

## A Century of Breeding Bird Assessment by Western Travellers in Iran, 1876–1977

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**Abstract:** This article lists 99 articles on distribution of wild birds in Iran, which appeared between 1876 and 1977 and which were published by authors writing in European languages. Each paper has a reference number and is supplied with annotations, giving the localities and time of year where the bird observations had been made. These localities are also listed on a separate website ([www.wesca.net/podoces/podoces.html](http://www.wesca.net/podoces/podoces.html)), supplied with coordinates and the reference number. With help of these coordinates and the original publications an historical atlas of bird distribution in Iran can be made. A few preliminary examples of such maps are included. Many authors also collected bird specimens in Iran, either to support their identifications or in order to unravel subspecies taxonomy of the birds of Iran. The more important natural history museums containing study specimens from Iran are listed.

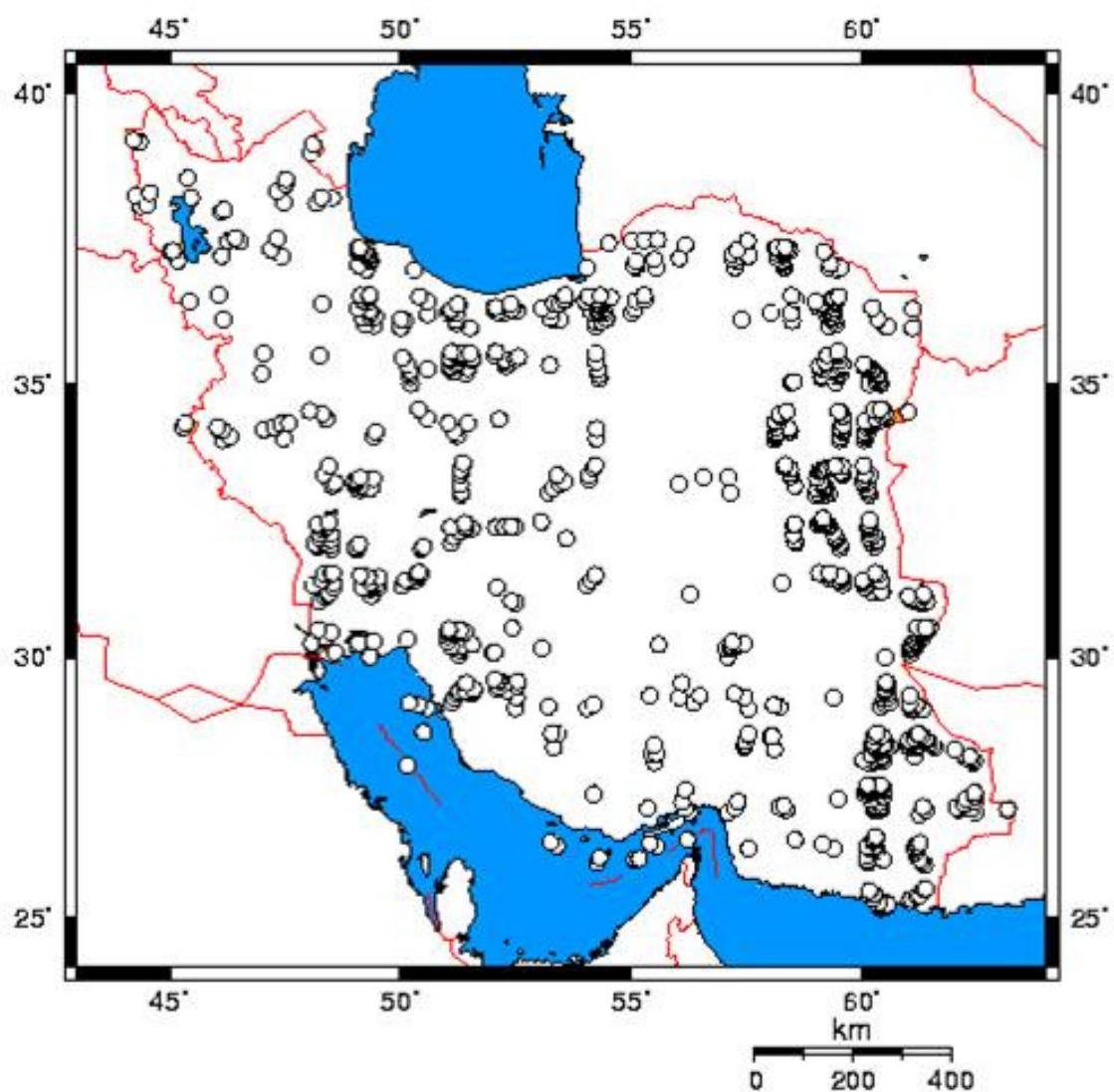
**Keywords:** Iran, Zarudnyi, Koelz, birds, gazetteer, literature, *Passer*, *Podoces*, *Sitta*.

مقاله حاضر به شرح مختصری از مکان‌ها و زمان‌های مشاهده پرندگان ایران بر اساس ۹۹ مقاله از پرندشناسان اروپایی در بین سال‌های ۱۸۷۶ تا ۱۹۷۷ می‌پردازد که مختصات جغرافیایی این مکان‌ها قابل دسترسی در آدرس [www.wesca.net/podoces/podoces.html](http://www.wesca.net/podoces/podoces.html) می‌باشد. چنین داده‌های برگرفته از مقالات و دست‌نوشته‌ها می‌تواند در تهیه و تدوین اطلس پراکنش جغرافیایی کهن و جدید پرندگان ایران نقش موثری داشته باشد. به عنوان الگو نقشه پراکنش جغرافیایی چند گونه از سبک‌بالان ارائه گردیده است. بسیاری از مولفین مقالات یادشده همچنین تعداد قابل توجهی از گونه‌های پرندگان ایران را برای تایید شناسایی و یا رده‌بندی تکمیلی (زیرگونه) از ایران خارج نموده‌اند که در ادامه مقاله حاضر، لیستی از مهم‌ترین موزه‌های تاریخ طبیعی که این نمونه‌ها را در خود جای داده‌اند ارائه شده است.

### INTRODUCTION

Iran is an ornithologically interesting country because it is on the crossroads of fauna originating from Europe, southern Asia, and Siberia. The largest part of the country is situated in the Palearctic region, but the southeastern lowlands belong zoogeographically to the Oriental region because birds from the Indian subregion predominate here as breeders (Roselaar 2006). Several Oriental species extend much further in Iran than the southeastern coastal zone, reaching well into the Palearctic towards SW Iran or Iraq, or through E Iran north to S Uzbekistan or even S Kazakhstan. Among Palearctic bird species, many European ones have a breeding range extending into the Elburz

and Zagros Mountains of north and southwest Iran. These European birds include a number of (near-) endemics from the Caucasus area. From the north, quite a number of birds of the steppes and deserts of central Asia extend into the interior of Iran, and some from Siberia extend into NE Iran. Also, some Palearctic species from the Central Asian mountains like the Tien Shan, Pamir, and Himalayas breed in Iran, mainly in the mountains of the east. Pairs of related species of Caucasian and Himalayan origin may form narrow intergradation zones in the eastern Elburz (Paludan 1940, Haffer 1977, Aliabadian *et al.* 2005). Because of its geographical position, Iran has long been a favorite destination for ornithologists from abroad, mainly because of scientific interest in the country's birdlife, though undoubtedly also



**Figure 1.** Localities in Iran on which birds have been collected or observed, according to published literature from the period 1876–1977. See Appendix 1 at [www.wesca.net/podoces/podoces.html](http://www.wesca.net/podoces/podoces.html) for locality names and coordinates.

because this interest in birds could be combined with travelling through magnificent landscapes alternated by views of a rich cultural history.

In this paper we list papers published by non-Iranian researchers from the period 1876–1977, and investigate whether these papers together will be sufficient to inform Iranian readers on breeding distribution and taxonomy of the birds of the country.

## METHODS

A thorough research of existing ornithological literature (*e.g.* Burgess *et al.* 1966 and the Zoological Record 1877–1976) resulted in some 250 titles of books and papers dealing

with birds of Iran. Not all of these are considered in our article. Some are general handbooks on geographical variation of larger regions which include Iran (*e.g.* Hartert 1903–22, Hartert & Steinbacher 1932–38, Vaurie 1959, 1965, Dickinson 2003). These certainly need to be consulted when establishing the taxonomy of Iranian birds, but do not provide the distributional details searched for. Nearly a hundred papers are short articles describing new taxa of birds occurring in Iran. Most of these articles are by-products of researchers working on bird specimens collected in the country, publishing new taxa in advance of their major scientific results. These interesting articles, describing many endemic Iranian taxa, will be dealt with in a later paper. Other papers

report on wintering birds (*e.g.* wild- and waterfowl or wading birds), bird migration, or local bird-lore, but lack detail on breeding birds.

