowish-green, finely scabridulous shrublet, 30-80 cm high, nearly leafless in the dry season. Leaves alternate, oblong, 3-12 mm long. Flowers yellowish. Fruits slightly compressed, 3-8 mm long, obovate with wrinkled faces, winged. Important as a grazing plant in some sandy regions, including the Rub’ al-Khālī. Bedouins say that ‘algā provides the favorite food of the ḥbārā, the houbara bustard (*Chlamydotis undulata*), a bird formerly much hunted with falcons.

‘andāb (gen. south) The synonyms *thundā* and *mussē* (Shammar) are used among northern tribes. Tribes of the southern Rub’ al-Khālī call it *gašīy* (Āl Rāshid).

*Cyperus conglomeratus* Rottb. agg. Cyperaceae. BM 2890, 8265, 8358. Perennial with culms to ca. 60 cm high. Leaves narrowly linear, involute-teretish, channeled, to ca. 50 cm long. Spikelets clustered, with tightly imbricate glumes, to ca. 30-50 mm long. An important grazing plant in the Rub’ al-Khālī but
elsewhere considered second-rate fodder. Reportedly used to make cordage by the Shammar tribe in northern Arabia.

\textit{\textsuperscript{'}arfaj} (gen.) \textit{Rhanterium epapposum} Oliv. Compositae. BM 1756, BM 2709, 2741. Rounded, often hemispherical, intricately branched shrublet 30-70(100) cm high with white-tomentose young stems. Leaves sessile and linear, entire or remotely dentate, 1-3 cm long. Flower heads numerous, solitary, terminal, yellow-flowered. One of the most important grazing plants of our study area; dominant in a plant community covering wide areas, especially in parts of the northern plains.

\textit{birk\=a\=n} (\=Al Murrah, \=Al Rashid) \textit{Limeum arabicum} Friedr. Aizoaceae. BM, K 468, BM 1019, BM 7003. Tangled shrublet to ca. 50 cm high, densely covered with minute knobbed glands and often viscid, with adherent sand. Leaves opposite or subopposite, unequal, ovate to orbicular, to ca. 5 mm long. Flowers axillary, solitary, with white, clawed petals. Fruit splitting into two hard, gray-tan mericarps. Found on deep sands, particularly in the Rub\=a\=l Kh\=a\=li, where it is a grazing plant.

\textit{\textsuperscript{'}a\=h} (gen.) A tribesman of \=Al Wahibah, southern Rub\=a\=l Kh\=a\=li, used the diminutive form, \textit{\textsuperscript{'}u\=ay\=y}; a central and northern synonym is \textit{ha\=cid} (\textsuperscript{'}Utaybah, \textsuperscript{'}Ulubah, Qa\=ht\=an).

\(\text{dabyah}\) (Bani Khālid) Cf. \(\text{dabyah}\), "she gazelle," but the meaning of the plant name is uncertain. A Bedouin of Āl Wahibah (of the southern Rub' al-Khāli and non-Najdī Arabic speaking) gave the synonym \(\text{nazza'}\). A member of the settled community of al-Ājām, near the Qaṭīf Oasis, called it \(\text{alāl}\).

\(T\)avernier\(a\) spart\(e\)a DC. Leguminosae. BM 1467, 7459. Erect, silvery-grey canescent shrub to ca. 1.5 m high. Leaves 1- or 3-foliolate with obovate leaflets 5-8 mm long. Flowers solitary or paired; corolla pink with with red-mauve veins. Pods 5-17 mm long, strongly compressed, constricted into 1-4 rounded joints. The plant is apparently restricted to a few coastal locations and is probably not known among many inland tribes.

\(\text{dhaˈlūg}\) (Northern tribes, Musil 1928a:693). Also \(\text{dhaˈlūg al-jamal}\), "camel's \(\text{dhaˈlūg}\" (Musil 1927:595).

\(S\)corzonera tortuosissima Boiss. Compositae. BM 3114, 2888, 3871. Ascending, silvery-greyish branched perennial, 20-50 cm high, with stems whitish-canescent. Leaves finely linear to subulate, 5-15 cm long below, much shorter above. Heads numerous, solitary-terminal, mostly with 5-7 yellow florets. Achenes narrowly columnar-prismatic, 8-12 mm long with a persistent pappus of brownish-white bristles, finely plumose below, scabrous above. Reportedly sometimes eaten raw (Musil 1928:95).

\(\text{gaṣbā}\) (Āl Murrah) The root \(q \ s b\) is the basis for the general Arabic name for reeds (large reeds of wetlands), \(q\)aṣ\(āb\), but Āl Murrah, and perhaps others, apply \(\text{gaṣbā}\) quite specifically to two very similar species of the grass genus \(C\)entropodia, both non-reedlike and always found in deep sands or even mobile dunes.

Centropodia fragilis (Guinet et Sauvage) Cope. 7541, 8035. Very similar to the foregoing but with anthers twice as long (ca. 2 mm) and narrower than in C. forsskalii. Both species, although never abundant, are grazed by camels.

gharaz (Al Murrah, Qahtân) Chrysopogon plumulosus Hochst. Gramineae. BM 1051, 7942, 8321. Densely tufted, fine-culmed perennial grass, usually 20-50 cm high. Lamina usually less than 8 cm long; ligule a rim of fine hairs. Spikelets in a terminal panicle 5-10 cm long with whorled branches. Pedicels of lateral spikelets and base of sessile spikelet densely bearded with golden-tawny hairs.

girḏi, gurḏi (gen.) Ochradenus baccatus Del. Resedaceae. 2154, 7805, 8699.
Glabrous, erect, branched dioecious shrub to ca. 1.5 m high. Leaves single or fascicled, deciduous, narrowly linear, to 4 cm long. Flowers in spiciform terminal racemes, apetalous. Fruit an ovoid to globose berry 4-8 mm in diam., ripening to a waxy white.

ḥazzā (Shammar) A Bedouin of the ʻUjmān tribe called this plant sūs, a name used in general Arabic for licorice.

Deverra triradiata Hochst. ex Boiss., subsp. musili (Chrtek, Osbornova et Sourkova) Pfisterer et Podlech. Umbelliferae. BM 2955, 7399, 7904. Aromatic shrub with ascending, glabrous, virtually leafless wandlike stems up to ca. 1.7 m high. Umbels at or near branch tips, mostly 3-4-rayed. Umbellules mostly 5-9-flowered. Fruits ca. 2.5 mm long, ovoid, densely whitish-hirsute. Many herdsmen pointed out the camel's particular fondness for this plant, which is never
very abundant and often found standing within other shrubs in sand-floored, rocky ravines.

ḥazzaz (Muṭayr) A strongly scented umbellifer like the foregoing. 


‘ījlah (Bani Khālid) ‘ījlah in general Arabic means "female calf, heifer," and I have no record of an explanation of this plant name.

*Halopyrum mucronatum* (L.) Stapf. Gramineae. K, BM 118, 1938, 7068. Coarse perennial grass with erect culms from woody rhizome, to ca. 1.5 m tall. Leaf blades narrowly linear, convolute. Inflorescence a narrow, contracted panicle 10-30 cm long. The distribution of this grass is restricted to dunes above the beach at coastal sites, and it is known only by tribes frequenting coastal areas. Considered good for grazing.

karī (Āl Murrah) *Heliotropium digynum* (Forssk.) Aschers. ex C. Christ. Boraginaceae. BM 1438, BM 1469, 7632. Ascending to erect diffusely branched shrublet, softly pubescent with stems white above, 15-50 cm high. Leaves ovate to oblong, to 1.5 cm long. Flowers yellow, sessile in terminal helicoid cymes. Milk camels are said to have a particular fondness for this plant.
**khaṣāb** (ad-Dawāsir) A Qaḥṭānī informant gave the name *saḥam* for this grass. Musil (1928b:363) recorded *ṣullēyān* from the Ruwalah in northern Arabia.

*Stipagrostis ciliata* (Desf.) de Winter. Gramineae. K 161, BM 1736, BM 1752. Perennial grass to ca. 80 cm high. Culms with conspicuous spreading hair tufts at the nodes; internodes glabrous. Leaf blades tightly involute, linear. Panicle erect, terminal, sometimes contracted. Central plumose awn of the spikelets 45-50 mm long.

**nuṣī** (gen.) Tribes of the southern Rubʿ al-Khālī speaking southern Arabic dialects use the synonym *rāhim* (Āl Rāshid). Various other names are applied to this important grazing grass to indicate different growth stages or conditions (see section 9.7).

*Stipagrostis plumosa* (L.) Munro ex T. Anders. Gramineae. K 175, K 8340, BM 1813. Perennial grass, densely tufted at base with culms erect or geniculately ascending, 15-45 cm high. Internodes closely woolly below. Leaf blades tightly convolute, subfiliform-linear, mostly 4-10 cm long. Panicles solitary-terminal, mostly 10-15 cm long, 0.5-2 cm wide. Central awn branch 20-25 mm long, plumose in upper half to two-thirds. A very important grazing plant throughout most parts of Arabia.


*Convolvulus cephalopodus* Boiss. Convolvulaceae. K 552, BM 1787, BM 3123. Ascending to decumbent shrublet, many-branched from the base with stems more or less white-woolly and villous, to ca. 60 cm high. Leaves linear-oblong to
lanceolate, appressed-pubescent, 2-7 cm long. Flowers clustered, with rather showy pink to near-white corollas 15-20 mm long.

*sabat* (gen.) *Stipagrostis drarii* (Tākh.) de Winter. Gramineae. K 475, BM 342, BM 606. Perennial grass with several erect culms, to 120 (150) cm high. Internodes densely woolly. Leaf blades tightly involute, to 25 cm long. Panicles terminal, lanceolate-pyramidal, contracted (when young) to spreading and open, 10-30 cm long. A well known and important grazing species found on semi-stabilized dunes.

*sahām* (Qaḥṭān) Musil (1928b:363) recorded the synonym *ṣullēyān* in northern Arabia. An elder consultant pointed out the glabrous internodes of this grass as a key character differentiating it from *sabat* (*Stipagrostis drarii*), which it otherwise resembles.

*Stipagrostis ciliata* (Desf.) de Winter. Gramineae. K 161, BM 1736, BM 1752. Perennial grass, tufted at base with erect culms, 30-80 cm high. Culms with conspicuous spreading hair tufts at the nodes; internodes glabrous. Leaf blades tightly involute, to ca. 17 cm long. Panicle erect, terminal, 10-15(20) cm long. Spikelets pedicellate, 10-14 mm long, often darkened purplish near the base.

*thēmūm* (gen.) Variant: *thūmū* (Qaḥṭān). Both forms are based on the name *thmān*, itself applied only to the important fodder grass *Panicum turgidum*, which this plant somewhat resembles, at least when not in flower.

*Pennisetum divisum* (Gmel.) Henr. Gramineae. K 2, K 170, 1987. Glabrous, shrubby perennial grass, somewhat woody below, with culms stiff, many-branched, forming bushes to ca. 150 cm high. Leaf blades mostly 3-8 cm long, 1-2 mm wide. Spicate panicle dense to somewhat loose, cylindrical-lanceolate, 3-10
cm long. Spikelets ca. 4 mm long, each seated in an involucre of bristles. A useful grazing plant but considered inferior to thmām, Panicum turgidum.

thmām (gen.) Variations on this name, thmūm, thēmūm, are applied to several other bushy perennial grasses but never to this plant itself.

Panicum turgidum Forssk. Gramineae. K 171, BM 1077, BM 3140. Glabrous perennial grass with ascending, tangled culms branched upward at swollen, knotty nodes, forming rounded bushes to ca. 100 cm high. Leaf blades often 6-8 cm long, 2-4 mm wide. Panicle open and rather irregular, sparse, often 4-7 cm long with 1 to several racemes of pedicelled ovoid spikelets ca. 4 mm long. Anthers rust-colored, ca. 2 mm long. A very important grazing plant. The grains are also said to have been collected formerly for human consumption.

thmūm (Bani Hājir) A variant of the name thmām (see the preceding), the latter applied exclusively to Panicum turgidum, another and more important shrubby fodder grass. Synonyms recorded for this Cenchrus are: khādir (Qaḥṭān, from root kh ḍ r, "to be green," referring to the fresh green color of this grass compared to more desert-adapted species) and gharaz (northern tribes, Musil 1928b:357).

Cenchrus ciliaris L. Gramineae. K 28, BM 1234, BM 3136. Perennial grass, sometimes shrubby, with culms ascending from a stout, somewhat woody rhizome, to ca. 100 cm high. Inflorescence a terminal, cylindrical, spicate raceme 5-12 cm long, sometimes purplish, with spikelets crowded or sometimes somewhat loose. Spikelets with an involucre of bristles A grass often associated with disturbed ground, seldom in undisturbed desert. Useful fodder but not abundant enough to be of importance.
zahr (gen. south) Of interest in being identical to the word used in many Arabic dialects to denote "flowers" (in general), zahrah, "a flower." Tribes in the southern and south-central parts of our study area apply it as a name for two species of Tribulus (Zygophyllaceae), one of which has quite large, bright showy flowers and indeed could be a candidate for a prototypical "flower." Bedouins, at least those from the central parts of our study area, use a different term, nuwwär, for the colored and showy flowers (in general) of plants.

Tribulus pentandrus Forssk. agg. K 517, BM 653, BM 923. Prostrate perennial with stems up to 50 cm long. Leaves pubescent, 15-35 mm long with one of each pair smaller. Leaflets in 5-7 pairs, oblong, 5-10 mm long. Flowers solitary, 6-11 mm in diam., with pale yellow petals. Fruits globular, hirsute between the wings, 8-11 mm in diam., with 2-4 mm-broad, dentate wings between the carpels.

Tribulus arabicus Hosni s.l. BM 194. BM 7446, 7857. Ascending to decumbent grayish-green perennial, pubescent with appressed and erect white hairs, 20-70(100) cm high. Leaves 10-40 mm long in unequal pairs; leaflets in 5-9 pairs, oblong-elliptical, 4-8 mm long. Flowers 15-30(40) mm in diam. with bright yellow petals. Fruit globose-ovoid, 9-12 mm long, hairy between the wings, the carpels with subentire to dentate wings 1.5-2.5 mm broad. This Arabian endemic is one of the main camel grazing plants for tribes in the eastern and southeastern Rub' al-Khāli. Bedouins of Āl Rāshid have different names for the plant at different developmental stages (see section 9.7).
1. Life form: shajar₁ (all perennials)

4. Sub-life form *shima* (bushes, of well less than man-height)

7. All non-ḥamd bushes

9. Non-ḥamd bushes seldom or never grazed

ʻaḍīd (gen.) *Launaea mucronata* (Forssk.) Muschl. Compositae. BM 871, BM 1445, BM 2258. Erect, branched, rather stout glaucous and lactiferous perennial herb, 30-80 cm high. Basal leaves oblong-lanceolate, pinnatifid, to 15 cm long. Stem leaves shorter with dentate auricles at base. Heads terminal, with yellow florets, 1-1.5 cm long.

ʻuḍrīs (Qaḥṭān, gen.) Āl Murrah consultants used the variant ʻuḍrīs.

*Convolvulus oxyphyllus* Boiss. subsp. *oxycladus* Rech. f. Convolvulaceae. BM 217, BM 3208, 8366. Rounded shrublet 15-65 cm high with rigid, woolly-tomentose main branches; lateral branches straight, rigid, becoming spinescent at tips. Leaves elliptical-oblanceolate to linear-spathulate, more or less woolly-tomentose, up to ca. 4 cm long. Flowers solitary with corollas white but drying pinkish, 8-10 mm long. Reportedly exudes a gum eaten by children.

ʻagrabān  Related to ʻq r b, a quadriliteral root strongly associated with the word for "scorpion", ʻagrab; it is not entirely clear how this reed would be considered analogous, although the plume-like panicle, especially when nodding, vaguely resembles the scorpion's tail. The suffix -ān would connote "resembling" or "male gender of". This name for the common reed is replaced in the north with *qasbā* (Shammar, Ruwalah).

‘āgūl (gen.) Alhagi maurorum Medik. Leguminosae. BM 1908, BM 2906. Erect to ascending shrublet to 1 m high, glabrous with lateral twigs becoming spines to 5 cm long. Leaves obovate, to 2 cm long. Flowers pink to purple, in axillary racemes. Fruit a linear-cylindrical pod 1-3 cm long, more or less curved and constricted between the seeds. Known mainly as a plant of disturbed or waste ground. Roots used medicinally.

‘alandā (gen.) Cf. classical ‘alandā "thick, strong". The synonym ‘adām was recorded from a consultant of the Ruwalah tribe.

Ephedra alata Decne. Ephedraceae. BM 2836, BM 2853, 8728. Stiff, yellow-green dioecious shrublet to 100 cm tall with striate twigs. Leaves reduced to rudiments, the plant appearing leafless. Cones sessile, the pistillate ones with several pairs of bracts.

bardī (gen.) Typha domingensis Pers. Typhaceae. K 636. A stout, erect cat-tail usually 1.5-3 m high. Leaves linear, leathery, equalling or exceeding the stem and 4-10 mm wide, flat above, rounded-convex below. Spikes cylindrical, dense, the staminate and pistillate parts on the same axis. Not a true desert plant but found in a few spots where there is standing water from leaking wells or springs.

b‘ēthirān (Mutayr, gen. north) Artemisia judaica L. Compositae. BM 3207. Densely tomentose, aromatic shrublet, 30-70 cm high. Leaves rounded, 1-2 pinnatifid with oblong lobes. Inflorescence terminal, paniculate. Heads hemispherical, 3-4 mm
in diam. with numerous yellow florets. Reportedly used by Shammar tribesmen to flavor dates.

**dhinabān** (gen.) *dhanab*, "tail" + -ān, "resembling", lit. "tail-like," referring to the flowering of these plants in elongated, tail-like, terminal racemes. A Shammarī consultant used the variant *dhanabnāb*. Āl Murrah and Qaṭānī consultants gave me the synonym *shōlah*, referring to the tail of a scorpion and related to a term for the upraised tail of a camel. Applied to several species of *Reseda* (Resedaceae), of which only one perennial is listed here.

*Reseda muricata* Presl. K 470, 8781. Ascending to erect perennial herb to 70 cm high, branching from the base. Leaves linear, distally ternate, with linear lobes wavy at margins. Flowers ascending-spreading in terminal racemes, with white petals. Capsules erect, subglobose, 5-8 mm long, 3-toothed at apex. The plant, unimportant for grazing, is sometimes seen on disturbed ground.

**garnuwah** (Āl Murrah) Probably from *garn*, "horn," referring to the pointed beaks on the fruits of the plant. The name may also be applied by Āl Murrah Bedouins to several species of *Erodium*, which shares the fruit beak feature.

*Monsonia nivea* (Decne.) Decne. ex Webb. Geraniaceae. 794, 1042, 8038. Ascending to erect silver-grey canescent perennial, 8-30 cm high. Leaves ovate to oblong-elliptical, 1.5-3 cm long, crenulate, subplicate on the impressed nerves. Flowers 2-6 in umbels with pink petals slightly exceeding the sepals, fugaceous. Fruit beaks 3.5-4 cm long.

**gēšūm** (gen.) *Achillea fragrantissima* (Forssk.) Sch.-Bip. Compositae. 735, 3197, 8798. Closely woolly-tomentose perennial 30-75(100) cm high with stems erect, virgate, branched from base, extremely fragrant-aromatic in all parts. Leaves
ovate-triangular, sessile, bluntly serrulate at margins, 4-6 mm long. Heads
discoid, ca. 3-4 mm wide with yellow florets, in short, rather dense terminal
corymbs. This is by far the most powerfully fragrant plant in our study area and
is found on silt-floored basins of the northern plains and Şummân.

**ghalgah** (gen.) *Pergularia tomentosa* L. Asclepiadaceae. 352, 1053, 1875. Greyish
tomentose shrub with milky sap. Leaves opposite, cordate, acute, to ca. 4 cm
long. Flowers in axillary umbels, with whitish corolla ca. 10 mm in diam.
Follicles lanceolate-ovoid, spiny-tubercled, 4-5 cm long. Used, at least formerly,
to remove the hair from hides before tanning.

**haltā** (Āl Murrah) From *halat*, "to scratch (the skin)", "scratchweed". Synonyms:

*ḥamāh*, "hotweed" (Qaḥtān, ad-Dawāsir), *jreḥab* "little mangeweed" (Ruwalah),
*ḍabyah* (Banī Khalīd), all but the last referring to the scratching, burning
sensation obtained when the plant is rubbed on tender skin. (With respect to
"mangeweed," camels scratch themselves continuously when afflicted with
mange).

*Farsetia aegyptia* Turra. Cruciferae. BM 1141, 2868. Ascending, many-
branched shrublet to ca. 50 cm high, with indumentum of fine appressed hairs.
Leaves linear, 10-40 mm long, 1-2 mm wide. Flowers with petals lead-grey or
whitish to pink, yellowish or purplish. Silicle strongly compressed, oblong, 12-
24 mm long. Used by Bedouin children in play as a sort of "itching powder."

**ḥaṣal** (Banī Ḥājir) *Cyperus laevigatus* L. Cyperaceae. BM 1887, BM 3799, BM 3801.
Perennial sedge with numerous terete culms arising from a creeping rhizome, 30-
100 cm high. Leaves reduced, inconspicuous. Inflorescence a dense, false-lateral
sub-globular head 1-4 cm in diam. with few to many lanceolate-linear spikelets
mostly 5-15 mm long. Not a desert plant and usually found in or near standing fresh or brackish water in coastal zones. Tribes ranging near the coast, however, know and name it.

 hastalık (Qaṭṭān). Farsetia burtonae Oliv. Cruciferae. K 572, BM 1271, BM 1597. Ascending low perennial herb, densely appressed-pubescent, 3-25 cm high, sometimes flowering in dwarf form little more than a seedling. Leaves linear-elliptical to linear-oblanceolate, 10-40 mm long. Flowers white or pink-purple with a very sweet, fruity fragrance. Silicles narrowly oblong, compressed, 10-18 mm long.

‘idrat al-hāyish (Qaṭṭān) The elder Qaṭṭāni consultant explained the word hāyish as a variant of hanish, "snake." The meaning of ‘idrat(t) is unclear; it certainly does not belong to the class of spiny trees known by the same name. Dickson (1955:40) gives the name ghazālah, "gazelle," for this plant.

Euphorbia retusa Forssk. Euphorbiaceae. BM 789, 2067, 8350. Erect, often reddish perennial herb, often growing as a dense rounded shrublet to 60 cm high. Cauline leaves linear, denticulate, 1-5 cm long; floral leaves broadened and rounded at base, ovate with acuminate apex. Capsules 5-6 mm long. An infrequent plant of silty basins said to be used medicinally as an emetic.

idhn al-ḥmār (north, Musil 1927:606) idhn, "ear," + al-ḥmār, "the donkey," thus "donkey's ear," probably referring to the softly hairy leaves of the plant (or conceivably to the form of the erect corollas of the flowers). Astragalus kahiricus DC. Leguminosae. BM 537. Procumbent or decumbent perennial, branching from base with pubescent stems 15-50 cm long. Leaves 10-25 cm long, pinnate with 5-9 leaflet pairs, the leaflets orbicular with apiculate
apex, 10-25 mm in diam., woolly-tomentose below. Flowers yellow, ca. 25 mm long, racemed. Calyx white-lanate, enclosing the pod and 10-15 mm broad.

‘ishrig (gen.) A Qaḥṭānī consultant used the synonym *shajarat ad-dābb, shajarah*, "bush" + *ad-dābb*, "the snake", lit. "bush of the snake", "snake bush."

*Cassia italica* (Mill.) F. W. Andr. Leguminosae. BM 2947, 1049. Erect to ascending-spreading branched shrublet with blue-green foliage, to ca. 1 m high. Leaves paripinnate with 3-6 pairs of oblone to obovate mucronate leaflets 1.5-3 cm long. Flowers yellow with darker veins, racemed, 1-1.7 cm long. Pod flat, curved-oblong, 3-5 cm long, 1-1.8 cm wide with transverse creases and short longitudinal crests. A plant considered toxic to livestock and used rarely medicinally as a purgative.

*ja’dah* (gen.) I have no meaning from informants, but cf. classical *ja’d*, "curled (hair), woolly," which fits the plant well. (The adjective, however, could be based on the plant.)

*Teucrium polium* L. Labiatae. 184, 447, 8272. Highly aromatic, whitish woolly-canescent dwarf shrublet, 10-35 cm high. Leaves oblong, crenulate and revolute, 8-20 mm long. Flowers in dense ovoid heads 12-15 mm in diam.; calyx tomentose-woolly; corolla white or cream to pale pinkish, yellowish in throat, with one lip prominent. Very well known as a medicinal; also used to preserve stored leather and may have insect repellent properties.

