SERJEANT, R. B.: a. LEWCOCK, R. (eds.): San'a. An Arabian Islamic City. London 1983.

STÖBER, G.: "Habous Public" in Chaouen. Zur wirtschaftlichen Bedeutung religiöser Stiftungen in Nordmarokko. In: Die Welt des Islam 25, 1985, 97-125.

TARAZ, ABD AL-VAHHAB: Ketabcheh-ye Mouqufat-e Yazd [Small Book of the Yazd Endowments], Text of 1257/1841-42, ed. by I. AFSHAR. In: Farhang-e Iran Zamin 10, 1962-63, 5-123 (In Persian).

VON GRUNEBAUM, G. E.: The Structure of the Muslim Town. In: Islam. Essays in the Nature and Growth of a Cultural Tradition. London 1955, 141-158; originally published as Die islamische Stadt. In: Saeculum 6, 1955, 138-153.

WIRTH, E.: Strukturwandlungen und Entwicklungstendenzen der orientalischen Stadt. In: Erdkunde 22, 1968, 101-128.

- : Die Beziehungen der orientalisch-islamischen Stadt zur Theorie des Rentenkapitalismus. In: Geographie heute. Einheit und Vielfalt, Ernst Plewe zu seinem 65. Geburtstag von seinen Freunden und Schülern gewidmet. Wiesbaden 1973, 323-333.

- : Zum Problem des Bazars (suq, çarşi). In: Der Islam 51, 1974, 203-260; 52, 1975, 6-46.

- : Die orientalische Stadt: Ein Überblick aufgrund jüngerer Forschungen zur materiellen Kultur. In: Saeculum 26, 1975, 45-94.

# DUALITY OF MARKET STRUCTURES IN NINETEENTH AND EARLY TWENTIETH CENTURY OMAN

With 5 figures and 5 tables

MARK SPEECE

*Zusammenfassung:* Der Dualismus der Marktsysteme in Oman während des 19. und frühen 20. Jahrhunderts

Duale Strukturen haben die Geschichte Omans durchgehend geprägt. So war der Küstensaum stets auf den Handel ausgerichtet und die weltoffenen Städte dieser Region stellten Brennpunkte des sozialen und ökonomischen Lebens dar. Demgegenüber war das Innere Omans traditionell durch eine auf sich selbst bezogene, stammesmäßig organisierte Gesellschaft gekennzeichnet. Dieser Dualismus schlug sich u. a. in der sehr unterschiedlichen räumlichen Organisation des Marktwesens nieder. Die räumlichen Strukturen Omans in der Zeit vor dem Beginn der Ölförderung sind am besten in den Berichten von politischen Repräsentanten und Reisenden aus den Jahrzehnten um 1900 dokumentiert.

Zu dieser Zeit war die Küstenregion Omans über ein hierarchisch gestuftes System von Marktorten mit dem Handelsnetz des Indischen Ozeans verknüpft. Innerhalb dieses Systems waren die untergeordneten Märkte jeweils nur auf einen Markt höherer Ordnung ausgerichtet, und die Güterströme flossen innerhalb der Markthierarchie zu den unmittelbar über- oder untergeordneten Zentren. Horizontale Güterströme zwischen Märkten gleicher Rangordnung oder Ströme, die benachbarte Hierarchiestufen umgingen, waren sehr selten. Auf der untersten Marktebene waren Araber die Träger des Handels, doch mit wachsender Rangordnung der Märkte entfernte sich die ethnische Herkunft der Händler immer mehr von der eingesessenen arabischen Bevölkerung Omans. Diese Verhältnisse isolierten die breite Bevölkerung von einem wirksamen Kontakt mit dem internationalen Handel.

Das Landesinnere Omans hatte keinen Anteil an diesem hierarchischen System; es war vielmehr charakterisiert durch das Fehlen einer integrierten Marktstruktur. Die Marktorte des Innern fungierten gewöhnlich als Zentren von kleinen, lokalen Marktbereichen ohne nennenswerte Beziehungen zu anderen Märkten des Binnenlandes oder zum internationalen Handelsnetz. Ihre Standorte waren in erster Linie darauf ausgerichtet, den Austausch zwischen den verschiedenen naturräumlichen, sozialen, kulturellen und politischen Einheiten der traditionellen Gesellschaft Omans zu erleichtern.

## *1. Introduction*

The history of Oman is largely a story of competition, and often conflict, between two vastly different entities. This duality was even symbolized by the name of the country, The Sultanate of Muscat and Oman, until 1970. The Sultanate was formed from the fusion of the Batinah coastal plain and its port

cities, symbolically Muscat, and the interior of the country, Oman. Even within the last decade, one of the major problems in Oman's efforts to develop has been "der traditionelle Gegensatz zwischen dem an der Küste residierenden Sultan und den binnenwärts orientierten Stämmen" (SCHOLZ 1978, p. 505).

This kind of dual organization reflected a number of basic differences in Omani society. Coastal Oman has always been very trade oriented and thus open to foreign influences. Although the Batinah is densely populated with villages, the cosmopolitan coastal urban areas have been the focus of social and economic life. The interior of Oman was oriented toward self-sufficiency rather than trade, and thus was very inward looking. Society was quite homogeneous, almost completely Arab. The tribe and agricultural villages made up of one or several tribes were the basic mode of organization.

This dichotomy has not been particularly well analyzed. Oman remained fairly isolated throughout most of the Twentieth Century, both because of its economic insignificance and because of the isolationist policies of the Imams and many of the Sultans. For this reason, very little data has been compiled on Oman since the turn of the century which could be used in detailed spatial or economic analysis of the country. Those few Westerners allowed into Oman prior to 1970 primarily were interested in the political history and the political composition of the country, and made few comments on economic matters such as land tenure patterns or the location of markets. Since 1970, research has begun on such questions (e. g. WILKINSON 1977, 1980; SCHOLZ 1976, 1977 b, 1978, 1980, 1984), although too little has been done yet to gain a good overall view of the traditional patterns of economic organization throughout the country.

However, throughout the Nineteenth Century, Oman was of the utmost strategic importance to Great Britain. Furthermore, until the later years of that century, it was politically and economically one ot the most important countries of the Indian Ocean region. The British stationed political officers throughout the Arabian Gulf, including in Muscat, where extensive data on many aspects beyond purely political affairs was compiled. The culmination of the British intelligence activities was LORIMER's Gazetteer of the Persian Gulf, Oman, and Central Arabia. Volume II (1908), subtitled Geographical and Statistical, covers nearly every town, village, tribe, and natural feature of the region. Nearly 800 Omani settlements are described, many in considerable detail. In addition, a great many other reports and articles were written by British officials or travelers during the decades around the turn of the century. These can be used to supplement and verify data found in the Gazetteer.

Oman at that time was in the midst of a major economic depression. The basic causes will only be briefly reviewed; they have been analyzed in detail several times (e. g. LANDEN 1967; SCHOLZ 1976, 1977 b). The fragile unity between coast and interior forged in the Seventeenth Century was disrupted by increasing conflict, as dynastic struggles intertwined with the old socioeconomic and regional differences. These conflicts had already become common by the time two new factors were added in the early part of the Nineteenth Century. The de facto transfer of the Sultan's capital to Zanzibar in 1820 meant that the Sultan's economic activity and assets were concentrated in East Africa, to the detriment of coastal Oman. Also, around 1822 the British began to suppress the slave trade, which was an important component of Oman's commerce. Their pressure on Oman culminated in the Sultan's ban on the trade in 1873.

The situation slowly deteriorated as the century progressed. The introduction of steamers in the mid 1800s all but finished any remaining long distance shipping by Omani vessels. The British sponsored separation of Zanzibar from Oman in 1861 cut off the economic center of gravity from the country. The opening of the Suez Canel in 1869 made the journey from Europa to India much shorter and greatly reduced Muscat's value as a way station. As the Indian Ocean came under increasing British domination, commerce shifted from the traditional silver standard to the British gold standard. Oman, still on the silver standard (the Maria Theresa dollar), was drained of currency when silver prices plummeted in the late Nineteenth Century. Finally, Omani handicraft industries had been nearly eliminated by the end of the century because they could not compete with European and European sponsored Indian manufacturing.