The list of literature below is restricted to those papers published from 1876 to 1977, giving a more or less complete list of bird species collected or observed, the emphasis being on breeding birds. These papers were published by researchers travelling in Iran or who were resident for a longer period. The list excludes data from papers published in our survey period of 1876–1977, but which recently have been published (see Farnsworth 1992, Rogers 2001, Scott 2007a,b, Mlikovsky 2007). Likewise, we omit results from western expeditions during the 1977–2007 period, with which we hope readers are familiar. Literature prior to 1876 (*e.g.* Gmelin 1774, 1784; Hablizl 1783) is not covered here, mostly because they describe distribution in a generalised way rather than giving precise localities. Some zoogeographical accounts like those of Zarudnyi (1889–91, 1911), Serebrovskii (1929), Haffer (1977), and Neronov & Zaboletskii (1992) are included.

Coordinates for most of the almost 1000 localities mentioned in the literature were obtained. These have been tabulated as Appendix 1 to this paper at [www.wesca.net/podoces/podoces.html](http://www.wesca.net/podoces/podoces.html). Appendix 1 lists the localities and their coordinates, each location being cross-referenced to the serial numbers (01–99) in the Iran literature list (pp. 79–90 above). Note that only some of the literature applying to such georeferenced localities gives a full list of species observed, while other papers contain data for a few species or even only one. The coordinates derive primarily from the Times Atlas (1996, with Iranian names in English spelling), Andrees allgemeiner Handatlas (1909, with Iranian names in German spelling) and a detailed travel map of Iran produced by the Iranian Ministry of Roads, the last-named being particularly helpful in providing insights to the approximate routes travelled by researchers. Further maps consulted were from [www.lib.utexas.edu/maps/jog/Iran/](http://www.lib.utexas.edu/maps/jog/Iran/), where 109 maps of Iran at a 1:250,000 scale can be examined. However, this series is incomplete and names of villages are omitted from some maps. Details of other villages and geographical features listed in the literature but not shown on

maps were obtained from the internet, a helpful but not infallible source when only the approximate travel route and positions are known – many village names recur many times across Iran. The main internet sites used were [www.traveljournals.net/explore/Iran/locations](http://www.traveljournals.net/explore/Iran/locations) (which lists 165,358 names of habitations, rivers, mountains, lakes, *etc.* for Iran) and [www.fallingrain.com/world/IR](http://www.fallingrain.com/world/IR) (which lists 224,549 settlements in Iran but no other features. However, it gives many alternative names for towns and villages). Some localities have ‘*at circa:*’ (at approximately...) as an annotation; these could not be found on official maps or the internet, but either derive from a map produced by Koelz (see [www.ummz.umich.edu/birds/collection.html](http://www.ummz.umich.edu/birds/collection.html)) and apply to the Koelz collections or refer to the Zarudnyi itineraries: Zarudnyi gives the distance covered daily to the next village in farsangs [= 5.6 km] or wersts [=1,067 km], making a reconstruction of the position of a village often possible, at least when the itinerary suggests travelling in a straight line. Spellings used in articles differing from official ones are either in brackets behind the name, or, if differing in more than the first letters, listed separately.

## RESULTS

### List of major papers dealing with breeding distribution of birds in Iran

The following list is alphabetically in order of author. Non-english titles are translated and each reference has a sequence number. This number can also be found in the list of localities on [www.wesca.net/podoces/podoces.html](http://www.wesca.net/podoces/podoces.html). Added to each reference are our comments in brackets, listing the localities mentioned in the paper and a time-table of the visits as far as it is obtainable from the text. Some papers (*e.g.* Blanford 1876, Énard & Etchécopar 1970) contain very many localities, and in this case only a general outline of the travels is given; with help of the data and the sequence of the places mentioned, the whereabouts of other localities are traceable fairly accurately. A few articles could not be consulted (*e.g.* Cumming 1905, Baker 1919, Dementiev 1948, Savage 1958), but are still noted here to point to their existence.

- 01** Beldi G.G. 1918. Ornithologische Notizen aus West-Persien und Mesopotamien. *Aquila* 25: 89–101. [In Hungarian and German: Ornithological remarks from West Iran and Mesopotamia] [Birds observed by a Hungarian diplomat fleeing from Tehran through the Zagros mountains westward to escape the hostilities of World War I. Most notes made during longer stays in Simirun (4 Apr–4 May 1916) and Kermanshah (= Bakhtaran, 24 Sep 1916 to 28 Feb 1917), but include observations from Tehran, Jolfa, Abadeh, and Qasr-e-Shirin]
- 02** Baker E.C.S. 1919. Notes on two collections of birds from Seistan. *Records Indian Museum* 13: 121–134.
- 03** Baker E.C.S. 1923. Remarks on eggs from Mesopotamia and the Persian Gulf. *Bulletin British Ornithologists' Club* 43: 70–71. [On some eggs collected by V. LaPersonne, mostly in Iraq and Kuwait, but a few also in Khuzestan. See Cheesman (1922), below, for sites visited during LaPersonne's trip in Iran]
- 04** Berlioz J. 1958. Étude d'une collection d'oiseaux d'Iran. *Bulletin Muséum National d'Histoire Naturelle Paris* 29: 451–461. [In French: A study of a collection of birds from Iran] [A report of the birds in the collection of F. Petter, taken Oct–Dec 1956. Mr. Petter collected his birds along the following route: Tehran, Damavand, Firuzkuh (11 Oct), Gonbad-i-Qabous (= Gonbad-e-Kavuz, 12–23 Oct, including forest in the E Elburz Mts 70 km east and 40 km south of Gonbad), Dach Bouroun (= Burun, on Atrek R., 23 Oct), Dasht (28–29 Oct), Robat-e Gharbil (= Qarabil, 29 Oct), Bodjnourd (= Bojnurd, 30 Oct), Sarakhs and Mouzdouran (= Mozduran) (4–10 Nov), Mainé (13 Nov), Roum (= Rum, 15 Nov), Zabol (18–20 Nov), Kuhak (20–22 Nov), Tassuki (23–25 Nov), Zahedan (29 Nov–3 Dec), Kahurak (4–6 Dec), Bam (6 Dec), Aliabad (8 Dec), Saidabad/Sirjan (9 Dec), Hajjiabad (9 Dec), Gora (near Aliabad, 9–10 Dec), Bandar-e-Abbas (11–13 Dec), Lar (15 Dec), Djarhoum (= Jahrom, 16 Dec), Persepolis (18 Dec), Esfahan (21 Dec), and Tehran. About 115 birds collected, of which c. 22% non-passerines]
- 05** Blanford W.T. 1876. Eastern Persia. An account of the journeys of the Persian Boundary Commission 1870–1872. MacMillan & Co, London, 2 volumes. [Lists 384 bird species, of which some 16 are doubtful, however. Most collecting was in Shiraz and in Tehran with the nearby Elburz Mts., but Blanford also made journeys from Tehran over Qazvin and Manjil to Rasht, from Tehran north over the Elburz and east over the Caspian plain to Amol (in Aug 1873), and southward to Esfahan, Kerman, Khan Sorkh (SE of Kerman), Shiraz Lake, Neyriz, and Jalq east across the border to W Pakistan. Birds discussed include those taken in Iran by others, e.g. by St. John, who obtained a fairly large collection of well-labelled bird skins in Tehran, Rasht, Shiraz, etc.]
- 06** Buxton P.A. 1921. Notes on the birds from northern and western Persia. *Journal Bombay Natural History Society* 27: 95–133, 844–935. [Observations on birds during a 7-month residency in Rasht and Bandar-e Anzali, and during visits to Kermanshah (= Bakhtaran), Hamadan (11–12 Dec 1918), Qazvin (Dec 1918–Jan 1919, mid-Jul to Oct 1919), Karind and nearby Kuh-e Nur Mt., Manjil, Noglabar, and Golhak. Also, notes on birds observed and collected by R.E. Cheesman in May–Jun 1919 when travelling from Baghdad (Iraq) over Tehran and Gulhek to Enzeli (= Bandar-e Anzali), and by C.M. Ingoldby in Zinjan and Bandar-e Gaz]
- 07** Capito C.E. 1931. Some birds from the north-west corner of Fars, Persia. *Journal Bombay Natural History Society* 34: 922–935. [Lists 138 bird species observed within the area Ras Baghran (= Ras Bahrgan), Deh Molla, Behbehan, Kazerun, Rud Hillah (Helleh) River mouth, and the Persian Gulf coast]
- 08** Cheesman R.E. 1922. Zoological investigations in the Persian Gulf and Iraq. *Journal Bombay Natural History Society* 28: 1108–1110. [Report on a collecting trip made by V. LaPersonne, undertaken to investigate bird migration on islands in the Persian Gulf. Visits made to Tanb I. (= Tunb al Kubra) and to islands in Khor Abdulla and Khor Musa bays, from mid-Mar to early May 1921, followed by research in Iraq and Kuwait into 1922]
- 09** Cumming J.W.N. 1905. Birds of Seistan, being a list of birds shot or seen in Seistan by members of the Seistan Arbitration Mission, 1903–5. *Journal Bombay Natural History Society* 48: 93–117.
- 10** Dement'ev G.P. 1948. Materialy po ornitologii severnogo Irana. *Trudy Tsentral Byuro Kol'tsevanikh* 7: 177–194. [In Russian: Data on the ornithology of northern Iran] [On birds collected by various Russian researchers in Iran, mostly in Azarbayjan, Golestan, and N Khorasan. For birds collected by Radde or Zarudny, see below; other Iranian material present in Russian collections has not reported elsewhere, e.g. birds taken by, e.g. M. Menzbier and D. Glasunov]
- 11** Desfayes M. & Praz J.-C. 1978. Notes on habitat and distribution of montane birds in southern Iran. *Bonner zoologische Beiträge* 29: 18–37. [Report of birds seen and collected during a stay from 7 May to 25 June 1975 in the Kerman-Sistan area in southern Iran. Localities visited: Kuh-e Jupar Mt. (4120 m), Kuh-e Hazar Mt. (Kuh-e Hazaran; 4465 m), Kuh-e Shah Mt. (Kuh-e Laleh Zar, 4380 m), Deh Bakri Pass (in Kuh-e Jebel Barez Mt., 2300–2400 m), Kuh-e-Taftan Mt. (E slope and villages Zadnuk and Kusheh on west slope), the Zahedan area (1350 m), and Mirjaveh at the Pakistan border. Many notes on the habitat favored by each bird species and on ecology, e.g. weights; c. 110 birds collected, of which only 10% non-passerines]
- 12** Diesselhorst G. 1962. Anmerkungen zu zwei kleinen Vogelsammlungen aus Iran. *Stuttgarter Beiträge zur Naturkunde* 86: 1–29. [In German: Notes on two small collections of birds from Iran] [Despite the title of the paper, it includes details of 5 collections, though 3 of them quite small. (1) The collection of S. H. Jervis Read (c. 220 birds), who was residing in Tehran from Jul 1956 to May 1958, with collecting trips to: (a) Tehran suburbs and nearby mountain villages, up to c. 75 km east and west of Tehran (Abeli, Gulhak, Jaji Rud/R., Lashkarak, Lar R. valley, Larak, Karaj, Mehrabad, Pulus, Shahabad, and Shemiran), (b) Firuzkuh pass in Elburz (Apr 1957, May 1958), (c) Zagros Mts. on 1–6 April 1958 (Band-e Amir marsh, Ismailabad, Persepolis, Sa'adatabad, Yazd-e Khvast), (d) east Caspian plain in Dec 1957 and May 1958 (Babol Sar, Tirtash near Bandar-e Gaz, Behshahr), (e) north-west Caspian plain and nearby W Elburz, e.g. in Jul 1956, Dec 1957 and Jan–Mar 1958 (Bandar-e Pahlavi = Bandar-e Anzali, including Mordab Lake, Gach Sar, Sia Bishe, Valiabad, Chalus with nearby pass and tunnel, Menjil [= Manjil], Resvandeh [= Rezvanshahr]), (f)