*jathjāth* (gen.) The variant *jathyāth* was heard from some consultants of northern tribes. A tribesman of Āl Murrah called it *‘rēfijān*, which is *‘rēfij*, diminutive form of the name of the *‘arfaj* bush (*Rhanterium epapposum*), which it resembles to some extent, + suffix -ān ("resembling"), thus lit. "little *‘arfaj*-like bush."
*Pulicaria undulata* (L.) C. A. Meyer. Compositae. 315. 1974, 8295. Ascending, often hemispherical suffrutescent perennial to ca. 75 cm high, intricately branched from the base and with stems white-woolly tomentose. Leaves linear or broadening distally, repand-undulate, mostly 5-20 mm long. Heads solitary-terminal, hemispherical, the disc convex with golden-yellow to orangish florets. Found in silt-floored basins, sometimes as a ruderal. Not considered a good grazing plant.

*khatmi* (north, Dickson 1955:33) I have recorded this name also for the oasis weed, *Convolvulus arvensis* L., and it may be found applied to other species of *Convolvulus*.

*Convolvulus pilosellifolius* Desr. in Lam. Convolvulaceae. BM 609, BM 1096, BM 3086. Prostrate or ascending perennial, more or less appressed-pubescent, with stems to ca. 80 cm long. Lower leaves oblong-lanceolate, to ca. 8 cm long, those above smaller, lanceolate. Flowers mostly 1-3 together with corollas 10-13 mm long, pink or sometimes near-white. Capsule glabrous, ovoid, ca. 5 mm long.

*khinnêz* (Qahtân) From root *kh n z*, "to stink," thus "stinkweed." Synonyms: *durrêt an-na‘ām* (Musil 1927: 631), diminutive intensive of *dârṭ*, "fart" + *an-na‘ām*, "the ostrich," thus "ostrich fart," also *‘ifēnah* (Musil 1927:597) from root *‘f n*, "to be putrid, stinking," a diminutive feminine, thus "stenchweed." All names refer to the rather distinctive unpleasant smell of this plant's foliage.

*Cleome amblyocarpa* Barr. et Murb. Capparaceae. BM 67, BM 3117, BM 7494. Erect perennial fetid herb to ca. 45 cm high, sometimes suffrutescent at base. Leaves trifoliolate with elliptical-lanceolate leaflets 4-25 mm long. Flowers with
petals white, broadly veined yellow with purple-veined tips. Fruit a compressed, glandular 2-valved capsule 10-50 mm long.

*khiyyēs* (aš-Ṣulabah) An intensive diminutive form closely related to *khāyis*, "stinking," thus "stinkweed". Musil (1927:621) recorded from the Ruwalah the synonym *shajarat al-khinēzīr*, from *shajarah*, "bush" + diminutive of *al-khinzīr*. Musil does not provide a gloss for the name. The word *khinzīr* in general Arabic is often glossed "pig, swine," but there is evidence of its use in a wider sense in at least one Bedouin Arabic folk classification of animals. There, it can be an inclusive term for a variety of mammals that are generally considered inedible. It includes, as well as the pig, apes, the donkey and all carnivores (Hobbs 1989:87).

*Peganum* in other parts of Arabia and in other Arab countries is called *ḥarmal* (applied to *Rhazya stricta* in our study area), the name carried into scientific taxonomy as the specific epithet.

*Peganum harmala* L. Zygophyllaceae. Glabrous perennial herb to ca. 50 cm high. Leaves sessile, irregularly pinnatifid into linear-lanceolate lobes. Flowers with petals white, sometimes streaked yellowish or green. Fruit depressed globose, 6-10 mm in diam. Very rare in our study area.

*kidād* (gen.) Cf. classical *kadda*, "to comb the hair," the long spines of this plant resembling the teeth of a comb. A Qaḥṭānī offered the variant *kdyidān*, the diminutive of the name + suffix -ān. A consultant of the Ḥarb tribe, northwestern Arabia, gave the name *shawīf*, from *shawwat*, "to burn the spines off plants," referring to the practice of burning off the spines of this plant so that it can be eaten by camels.
Astragalus spinosus (Forssk.) Muschl. Leguminosae. Ascending, branched, exceedingly spiny shrub, 20-70 cm high. Leaves with 4-5 pairs of oblong-elliptical leaflets 4-7 mm long, the rachises soon dropping the leaflets and becoming spines. Flowers mostly solitary, axillary, ca 20 mm long with corolla whitish tinged with pink and conspicuous inflated calyx 15-18 mm long, pinkish to cream white, enclosing the pod. This is the one plant described by Bedouin as being too spiny for the camel to eat. It is a range increaser often marking severely overgrazed land.

kirsh (Banī Hājur) From kirsh, "paunch, rumen (of livestock)", probably in reference to the plant’s reputation for causing bloat in camels and other ruminants. A consultant of Ruwalah, northern Arabia, gave the synonym dabghah, from dabagh, "to tan a hide, make leather." I have no data indicating its present use for tanning but the probable former use of at least one species of Erodium as a tanning agent is indicated by Musil's record (1927:596) of the name dahma for Erodium laciniatum (Cav.) Willd. Ibn Khālawayh's plant book of the tenth century A.D. noted that dahmā' was used for tanning (Nagelberg 1909:18).

Erodium glaucophyllum (L.) Ait. Geraniaceae. BM 1595, BM 1782, 8619. Stout perennial, glaucous herb to ca. 75 cm high. Leaves ovate or subcordate to oblong, opposite at least above, to ca. 4 cm long. Flowers 2-4 in umbels, with fugaceous, bright purple petals. Fruit beaks 6-7 cm long.

mḥārūt (Shammar, gen. north) Musil vocalized this name among the Ruwalah as

mḥarūt (1927:222-223, 270-271) Not found in the strict confines of our study area but present in northwestern Saudi Arabia, where it has been well known for its edible rootstock. Musil (1927:612) identifies it as Scorodosma arabica Vel.
That genus is now sunk in *Ferula*, and Musil's plant is probably one of the two following species.

*Ferula blanchei* Boiss. or *F. rutbaensis* C. C. Townsend (Umbelliferae), both of which are perennial plants to ca. 50 cm high with thickened root. Both also have grey, velvety-canescence leaf surfaces, meeting Musil's description of the plant as having leaves "looking as if they were covered with a white veil." The thick root of the plant is edible, eaten after baking under hot ashes. There may be more than one species of *Ferula* with the same vernacular name and used in the same way.

*mša* (gen. north) This is the name favored by Bedouins of northern Arabia who gather the plant's edible fruits. In the stricter confines of our study area, at least by tribes in the Gulf coastal zone, it is called *ghardag*. A Sharārī consultant (from the far northwest) said that *ghardag* was used by his people as a catch-all term for the very succulent species of *hamđ* (Chenopodiaceae) found in salt marshes, thus equivalent to the *țahămîj* of Banī Hájir along our Gulf coast.

*Nitraria retusa* (Forssk.) Aschers. Zygophyllaceae. 1911. Ascending, stiff-branched shrub 1-2 m high with grey woody twigs becoming spinescent. Leaves obovate-deltoid, obtuse, truncate or faintly retuse, 8-15(20) mm long. Flowers 5-6 mm long with petals hooded, greenish-white to yellowish. Fruit an ovoid red drupe 5-9 mm long. The fruits are edible and are often collected in northwestern Arabia.

*namas* (gen.) A Bani Khālid consultant used the synonym *wasal*.

*Juncus rigidus* Desf. Juncaceae. K 123, BM 1886, BM 3800. Stout, tufted perennial rush with creeping rhizome and numerous rigid, erect stems up to ca. 1.5 m high. Leaves arising from the base, terete, sharp-pointed, 2-3 mm in diam.
and mostly somewhat shorter than the flowering stems. Inflorescence a false-lateral, contracted or loose panicle of numerous flowers, up to ca. 25 cm long. Capsule lanceolate-ovoid, tapering to an acute apex, 3-4 mm long. Often used in the oases as a material for weaving mats.

*nigd* (gen.) *Anvillea garcinii* (Burm. f.) DC. Compositae. BM 1505. Woolly-canescent, rigidly branched perennial, rounded and often broader than high, ca. 20-50 cm high. Leaves oblong to spathulate, long-tapering to base, repand, entire or irregularly dentate or lobed. Heads discoid with golden yellow florets, 2-3 cm in diam., on thick peduncles. Frequent on silty soils.

*rā* (gen.) A Banī Hājir consultant used the synonym *tuwwēm* (prob. "pearly bush," from *tuwam*, "pearls" -- the fleecy parts of this plant having a pearly luster).

*Aerva javanica* (Burm. f.) Spreng. Amaranthaceae. BM 173, 648. Grey shrub, tomentose with dense stellate hairs, 30-70 cm high with erect stems branching from base. Leaves elliptical-oblanceolate, 1-5 cm long. Flowers extremely white-woolly in mostly terminal spikes to 5 cm long. Perianth lobes densely white-fleecy. Fleecy parts used in earlier times for the stuffing of cushions and saddle pads.

*rğrūg* (gen.) Applied to several species of *Helianthemum* (Cistaceae), all important as indicators of favorable locations for desert truffles, *fag*. My impression is that the focus of the name may be on the two perennial species of this genus, *H. lippi* and *H. kahricum*. For the annual species see *jirrēd*, under life form *īshb*, below. The following are common synonyms: *umm as-swēgah* (Āl Murrah), *swēgah* (Ruwalah, Musil 1927:625), *jirrēd* (Zafir), *argā* (Banī Hājir; also Ruwalah, Musil 1927:598), *hashmah* (Dickson in Burtt and Lewis 1949:304).
Helianthemum kahiricum Del. BM 1222, 8600. Dwarf shrublet 10-30 cm high, grey green with stellate pubescence. Leaves elliptical-lanceolate, revolute-margined, 3-12 mm long. Flowers racemed, pedicillate, rarely seen open, with yellow petals. Capsule ovoid, ca. 4 mm long, with spreading hairs above.

Helianthemum lippii (L.) Dum.-Cours. BM 1212, BM 3071, BM 3143.
Ascending, stellate-pubescent dwarf shrublet with branches often white glossy beneath the hairs. Leaves elliptical-lanceolate, revolute-margined, 4-17 mm long. Flowers sessile or subsessile in 5-10-flowered, often one-sided spikes. Capsule ovoid, hairy.

**ramrām** (gen.) Applied to either of two very similar species of *Heliotropium* (Boraginaceae).

*Heliotropium bacciferum* Forssk. BM 1054, 8277. Ascending dark green or greyish green hard-herbaceous perennial, 15-75(100) cm high, rough with appressed hairs and larger bristles. Leaves narrowly elliptical, oblanceolate to linear, 0.3-4 cm long. Flowers in terminal helicoid cymes with white corollas. Fruits globose or depressed globose, separating into two parts (each of two fused nutlets). A traditional medicinal used to treat snakebite.

*Heliotropium ramosissimum* (Lehm.) DC. BM 1693, BM 3110, BM 7509.
Intricately branched, densely hairy to bristly shrublet, 15-50 cm high. Leaves narrowly elliptical or oblanceolate to linear, 0.5-3.5 cm long. Flowers in terminal helicoid cymes, with white corollas. Maturing fruit more or less globose, separating into four pubescent nutlets. Like the foregoing, a medicinal used traditionally for snakebite.
**rashād** (gen.) The synonym hōr was heard from a Bedouin of Banī Khālid (a name given on several occasions from northern consultants in loose application to any plants of saltmarsh habitat).

*Sporobolus iocladus* (Nees ex Trin.) Nees. Gramineae. K 165, BM 3730. Perennial grass often of saline habitat, densely tufted at base and often spreading by stolons, with erect culms to ca. 75 cm high. Leaf blades stiff, narrowly linear, to ca. 20 cm long, tightly involute. Panicles terminal, when mature open with spreading capillary branches, to ca. 20 cm long. Considered poor forage.

**sakhbar** (‘Utaybah, ad-Dawāsir). The synonym *idhkhir* (ad-Dawāsir), which seems to be preferred when the plant is referred to as a medicinal, is common. Also recorded were *khasāb* (Qaḥṭān) and ẖamrā (Ruwalah).

*Cymbopogon commutatus* (Steud.) Stapf. Gramineae. BM 2240, BM 2838, BM 3120. Perennial grass, strongly sweet-aromatic in vegetative parts, densely tufted at base with erect culms to 100 cm high. Leaf blades linear, subfiliform, somewhat curled. Panicle terminal, erect, more or less spathulate at base, with distant pairs of diverging racemes. Spikelets with kneed awns. Used medicinally.

**shafallah** (gen.) *Capparis spinosa* L. Capparaceae. BM 3122, 8377. Scrambling, branched shrub to ca. 0.6 m high and 2-3 m or more broad. Leaves mostly alternate, orbicular or broadly ovate, more or less tomentose when young, 1-4 cm long and wide. Stipules modified to sharp, hooked spines 3-5 mm long. Flowers showy, to ca. 8 cm across, with petals white to pale pink. Fruits obovate-ellipsoid, ca. 3 cm long, dark green with 7 lighter longitudinal stripes, opening by
valves and exposing the red pulp and numerous seeds. A well-known but uncommon plant.

shajarat an-na'ām (Qaḥṭān) shajarah, "bush" + an-na'ām, "the ostrich", lit. "bush of the ostrich", "ostrich bush."

Psoralea plicata Del. Leguminosae. BM 7013, 477. Ascending grey-green, appressed-pubescent shrublet with scattered white to yellowish glands, to ca. 50 cm high. Leaves 3-foliolate with narrowly oblong leaflets, plicate on the nerves and undulate-marginated, 4-10 mm long. Flowers 3-5 mm long in open spicate racemes, with white standard and violet-tinged wings and keel. Pod ovoid, enclosed in the calyx, 3.5-4 mm long. Very rare in our study area.

shēyyūkh (Āl Murrah). The variant shuwwaykh (Banī Hājur, Ruwalah) is also commonly heard. A Shammarī informant gave the name kharshaf for the same plants, which are two somewhat similar species of globe thistle, Echinops (Compositae).

Echinops blancheanus Boiss. K 585, 8801. Erect spiny perennial to ca. 150 cm high. Lower leaves lanceolate in outline, half-clasping at base, to ca. 40 cm long, pinnatisect in triangular lobes terminating in spines. Heads to ca. 8 cm in diam. (not including spines), strongly corinigers. Corollas pale violet when young, becoming whitish to cream. Found in silty or rocky ground in the northern part of our study area.

Echinops mandavillei Kit Tan. K 446, E 7760, BM 1811. Felty-tomentose spiny perennial 20-60 cm high. Stem leaves lanceolate, mostly 8-17 cm long, amplexicaul at base with lobes terminating in spines. Heads solitary, globose, 5-6 cm in diam., with whitish to pale bluish florets. Found in sand terrain.
**shīḥ** (gen.) *Artemisia sieberi* Besser. Compositae. 1582, 2862. Ascending, grayish-tomentose shrublet, strongly aromatic with a lemony-sweet fragrance, to 50 cm high. Lower leaves ovate to oblong in outline, 1-2-pinnatisect into obtuse lobes mostly 1-4 mm long. Heads nearly cylindrical, sessile in a rich, dense paniculate inflorescence, ca. 3-4 mm long. A well-known medicinal; also used to provide tinder for firemaking.

**shrubrum** (gen.) Synonyms: *shibrig* (Sharārāt), cf. classical *shabraqā*, "to cut, tear to pieces," in probable reference to the spiny nature of this plant; *sillā* (Ḫarb, ʿUmaybah, Muṭayr, Hutaym), this last doubtless the source of the scientific genus name.

*Zilla spinosa* Prantl. Cruciferae. 695, 2270. Intricate, rounded, glabrous and often nearly leafless spiny-branched shrublet to 75 cm high. Leaves on fresh growth oblong-linear, fleshy. Older growth nearly leafless with stems hardening to tapering spines. Petals pink or violet, sometimes nearly white, with darker veins. Fruit ovoid-globose, becoming bony, 8-10 mm in diam. with 3-4-mm beak at apex.

**tannūm** (gen.) *Chrozophora oblongifolia* (Del.) A. Juss. ex Spreng. Euphorbiaceae. BM 509, 3204, 7806. Shrubby, ascending grey to grey-white, stellate-canescentscent perennial, 40-100 cm high. Leaves mostly elliptical-lanceolate with repand margins to broadly ovate-triangular, 2-6 cm long. Flowers racemose, 3-5 mm long. Capsules depressed-globular with 3 rounded lobes, silvery-scurfy, 5-7 mm long. Formerly used in making ink and possibly in dyeing.
tummēr (Shammar) The root *t m r* is closely associated with the fruit of the date palm, *tamr*, "dried dates," but any association here is unclear.

*Onobrychis ptolemaica* (Del.) DC. Leguminosae. BM 708, BM 1623, 8620. Ascending perennial, branched from base with stems 15-30 cm long, densely covered with fine white erect hairs. Leaves imparipinnate, 10-15 cm long with 4-6 rather distant pairs of lanceolate to elliptical leaflets 12-20 mm long. Flowers 10-15 mm long, cream with reddish veins. Pods flat-orbicular, 8-13 mm in diameter, densely silky-pubescent, with short prickles.

*umm gṭēnah* (Muṭayr) *umm*, "mother," + *gṭēnah*, feminine diminutive of *gātn*, "cotton"; lit. "mother of little cotton", "cottonbush". Muṭayr consultants also used the synonym *shīḥēbā*, diminutive of *shahbā*, "gray (fem.)", "little graybush," Both names refer to the dense, gray pubescence of this plant.

*Sophora gibbosa* (DC.) Yakovl. Leguminosae. 8824, 8830. Erect shrublet, strongly woody at base, 30-80 cm high and silvery-grey canescent with dense, silky appressed hairs. Leaves imparipinnate, to ca. 15 cm long with 6-9 pairs of obovate to suborbicular leaflets 5-15 mm long. Flowers in terminal racemes with pale yellow corollas, the standard darkening with age. Pod strongly compressed, appressed-silky, linear, to 6 cm long, contorted or coiled. So far found only on the extreme northwestern edge of our core study area.

ʿuwēdhirān (Muṭayr) Formed from the diminutive of ʿādhir, the well-known name of *Artemisia monosperma* + suffix -ān, conveying the idea of resemblance, thus "little ʿādhir-like bush." This plant does resemble ʿādhir but is a less-useful, weedy species often seen along roadsides and on other disturbed ground in northern parts of the study area.
Artemisia scoparia Waldst. et Kit. Compositae. 575, 3203. Erect annual or biennial, nearly glabrous, often 50-100 cm high with stems sometimes reddish. Basal leaves ovate in outline, 2-pinnatisect into linear-oblanceolate lobes; stem leaves sessile with sub-filiform lobes. Heads in numerous 1-sided racemes all forming an elongate, terminal, paniculate inflorescence to ca. 40 cm long. Heads obovoid, 1.5-3 mm long. This very atypical annual is placed among perennials here because it is thought of as a "bush" like its namesake ādhir rather than as an annual herb.

yanbūt (gen.) Prosopis farcta (Banks et Sol.) Macbride. Leguminosae. 507, BM 1098. Straggling shrub, 0.4-2 m high, fine-pubescent on leaves and young stems. Older branches grayish to white, with scattered prickles. Leaves 2-pinnate with 3-6 pinnae pairs; leaflets in 8-14 pairs, oblong-elliptical, 2-3.5 mm long. Flowers cream, 3-4 mm long, in spikes 4-10 cm long. Pod fat, ovoid or irregularly swollen, to ca. 5 cm long, purplish brown when ripe. A weed shrub of waste land and disturbed ground around cultivation but collected once in a disturbed inland desert basin.

1. Life form: shajar\textsubscript{1} (perennial plants, often woody)

10. Residual group of perennials smaller than bush-size

The following perennials are generally considered to be not high or prominent enough to be classed as shima\textsuperscript{1}, "bushes." They are treated simply as shajar (in the shajar\textsubscript{1} sense, "perennials"). In the alternative, northern (provisional) classification described in section 9.2 they would be candidates for classification as tawālī\textsuperscript{1}.
**drēmā** (Āl Murrah, Banī Hajir) A diminutive of *darmā*, which was heard once from a Rāshidi of the southern Rubʿ al-Khālī. The synonym *ḥlēwah*, "little sweet one," referring to the sweet fragrance of the plant's flowers, is well known among Āl Murrah and Banī Hajir and is used almost as often as *drēmā*. Bedouins in northern Arabia use the synonym *janbah*, sometimes heard as *jambah* (Ruwalah). Applied to several species of *Fagonia* (Zygophyllaceae), the focus being probably *F. bruguieri*.

*Fagonia bruguieri* DC. Procumbent subshrub with sulcate stems spreading from a woody base, with stipular spines to 12 mm long. Leaves 1-3 foliolate with central leaflet larger, lanceolate to ovate, 4-10 mm long. Flowers solitary, very fragrant, with pale pink to purple petals. Capsule pyramidal, 5-angled, 3-5 mm long.

*Fagonia indica* Burm. f. Similar to the above but with leaves all 1-foliolate; leaflets 2-3.5 mm wide. Apparently found only in the more southerly parts of our study area.

*Fagonia ovalifolia* Hadidi. Rather close to *F. indica* but with larger leaflets 4-8(13) mm wide. Also with a southern distribution.

*Fagonia olivieri* DC. Similar to *F. bruguieri* but glabrous (non-glandular) and with middle and upper internodes distinctly sulcate-quadrangular. This name might be applied by some tribesmen also to *Fagonia parviflora* (see *umm at-trāb*, below.)

**ḥkrish** (gen.) *Aeluropus lagopoides* (L.) Trin. ex Thwaites. Gramineae. K 3, 3803, 8291. Pubescent perennial grass with spreading, wiry stolons or rhizomes and shoots ascending from the rooting nodes. Culms to ca. 15 cm high. Leaves distichous, channeled or infolded longitudinally, the blades and sheaths finely
hairy. Inflorescence a very dense subglobose or oblong terminal head of hairy spikelets, 5-15 mm long. An obligate halophyte of *sabkhah* (salt flat) edges. Grazed by livestock although not considered a very good fodder plant.

_ītr_ (Banī Hājir, Āl Rāshid) I recorded several synonyms for this widely-known edible plant: _kuraysh_ (Āl Murrah), a diminutive intensive form from _kirsh_, "paunch, rumen" (of livestock), in this case referring to the paunch-like shape of the inflated fruits; _kabūsh_ (Yemeni tribesmen, cf. the fruit name, following); _kubbaysh_ (Qaḥṭān, also similar to the fruit name); _‘antīr_ (Ṣulabah and Hutaym of northern Arabia; _sakab_ (Shammar). The edible fruits are called _jarū_ (Banī Hājir, the same term applied to the young of the dog, "pups"); _‘itrī_ (Qaḥṭān, _‘itr_ + suffix _-ī_, forming the _nisbah_ relative adjective from the plant name); _kabash_ (Āl Rāshid, cf. similar names for the plant).

_Glossonema varians_ (Stocks) J. D. Hooker. Asclepiadaceae. BM 1823, 7841. Ascending, branched, perennial lactiferous herb, gray green and pubescent with short white hairs, to ca. 25 cm high. Leaves mostly opposite, ovate to suborbicular or deltoid, repand undulate, mostly 1-2 cm long and broad. Flowers mostly about 5 together, yellowish brown. Follicle inflated, ellipsoid, 3-5(6) cm long, smooth glaucous with soft conical tubercles. The young fruits and leaves of this plant are edible.

_‘rēbā_ (Shammar) Diminutive of _jarbā_, meaning "afflicted with mange" (fem. singular adj.), thus "little mangy one." The puckered, bullate surfaces of the leaves resemble the hairless, bumpy skin of a camel infected with sarcoptic mange.

_Salvia lanigera_ Poir. Labiatae. BM 810, BM 1334, BM 1616. Dwarf shrublet 10-20 (30) cm high, tomentose with short pubescence. Leaves in distant pairs,
elliptical to linear-oblancoolate, weakly rugose-bullate, 10-20 mm long. Flowers white to pale bluish, densely spotted blue-violet, with lower lip longer than the upper.

labnah (Āl Murrah) From laban, "milk, sour milk," in reference to the milky sap of the plant. A consultant of the ‘Ujmān tribe used the name hillab, an intensive form related to ḥalīb, "milk."

_Euphorbia granulata_ Forssk. Euphorbiaceae. BM 1130, BM 2247, BM 3130. Prostrate, sparsely to densely pubescent annual or perennial, grayish green or reddish, spreading from the base with many branching stems to 20 cm or more long. Leaves oppposite, mostly oblong, 3-7 mm long. Glands of the flowers with minute whitish petaloid appendages. The same names may be found applied to other, less common, species of herbaceous _Euphorbias_ in our study area.

makar (Āl Murrah) A consultant of Āl Rāshid (a non-Najdi Arabic speaker) gave la‘la‘ah for this plant, and a Shammarī from northern Arabia offered rgēyigah, a diminutive feminine noun form from ragīg, "thin (in shape)," a reference to the thin-stemmed, straggly appearance of the plant.