Oman at the turn of the century, then, although still within the Indian Ocean network, had become relatively insignificant economically. The coast was still firmly tied to the Indian Ocean trade, but the volume of the trade was not great enough to support prosperity for more than a few merchants. Coastal Oman was also tied to the British Empire economically and politically, since the British controlled India and other areas of the trade network. The British held "a commanding trade position; amenities of extraterritorial privileges; assurance that no foreign power could obtain land; quasi-legal power of recognition and subsidy control; a British agent and agency;

*Table 1: Documented markets in Oman*
Nachgewiesene Märkte in Oman

| Market | Size (shops) | Size of settlement (houses) | Cited in: |
|---|---|---|---|
| Adam | | 500 | Miles 1910, p. 168 |
| | | | (Lorimer 1908, p. 18)*) |
| Afi | | 1000 | Lorimer 1908, p. 1114 |
| Ali, Bilad bani bu | | 600 | Ward et al. 1847, p. 106 |
| | | | (Lorimer 1908, p. 64)*) |
| Awabi | 50 + | 450 | Lorimer 1908, p. 186 |
| Bahlah | | 545 | Palgrave 1864, p. 148 |
| | | | Miles 1910, p. 177 |
| | | | (Lorimer 1908, p. 209)*) |
| Barkah | 100 + | 1200 | Lorimer 1908, p. 266 |
| | | | Pengelly 1861, p. 33 |
| | | | U.S. Navy 1931, p. 68 |
| | | | Wellsted 1978, p. 194 |
| Dhank | 20–25 | 700 | Cox 1925, p. 209 |
| | | | Miles 1910, p. 418 |
| | | | (Lorimer 1908, p. 437)*) |
| Fanjah | | 450 | Lorimer 1908, p. 1670 |
| Hasan, Bilad bani bu | 40 | 1000 | Lorimer 1908, p. 679 |
| | | | Ward et al. 1847, p. 104 |
| Hibra | | 300 | Lorimer 1908, p. 1114 |
| Ibra | 90 | 800 + | Lorimer 1908, p. 756 |
| Ibri | 60–80 | 1000**) | Lorimer 1908, p. 757 |
| | | | Miles 1910, p. 414 |
| | | | Cox 1925, p. 211 |
| Kalhat | 12 | 120–130 | Lorimer 1908, p. 971 |
| Kamil | 15 | 200 | Lorimer 1908, p. 884 |
| Khaburah | | 1600**) | Lorimer 1908, p. 1002 |
| | | | Miles 1966, p. 456 |
| Khadhra bin Daffa | | 120 | Lorimer 1908, p. 1373 |
| Liwa | 7–8 | 710 | Lorimer 1908, p. 1109 |
| Masna'ah | 60 + | 300 | Lorimer 1908, p. 1178 |
| | | | Miles 1966, p. 458 |
| Muscat | 340 + | 1283 | Lorimer 1908, pp. 1181–1185 |
| | | | Bent 1895 b, pp. 876, 878 |
| | | | Cox 1925, p. 196 |
| | | | U.S. Navy 1931, pp. 60 f. |
| | | | Wellsted 1837, p. 103 |
| | | | Wellsted 1840, pp. 12–13 |
| | | | Wellsted 1978, p. 71 |
| Matrah | 340 + | 2680 | Lorimer 1908, pp. 1198–1200 |
| | | | Miles 1966, pp. 461 f. |
| | | | Ruschenberger 1838, p. 71 |
| Mudhairib | 20 | 300 | Lorimer 1908, p. 1764 |
| Muladdah | 50 | 400 | Lorimer 1908, p. 288 |
| Nakhl | 60 + | 606 | Lorimer 1908, p. 1359 |
| | | | Miles 1901, p. 470 |
| Nizwa | | 1274 | Cole 1847, p. 115 |
| | | | Cox 1925, p. 215 |
| | | | Miles 1910, p. 177 |
| | | | (Lorimer 1908, p. 1365)*) |
| Quryat | | 710 | Lorimer 1908, pp. 1566 f. |
| | | | Miles 1896, p. 535 |
| Rustaq | 80 | 400 | Lorimer 1908, pp. 1603 f. |
| | | | Miles 1910, p. 422 |
| Saham | 50 | 760 | Lorimer 1908, p. 1645 |
| | | | Miles 1966, p. 450 |
| Sama'il, Hisn | 60 | 30–40 | Lorimer 1908, p. 1663 |
| | | | Miles 1901, p. 495 |
| | | | Miles 1910, p. 177 |
| Shinas | 7 | 400 | Lorimer 1908, p. 1811 |
| Sib | 58 | 1000 | Lorimer 1908, p. 1823 |
| | | | Miles 1966, p. 459 |
| | | | Thomas 1931, p. 129 |
| | | | U.S. Navy 1931, p. 66 |
| | | | Wellsted 1978, p. 177 |
| Sohar | 200 | 1430 | Lorimer 1908, pp. 1838 f. |
| | | | Eccles 1927, p. 22 |
| | | | Miles 1877, p. 51 |
| | | | Miles 1910, p. 177 |
| | | | U.S. Navy 1931, p. 71 |
| Sur | | 2390 | Lorimer 1908, p. 1847 |
| | | | U.S. Navy 1931, p. 50 |
| | | | Ward et al. 1847, p. 102 |
| | | | Wellsted 1978, p. 43 |
| Suwaiq | | 600 | Miles 1966, p. 457 |
| | | | U.S. Navy 1931, p. 69 |
| | | | (Lorimer 1908, p. 1851)*) |
| Tasawir | | 25 | Lorimer 1908, p. 1671 |
| Tiwi | 15 | 320 | Lorimer 1908, p. 1906 |
| Wasil | | 300 | Lorimer 1908, p. 196 |
| | | | Cole 1847, p. 109 |
| | | | Wellsted 1978, p. 91 |
| Wudam | | | Lorimer 1908, p. 289 |

*) In cases where LORIMER is cited in parentheses, the market was not noted by him. However, the settlement size is from the page cited in LORIMER

**) Settlement size given in population only. This has been divided by five, the average occupation per house according to analysis of data in LORIMER

[and] precedents of occasional British intervention in aid of the Sultan against foreign or internal aggression" (BUSCH 1967, p. 21; cf also LANDEN 1967).

The interior was relatively immune from the situation on the coast. Its economy was still based upon subsistence agriculture, which was affected very little by the international economic system. Politically, the interior was essentially independent; in fact the Imamate had been revived in 1868 and again in 1913 to challenge the Sultan. Local tribal shaykhs otherwise held power in the interior. They had no particular interest in encouraging economic activities outside of agriculture, and the British had no interest in the interior as long as it did not threaten their position on the coast. The Sultan had little power to do anything even if he had been interested in the interior. The period around the turn of the century thus presents an opportunity to examine the economic duality of Oman at a time when the two systems were relatively static and functioning separately.

## 2. *Markets and hierarchical structure*

One of the primary methods used to analyze Oman's socioeconomic structure was an examination of the spatial distribution of markets. Extensive data is available neither on the number of functions in the markets nor on spatial purchasing patterns, which are most commonly used to determine marketing structure (cf e. g. BONINE 1980). The data does locate markets in Oman. Table 1 is a list of the documented markets, their sizes if known, the size of the settlement, and references to each market in the literature.

Hierarchical structure of Omani markets was derived from demographic and spatial locational data, since data on functions and purchasing patterns was not available. Demographic variables included the settlement size (in houses); and the presence or absence of Indians; of Khojas; and of the Sultan's troops in a settlement. Spatial locational variables include whether or not the market is located on various types of ecological, social, and political boundaries; location on the coast; and location on the seaward or interior side of the watersheds. Empirical studies have shown that settlement size is usually a good proxy for number of establishments and by extension for number of functions (cf BONINE 1980 for an illustration in the Middle East). To our knowledge, the other variables have not been used in such a context, although the discussion below will show that most of them should be good proxies for the presence of various functions. Indians, for example, would tend to be associated with large wholesalers, Khoja with middle to lower level wholesalers.