- several visits to the plains and hills south of Tehran (Ahmadabad, Kholmar, Jenatabad, Kashan, Rud-e-Shur and nearby Robat Karim, Varamin, Qom, and Siah Kuh Mt.), (g) Khorramshahr on the Persian Gulf, (h) Tuslu Göl near Arak in Jun 1957. (2) Collection of R. Passburg (c. 10 birds), made September 1957 and Mar–May 1958 in Bandar-e Pahlavi, Chalus, Mordab Lake, Karaj, Manjil, Rud-i Shur, and Tehran (see also Passburg 1959, below). (3) The collection of K. Krell (c. 10 birds), obtained in the Gorgan area between Sep 1951 and Aug 1952, visiting the lower Atrek R. (May 1952), Gonbad-e-Kavus (Jun & Aug 1952), Semnan (Dec 1951, Mar 1952), and Gorgan city (Jan 1952) (see also Schüz 1959, below). (4) The collection of J. Popp (c. 10 birds), obtained at Harmaleh (12–27 Oct 1957) and Shush (28 Sep–3 Oct 1957). (5) the collection of W. Richter (c. 70 birds), taken in 1954 at Bampur (Mar–Jul), Iranshahr (3 Mar–27 Apr), and Machnudabad on Bampur R. some km W of Iranshahr (7–21 May), and in 1956 at Ahvaz and Shadegan on the Karun R. (15 Feb–20 Mar), at Shush, Haft Tepe, and the Dis (= Dez) River SE of Shush (21–25 Mar), at the Jarrahi R. (15 km NE of Shadegan, 25 Mar–11 Apr), and at Anbar-abad (near Jiroft, 23 Apr–10 May). For the birds observed by Richter in 1956, see Richter (1961), below. The total number of bird skins in these five collections is c. 310, of which c. 25% non-passerines; most of these are in München (c. 225), the remainder in Stuttgart]
- 13 Éraud C. & Etchécopar R.-D. 1970. Contribution à l'étude des oiseaux d'Iran (Résultats de la mission Etchécopar 1967). *Mémoires Muséum national d'Histoire Naturelle* (A) **66**: 5–146. [In French: A contribution to the study of birds of Iran] [Extensive report on birds seen or collected during a roundtour through Iran. The route roughly followed was: Khosravy (6 April), Kermanshah (= Bakhtaran), Hamadan, Ghazvin (= Qazvin), Teheran and surroundings (8–14 April), Saveh, Qom, Esfahan, Persepolis (17–19 April), Shiraz, Maharlu Lake (21 Apr), Fasa, Jahrom, Kahurestan (23 Apr), Lar, Bandar-Abass (25–26 April), Gheshm I. (= Qeshm, 26–28 April), Hormoz I. (29 April), Bandar-Abass (30 April to 3 May), Minab, Sabzevaran, Bam (6–7 May), Zahedan (9–10 May), Khash, Iranshahr, Nikshahr & Ghasreghand (= Qasr-e-Qand, 13 May), Iranshahr, Khash, Mirjaveh, Zahedan (14/16 May), Zabol (18–20 May), Zahedan (22 May), Birjand (24–24 May), Ghaen (= Qayen), Bidokht (24–25 May), Torbat-e Heydariyeh, Mashhad (26–27 May), Ghoochan (= Quchan, 27 May), Shirvan (27 May), Bodjnoord (= Bojnurd, 28 May), Dasht (28–29 May), Gonbad-cavous, Gorgan, Sari (29–30 May), Chalus, Tehran (31 May to 4 June), Ghazvin (5–6 June), Zandjan, Miyaneh, Tabriz (6–7 June), Shahpoor (8 June), Khoy, Makoo (8–9 June), and Bazargan (9 June); also, some 130 other localities listed, which can be found with help of the data above or with the map and gazetteer provided in the article. Further, includes a partial survey of the Caspian coast between 19 March and 7 April. The article includes many biometrical data, notes on habitat, migration, taxonomy, etc.]
- 14 Feeny P.P., Arnold R.W. & Bailey R.S. 1968. Autumn migration in the South Caspian Region. *Ibis* **110**: 35–86. [Report of a visit from 19 August to 2 October 1961 to the shores of the Caspian Sea. Observations were carried out at the Myiankaleh sandspit and at nearby Bandar-e-Gaz (Gorgan Bay) in the southeast corner of the Caspian Sea, in the surroundings of Shahi (= Qaem Shahr), Bandar Shah (= Bandar-e Torkeman), and Behshahr, and in the Elburz Mts. at the Gudar Guduk Pass (Firuzkuh Pass) and Imamzadeh Pass (just south of Damavand Mt.); also, data from the same area included from July–August 1963. Most data are on migratory birds, but the systematic list includes details of some birds breeding locally. A few birds collected]
- 15 Genenger I. & Genenger W. 1968. Ornithologische Beobachtungen in Nord-Persien. *Ornithologische Mitteilungen* **20**: 62–68. [In German: Ornithological observations in northern Iran] [Report on birds seen during a stay from 25 April to 6 May 1966 at Bender Pahlevi (= Bandar-e Anzali) and nearby Gulega, Mordab Lake, and the Shafa Rud mouth and valley (the same area as in Schüz 1959) and in the Elburz at Sefi-Rud barrage (near Manjil) on 2 May. Also, observations made during travel from Maku (at Turkish border) via Khvoy, Tabriz, Mianeh, Zanjan, and Qazvin to Tehran on 17–19 April, and on the same way back on 10–11 May, when calling also at Lake Urmia (= Orumiyeh)]
- 16 Gyllin R. 1970. Bilder från en persisk Fågelsjö. *Fauna och Flora* **65**: 113–117. [In Swedish: Pictures from an Iranian bird-lake] [A Swedish expedition in the spring and early summer of 1969 covered much of Iran, including the Dasht-e Lut and the shores of the Hormuz Strait. The only published result of the expedition is apparently this paper, on birds observed at Lake Guri near Tabriz on 14 Apr and 9–13 Jun]
- 17 Haffer J. 1977. Secondary contact zones of birds in northern Iran. *Bonner zoologische Monographien* **10**, ZFMK, Bonn, 64 p. [Detailed distributional research in a contact zone of several species pairs in the eastern Elburz Mts., with zoogeographical data and locality details. A small number of birds collected]
- 18 Heinrich G. 1928. Elburs Expedition 1927. *Journal für Ornithologie* **76**: 237–313. [In German] [Report of an expedition to the Elburz Mts. undertaken by G. Heinrich and M. Dammholz. This article includes itinerary, map, and general observations; for the specimens collected, see Stresemann (1928), below. Approximate route followed: Pahlevi (= Bandar-e Anzali), east by boat to Chahsevar (= Tonekabon), from where trip south into Pish Kuh (= Posht Kuh) mts., east along coast over Kuramabad (= Khorramabad), Abasabad, Saerdabrud (= Sardab Rud), Suledai (= Suledeh) to Rostamabad (with a trip 20 km to the south), then to Meshediser (= Babolsar), south to Barfurush (= Babol) and Sari and from there into the E Elburz over Warende (= Varand), Deseli, Didou (= Didu), Kiasar, Iwell (= Ivel), Bart, Sarhedae, Astanae (= Astaneh), Chesmeali (= Cheshmeh Ali) to Chehardeh (= Chardeh) and the nearby Shah Kuh Mts. (where collecting was less successful because Heinrich was severely ill); rapidly back to Asterabad (= Gorgan) and by plane to Bender Gas (= Bandar-e Gaz)]
- 19 Kobayashi K. 1969. A small collection of Iranian birds. *Tori* **19**: 17–27. [On 29 bird species seen and 13 birds collected by G. Nakara in the Tehran area in 1963–1968, mainly in Hesarak. The article is in Japanese but has a summary in English]
- 20 Koelz W. 1950. New subspecies of birds from southwestern Asia. *American Museum Novitates* **1510**: 1–10. [4 new subspecies described, of which only one from Iran, however: *Ammomanes deserti darica* from Shiraz. W.N. Koelz and his assistant T. Rupchand travelled widely in southern Asia during 1930–1950, obtaining the largest known bird

