THE CITY OF KERMAN, IRAN *)

With 3 figures and 1 table

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Zusammenfassung: Die Stadt Kerman im Iran

Die Stadt Kerman liegt im südlichen Teil des Iran in einem weiten Gebirgskessel mit einer größeren Anzahl landwirtschaftlicher Niederlassungen. Stadt und Dörfer wurden getrennt untersucht.

Die Stadt ist jetzt Provinzhauptstadt und war seit mehreren Jahrhunderten ein Zentrum für Handel, Industrie und Verwaltung. Ihre unmittelbare Umgebung jedoch ist weniger für den Lebensunterhalt einer hohen Bevölkerungszahl geeignet als die verschiedener anderer Städte des südlichen Iran. Kerman im besonderen ist abhängig vom Wasser, das aus einer Entfernung von 30 km durch kostspielige Untergrundkanäle (qanat) bezogen wird, die zwischen 10 und 300 m unter der Oberfläche verlaufen.

Die vorliegende Arbeit beschäftigt sich mit der Geschichte und dem Handel der Stadt Kerman und zeigt, wie die politischen und kommerziellen Vorteile ihrer Lage die natürlichen Nachteile überwogen haben. Diese Vorteile lassen sich beide von der Tatsache herleiten, daß Kerman weiter als seine möglichen Rivalen von den Gebieten der primitiven Stämme im Süden und Westen entfernt ist und damit weniger deren Zugriff ausgesetzt war.

Als Gegenstück wird in einer zweiten Arbeit (BECKETT und GORDON) gezeigt, wie die landwirtschaftlichen Niederlassungen im Kerman-Kessel, ihre Landnutzung und die Beschäftigungsarten der Bewohner fast gänzlich von den Faktoren der natürlichen Umgebung bestimmt werden.

Der Vergleich beider Arbeiten läßt deutlich hervortreten, wie im selben Gebiet die Bedeutung der verschiedenen kausalen Faktoren (der natürlichen politischen und kommerziellen Vorteile usw.), für die Entwicklung menschlicher Niederlassungen verschiedener Größe sehr unterschiedlich sein kann.

Introduction

An earlier paper (BECKETT and GORDON) has described the rural settlements round Kerman in southern Iran. Their distribution appears to be almost wholly explicable in terms of the local physical environment, and notably *water* and *soil*. Not only the distribution of population but also their occupations, and the pattern of land use, depend upon the balance of soil and water.

The present paper discusses the city of Kerman itself of which, in contrast, the location and development seem to be inexplicable except in terms of political and economic factors.

The City of Kerman

The city of Kerman is high and dry. It lies about 5.600 ft. above sea level, and experiences an average annual precipitation of 15 cms. The winters are bitterly cold. The summers are hot, but the relative humidity is moderate.

Until recently Kerman has been isolatd from neighbouring centres by tedious and intermittently dangerous journeys. Camel caravans used to take 30–40 days to reach Shiraz, 25–40 days to Bandar Abbas, and 25–30 days to Yezd (see Fig. 1.). Not infrequently,

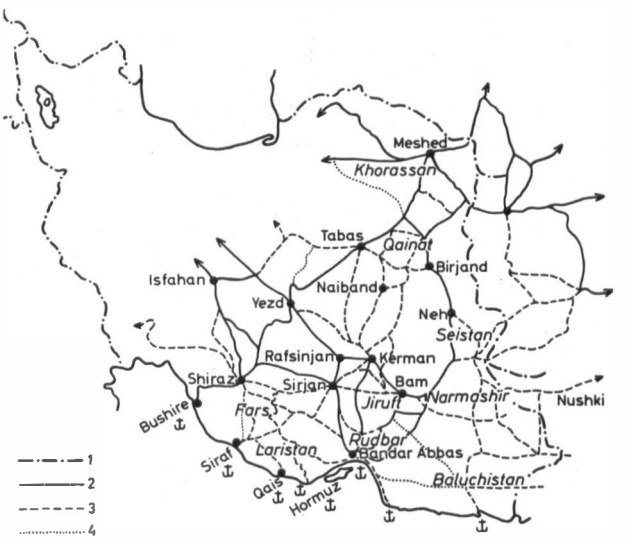

Fig. 1: Caravan routes of South and East Iran.
1 current international boundaries; 2 preferred routes capable of supporting substantial caravan traffic; 3 other routes preferred during some periods but less capable of carrying substantial traffic; 4 uncertain routes
(Compiled from various sources)

tribal lawlessness in Fars, Laristan or Baluchistan closed the roads completely. The published reports from the Bristish Consulate in Kerman early in this century commonly refer to such hindrances to trade [1]), and to the inability of any but the strongest governors to provide sufficient security for the commerce on which Kerman depended. (*4493; 5263; 5452*) [2]).