Factor analysis was performed on the observations in Table 1 using these variables. In principle, the proceedure used here is similar to the use of factor

*Table 2: Factor scores and proposed hierarchy of markets*
Faktorenwerte und vorgeschlagene Hierarchie der Märkte

| Settlement | Score on factor 1 | Score on factor 2 | Score on factor 3 | Hierarchy level | Adjusted level |
|---|---|---|---|---|---|
| Matrah | 4.051 | | | 5 | 5 |
| Sohar | 3.370 | | | 4 | 4 |
| Khaburah | 3.292 | | | 4 | 4 |
| Barkah | 3.209 | | | 4 | 4 |
| Muscat | 3.069 | | | 4*) | 5 |
| Sib | 2.871 | | | 3 | 3 |
| Quryat | 2.667 | | | 3 | 3 |
| Suwaiq | 2.589 | | | 3 | 3 |
| Masna'ah | 2.379 | | | 3 | 3 |
| Sur | 1.816 | | | 2 | 2 |
| Saham | 1.617 | | | 2 | 2 |
| Liwa | 1.582 | | | 2*) | 1 |
| Shinas | 1.364 | | | 2*) | 1 |
| Nizwa | 1.146 | | 2.481 | 3 | 3 |
| Nakhl | | | 2.371 | 3 | 3 |
| Awabi | | | 2.354 | 3 | 3 |
| Rustaq | | | 2.349 | 3 | 3 |
| Sama'il, | | | | | |
| Hisn | | | 2.310 | 3 | 3 |
| Ibra | | | 1.846 | 2*) | 3 |
| Bahlah | | | 1.818 | 2 | 2 |
| Khadhra | | -1.518 | 1.393 | 2 | 2 |
| Ibri | | -2.279 | | 1*) | 2 |
| Hasan, | | | | | |
| B.B.B. | | -2.279 | | 1 | 1 |
| Ali, | | | | | |
| B.B.B. | | -2.144 | | 1 | 1 |
| Adam | | -2.111 | | 1 | 1 |
| Mudhairib | | -2.044 | | 1 | 1 |
| Wasil | | -1.823 | | 1 | 1 |
| Dhank | | -1.492 | | 1 | 1 |
| Kalhat | | 1.452 | | 2*) | 1 |
| Tiwi | | 1.387 | | 2*) | 1 |
| Wudam | | | -1.150 | 1 | 1 |
| Afi | | | | 1 | 1 |
| Fanjah | | | | 1 | 1 |
| Hibra | | | | 1 | 1 |
| Kamil | | | | 1 | 1 |
| Muladdah | | | | 1 | 1 |
| Tasawir | | | | 1 | 1 |

*) Indicates that the hierarchical level has been adjusted

Note: Only factor scores with absolute value of one or greater are reported

*Table 3: Stem and leaf histogram of characteristic factor scores showing suggested hierarchical levels*

Histogramm der charakteristischen Faktorenwerte mit Hinweisen auf die Hierarchiestufen

| Stem (units) | Leaf (tenths) | Market |
|---|---|---|
| 4. | 0 | Matrah |
| 3. | | |
| 3. | | |
| 3. | | |
| 3. | | |
| 3. | | |
| 3. | | |
| 3. | 3 | Sohar |
| 3. | 2 2 | Barkah, Khaburah |
| 3. | | |
| 3. | 0 | Muscat |
| 2. | | |
| 2. | 8 | Sib |
| 2. | | |
| 2. | 6 | Quryat |
| 2. | 5 | Suwaiq |
| 2. | 4 | Nizwa |
| 2. | 3 3 3 3 3 | Sama'il, Rustaq, Awabi, Nakhl, Masna'ah |
| 2. | | |
| 2. | | |
| 2. | | |
| 1. | | |
| 1. | 8 8 8 | Sur, Bahlah, Ibra |
| 1. | | |
| 1. | 6 | Saham |
| 1. | 5 | Liwa |
| 1. | 4 | Kalhat |
| 1. | 3 3 3 | Shinas, Tiwi, Khadhra |
| 1. | | |
| 1. | | |
| 1. | | |

analysis in BONINE (1980), although he used functions as the relevant variables. The three factors with eigenvalues greater than one (cumulatively accounting for 70.9 percent of the variance) roughly identify ecological zones. Coastal markets scored high on the first factor. Desert interior markets got high negative scores on the second, while two small ports which serve interior areas scored positive. Highland markets scored high on the third factor. A fourth group of markets did not receive high scores on any factor (Table 2).

Hierarchical level was assigned based on the magnitude of the largest positive factor score for each market. (For example, the factor score used to rank Nizwa was 2.48, its score on the third factor.) Factor scores of less than 1.0, 1.0 to 2.0, 2.0 to 3.0, 3.0 to 4.0, and above 4.0 relegated markets to the lowest, second, third, fourth, and the highest levels, respectively. A histogram of the relevant factor score for the top four levels suggests that these breaks at integer values are appropriate (Table 3). After this initial assignment to level, we followed BONINE (1980) in using qualitative evaluation to adjust the quantitatively derived hierarchy. Market size information could not be used directly in quantitative analysis because of missing values for many of the markets. Market size data is available for some markets, however, and should be taken into account. The hier-

*Table 4: Proposed hierarchy of markets*

Vorgeschlagene Hierarchie der Märkte

| Market size | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|
| 350 | | | | | Muscat<br>Matrah |
| 200 | | | | Sohar | |
| 100 | | | | Barkah | |
| 80 | | | Ibra<br>Rustaq<br>Nakhl | | |
| | | Ibri | Mas-<br>na'ah | | |
| 60 | | | H. Sa-<br>ma'il<br>Sib | | |
| | Muladdah | Saham | Awabi | | |
| 40 | BBB<br>Hasan | | | | |
| 20 | Dhank<br>Mudhairib<br>Kamil<br>Tiwi | | | | |
| 0 | Kalhat<br>Liwa<br>Shinas | | | | |
| Size unknown | Adam<br>Afi<br>BBB Ali<br>Fanjah<br>Hibrah<br>Tasawir<br>Wasil<br>Wudam | Bahlah<br>Khadhra<br>Sur | Nizwa<br>Quryat<br>Suwaiq | Khaburah | |

*Table 5: Classification results of the discriminant analysis*
Klassifikationsergebnisse der Diskriminanzanalyse

| Actual group membership | Variable value | Number of cases | Predicated group membership 0 | 1 |
|---|---|---|---|---|
| No market | 0 | 86 | 81<br>94.2% | 5<br>5.8% |
| Market | 1 | 37 | 10<br>27.0% | 27<br>73.0% |

Percent of cases correctly classified overall: 87.8%

Note that the table is read as follows: Of 86 towns which actually do not have markets, the discriminant function classified 81 (94.2%) as having no markets, and 5 as having markets

archical level of seven markets has been adjusted up or down one level, based on market size data and on discussions in the source documents concerning the functional complexity of the markets. The final hierarchical level is shown in the rightmost column of Table 2, and is presented in Table 4, too.

The validity of this hierarchy depends upon the assumption that the data is fairly complete, i. e. that the reports used to document markets have not failed to report very many markets. A brief qualitative discussion of this issue appears below. A quantitative check on the completeness of the data was made by using discriminant analysis on all known settlements with sizes over 200 houses. (It had already been determined that settlements less than that size almost never contained markets.) If the data is complete, settlements containing markets should be distinguishable from other settlements based on the variables which were used to derive the hierarchy. Very incomplete data would lead to an inability to discriminate between places known to have markets and the rest of the settlements.

Discriminating between the presence or absence of a market using the variables in question yielded a highly significant discriminant function ($p < .0001$). Classification results from this discriminant function are presented in Table 5. Overall accuracy in prediction was 87.8 percent. The function had some difficulty in predicting some of the markets in the lowest level of the hierarchy. (All ten incorrect classifications of settlements which actually do have markets were from small villages in the first level.) More importantly, though, the discriminant function only predicted five markets where the data failed to note a market. This gives considerable assurance that the data is reasonably complete in documenting the presence of markets in Oman.

### 3. *Patterns of coastal markets and trade*

This hierarchy of markets was then mapped to examine the spatial distribution (Fig. 1). It is notable that 16 of 36 markets known in Oman (Wudam is not strictly a market, see below), or about 45 percent, were on the coast. Leaving out the smallest markets, which undoubtedly were very locally oriented, 11 of the remaining 20 larger markets (55 percent) were on the coast. Also apparent is the fact that the largest bazaars, Muscat and Matrah were very asymmetrically located with respect to other markets.

Sea trade patterns are mapped based on descriptions in LORIMER (1908). Fig. 2 clearly shows that the coastal area near Sur was not part of the Muscat/Matrah system, but rather had its own overseas trade. It also shows the subordinate trade position of the Batinah coastal towns. Nearly every coastal market of the Batinah and two of the markets on the eastern coast carried on trade with Muscat/Matrah. These ports were first and foremost linked to Muscat/Matrah, rather than to the general Arabian Gulf commerce, as is evident from examining the volume of trade. For example, in 1863 Bushire, a port near the head of the Gulf, recorded imports from Muscat valued at 229,220 rupees, while it imported only 11,250 rupees annually worth of goods from all other Omani ports. Recorded exports from Bushire to Muscat were valued at 107,000 rupees, while there were no exports to any other Omani ports recorded (PELLY 1863). The combined total of all trade between Bushire and the Omani coast was only 3.3 percent of the value of trade between Bushire and Muscat.