_Polycarpaea repens_ (Forssk.) Aschers. et Schweinf. Caryophyllaceae. BM 5, BM 1440, BM 3156. Prostrate, trailing perennial, closely woolly-tomentose to glabrescent with stems woody at base. Horizontal stems to 25 cm or longer, with opposite lanceolate-linear leaves 3-10 mm long. Stipules scarious. Flowers mostly near ends of branches, 2-2.5 mm long with scarious-marginated sepals. A very common plant of sand terrain, used to treat sarcoptic mange of camels.
**misḥt adh-dḥīb** (Qaḥṭān) *misḥt,* "comb" + *adh-dḥīb,* "the wolf," thus lit. "wolf’s comb."

* Astragalus sieberi* DC. Leguminosae. BM 2239, BM 2973, BM 3097.

Cushion-like pubescent perennial, 10-20 cm high with lower leaves becoming spinescent with falling of the leaflets. Leaves linear, 8-11 cm long with 15-25 pairs of ovate to orbicular leaflets 3-6 mm long. Flowers bright sulfur yellow, ca. 20 mm long. Pod oblong-lanceolate, appressed pubescent, 20-40 mm long, tapering to a rigid beak.

**mlēlah** (Shammar) *Andrachne telephioides* L. Euphorbiaceae. 215, 809, 2879.

Glabrous prostrate perennial herb, sometimes woody at base, glaucous and bluish-green with stems spreading from base. Leaves obovate to suborbicular, 2-6 mm long. Flowers 1-3 in the axils, 2-3 mm in diam., with petals shorter than the sepals. Capsules depressed-globose, obscurely 3-lobed, 1-3 mm in diam. A locally frequent plant on silty basins.

**msēkah** (gen.) A feminine diminutive noun from *misk,* "musk." The name is apt, as the strong, unpleasant scent of all parts of this plant have an animal accent, reminding me of the American skunk. Synonyms also emphasize various aspects of the odor: *zgēgh* (Āl Murrah), diminutive from *zigg,* "turd," "turdlet weed";

*frēthah* (Musil 1927:599, from Ruwalah), from *firth,* "stomach contents, offal";

*zifrah* (Shammar), from *zafr,* "filthy."

*Haplophyllum tuberculatum* (Forssk.) A. Juss. Rutaceae. BM 1692, BM 3138, BM 3145. Erect or ascending pubescent perennial, usually several-branched from a somewhat woody base, usually 15-50 cm high. Leaves highly variable in shape and size, from suborbicular to linear, up to 4-5 cm long and dotted with glands. Flowers ca. 8 mm broad, bright sulfur yellow, in a terminal, flat-topped
inflorescence. A plant well known for its powerful odor. Used medicinally to treat scorpion stings.

naggi (gen.) An Āl Wahībah tribesman of the southern Rub‘ al-Khālī (a speaker of southern Arabic) used the variant naggi.

*Blepharis ciliaris* (L.) B. L. Burtt. Acanthaceae. BM 1028. Rigid, spiny-prickly perennial herb, much branched from the base, 10-30 cm high. Leaves oblong or lanceolate, tapering at base. Flowers in dense spikes, exceeded by acuminate veined bracts 3-5 cm long, Corolla blue, veined darker, 2-2.5 cm long. Rare in our area and with a southerly distribution.

najil (Ruwalah) A Qaḥṭānī consultant used the synonym thēyyil.

*Cynodon dactylon* (L.) Pers. Gramineae. K 14, BM 3132, BM 3085. Perennial grass spreading widely by creeping rhizomes and stolons, rooting at the nodes and sending up shoots to 30 cm high. Inflorescence of digitate spikes, usually 4-5, with imbricated spikelets. This common weed grass is usually found around cultivation, but it also occurs in remote desert around old camp locations and other disturbed sites.

shari (Āl Murrah, gen. south) Tribes of northern Arabia use the synonym hanqal.

*Citrullus colocynthis* (L.) Schrad. Cucurbitaceae. 230, 1085. Creeping perennial with stems sometimes over 1 m long, tendril-bearing. Leaves alternate, ovate or triangular-cordate in outline, 3-10 cm long, parted into 3-5 main lobes. Flowers solitary, yellow. Fruit a globose, smooth gourd, striped green and yellow-white, 4-10 cm in diam., turning yellow and hollowing when drying. The common colocynth gourd, used medicinally as a laxative.
**shuuweel (gen.)** Names from this root, *sh w l*, often refer to narrow curved structures such as the tail of a scorpion and plants with elongated spicate inflorescences such as *Reseda* spp. A she-camel is said to be *shāyilah* when she raises her tail upwards in a curved arc. The name here may refer to this plant’s elongated, tail-like side stems, some terminating in rather narrow spikes of flowers.

*Cressa cretica* L. Convolvulaceae. BM23, BM1099, BM 2958. Erect or ascending perennial, gray-green with both appressed and spreading hairs, 10-30 cm high. Leaves ovate to lanceolate, sometimes subcordate, 3-6 mm long. Flowers in short, dense spikelike racemes at branch apices. Flowers 5-6 mm long, white to cream, with exserted stamens. A weedy plant of saline ground.

**umm at-trāb** (Ruwalah, Musil 1927:628) *umm*, "mother," + *at-trāb*, "the earth, soil," thus "mother of the soil," referring to the grains of soil or sand always adhering to this viscid plant. Members of tribes in the more central parts of our study area might call this plant *dremā* (q.v., above) or *hlēwah*, names often used for other species of *Fagonia*.

*Fagonia glutinosa* Del. Zygophyllaceae. BM 1170, BM 1358, BM 3121. Prostrate perennial, glandular-viscid and often with adhering sand, often purple-tinged, with stems spreading, up to ca. 20 cm long with stipular spinelets. Leaves trifoliolate with leaflets mostly obovate, 4-10 mm long, mucronate. Flowers 3-5 mm long with mauve petals. Capsules 3-5 mm long.
11. Life form: ‘ishb (all annual plants)

*abū nashr* (Ruwalah, Musil (1927:587) Probably from *nashar*, in the sense of "to saw, cut with a saw." *abū*, "father," + *nashr*, "sawing" literally "father of a sawing", "saw-wort," referring to the rough, retrorsely-scabrous surfaces of this plant.

*Galium ceratopodum* Boiss. Rubiaceae. K 613, 3895. Ascending, somewhat delicate annual, 10-30 cm high, with stems retrorsely rough-scabrous. Leaves in whorls of 5-7, ob lanceolate, mostly 5-15 mm long, with scabrous margins. Flowers minute, in axils, the corolla with 4 white lobes. Fruits a twin mericarp, sometimes single by abortion, dark brown and tuberculate.

*abū threb* (Qahtān) *abū*, "father" + *threb*, diminutive of *thirb*, thus "father of a little *thirb*." The meaning of *thirb* in this context is unclear; classically it is glossed as "fat of the intestines (of livestock)". The consultant providing this name noted that "some people say *umm threb*" (substituting "mother" for "father"). A consultant of the Suhūl tribe gave me that form, but with the definite article, *umm ath-threb* (q.v.) for two species of *Hypecoun*.

*Frankenia pulverulenta* L. Frankeniaceae. BM 1463, BM 1741, BM 1827. Low subprostrate annual, grayish green or often turning reddish, finely pulverulent with whitish glands or excreted salt crystals. Stems branching at base, 5-30 cm long. Leaves opposite or whorled, oblong-oblanceolate, 2-6 mm long. Flowers with ribbed, tubular calyx 3-4 mm long and pink petals. Capsule 2-2.5 mm long. A plant of saline habitat, often on disturbed ground but sometimes in desert.

‘ansalān (gen.) The variant ‘asansal was heard from Ruwalah and Shammar Bedouins of northern Arabia.
Dipcadi erythraeum Webb et Berth. Liliaceae. BM 50, BM 1203, BM 1815.
Glabrous herb arising from an ovoid, 2-4-cm-long bulb. Scape single, 10-20 cm long. Leaves 3-4, narrowly linear, shining green and often exceeding the scape and accumbent on the ground. Flowers 5-15 in a somewhat 1-sided raceme, with perianth 12-15 mm long, greenish brown to brownish coral. Capsule broadly oblong, 12-15 mm long with 3 rounded lobes.

bābūnaj (gen.) According to Lane (1863:1:145), from Persian bābūnah, "camomile."

Matricaria aurea (Loefl.) Sch.-Bip. Compositae. 8118, 8606. Glabrous, sweet-aromatic annual, 5-25 cm high. Leaves very finely dissected, 1-2-pinnatisect in linear segments under 1 mm wide. Heads discoid, mostly terminal, dome-shaped to rather high conical, with yellow florets. Used by Bedouins and villagers to make a medicinal tea. Closely related to European camomiles.

barwag (gen.) Āl Murrah consultants used the variant bērag.

Asphodelus tenuifolius Cav. Liliaceae. BM 1299, BM 1675, BM 1832. Erect glabrous annual with scapes solitary or several, often branched above. Leaves numerous from base, narrowly linear, mostly 1/3 to 1/2 as long as the scapes. Flowers loosely racemed. Perianth ca. 3 mm long, the lobes white with purple medial nerve. Capsule nearly globose, ca. 3 mm in diam. Livestock reportedly avoid this weedy plant, which is common on disturbed ground around old campsites. Used in the preparation of igt, dried sour milk cakes. The same name may be applied also to two smaller, less common species of Asphodelus: A. refractus Boiss. (8103, 8566) and A. viscidulus Boiss. (BM 1410, BM 1484).
basbās (gen.) Dickson (1955:19) recorded the synonym *umm ḍrūs*, from *umm*, "mother," + ḍrūs, "teeth", lit. "mother of teeth," doubtless in reference to the hardening, teethlike dispersal units of this plant.

*Anisosciadium lanatum* Boiss. Umbelliferae. BM 128, BM 1238, BM 3116. Ascending or decumbent pubescent annual to ca. 40 cm high. Leaves ovate-oblong in outline, 2-3-pinnatisect into linear lobes. Flowers white, in domeshaped dense umbels. Umbels axillary with 8-18 rays. Pedicels 10-18, hardening in maturity to parallel columns and forming a cylindrical dispersal unit 6-10 mm long. Some medicinal uses.

daʻā (gen.) For the application of this name by Shammar and the Ruwalah as a folk specific, see generic *samḥ*, below. It is included here also as a generic, as that appears to be a usage in our core study area, where edible *samḥ* seed is not collected.

*Aizoon canariense* L. Aizoaceae. BM 1208, BM 3165, 7736. Procumbent, pubescent papillose annual with stems branching from base, rather stiff and zigzagged. Leaves alternate, spatulate to oblong-ovate, 1-2 cm long. Flowers sessile, apetalous, greenish outside but yellowish within, with perianth 3-5 mm long with triangular lobes. Capsule flattish, star-shaped at apex.

dhanabān (Al Murrah) From *dhanab*, "tail" + -ān, denoting similarity, lit. "tail-like," referring to the tail-shaped spiciform flowering racemes of these plants. Applied to several plants of the family Resedaceae which have tail-like flowering racemes. The variant *dhanābah* was given by a Marrī consultant for *Oligomeris linifolia*. *Oligomeris linifolia* (Vahl) Macbride. Resedaceae. BM 188, BM 1288, BM 1665. Ascending to erect glabrous herb, 5-30 cm high. Leaves solitary or
fascicled, linear, 1-4 cm long. Flowers white, in spiciform terminal racemes. Fruit a depressed-globose sessile capsule, 4-toothed at mouth.

*Reseda arabica* Boiss. Resedaceae. K 387, BM 1475, BM 1769. Ascending or erect glabrous herb, 10-30 cm high. Leaves entire-oblanceolate or distally ternate, sometimes wavy-margined. Flowers in elongated terminal racemes, pedicillate, with white petals. Capsules pendulous, globose-ellipsoid, more or less gaping, 5-10 mm long, 3-toothed.

*Reseda decursiva* Forssk. Resedaceae. BM 612, BM 1691, BM 1706. Decumbent to erect glabrous herb, 6-30 cm high. Leaves rosetted at base, pinnately divided with narrowly oblong to linear lobes. Flowers in dense spikelike terminal racemes, subsessile, with white petals. Capsules 4-6 mm long, ovoid, 4-toothed at gaping mouth.

*dmdgh al-jarbu'* (north, Dickson 1955:39) *dmdgh*, "brain," + *jarbū*, the jerboa (kangaroo rat, *Jaculus jaculus*), thus "jerboa's brain." The name refers to the peculiar nutlets of the plant, which when mature are glossy grey-green, tubercled and furrowed in a way that resembles a miniature brain. Musil (1927:598) recorded the synonym *išbat ar-rās*, construct form of *išbah*, "herb, annual plant," + *rās*, "head," thus "head-wort," probably in reference to the same feature of the nutlets.

*Lappula spinocarpos* (Forssk.) Aschers. Boraginaceae. Erect to ascending-decumbent dwarf annual, 3-15 cm high. Leaves linear to linear-spathulate, 1-3(5) cm long. Flowers solitary or in loose racemes; corolla 3-4 mm long with limb blue or sometimes whitish. Calyx growing in fruit, exceeding the nutlets. Nutlets triquetrous-pyramidal, ca. 4 mm long.
fānī (Āl Murrah) Musil (1927:628) in northern Arabia recorded for this plant the name

_umm ar-rwēs, umm_. "mother" + _ar-rwēs_, diminutive of _ar-rās_, "the head",
"mother of the little head," doubtless referring to the conspicuous grouped
coronae of the fruiting heads.

_Scabiosa palaestina_ L. Dipsacaceae. BM 603, BM 1228, BM 1602. Erect
annual, 5-45 cm high with main stem branched above. Leaves linear-oblong to
lanceolate, 2-8 cm long, the lowest sometimes divided. Flowers in heads 1.5-3
cm in diam., in ours pale yellowish-white, fragrant, 12-15 mm long. Fruiting
heads more or less globose, with prominent membranous coronae 8-10 mm long,
30-35-nerved.

gahwīyān (gen.). Applied to two very similar species of _Anthemis_ (Compositae).

_Anthemis melampodina_ Del. BM 1492, BM 3776, BM 3846. Ascending annual,
pubescent or tomentose, 5-25 cm high. Leaves oblong in outline, 1-3 cm long,
pinnatisect into linear lobes. Heads 2-3 cm broad with white ray petals and disc
yellow. A well-known plant, rather common in the spring flora after good rains.

_Anthemis scrobicularis_ Yavin. BM 1446, BM 2831, BM 4080. Very similar to
the foregoing but differing by its non-tuberculate, longitudinally ribbed achenes.

garnuwah (Banī Hajir) Derived from _garn_, "horn," in reference to the long pointed fruit
beaks, resembling long horns.

_Erodium laciniatum_ (Cav.) Willd. Geraniaceae. BM 536, BM 1436, BM 1681.
Procumbent to ascending annual, greyish-green with stems to ca. 30 cm long.
Leaves ovate in outline, 2-4 cm long, varying in lobation from dentate to pinnately
divided. Flowers in umbels with pink, rarely white, petals 5-6 mm long. Fruit
beaks 30-45 mm long; achenes with 2 pits at apex.
ghrērah (Āl Murrah, Qaḥṭān) A consultant of Āl Murrah also used the synonym

gurḥān. Both of these names are related to classical terms associated with a blaze on the face of a horse: ghurrah and qarḥāʾ (fem. adj.).

*Eremobium aegyptiacum* (Spreng.) Boiss. Cruciferae. BM 220, BM 1812, BM 3184. Decumbent to ascending branched, stellate pubescent annual, 5-30 cm high. Leaves linear, 5-45 mm long, 1-3 mm wide. Flowers with petals 4-10 mm long, white to pink and mauve, sometimes tinged with yellow. Siliques linear, 10-35 mm long, spreading or ascending. One of the very few annual plants with a distribution extending into the Rubʿ al-Khālī.

gitt (gen.)

*Medicago sativa* L. Leguminosae. 8077. Erect or ascending branched annual or perennial, 20-90 cm high. Leaves trifoliolate with leaflets oblanceolate to oblong-linear, 10-35 mm long. Flowers in dense spiciform racemes, lilac, violet to purple, ca. 12 mm long. Pod compressed, 4-8 mm in diam., usually tightly coiled and auger-shaped. This is alfalfa (the English name coming through Spanish from Arabic al-fisṭīṣah, the latter according to Hamidullah (1973:188) being of Persian origin), sometimes found spontaneous along roadsides or on disturbed desert camp sites. Bedouins occasionally purchase it as supplementary fodder. I place it here among the annuals because it is found as an occasional, spontaneous plant. I have no data on its life form when treated as a cultivated crop but think it unlikely that it would be included in the category ʿishb.

glēgilān (gen.) Non-diminutive variants: from a consultant of Āl Murrah, gungulān; from Qaḥṭān and Banī Hájir, gulgalān. All these forms relate to classical
qalqala or taqalqala, "to shake, tremble," referring to the way the pods of this plant, on fine capillary pedicels, quake and tremble in the slightest wind.

Savignya parviflora (Del.) Webb. Cruciferae. BM 1178, BM 1402, BM 1687. Ascending, glabrous branched annual, 10-40 cm high. Lower leaves obovate-oblong, sinuate or dentate; upper leaves narrower. Flowers pink, with petals 4-6 mm long. Silicles elliptical-oblong to suborbicular, strongly compressed, 8-14 mm long on spreading capillary pedicels longer than the fruit.

gtēnah (gen.) From qaṭn, "cotton," referring to the cottony-woolly appearance of this plant. Variant: gūṭēnah (Qaḥṭān). Synonyms recorded only for B. eriophora: ḥmēḍat al-arnab (Qaḥṭān), ḥmēḍah, diminutive of ḥamḍah, "saltbush," + al-arnab, "the hare", "little saltbush of the hare"; ḥmēd (Āl Rāshid), diminutive of ḥamḏ, "saltbushes", "little saltbushes"; ṭīrf (Shammar). Synonyms recorded only for B. muricata: urēnibah (Ruwalah), diminutive fem. of ar unab, "hare", "little hareweed"; lēbid (Qaḥṭān), from labad, "felt, wool"; dhinnabān (Banī Hājir), from dhanab, "tail" + -ān, denoting resemblance, "tail-like weed"; sh/hēbā (Shammar), diminutive of shahbā, "gray, fem.", "little grayweed.

Applied to two species of the genus Bassia (Chenopodiaceae) with a focus on B. eriophora, which has the stronger cottony-woolly aspect. The variant gūṭēnah was also applied by a consultant of the Muṭayr tribe to Filago desertorum Pomel (Compositae), which also has a gray-woolly appearance.

Of particular interest here is the clear attribution of this plant (B. eriophora, at least) by some names to the ḥamḏ group of plants (saltbushes). The genus does indeed belong to the Chenopodiaceae, and this is one of the very few annual plants classed as ḥamḏ.
Bassia eriophora (Schrad.) Aschers. BM 1618, 8293, 8344. Ascending, cottony-villous annual 5-20 cm high, the stems appearing as white columns of cotton with leaves partly hidden in the fleece. Leaves narrowly oblong to elliptical, 8-14 mm long. Flowers clustered, hidden in dense fleece. Fruiting perianth clothed in very dense white wool, falling as dispersal units resembling small balls of cotton.

Bassia muricata (L.) Achers. BM 1233, BM 1435, BM 3147. Erect villous annual, 8-50 cm high, often somewhat frutescent. Leaves grayish-green, narrowly linear, 5-15 mm long. Flowers solitary or clustered in the axils, fleecy. Fruit perianth indurate, the lobes prolonged in spreading spinules 2-4 mm long, exserted from the fleece.

gurreş (az-Zafîr) Cf. classical qurs, "disk of the sun, disk of metal (ornament)," which fits the appearance of this plant’s yellow discoid heads very well. A consultant of the Qaḥṭān tribe used the variant garrāṣ.

Aaronsohnia factorovskyi Warbg. et Eig. Compositae. BM 1239, BM 1314, BM 1667. Annual herb 8-25 cm high, branched at base with stems erect or decumbent. Leaves much dissected, slightly succulent, bipinnatisect into linear lobes ca. 1 mm wide. Heads discoid, hemispherical, mostly 6-8 mm in diameter, with bright yellow florets, solitary on numerous leafless peduncles exceeding the leafy stem parts. Considered edible and sometimes eaten raw; also used in the preparation of īgt, dried sour milk cakes.
**hambasīṣ** (gen. at least in north) The shortened variant **hamsīṣ** was reported by Musil (1927:28; 1928a:697).

*Rumex pictus* Forssk. Polygonaceae. BM 1249, 3283, 4030. Glabrous, often reddish and somewhat brittle-succulent annual, 10-25 cm high with many decumbent leaves from the base. Leaves 1.5-4 cm long, pinnately parted. Flowers clustered in the upper nodes, forming a spicate or narrowly racemose inflorescence. Fruit perianth winged, 5-9 mm broad, pink or turning yellow, the valves with a medial, elongated wart. Considered edible and eaten raw.

**hambizān** (gen.) Variants: **ḥimbāzāh** (Shammar), **ḥumbēz** (Ruwalah), ‘ambaṣīṣ (sic, Āl Murrah).

*Emex spinosa* (L.) Campd. Polygonaceae. BM 1292, BM 1386, BM 1680. Glabrous annual, 5-20 cm high and sometimes tinged reddish, single-stemmed with a basal rosette of leaves. Taproot thickened, carrot-like, whitish and fleshy. Leaves ovate to oblong, 1-6 cm long. Flowers clustered in the axils with perianth growing in the fruit, 3 segments indurating and with recurved spinules 1-3 mm long. One of the best known edible plants, the sweet, carrot-like taproot consumed raw.

**ḥanwah** (Shammar, Banī Hājir) From **ḥanū**, "crook, bend," referring to the hooked shape of the maturing achenes of this plant. Synonyms: ʾishbat al-ghurāb, ʾishbah, "annual plant," + al-ghurāb, "the crow or raven," thus "crow-wort" (northern tribes, Musil 1927:598).

*Calendula tripterocarpa* Rupr. Compositae. BM 1246. BM 1403, BM 1509. Decumbent to ascending annual, usually glandular-pubescent, with stems 5-25(40) cm long. Lower leaves ob lanceolate to linear-oblong, mostly 2-5 cm long,
obscurely serrate to entire. Flowering heads 0.5-1.5 cm wide with florets yellow to a rich orange. Ripening fruits with some achenes 3-winged. A plant considered dangerous to livestock, causing digestive ailments.

**harās** (Bani Hājir, Qaḥṭān) Cf. classical harasa, “to crush, bruise.” Synonym: ḡrēsah, diminutive fem. of ḡirs, "tooth" (recorded by Dickson, 1955:83, as "Al Thraisa"). Both names refer to the peculiar, mace-like, rounded, spiny fruiting heads of this plant.

*Sclerocephalus arabicus* Boiss. Caryophyllaceae. BM 1159, BM 1280, 7510. Procumbent or ascending glabrous annual with stems rather rigid, 2-10(15) cm long. Leaves terete-linear, 4-15 mm long, mucronate, with scarious stipules. Flowers in dense spherical heads becoming indurate and spiny in fruit, 0.7-1 cm in diam.

**ḥārrah** (Ruwalah, Musil 1928a:697) From ḥārr, "hot," referring to the hot, mustardy taste of this crucifer. I am not entirely comfortable with this record, which could have been given Musil as an adjective, rather than a name. It does, however, fit plant name patterns.

*Sisymbrium irio* L. Cruciferae. 8097, 8583. Erect branched annual, 15-50 cm high, sparsely pubescent. Basal leaves lyrate-pinnatifid or dentate, with hastate terminal lobe. Flowers minute, with yellow petals ca. 2 mm long, hardly exceeding the calyx. Fruit 20-45 mm long, 1 mm wide, erect-spreading. A weedy plant found in desert only on disturbed ground, such as around camp sites.

**ḥaṣād** (Qaḥṭān, gen.) *Avena sativa* L. Gramineae. 434, BM 1070. Annual grass with erect glabrous culms and glabrous leaf blades. Spikelets with 1 lemma awned, or all awnless, in a spreading or nodding panicle. This is the cultivated oat, found
outside cultivation only as an occasional escape but known to Bedouins who occasionally purchase the grain as fodder. With respect to life form assignment, see hintah, below.

ḥassār (az-Zafīr) Cf. classical ḥasīr, "tired, weak," the name possibly referring to the limp, soon-falling petals of this plant. Dickson (1955:81) recorded (as "Bakātārī") the name bakhatī (cf. classical bakhtārī, "elegant, beautiful") for this species in Kuwait territory.

Roemeria hybrida (L.) DC. Papaveraceae. BM 1368, BM 1501, BM 1641. Erect or ascending annual, 10-30 cm high, often with stiff, whitish erect hairs. Leaves 3-5 cm long, deeply pinnatisect into linear lobes. Flowers with deep violet petals 0.8-2 cm long that are thin, fragile and soon-falling. Capsule 2-4 cm long, often with stifferish hairs.

hintah (gen.) Synonym: gamh.