Tall limestone crags not far from the centre of the Kerman plain provide the kernel for a strong defensive position. They were presumably the nucleus round which the city has developed. The complicated geological folding, that produced the crags, has apparently also given rise to a relatively shallow ground water table near their foot. Numbers of qanats (BECKETT 1953; NOEL 1944; SMITH & ARMSTRONG 1951) tap the ground water immediately to the north, east and south of the city. Yet the water resources of the immediate neighbourhood are quite unable to support the present (1956) population of 62.160, and populations comparable, or up to 100.000, during

*) Grateful thanks are due to Dr. A. D. H. Bivar, Miss Judith Brown and the late Mr. L. Lockhart. who have criticised drafts of this paper; to Professor W. B. Fisher whose invitation to read a paper to his faculty provided the spur to finish it; and to the librarian of the Royal Geographical Society who exhumed the Diplomatic and Consular reports.

[1]) e.g. "Roads are impassable except for well-armed parties able to beat off attack". (1908/09; *4316*). Such lawlessness is reported in 1902/3 (*3182*); 1907/8 (*4162; 4156*); 1908/9 (*4376; 4396*); 1910/11 (*4702; 4838; 5263*); 1912/13 (*5211; 5266*). For italic numbers see footnote 2.

[2]) Diplomatic and Consular Reports are referred to in the text by their serial numbers, in italics.

Table 1

Value of local surpluses of produce in South and East Iran (1890–1910)
Value in £ 1000 p. a.

	< 0.1	0.1–0.3	0.3–1	1–3	3–10	10–30	30–100	Unknown [2])
Kerman		Gum : Wool	Pistachio	Raw opium			Carpets	
Yezd [1])					Textiles			Silk cocoons : Silk yarn : Prepared opium : Prepared henna.
Isfahan [1])					Textiles			Raw opium : Rice : Shoes : Madder : Cotton
Shiraz [1])		Rice : Tobacco						Wheat
Sirjan	Skins		Carpets	Gum Almonds	Asafoetida			Wheat : Cotton
Lar	Tobacco : Wheat : Barley : Dates							
Rafsinjan					Cotton			Pistachio : Almonds
Ravar				Wool				
Khabis								Dates : Oranges
Khorassan [1])	Wool : Tobacco	Turquoise : Livestock : Dried fruit : Leather	Rice : Ghi : Wheat	Silk textiles		Raw opium		
Narmashir			Wool	Barley	Raw henna : Wheat			Ghi : Skins : Indigo : Tobacco : Pulses : Cotton
Jiruft			Barley	Wheat				Ghi : Indigo : Rice : Cotton : Tobacco
Qainat	Wool : Ghi : Dried fruit	Asafoetida Livestock	Saffron Hides					
Seistan	Melon seeds	Barley : Ghi : Wheat : Feathers	Wool : Skins					
Makran	Rice : Ghi : Wheat : Barley	Dates						
Sarhad		Livestock : Ghi						
Rudbar			Dates					Cummin seed

[1]) Of the local surpluses in Isfahan, Shiraz, Yezd and Khorassan, only those parts are shown which affect trade in S. E. Iran
[2]) 'Unknown' may be large; it is certainly significant locally

many periods in the last seven or eight centuries. The development of Kerman has depended upon the construction of long and costly *qanats* to bring water from the southern edges of the plain 30–32 kilometres away[3]). These start as deep wells at the northern edges of the cultivated lands in the south of the basin (BECKETT, GORDON) and up to 100 metres deep. From the foot of the shafts long, horizontal adits bring the water 30 kilometres to Kerman: the adits are ventilated by shafts every 50–100 metres or so. At any period, the cost of constructing the *qanats* must have been great. Rough estimates (BECKETT 1953) suggest that one such *qanat* might have cost £15.000–£ 20.000 (pre-1939). In 1950 the water to irrigate one hectare of land in Kerman cost about £150 a year.

The problem

The problem is – why Kerman? Other centres are as well provided with soil, and better provided with water. Why is Kerman a city, if its development has required such a disproportionately high investment?