Political organization of the coastal areas also partially reflects these trade patterns. The Batinah ports were usually controlled by the Sultan from Muscat. The main customs house was in Muscat, and most goods had to pass through that city before they were shipped further (e. g. MILES 1877). Customs income at Muscat and Matrah amounted to M.T. $ 300,000 annually around the turn of the century, while the customs from all other Omani ports was around M.T. $ 25,000 (LORIMER 1908). Of course, not all trade was legally shipped. Wudam, for instance, shows up on Fig. 2 as a point of trade in the Batinah which carries on commerce with the Gulf, India, and Yemen, but not with Muscat. Wudam became one of the smuggling centers in Oman during the Nineteenth Century

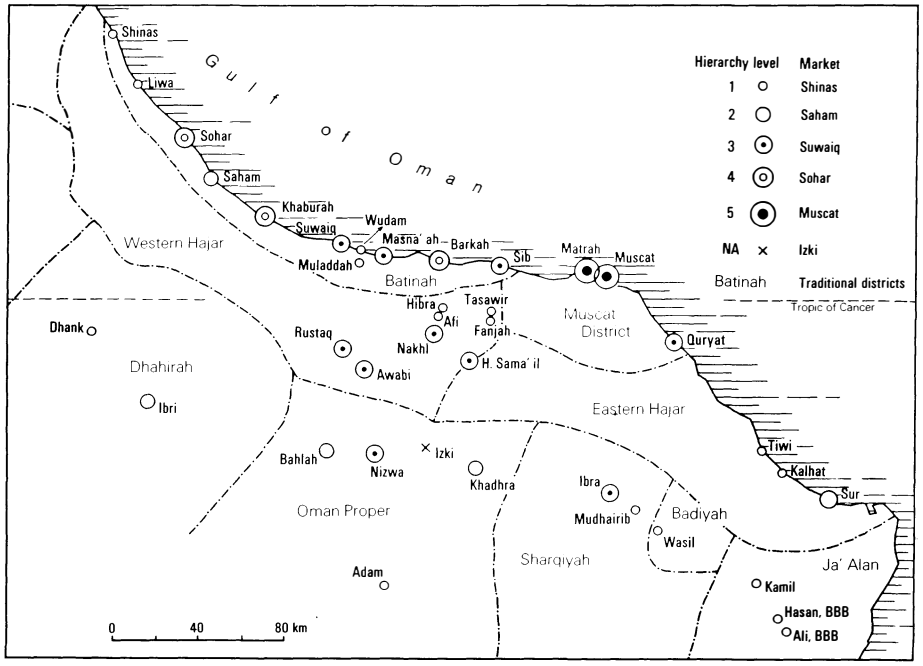


*Fig. 1:* Documented markets and traditional districts in Oman
Nachgewiesene Märkte und traditionelle Regionen in Oman

(LANDEN 1967). The volume of trade of such ports cannot be ascertained. Certainly it was much less than the volume passing through Sur, the largest port in Oman relatively free of the Sultan's control. At Sur, LORIMER (1908) estimated that the annual revenue would have been around M.T. $ 50,000 had the Sultan been able to enforce his authority.

Fig. 2 also shows the inland trade networks which are noted in Lorimer and several other accounts (LORIMER 1908; COX 1925; MILES 1877, 1896, 1901, 1910). With very few exceptions, the hinterland of each port is confined to a local system of wadis on the seaward side of the mountains. This can be demonstrated both from descriptions of the trade area of each port, and by noting the port for each inland area. For example, Barkah's hinterland is described as follows: "Barkah ... is the port of the villages in Wadis Lajal and Ma'awal and partially of those in Wadis Tau and Bani Kharus and also of the town of Nakhl" (LORIMER 1908, p. 1029).

The most striking aspect of the coastal system of ports and hinterlands is that the trade flow within the network was almost entirely vertical. Goods moved from Muscat/Matrah to subordinate port to the hinterland via a wadi route. There was no horizontal trade between hinterlands to speak of, nor was there trade between the subordinate ports. Such organization persisted until after 1970, when Oman first began to implement its development programs. It is described by SCHOLZ (1978), where he presents a schematic drawing of the network and analyzes changes in it brought about since 1970.

This kind of network can be understood as a type resembling the mercantile model outlined by VANCE (1970). "The fundamental dynamic of the mercantile model of settlement is the operation of forces external to the local system ..." (VANCE 1970, p. 153). Major centers are oriented primarily toward the international trade network. SMITH (1974), in summarizing VANCE's model, notes that "expansion of trade proceeds along single avenues from port cities into the interior, upon which subcenters are established. Hence centers and transport routes develop in a linear fashion, becoming separate branchlike systems rather than an interconnected grid" (p. 178). In the mercantile model, Muscat/Matrah was the major center oriented toward the external system, or the "point of attachment", in VANCE's terminology, between Oman and the Indian Ocean trade network.

VANCE's model itself is seen by SMITH (1974) as one type of dendritic system. Dendritic systems are characterized by organization in which "all lower level centers are tied to a single higher level center in a chain that is entirely vertical without horizontal

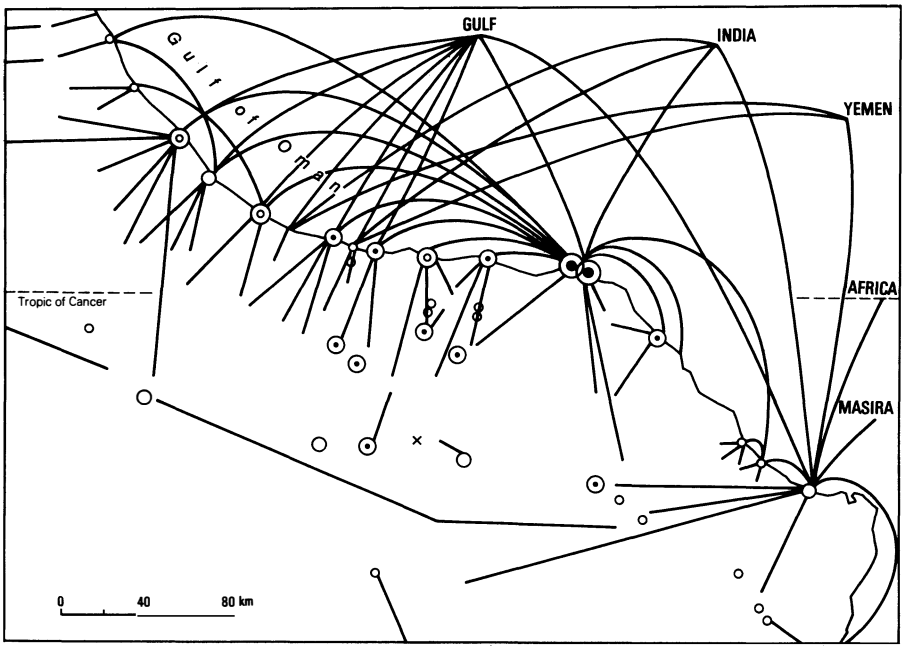


*Fig. 2:* Documented trade patterns
Nachgewiesene Handelswege

links" (SMITH 1974, p. 177). These systems "seem to occur mainly in colonial or recently colonial societies where marketing is not only imposed by conquest, but imposed by an outside group involved in the international market and import-export trade" (SMITH 1974, p. 178). Throughout history this coastal system in Oman has often been under foreign domination and was actually more or less a British client during the time of LORIMER's data.

However, foreign political domination is not the key factor. Rather, the foreign orientation of merchants and trade determined the nature of the marketing structure. The ports of Oman were the only settlements in the country where one could consistently find significant foreign populations. In Muscat "the merchants are chiefly Banyans [Hindus] from India and Persians" (BENT 1895a, p. 112). In Barkah "the ready cash is all in the hands of the Banyans . . ." (PENGELLY 1861, p. 33). At Khaburah, trade is "in the hands of twenty-five Khoja traders . . ." (MILES 1966, p. 456); at Suwaiq "there are eleven Banians here who control the trade . . ." (MILES 1966, p. 457). Descriptions of nearly every other port in the Batinah contain variations of these examples. The Hindus tended to control the import-export trade and were the primary bankers. Persians and Khojas (originally Shi'i Muslims from India) made up a large proportion of smaller merchants and shopkeepers, although a few of them also owned major import-export firms (LORIMER 1908; cf also ALLEN 1981).