collections for Iran and Afghanistan, even though they were primarily plant collectors, taking birds and other animals only when time permitted. No account of the travels was published, but details on a number of the species he collected can be found in Vaurie (1949a,b,c; 1950a, b; 1951a,b,c; see below) and Marien (1950a,b; 1951a,b; see below). Also, a map with a number of localities visited by Koelz (but apparently not those visited solely by Rupchand) is available at [www.ummz.umich.edu/birds/collection.html](http://www.ummz.umich.edu/birds/collection.html). During 1930–1938 and 1946–1950, Koelz and Rupchand mostly were active in various parts of India, either in spring only or throughout the year, but they made collecting trips further away to Kashmir & Ladakh (July–early October 1936), Afghanistan (mid-April to Dec 1937, mid-August to mid-November 1939), and Nepal (Mar to early Aug 1947). From mid-Dec 1939 to Feb 1941 Koelz and Rupchand collected in Iran, and also (at lower intensity; part of the collecting by Rupchand only) from Mar 1941 to Jan 1946. From the papers published by Vaurie and Marien the following itinerary of Koelz can be reconstructed (localities in sequence visited, but repeat visits not mentioned): Hormozgan (16–28 Dec 1939; Bandar ‘Abbas, Isin, Sa’adatabad, Teserj, Madanu, Hajjiabad), Kerman region (27 Dec 1939 to 18 Febr 1940; Saidabad, Balvard, Deh-e Bala, Mohamedshah, Shadab, Chahar Farsakh, Pushtre, Deh Shib, Kerman, Bam, Deh Bakri Pass, Gudar Ushturu pass, Khatunabad, Dehidisk, Chashmeh-e Dozi, Tomogaon, Goraghan, Maskun, Pay Boneh, Darzin, Rafsanjan), Yazd region (20–25 Feb 1940; Yazd, Shirkuh mts., Taft), Esfahan region (26 Feb–5 Mar 1940; Na’in, Esfahan), Fars (6 Mar–11 Apr 1940; Surmaq, Eqlid, Persepolis, Shiraz, Jahrom, Neyriz, Estahbanat, Fasa, Mian Jangal mt., Dasht-e Arjan, Kotal-e Pirehzan pass, Kazerun, Churum), Bushehr region (11–14 Apr 1940, Borazjan, Bushehr), Khuzestan (15 Apr–23 May 1940; Bandar Khomeyni, Ahvaz, Dezful, Siah Mansur, Sar Bishah, Marbirinji, Mulikiaulia, Sar Dasht, Lab Sefid, Abulhassan, Tall-e Mausur, Cheshmeh Shirin, Siah Chal, Belu, Tazeh, Damavar, Pashmshurun, Sefid Kuh mt.), Lorestan (20 May–7 Jun 1940; Dow Rud, Karun, Cham Chid, Kalvar, Ti, Khali Kuh mt., Galichir), Tehran (14 Jun–6 Jul 1940), Mazandaran and Golestan (10–31 Jul and 28 Sep–3 Oct 1940; Gorgan, Namul, Gozlu pass, Dimalu, Robot Kharim, Shah Kuh mt., Karimserai, Garmabdasht, Kherat, Gonbad-e Kavus, Moraveh Tappeh; on way back in Sep/Oct Shah Pasand, Gorgan, Kherat, Bandar Shah), Khorasan (1 Aug–23 Sep 1940; Garmah, Bojnurd, Kotaliyekchinar pass, Karak, Fariman, Abdullabad, Bardu, Bejestan, Firdaus, Tabas, Robot-e Khan, Kharv-e Bala, Torbat-e Heydariyeh, Juymand, Neyshabur, Soltanabad, Sabzevar, Zedar), Semnan region (24–28 Sep; Abasabad, Shahrud), Tehran (3–21 Oct 1940), Zanjan region (22–24 Oct 1940 and 18–19 Dec 1940; Sharifabad, Qazvin, Gurveh, Takestan, Zanjan, Amirabad, Anekh, Najafabad), Azarbaijan and Ardabil regions (25 Oct–16 Dec 1940; Gharib Dust, Tabriz, Bostanabad, Sarab, Ardebil, Namin, Sabalan Mts., Livan, Sardarud, Mahabad, Maragheh, Mianduab, Dash Aghel, Rezaiyye, Khvoy, Marand), Hamadan (2–23 Dec 1940, 17–18 Jan 1941), Bakhtaran region (23 Dec 1940–15 Jan 1941; Kangavar, Bakhtaran, Shahabad, Qasr-e Shirin, Sorkkeh Dizeh, Bisitun), Lorestan (20 Jan–28 Feb 1941; Karun, Borujerd, Cham Chid, Baraftab, Ti, Imarat). From Mar 1941 to Dec 1943, collections were mainly made from a base camp at Dow Rud in Lorestan, with frequent visits to Borujerd and occasional ones to Tehran, Tudar, Beshedalen, Kuh-e Pariz mt., Qala Taiyak, and Gosha; from Jan 1944 to Jan 1946 the party was housed in Karaj and Tehran, with occasional collecting trips to Kuh Pansar and Shir Kuh Mt.]

- 21 Løppenthin B. 1951. Sea birds of the Persian Gulf. *Proceedings International Ornithological Congress (Uppsala 1951)* **10**: 603–610. [Research in the Persian Gulf from 17 Dec 1937 to late Apr 1938, partly at shore in Bushehr, Bandar Khomeyni, and Khorramshahr, but the observations published are restricted to seabirds seen from a fishing vessel along the coast between Khorramshahr and Chah Bahar and further offshore, or found when landing on islands. Inhabited islands visited were Kharg, Forur, Henqam, Larak, and Hormoz, (then) uninhabited ones were Farsi, Arabi (= Hendorabi), Shatvar, Bani Forur, and Nabiyu Tunb; also, a visit to Harkus (27°56’N, 49°41’E) in Saudi Arabia]
- 22 Ludlow F. 1917. Notes on the bird life in Ahwaz, Persia. *Journal Bombay Natural History Society* **25**: 303–306. [Birds seen and collected in Ahvaz during Feb–May 1917; mainly larger non-passerines are listed (c. 55 species), and only 11 passerines]
- 23 Marien D. 1950a. Notes on some Asiatic Meropidae (Birds). Notes from the Walter Koelz collections **5**. *Journal Bombay Natural History Society* **49**: 151–164. [On some species taken by Koelz in (among others) Iran, with detailed localities and data. For the collections of W. Koelz, see Koelz (1950), above. For revisions of some other taxonomic groups based on the Koelz collections, see Marien (1950–1951) and Vaurie (1949–1951), below]
- 24 Marien D. 1950b. Notes on some Asiatic Sturnidae. Notes from the Walter Koelz collections **9**. *Journal Bombay Natural History Society* **49**: 471–487. [As for Marien 1950a]
- 25 Marien D. 1951a. Notes on the bird family Prunellidae in southern Asia (Notes from the Walter Koelz collections **7**). *American Museum Novitates* **1482**: 1–28. [As for Marien 1950a]
- 26 Marien D. 1951b. Notes on some pheasants from southwestern Asia, with remarks on moult (Notes from the Walter Koelz collections **10**). *American Museum Novitates* **1518**: 1–25. [As for Marien 1950a]
- 27 Meiklejohn M.F.M. 1948. Summer notes on birds of Teheran and the Alburz mountains. *Ibis* **90**: 76–86. [Report on birds observed when the author lived in Tehran in 1946 and during visits from Tehran into the valleys on the southern slope of the Elburz Mts., from the Karaj and Kan valleys in the west to the Lar valley near Damavand in the east]
- 28 Misonne X. 1953. Les grands Quartiers d’hiver du Sud-est de la Mer Caspienne. *Gerfaut* **43**: 103–127. [In French: The large winter-quarters in the southeast of the Caspian Sea] [Report on a stay by a Belgian wildfowl specialist in the plains at the southeast corner of the Caspian Sea and on the nearby slopes of the Elburz Mts. from October to early December 1952. Main sites visited were on the coast between Ramsar and Bandar-e Gaz, in the plains near Tirtash and Sari, and at a good spot for observing migration on the Firuzkuh Pass (south of Sari). About 20 birds collected, mostly waders]