Because of its size and established hegemony, Kerman is now a centre of provincial government, and a military headquarters. It contains shops, a large bazaar, banks, garages, caravanserais, at least two hospitals and an airfield. It has been an important centre of the shawl and carpet industry, though the trade has shrunk considerably since its heyday earlier in this century. There are long-established brass and silver manufacturies, a textile trade ancillary to the carpet industry and a sugar refinery. The pattern of local trade (Fig. 2) reflects the local importance of Kerman.

Figs. 2 and 3 are based upon the published reports of the British-Indian consuls in South East Iran between 1890 and 1914. The great value of these lies in the fact that they record in some detail the traditional patterns of trade, and the regional activities in Iran, on the last occasion before the upheavals of World War I, and the introduction of motor transport, irrevocably altered them. The picture is distorted slightly by the intense trade competition at that time between Russia from the north and the European powers and India from the South, and by the prevailing lawlessness. It is unfortunate that there is no year for which reports are available from all centres; and that there are reports for only one or a few years from some centres. Also the reports were compiled by officers many of whom lacked much training in, or patience with, commercial statistics! Nevertheless, the generalised picture obtained (Figs. 2 and 3) is sufficiently clear.

Table 1 shows how at that time Kerman produced a tremendous surplus of manufactured goods, (nearly a quarter of a million pounds sterling of carpets in 1909–10 [*4493*]) and of high cost agri-

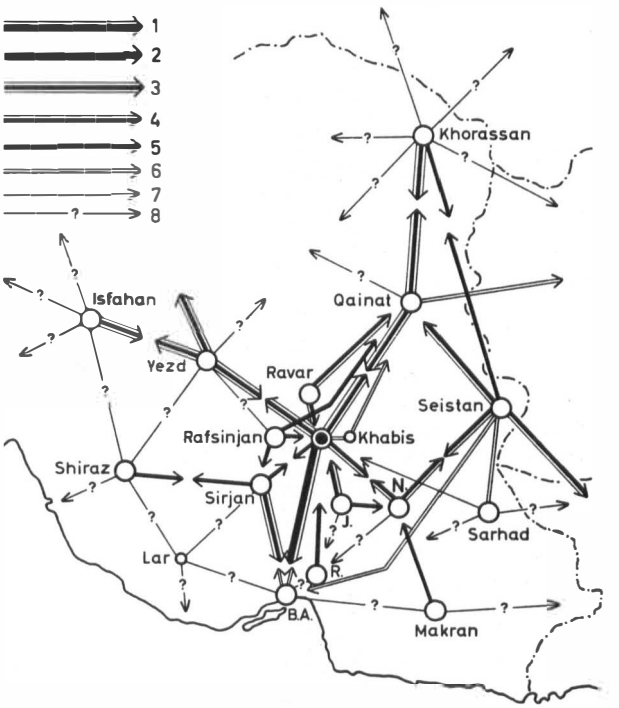

Fig. 2: Value of trade in local surplus produce in South East Iran (1890–1910)
Value in £ 1000 p. a (logarithmic scale): 1 = 30–100; 2 = 10–30; 3 = 3–10; 4 = 1–3; 5 = 0,3–1; 6 = 0,1–0,3; 7 = less than 0,1; 8 = unknown, though in some cases substantial

cultural produce, in contrast to the food-grain surpluses of Sirjan, Jiruft and Narmashir. Note also the predominantly pastoral surpluses of the Sarhad, Seistan and Qainat in contrast with the crop surpluses of Narmashir, Jiruft, the Makran, Rudbar and Lar. By this time, manufacture had been much concentrated in Kerman, which was fed by its hinterland, and indeed by its former rivals Jiruft and Sirjan. Fig. 2 demonstrates the role of Kerman as a collecting centre for local produce, to be exported via Bandar Abbas or made up. Sirjan still, in 1890–1910, provided the next largest export surplus after Kerman, but ten fold smaller[4]). Most of the produce of Bam and Narmashir, and Jiruft was drawn towards Kerman. Bandar Abbas was a transit port, with little local produce and only a small local market (*3182; 5263*).