The emerging picture of the coastal system can be refined by exploring one obvious question; namely, why were the two largest bazaars in Oman right next to each other? In fact, these two bazaars were very different in function. Muscat was the import-export port, and "nearly the whole of the commerce of Oman passes through the hands of the merchants at Maskat . . ." (WELLSTED 1978, pp. 317–318). Matrah, however, was "much frequented by the Imam's [the Sultan's] vessels, but seldom by those of others" (WELLSTED 1978, p. 32). BENT calls Matrah the "trading center" of Muscat (1895b, p. 875), and Cox calls it the "commercial port" of Muscat (1925, p. 197). Both are obviously referring to domestic trade.

LANDEN (1967) has already noted (without any theoretical framework) the separate complementary functions of these two cities. Import-export was centered at Muscat and dominated by Hindus, while domestic trade centered on Matrah and was dominated by Khojas. POLANYI (1975) argues that foreign trade and domestic marketing are two entirely separate concepts, and that many societies organize them separately. Foreign traders may be "strictly enjoined to make use of the services of a broker in order to

prevent the fusing of bazaar trade [domestic marketing] and foreign trade into anything in the nature of general marketing" (POLANYI 1975, p. 153). ARNOLD (1957) analyzes an actual case of such functional separation in Eighteenth Century Dahomey, and concludes that the effective purpose for the separation was to insulate the native population from contact with foreigners.

Dendritic systems are almost always associated with traditional agricultural societies which have been penetrated by the international market (SMITH 1974). The separation of function POLANYI argues for, as well as distinctions on various hierarchical levels in social and ethnic composition of merchants and traders that SMITH (1975) expects, served as in Dahomey to insulate the traditional society from the differing values of international commerce. In Oman, a series of these buffers smoothed the transition between the mercantile Indian Ocean economy and the subsistence agricultural economy inland. The physical separation of Muscat and Matrah and the corresponding social separation between Hindu and Khoja was only one level of these buffers. Neither Hindus nor Khojas generally ventured inland (MILES 1896); instead, brokers or agents were engaged. In some cases these petty traders were Baluchis (MILES 1896) who were the foreign group most integrated into Omani society. In most cases, however, the agents were Arabs (LANDEN 1967).

On a purely local level, provision markets held just outside the walls of large cities can be viewed as a form of these buffers. These "Vorstadtbazare" function as a place for local exchange between the city and its immediate agricultural hinterland (WIRTH 1974–75). Muscat had one of these Vorstadtbazare just outside one of its gates on the road leading to local agricultural villages. This particular market place did not serve as a collecting point for goods destined for export, nor as a point of dispersal for goods to the interior (LORIMER 1908; COX 1925; BENT 1895b).

On a wider level, the hierarchy of markets itself also served as a buffer. The further removed from Muscat/Matrah the market was, the less contact with the international network there was. To be sure, the subordinate ports did all have small populations of Hindus and/or Khojas, as well as Baluchis and Persians (LORIMER 1908). The Indians were traders and merchants in these ports as they were in Muscat/Matrah. However, only a few acted independently, notably at Sohar (LORIMER 1980). Rather, most were members of firms headquartered in Muscat/Matrah (LORIMER 1908; LANDEN 1967) and did not deal directly with the international network.

Sohar was the only port which requires particular comment, since WELLSTED (1978) ranked it next to Muscat in importance in the first half of the Nineteenth Century (compare ECCLES 1927). By the end of the century, MILES (1966) still singled out Sohar for comment, but noted that it had sunk almost to the level of the other Batinah ports. Sohar's prominence was due partially to residual historical importance. It was the major Persian port in the country around the time of the rise of Islam, and it became the major Omani port again in the Tenth Century. (SPEECE 1981 contains extensive references to historical trade.) However, Sohar also partially fulfilled the functions of contact point with areas outside the coastal system, as reference to Fig. 2 will show.

Fig. 3 is a schematic representation of the markets and trade patterns of the coastal network. Muscat was the "point of attachment" to the international network. Matrah was complementary to Muscat, not duplicative; it organized domestic trade. The Batinah ports were subordinate to Muscat/Matrah and were entry or exit points inland. Several of these ports in turn had subordinate markets where population concentrations would support additional markets. These additional levels could be inland, or associated with very small unimportant coastal markets. Sohar functioned as a contact point with outside systems for certain areas of the interior which were much closer to it than to Muscat/Matrah. Finally, two inland markets seem to have had small dependent markets. It should be noted that some links bypassed intermediate levels and went directly to higher order centers. EHLERS (1975) and BONINE (1979, 1980b), among others, have shown that this is fairly common in Iran. In fact, it is quite consistent with the phenomenon of urban dominance found in many areas of the Middle East.

### *4. Interior organization*

In VANCE's model, and in the cases to which the dendritic model is usually applied, the international trade system expands into more or less of a vacuum in the interior. The situation in this case is different. Oman has been attached to the Arabian Gulf/Indian Ocean trade network at least since the Third Millenium (SPEECE 1984). Except for a few brief occupations by foreign invaders, the tribes of interior Oman have generally been able to maintain their independence from any political domination of the coast. They were also able to successfully resist the penetration of the coastal economic system. The

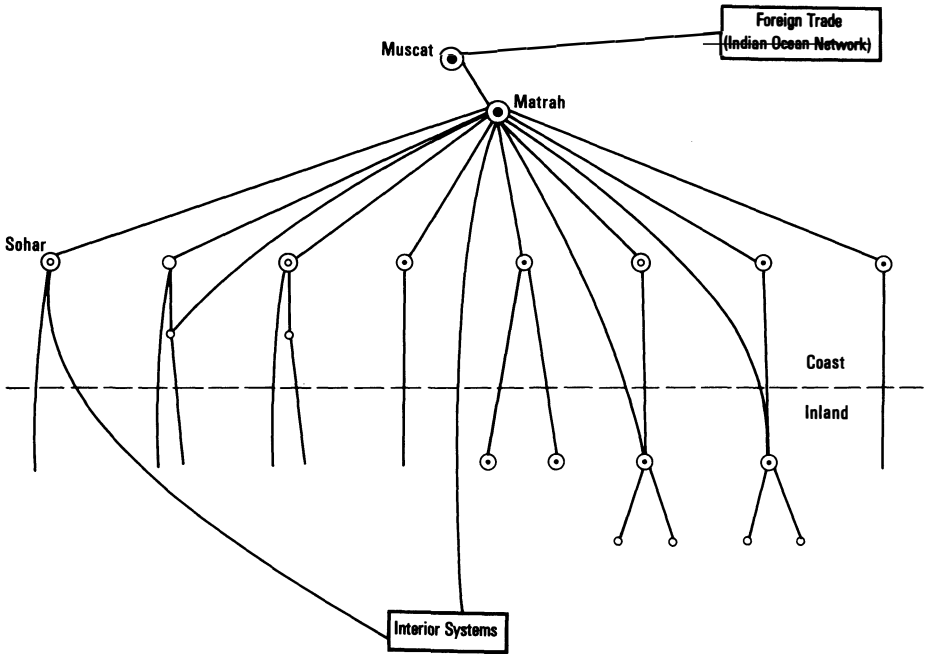


*Fig. 3:* Schematic representation of the coastal system
Schematische Darstellung des Küsten-Systems

interior thus developed a socioeconomic structure which was distinct from that of the coast. These differences translated into differences in spatial organization.

Fig. 2 indicates that the markets of the interior show no particular integration. This is not simply a reflection of lack of data, or of the failure of observers to note trade patterns. Many discussions of these interior markets do indicate local patronage patterns (e. g. Ibri, MILES 1910; Nizwa, MILES 1901; and Khadhra bin Daffa, LORIMER 1908). In addition, long distance and foreign trade were noted where they existed. For example, Dhahirah exported wheat and fruits both to Sohar and to Sharqiyah (LORIMER 1908). Sharqiyah district itself channelled most of its foreign trade through Sur (LORIMER 1908). Sur was also the port for Ja'alan, either directly or via the small coastal village of Lashkharah (LORIMER 1908). However, even Sur, which was the primary port for most of the interior, was very little involved in import-export activities. Rather, its prosperity was based almost completely upon its role in the transit trade (WELLSTED 1837).