- 29 Misonne X. 1954. Notes complémentaires sur les oiseaux de la côte Caspienne. *Gerfaut* **44**: 88–91. [In French: Additional notes on the birds of the Caspian coasts] [Another stay by Misonne at the southeast corner of Caspian Sea, mainly at the Bandar-e Gaz bay, during 1–5 September 1953; see the previous reference]
- 30 Misonne X. 1955. La migration d'automne dans le Kurdistan Oriental. *Gerfaut* **45**: 33–67. [In French: Autumn migration in eastern Kordestan] [Report on long stays in Akinlou during July–December 1953 and in summer 1954, with some notes from elsewhere in Iranian Kordestan and Azarbaijan (e.g. Jolfa and Moghan). At least 20 birds collected, mostly non-passerines]
- 31 Misonne X. 1956. Notes sur les oiseaux de la Syrie et de l'Iran. *Gerfaut* **46**: 191–197. [In French: Notes on birds of Syria and Iran] [For Iran, report of a visit to Akinlou, 23 April to 10 May 1956]
- 32 Misonne X. 1976. Notes sur la migration de printemps dans le Dasht-i-Lut et le Jaz Murian, Iran Oriental. *Gerfaut* **66**: 89–106. [In French: Notes on the spring migration in the Dash-i-Lut and the Jaz Murian, eastern Iran] [Report on a large Belgian collecting expedition to Iran, 1 Apr to 15 Jun 1972. Despite the title, includes data on local breeding birds also, not just on migration. 48 localities listed, with coordinates, mostly along desert routes: Tehran (1 Apr), Deh Alum (5 Apr), Tabas (8 Apr), Purvadeh (9 Apr), Kuh-i Bakhty (12–13 Apr), Bam (15–18 Apr), Jaz Murian Lake area (mainly at Tamgiran, 21 Apr, and Kabahu Rig, 22–26 Apr), Bandar 'Abbas (28–29 Apr), Sirjan (Saidabad, 1 May), Kerman (2–4 May), Bam (5 May), some 10 localities in the southern Dasht-e Lut desert (6–19 May, within triangle from 28°28'N, 59°28'E north to 31°28'N, 59°17'E and west to 30°17'N, 57°45'E), Bam (20–21 May), Kerman (22–23 May), Bampur (26 May), Fanuch (= Fannuj, 27 May), Mokhtarabad (S of Jaz Murian, 28 May), Bunsaik (29 May), Kalat Dar Keshlek (W of Jaz Murian, 30 May), Manujan, the area between Jagin (= Jaghin) and Anguran (= Angohran) (1–6 Jun), Bandar 'Abbas (8 Jun), and Tehran (9 Jun)]
- 33 Mörike K.D. 1960. Beiträge zur Kenntnis der Vogelwelt Khusestans (Südwestpersien). *Vogelwelt* **81**: 161–178. [In German: Contributions to the knowledge of the avifauna of Khuzestan (southwest Iran)] [Birds seen during a stay from October 1959 to March 1960 at Ahvaz. During this stay, travels were also undertaken southward to Abadan, Khorramshahr, and Bandar-e Shahpur (= Bandar Khomeyni), north to Karkheh R. (west of Haft Tappeh), Susangerd, Susa (= Shush), Andimeshk, and Shushtar, and east to Haft Gel]
- 34 Neronov V.M. & Zabolotskii I.N. 1992. Ekologo-geograficheskii analiz avifauny Irana. Pp. 96–124 *In*: Kurochkin E.N. (ed) *Sovremennaya Ornitologiya* 1991. Rossiiskaya Akad. Nauk/Vsesoyuznoe Ornitologicheskii Obshchestvo, Moskva, 287 p. [In Russian: Ecological-geographical analysis of the avifauna of Iran, in: Present-day ornithology 1991] [An analysis of bird distribution in Iran, dividing maps of 219 species derived from Scott *et al.* (1975, below) in squares of 1 degree, building tree of relatedness among these squares and comparing results with geographical regions for Iran as established by Zarudny (1911)]
- 35 Nielsen B.P. 1969. Further spring observations on the birds of Gilan, northern Iran. *Dansk Ornitologisk Föreningens Tidsskrift* **63**: 50–73. [Several excursions made into Gilan in order to observe bird migration between 24 Mar and 21 Apr 1967. Based at Ghazian (eastern suburb of Bandar-e Anzali), with most time spend at Lake Mordab (mainly at Gulega) and at the coastal zone west of Anzali, but also trips made to Tehran and Qazvin. Most notes on migration, but includes some details on breeding birds, e.g. on the local dark-headed form of *Remiz*]
- 36 Nielsen B.P. & Speyer H.-J. 1967. Some observations of birds in Northern Iran. *Dansk Ornitologisk Föreningens Tidsskrift* **61**: 30–39. [Short report on several excursions made in 1954–1964 to Iran, with emphasis on the southern shore of the Caspian Sea and on migration, also including some data of A. Davidson from Tehran. Notes mainly from (1) Lake Mordab in northwest Iran (especially at Gulega, April–May 1968), and (2) the Meyan Kaley (Myiankaley) sandspit in the northeast (between the Caspian Sea and Gorgan Bay), in Mar 1963]
- 37 Nikol'skii A.M. 1886. Poezdka v severo-vostochnuyu Persiyu i Zakaspiiskuyu oblast'. *Zapiski Russkogo Geograficheskogo Obshchestva po obshchei Geografii* **15(7)**: 1–57. [In Russian: Voyage to northeast Iran and the Transcaspien Region] [See Zarudny (1896), below, for localities visited]
- 38 Norton W.J.E. 1958. Notes on birds in the Elbruz mountains of North Persia. *Ibis* **100**: 179–189. [Birds observed 19 Jul to 10 Aug 1956 in the Sardab Rud valley of the Alam Kuh (Takht-i-Suleiman) Mts., from Kelardasht over Rudbarak up to Hazarchal (4000 m), followed by 3 days along the coast in Chalus; then a voyage east over the Caspian plains to Babol, south over the Firuzkuh Pass, and south of the Elburz west to Pulur at foot of Damavand Mt.; on 16–28 August research in Lar Valley on Mt. Damavand, with a base camp at Safid Ab and climbing up to Baresang Kuh (4300 m) in the alpine zone]
- 39 Paludan K. 1938. Zur Ornithologie des Zagrossgebietes, W.-Iran. *Journal für Ornithologie* **86**: 562–638. [In German: On the birds of the Zagros-area] [Report on a collecting trip in 1935 to Salehabad (= Andimeshk, 14–21 Mar, 31 Mar–14 Apr) and nearby Kulmahak, Dum-Dum R. (22–30 Mar, e.g. Chahbazan village), Bishe-Porem (15 Apr–4 May, 10–14 May), Chamchid (5–9 May), and Karun with the nearby Pariz Kuh mt. (15–28 May). Includes many data on migration, habitat, etc.; c. 250 birds collected, of which 18% non-passerines]
- 40 Paludan K. 1940. Contributions to the ornithology of Iran. *Danish Scientific Investigations in Iran* **2**: 11–54. Munksgaard, København. [Birds seen between 15 June and 4 August 1935 in the eastern Elburz Mts., mostly in the Gorgan - Aliabad - Zarangul - Abr - Shahrud (= Emamrud) area; also, observations from 30 May to 4 June 1935 at Soltanabad (= Arak) and Tuslu Göl].
- 41 Passburg R.E. 1959. Bird notes from northern Iran. *Ibis* **101**: 153–169. [Bird notes obtained during a stay of 3 years (1955–1957) in Tehran, with trips in the Tehran surroundings (Ahmadabad, Karedj = Karaj, Varamin, Damavand Mt.), to the Caspian coast (Bandar-e Anzali, Mordab Lake, Chalus, Babolsar), to the Rud-e Shur valley from Kazvin (= Qazvin) to Daryachehye Namak (a temporary salt lake east of Qom), and (further away) to Persepolis and nearby marshes in the Zagros Mts. The birds collected by Passburg are discussed in Diesselhorst (1962), see above]