But all this only reflects the balance of trade and influence once Kerman had achieved commercial and political dominance. If we compare its natural resources with those of the districts of Jiruft (near present Sabzarawan), Narmashir (by Fahrej), and Sirjan (Saidabad), the Kerman plain is by no means the most fertile or best watered of the limited number of areas in southern Iran in which relatively concentrated

[3]) SYKES (1902; p. 191) states that "the great ruined tank" at the southern foot of the crags overlooking Kerman was "formerly filled by the Bahramjird river [Rud-i-Chari], the waters of which now run to Baghin". The appearance of the plain, and the contours on the 1 : 253,440 map both make this seem unlikely.

[4]) Note the logarithmic scale of the symbols on Figs. 2, 3A–3D: each symbol represents a × V10 increase in value on the one below.

agricultural settlement is possible [5]). For this reason indeed, the city developed later than Sirjan and Jiruft. Bam and Rudbar are probably disqualified by their great summer heat, and possibly Narmashir.

Nor is Kerman as well sited to be a trading centre as Sirjan.

We can only understand then why Kerman has become a political and commercial centre, and retained its hegemony even after its devastation between 1794–1820, is we refer briefly to the history and trade of southern Iran.

History

In many parts of southern Iran we may still find the ruins of substantial towns, if not cities, long since deserted. The areas round Kerman, Sirjan and Jiruft are no exception. Indeed, the present city of Kerman itself is developed on the debris of part only of the pre-1794 city, much of which still lies in ruins, outside the limits of the present city. The ebb and flow of history thus mutely recorded allows no short and simple summary. So the following outline can do no more than indicate what seem to be the most significant facts.

Kerman appears to have played an insignificant part during early Iranian history. The district or province of Carmania is mentioned from earliest times [6]), though TARN (1951) is of the opinion that at least up to Seleucid times Carmania essentially consisted of the settlements along the Minab river up to Gulashgird (Alexandria). It is only at the beginning of the third century A. D. that the existence of a town on the site of the present city of Kerman may first be recognised beyond doubt. About 218 A. D., Ardeshir Papakan built (or rebuilt) the fortresses and town, giving the latter the name of Beh-Ardeshir, later contracted to Bardasir. Kerman contained a Sassanian mint (BIVAR, personal communication). It came under Muslim control in 642, and figures as a mint name on Arab coins, which Jiruft and Sirjan do not (BIVAR). By 709 Bardasir was an 'extensive' city but was smaller than Sirjan, and even by the tenth century Mukadassi described it as being well fortified but not large.

Bardasir first became the provincial capital in 928, at a time when Buwaihid pressure from Fars was growing and caused the Samanid governor (Abu Ali ibn Ilyas) to move his seat of government from the larger city of Sirjan. This is a significant and recurring reaction – the overawing of the local administration by tribal groupings from Laristan, Fars and Baluchistan. At this time Siraf was the main emporium of the south-west coast and Sirjan (Fig. 1) was, therefore, better sited as an inland centre of trade than Kerman. Even fifty years after the town had become the provincial capital, the Hudud al Alam (latter tenth century) was still able to describe Bardasir and Chatrud as "very favoured by nature, but with a sparse population", while Jiruft was a commercial centre ("very prosperous and pleasant") of comparable importance to Bardasir, and Sirjan was a large town. Bardasir remained the provincial capital after it was occupied by the Buwaihids (968); it contained a routine Buwaihid mint.

The relative isolation of Bardasir from Fars, and from the shifting bases of government to the north and west, saved it from the worst chaos of the Seljuk (11th century) and Mongol (13th century) invasions, and allowed the accession of the semi-independant dynasties first (1041–1187) of the Seljuk Qawurd Begh, and later (1222–1307) of the Qutlugh Khans. Their courts attracted much commerce and manufacture to the city, and there was great prosperity in the first half of the 12th century. Nevertheless, during the same period, Ibn Abrahim reports Jiruft as an emporium where precious goods from China, Hindustan and Central Asia, from Africa and Egypt, were all to be found. Note the evidence here for an international trade axis running from south-west to north-east. Jiruft (Comadi) was sacked in 1170 by the Seljuk Bahram Shah, recovered, and was then sacked again. Sirjan lay on the Kerman-Fars boundary during Seljuk times and was garrisoned by the Seljuks. The fort was destroyed, repaired by Arslan Shah, destroyed and again reoccupied (1188 A. D.) [7]) Marco Polo, who passed through Kerman during the reign of the Mongol Turkan Khatun (1258–1282), highly recommended the local manufactures of arms and silk embroidery. Jiruft was of little consequence by the time of Marco Polo's visit [8]).