These differences in trade patterns indicate that the mercantile/dendritic model of the coast does not adequately describe the economic system of interior Oman. Actually, it would be somewhat misleading to speak of a single interior system at all; the interior was distinguished by a number of local marketing mini-systems which were not integrated into a wider network. Within the constraints placed upon these mini-systems by the availability of suitable land and water (cf SCHOLZ 1984; WILKINSON 1977; BIRKS 1977; BIRKS a. LETTS 1976), the major factors in location of markets were social and to some extent ecological boundaries.

The theoretical basis for understanding such location factors was advanced by POLANYI (1957), and the phenomenon has been noted in many diverse settings. CHAPMAN, who discussed ecological boundary locations of markets in the ancient Indian civilizations of Central America, notes that "trans-shipments naturally developed from the earliest times on the borders of ecological regions, such as highland and plain, desert and jungle, forest and savannah" (p. 116). Reference to Fig. 4 will show that nearly all of the larger markets away from the coast were located on the boundary between the inhabited mountain region and the more sparsely populated foothill zones. Further inland, a number of small interior markets were situated near the boundaries between the inhabited inner foothills and the desert regions frequented only by nomads. These markets facilitated trade between ecological zones which produced different kinds of products.

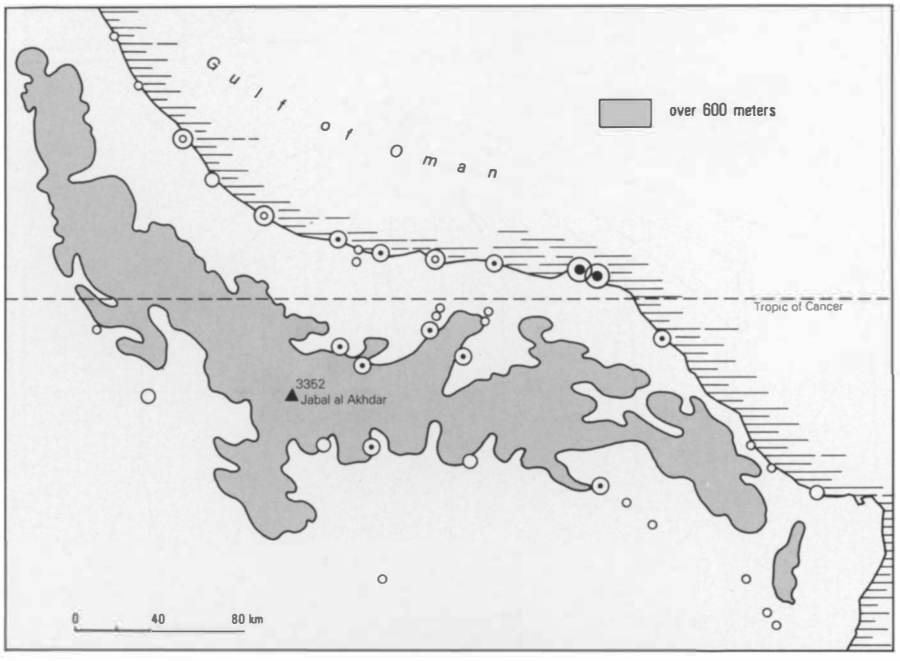


*Fig. 4:* Location of markets with respect to mountains
Lage der Märkte in Beziehung zum Relief

Most ecolological boundaries coincided with sociopolitical divisions within Omani society, and the markets also facilitated exchange across these sociopolitical boundaries. The bazaars of Rustaq and Nakhl certainly fit this category. They helped bridge the gap between cosmopolitan coastal ports and tribal interior villages as much as between coastal plain and mountain zone. Similarly, the small interior markets tend to closely follow the line dividing settled agriculturalists of the foothills and the nomadic Bedouin of the desert. (This line is mapped by SCHOLZ 1977 a, 1977 b.) These small markets were primarily provision markets for Bedouin. Adam "forms a convenient market for Bedouin to resort to for provisions and other necessaries" (MILES 1910, p. 169). Descriptions of the Dhank market and the goods sold in it also suggest orientation toward trade with the Bedouin (MILES 1910; COX 1925). Badiyah district, in which Wasil is situated, contained as many Bedouin in temporary camps as it did settled people in villages (LORIMER 1908).

One aspect of social organization in the interior transcended the differences between settled and nomadic Omanis. Tribal rivalries fostered division into two great political factions, Hinawi and Ghafiri (LORIMER 1908; also WILKINSON 1977 for modern discussion and references). All of the larger inland market towns were located on or very near the boundaries of this traditional tribal political division. Ibra, for example, consisted of one Hinawi and one Ghafiri quarter. The bazaar was actually in two parts; one in each quarter (LORIMER 1908; GRANDMAISON 1977 analyzes this division for modern Ibra in detail). The Hisn Sama'il market was under the walls of a fort which marked the boundary (LORIMER 1908; MILES 1901). In Nizwa, the bazaar was located on a wadi which separated the two Hinawi and Ghafiri quarters (LORIMER 1980; MILES 1910).

Tribes of both factions also inhabited Bahlah (LORIMER 1908), Nakhl (LORIMER 1908; MILES 1901), and Rustaq (LORIMER 1908). Ibri and Awabi lie very near the boundary. In fact, the Hinawi inhabited village of Salaif "is practically a suburb" of the Ghafiri occupied Ibri (LORIMER 1908, p. 47). Reference to Fig. 5 will show that many of the smaller markets, such as Hibra, Adam, and Bilad bani bu Hasan, also fell on or very near the boundaries. Part of Fanjah was actually a small neutral territory occupied by a tribe which remained outside of the two tribal factions (LORIMER 1908).

Market location on such political boundaries has been documented elsewhere. In the Berber areas of Morocco, for example, the territories of the two tribal political factions coincide with mountain chains, and

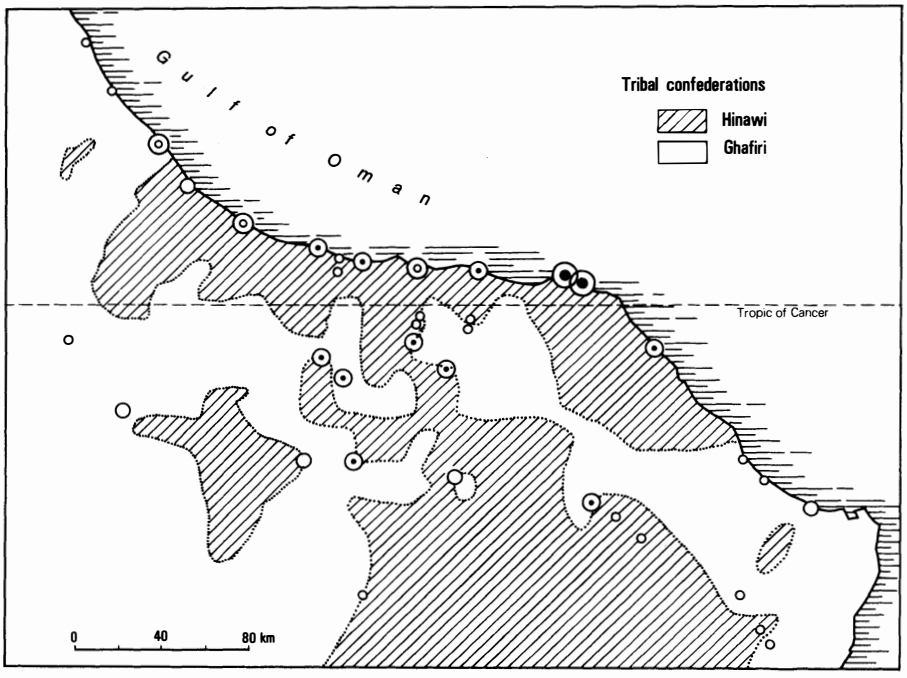


*Fig. 5:* Location of markets with respect to tribal confederations
Lage der Märkte in Beziehung zu Stammesverbänden

markets are located in the valleys between these chains (BENET 1957). Such locations allow for exchange on neutral ground, where the rules of tribal rivalry may be temporarily put aside. The smaller markets of interior Oman seem to be examples of an "extended network system" in SMITH's terminology (1976a, 1976b). Such systems are characteristic of "independent ‚tribal' societies" (SMITH 1976a, p. 317).