Triticum aestivum L. Gramineae. 7892. Annual grass with culms to 100 cm high (but often about 40 cm in our area) and leaf blades to 2 cm broad in cultivation. Inflorescence a 2-rowed spike, the spikelets with an awn or tooth at apex. Cultivated wheat, very common in cultivation in our study area since the 1980s and known to all Bedouins. Sometimes escaped along roadsides from spilled grain. I have no data indicating the life form of this cultivated plant. It is placed here among the ʿishb on the basis of its annual habit and occasional appearance spontaneously on disturbed desert sites. It is probable that this (and other cultivated grains such as barley and oats) are placed outside ʿishb, which properly seems to apply only to wild plants.
hōdhān (gen.) A synonym heard once from a consultant of Āl Murrah is ḥuwwā (which is generally applied to rather similar *Launaea* spp.).


Ascending annual 5-30 cm high, hispid with short bristles. Basal leaves rosulate, oblong-lanceolate in outline, runcinate-pinnatifid and 3-8 cm long. Heads solitary-terminal with bright yellow, broadly spreading florets, sometimes dark-centered with immature florets. Achenes beaked, with a pappus of 10-15 plumose bristles. A common and rather conspicuous member of the annual flora.

ḥsēkah (Āl Murrah). Non-diminutive variant: ḥasak (Ruwalah, Qaḥṭān). The name *nafal*, usually applied to *Trigonella*, was heard once for this plant from a Bedouin of Āl Murrah.

*Medicago laciniata* (L.) Mill. Leguminosae. BM 1195, BM 1512, BM 1816.

Prostrate to decumbent annual with stems 5-30 cm long. Leaves 3-foliolate with cuneate to obovate leaflets 3-10 mm long. Flowers yellow. Pod a spheroid or ovoid coil, 3-6 mm in diam., with dense, interlacing prickles.

hulbah (gen.) The root ḥlāb is basically related to the concept of "milk," and the association with this plant is unclear.

*Trigonella foenum-graecum* L. Leguminosae. 378. Erect herb to ca. 30 cm high. Leaves trifoliolate, with leaflets obovate to oblong, 10-30 mm long, dentate above. Flowers solitary or paired in the axils, 13-18 mm long with white to cream corolla. Pod erect, 6-12 cm long, somewhat compressed, tapering to a straight beak 2-3 cm long. Fenugreek -- a cultivated plant of the oases, but known to Bedouins and sometimes considered a medicinal.
**hummēd** (gen.) From ḥāmiḍ, "sour." Variant: ḥammāḍ. The name ḥambaṣīṣ may also be used for this plant.

*Rumex vesicarius* L. Polygonaceae. 397, 1204, 2761. Glabrous, somewhat succulent annual, 10-30 cm high. Leaves ovate to deltoid, to ca. 6 cm long. Flowers clustered in the upper axils forming dense racemes. Fruiting perianth growing, showy, greenish-yellow when young, becoming bright pink to reddish, with red-nerved wings ca. 2 cm broad. An edible plant; used also in the preparation of *igt*, dried milk shards.

**ḥurbuth** (gen. south) A near equivalent used among tribes of the north is gafā (cf. gafā, "shriveled, shortened, drooping", fem. adj.). It is applied in our study area to at least eight species of annual legumes with a focus on several annual species of *Astragalus*, particularly those with characteristic elongated, usually more or less curved fruit pods. The following list may be incomplete to a slight extent and is provided with abbreviated descriptions. This generic is unusual in being apparently polytypic to some degree, including one species of *Astragalus* distinguished by a specific name (see section 9.4 for discussion).

Generic: ḥurbuth

Quasi-specific: *abū khawātim* (Āl Murrah), from *abū*, "father" + *khawātim*, pl. of *khātim*, "signet ring, seal", thus "father of seal rings," referring to the circular, flattened, ring-like pods of the plant. Bedouin children wear the "rings" on their fingers in play. A synonym is *aṣābī‘ al-‘arūs* (Dickson 1955:20), from *aṣābī‘*, "fingers" + *al-‘arūs*, "the bride", thus "bride's fingers," referring to the reddish flecks on the pods resembling the henna-stained fingers of a bride decorated for her wedding.
Astragalus annularis Forssk. Leguminosae. BM 1487, BM 1694, BM 1799.
Leaflets in 1-3 pairs, obovate-elliptical. Flowers pink to red-purple. Fruits strongly compressed dorso-ventally, irregularly streaked with purple flecks, curved into a ring shape.

The following form a residuum in which only the generic name, hurbuth, is used for each:

Leaflets in 5-9 pairs, oblong and truncate-retuse. Flowers pink to cream to blue-violet with white. Pods curved-linear, 20-35 mm long and reticulate-rugose.

Astragalus eremophilus Boiss. Leguminosae. K 8003, 8041, 8055. Leaflets in 5-7 pairs, obovate to oblong. Flowers 1-3 in axillary racemes, cream to pinkish. Pods linear, nearly terete, hairy, curved to a half-circle.

Astragalus schimperi Boiss. Leguminosae. BM 1265, BM 1750, BM 3305.
Leaflets elliptical, in 4-8 pairs. Flowers often with pink standard and whitish wings and keel, in headlike inflorescence. Pods often in radiate clusters, linear, subterete, moderately curved, pubescent.


Hippocrepis bicontorta Lois. Leguminosae. BM 1194, BM 1437, BM 3180.
Leaflets in 3-5 pairs, 8-15 mm long, linear to oblong with emarginate apices. Flowers yellow, umbelled with 3-4 together. Pods strongly compressed, contorted and coiled, with horseshoe-shaped sinuses bordered by horn-like processes. Dickson (1955:50) recorded the name umm al-grën for this plant.
among Bedouins of Kuwait, apparently treating it as a generic. It is from umm, "mother" + al-ğrèn, "the little horn," thus "mother of the little horn, hornwort," referring probably to the hornlike protuberances along the edge of the pod although Dickson quotes a resemblance to a Bedouin hair style of the same name. This name may be used only by the more northern tribes; my Āl Murrah and Qaḥṭān informants called it only ħurbuth.

Lotus halophilus Boiss. et Sprun. Leguminosae. BM 1261, BM 1621, BM 3295. Prostrate or decumbent pubescent annual with sessile 5-foliolate leaves, the lower pair stipule-like. Flowers yellow. Pod glabrous, linear-cylindrical, slightly curved, ripening a shining dark brown.

Ononis serrata Forssk. Leguminosae. BM 1412, BM 1722, BM 1797. Glandular-hairy annual with 3-foliolate leaves and leaflets oblong, serrate, 6-10 mm long. Flowers solitary in the axils, pink with white keel. Pod oblong, glabrous, hardly exceeding the calyx.

ḥuwwā (gen.) Cf. classical aḥwā, fem. ḥawwā', "dark green," possibly referring to the dark green color of the leaves (or the color so called after the plant). Applied to three species of Launaea (Compositae), with focus on L. capitata.

Launaea capitata (Spreng.) Dandy. Glabrous, usually procumbent annual, stemless or with stems 5-15 cm long. Leaves rosulate, oblong to spathulate, runcinate-pinnatifid with cartilaginous, denticulate margins, 2-7 cm long. Heads yellow-flowered, basal or at the ends of stems. Considered a poor-quality edible plant.

Launaea nudicaulis (L.) Hook. f. BM 813, BM 3111, BM 3176. Glabrous perennial (but generally considered to be ‘īshb), ascending and 20-50 cm high, sometimes larger scrambling on rocks. Leaves rosulate, oblong, runcinate-
pinnatifid with triangular dentate lobes. Heads numerous on upper stems, the ligules yellow, whitish on back. Achenes of two types: columnar-tetragonal and compressed, darker.

*Launaea procumbens* (Roxb.) Ramayya et Rajagopol. K 637, BM 1456, BM 1909. Glabrous perennial with stems procumbent, decumbent or ascending, 10-30 cm high, sometimes tangled and shrubby at base. Leaves mostly basal and rosulate, sinuate-dentate to runcinate-pinnatifid with callose margins, 4-15 cm long. Heads usually clustered, yellow-flowered.

**'ifēnāh** (Muṭayr) Cf. 'āfīn, "putrid, mouldy."

*Vicoa pentanema* Aitch. et Hemsl. Compositae. K 624, 8115. Erect or ascending, branched annual with white spreading hairs and purplish stems. Basal leaves oblong-spathulate, entire or dentate, mostly 2-4 cm long; stem leaves smaller. Heads numerous, mostly terminal, villous, ca. 6-7 mm long and broad, with yellow florets. Generally found as a weed around cultivation or roadsides.

**'ishbat umm sālim** (Ruwalah, Musil 1927:598) ‘ishbat, construct form of ‘ishbah, "herb, annual plant," + umm, "mother," + sālim (male personal name). umm sālim (literally "the mother of sālim") is the name of the bifasciated or hoopoe lark (*Alaemon alaudipes*), conspicuous by its rising song and spiraling breeding display in spring. In my experience Bedouins consider it a "good bird" and avoid harming it in any way, telling boys, for example, not to shoot at it with their air rifles. The name of the plant thus means "herb of the hoopoe lark," but why it is associated with the bird is unclear.

*Notoceras bicorne* (Ait.) Amo. Cruciferae. BM 751, BM 1495, BM 1564. Prostrate or decumbent annual, branching at base with stems to 20 cm long.
appressed hairy. Leaves oblanceolate, 15-30 mm long, tapering to base. Flowers in terminal racemes, with white to yellowish petals less than 2 mm long. Fruits appressed to stem, 6-7 mm long, somewhat compressed and constricted between the seeds, with 2 diverging horns at apex.

**jahag** (Shammar)

*Diplotaxis acris* (Forssk.) Boiss. Cruciferae. BM 602, BM 1605, BM 3115.

Erect glabrescent annual, 5-50 cm high with leaves mostly at base, somewhat fleshy, obovate to oblong and dentate. Flowers in an often flat-topped terminal inflorescence with pink-purple petals. Siliques ascending, 20-50 mm long, 2-3 mm wide, on pedicels 7-15 mm long.

**jirjir** (Qahtân)

*Eruca sativa* Mill. Cruciferae. 546, 7976, 8427. Erect annual, 10-50 cm high with leaves pinnatifid with large terminal lobe, the uppers entire or serrate. Flowers cream or yellowish with greenish to violet veins, the petals 15-20 mm long. Siliques 15-25 mm long, 3-5 mm wide, appressed to stem and with a compressed beak. A weed usually seen in cultivation but sometimes along roadsides in spring. Musil (1928b:343) reported that Shammar tribesmen used this name for *Senecio glaucus* L. subsp. *coronopifolius* (Maire) Alexander.

**jirrêd** (az-Zafîr, other northern tribes) Applied to two annual species of *Helianthemum* (Cistaceae). Possibly applied sometimes also to the perennial species, *H. lippii* and *H. kahiricum*. Conversely, the name *ragrûg* may apparently be used sometimes for the annual species, below (see *ragrûg*, under life form *shajar*, above).
Helianthemum ledifolium (L.) Mill. BM 744, BM 1425, BM 1642. Erect pubescent annual, 5-20 cm high. Leaves elliptical-lanceolate, to 15 mm long. Flowers distant or crowded in upper axils, 5-8 mm long. Capsule ovoid, ciliate along upper margins of the valves, ca. 7 mm long. Like other species of Helianthemum, an indicator plant for desert truffles.

Helianthemum salicifolium (L.) Mill. BM 1306, BM 1522, BM 1701. Ascending pubescent annual 5-25 cm high. Leaves ovate to lanceolate, to 20 mm long. Flowers in terminal racemes, distant, with inner sepals 4-6 mm long. Capsule globose-ovoid, 4-5 mm long. Like the foregoing, an indicator plant for desert truffles.

jurres (Ruwalah, Musil 1927:601) From jurès, diminutive of jaras, "bell," referring to the unusual shape of the plant's heads, which are enclosed by the erect and incurving involucral bracts, forming a sphere. It is in fact very suggestive of some bells made of brass in India that are spherical with multiple ribs.

Atractylis cancellata L. Compositae. BM 1617, 2728, 8123. Ascending annual, branched from base and 4-25 cm high. Basal leaves (when present) spathulate, prickly-dentate; stem leaves linear-ob lanceolate, prickly-dentate, 1.5-2.5 cm long. Heads discoid, terminal, with outer involucral bracts pectinate-pinnatisect and prickly-spinescent, erect and incurving to enclose the head. Florets pink or purple.

kaftah (gen.) Cf. classical inkafata, "to contract, become compact," which well describes the form of the plant when dry (but the verb perhaps from the plant name). A widely known plant with many synonyms, the more generally known of which are kaftah and kaff maryam, the latter from kaff, "hand, palm" + maryam.
"Mary" (the mother of Jesus), thus "Mary's hand." Other names: birkān, barukān (Shammar); jmē fātmah, from jmē, diminutive of jumē, "fist" + fātmah, "Fāṭimah" (woman's name, doubtless referring to Fāṭimah, the daughter of the Prophet Muhammad and his first wife, Khadijah, thus "Fāṭimah's little fist"); kaff al-ādhrā (Dickson 1955:16), from kaff, "hand, palm" + ʿadhrā, "maiden, virgin," thus "virgin's hand" (another reference to Mary, the mother of Jesus); kafn, gufe'd (Qaḥṭān), the last the diminutive of gaf'ā, "shriveled, contracted"; gnējidhah (Ruwalah, Musil 1926:357), the diminutive of gunfudh, "hedgehog", thus "little hedgehog." The several references to "hand" or "fist" refer to the hand of Mary or Fāṭimah clenched in pain at childbirth. The dried plant is widely used in Arabia as a medicinal or charm to ease childbirth.

Anastatica hierochuntica L. Cruciferae. BM 1494, 2106, 2238. Stellate-pubescent dwarf annual, branched radially from base, prostrate or decumbent and often ca. 15 cm across, the branches rolling inward after maturity to form a tight, woody ball. Leaves oblanceolate to obovate, to ca. 3 cm long. Flowers white, with petals ca. 3 mm long. Fruit 4-6 mm long, with an ear-like appendage on each side and persistent style.

kahīl (gen.) also kahal, kahlā (Āl Murrah, Banī Hājir). Synonym: ʾishbat al-ḥamām, (Musil 1927:598) from ʾishbat, construct form of ʾishbah, "herb, annual plant," + al-ḥamām, "the doves", "herb of the doves." The name kahīl means "annointed with kuḥl," the fine black powder widely used in the Arabian Peninsula and elsewhere in the Middle East as an eye cosmetic or medicinal. This material is often described as powdered antimony or an antimony compound, but recent chemical analyses of samples from the Gulf area have shown major ingredients to
be powdered galena (lead sulfide) or amorphous carbon (Hardy et al. 1998; Hardy, Sutherland and Vaishnav 2002). The term kahil and variants as applied to these plants is in the more general sense of "colored ointment" or "cosmetic" and is otherwise unrelated to the eye cosmetic known as kuhl. Kahl labels a complex of five boraginaceous plants, four of them species of Arnebia, which have taproots with a staining red pigment on their epidermis. The roots are rubbed on the face as a rouge-like cosmetic by Bedouin women and girls (see section 6.6). The focus of the name appears to be on Arnebia decumbens and A. linearifolia, the species most commonly used as cosmetics.

Arnebia decumbens (Vent.) Coss. et Kral. BM 1604, BM 1820, BM 3311. Hispid ascending annual 5-30 cm high. Lower leaves linear-oblong to linear-lanceolate, 2-7 cm long. Flowers yellow, in dense, 1-sided spicate inflorescences, the calyx growing in fruit to 8-12 mm long with lobes becoming narrowly linear.

Arnebia linearifolia DC. BM 1670, BM 3258, BM 3359. Very similar to the foregoing but differing in the longer, broader fruiting calyx lobes, which are 15-30 mm long and 3-5 mm broad at middle.

Arnebia hispidissima (Lehm.) DC. BM 1460, BM 3073, BM 3182. Ascending or erect annual, sometimes perennating, hispid with rough white bristles. Lower leaves linear-oblanceolate, to ca. 4.5 cm long. Flowers in crowded terminal or elongate 1-sided inflorescences, with yellow, pubescent corollas and calyces 5-7 mm long, not or hardly growing in fruit.

Arnebia tinctoria Forssk. BM 557, BM 1319, BM 1707. Dwarfish annual, usually branching from base and 5-10 cm high. Lower leaves linear-oblanceolate or linear-oblong, to ca. 3.5 cm long. Flowers in dense, 1-sided spicate inflorescences with pale violet or pinkish corollas.
_Echium horridum_ Batt. BM 601, BM 1502, BM 1548. Erect, usually branched hispid annual. Leaves at base sometimes rosetted, with broad-based white bristles, linear-oblong to spatulate, to ca. 15 cm long. Flowers in helicoid cymes with showy corollas, trumpet-shaped, 15-25(30) mm long with oblique open mouth, red to purplish, darkening with age.

*karrāth*, (Muṭayr, northern tribes) Variant: *kurrēth*. Informants of Āl Murrah, Qaḥṭān, and Āl Rāshid also used *baṣāl*, the name for the cultivated onion, for this plant.

_Allium sphaerocephalum_ L. Liliaceae. BM 1058, BM 1788, 8634. Herb with erect scape 30-110 cm high, leafy somewhat above ground level with leaves pale green, linear and involute-channeled above, often somewhat pendulous and lying on the ground. Umbel dense, globose, 3-5 cm in diam. with purple to pinkish flowers. Flower parts used as a spice in food.

_Khafsh_ (Shammar, Qaḥṭān, also Ruwalah (Musil 1927:601) Synonyms: *khinnēz* (Qaḥṭān), from root *kh n z*, "to stink," referring to the somewhat unpleasant smell of this coarse crucifer.

_Diplotaxis harra_ (Forssk.) Boiss. Cruciferae. BM 1243, BM 1313, BM 1673. Erect pubescent annual, sometimes perennating, 10-50 cm high. Leaves mostly basal, ovate to oblong-oblancoleate, dentate. Flowers yellow with petals 7-10 mm long. Fruits 20-40 mm long, ca. 2 mm broad, erect-spreading and at length somewhat pendulous, on pedicels 5-15 mm long.

_Khīfjl_ (Qaḥṭān) _Centaurium spicatum_ (L.) Fritsch. Gentianaceae. BM 1088, BM 1915, 7771. Erect glabrous herb 20-50 cm high. Stem leaves lanceolate, entire, 15-30 mm long, smaller above. Flowers in terminal spicate racemes up to ca. 15 cm long, with corolla pink or white, 9-12 mm long. Capsule terete, tapering at apex,
shining brown, 6-8 mm long. Found only as a weed of oasis cultivation but known by one of my elder consultants.

*khubbēz* (gen.) From *khubz*, "bread," referring to the flattened, disc-like fruits resembling round loaves of bread. Synonym: *tubbāg* (Banī Hājir), cf. classical *tabag*, "cover, round tray, large dish," all descriptive of the fruit form.

*Malva parviflora* L. Malvaceae. BM 1341, BM 3163, BM 7423. Ascending annual, 4-40 cm high. Leaves orbicular or reniform, crenate-dentate, 2-8 cm in diam., nearly entire or palmately lobed. Flowers few or densely clustered, with petals white to pink or bluish, calyx broadly flattened at base, supporting the carpels in a disc-like fruit. Generally found only on disturbed ground, such as old desert camp sites.

*khushshēn* (Muṭayr) From *khashin*, "rough, harsh (to the touch)", "rough-wort," referring to the stiff, rough feel of this herb.

*Neotorularia torulosa* (Desf.) Hedge et J. Leonard. Cruciferae. BM 1345, BM 1562, BM 7552. Rather rigid annual, 5-25 cm high, finely hirsute with erect white hairs. Basal leaves rosulate in young plants, oblong and sinuate or pinnately lobed, often absent in older plants. Stem leaves linear, sinuate-dentate or nearly entire. Flowers white, with petals 2-3 mm long. Siliques in elongated rigid racemes, terete, 12-25 mm long and less than 1 mm wide, usually spirally coiled. Musil (1927:603) records the same name for *Carrichtera annua* (L.) DC., which is also a stiff, rather rough-feeling crucifer, hispid with erect hairs.

*khzāma* (gen.) *Horwoodia dicksoniae* Turrill. Cruciferae. BM 78, BM 1173, BM 3159. Decumbent to ascending annual 8-40 cm high, the young parts densely hirsute. Leaves ovate to oblong, coarsely serrate or pinnately lobed. Flowers in
terminal racemes with mauve-purple to violet petals, ca. 15 mm long. Silicles orbicular, 12-20 mm across, glabrous and glossy when mature, strongly compressed with medial keel. The flowers are strongly and sweetly fragrant and often scent the milk of camels feeding on it.

**kitā'ah** (Muţayr) Dickson (1955:60) reports the synonym *sibsab* from the general vicinity of Kuwait.

*Limonium thouinii* (Viv.) O. Kuntze. Plumbaginaceae. 3879, 3905, 7527. Annual, glabrous but dotted with minute white excretions, 10-25 cm high with several stems from a basal rosette of leaves, the upper stems with veined wings. Leaves oblanceolate to spatulate, usually with 3-4 pairs of rounded lobes, to 8 cm long. Flowers in terminal helicoid cymes with branches below the flowers expanded into a leaf-like wing. Calyx limb papery; corollas cream yellow but soon deciduous leaving the blue to white persistent calyces.

**krā' al-ghurāb** (Banī Hājir) *krā', "shank" + al-ghurāb, "the crow, raven", thus "crow's shank"*. Synonyms: *rijlat al-ghurāb* (Ruwalah, Musil 1927:619), *rijlah, "foot" + ghurāb, "crow", "crow's foot"; *zumlūg* (Banī Hājir); *shakhūṣ* (Shammar); *jirjīr* (Shammar, Musil 1927:600).

*Senecio glaucus* L. subsp. *coronopifolius* (Maire) Alexander. Compositae. BM 1210. BM 1506, BM 1545. Ascending, glabrous branched annual, 10-25 cm high. Leaves somewhat succulent, pinnatisect into linear lobes or rarely entire. Heads 1.5-2 cm in diam. in flower, a rich golden yellow. Achenes cylindrical, indistinctly ribbed, dark brown, 1.5-2 mm long with a caducous pappus of white hairs. An edible plant, consumed uncooked.
lihyat at-tēs (Qaḥṭān, Ruwalah) From lihyah, "beard" + at-tēs, "the male goat," thus "goat's beard". A consultant of Āl Murrah used the synonym lihyat ash-shēbah, lihyah, "beard" + ash-shēbah, "the old man," "old man’s beard." Also: dhignūn (Shammar), cf. dhiqan, "beard."

Koelpinia linearis Pall. Compositae. BM 1290, BM 1510, BM 1654.
Ascending or decumbent diffuse annual branching from base, 10-30 cm high. Leaves very narrowly linear, 5-15 cm long. Heads peduncled in the axils, with rather few yellow florets. Achenes stellate-spreading, conspicuous, 15-20 mm long, narrowly cylindrical and with rows of hooked prickles at back. An edible plant, generally consumed raw.

maknān (Āl Murrah) A Shammarī gave the name ḥalūlā for this plant.

Reichardia tingitana (L.) Roth. Compositae. BM 1270, BM 1542, BM 1587.
Decumbent or short-ascending glabrescent annual with stems 5-25 cm long. Leaves mostly rosulate, oblong to oblanceolate in outline, nearly entire or pinnatifid with dentate lobes. Heads mostly solitary, yellow-flowered with ligules reddish-purple on backs. Achenes 4-sided with rounded angles, rugose-tubercled.

marār (Āl Murrah, Bāni Hājir) From murr, "bitter," referring to the bitterness this plant is said to impart to the milk of camels that graze on it. A Qaḥṭānī consultant vowelled the name quite clearly as murār.

Centaurea pseudosinaica Czerep. Compositae. K 554, BM 1775, BM 3912.
Ascending, shortly-pubescent annual with stems and branches narrowly winged with decurrent leaves, 10-35 cm high. Leaves oblong-linear in outline, the lowest more or less pinnatifid with oblong segments, dentate, those above linear-oblong.
to lanceolate. Heads terminal, 5-15 mm wide (excluding spines). Involucral bracts terminating in yellow spines. Florets yellow. Achenes with a pappus of fine bristles in several rows. A plant said to be much liked by camels but avoided by herdsmen because it taints the milk with a bitter taste.

*milléh* (gen.) Related to *milh*, "salt", thus "saltwort."

*Aizoon hispanicum* L. Aizoaceae. BM 356, BM 1370, BM 1528. Papillose-succulent branched annual, 5-15 cm high. Leaves opposite or subopposite, oblong-lanceolate to linear, to ca. 3 cm long. Flowers apetalous, greenish outside, whitish within. Perianth 11-16 mm long with lobes lanceolate and much exceeding the tube. Capsule somewhat flattened at apex. This is one of the few annual plants that are assigned to the intermediate category *hamd*.