The Muzaffarid dynasty was established in 1345, and ruled Yezd, Shiraz and Isfahan from Kerman. The Hormuz trade started about this time (BIVAR) and the eastward shift of the south-west to north-east trade axis benefited Kerman. Sirjan was destroyed by Timur in 1396. Kerman was suppressed by Timur also but, whereas Jiruft and Sirjan never recovered their former importance, Bardasir [called Kerman from the fifteenth century onwards [9])] survived even the many disasters of the eighteenth century [10]) which finally left the population decimated and much of the city in ruins. During the seventeenth and eighteenth centuries Kerman derived some importance from the valuable goats-wool of the Ravar district to the north; the East India Company intermittently maintained an establishment there (L. LOCKHART, personal communication). Rebuilt in 1820, the city slowly recovered, particularly from 1860 onwards under the Governorship of the Vakil-al-Mulk.

The essential parts of all this seem to be that Kerman and Sirjan, and probably Jiruft too, are all equal-

[5]) SYKES (1902, p. 433) states that the soil of Sirjan is more fertile than that round Kerman. Both cities are centred on strong defensive positions.

[6]) e.g. Quotations in SYKES (1902, pp. 48–9) and LAWRENCE LOCKHART (1939, p. 66) from whom, with E. G. LE STRANGE (1905) and A. T. WILSON (1928) much of the material in this section is taken.

[7]) Afzal Kermani, quoted by SYKES (1902, p. 433).

[8]) SYKES (1902, p. 267) suggests that the final destruction of Jiruft was by flood.

[9]) The name Bardsir is now used to describe the area around Negar and Mashiz.

[10]) Afghan invasions of 1720–1729 and 1748; the disasters brought by Nadir Shah (1736 and 1747), and the final sack by Agha Mahamad Qajar (1794).

ly accessible to the main political centres to the north-west. They are all therefore, equally suitable as centres of the provincial administration of a government claiming suzerainty over most of Iran. Conversely all three are equally isolated from the north-west, and thus they are equally suitable to become the centres of independent dynasties, and all are much more suitable than Yezd. Also during considerable periods Sirjan and Jiruft were clearly favoured as inland centres of trade. It will be shown below that they lie on the preferred caravan routes.

Yet, in spite of all this, Kerman was on more than one occasion selected as an administrative and financial centre even while it was smaller than its two main rivals. The relatively greater isolation of Kerman from tribal country seems to have been an important factor. Sirjan lay on the border of Fars and we have already seen how the provincial administration was moved from Sirjan owing to its proximity to Fars. In 1902, SYKES (p. 75) attributes the absence of agricultural development at Pariz, north-east of Sirjan and 80 miles west-south-west of Kerman, to the fact that it was "one of the first points struck by Fars raiders". We are told that the district between Sirjan and Bandar Abbas is inhibited by "nomads of predatory type" (*3374*). Similarly, Jiruft was well within reach of raiders from Baluchistan and from the Bashakird area south east of Rudbar. Kerman itself was not wholly out of reach; there are still (1950) bullet marks on a watch-tower on the Bam road and there are Consular reports of Baluchi raiders in the Kerman basin during 1912–1914 (*5266; 5482*).

Commerce

Now that it is possible to travel from Europe to Pakistan by bus through Bam and Baluchistan, it is easy to forget that until very recently there has been no major trade axis through Kerman connecting the north west with the south east corners of Iran. In commerce as in politics, Kerman lay at the end of the road from the main centres of north and western Iran. Beyond it to the south east there was only a local distribution of imports from the north and west, and there was no through trade to India. This is clear enough from Figs. 3 A, 3 B and 3 D. Neither in prehistoric (PIGGOTT) nor in historic times did the Indian trade with the west pass overland through Kerman. Indian trade to the West came by sea to Bandar Abbas or to the Gulf ports, or it proceeded by land through Kabul and Kandahar to Khorassan. The overland route from Quetta through Nushki, round the southern edge of the Helmand desert, and thence through Neh to Khorassan, was developed only at the turn of this century by the energies of British-Indian officials in eastern Iran (e. g. *1429; 2533; 2921*), and was inconsiderable (e. g. *2738*) before the completion of the railway to Zahidan in this century (LOCKHART).