Careful examination of the data in LORIMER reveals several towns of some size which lie on the political boundaries, but for which no market is documented. Izki and Manah are the most notable of these. This raises the question of whether the theory outlined here is inadequate or whether Nineteenth and early Twentieth Century reports are incomplete. The discussion above on the results of the discriminant analysis indicate that the primary documentation is fairly complete, and that only a very few markets are likely to have remained uncited in them. In the case of Izki and Manah, markets are documented in SCHOLZ (1977a). Furthermore, SCHOLZ also notes markets in several large villages in Oman Proper which lie on the fringe of the desert. The theory would expect to find markets in many of these towns to facilitate trade between Hadhr and Bedouin.

In Sharqiyah and Ja'alan, SCHOLZ's market locations correspond almost exactly to the travelers reports (Fig. 1 and SCHOLZ 1977a). The single difference is that SCHOLZ does not show a market at Wasil but adds one to nearby Mintirib. THESIGER (1950) states that Wasil's falaj dried up and its palms all died, which is undoubtedly the reason that this shift occurred. Because of this close correlation, it is likely that the discrepancy between the earlier documents and SCHOLZ in Oman Proper is due to the fact that LORIMER and others simply failed to comment on a few of the smaller markets. If, however, the markets noted by SCHOLZ have been newly established since the early Twentieth Century, the theory still holds. The markets have appeared exactly where one would expect to find them. (Note that of the five settlements identified above by the discriminant analysis which should have markets but do not have them documented, three appear in SCHOLZ's discussion, including Izki and Manah.)

The nature of the interior's "port" at Sur is a final issue that must be addressed. On the surface, it might seem that Sur served the functions seen at Masqat and/or Matrah. Sur was the second largest town in Oman after Matrah (LORIMER 1908). It was the port for all of eastern Oman (MILES 1966), especially Sharqiyah and Ja'alan (Lorimer 1980). After Muscat/Matrah and Sohar, it was perhaps the most flourishing port in the country, and one observer felt that

the potential customs revenues could be quite high (ECCLES 1927). There were even a handful of Hindu traders residing in Sur (LORIMER 1908).

However, despite these surface similarities, Sur did not occupy a position similar to Muscat/Matrah in any larger system. Even its physical structure was different. Muscat and Matrah were both well-defined walled urban conglomerations (cf the map of the two cities in STIFFE 1897, p. 660). Sur, however, was actually a dispersed settlement consisting of a number of tribal quarters. The bazaar was in a separate quarter, a mile and a half away from the main residential quarters (LORIMER 1908; WELLSTED 1978). As already noted, Sur's hinterland trade was "trifling" and the town's merchants depended on their role as transit middleman in the Indian Ocean trade (WELLSTED 1978, p. 44). Sur thus was not very involved in import-export and had no need of a settlement like Matrah to organize its nearly non-existent hinterland trade.

## 5. *Conclusion*

Traditional Omani duality, then, translated into a number of striking differences. Spatial organization of the marketing network was quite elaborately defined for the coastal system centered on Muscat and Matrah. Muscat/Matrah were the top level of a dendritic/mercantile system. Such systems are a characteristic spatial organization of societies which are highly oriented toward external long-distance trade. In Oman, Muscat was the international trade center for the system, while distribution and collection functions for domestic trade were turned over to Matrah. Trade with other parts of the coastal system was channeled from Matrah through a set of subordinate ports. From these subordinate ports the connection inland followed routes up wadis. In a few areas (those with sufficient hinterland populations) markets developed inland on these routes. This kind of organization allowed quite extensive participation (by Omani standards) in international trade networks while at the same time largely insulating the inland population from direct contact with the international network.

The interior was not part of this dendritic/mercantile system, and trade with it was organized separately through Matrah or Sohar. The Imamate had quite different organization; in fact, it was characterized by lack of a coherent overall structure. The bazaars of the interior usually functioned as the center of a small distinct system without any substantial trade relations to other bazaars or to the international network. Interior markets were located to facilitate local trade across various kinds of boundaries. Location on ecological boundaries was particularly evident in the foothills between mountains and plains. Social boundaries were bridged by a string of small markets along the fringes of the inhabited areas, where Bedouin meet Hadhr. Most large bazaars were located to facilitate contact across the boundaries between the two major political confederations.

Marketing structures are, of course, only one aspect of the total background to Oman's long-lasting duality. Research on some of the other aspects has begun; much more is needed, however, before the traditional structure is lost to social science investigation as it evolves under the impact of development. The traditional economic structure is the foundation upon which current development efforts must take place, and understanding it well can only aid in more efficient development planning, both in Oman and in other countries which may have similar structures.

## *References*

ALLEN, C. H.: The Indian Merchant Community of Masqat. In: Bulletin of the School of Oriental and African Studies 44 (1), 1981, 39–53.

ARNOLD, R.: Separation of Trade and Market: Great Market of Whydah. In: Trade and Market in the Early Empires: Economies in History and Theory (K. POLANYI et al., eds.). New York 1957, 177–187.

BENET, F.: Explosive Markets: the Berber Highlands. In: Trade and Market in the Early Empires: Economies in History and Theory (K. POLANYI et al., eds.). New York 1957, 188–217.

BENT, J. T.: Exploration of the Frankincense Country, Southern Arabia. In: Geographical Journal 6 (2), 1895 a, 190–234.

– : Muscat. In: Contemporary Review 68, 1895 b, 871–882.

BIRKS, J. S.: The Reaction of Rural Populations to Drought: a Case Study from Southeast Arabia. In: Erdkunde 31, 1977, 299–305.

BIRKS, J. S. a. LETTS, S. E.: The Awamir: Specialist Well and Falaj Diggers in Northern Interior Oman. In: Journal of Oman Studies 2, 1976, 93–100.

BONINE, M. E.: City and Hinterland in Central Iran. In: Interdisziplinäre Iran-Forschung: Beiträge aus Kulturgeographie, Ethnologie, Soziologie und Neuerer Geschichte (G. SCHWEIZER, ed.). [Tübinger Atlas des Vor-

deren Orient, Beiheft Reihe B (Geisteswissenschaften) Nr. 40]. Wiesbaden 1979, 141–154.

– : Yazd and its Hinterland. A Central Place System of Dominance in the Central Iranian Plateau. Marburger Geographische Schriften, H. 83. Marburg 1980.

BUSCH, B. C.: Britain and the Persian Gulf, 1894–1914. Berkeley 1967.

CHAPMAN, B.C.: Port of Trade Enclaves in Aztec and Maya Civilizations. In: Trade and Market in the Early Empires: Economies in History and Theory (K. POLANYI et al., eds.). New York 1957, 114–153.

COLE, C. S. D.: An Account of an Overland Journey from Leskkaire to Maskat and the Green Mountains of Oman. In: Transactions of the Bombay Geographical Society 8, 1847, 106–119.

COX, P.: Some Excursions in Oman. In: Geographical Journal 66 (3), 1925, 193–227; map.

ECCLES, G. J.: The Sultanate of Muscat and Oman. In: Journal of the Royal Central Asian Society 14, 1927, 19–42.

EHLERS, E.: Die Stadt Bam und ihr Oasen-Umland/Zentraliran: Ein Beitrag zu Theorie und Praxis der Beziehungen ländlicher Räume zu ihren kleinstädtischen Zentren im Orient. In: Erdkunde 29 (1), 1975, 38:52.

GRANDMAISON, C. LEC.: Spatial Organization, Tribal Groupings, and Kinship in Ibra. In: Journal of Oman Studies 3 (2), 1977, 95–106.

LANDEN, R. G.: Oman since 1856: Disruptive Modernization in a Traditional Arab Society. Princeton, NJ, 1967.

LORIMER, J. G.: Gazetteer of the Persian Gulf, Oman, and Central Arabia. Vol. 2: Geographical and Statistical. Calcutta, India, 1908.

MILES, S. B.: On the Route between Sohar and el-Bereymi in Oman, with a Note on the Zatt, or Gipsies in Arabia. In: Journal of the Asiatic Society of Bengal XLVI (1), 1877, 41–60; map.

– : Journal of an Excursion in Oman, in Southeast Arabia. In: Geographical Journal 7 (5), 1896, 552–537; map.

– : Across the Green Mountains in Oman. In: Geographical Journal 18 (5), 1901, 465–498.

– : On the Border of the Great Desert: a Journey in Oman. In: Geographical Journal 36 (2; 4), 1910, 159–178; map: 405–425.