*nafal* (gen.) A consultant of the Shammar tribe used the name *shmatrī* in an equivalent sense. Applied to two species of *Trigonella* (Leguminosae), with focus on the aromatic *T. stellata*.

*Trigonella stellata* Forsk. BM 565, BM 1256, BM 1824. Glabrescent prostrate annual with stems up to ca. 35 cm long. Leaves trifoliolate with leaflets obovate to obcordate, dentate above, 4-12 mm long. Flowers clustered, 3-4 mm long with yellow corollas. Pods stellate-spreading, curved, 4-8 mm long. The plant overall is aromatic, with a sweet, clean smell. Used by Bedouins as a hair dressing.

*Trigonella anguina* Del. BM 1584, BM 7417, 8080. Prostrate, glabrescent annual with trifoliolate leaves. Leaflets obovate or rounded-cuneate, serrate, 5-9 mm long. Flowers clustered in the axils, 3-4 mm long with yellow corolla slightly exceeding the calyx. Pods sessile, clustered, to ca. 8 mm long, strongly zig-zag
wavy or folded from side to side. The pods are very distinctive, resembling small wavy, wriggling worms or snakes.

**ragam** (gen., at least among northern tribes). Applied to procumbent or decumbent annual species of *Erodium* (Geraniaceae) with a focus on *E. deserti* and *E. laciniatum*. Banī Hájir (and possibly other more southern tribes) appear to prefer the synonym **garnuwah**, from **garn**, "horn," referring to the horn-like beaks on the fruits.

*Erodium deserti* (Eig) Eig. BM 588, BM 1559, BM 2190. Procumbent or decumbent pubescent annual with stems to ca. 30 cm long. Leaves oblong in outline, 2-8 cm long, 1- or 2-pinnatisect with incised segments. Umbels 3-10-flowered, on long peduncles. Flowers with pink-mauve petals. Fruit beaks 25-35 mm long. Achenes with 2 pits at apex with a concentric furrow below each.

*Erodium laciniatum* (Cav.) Willd. BM 536, BM 1436, BM 1830. Procumbent to ascending annual, grayish green and short-pubescent, with stems to 30 cm long. Leaves ovate in outline, 2-4 cm long, with varying lobation from dentate to pinnately divided nearly to base, often with 3-5 main lobes. Flowers umbelled, pink, rarely white. Fruit beaks 30-40 mm long; achenes with 2 pits at apex, without furrows.

Dickson (1955:40) reports this name used also for *E. ciconium* (L.) L’Hér., also found in our area and recognizable by its very stout fruit beaks.

**rghelah** (northern tribes. Musil 1927:619)). Diminutive of **rughl**, the widely used name for the perennial *Atriplex leucocladia*, thus "little rughl."

*Atriplex dimorphostegia* Kar. et Kir. Chenopodiaceae. BM 622, BM 1447, 7835. Whitish-canescet branched annual 10-25 cm high. Leaves 2.5-6 cm long,
deltoid or rhomboid to ovate-elliptical, silvery with shining crystalline papillae when fresh. Flowers in both axillary clusters and short terminal spikes. Fruiting valves broadly cordate, reticulately nerved, ca. 8 mm broad, obscurely denticulate. One of the few annual plants considered to belong to the hamāį group.

ribl (gen.) A consultant of Āl Murrah used the synonym yanam for this and at least one other species of Plantago.

*Plantago boissieri* Hausskn. et Bormm. Plantaginaceae. BM 1416, BM 1646, BM 1777. Ascending, villous annual, usually stemless, 10-30 cm high. Leaves rosulate, linear-lanceolate, 5-15 cm long. Flowers in cylindrical spikes 2-12(20) cm long, 3-5 mm wide; sepals oblong, scarious-margined, ciliate at apex; corolla lobes ovate-oblong, glabrous. Capsule enclosed in calyx, ovoid-globular and scarious, 2-2.5 mm long. A very important spring grazing plant in sandy terrain, often probably accounting for the major portion of the total seasonal biomass.

rubāḥlah (gen.)

*Scorzonera papposa* DC. Compositae. BM 1276, BM 1400, BM 1614. Ascending, showy-flowered perennial herb with branched stems, 15-50 cm high, with a dark brown tuber on the root. Leaves elliptical-oblanceolate, entire or erose, often wavy-marginated, 5-10 cm long. Heads solitary, terminal, 4-5 cm wide in flower, with showy pink to purplish florets. Achenes 8-10 mm long, grooved-muricate, with a white pappus 10-13 mm long. One of the best known edible plants, the Brazil nut-like tuber being the part used, eaten raw.

saʿdān (gen.) Cf. classical saʿdānah, "knot, camel's callosity, areola of the nipple," all resembling the peculiar discoid fruit of this plant.
Neurada procumbens L. Rosaceae. BM 1262, BM 3129, BM 3154. Prostrate, gray-green tomentose annual with several branches from the base. Leaves ovate-lanceolate, unequally and pinnately lobed, with raised nerves on lower face. Flowers in the upper axils, inconspicuous, with 5 cream, greenish or pinkish petals and 10 stamens. Fruit flat, discoid, 12-18 mm in diam., hard and woody in maturity, smooth below and furnished with prickles above. The prickly fruit are effective dispersal units, clinging equally well to the feet of animals, the shoes of man, and the tires of automobiles. A very well known plant and a very stable name.

Salih (gen. north) Sometimes vocalized Islih (which corresponds to classical spelling). A consultant of Banī Hājir offered the name zamlūg (q.v.) for Cakile. The name Salih seems to focus on Cakile and other red or purple-flowered annual crucifers of large, spreading stature.

Cakile arabica Vel. et Bornm. Cruciferae. BM 1184, BM 1810, BM 3173. Ascending, branched, somewhat succulent glabrescent herb to 50 cm high. Lower leaves pinnately divided into narrowly linear lobes. Flowers purple with petals 8-10 mm long. Fruits spreading, in elongated loose racemes, 2-jointed, 10-20 mm long, 2-3 mm wide, the distal joint compressed, tapering to a flattened apex. According to Dickson (1955:40) this name is also applied to:

Erucaria hispanica (L.) Druce. Cruciferae. K 608, BM 4024, BM 4046. Erect, glabrous branched annual to 75 cm high. Leaves succulent, bipinnatisect with linear lobes. Flowers with petals 10-14 mm long, purple to white, finely veined. Fruits 10-17 mm long, 1.5-2 mm wide, spreading or somewhat appressed, terminating in a beaklike filiform style 3-4 mm long.
I also have a record of a (doubtful) attribution of this name to *Gypsophila antari* Post et Beauv., a rather different-looking plant, by a consultant of the Ruwalah tribe.

ṣamʿā (gen.) Cf. ṣamʿā, "slender, sharp," fem. sing.

*Stipa capensis* Thunb. Gramineae. K 101, BM 1399, BM 1876. Tufted annual grass with numerous culms knedd at base, then erect, 15-45 cm high. Leaf blades mostly 4-10 cm long, very narrow and convolute. Panicle terminal, erect, 8-30 cm long. Spikelets acuminate, 15-20 mm long, with awn 6-13 cm long, twisted and short-pubescent in its lower half. Considered a good grazing grass when young, but the hardening awns may later penetrate the mouth parts of livestock.

*samḥ* (gen. north) This name, in northern Arabia, is a generic including the three aizoaceous plants used as sources for the edible seeds (also usually called *samḥ*) that have long been an important wild food gathered by several tribes of the northwest. The focus of the name is on the most important of these three plants, *Mesembryanthemum forsskalei*, which is assumed to be referred to in the absence of qualifying information. As a generic it includes three folk specifics (see discussion in section 9.4):

Generic: *samḥ*

Specifics:

*samḥ, samḥ ḥurr, samḥ + ḥurr,"pure, genuine", thus "genuine samḥ".*

When used in the context of discussions about "types of samḥ," the "samḥ" part of the name is assumed and it becomes simply ḥurr, or al-ḥurr, "the pure or genuine one."

*Mesembryanthemum forsskalei* (Hochst.) N. E. Br. 3764A.

Papilloose, very succulent herb, erect or ascending with stems 10-25
368

cm high. Leaves conical, subterete, decurrent above, to ca. 5 cm long, 1.5 cm thick. Flowers axillary with calyx of unequal lobes and petals white to cream, yellowish at base, exceeding the calyx at anthesis. Capsule 12-15 mm long. Provides edible seeds.

ḥamar wāgif (Shammar), from ḫamar, "red" + wāgif, "standing", thus "standing red," referring to the erect or ascending habit and red color of this plant (and thus differentiating it from its fellow specific, Aizoon canariense, which is procumbent and green).

*Mesembryanthemum nodiflorum* L. BM 2893, 3781, 7523.
Ascending succulent, papillose herb, often becoming reddish, branching from the base and 5-20 cm high. Leaves teretish linear, to ca. 3 cm long, more or less ciliate at base. Flowers axillary, with petals often 20-30, subfiliform and white to cream, yellowish near base, within a succulent calyx with lobes unequal, 6-10 mm long. Capsule 5-8 mm long, somewhat pentagonal-pyramidal at apex. Provides edible seeds.

daʿāʾ, *Aizoon canariense* L. BM 1208, BM 1751, BM 3165.
Procumbent, pubescent-papillose herb with stems branching radially from base, rather stiff and often zig-zag, to ca. 15 cm long. Leaves alternate, spathulate to oblong-ovate, mostly 1-2 cm long. Flowers apetalous, greenish outside and yellowish within, with perianth 3-5 mm long with triangular lobes. Capsule flattish, star-shaped at apex. Provides edible seeds. The name daʿāʾ is applied.
by some informants, particularly in areas where *samḥ* seeds are not collected or used, also to *Mesembryanthemum nodiflorum*.

**samnah** (Shammar) From *samn*, "clarified butter," referring to the yellow color of the flowers.

*Carthamus oxyacantha* M.B. Compositae. BM 644, 7847, 8304. Ascending, much-branched coarse prickly herb with whitish stems, 30-100 cm high. Leaves coriaceous, oblong to lanceolate, partly clasping at base, dentate and with yellow spines at margins, 2.5-5.5 cm long. Heads solitary terminal, exceeded by the spiny outer involucral bracts, with yellow florets. Usually on disturbed ground.

**shaʻr** (gen.) Probably related to *shaʻr*, "hair," with reference to the awns on the spikelets of this plant.

*Hordeum vulgare* L. Gramineae. BM 1727, 3741, 8252. Stout annual grass with culms to ca. 90 cm high. Leaf blades flat, tapering to apex, with small auricles at base. Spike oblong-lanceolate, 6-10 cm long (excluding awns), dense, with 2 or 6 rows of fertile spikelets, with awns 12-15 cm long. Both 6-rowed and 2-rowed forms (the latter = *Hordeum distichon* L.) have been noted in our study area. This is cultivated barley, known to all Bedouins, the grain sometimes purchased for livestock feeding and the plant sometimes escaping along roadsides from spilled grain. Concerning the life form of this species, see remarks under *hințah* (above), which also apply here.

**shgārā** (Āl Murrah, gen.) The name is related to *shagrā*, "reddish or blond (fem.)," probably in reference to the reddish flowers of the plant. Applied to two species of *Matthiola* (Cruciferae). Musil (1927:604) recorded the name *ḥimḥim* for these
plants among the Ruwalah of northern Arabia. Classical Arabic written sources indicate that himhim is synonymous with khimkhim and that it resembles (if it is not identical with) shuqárá (Lewin 1953:125-126). Shuqárá was also said to give a pungent odor to the milk of camels that eat it (Hamidullah 1973:69, who uses the form shuqqárá), and a consultant of Āl Murrah told me that it is khimkhim that gives the strongest smell to camels' milk (he may have used this synonym rather than the more common name, shgārā because he had in mind a folk poetic source).

*Matthiola longipetala* (Vent.) DC. BM 556, BM 1553, BM 3322. Erect or ascending annual, gray-tomentose with stellate pubescence, 8-40 cm high. Lower leaves pinnately lobed with obtusish, oblong-triangular segments; upper leaves narrower. Flowers 15-20 mm long with petals undulate, purple and often tinged yellowish or greenish. Fruits terete, 4-6 cm long, when mature with 2 prominent curved horns at apex.

*Matthiola arabica* Boiss. BM 426, BM 1448, BM 1807. Rather similar to the foregoing species but identifiable by its entire lower leaves and hornless fruit.

*sh/hēbā* (Shammar) Diminutive of *shahbā* "light gray (fem.)," referring to the conspicuous, silvery-white, scarious stipules and bracts of this plant. Two synonyms recorded by Musil in northern Arabia are *bwēḏā* (1927:594), diminutive of *bēḏā*, "white (fem.)," thus "little white-wort," and *shidd al-jamal* (1927:623). A Shammarī consultant pointed out that the name *sh/hēbā* is used among his people for two plants: the one below (*Paronychia*) and the chenopod *Bassia muricata* (which he named from a specimen).

*Paronychia arabica* (L) DC. Caryophyllaceae. BM 1268, BM 1778, BM 7426. Prostrate annual with stems puberulent, sometimes tinged reddish, to ca. 30 cm
long. Leaves sessile, narrowly oblanceolate or elliptical to linear, 4-13 mm long. Stipules silvery-white, conspicuous. Flowers 1.5 mm long, hidden in bracts.

**shi'eyirah** (az-Zafîr) Diminutive of **sha'îr**, "barley," thus "little barley," referring to the inflorescence of the plant which resembles a head of barley. Musil (1927:624) recorded the name **sijîl** for this species in northern Arabia.

**Rostraria pumila** (Desf.) Tzvelev. Gramineae. BM 1160, BM 1385, BM 3277. Annual grass with culms single to densely tufted, ascending to erect, 5-40 cm high. Leaf blades 2-9 cm long. Panicle dense, spikelike, lanceolate in outline and sometimes lobed, 1.5-4(8) cm long. Spikelets softly awned. A useful and sometimes abundant spring grazing plant.

**shilwah** (Ruwalah, Musil 1927:624) Not heard by the author, but entered here on Musil's usually reliable authority. He recorded it for **Linaria ascalonica** Boiss. et Kotschyi, a taxonomic synonym for our species.

**Linaria tenuis** (Viv.) Spreng. Scrophulariaceae. BM 1180, BM 1803, BM 3728. Erect annual, mostly glabrous, 10-30 cm high. Stem leaves linear-filiform, 1-3 cm long, those on sterile shoots wider. Flowers racemed, rather distant, with yellow corolla 7-9 mm long including the spur, which is descending, nearly straight. Capsule oblong-cylindrical, equalling or exceeding the calyx.

**shirshir** (gen.) Cf. classical **sharshara**, "to cut a thing, to sharpen," in possible reference to the sharp, prickly nature of this plant. The variant and synonyms **sharshshîr**, **drēsah** (diminutive of **dîrs**, "tooth", thus "little tooth") and **gâth** were heard from a Ruwalah consultant.
**Tribulus terrestris** L. Zygophyllaceae. BM 599, BM 1862, BM 3151. Prostrate annual with stems spreading from base up to 100 cm long. Leaves 2-4 cm long with 4-7 pairs of leaflets. Leaflets oblong, appressed pubescent below, 4-8 mm long. Flowers solitary, with yellow petals 4-6 mm long. Fruits globose, 5-7 mm in diam., with a pair of diverging spines, 3-6 mm long, on each carpel. Usually a weed around settled areas but also on disturbed ground around Bedouin camp sites.

**shōlah** (Qaḥṭān) From root *sh w l*, which connotes the idea of an "upraised, curved tail," such as the tail of a scorpion, referring to the tail-like spicate inflorescence of this plant (and most others of the family Resedaceae). A consultant of Shammar offered the synonym *dhanabnāb* (a variant of *dhanabān*, from *dhanab*, "tail" + -ān, denoting resemblance, thus "tail-like plant"). Both of these names have also been recorded for the perennial resedaceous plant, *Reseda muricata*.

**Caylusea hexagyna** (Forssk.) M. L. Green. Resedaceae. BM 587, BM 3099, 8626. Annual papillose to pubescent ascending herb, sometimes perennating, usually several-stemmed from the base, 20-50 cm high. Leaves entire, narrowly oblong to lanceolate, 1-5 cm long, wavy at margins. Flowers in dense terminal racemes elongating in fruit, with white petals and 10-15 stamens. Ovary stipitate, 6-toothed, gaping when ripe with woolly mouth.

**sifār** (gen.) Related to *asfār*, "yellow," referring to the strong yellow flowers of this plant. A Shammarī informant gave the variant *sifār*.

**Schimpera arabica** Hochst. et Steud. Cruciferae. BM 1302, BM 1331, BM 1486. Erect annual, often with a branching stem from a rosette of leaves, 3-30 cm high. Basal leaves lanceolate-spathulate, runcinate-dentate or pinnatifid; stem
leaves oblong-linear, nearly entire. Flowers in dense terminal racemes elongating in fruit; petals yellow. Fruit ovoid, 1-seeded, appressed to stem, with a 3-8-mm-long compressed beak diverging from the fruit body. A well-known edible plant, eaten raw for its mustardy, cabbage-like flavor.

ṣmēmā (Āl Murrah) Cf. root ṣ m m, associated with the idea of "hardness" as well as of "deafness." The name here is the diminutive of ṣammā, "hard (fem.)," thus "hard-grass," which fits Cutandia very well. A consultant of Bānī Hājir applied it also to Stipa capensis, which has awns that grow hard. A synonym from a Shammar informant was zarfī. Applied to at least three species of low, annual grasses with focus on Cutandia, which has a hard, stiff, inflorescence. Dickson (1955:97) recorded the name thayyil (as "Atheyil") for Cutandia memphitica; I got that as a synonym for Cynodon dactylon.

Cutandia memphitica (Spreng.) Benth. Gramineae. K 100, BM 1254, BM 1342. Low, ascending or decumbent annual grass, 10-30 cm high, sometimes flushed purplish. Inflorescence of numerous, richly and dichotomously-branched elongated, stiff, zig-zagged panicles. Spikelets 7-9 mm long. A good spring grazing grass.

Schismus barbatus (L.) Thell. Gramineae. K 96, BM 1603, BM 3102. Dwarf, tufted annual grass with several to numerous culms prostrate to ascending, usually 5-15 cm long. Leaf blades usually involute, 2-5 cm long. Panicles terminal, ovate-oblong in outline, mostly 1-3 cm long, contracted or somewhat loose, sometimes lobed. Spikelets green or purplish, 4-5 mm long, with white-margined glumes. Grazed by livestock in spring.
Schismus arabicus Nees. Gramineae. BM 1320, BM 1708, BM 2801. Very similar to the foregoing (and possibly conspecific with it), differing in some details of spikelet anatomy. Grazed by livestock in spring.

tarbah, turbah (Āl Murrah, Banī Hājir) A feminine noun form from tarb, trāb, "earth, soil," referring to the sand or soil particles always seen adherent on these viscid plants. A synonym for this Silene in northern Arabia is ballah (Shammar, Ruwalah), from root b 1 l, "to be wet," also referring to the viscid surfaces of the plant.

Silene villosa Forssk. Caryophyllaceae K 488, BM 1795, BM 1818. Glandular-pubescent ascending branched annual, 10-30 cm high, viscid and often with adherent sand. Leaves oblong-oblanceolate, 2-4 cm long. Flowers showy with white to very pale pink corollas, the petal limbs 2-parted or divided with obtuse lobes.

Ifloga spicata (Forssk.) Sch.-Bip. Compositae. BM 1152, BM 1638, BM 1791. Erect dwarf annual, 3-12 cm high, viscid and often with adherent sand. Leaves dense, very fine linear-subulate, mostly 10-15 mm long. Heads ovoid, ca. 3 mm long, clustered 1-3 in the axils with involucral bracts golden-yellow, ovate.

umm ath-threb (Suhūl) From umm, "mother," + diminutive of thīrb, classically meaning "fat of the intestines" (of a sheep, etc.). Applied to two rather similar species of Hypecoum (Fumariaceae). Essentially the same name, but with abū, "father," substituted for umm, "mother," was used by a Qaḥṭānī informant for Frankenienia pulverulenta.

Hypecoum geslinii Coss. et Kral. BM 1442, BM 3872, BM 4027. Ascending or decumbent glabrous annual, 5-25 cm high. Leaves mostly basal, rosulate,
lanceolate-oblong in outline, usually 3-10 cm long, several-pinnatisect into linear to filiform lobes. Flowers 5-7 mm long with 4 yellow petals. Fruits cylindrical-linear tapering at the apex, transversely jointed, 2-3.5 cm long, often ascending from a reflexed pedicel.

*Hypecoum pendulum* L. BM 585, BM 3348, BM 4007. Similar to the foregoing species but identifiable by its pendulous (rather than erect, ascending) fruits and by the minute, purple-black flecking on the inner pair of petals.

\'uns\'el\' (gen. north) *Gynandriris sisyrinchium* Parl. Iridaceae. 851, BM 1422. Herb 10-30(50) cm high with stems erect, arising from an ovoid corm with brown, fibrous tunics. Leaves usually 2, ascending from the base, linear, channeled above. Flowers 2-4 cm long, arising from papery spathes, with a ground color of purple to purplish-pink, faintly and radially veined darker; falls spatulate, with white to yellowish central spot flecked below with purple. This wild iris is one of the showiest of the spring flowers, sometimes growing in striking masses.

\'uw\'enah\' (gen.) Diminutive of \'en, "eye," thus "little eye."

*Anagallis arvensis* L. Primulaceae. BM 2729 (var. *caerulea*), 7950 (var. *caerulea*), 8194 (var. *arvensis*). Glabrous ascending annual, 5-20 cm high, with quadrangular stems. Leaves opposite or whorled, ovate to triangular-ovate, 1.5-2 cm long. Flowers red (var. *arvensis*) or blue (var. *caerulea*), ca. 10 mm in diam. Capsule globose, 4-6 mm in diam. Usually found as a weed in agricultural land but also occurs on disturbed ground around Bedouin camp sites. The red and blue-flowered varieties may occur together.

\'wberah\' (north, Musil 1927:629) Diminutive from *wabar*, "fur, soft hair," referring to the soft hairy appearance of this plant.
**Scabiosa olivieri** Coult. Dipsacaceae. BM 1347, BM 1521, BM 1672. Erect or ascending annual with both appressed and spreading hairs. Leaves linear-oblong or oblanceolate, 1-5 cm long. Heads 4-10 mm in diam. Flowers pink-lilac, pubescent, 5-10 mm long. Corona of involucel membranous, ca. 2 mm long, 20-40-nerved. Awns of inner calyx fine, 4-7 mm long, reddish purple and conspicuous.

**yanam** (Āl Murrah) Āl Murrah informants tend to use the name **yanam** for all desert species of *Plantago*, including *Plantago boissieri*, which is consistently called **ribl** by other tribes. Dickson (1955:75) gives the synonym **gurefta** (among northern tribes) for *P. ciliata*.

*Plantago ciliata* Desf. Plantaginaceae. BM 1287, BM 1351, BM 3066. Villous, short-stemmed or stemless annual, 3-7 cm high. Leaves roslulate, obovate-spathulate to oblanceolate, 1.5-5 cm long. Spike ovoid to oblong-short-cylindrical, 1-2 cm long. Bracts elliptical, villous, white-margined. Corolla lobes villous at back. Capsule obovoid, ca. 2.5 mm long, darkish brown.

**zamlûg, zumlug** (various tribes) A rather puzzling name, heard from different tribal sources and applied to plants that are quite unrelated in appearance or in known use. A tribesman of az-Ẓafîr (met in the field and of untested reliability) gave this name to *Anthemis melampodina*, a composite with white ray florets, which is otherwise generally called **gahwiyan**. A Bani Ḥājir informant gave the same name for the purple flowered crucifer, *Cakile arabica* and another Ḥājirī applied it to *Senecio glaucus*, a composite with bright yellow flowers. A boy of unknown tribal connection in the vicinity of the Qatif Oasis gave it for the common sedge, *Cyperus conglomeratus*. (His names for other plants in the vicinity fitted well
with general Bedouin usage). One of my Shammar consultants told me that \textit{zamlūg} can mean "annual plants in general," thus a synonym for \textit{'ishb}. It seems probable that the name has basically this general sense and was simply being thrown out by speakers who did not know the names of the plants being presented.

\textit{zarri'} (Shammar) The root \textit{z r '} is strongly associated with concepts of "seeds" and "cultivation." Shammar informants appear to apply this name to a variety of annual grasses including, besides this \textit{Hordeum}, \textit{Cutandia memphitica}, \textit{Polypogon monspeliensis}, and \textit{Avena sativa} (the cultivated oat). \textit{Hordeum murinum} L. subsp. \textit{glaucum} (Staud.) Tzvelev. Gramineae. K 595, BM 3089, BM 7420. Annual grass with culms ascending to erect, mostly 10-35 cm high. Leaf blades flat, linear-acuminate, 3-8 cm long. Spike linear-oblong, 3-7 cm long. Awns of the central spikelets ca. 22-25 mm long, slightly exceeded by those of the acuminate lateral spikelets. A weedy species, but sometimes found on apparently undisturbed desert in the north of our study area.