Nevertheless, there has always been a very important trade axis from south-west to north-east, linking India, Africa and the West with Central Asia through ports in southern Iran (see Figs. 3 B and 3 C). The two most favoured routes along this axis were through Narmashir and Birjand, or Yezd and Tabas (cf SYKES 1902, p. 300), which favoured Jiruft or Sirjan rather than Kerman during any period in which Bandar Abbas or Hormuz were the main ports of southern Iran. Qais, Siraf or Bushire favoured Sirjan and Yezd. The periods during which Siraf (9th and 11th centuries) and Qais (11th to early 13th centuries) were important centres undoubtedly favoured Sirjan at the expense of Kerman or Jiruft. In neither case would the main caravan trunk routes to the north-east have passed through Kerman.

Fig. 1 indicates most of the caravan routes in south and east Iran that have been used to any extent at some period or another. The route from Kerman, through Ravar across the Dasht-i-Lut to Naiband and Birjand, is not impassable, but is apparently not so suitable for a regular traffic of large caravans as the other two routes named: also it depends on regular rain to refill the reservoirs over some stages (SYKES). The alternative route from Kerman through Zarand to Tabas is preferable (SYKES) and has been extensively used during some periods. The route from Bandar Abbas to Khorassan through Narmashir was probably the best of all; it carried grazing all the way. A camel caravan took about 70–90 days to Birjand and 100–140 days to Meshed (*1134; 4006; 4162*). The transport of a 16 kg. load from Bandar Abbas to Meshed cost about £.32 in 1899 (*2368*).

So, in general, Kerman cannot be said to owe its commercial importance to a junction of major caravan trunk routes. It lies at the end of one major axis and off the preferred routes of the other, in contrast to Yezd, which lies across both. Kerman is not even better sited naturally than Sirjan or Jiruft as a focal point of local trade, since both of the latter lie nearer the centre of gravity of the main areas of agricultural production in southern Iran.

However, Kerman does lie more or less equidistant from the two main routes between Central Asia and the ocean, and, as stated above, it lies at the maximum distance from the two main centres of tribal lawlessness. Political insecurity in Fars could lead to the interruption of trade through Sirjan: trouble in Baluchistan as in 1912–1914 (*5266; 5482*), or in the Makran, would sever routes through Jiruft or Narmashir: in either case trade could still be redirected from one route to the other through or near Kerman, or could be diverted along the less suitable but adequate roads from Kerman, through Tabas or Naiband. This happened, for example, in 1910–11 when robbers from Fars blocked the roads from Bandar Abbas to Yezd, and Bushire to Shiraz, but trade remained free by the more easterly road between Kerman and Bandar Abbas (*4838*). To sever all trade through Kerman, however, required simultaneous forays from both areas to close all routes. The Consular reports stress that, for this reason, many merchants in Khorassan preferred to trade through Kerman during the unsettled period to which Figs. 2 and 3 refer. The markets of Kerman once it was established as a provincial centre were large enough to absorb appreciable amounts of merchandise unexpectedly diverted from Khorassan or Siestan (*2738; 4006; 4162*) as a result of the blocking of the roads. Fig. 3 C shows how during this period the transit trade from Bandar Abbas to Khorassan