- 42 Planiol M. 1932. Quelques oiseaux de Perse. *Oiseau et Revue française d'Ornithologie*, Nouv. Sér. **2**: 632–647. [In French: Some birds of Iran] [Though living in Iran in 1928, no field observations given nor details on localities visited: the paper is largely on local bird-lore, especially of falconry, based in part on literature]
- 43 Radde G. 1881. Reise nach Talysch, Aserbeidshan und zum Sawalan, 1879–1880 - vorläufiger Bericht. *Petermann's Mitteilungen* **27**: 47–55, 169–176, 261–270. [In German: A travel to Talysh, Azarbaijan and to the Sawalan, 1879–1880 – preliminary report] [Notes on an expedition which collected over 3000 birds and paid much attention to observations of wildlife. However, most of these were made in the Lenkoran-Talysh area of the Azerbaijan Republic, while in Iran only the Sawalan (= Kuhha-ye Sabalan Mts.) was covered. Travel in Iran: a short trip of Radde and a taxidermist from Bandar-e Anzali over Mordab Lake to Rasht and back in the last week of May 1880 to obtain collecting permissions, followed by an expedition from 13 Jun to 1 Jul 1880 (old Russian style) from Namin over Ardabil to the Sabalan peak (20–26 Jun), returning to Baku northward over Kuyeh, leaving Iran near Germi]
- 44 Radde G.I., Valter A. & Konshin A.M. 1886. *Predvaritel'nyi otchet o snaryazhennoi, po vysochaishemu povelenyu, ekspeditsii v Zakaspiiskii kraj i Severnyi Khorassan*. Tiflis, 417 p. [In Russian: Preliminary report about the expedition in 1886 according to Imperators' order into Transcaspian region and Northern Khorasan] [General results of the expedition. See the next paper for the itinerary of the expedition and both next papers for the scientific results]
- 45 Radde G. 1889. Wissenschaftliche Ergebnisse der im Jahre 1886 Allerhöchst befohlenen Expedition nach Transkaspien und Nord-Chorassan. *Petermanns Mitteil., Ergänzungsband* **27**(126): 1–195. [In German: Scientific results of the expedition of 1886 to Transcaspia and north Khorasan, ordered by His Highness [the Russian Czar]] [Despite the North Khorasan in the title, virtually all data on birds observed and collected are from present-day Turkmenistan, as most of the travels halted when touching the Iran border. Iran entered only near Kelat [= Kabud Gonbad], along the Tedzhen/Hari Rud R. south of Sarakhs, and when travelling along the lower Kashaf R. up to Schurdsche; the locality Germab frequently cited in the paper is the settlement above Geok Tepe in the Kopet Dag of Turkmenistan, not Garmab in Iran]
- 46 Radde G. & Walter A. 1889. Die Vögel Transcaspiens. Wissenschaftliche Ergebnisse der im Jahre 1886 in Transcaspian von Dr. G. Radde, Dr. A. Walter und A. Konschin ausgeführten Expedition. *Ornis* **5**: 1–128, 165–279. [In German: The birds of Transcaspia. Scientific results of the expedition undertaken in 1886 by Dr. G. Radde, Dr. A. Walter and A. Konschin] [See the previous two reports; as in these, only a few details on Iran are given, but these include data of possible occurrence of Pander's Ground-Jay (see note at end of this paper), and the report is accompanied by a detailed map of (among others) N Khorasan]
- 47 Radugin V.I. 1917. Iz nablyudennii nad prirodoi Kotursko-Irmiiskogo raiona v. severo-zapadnoi Persii. *Izvestiya Kavkazskogo otdela Russkogo Geograficheskogo Obshchestva* **25**: 284–300. [In Russian: On observations of the nature of the Kotur-Urmia Lake region in northwest Iran] [Bird observations in the surroundings of Qotur and Orumiyeh]
- 48 Read S.J. 1958. Notes from the Tuslu Göl, central Iran. *Ibis* **100**: 274–275. [Observations of birds made on 21–22 June 1957 at Tuslu saltlake]
- 49 Richter W. 1961. Reisebericht über eine Reise in den Südwest- und Südost-Iran 1956. *Stuttgarter Beiträge zur Naturkunde* **76**: 1–13. [In German: Travel report on a voyage to southwest and southeast Iran 1956] [Birds seen and collected by a small expedition from the Stuttgart Museum, including among others Prof. E. Schüz, to collect insects and birds in southern Iran, 3 Feb to 29 May 1956. Travel by plane, train, boat, foot, car, and animal transport, with field observations at Ahvaz and Shadegan on the Karun R. (15 Feb–20 Mar), at Shush, Haft Tepe, and the Dis (= Dez) River 40 km SE of Shush (21–25 Mar), and at the Jarrahi R. (15 km NE of Shadegan, 25 Mar–11 Apr). Then back to Tehran, followed by an expedition from Kerman over Bam to Anbar-Abad (23 Apr to 10 May 1956). Only the birds observed are published in this paper; for the birds collected, see Diesselhorst (1962), above. In this latter article, also birds collected by Richter in the Iranshahr area in 1954 are listed, but observations made during the expedition of 1954 remain apparently unpublished]
- 50 Roberts G. 1943. Notes from the Persian coast. *Journal East African Natural History Society* **17**: 123.
- 51 Savage C.D.W. 1958. A year in Mazandaran. *Journal Royal Central Asian Society* **45**: 269–275. [Observations made by a waterfowl specialist when travelling along the plains of the southern Caspian]
- 52 Savage C. 1964. Lake Rezaieyeh: a specialized summer habitat for Shelduck and Flamingos. *The Wildfowl Trust Annual Report* **15**: 108–113. [Research in May–Sep 1960 on Lake Orumiyeh, in part assisted by F. Plattner. Mainly a report on *Tadorna tadorna*, *T. ferruginea*, and *Phoenicopterus roseus* and their food, but lists some species of local breeding birds in the surroundings. Many other papers of Savage are restricted to wintering waterfowl and their ecology and numbers, and these are not listed here]
- 53 Schalow H. 1876. Zur Ornis Persiens. *Journal für Ornithologie* **24**: 173–189. [In German: On the birds of Iran] [Summary of and annotations on a 398 pp book of F. de Filippi, 'Note di un viaggio in Persia nel 1862 (Note on a voyage to Iran in 1862), with remarks on the specimens collected. De Filippi travelled from Diulfa (= Jolfa) over Marend (= Marand), Tauris (= Tabriz), Migneu (= Miane), Zendian (= Zanjan), and Kazvin (= Qazvin) to the Tehran area, where the nearby Damavand Mt. and Lar valley were visited; voyage back over Qazvin, Rasht, and Astara, but the Marquiss Doria travelled on to Shiraz]
- 54 Schüz E. 1957a. Vögel von Teheran und von Baghddad. *Vogelwelt* **78**: 73–82. [In German: Birds of Tehran and Baghddad] [Comparison of the birds observed during two 10-day stays in Tehran in February and June 1956 with those of a 1-week stay in Baghddad (Iraq). The Tehran report includes observations made in Tehran by K. Krell (for Krell, see also Diesselhorst 1962, above)]
- 55 Schüz E. 1957b. Ein Vergleich der Vogelwelt von Elburzgebirge und Alpen. *Orn. Beob.* **54**: 9–33. [In German: A comparison between the avifauna of the Elburz Mts. and the Alps] [Report on two short trips made in 1956 by Schüz in