\textit{zwān} (Ruwalah, Musil 1927:631) \textit{Lolium rigidum} Gaud. Gramineae. BM 3060, K 8219, 8253. Glabrous annual grass with culms ascending, usually 30-60 cm high. Leaf blades long-tapering to apex, mostly 5-20 cm long. Spike 10-30 cm long, erect, more or less stiff, with spikelets appressed-ascending. Spikelets awnless, usually 10-15 mm long. Mainly a weed of cultivated areas but also seen on roadsides and on disturbed desert sites.

12. Unaffiliated generics (generics not considered to belong to any life form):
nakhl (gen.) Phoenix dactylifera L. Palmae. Dioecious tree with single trunk or with offshoots arising from the base, up to ca. 15 m high in our area. Leaves glaucous, spreading from a terminal crown, mostly 3-5 m long with a woody midrib, the leaflets numerous, induplicate, grading below into strong spines. Inflorescences several, richly paniculate. Flowers sessile, the staminate ones ca. 8 mm long with calyx reduced to a short, 3-toothed cup; petals 3. The pistillate flowers ca. 5 mm long with 3 carpels slightly exserted. Fruit the drupelike date, highly variable in shape size and color according to cultivar.

This is the date palm, cultivated on a large scale in the major oases such as those of al-Ḥasā and al-Qedīf. It also occurs in wild form, which Bedouins call hīsh, in the coastal plain of our study area. Some of these uncultivated plants may be escapes from dropped seeds; others may be remnants of original wild populations (Mandaville 1990:397-398). Bedouins do not consider the date palm a kind of shajar, or "shrub/tree." It is rather a nāṯin ḫālḥā, "a kind by itself." According to Vidal (1955:164-165) this is also the view of the settled oasis folk, who never refer to a date palm as a shajar, although that life form does include other oasis plants of shrub or tree form.

The fruit-bearing female date palms are propagated by offshoots from mother plants, thus maintaining true varieties by cloning. Pollination is by hand, using sprigs of staminate flowers from the small number of male palms maintained in the orchards.

Dates are perhaps the most important locally grown staple food of the Bedouins, who are well familiar with the tree although virtually all of their fruit requirements are purchased from oasis cultivators. A few tribes, including Āl Murrah, have settled sections that own date palms in minor oases or irrigated
gardens, maintained largely by hired farmers of non-Bedouin background. Dates are picked and eaten in three main stages of development: (1) called *bisr*, when the fruit is still hard and of characteristic varietal color; it is quite sweet, although the sugar has not yet inverted, (2) called *rutab*, when the fruit is beginning to change to the fully ripe stage, parts of it (usually the distal end) becoming softer and dark brown, and (3) called *tamr*, fully ripe, brown and soft dates, which are dried and usually compressed for storage. Due to their high sugar and low moisture content, *tamr* dates keep well for months (or even years) without refrigeration or other special measures. Bedouins purchase dates mainly in the *tamr* stage, dried and compressed into blocks for compact storage and carriage.

Vidal (1955:163) lists 36 recognized varieties of dates grown in al-Hasa Oasis alone. Some of these names, as folk specifics, are well known and used by the Bedouins in our study area. The list below is incomplete; I have included only those that I have personally heard in use by Bedouin informants, and they are listed in the approximate order of generally accepted fruit quality. These names are known to the Bedouins primarily as fruit varieties, and the average desert tribesman is unlikely to be able to identify the date palm folk specifics when they are not bearing fruit. It is generally appreciated, however, that they come from different "kinds" of *nakhl*.

**Generic:** *nakhl* (the date palm)

**Specifics:**

*khlāṣ* (gen.) From *khāliṣ*, "pure, genuine." A yellow date, generally believed to be the best variety in the Gulf area. It is considered by both Bedouins and townspeople to be *bārid*, a "cold" variety, which is highly palatable and easily digested (Vidal 1955:164).
**hsheish (gen.)** Diminutive of *hashish,* "tender, soft." Like the *khlāṣ,* considered a "cold" variety (Vidal 1955:164).

**ḥalwah (gen.) ḥalwah,** "sweet." A highly esteemed large variety of the north Arabian oases.

**khnezi (gen.)** Apparently from root *kh n z,* associated with the idea of "stinking, bad smelling"; the association, if any, is unclear. A large, red-skinned variety, very sweet in the *ruṭab* stage.

**rzēz (gen.)** A yellow variety that traditionally has accounted for the bulk of the al-Ḥasā date crop.

Unaffiliated complex: "*al-firīyāt*" (see section 9.3 for discussion):

**Generic:**

*Fag* Desert truffles (subterranean fungi). The great cultural importance of this generic is discussed in section 6.3.

**Specifics:**

**zbēdī (gen.)** Diminutive relative adjective from *zibd,* "butter," in reference to the slightly off-white color, like freshly churned butter, of the ascocarps.

*Tirmania nivea* (Desf. ex Fr.) Trappe, and probably *Tirmania pinoyi* (Maire) Malençon.

*khlāṣ (gen.)* From *khaliṣ, khlāṣ,* "choice, pure."

*Terfezia boudieri* Chatin. A smaller, reddish-brown colored species.

From a Shammarl informant, the apparent variant: *ghlāṣ.*
jbēy (gen.) A consultant of the Shammar tribe used the non-diminutive variant jībā. Scientific identity not determined. The kind of truffle called kama by the Ruwalah Bedouins (Musil 1928a: 15) may be a synonym for this specific. It corresponds to a classical Arabic name for desert tuffles (as a generic): kamā’ā


bliikh (Shammar) A plural in form. Reportedly found only in the Syrian Desert, including its part in extreme northern Saudi Arabia. Scientific identity undetermined.

Generics:

‘arjūn (gen.) Podaxis pistillaris (L.) Morse. The club-shaped (capless) desert toadstool widespread in sandy areas of our study area (and in other parts of the world). Edible if collected while still young; eaten baked in campfire ashes.

iftarrah (Bani Hājir) The variant fuṭur or futūr was recorded (as "Ftur") for mushrooms in Kuwait by Dickson (1955:103-104). As used by my Hājiri consultants, iftarrah refers to capped mushrooms, which are rare in our study area. I have seen at least two different species on different occasions after good rains. Musil (1928a:15) says that mushrooms called hōbar (the same name given me by a Shammarī for the smallest kind of
truffle) were collected and eaten by the Ruwalah. I find no records of scientific determinations of mushrooms in our study area.

\textit{dhānūn} (gen.) The variant \textit{dhnūn} (more commonly applied to Orobancha spp.) was heard from a consultant of Āl Murrah. Āl Rāshid of the southern Rub' al-Khāli (speakers of a southern Arabic dialect) use the synonym \textit{bāṣūl}.

\textit{Cistanche tubulosa} (Schrenk) Wight. Orobanchaceae. BM 1789, 7540, 7612. Tuberous parasitic herb arising as a leafless, showy flowering spike, 20-80 cm high. Flowers mostly 4-5 cm long with corolla tube yellow to pinkish violet, aging brownish, cylindrical to funnel-shaped above. Capsule ovoid-oblong, ca. 1.5 cm long. Parasitic, with underground root attachments, on \textit{Haloxylon}, \textit{Cornulaca}, other Chenopodiaceae, \textit{Zygophyllum} and apparently \textit{Calligonum}. A very conspicuous and well-known plant.

\textit{dhnūn} (gen.) A variant on the name \textit{dhānūn}, \textit{Cistanche tubulosa}, to which this genus is related. Applied to three species of Orobanche (Orobanchaceae), all leafless root parasites of generally similar appearance. Musil (1928a:95) lists \textit{Orobancha}, under the synonym \textit{zibb adh-dhikh}, as one of the plants eaten baked by the Ruwalah in northern Arabia. This rather puzzling name is possibly a corruption of \textit{zibb adh-dhīb} ("penis of the wolf"), as both versions are listed by Täckholm (1974:853) for \textit{Orobancha (dhīb given by her as Egyptian colloquial "deeb")}.

\textit{Orobancha aegyptiaca} Pers. BM 1474, BM 1717, 7711. Erect, leafless parasitic herb, arising as a spike of flowers, sometimes branched from
near base. Flowers in rather loose and broad spikes, 5-20 cm long. Corollas blue-violet except at base and lower lip, 25-35 mm long with tube cylindrical below, funnel-shaped above, deflexed. Capsule long-ovoid, 6-8 mm long. Often growing on Rhanterium epapposum.

Orobanche cernua Loefl. BM 1726, BM 4068, 8060. Of similar aspect to the last, 10-35 cm high, with flowers 15-20 mm long. Corolla tube cylindrical, hardly widening above, constricted above fruit, yellowish or pale violet above, with pale to dark violet limb. Capsule ovoid to ellipsoid, 6-12 mm long. Found on Lycium and Artemisia.

Orobanche mutelii F. W. Schultz. BM 1738, BM 1760, 8067. A dwarfish plant, 5-10(15) cm high, often with no stem visible beneath the flowers. Flowers 12-22 mm long; corollas dirty white, often tinged with pale violet, the tube narrowly funnel-shaped. Capsule ovoid, 6-8 mm long.

†arthūth (gen.) Synonyms are zībb al-arḍ, from zībb, "penis" + al-arḍ, "the earth," thus "earth penis," and zībb al-hamād, from zībb + hamād, "flat plains," thus "penis of the plains," both referring to the phalloid form of the plant.

Cynomorium coccineum L. Cynomoriaceae. 7685, 8652. Fleshy, reddish, club-shaped and leafless root parasite, to ca. 30 cm high arising from tubers near the roots of host plants. Stem simple, cylindrical, ca. 2 cm in diameter with imbricated scales. Flowers ca. 5 mm long, packed in a dense, very dark red terminal spadix 10-20 cm long. The lower stalks are edible, and the plant is also used to produce a crimson dye.
13. Generics of unknown life form status:

**shbēkah** (gen.) Variants **shabbākah, shubbāk** (Banī Hājir); all from **shabakah**, "net," referring to the way this plant covers and entangles its host shrubs. Applied to two species of *Cuscuta* (Cuscutaceae), *C. planiflora* being the more common.

*Cuscuta planiflora* Ten. BM 540, BM 1704, 7053. Twining, filiform, leafless parasite growing upon, sometimes virtually covering, other plants with threadlike, usually yellow stems. Flowers 5-merous, in globose clusters 4-10 mm in diam. Corolla limb with triangular white or reddish lobes. Some flower parts sometimes purplish. Capsule depressed-globose. In our area found on a wide variety of hosts, including *Astragalus* spp., *Horwoodia*, *Rhanterium*, *Helianthemum* and *Fagonia*.

*Cuscuta pedicellata* Ledeb. BM 2329. Similar to the last, distinguishable by its stigmas being capitate or subglobose rather than filiform as in *C. planiflora*.

I have no data on the life form status of this anomalous generic, and further study may indicate that it is unaffiliated.

Another species, *Cuscuta campestris* Yuncker (BM 1902, BM 2902, 7772) was found only in oasis cultivation, where it was named by a farmer of al-Qatīf as *sūyah*, apparently a noun form from *sā'a*, "to be bad, evil, abominable." It is a serious pest of crops.
11. PLANTS AS VEGETATION AND PLACE

11.1. Vegetation Terminology

Bedouins have a well developed common set of terms referring to vegetation. This displays some regional variation, but for the most part it cuts across tribal lines. The following list, although to some extent incomplete, will provide some feel for this specialized language.

Pertaining to all life forms:

waragah. This is a metaphorical term, literally meaning "leaf," applied to new growth of plants. It is used primarily in reference to annuals and is frequently used in passing news of new spring growth from recent rains. "Do you have any waragah?" "Is there any "leaf" over there?"

hayāh. This is another metaphorical usage, meaning literally "life," also used in the sense of new growth, primarily annuals, and used in the same way as the foregoing.

sahh. A term used among Āl Murrah (and perhaps other groups) for new plants, just emerging from the ground, after germination following rain. Tribesmen from northern Arabia said the term for them meant "dry, tough dates."

Pertaining to ïshb, "annuals:"

dafīn. Annuals that germinated from wasm (autumn) rains, as seen in winter. The word is from the root dfn, with the basic meaning of "to bury," "to be buried" and refers to
growth from early-germinating seeds that is held back in development by the cold weather of winter, remaining nearly buried until the warmth of spring allows further development.

*dawāwīr.* Literally "those that go in circles." It refers to the denser and better developed circular patches of annual plants growing in the shelter of shrublets as compared to annuals out in the open, which are smaller and less dense. This is a very perceptible characteristic of desert vegetation, and my consultants presented a plausible explanation: "The bush catches more rain and protects the annuals, so they grow bigger."

*rmām.* Cf. classical *ramma,* "to be decayed, worn out." This refers to annuals that have died and dried out from the seasonal drought of early summer or from lack of rain earlier in the season. There are several widely known synonyms for *rmām:* *hamīs* (something "fried"), *hamrī* (referring to the color red or red-brown), *jamīd* (something become "hard, solid") and *sā'irah* (something "burning up").

*ghamīr.* Patches of annuals that have died back once from lack of rain but then have sprung up again green after new, delayed rainfall.

Pertaining to *shajar* ("all perennials"), but mainly *shima* ("bushes"): 

*mnammalah.* An adjective, with the literal meaning of "anting, covered with ants," referring to bushes that have the first rudiments of leaves appearing early in the rainy season. The visual likeness to ants is particularly apt, I found, with respect to *ʿarfaj,* the composite shrublet *Rhanterium epapposum.*

*khuddār* ("those becoming green"). Bushes which are in green leaf and good new growth.

*najīl.* Bushes in green leaf, thus appearing dark when viewed from a distance.
jalāyil (a plural with singulargs jalīlah or jalūlah, the latter used more often among northern tribes). From the root jll, connoting the idea of being "high, great" (as in social status). This term is somewhat problematic. I at first took it almost as a specialized life form category specifying some kind of shima‘, "bushes." Further discussions proved that it had the following characteristics: it is applied only to generics of the shima‘ (bush) life form that are important for grazing, and its use seemed to imply good condition (green and leafy). It cuts across the hamē/khillah boundary and can be used for either. The following generics were offered as possible examples of the category: ‘arfaj, sabat, rimth, thmām, and ‘andab. These are all important grazing plants. I can gloss it only as something like "good grazing plants in good condition." The term could obviously be useful to a herdsman returning from a vegetation scouting expedition.

rif. The linguistic root, ryf, is associated with ideas of "fertility, fruitfulness."
Explinations for this term were rather variable, but it appeared to be a collective for perennial plants, particularly grasses, that provide grazing into the rainless period of early summer. Some consultants said rif referred to dry plants, particularly dry grasses; others allowed the plants could be still green. Generics particularly associated with the term are the grasses nuṣī (Stipagrostis plumosa) and sabat (Stipagrostis drarii). Both are important early summer grazing species.

11.2. Plants in Topography

The Bedouin describes his desert lands with a rich repertoire of topographic terms, and vegetation often plays an important role in defining or characterizing them. Sometimes the two factors are so closely related that it is difficult to decide whether words are
basically topographic terms characterized by certain plants, or plant community names associated with particular land forms.

A gōz (pl. gīzān), for example, is defined as an area of sand terrain having ghaḏā shrubs (\textit{Haloxylon persicium}) as the dominant perennial. Tribes in northern Arabia use gašīmāh (pl. gašāyim) for the same feature. Ghaḏā is one of the largest shrubs found in the deep sands, and stands of it are always characterized by unusually large, wind-blown sand hummocks that accumulate around the shrub bases. The shrubs are also fairly wide spaced compared to the situation in areas carrying other perennials. The term thus immediately conjures up a specific terrain type known by all Bedouins. A stand of ghaḏā is distinguished by a special term presumably not only because the terrain is distinctive but because of the importance of the shrub for both saltbush grazing and for firewood supply. For reference to a place characterized by one dominant shrub I also once heard the plant name put into the special Arabic grammatical form called the "noun of place or abundance". Thus the term mirmāth was applied to a "place abounding in rimth shrubs" (\textit{Haloxylon salicornicum}).

Other terms may be less specific but nevertheless associated with individual classes of plants. They usually can also be considered names for grazing, or range types. Banī Ḥājir apply the term ʿafjah (pl. ʿifjā) to an area with mixed ḥamḏ (saltbush) vegetation. For a ḥamḏ area particularly good for camels, with such species as rimth (\textit{Haloxylon salicornicum}) and ḍumrān (\textit{Traganum nudatum}), southern tribes including Āl Murrah and Ḍaḥṭān use the term msās. A synonym used in the north among the Ruwalah is \textit{mara}’. The opposite of a msās is a wakhmah (pl. ṭkhām) an area without ḥamḏ and usually with poor grazing of other sorts.

Banī Ḥājir and Āl Murrah use the term hamrūr (pl. ṭmārī) for areas of sand terrain that carry perennials said to be khafīfah ("light weight"), such as grasses or the
sedge 'andab (Cyperus conglomeratus). A more general term is marbakh (pl. mrâbikh), applied to an area dotted (and usually hummocked) with bushes, sometimes of any type but often of the class called khillah, "non-saltbushes." A consultant of Bani Hājir used the term 'afsh in much the same sense: "ground with many bushes."

An area virtually without any perennial vegetation at all, particularly in the northern plains where shrubs are overall fairly plentiful, is called a gra'ah ("baldland"). The same word, with definite article, is also the name of a specific shrubless area in the northern plains of Saudi Arabia's Eastern Province.

As an aside I will mention the topographic term "dikâkah," which appears in the glossaries of some maps of eastern Saudi Arabia prepared by the Arabian American Oil Company (now the Saudi Arabian Oil Company). The meaning given for this on map legends is always something like "ground with dense sand hummocks around shrubs, difficult to traverse by motor vehicles". Early American geologists picked up this term in the 1930s from some unknown source, and having obvious utility it has been passed on through several generations of American field personnel to the present day. To be an "experienced desert hand" one had to know and use the term, "dikâkah." I questioned numerous Bedouins, of different tribes, about this term, but none of them knew it as a terrain type (although some Bedouin guides learned to use it, once it had become part of oil company lore, "because that's what my boss calls it.") Among themselves Bedouins usually simply use the word wa'r ("rough place") for such terrain. "Ad-Dikâkah" does occur as the name of a specific area in the southern Rub' al-Khāli, but the explorer Bertram Thomas' description of this region, both in words and photographs (Thomas 1932:188-203) indicates nothing of close-spaced bushes and much of rolling sand terrain only dotted here and there as usual with occasional shrubs. Thesiger (1949:44) goes as far as putting this into a list of topographical terms (spelled "dakaka") which he defines as
"Undulating ground consisting largely of hard packed sand," but he appears to use it in his writings only as the proper name of the region traversed by Thomas. In any case, the geologists' "dikākah" was in use before Thesiger's travels and before they themselves had penetrated that deeply into the southern sands. Its origin is still a mystery.

Bedouins will often give directions to travelers in terms of the boundaries of plant communities. For example: "Go north until you come to the end of the rimth [rimth being the dominant bush in a well-known community type] and reach the gra'ah [meaning an area without any bushes at all], then turn right and go for about an hour along the edge until you see some 'ōsaj [a kind of large, dark, shrub]. The camp is just beyond those." Boundaries of area place names are often marked by shifts in vegetation. The well known and important grazing tract called al-Ḥabl (centered some 80 km west-northwest of ad-Dammām) has its boundaries with other named areas both to its south and west marked by a shift in dominant bush type from khillah to hamd. The northeastern coastal tract called as-Sūdah is defined by the presence of hamd (saltbush) vegetation), in contrast to surrounding areas without it. The name refers to the "blackness" of such bushes when they are in winter dormancy and/or the dark color of their succulent foliage in summer.

Individual plant species may also provide guidance in choosing routes through difficult terrain. Āl Murrah guides taught me to avoid spots with gašbā, the bushy perennial grass Centropodia forsskalii, while driving motor vehicles in heavy dune country; that plant marks places where dune sand stratification of former slip faces is nearly vertical, leading to very soft spots in which cars are liable to get stuck. This is doubtless a bit of plant-topographical lore that has been passed on from a time when travel was exclusively by camels, where it would have been equally useful.
Plant names also occur rather frequently in the specific names of places, sometimes referring to an area where the plant referent is widely abundant, but sometimes to where it is rare and unusual, and thus noteworthy. A common formula for such names is the creation of a feminine noun through attachment to the plant name of the relative adjective (nisbah) suffix -ًَّ, in turn linked to the marker of the feminine singular -َّه or plural -َّات. Following are some examples from our study area:

al-Ḥarmaliyah, from ḥarmal, the shrublet Rhazya stricta (Apocynaceae). A hill and settlement about 80 km south of the al-Ḥasā Oasis.

al-Ḥuwaydhiyah, from the diminutive of ḥddh, the shrublet Cornulaca monacantha (Chenopodiaceae). A group of hills 50 km south of the al-Ḥasā Oasis.

al-Ḥamatlyat, from ḥamdt, the small perennial Moltkiopsis ciliata (Boraginaceae). A series of seasonal water courses in the vicinity of the Saudi Arabia-Kuwait border.

The masculine adjectival form is less common, an example being:

al -Khuzāmī, from khzāmā, the annual Horwoodia dicksoniae (Cruciferae). A well about 170 km west of Dhahran.

Plant names may also be coupled with the parental terms َّبَّع, َّبَّأ, "father," or َّمَّمَّأ, "mother" to form a name denoting a place where a certain plant is found. Thus:

Umm al-'Ādhir, from *umm*, "mother of," + *al-'ādhir*, "the 'ādhir bushes," *Artemisia monosperma* (Compositae). A well in the same general area as the last.

Plant names may also be linked with a topographic term to make a specific place name, as in:

Barqā‘ aḍ-Ḍumrān, from *bargā*, meaning "a broad hill with sand banked along its sides" + *aḍ-ḍumrān*, the shrublet *Traganum nudatum* (Chenopodiaceae), with definite article. An elevated area 55 km southwest of the al-Ḥasā Oasis.

Mishāš Abū al-'Ikrīsh, from *mishāsh*, meaning "shallow, hand-dug water well" + *abū*, "father of" + *ikrīsh*, the grass *Aeluropus lagopoides*. A well 105 km southwest of al-Ḥasā Oasis.

Rās Abū Muraykhah, from *rās*, "headland, cape" + *abū*, "father of" + *muraykhah*, diminutive singular of *markh*, the shrub *Leptadenia pyrotechnica* (Asclepiadaceae). A Gulf coastal headland 12 km northwest of Ras Tanura.

Rijm ash-Shinānah, from *rijm*, "stone marker cairn," + *ash-shinānah*, "the shindn bush," *Seidlitzia rosmarinus* (Chenopodiaceae). A high point on the eastern edge of the Dahna‘ sand belt near the Khurais oil field.

Jabal Dawmat al-'Arād, from *jabal*, "hill," + *dōmah(t)* (meaning uncertain) + *al-'arād*, "the 'arād bushes," *Salsola cyclophylla* (Chenopodiaceae). A rocky hill 70 km southwest of an-Nu'ayriyyah.
Jabal Nufayl, from *jabal*, "hill" + *nufayl*, diminutive of *nafl*, the leguminous annual *Trigonella stellata*. A hill 50 km west of al-Jubayl.

Jaww ash-Shanāyin, from *jaww*, "valley, hollow," + *ash-shanāyin*, plural of *shinān*, the chenopodiaceous shrublet *Seidlitzia rosmarinus*. A low area 35 km southwest of Abqaiq.

A few place names are simply a plant name, usually in singular form, without additions except the definite article:

al-Qayṣūmah, *al-gēṣūmah*, "the gēṣūm bush," *Achillea fragrantissima* (Compositae). A pump station and settlement on the Trans-Arabian Pipeline, near the northwestern edge of our core study area. It was originally the name of a slight depression in the vicinity that had *gēṣūm* bushes on its silty floor. The name was applied there because this was an exceptional occurrence of a plant commonly found only well northwest of this area.

as-Sudayrah, *as-sudayrah*, "the little sidr tree" (singular diminutive), *Ziziphus spina-christi* (Rhamnaceae). A well 25 km south of an-Nu‘ayriyah.

Ar-Rākah, *ar-rākah*, "the rāk shrub" (singular), the shrub *Salvadora persica* (Salvadoraceae), in this case marking "the place where rāk grows." A suburban area between ad-Dammâm and al-Khubar. The name refers to the growth there in former times of *rāk*, used to make tooth brushes.

Plant-related topographic terms may also be coupled with a non-plant designator acting something like a specific epithet in naming a place or area. Thus:
Marbakh al-faras, from *marbakh*, "sand area with many bushes" + *al-faras*, "the mare," forming a name meaning "*marbakh* of the mare." An area in the northern Rubʿ al-Khāli.