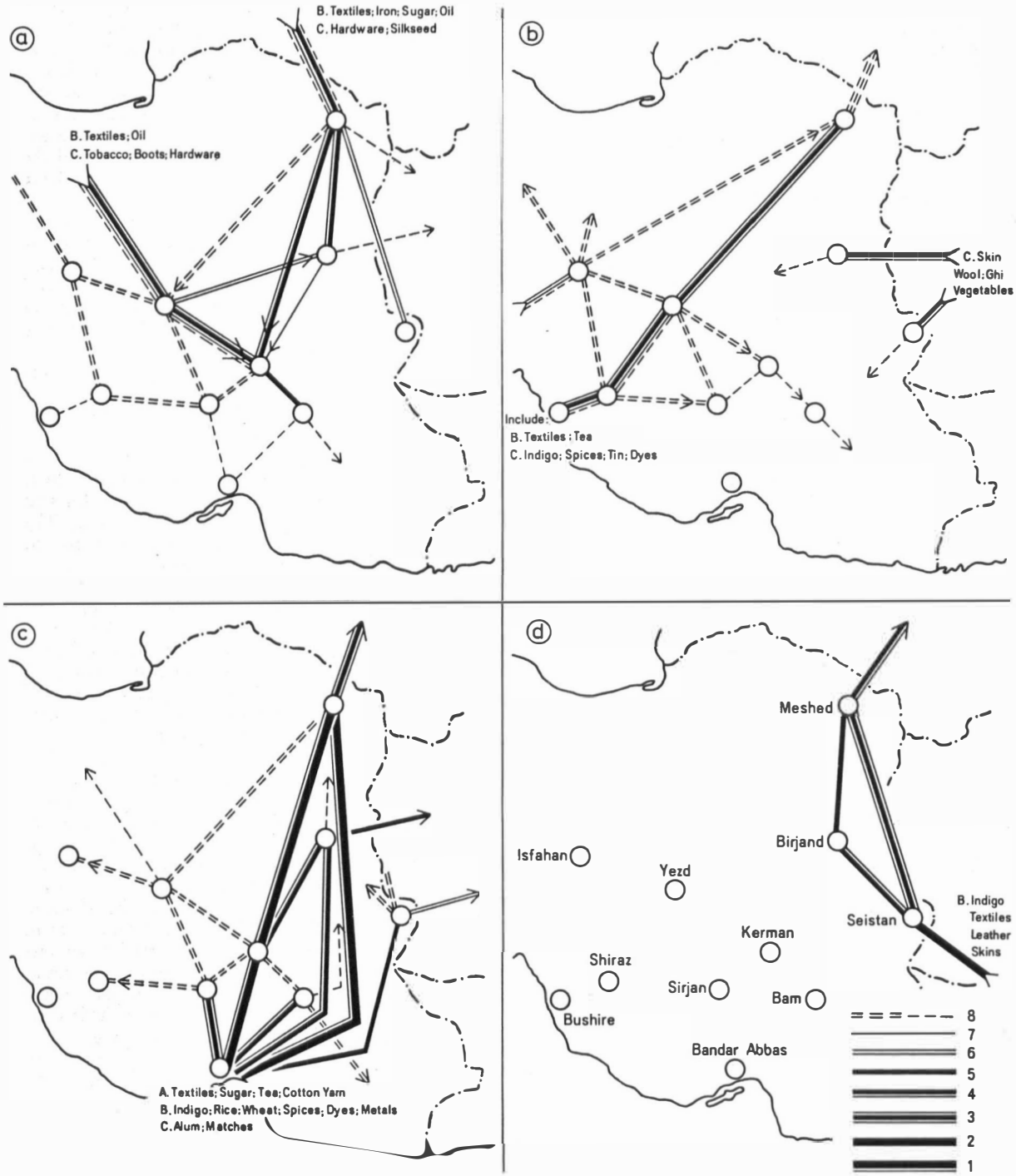

Fig. 3: The value and destination of imports into South and Eastern Iran (1890–1910)

a Overland imports through Russia and Black Sea ports
b Imports from Afghanistan and through Persian Gulf ports north of Bandar Abbas
c Imports through Bandar Abbas
d Overland imports from India, mainly by Nushki route

Value of imports in £ 1000 p. a.: A = more than £ 30; B = 3–30; C = less than 3
Value of trade in £ 1000 p. a.: 1 = more than 30; 2 = 10–30; 3 = 3–10; 4 = 1–3; 5 = 0,3–1; 6 = 0,1–0,3; 7 = less than 0,1; 8 = unknown, may be considerable
Local distribution is not indicated nor is trade through Bushire destined for the North

through Kerman was as valuable as that through Narmashir and ten-fold greater than that through Sirjan or Yezd.

Incomplete though the information presented may be, Figs. 3 A–3 D indicate very clearly the relative importance of the competing sources of trade in eastern Iran during this period of intense competition.

The flexibility of trade through Kerman as a result of its central position; its isolation; the supersession of Siraf and Qais by Hormuz and Bandar Abbas; all these may have helped to offset the natural advantages of Sirjan and Jiruft and may partly account for their failure, once destroyed, ever to recover their former importance at the expense of Kerman.

Conclusions

Human, commercial and political inertia have all helped to maintain the hegemony of Kerman once achieved. The climate, less enervating in summer than Sirjan or Jiruft, may have had some influence. Nor can the caprices of rulers be ignored.

Yet, when all is considered, the development of Kerman as a provincial centre seems to derive from a small number of causes:

(1) Potential local surplus of agricultural produce;
(2) A good natural defensive position for a citadel;

(1) is shared with both Sirjan and Jiruft, and (2) is shared with Sirjan.

(3) Maximum distance from tribal centres and from other centres of independant dynasties;
(4) A central position between the two preferred routes of a major axis of international trade, both of them vulnerable to tribal interruptions at points remote from Kerman.