- the Elburz Mts: (1) 9–12 May from Gorgan over Ghoznavi, Schahpassand (= Shah Pasand), and the Kosch Dschilagh pass (= Khush Yailaq pass) to Schahrud (= Emamrud), and back over Gorgan and Tschaluss (= Chalus) to Resvandeh (= Resvanshahr), and (2) 19–21 May from Resvandeh over the Tschaluss pass and Keredsch (= Karaj) to Tehran. About 20 birds collected. For a full report of birds seen and collected in the neighbouring lowlands, see Schüz (1959)]
- 56 Schüz E. 1957c. Vogel-Erlebnisse in einer Baum-Oase bei Bender-schah (Iran). *Beiträge zur Vogelkunde* **6**: 75–78. [In German: Experiences with birds in a tree-oasis near Bandar-Shah (Iran)] [Birds seen during a one-day-visit on 8 May 1956 to a tree-covered grave in the steppe near Bandar-Shah (= Bandar-e Torkeman); most birds were migrants]
- 57 Schüz E. 1959. Die Vogelwelt des Südkaspischen Tieflandes. E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, 199 p. [In German: The avifauna of the South Caspian lowlands] [An important book containing many notes on ecology, taxonomy, migration, numbers, biometrics, and so on for each bird species seen and collected. Main research by Schüz from 13 February to 18 May 1956, when he was based in Resvandeh (= Rezvanshahr), from where frequent visits were made to the nearby coastal dunes and shrubbery at Rudesar, Tassehabad and Rud-e-Posht, or a little east of these to Gulega on the Murd-ab lake; also, trips west of Resvandeh made to the coast west of the Schafa-rud mouth and to scrub-forest in the Schafa-rud valley, and trips southward to the mountain forest in the Schafa-rud gorge above Punnell. Other short excursions further away were made to Bandar-Pahlevi (= Bandar-e Anzali)/Ghazian (21–22 Feb, 19 Mar, 17–18 Apr, 15–16 May) and to Astara (3 May); longer travels were on 5–12 May from Resvandeh over Ramsar, Babulsar, and Bender Gas to Gorgan (with a short visit to the mountains) and back over Tschaluss (= Chalus) to Resvandeh, and on 19–21 May over the Chalus pass to Tehran. For observations in the mountains on 9–10 and 19–21 May, see Schüz (1957b). Includes data from others, e.g. on birds collected by Krell and Reza Pahlavi Sep 1951–Aug 1952 in the SE corner of Caspian Sea, on the Atrak R., and east up to Budschnurd (= Bojnurd) and Mashhad (see also Diesselhorst 1962 and Schüz 1957a,b,c). About 400 birds collected, of which 33% non-passerines]
- 58 Scott D.A., Hamadani H.M. & Mirhosseyni A.A. 1975. [The birds of Iran]. Dept. of Environment, Tehran, 412 p. [Fieldguide to the birds of Iran, which includes preliminary maps of breeding distribution of all Iranian birds]
- 59 Serebrovskii P.V. 1929. K ornitogeografii Perednei Azii. *Ezhogodnik' Zoologicheskago Muzeya Akademii Nauk SSSR* **29**: 289–392. [In Russian: On the ornithogeography of SW Asia] [A zoogeographical account]
- 60 Sharpe R.B. 1886. On a collection of birds from Bushire in the Persian Gulf. *Ibis* (5)**4**: 493–499. [On a small poorly documented set of bird skins taken by A.J.V. Palmer in or near Bushehr, on the southwest coast of Iran]
- 61 Sharpe R.B. 1889. Birds. Pp. 66–93 in: J.E.T. Aitchison (ed) The zoology of the Afghan Delimitation Commission. *Trans. Linn. Soc. London* (2)**5**(3): 53–142. [Birds collected by a party establishing the border between W Afghanistan and NE Iran in autumn 1884–summer 1885. Just over 400 birds collected (35% non-passerines), but most of them in W Afghanistan. Relatively few were taken in Iran, during the voyage from Meshed (Mashhad) to Khusan (Kohsan, 34.40°N, 61.11°E, Afghanistan), and, on the way back, from Kilki (Afghanistan) via Rui Khauf (Khvaf/Rud) and Torbat-e-Heydariyeh to Mashhad]
- 62 Shestoporov E.L. 1927. Ekskursiya po Atreky i Astrabadskoi provintsii. *Byulletin Moskovskogo Obshchestva Ispytatelei Prirody otdel Biologicheskii, Novaya Seriya* **36**: 366–379. [In Russian: Excursion to the Atrak and the Astrabad province] [Birds, butterflies and reptiles observed during a voyage in NE Iran; includes many observations on timing of bird migration in the SE corner of the Caspian Sea. Departed Kyzylarvat on 4 Sep 1916, then over Karakal, Chekankala, Dazly Olum, and Sangudag to Chatly (excursions in surroundings 16 Sep–12 Oct); from mid-Oct to mid-Feb in Gumbet-Kabuz, and onward voyage over Lëva (14 Feb) to Asterabad (= Gorgan) and immediate surroundings (23 Feb–19 May)]
- 63 Stresemann E.L. 1928. Die Vögel der Elburz-Expedition 1927. *Journal für Ornithologie* **76**, 313–411. [In German: The birds of the Elburz-Expedition] [Extensive report of a collection trip undertaken by G. Heinrich and M. Dammholz in Feb–Aug 1927 (see Heinrich 1928 for a vivid account). Stresemann was responsible for the scientific results of the trip, based on the c. 500 specimens collected (18% non-passerines); his report is a valuable contribution to taxonomy, biometrics, and ecology of the birds of northern Iran, but note that his wing measurements are on average 1–2% below those taken with present-day standard methods. For the localities visited, see Heinrich 1928, above]
- 64 Sutton S.L. 1961. Report on the research of the Oxford Expedition in the provinces of the South Caspian. *Shekar va Tabiat* **37**: 36–39.
- 65 Ticehurst C.B., Buxton P.A. & Cheesman R.E. 1923. The Birds of Mesopotamia. *Journal Bombay Natural History Society* **28**: 210–250. [Mainly an overview of all birds known to occur along the Euphrat and Tigris rivers in Iraq, from Mosul (Al Mawsil) south to Fao (Al Faw) and from the Syrian-Arabian desert east to the Jabal Hamrin Mts. However, includes some data from neighbouring southwest Iran, especially from Qasr-e-Shirin (visited by Cheesman in May) and from Shushtar (visited in Feb 1918 by F.M. Bailey)]
- 66 Ticehurst C.B., Cox P.Z. & Cheesman R.E. 1925. Birds of the Persian Gulf Islands. *Journal Bombay Natural History Society* **30**: 725–733. [Report of a visit to a number of islands in the Persian Gulf. Research on Iranian islands was restricted to landings made in March and May on Henjam island (= Henqam), in March–April on Tanb island (= Tunb al Kubra, Tonb-e-Bozorg) and on Nabi-u-Tanb island (= Tunb as Sughra, Tonb-e-Kuchek), and in July on Nabi-ul-Farur (= Jazireh-ye Bani Forur). At least 40 birds collected]
- 67 Tomlinson A.G. 1916. Notes on the birds of Mesopotamia. *Journal Bombay Natural History Society* **24**: 825–829. [Most observations made during a residency of several years in Basrah (Iraq), but Tomlinson extended his occasional trips into the nearby parts of Khuzestan in Iran: visits were made to Ahvaz, Shushtar, the Karun R., and the Gargar (= Karkheh) R.]