Qīzān al-Maqran, from *qīzān*, pl. of *gūz*, "sand area with *ghadā* shrubs," *Haloxylon persicum* (Chenopodiaceae) + *al-magran*, "place of horn-like knobs". An area in the northern Rubʿ al-Khāli.
I would hesitate to describe the Bedouins of our study area as "superstitious." They are of an eminently practical nature and smile at ghost stories. At the same time, however, they do generally avoid some places and things considered to be of bad omen and the abode of the creatures called jinn (classically jānī, sing. jinnī. The jinn are not treated as supernatural beings in the sense of "unexplained." Their existence is quite accepted in orthodox Islam, where they are considered a third class of intelligent beings, the other two being mankind and angels (Macdonald 1953:90). Their acceptance is near universal in Arabia among the untutored and even (as an Islamic belief) among many of today's college graduates.

The jinn are not considered to be intrinsically evil. They may be harmless or even sometimes helpful, but they are also mischievous and may play tricks on mankind that may be harmful, or at least frightening. They are thought of as having a form similar to humans but are capable of assuming the shape of other creatures to suit their designs. The places they frequent are often old ruin sites, remote desert wells or unusual rock formations. They are also associated with certain kinds of desert plants, which tend to be large, dense, dark colored shrubs. Prominent among these in our east Arabian study area (and also in the north, according to Musil 1928a:416), is the ōsaj (also called ʿōshaj, ʿōshaz), Lycium shawii Roem. et Schult. and L. depressum Stocks. This densely and intricately stiff-branched shrub, usually 1.5-2.5 m high, tends to occur in discrete groves of about 5-50 individuals. I have seen it on several occasions around abandoned ruins or graveyards in rural areas, which might account in part for its general spookiness. Dickson (1951:537-538) says that Bedouins will never cut wood from an ōsaj bush and
when approaching it will always invoke God's protection by saying the bismillāh formula ("In the Name of God, the Merciful, the Compassionate"). They will then throw a stone into the bush to appease the spirits. I have never seen this little ceremony performed, but I have seldom been near these shrubs in Bedouin company and have seen āsaj bushes with otherwise unexplainable piles of stones in their bases. All Bedouins know that the small round, reddish berries of āsaj are edible (section 6.3, above), but I have never seen them collecting or eating them.

Another shrub associated with jinn among the Ruwalah, according to Musil (1928a:416) is the sidr (Ziziphus nummularia (Burm. f.) Wight et Arn. The sidr is a large, quite woody shrub of silt basins in the inland Şummān region of our study area and farther north. The Ruwalah, according to Musil, believe there is a spirit in each bush and that jinn have their gardens where the shrub occurs in groves (as it usually does). I have traveled with Bedouins in the Şummān sidr country of our study area and never noted any particular respect given this plant. Dickson (1951:652) says that the chiefs of the Muṭayr tribe prize and guard the sidr trees of the Şummān and that the form of camel stick called the mishāb is cut from it. The jinn association with the sidr may thus be restricted to the Ruwalah country farther to the north and west.

In the northwestern part of the Rubʿ al-Khālī is a place called Jawb al-ʿAsal ("Basin of the ʿasal Bushes"), a low place surrounded by dunes dotted with large, dark shrubs of ʿasal (Suaeda monoica Forssk. ex J. F. Gmel., Chenopodiaceae). This big, succulent saltbush grows 1-3 m high. It grows nowhere else in our study area, and I consider the stand a relic of a wider population that extended from the southwest in earlier, pluvial times (Mandaville 1990:83). I passed through Jawb al-ʿAsal in a motor convoy in 1965, and our Marrī guide obviously preferred not to spend the night there although I had heard of the place and wanted to stop. He had explained the day before
how this place was considered haunted, a situation he connected with the unusual ‘āṣal
shrubs growing there. He was not in the least surprised when our main supply truck
broke down with a rear-end differential problem amid the ‘āṣal bushes, interrupting the
trip with two days of repair work, the only mechanical mishap of a 10-day expedition.

Charles Doughty, traveling in northwestern Arabia in 1876-78, was stopped by
his Arab traveling companions from cutting some pieces off an Acacia tree for tent pegs.
One of the defenders said the tree was jinn-possessed and that one of his fellows had
broken just one branch, after which he had died along with all his livestock. It was said
that a little girl who had gathered only a fallen stick for firewood had her arm paralyzed
(Doughty 1936:1:411 ). Trees and shrubs, Doughty found, were often thought to be
manāhil (sing. manhal), the camping or descending places of angels or jinn, magical
places where travelers would place offerings of beads and cloth pieces, and he wondered
if such places were hangovers from ancient tree-worship in pre-Islamic Arabia
(ibid.:497). One cannot help speculating also about possible conservation functions.

Such ideas have indeed been around for a long time. W. Robertson Smith (whose
data remain useful despite the general discrediting of his totemic theory) recounts from
classical Arabic literature the story of Ḥarb ibn ʿUmayyah and Mirdās ibn Abī ʿĀmir,
historical personages of the generation before the prophet Muḥammad. They set fire to a
shrub thicket to clear it for cultivation. The jinn of the place flew away in the form of
white snakes, and the two men died soon after. "Here the spirits of the trees take serpent
form when they leave their natural seats, and similarly in Moslem superstition the jinn of
the 'oshr and the ḥamāta are serpents which frequent trees of these species" (Smith
1894:133). The "'oshr" here is our friend Calotropis procera (sections 6.4, 6.7); the
"ḥamāta" is the wild fig of the Ḥijāz mountains. Henri Lammens, in his most valuable
account of Western Arabia at the time of the birth of Islam, speaks of the pre-Islamic
sanctuaries of the Ḥijāz and their cult trees with votive offerings, as well as how the Prophet himself tolerated the sacred *samrah* (*Acacia tortilis*) of al-Ḥudaybiyah (Lammens 1914:70-71).

With respect to the apparent, present-day bans sometimes observed on the cutting of *‘ūsaj* or (by some) of *sidr*, I would note that both of these shrubs are in any case hardly prime candidates for fuel. The *‘ūsaj* has short, stiff, almost spinescent branches, tough and hard to cut; *sidr* is armed with vicious hooked spines that leave anyone, once they have tried to release themselves from its bite, hesitant ever again to approach too closely.
Use of our system of Bedouin plant names and classification is not restricted to eastern or central Saudi Arabia, nor even to the Arabian Peninsula. It in fact extends westward for some 5,000 kilometers, over 55 degrees of longitude and at least seven present nation-states, to the far western edge of the Sahara and within a stone's throw of Atlantic beaches. This is the great western part of the Saharo-Arabian floristic region, where the desert flora largely reproduces that of the Arabian Peninsula. There, wherever Arabic speaking tribes are found, our Bedouin plant language is in current use, existing side-by-side with one or more parallel sets of terms used by the original Berber inhabitants. It was carried there by westward-spreading Arab tribes beginning mainly in the middle of the eleventh century. The leading groups were the Banī Hilāl and the Sulaym, who had moved from the Arabian Peninsula into Egypt in the eighth century (Abun-Nasr 1987:69) and who were unleashed on the countrysides to the west about 1050, by the Fatimid ruler al-Mustanṣir, carrying with them Bedouin Arabic (Julien 1970:72-73).

Today's North African plant vocabulary is not exactly the same as that used by our east Arabian consultants. There are dialectal shifts and a mixture of Berber and other loan words. But much remains that is familiar. Writing in the middle of the twentieth century, French botanists working in territories now part of Mauritania prefaced their collection of vernacular plant names with the observation that (here in translation):

The Maures classify plants into two categories: woody plants and ephemeral herbaceous plants. ... A. The woody plants, trees, bushes and shrubs are called "ṣṣdar" (in the collective). This word is the Maure representation of the

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I thank Prof. Michael Bonine for pointing out the comparatively late (relative to the initial Muslim conquest of the seventh century) spread of Bedouin Arabic into the North African hinterland.
classical [Arabic] șağar. ... B. The ephemeral herbaceous plants. These are the *therophytes*, that is to say "the ephemeral vegetation of annual herbaceous plants appearing after rain" (Monod) ... as a group the *acheb* ... (Monteil and Sauvage 1949:27)

Hilda Gauthier-Pilters, who in course of her unique studies of camel grazing practices in this same area acquired an intimate knowledge of the flora and its vernacular nomenclature, records the following names (Table 13.1), selected by me from two separate lists (Gauthier-Pilters 1961, 1965). I add my own Najdi Arabic records beside them.

<table>
<thead>
<tr>
<th>Western Saharan</th>
<th>Najdi Arabian</th>
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<td>akrich</td>
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<td>chagar</td>
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<td>goulglane</td>
<td>glegīlān</td>
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<td>choubrek</td>
<td>shibrīg</td>
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<td>relga</td>
<td>ghalgā</td>
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<td>rerdag</td>
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<td>djada</td>
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<td>mkar</td>
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<td>arfedg</td>
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</table>

Even in this author's informal French-style transliteration, the near identity of her names and their applications with ours are clearly evident. Similar examples can be found in
botanical works dealing with regions stretching back eastward to the Red Sea (e.g. Quézal and Santa 1962-1963; Täckholm 1974).

Bedouin Arabic plant nomenclature also has great depth in time. Few ethnobotanists have the luxury of viewing the diachronic development of their folk nomenclature and classifications back beyond one or two hundred years, if that. Some quirks in the development of Arabic as a literary language, however, give us the opportunity to view Bedouin plant names and plant classification as they were over 1100 years ago and to compare that state of affairs with today's practice. This possibility arises from several factors. First, among the Islamic scholars of the first two centuries after the Prophet Muhammad, there was overwhelming concern for the exploration and analysis of what was becoming classical Arabic, essentially the language of the Prophet's revelation. Meanwhile, the highest form of art continued to be that fund of Bedouin poetry, couched in similar classical style but as yet largely unwritten, that had developed in the century or two immediately preceding the time of Muhammad. At the same time, the Islamic empire was expanding at an explosive pace, bringing into its fold peoples whose native languages were not Arabic. Early scholars, some of them of non-Arab origin themselves, were thus greatly concerned with the codification of Arabic grammar to establish a firm base for study of the Qur'ān and classical verse, and for the development of dictionaries to maintain Arabic vocabulary. These concerns were particularly acute in the urban milieu of Iraq after the move of the Islamic capital to Baghdad in the mid-eighth century A.D. Here the life of Arabs, amid an increasingly foreign population, was already becoming disconnected from the Peninsular homeland (Fück 1955:47). Schools of grammar and philology became established at Basra and Kufa in Iraq and vied with each other in the collection and analysis of Arabic linguistic materials.
For us the significant aspect of all these developments was the fact that the ideal standard for the Arabic speech under study was held to be not that of the cities or of the working scholars themselves. Rather, it was the speech of Bedouins -- preferably those from the midsection of the Arabian Peninsula (Blachère 1950:38) -- that was held to be closest to poetic Arabic and as yet unsullied by contact with non-Arabs in the burgeoning city culture of Baghdad. The approach taken by the philologists was to enlist Bedouin informants and consultants, much as a linguist or ethnobiologist might do today, in their study and collection of the vocabulary of desert nomadism that was essential to the full understanding of pre-Islamic and early Islamic Arabic poetry (Fück 1955, Veersteegh 1997). Thus Blachère titles his sketch of this unique scholarly relationship "Les Savants Iraqiens et Leurs Informateurs Bédouins aux IIe - IVe Siècles de L'Hégire" (Blachère 1950). Blau (1963) has shown that some of the traditional lore associated with the use of these Bedouin consultants is probably apocryphal, particularly the stories of Bedouin arbitrators being called in to settle disputes of specialists in issues of classical grammar. He concludes, however, that in matters of lexicography Bedouins were indeed consulted and played an important role. These Bedouin consultants were called ruwt (sing. rawi), literally "reciters". Primarily this term referred to those who had committed to memory great stores of classical poetry and who could recite these with proper classical vocalization. It also applied to informants who provided general linguistic information, such as the vocabulary that figured in such verse (Jacobi 1995). Inasmuch as descriptions of desert plants and animals figured prominently in the classical oral poetry tradition, the works of early philologists often included specialized vocabularies, derived from Bedouin consultants, in various fields of natural history.

Of the various works entitled kitab an-nabat or kitab an-nabat wash-shajar ("The Book of Plants" or "The Book of Plants and Trees") compiled by the early philologists
(many of which are no longer known to exist even in manuscript), by far the most important was that by Abū Ḥanīfa ad-Dinawarī (d. 895 A.D.). Lewin says of it:

Of all the learned works of Abū Ḥanīfa ad-Dinawarī (d. about 282/895) the most popular one is undoubtedly his Kitāb an-nabāt. At all times it has been linked with the name of Dinawari, who, down to this day, is known in the Orient simply as "the Author of the Book of Plants". In fact, the rich botanical nomenclature of the classical Arabic language was known to later generations of philologists, lexicographers and writers on botanical and pharmacological matters essentially through this work of Dinawari, considered also by Western orientalists as one of the very great contributions in the field of Arabic philology and as a specimen of genuine scholarship (Lewin 1953:1).

Lewin has shown that this work consisted of two sections, one a series of monograph discussions about various aspects and uses of plants, the other a listing of plant names and descriptions in alphabetical order. Parts of the work have been widely quoted in early Arabic dictionaries, but no manuscript of the original text was known until 1947, with the discovery in Medina of a fragment (40 manuscript leaves) of the book (Lewin 1953). A manuscript volume was found about a year later at the University Library in Istanbul. This was the beginning of the alphabetical section, covering the initial letters alif to zāy. Lewin edited this into a printed Arabic text (Lewin 1953). The source material used by ad-Dinawari was both written and oral. L. Kopf, in his review of Lewin's publication, made particular note of the use of Bedouin informants:

Remarkable is the wealth of information which Abū Ḥanīfa derived directly from the mouth of Bedouins. He was one of the last representatives of that epoch in which practically all philologists extensively and systematically used the Arabs of the desert for their researches. Later on, only few ones are reported to have followed this method, which completely fell into disuse after the time of al-Cauhari. Although Abū Ḥanīfa derived his information from Bedouins who belonged to various tribes and who stemmed from different parts of the Arabian Peninsula ... the tribe of Asad is mentioned ... a Bedouin from 'Umān ... another from aqāṣi ard al-'arab ... it need not be assumed that he had visited all these
places himself. He probably met the Bedouins, as did practically all his predecessors ... in or near his various places of domicile (Kopf 1955:150).

Yet another part of Kitāb an-nabāt was later discovered among Arabic manuscripts of the Yale University Library and published in Arabic text by Lewin (1974). This was the third part of the overall work, consisting of monographs on specific groups of plants or uses. Meanwhile, in 1973, Muhammad Hamidullah published a reconstitution of the remainder of the alphabetical section (letters sīn through yā) by compiling quotations attributed to ad-Dinawarī from the later major Arabic dictionaries (Hamidullah 1973).

It is known from references in extant portions of the Kitāb an-nabāt that one of Abū Ḥanifah's monographs was titled Bāb tajnīs an-nabāt, "Section on the Classification of Plants" (Lewin 1953:3). Unfortunately the text of this, which would have provided an invaluable point of comparison for our present-day Bedouin plant classification, is not among the parts so far discovered. Nevertheless, some aspects of this framework can be gleaned from remarks in other sections and in other words, and will be discussed below.

I have chosen mainly the alphabetic section of Kitāb an-nabāt, using Lewin's edition of the first part and Hamidullah's reconstitution of the remainder, as a point of comparison with the plant names recorded from Bedouin consultants today. The results are shown in Appendix A. This tabulation shows that of 251 present-day names, 179 (71 percent) have, in the ninth century texts, either exact equivalents or very close cognates of the same linguistic root. Of these 179, 120 (67 percent) are accompanied by at least some evidence that they were applied to the same scientific species that they label today, while 31 (17 percent) appeared to differ. The remainder (16 percent) lacked sufficient description to be assigned either way. Such early works also list many of the same uses, of the same plants, that are made of them by Bedouins today, such as for food, dyeing,
tanning and medicines. The shrublet *ramrām*, for example was used to treat snakebite, as it is today, at least as early as the ninth century A.D. (Lewin 1953:193).

Of the present-day generics *without* such early historical cognates, the majority tend to be productives, otherwise complex lexemes or descriptives, rather than the simple, unanalyzable names that form the core of the Bedouin classification -- core in the sense of referring to those perennial plants that make up the great bulk of the visually prominent and economically useful desert vegetation. This core group, including such generics as *rimth, ʿarfāj, thmām, sabāṭ, nuṣī, arṭā, harm, ghaḍā, ḥādh, sidr, ṣarfā, salām, samūr* and *ṭalḥ*, have carried their names without change for over 1100 years. The same can be said of the more common annuals of the desert landscape, such as *yanām, gahwīyân, ḥūḍhān*, and *huwwā*.

The early existence of what I call "growth stage generics" (section 9.7) is proved in the lexicographical literature. At least one example involves exactly the names and applications used today: The philologist al-ʿAsmaʿī (d. 831 A.D.) points out that *ḥalam*, after it has dried out, is called *ḥamāṭ* (Al-Ghnaym 1972:19). He also, as do Bedouins today, provides various growth stage or condition names for *nuṣī*, the important grazing grass *Stipagrostis plumosa*. Thus *nuṣī*, when it has gone dry, is called *ḥaly*; after it has darkened and broken up it is called *dawl* (ibid.:22).

There are a few unexpected absences in the old data. We find no *rūṭh* saltbush, so important to the northern tribes today, but that species probably lies in one of the few old *ḥamāṭ* plant (saltbush) names listed which we have not yet identified. *Samḥ*, the *Mesembryanthemum* so important, at least until relatively recently, for its edible seeds, carried the name *fathṭh* in those early times, although the names of two of its seed-producing close relatives have not changed. We also look in vain for two important annuals with edible rootstock: *rubāḥlāh* and *ḥambīzān*. These, and others, might be
identifiable upon closer study of differently named edible plants listed by Abū Ḥanīfah. The name faq' for desert truffles, seems to have been used in those times for a non-edible, even poisonous toadstool, while kama' was the truffle designator.

The question of early terms for the more inclusive categories of plants, and the overall matter of classification, is less straightforward. Our classes of shajar and 'ishb were obviously well known to Abū Ḥanīfah and his near contemporaries. Shajar seems to be accepted as a word needing no definition, although remarks by Abū Ḥanīfah on other plant classes as compared to shajar make it clear that shajar are plants whose main stem is not destroyed by the winter cold (Lewin 1953:90), thus referring to both trees and shrubs, and even perennial herbs. Abū Ḥanīfah's several references to changes in different plant classes as effects of winter indicate he is viewing these classes not as a Bedouin of the Arabian Peninsula but rather as a more general quasi-botanist familiar with more temperate climes including the sometimes frosty mountains of his native Iran. Thus he defines 'ūshb (the Bedouin 'ishb) as (my translations) "whatever [plants] are destroyed by winter [cold] and that grow forth again from [buried] rootstock or seeds" (Hamidullah 1973:133) rather than as "those killed by summer drought", as Bedouins say today. He uses baql as a general term for "herbs" (as opposed to shrubs or trees), and divides these into two classes, one called adh-dhukūr (lit. "the male ones"), that are thicker and harder, the other called al-ahrār (literally "the 'free' or 'true' ones") that are softer and finer (Lewin 1953:182). It is unclear to what extent these terms were actually used by the Bedouins of that time. My modern Bedouin consultants did not recognize the terms adh-dhukūr or al-ahrār. The term baql is understood as a general Arabic word referring to "herbs" or "greens" and is used in some Arab countries today in specific reference to the salad herb, Portulaca oleracea.
Abū Ḥanīfah's work, as we know from an entry in his alphabetic section, included a monograph on the ‘iddāh, the class of spiny trees given the same name by our Bedouin consultants today. That section is not included in the monograph material known to be extant, but use of the term by other early philologists provided a clear account of its use. Al-ʿAṣmaʿī defines the class as "all trees that have thorns and which grow big" (Al-Ghunaym 1972:23). The examples he gives of this class, beginning with ṭalḥ, salam, sayyāl, ʿurfūt and samur, show that its focus was then, as now, on the genus Acacia. Ibn Khālawayh divides the class into two subgroups; al-ʿiddh al-khālis ("the true ʿiddāh") being the large thorny trees, while the small ones are called al-ʿiddal or ash-shirs (Nagelberg 1909:1). Acacias are given as examples of the first; of the second the majority are bushes of western Arabia and the Ḥijāz mountains although he includes our shubrum (Zilla spinosa).

Our present-day common Bedouin word for bush, shima‘, is rather surprisingly quite absent from these early botanical works, as is its equivalent among today’s northern tribes, qisha‘. Nor does there appear to be any other life form name referring only to "bush." Abū Ḥanīfah describes a life form class called janbah, intermediate between herbs and shajar, but this appears to refer to perennials that die back to ground level and maintain a persistent rootstock while (unlike a tree or the majority of bushes) losing its upper stem (Lewin 1953:90). Among my consultants, some northern tribesmen used the term janbah, but only as a generic name for the low zygophyllaceous perennial Fagonia bruguieri which, interestingly, is in fact intermediate in growth form between an herb and a shrublet. The apparent absence of a Bedouin term for "bush" a millennium ago is of interest, as discussed in section 9.2, with respect to Brown’s (1977,1984a) universal evolutionary scheme for the development of life form terms. The apparent late addition of
"bush" supports his hypothesis that "tree" and "grerb" (or "grass") would be encoded first.

Abū Ḥanīfah did not originate these classes that are not recognized today by the Bedouins. As pointed out by Lewin (1953:intro.:6), he quotes Abū ʿAmr ash-Shaybānī (d. 821 A.D.) concerning the division of plants into dhukūr, ahrār, and janbah. He also quotes lines of poetry, including some by Dhū ar-Rummah of the Omayyad period (661-750 A.D.), referring to baql of the dhukūr and ahrār classes (ibid.:182). As shown in Al-Ghunaym (1972), the same terms, sometimes with identical identifying phrases, are found in the Kitāb an-nabāt of al-ʿĀṣmaʾī (d. 831 A.D.), who groups his lists of herbs under these headings. The later writer Ibn Khālawayh (d. 980 A.D.) provides a somewhat different picture, dividing all vegetation between shajar and kalāʾ ("herbage"), the latter subdivided into ʿushb, the "male" type that is big and thickish and baql, that are "fine" and "soft" (Nagelberg 1909:10). He goes on to list many kinds of annuals, virtually all of which are individually designated with the term ʿushbāh, just as a Bedouin would do today, and perhaps as Bedouin consultants did then.

Today's Bedouin division of grazing plants into ḥamḍ and khillah based on nutritional requirements of the camel was also clearly recognized in Abū Ḥanīfah's time, and no doubt before. He seems to have come to about the same conclusion we have with regard to the nature of khillah. Under the heading "khillah or khullah" in his alphabetical section, Abū Ḥanīfah defines that word as meaning "pasturage in which there is no saltiness in its bushes or other" [plants, or perhaps even ground]. He notes that khullah may be said to be a kind of "land" while ḥamḍ is not so used, implying that ḥamḍ can refer only to plants themselves (Lewin 1953:154). Al-ʿĀṣmaʾī had earlier described the ḥamḍ/khillah contrast, quoting 1100 years ago the same saying that Bedouins repeat today: "khullah for camels is like (lit."of the rank of") bread, while ḥamḍ [for them] is like meat"
(Al-Ghunaym 1972:17). "Hamd," he says, "is that which is saline, while khullah has no saltiness in it" (ibid.: 17). He goes on to list the plants classed as hamd, the majority of which carry precisely the same saltbush names used by Bedouins today.

A full comparative analysis of early Islamic plant classification is outside the scope of this study. We may say from our brief survey here that much is very similar to Bedouin usage today, while some, such as the grouping of baql into dhukür and ahrār, seems quite different. We seem to have an underlying folk system with terms much like those found today overlain by a rationalized view of plants added by writers familiar with more temperate areas and a wider range of plant growth forms. The early philologists were scholars well versed in formal, written grammar, which has a strong transitive taxonomic structure ("a noun of kind is a kind of collective, which is a kind of noun which is a kind of word"). A tendency toward "overdifferentiation" might not be unexpected.

Overall, however, considering both our comparison of generic names and the remarks above on terms of classification, our data suggests that a Bedouin of east-central Arabia would feel quite at home in discussing desert plants with his counterpart of 1100 years ago. The terminological differences would hardly exceed that variation experienced today between Bedouins of different geographical parts of the Najdī Arabic dialect territory -- another testimony to the conservatism and endurance of oral tradition among these pastoralists.
As indicated by remarks in the introduction to this study, Bedouin life style and practices at the time of my data collection between 1960 and the early 1970s were still much as they had been at the time of Musil's travels, early in the last century. Beginning with the following decade and its flood of "petrodollars," however, the central Arabian Peninsula fairly plunged into change, with strong consequences for both the settled and nomadic populations. My brief remarks here concern only the impact on traditional plant knowledge; other writers (see particularly Lancaster 1997) have dealt with the broader scope of Bedouin adaptations to modernism.