– : The Countries and Tribes of the Persian Gulf. London 1966.

PALGRAVE, W. G.: Observations Made in Central, Eastern, and Southern Arabia during a Journey through that Country in 1862 and 1863. In: Journal of the Royal Geographical Society 34, 1864, 111–154.

PELLY, L.: Remarks on the Tribes, Trade, and Resources around the Shore Line of the Persian Gulf. In: Transactions of the Bombay Geographical Society XVII, 1863, 32–113.

PENGELLEY, W. M.: Remarks on a Portion of the Eastern Coast of Arabia between Muscat and Sohar. In: Transactions of the Bombay Geographical Society XVI, 1861, 30–39.

POLANYI, K.: The Great Transformation: the Political and Economic Origins of our Times. Boston 1957.

– : Traders and Trade. In: Ancient Civilizations and Trade (J. A. SABLOFF a. C. C. LAMBERG-KARLOVSKY, eds.). Albuquerque 1975, 133–154.

RUSCHENBERGER, W. S. W.: A Voyage Round the World; Including an Embassy to Muscat and Siam in 1835, 1836 and 1837. Philadelphia 1838.

SCHOLZ, F.: 1976. Entwicklungstendenzen im Beduinentum der kleinen Staaten am Persischen/Arabischen Golf – Oman als Beispiel. In: Mitteilungen der Österreichischen Geographischen Gesellschaft 118 (1), 1976, 70–108.

– : Die beduinischen Stämme im östlichen Inner-Oman und ihr Regional-Mobilitäts-Verhalten. In: Sociologus 27, 1977 a, 97–133.

– : Sultanat Oman: Ein Entwicklungsland im Südosten der Arabischen Halbinsel. In: Die Erde 108, 1977 b, 23–74.

– : Ziele und Ergebnisse der wirtschaftlichen und wirtschaftsräumlichen Entwicklung in den kleinen arabischen Erdölförderländern – Oman als Beispiel. In: Die Erde 109, 1978, 493–514.

– : Sultanate of Oman, Part I: A Geographical Introduction to the Country of Oman, its Natural Resources, its People, its Settlements, its Economy, and its Modern Development. Stuttgart 1980.

– : Falaj-Oasen in Sharqiya, Inner-Oman. In: Die Erde 115, 1984, 273–294.

SMITH, C. A.: Economics of Marketing Systems: Models from Economic Geography. In: Annual Review of Anthropology 3, 1974, 169–201.

– : Examining Stratification Systems through Peasant Marketing Arrangements: an Application of some Models from Economic Geography. In: Man (N.S.) 10, 1975, 95–122.

– : Exchange Systems and the Spatial Distribution of Elites: the Organization of Stratification in Agrarian Societies. In: Regional Analysis Vol. 2: Social Systems (C. A. SMITH, ed.). New York 1976a, 309–374.

– : Regional Economic Systems: Linking Geographical Models and Socioeconomic Problems. In: Regional Analysis Vol. 1: Economic Systems (C. A. SMITH, ed.). New York 1976b, 3–63.

SPEECE, M.: Sultan and Imam: an Analysis of Economic Dualism in Oman. Masters Thesis, University of Arizona, 1981.

– : The Role of Eastern Arabia in the Gulf Trade of the Third and Second Millenia. In: Studies in the History of Arabia, Vol. II: Pre-Islamic Arabia. Proceedings of the Second International Symposium on Studies in the History of Arabia, King Saud University, Riyadh, Saudi Arabia, April 1979. (A. M. ABDALLA, S. AL-SAKKAR a. R. MORTEL, eds.) Riyadh 1984, 167–176.

STIFFE, A. W.: Ancient Trading Centers of the Persian Gulf, IV: Maskat. In: Geographical Journal 10 (6), 1897, 608–618; map 660.

THESIGER, W.: Desert Borderlands of Oman. In: Geographical Journal 116 (4–6), 1950, 138–171.

THOMAS, B.: Alarms and Excursions in Arabia. Indianapolis, IN, 1931.
U.S. Navy Department, Hydrographic Office: Sailing Directions for the Persian Gulf. Washington, DC, 1931.
VANCE, J. E.: The Merchant's World: the Geography of Wholesaling. Englewood Cliffs, NJ, 1970.
WARD, C. G., SYLVESTER, C. J. a. JAMES: Account of a Journey from Soor to Jahlan, and thence to Ras Roves. In: Transactions of the Bombay Geographical Society, 8, 1847, 101-106.
WELLSTED, J. R.: Narrative of a Journey into the Interior of Oman in 1835. In: Journal of the Royal Geographic Society 7, 1837, 102-113.
- : Travels to the City of the Caliphs, along the Shores of the Persian Gulf and the Mediterranean, Vol. 1. London 1840.
- : Travels in Arabia, Vol. 1. Graz, Austria, 1978. (Reprint of 1838 ed.)
WILKINSON, J. C.: Water and Tribal Settlement in South-East Arabia: A Study of the Aflaj of Oman. Oxford, England, 1977.
- : Changes in the Structure of Village Life in Oman. In: Social and Economic Development in the Arab Gulf (T. NIBLOCK, ed.). London 1980, 122-134.
WIRTH, E.: Zum Problem des Bazars (suq, carsi): Versuch einer Begriffsbestimmung und Theorie des traditionellen Wirtschaftszentrums der orientalisch-islamischen Stadt. In: Der Islam 51 (2), 1974, 203-260; 52 (1), 1975, 6-46.

# CITRUS IN FLORIDA

## Ecological management and nature's latest intervention through freeze

With 11 figures and 2 tables

WOLFGANG WEISCHET and CESAR N. CAVIEDES

*Zusammenfassung:* Citrus in Florida. Ökologisches Management und die Frostkatastrophe 1983/85

Ende der 70er Jahre wurde in Florida auf 310000 ha Citrus-Plantagen mit nahezu 11 Millionen Tonnen über ein Viertel der auf der Welt für den Markt bestimmten Citrusfrüchte mit einem Wert von mehr als einer Milliarde US-Dollar produziert. Zwei Drittel der Gesamtmenge wächst unter den ökologischen Bedingungen der Sandhügelländer der Central Ridges, ein Drittel entstammt den grundwassernahen Sandebenen der Flatwoods. Die Central Ridges bestehen aus einer mächtigen Auflage pleistozäner Quarzsande über einem Karstrelief in Kreidekalken. Die Flatwood-Ebenen sind pleistozäne Abrasionsflächen, die ebenfalls eine Quarzsanddecke tragen.

Als subtropische Spezies vertragen die Citrusbäume leichten Frost, bei Temperaturen unter – 3.3 °C erfrieren die Früchte, bei mehr als 4 Stunden unter – 5.6 °C wird der ganze Baum schwer geschädigt. Auf Grund der Frostkatastrophen am Ende des 19. Jhs. sowie zu Anfang der 40er und 60er Jahre ist der Schwerpunkt der Citruskulturen auf den mittleren und südlichen Teil der Central Ridges und in die Flatwoods Zentralfloridas gewandert. Die beiden Frostkatastrophen vom Dezember 1983 und Januar 1985 haben insgesamt 40% der Kulturen, diejenigen nördlich der Breite von Orlando total vernichtet.

Hauptgegenstand der Darstellung ist das technologisch ausgefeilte ökologische Management der Citrus-Kulturen auf den stark sauren, höchst durchlässigen, extrem nährstoff- und humusarmen, nur mit sehr niedriger Austauschkapazität ausgestatteten Quarzsandböden. Die Citrus-Kulturen sind vollständig auf „künstliche Ernährung" angewiesen; sie gleichen einem „hydroponic system", in welchem der Boden nur dem Halt der Wurzeln dient und die Rolle des Übermittlers der vom Menschen verabreichten Nährstoffe spielt. Aber wie kann er das bei der exzessiv großen Permeabilität, für die sich der rasche Durchsatz nicht absorbierter Elemente mit Hilfe des Modells von NOFZIGER a. HORNSBY rechnen läßt? In der Kombination eines möglichst tief reichenden Wurzelstocks als Abfangsystem, bestimmter Eigenschaften des subtropischen Niederschlagsrhythmus und daran angepaßter Portionsdüngung ist dies im Normalfall möglich.

Citrus was first introduced into Florida by the Spanish settlers in the St. Augustine and St. Johns Rivers region. Citrus production achieved significant importance as a commercial enterprise, especially in the vicinity of the St. Johns River, following the