(3) and (4) may have been sufficient to outweigh the otherwise superior situations of Sirjan and Jiruft.

They emphasize the contrast between the factors which affect the distribution and development of the rural settlements of the Kerman plain, and the factors which have affected the development of the city itself.

References

Beckett, P. H. T. (1953): *Qanats* around Kerman. Roy. Central Asian J. Vol. 40. p. 47. (1953).

Beckett, P. H. T. and Gordon, E. D. (1966): Land Use and Settlement round Kerman in S. Iran. Geogr. J. (in the press).

le Strange, E. G. (1905): Lands of the Eastern Caliphate. Cambridge. Univ. Press.

Lockhart, L. (1939): Famous Cities of Iran.

Noel, E. (1944): *Qanats.* Roy. Central Asian J. Vol. 31. p. 191.

Pigott, S. (1950): Prehistoric India. Penguin Books.

Smith, A. J. F., Armstrong, A. J. F. (1951): *Qanats.* J. Iran Soc. Vol. 1. p. 86.

Sykes, P. M. (1902): Ten thousand miles in Persia. John Murray.

Tarn, W. W. (1951): The Greeks in India and Bactria. Cambridge Univ. Press.

Wilson, A. T. (1928): The Persian Gulf. Allen & Unwin.

KONFERENZ ÜBER DIE VERWENDUNG VON RAUMFAHRZEUGEN FÜR DIE GEOGRAPHISCHE FORSCHUNG

(„Conference on the Use of Orbiting Spacecraft in Geographic Research")

in Houston, Texas, 28.–30. Januar 1965

Dieter Steiner

Einleitung

Ende Januar letzten Jahres fand im „NASA-Manned Spacecraft Center" in Houston, Texas, eine Konferenz über den möglichen Einsatz von Satelliten für die geographische Forschung statt, zu der auch einige europäische Geographen eingeladen waren. Die Tagung wurde organisiert vom Committee on Geography, National Academy of Sciences – National Research Council (NAS-NRC) und der Geography Branch, Office of Naval Research (ONR), US Department of the Navy, mit Unterstützung der National Aeronautics and Space Administration (NASA).

Die ursprünglichen Impulse für die Entwicklung der Raumforschung stammen zweifellos vom Verlangen, in den Weltraum vorzustoßen, also von einer nach außen orientierten Blickrichtung her. In den letzten Jahren haben sich die verantwortlichen Fachleute aber auch mehr und mehr darauf besonnen, welche neuartigen, ja ungeahnten Möglichkeiten der „Blick zurück" für die verschiedenen Erdwissenschaften eröffnet. Die Erde als Beobachtungsobjekt von Satelliten ist damit nicht mehr nur als bloßes Analogon zu andern Planeten von Interesse, sondern die gemachten Beobachtungen sollen in den Dienst der Erforschung der Erde selbst gestellt werden.

Nachdem auf dem Gebiet der Meteorologie bereits eine ganze Reihe von Versuchen mit den bekannten Wettersatelliten TIROS und NIMBUS gemacht worden sind, befaßt sich neuerdings die NASA mit dem Gedanken, einen allgemeinen geographischen Forschungssatelliten zu lancieren. Während über das bisher bestehende Raumbildmaterial und seine mögliche geographische Verwendbarkeit vom Geographischen Institut der McGill-Universität zusammengestellte Übersichten vorliegen (Bird und Morrison 1964, Bird, Morrison und Chown 1964), geht es nun im Falle einer speziellen geographischen Beobachtungsstation darum, festzustellen, was einerseits unter bestimmten gegebenen Bedingungen erwartet werden darf und welche Spezifikationen andererseits für die Ausrüstung eines solchen Satelliten aufgestellt werden müßten. Die Tagung in Houston diente zur Klärung dieser Frage sowie der Formulierung von konkreten Vorschlägen für zukünftige Forschungsprogramme (siehe auch Alexander 1964 und *OFFICE of NAVAL RESEARCH* 1964).

Die vorbildlich organisierte Tagung erforderte von den 80 Konferenzteilnehmern aktivste Mitarbeit an Ort und Stelle. Der erste Tag wurde nach den Begrüßungen mit Berichten und Mitteilungen von Experten eröffnet, die sich auch bei einer informellen Abendsitzung zur Diskussion stellten. Dieses einleitende Programm gab den wissenschaftlichen und