The Saudi Arabian boom years took me away from the Bedouins as new oil company projects, just like the government ones, soaked up all available manpower, then recruited thousands of additional people from outside the country. But even chance encounters told me that Bedouin life was no longer what it had been. I remember my shock while out on a weekend desert camping trip I stopped to inquire directions from a camel herder. He had looked slightly unusual from a distance; face-to-face he was smiling but spoke little Arabic and knew nothing of the country beyond the horizon. He was from Pakistan. A few months later I had another such encounter, this time with a Sudani who, while voluble in his brand of Arabic and happy to talk with me all day, was of little help with local topography and had obviously been instructed by his employer not to talk to strangers about where the family camp was. At least some Bedouins were now hiring foreigners to herd their camels. I wondered if "checking on the herd" was becoming, for its owners, not much more than an excuse for weekend picnics.
At the time of my last visit to Saudi Arabia, in 1998, I hired a four-wheel-drive vehicle and drove out to the 'Ayn Dar camel trough area hoping to find some members (or at least their descendants) of the Ghayathin Al Murrah I had known there 35 years earlier. It was summer camp time, but not a single black tent was to be seen. I finally stopped at a drilled water well where off at a distance I could see a modern, concrete block house and walled courtyard. Inquiring at the door I discovered that the owners were indeed Ghayathin and that they recognized the names of my old friends. The house had air conditioning units in two of the windows, and a motor generator\(^1\) sat outside, providing electricity for those as well as a refrigerator, lights, and television. I was invited to sit on rugs in the courtyard where coffee, dates and a large bowl of camel milk were served.

Near sunset dust appeared on the horizon and a herd of fine, black majahim camels were driven into the electrically-pumped well, all herded by a youth driving slowly in a Datsun mini-pickup, skillfully managing the herd with his maneuvers around the back of the large camel group.

There are indeed fewer Bedouins out on the land now even though the herds themselves seem hardly to have diminished. Hired labor accounts for part of this, and today's universal mechanization of herding life means fewer people are required to maintain the same numbers of stock. One of the great benefits of the oil boom was the extension of the basic education system to all corners of the Kingdom, and the country now has several universities. Jobs in government or business require at least a secondary education, and a college degree is often considered essential. Education, with its required regular attendance, is very difficult to universalize in a nomadic pastoral setting, and town

\(^{1}\) The Bedouin term for an electrical generator (which is used also in other dialects of Arabic) is mwallid. It is a present participle meaning literally "that which gives birth" or "that which causes to give birth" and is a good example of Arabic's facility for coining new terminology through lexical extension. The use of the common participial "m-" prefix here does not occur in Bedouin plant names, a fact which underscores their basically substantive nature (see section 9.5).
populations have been growing at the expense of the countryside. The 1998 telephone
directory of the Saudi Arabian Oil Company lists 75 employees with the surname "Al
Hajri" and 23 with "Al Marri", indicating their membership in the tribes of Banī Hājir and
Āl Murrah. There are doubtless many others, who use family or clan names instead of the
tribal designation for directory purposes. These are not drivers or clerks; they are
responsible staff with technical and supervisory responsibilities that presuppose, in many
cases, a college education.

The trend toward universal primary and secondary education will of course have
some effects on folk botanical nomenclature. School graduates are doubtless already
prepared to argue for the existence of a labeled plant class of kingdom rank. The
prototypical shajarah is already becoming, for first graders, the very un-Arabian, red-
fruited apple tree portrayed with "shin for shajarah" in some ABC books patterned after
Egyptian and Lebanese models. But these are of minor consequence. More significant
would be the loss of desert ecological knowledge associated with the more detailed
structure and content of plant classification and nomenclature.

There would appear to be some reasons for optimism. Bedouin plant talk is
closely involved with the wider aspects of the pastoral tradition and with general poetic
literature. One can foresee, in Saudi Arabia, a trend toward ranch-style meat production
using concentrated feeds rather than desert grazing. But this would probably involve
sheep rather than camels. Nor are camels going out of style. They are still being kept in
large herds over large areas, and as long as there are Saudi nationals owning and managing
them -- even if as today at greater arm's length -- there will be some talk of grazing and
plants. Also, unlike the case with many plant-using groups with shrinking populations of
native speakers, Najdī Arabic speakers are widespread, growing in numbers, and have a
highly developed oral and written literature. This, just as it has preserved for us the outline
of Bedouin plant terminology in use a millennium ago, might continue to enlighten, or at least entertain, generations to come. Without first-hand observation and hands-on use of plants by the younger generation, however, there seems bound to be a loss of practical field lore -- some withering of that facility for placing plants in the scheme of a world where leafy things, except in the rare instant of a *rabī*, are both few and far-between.
15. SUMMARY AND CONCLUSIONS

We have examined here utilitarian and cognitive aspects of the man-plant relationship among representatives of several tribes of pastoral nomads in the east-central Arabian Peninsula. The core study area, of 500,000 square kilometers, is characterized by a hyper-arid climate with rainfall limited to the cool season and annual precipitation ranging from about 100 mm in the north to less than 50 mm in the south. The vegetation consists largely of open shrublet communities, often led by a single perennial species, and with cover values rarely exceeding 8 percent. Tree forms are virtually absent. A dense ground layer of ephemeral annual species may appear locally in years favored by good rainfall, but periods of several years may pass without significant growth of therophytes.

Consultants providing data for this study were some 20 Bedouins, all male and in the age group 35-75, representing about 10 tribes speaking the Najdi dialect of Arabic. The major portion of the data was from members of the tribes of Āl Murrah and Banī Hājir. All but one of the consultants were nonliterate; all had spent at least half of their lives as desert herdsmen, and none had engaged in any form of horticulture. All were found to use essentially the same plant terminology and folk classification system although some geographical variation was apparent. Data were collected between the years 1960 and 1975, before major economic changes in Saudi Arabia had affected Bedouin life to a significant extent.

Uses of Wild Plants. The Bedouins use plants primarily as a grazing resource for their livestock, which among our consultants comprised primarily camels kept mainly for their milk. Bedouin herds consist mainly of female animals; the use of camels as work
animals, such as for goods transport or household baggage carrying, has declined greatly with the near-universal use of motor vehicles. Camels have a unique dietary requirement for relatively large quantities of salt. Meeting salt requirements plays an important part in Bedouin grazing practice, requiring alternation between plant communities led by perennial, salt-rich Chenopodiaceae and non-saltbush grazing. Annual herbaceous plants develop well only in years of above-average rainfall, leading to the ideal pasture condition known as *rabī*’, when camels can go for periods of 1-3 months without free water.

Another important use of plants by Bedouins is for firewood. Portable stoves using petroleum gas have come into increasing use for cooking purposes, but use of woody shrub fuel, *ḥatab*, is still preferred for the fire used in coffee-making for the entertainment of guests. Plants preferred for firewood are those larger and more woody shrubs such as ‘*abal* (*Calligonum comosum*) and *ghaḍā* (*Haloxylon persicum*). Plant materials provided tinder for the striking of fires by flint and steel in earlier times.

Wild food plants used by the Bedouins contribute a very small proportion of their total caloric intake, but a total of some 38 plants (including some noted only in literature) are listed as being collected and eaten, at least historically. The most important food plants are the desert truffles, *fag‘*, which are still collected and consumed whenever they appear, usually only at intervals of several years after good and well-timed rains. Flowering plants of the genus *Helianthemum* (Cistaceae) are well-known as indicator plants for spots prospective of truffle growth. Another important food plant, but only in northern Arabia, has been *samḥ*, seeds collected from three aizoaceous annuals (but chiefly *Mesembryanthemum forsskalei*). Several annuals are well-known for their edible rootstock or tubers, and others are collected for their leaves, eaten raw as salad greens.

In general, the primary function of wild food plants is to relieve an otherwise bland diet consisting of dairy products and a starch staple. They may also contribute vitamins and
trace elements. Inasmuch as the same drought conditions that lead to livestock losses also limit the growth of wild food plants, plant gathering has generally not played an important role in relieving famine. In northern Arabia, the collection of storable samḥ seeds was an exception to this limitation, and there is some indication that the grains of the grass thmām (Panicum turgidum) may have been used historically in similar fashion in our more southerly study area.

Some 30 wild plants were listed as medicinals by our consultants or found in the literature, but not much use was made of these even in the 1960s, when modern medical treatment was still outside the reach of the majority of Bedouins. Bedouins, rather, seemed to participate in the same herbalist tradition followed by people of the towns, which depended mainly on remedies imported to the Gulf from other countries. A collection of such traditional botanicals sold by town shops totaled some 57 species, of which 12 were obtained from wild plants in Arabia and were known in the field by consultants. Medicinal plants were also used by the Bedouins for veterinary purposes.

The use of plant material for tanning and dyeing has declined greatly with the ready availability of chemical agents for these purposes, but Bedouins are generally familiar with the former use of several wild plants, such as the ‘abal or arṭā shrub (Calligonum spp., Polygonaceae) for tanning hides. Dyes were obtained from the root parasite ṭarthūth (Cynomorium coccineum, Cynomoriaceae), the ‘arjūn toadstool (Podaxis pistillaris) and several other plants.

The leaves and shoots of several chenopodiaceous shrublets (but mainly shinān, Seidlitzia rosmarinus) provided alkaline substances used as a soap substitute. The powdered dried leaves of sidr (Ziziphus spina-christi, Rhamnaceae) are still used as a hair wash. The use of rāk twigs and roots (Salvadora persica, Salvadoraceae) as toothbrushes is still widespread.
Bedouins make little use of wood for construction or in crafts, and the majority of their wooden implements such as tent poles, saddle frames, and camel sticks, as well as mats and baskets, are purchased ready-made from village craftsmen. Some use is made of date palm fiber, lif, for cordage, but most rope requirements are also met by purchase of ready-made materials. Consultants were familiar with the use of fleecy materials taken from wild plants for the stuffing of saddle pads and pillows. A specialized historical use was the making of charcoal from the stems of ʿushar (Calotropis procera, Asclepiadaceae) for use in the formulation of black gunpowder.

Non-Material Cultural Aspects. Consultants seemed rather insensitive to the intrinsic beauty of wild plants, but plants -- particularly the life form category ʿishb, denoting annuals -- do figure in folk literature as symbols of grazing conditions (and the consequent situations of want or plenty) and as metaphors for describing color or other attributes of other things. Some plants have supernatural associations and a few have traditionally been avoided as the abodes of the mischievous, sometimes malevolent, spirits known as jinn. Overall, however, the Bedouin view of plants reflects the teaching of orthodox Islam: that they are a most valuable gift of God to mankind, providing both grazing for livestock and food products of more direct use.

Classification and Nomenclature. The Bedouins, like many pre-scientific societies, do not have a label for plants at the kingdom level. Classification at the life form level is marked by a strong binary contrast between shajar, "perennial plants" and ʿishb "annuals." This mirrors the clear contrast in desert plant ecology between the "drought withstanding" perennials and "drought evading" annuals, the latter emerging only in years of good rains and having an ephemeral existence of generally less than 10 weeks. Shajar (perennials) includes true trees, bushes, non-woody perennials and perennial grasses. It
is inclusive of another labeled life form, \textit{shima'\textsuperscript{c}}, denoting bushes smaller than man-height (and usually considerably smaller). \textit{Shima'} are considered to be "a kind of \textit{shajar\textsubscript{1}}" (all perennials) and contrast with a group, \textit{shajar\textsubscript{2}}, that is homonymous with \textit{shajar\textsubscript{1}} and probably prototypical for it, consisting of true tree forms and shrubs larger than man-height. They contrast also with an unlabeled residual group: those non-woody perennials of \textit{shajar\textsubscript{1}} that are neither \textit{shima'} nor \textit{shajar\textsubscript{2}}.

The Bedouins have no life forms corresponding to true grasses or to vines. Some data supplied by consultants of tribes in northwestern Arabia hinted at the existence of another labeled Bedouin life form: a category called \textit{at-tawālī\textsuperscript{r}}, denoting perennial but non-woody plants (the "residual group" mentioned in the paragraph above). Insufficient data is available, however, to substantiate this, and the same consultants did not deny the validity of the basic scheme presented above.

There are several labeled Bedouin plant classes at the intermediate level (between life forms and generics). The most important of these is the category \textit{hamḍ}, which maps almost perfectly on the scientific family Chenopodiaceae. Its significance is essentially utilitarian, encompassing shrublets of vital importance for providing salt nutrients for grazing camels. There is good evidence that \textit{hamḍ} is a term classifying plants and is not just a "pasture type." It contrasts directly with \textit{khillah}, denoting grazed perennial plants that are not halophytes. A third intermediate category is \textit{iḍāh}, which includes those trees and large shrubs that are markedly spiny. Its apparent focus is on the genus \textit{Acacia}, and it appears to be a vestige of plant classification in western Arabia, to which several of our important consultant tribes trace their origins. One unaffiliated generic cluster has some characteristics of an incipient life form, including conspicuous but anomalous plants without green stems or leaves: truffles, mushrooms, and flowering root parasites.
Generic level Bedouin plant names referring to *shajar* (perennial plants) are highly salient, and a higher proportion of scientific perennial species are labeled than are annual species (Table 15.1). Annual plants, as generics, are less salient, and there is a Bedouin tendency to think of annuals *en masse* rather than as individual kinds. This reflects the mode of use of annuals for grazing as well as their closely grouped and ephemeral nature. The life form name, *‘ishb*, is much more common in speech than the generics of that category.

Only three generics are clearly polytypic, all of them plants of high cultural salience: *nakhl* (the date palm, *Phoenix dactylifera*, with at least 5 folk specifics), *fag* (edible desert truffles with 4-5 specifics) and *samh* (aiizoaceous plants providing edible seeds, with 3 specifics). Of these, *nakhl* and *fag* are also unaffiliated with respect to life form. One other generic or quasi-generic, *hurbuth* (referring to several genera of annual legumes with a focus on *Astragalus*) includes one (questionable) folk specific and several individually unlabeled scientific species.

With respect to nomenclature, the names of both generics and more inclusive categories generally take the Arabic grammatical collective form used for the names of plants and of animals found in groups. The names are predominantly simple primary lexemes although complex forms also occur. Many of the simple lexemes are essentially opaque semantically. Those transparent in meaning tend to refer to physical attributes of the plants concerned, such as shape, color and texture, although associations with animals and other attributes are also found. The great majority of the generic names are perceptual, rather than utilitarian, in nature. None of the names of the few folk specifics are secondary lexemes in a formal sense. The unique forms of some of them, however, indicate that they are conceptually abbreviated secondaries.
Table 15.1
Statistical Summary of Scientific and Folk Taxa

Scientific Species in Core Study Area

<table>
<thead>
<tr>
<th>Life Form</th>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular Perennials</td>
<td>188(^1)</td>
<td>of which 142 (76 percent) are labeled</td>
</tr>
<tr>
<td>Vascular Annuals</td>
<td>205</td>
<td>of which 109 (53 percent) are labeled</td>
</tr>
<tr>
<td>Fungi</td>
<td>7(^2)</td>
<td>of which 7 (100 percent) are labeled</td>
</tr>
<tr>
<td>Total Species</td>
<td>400</td>
<td>of which 258 (65 percent) are labeled</td>
</tr>
</tbody>
</table>

Life Forms

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediates</td>
<td>3</td>
<td>of which 3 are labeled</td>
</tr>
<tr>
<td>Generics</td>
<td>209</td>
<td>of which 3 (1.4 percent) are polytypic and 7(^3) (3 percent) are unaffiliated</td>
</tr>
<tr>
<td>Generic synonyms</td>
<td>88</td>
<td>approximately</td>
</tr>
<tr>
<td>Specifics</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Varietals</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Bedouins use, in addition to general purpose plant names, a number of "growth stage generics" applied to particular plants of grazing importance. These denote stages of plant development or condition and are useful in the reporting of general plant and grazing conditions. Bedouins also have an extensive vocabulary related to vegetation in general, as opposed to particular kinds of plants, and vegetation types are important in defining some topographic terms and geographic areas.

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\(^1\) Includes one species of important use in the far north but not found in the core study area. Note also that generic names sometimes label more than one scientific species.

\(^2\) Macrofungi, particularly mushrooms, are poorly studied in our area; the ultimate total will somewhat exceed this number.

\(^3\) Does not include one generic of as yet undetermined life form.
In general, many features of Bedouin Arabic plant classification can be accounted for by Berlin's (1992) generalized model. There are, however, some conspicuous anomalies:

1. The use of "perennial" vs. "annual" as an all-encompassing life form criterion. This is a perceptually based opposition reflecting plant ecological facts in a hyper-arid habitat with rainfall strongly restricted seasonally.

2. The presence (resulting from 1, above) of a two-tiered life form structure in which "true trees", "bushes" and an unlabeled residuum of non-woody perennials are included in the broader category, "perennials."

3. Intermediate taxa are labeled rather than covert as is generally, but not universally, the case (Berlin 1992:27).

**Plant Classification and Subsistence Type.** Comparative ethnobotanical data for other pastoral societies is scanty, but plant classification descriptions for some herding groups in East Africa show some points in common with our Bedouin Arabic system. One such feature is a tendency to a bipolar break at the life form level between tree/shrub (or perennial) forms and herbaceous plants. This, however, appears to be simply a reflection of the physical life forms of plants in the two regions, both of which exhibit such a perceptual dichotomy. Two of the African systems have large numbers of generics -- in one case apparently exceeding 500 -- suggesting that pastoral societies in general may not necessarily be characterized, as is the Bedouins', by a low number of generic names as compared to cultivator groups. Another point in common, however, the low degree of polytypy among generics, may in fact prove upon further study to be a general characteristic of the pastoral subsistence mode. The reasons for such a situation may lie in the very limited degree of plant manipulation exercised by pastoralists -- even less than with hunter-gatherers -- as compared to small-scale agriculturists.
Geographical and Historical Considerations. A review of data from North Africa shows that a system of plant classification and nomenclature very similar to ours is followed by Arabic-speaking tribes of the Sahara as far west as the Atlantic coast of the African continent. This resulted from westward movements of Arabic-speaking Bedouin tribes beginning in the mid-eleventh century. Evidence from early Arabic literature shows that Bedouin plant classification and nomenclature has undergone little change over some 1100 years. Many plant names used by Bedouins today are identical to those recorded by philologists from desert Arab informants in the ninth and tenth centuries A.D. Plant descriptions from this early period suggest also that many of these names were applied to the same plants labeled by them today.

Major developments since the later 1970s in the now oil-based economy of Saudi Arabia have led to changes in the Bedouin way of life that could have repercussions for the transmission of indigenous plant knowledge to younger generations. Younger people are leaving the land for formal schooling and city-based employment. Foreigners are being hired as camel herdsmen. This threatens the maintenance of indigenous plant knowledge despite the continued importance of camel herding and the figuring of some plant lore in both oral and written literature.
APPENDIX A

PRESENT-DAY AND EARLY ISLAMIC PLANT NAMES

The following table compares the Bedouin plant names in our data with those in the classical text of Kitāb an-nabāt, "The Book of Plants," of Abū Ḥanīfah ad-Dīnawarī (d. 895 A.D.). The abbreviations before page numbers refer to (L) Lewin 1953 and (H) Hamidullah 1973. References were also made to two other early classical works when, in a few cases, our names were not found in Abū Ḥanīfah. These are: (A) the edition of al-ʿAsmaʿī's (d. 831 A.D) Kitāb an-nabāt edited by ʿAbd Allah Yūsuf al-Ghunaym (Al-Ghunaym 1972) and (IK) Ibn Khālawayh's (d. 980 A.D.) Kitāb ash-shajar, "The Book of Trees and Shrubs," edited by Nagelberg (1909). The first column comprises our Bedouin names, the second the same names rewritten in the modified BGN/PCGN transliteration I follow for classical Arabic, and the third the names as written in the sources indicated, again in BGN/PCGN format. The fourth column is an attempt to assess, if only very roughly, the applications of our names in the ninth or tenth centuries. Here, I have reviewed the plant descriptions provided by the original authors and use a "+" symbol if the description suggests the plant so named today, a "0" if the description is essentially neutral, and a "-" if the description seems to indicate a different species. The absence of any symbol indicates a lack of descriptive information. The early classical descriptions are incomplete and seldom conclusive. Needless to say, the decisions on these indicators involve a large measure of personal judgment on my part, but I think the results will have some usefulness given my relatively long field experience with the Arabian flora.
The main body of the table comprises all folk generics, including the majority of names listed as synonyms in my descriptive list (Chapter 10); the second, shorter, part lists terms of greater inclusiveness.

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**LIFE FORMS AND INTERMEDIATE CATEGORIES**

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APPENDIX B

BERLIN'S 1992 GENERAL PRINCIPLES OF ETHNOBIOLOGICAL CLASSIFICATION AND NOMENCLATURE

Summary of General Principles

I. Categorization

1. In ethnobiological systems of classification, conceptual recognition will be given to a subset of the existing flora and fauna. This subset will be comprised of the biologically most distinctive (hence, salient) species of the local habitat.

2. Ethnobiological systems of classification are based primarily on the affinities that humans observe among the taxa themselves, quite independent of the actual or potential cultural significance of these taxa.

3. Ethnobiological systems of classification are organized conceptually into a shallow hierarchic structure.

4. Recognized taxa will be distributed among from four to six mutually exclusive ethnobiological ranks, with taxa of each rank sharing similar degrees of internal variation and separated from each other by comparably sized perceptual gaps. The six universal ranks are the kingdom, life form, intermediate, generic, specific, and varietal. There is some evidence that foraging societies have poorly developed, or lack entirely, taxa of specific rank. No foraging society will exhibit taxa of varietal rank.

5. Across systems of ethnobiological classification, taxa of each rank show marked similarities as to their relative numbers and biological ranges.

   a. Taxa of generic rank are the most numerous in every system, with rare exceptions, number no more than five hundred classes in each kingdom, are largely monotypic (roughly 80 percent in typical systems), and, with notable exceptions, are included in taxa of life-form rank.
b. Taxa of life-form rank are few in number, probably no more than ten or fifteen, are broadly polytypic, and include among them the majority of taxa of lesser rank. Substantively, life-form taxa designate a small number of morphotypes of plants and animals that share obvious gross patterns of stem habit and bodily form.

c. Taxa of intermediate rank generally group small numbers of generic taxa on the basis of their perceived affinities in overall morphology (and behavior). Intermediate taxa are included in taxa of life-form rank.

d. Specific taxa subdivide generic taxa but are fewer in absolute number. Folk varietals are rare; when they occur, they subdivide folk species. Unlike taxa of superordinate rank, a major portion of subgeneric taxa in ethnobotanical systems of classification is recognized primarily as a result of cultural considerations, in that such taxa represent domesticated or otherwise economically important species.

e. The taxon marking the rank of kingdom in ethnobotanical as well as ethnozoological systems of classification is comprised of a single member.

6. Ethnobiological taxa of generic and specific rank exhibit an internal structure in which some members are thought of as prototypical of the taxon while others are seen as less typical of the category.

7. A substantial majority of ethnobiological taxa will correspond closely in content with taxa recognized independently by Western botany and zoology, with the highest degree of correspondence occurring with taxa of generic rank. Taxa of intermediate rank often correspond to portions of recognized biological families. Taxa of life-form and subgeneric rank exhibit the lowest correspondence with recognized biological taxa.

II. Nomenclature

1. Taxa of the ranks of kingdom and intermediate are generally not named. There is growing evidence that some covert life-form may also be found. When such taxa are labeled, they often show polysemous relations with taxa of subordinate rank.

2. Names for plants and animals exhibit a lexical structure of one of two universal lexical types that can be called primary and secondary plant and animal names. These types can be recognized by recourse to linguistic, semantic, and taxonomic
criteria. Primary names are of three subtypes: simple (e.g., fish), productive (e.g., catfish) and unproductive (e.g., silverfish). Secondary names (e.g., red maple, silver maple), with generally specifiable exceptions, occur only in contrast sets whose members share a constituent that refers to the taxon that immediately includes them (e.g., maple).

3. A specifiable relationship can be observed between the names of taxa and their rank. Life-form and generic taxa are labeled by primary names; subgeneric taxa are labeled, in general, with secondary names.

4. There are two well-understood conditions under which subgeneric taxa may be labeled by primary names, although these two conditions do not account for all of the empirically observed data. The first condition (4a) occurs when the name of the prototypical subgeneric is polysemous with its superordinate generic. Disambiguation of polysemy is accomplished by the optional occurrence of a modifier glossed as 'genuine' or 'ideal type'. The second condition (4b) occurs when nonprototypical subgenerics refer to subgeneric taxa of great cultural importance.

5. Ethnobiological nomenclature is semantically active in that the linguistic constituents of plant and animal names often metaphorically allude to morphological, behavioral, or ecological features that are nonarbitrarily associated with their biological referrants.

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