- 68 Trott A.C. 1947a. Notes on birds seen in the Lar valley, 1943 and 1944. *Ibis* **89**: 231–234. [Based in Tehran in 1943–1944, Trott reports on several excursions made into the nearby Lar Valley (on the slope of the Damavand Mt. in the Elburz)]
- 69 Trott A.C. 1947b. Notes on birds collected and seen in Persia, 1935–1945. *Journal Bombay Natural History Society* **46**: 691–704. [A resident of Tehran, making numerous trips, mostly in the surroundings, e.g. to the Lar valley (including Chihil Chesmeh, Deli Chai, etc. – see also Trott 1947a), Gulhak, Sultanabad, Surkh Hissar, and Varamin, but also more distantly to Abadan, Esfahan, Shiraz, Bushehr, and the Pir-i-Zan pass (= Kotal-e Pirehzan). At least 100 specimens collected and many species observed. Trott reports also on a small collection of a Mr. Brotherston from Ardakan, Ahvaz, and Qazvin]
- 70 Tuck G.S. 1974. Seabirds of the Persian Gulf (The Gulf) and Gulf of Oman - a Survey (1958–1973). *Sea Swallow* **23**: 7–21. [Summary of notes published in the Sea Swallow and from the archives of the Royal Navy BirdWatching Society, including observations from within Iranian territorial waters. Most notes were by ship-based observers and refer to non-breeding birds recorded off-shore, but data include birds seen in or near harbours and on islands in the Persian Gulf]
- 71 Vaurie C. 1949a. Notes on some Ploceidae from western Asia. Notes from the Walter Koelz collections **1**. *American Museum Novitates* **1406**: 1–41. [Includes Koelz's birds from Iran, with detailed localities and data. For the collections of W. Koelz, see Koelz (1950), above. For revisions of some other taxonomic groups based on the Koelz collections, see Vaurie (1949–1951), below, and Marien (1950–1951), above]
- 72 Vaurie C. 1949b. Notes on some Asiatic finches. Notes from the Walter Koelz collections **2**. *American Museum Novitates* **1424**: 1–63. [As for Vaurie 1949a, above; on various Fringillidae]
- 73 Vaurie C. 1949c. Notes on the bird genus *Oenanthe* in Persia, Afghanistan, and India. Notes from the Walter Koelz collections **3**. *American Museum Novitates* **1425**: 1–47. [As for Vaurie 1949a, above]
- 74 Vaurie C. 1950a. Notes on some Asiatic Titmice. Notes from the Walter Koelz collections **4**. *American Museum Novitates* **1459**: 1–66. [As for Vaurie 1949a, above; on *Parus*, *Aegithalos*, and *Remiz*]
- 75 Vaurie C. 1950b. Notes on some Asiatic Nuthatches and Creepers. Notes from the Walter Koelz collections **6**. *American Museum Novitates* **1472**: 1–39. [As for Vaurie 1949a, above; on *Sitta* and *Certhia*]
- 76 Vaurie C. 1951a. Notes on the Wrens and Dippers of western Asia and India. Notes from the Walter Koelz collections **8**. *American Museum Novitates* **1485**: 1–19. [As for Vaurie 1949a, above; on *Troglodytes* and *Cinclus*]
- 77 Vaurie C. 1951b. A study of Asiatic Larks. Notes from the Walter Koelz collections **11**. *Bulletin American Museum of Natural History* **97**: 431–526. [As for Vaurie 1949a, above; on Alaudidae]
- 78 Vaurie C. 1951c. Notes on some Asiatic Swallows. Notes from the Walter Koelz collections **12**. *American Museum Novitates* **1529**: 1–47. [As for Vaurie 1949a, above; on Hirundinidae]
- 79 Witherby H.F. 1903. An ornithological journey in Fars, South-West Persia. *Ibis* (8)**3**: 501–571. [Report on a collecting trip made by H.F. Witherby and C.F. Camburn in the central Zagros Mts. About 470 birds collected, of which c. 22% non-passerines; only collecting numbers were cited in the report, no localities for larger series of skins, and therefore these collecting numbers are listed below as far as given by Witherby for rarer birds, in order to link number, date and locality. Route followed: Bushire (= Bushehr; 18–23 Mar 1902; nrs 1–31), Shif (= Jazireh-ye Shif), Daliki (= Dalaki, 28 Mar), Konar Takhteh (28–30 Mar; nrs 35–51), Kamarij (30 Mar), Kazran (= Kazerun, 31 Mar–2 Apr; nr 65), Kaluni (3–4 Apr; nrs 78–85), and over the passes Kotal-e Dokhtar, Mian Kotal and Kotal-e Pir-e-zan (5–7 Apr) to Dasht-e Arjan (6–8 Apr; nrs 111–138) and Kalah Mushir (9–14 Apr; nrs 143–150). Onward voyage to Shiraz temporarily unsafe, thus a detour made to the north-west: Nudan (16–19 Apr; nrs 185–199), Naksh-e Baram (20–21 Apr; nrs 212–226), Nurabad (22 Apr), Pul-e Mard (22–23 Apr; nrs 228–233), Aliabad (24 Apr), Shul (25–26 Apr; nr 243), Kherak (26 Apr; nr 254), Khan-e Zinium (26–27 Apr; nrs 249–258), Kalah Mushir (28 Apr; nr 259), and Shiraz (29 Apr–14 May; nrs 276–293). Then to the high mountains further north-west: Shul (15 May), Aliabad (17–18 May, nrs 308–319), Shira R. (19 May; nrs 323–328), Ardakun (20 May; nr 338), Kuh-e Barm Firuz Mt. (21–22 May; nrs 339–345), Kuh-e Dinar (nrs 369–371) with nearby Kuh Sia Mts. and the foot of the Dinar (Pa Dinar; nrs 357–359) above Gardan-e Bijan (24–29 May), Sisakht (29–30 May; nrs 374–381), Dorah and nearby Khersan R. (31 May; nr 385), Chinar (1 Jun; nrs 394–395), Tassi (5 Jun), Sadat (5–6 Jun; nrs 408–412), Bija (8 Jun; nr 418), Basht (10/11 Jun; nr 442), Tol-e Safed (12/13 Jun; nrs 448–453) and rapidly back to Bushire (23 Jun) over Nurabad (14–15 Jun; nrs 461–462), Borazjan (19 Jun) and Shif (20 Jun).
- 80 Witherby H.F. 1907. On a collection of birds from western Persia and Armenia. *Ibis* (9)**1**: 74–111. [Report on an expedition of A.C. Bailward and R.B. Woosnam in March–July 1904; route travelled in Iran approximately: Bushehr (10–14 February), Ahvaz (26–28 February), Dezful (12 March), Shush (14–18 March), Shushtar (21 March), Ahvaz (28–30 March), Ramhormoz (2–5 April), Malamir (= Izeh, 8–13 April), Dehdez (14 April), Dopulan (= Dow Polan, 18 April), Ardal (20–21 April), Shalamzar (21–23 April), Esfahan (26–30 April), Tiran (8 May), Barbarud (11–12 May), Derbend (14 May), Borujerd (14–18 May), Sahneh (20 May), Bisotun (21 May), Kermanshah (= Bakhtaran, 26–28 May), Sanandaj, Divandarreh, Saqqez (4 June), Saujbolagh (= Mahabad; 8 June), and along the southwest of Lake Urmia (= Orumiyeh; 10–15 June) to Diza (= Yüsekova) in southeast Turkey; all localities visited later than 15 June are in Turkey. About 350 birds collected, of which c. 280 in Iran; 20% of latter non-passerines]
- 81 Witherby H.F. 1910. On a collection of birds from the south coast of the Caspian Sea and the Elburz Mountains, with field notes by R.B. Woosnam. *Ibis* (9)**4**: 491–517. [Report of a voyage by Woosnam in Feb–May 1907, travelling from Rasht along the Caspian coast to Bandar-i-Ges (in the southeast corner of Gorgan Bay), along the Elburz Mts. (including Damavand Mt.) to Tehran, then over Karaj to Qazvin and through the Safid Rud valley back to Rasht. About 260 birds collected, of which only c. 9% non-passerines]
- 82 Zarudnyi ('Zaroudnoï') N.A. 1886. Oiseaux de la contrée Trans-Caspienne. *Byulletin Moskovskogo obshchestva ispytatelei prirody* **61**(1): 262–332. [In French: The birds of the Transcaspien country] [Report of a voyage to

- Turkmenistan in 1884, marginally touching the neighbouring part of northern Khorasan. The name of the famous Russian bird collector Nikolai Zarudnyi is transcribed as Sarudny in his German articles and to Zaroudnoi in French
- 83** Zarudnyi ('Zaroudnoi') N. 1889–1891. Recherches zoologiques dans la contrée Trans-Caspienne. *Byulletin Moskovskogo obshchestva ispytatelei prirody* **1889**(1): 128–160; **1889**(4): 740–842; **1891**(4): 288–315. [In French: Zoological research in the Transcaspien country] [The first and last parts of this work contain an introduction and zoogeographical account, respectively; the 2nd part is a species list of mammals and birds encountered during a travel in Turkmenistan and just into the neighbouring parts of Iran and Afghanistan, probably in 1886 [collecting dates are listed without mentioning year, but some comparisons are made with an earlier excursion in 1884, for which see Zarudnyi 1886; another destination in Iran was chosen in 1885: see Zarudnyi 1892, below]. In Iran, reached Ljutfabad (= Lotfabad, 8–9 May) and the eastern Kopepet Dag (= Kopet Dag; 20–27 August), in the latter mountains travelling from Chakh-Chakh [= Chahchaheh] over Kelté-Chinar [=Kalateh-ye Chenar] to the Emam Qoli area]
- 84** Zarudnyi N.A. 1892. Materialy dlya ornitologicheskoi fauny Severnoi Persii. *Materialy k poznaniyu fauny i flory Rossiiskoi Imperii, Otdel Zoologicheskii* **1**: 106–137. [In Russian: Data on the bird fauna of northern Persia] [Report of a journey of N.A. Zarudnyi and A.M. Nikol'skii in N Iran. Both departed southward along the Caspian shore in Turkmenistan on 25 May 1885, reaching Gumish Tepe near the mouth of the Gorgan R. on 3 Jun; they then walked east up the Gorgan R. to Ak-Kala (= Aq Qal'eh) and from there to the northern slope of the Elburz above Gorgan (11 Jun), when Zarudny had to return to the Russian consul in Gorgan because of injured feet and financial problems; he made a visit to marshes near Bandar-e Gaz (25 Jun), but return to Russia by ship was unavoidable after this. Nikol'skii travelled onward in the Elburz to Aljastan (14–22 Jun), reaching up over the pass to Abr, travelling south of Elburz eastward over Nardin and Bojnurd to Garmab (in Turkmenistan, S of Geok Tepe). See also Nikol'skii (1886)]
- 85** Zarudnyi N.A. 1896a. Ornitologicheskaya fauna Zakaspiiskogo kraya (Severnoi Persii, Zakaspiiskoi oblasti, Khivinskogo oazisa i ravninnoi Bukhary). *Materialy k poznaniyu fauny i flory Rossiiskoi Imperii, Otdel Zoologicheskii* **2**: 1–555. [In Russian: The ornithological fauna of the Transcaspien area (northern Iran, Transcaspien region, Khiva oasis, and Bukhara plains)] [Report on excursions made in 1886–1891, mostly to present-day Turkmenistan and Uzbekistan, but includes a voyage made in 1892 to the C Kopet Dag Mts. along the Khorasan/Turkmenistan border, following the following route in Iran: Ashkhabad, entering Iran at Kelteshinar (= Kalateh-ye Chenar, west of present-day village of that name), Durungar valley (29 Apr), Ispion (= Espean) Mts., Asilmodag Mts. (not clear whether on Iranian or Turkmenistan side of this range, 12–18 May), Durb-adam, Kirmar Mts. (26–28 May), Guliuli Mts. (10–15 Jun), Kheyrahad (5–7 Jul), and (in Turkmenistan) Garmab (15 Jul)]
- 86** Zarudnyi N. 1896b. Marshrut' N.A. Zarudnago po vostochnoi Persii v' 1896 g. *Ezhegodnik' Zoologicheskago Muzeya Imperatorskoi Akademii Nauk* **1**: XVIII–XXI. [In Russian: Itinerary of N.A. Zarudny in eastern Iran in the year 1896] [Travel 23 Mar to 29 Jul in Khorasan and (for 10 days) the Sistan depression, listing 155 localities, too many to be all mentioned here. Other localities are fairly precisely known when collecting date available (all data old Russian style). Main route: Goudan (Russian border), Emam Qoli (23–24 Mar), Daulat Khaneh and Zubarán (25 Mar), Quchan (25 Mar), Farkhan and Hajjiabad (26 Mar), Seydabad (27 Mar), Nowbahar and Chanaran (27 Mar), Qasemabad (28 Mar), Mashhad (28 Mar–1 Apr), Toroq (2 Apr), Sharifabad (3 Apr), Khakestar (4 Apr), Eslam Qalah (4 Apr), Asadabad (5 Apr), Kaskak (6–7 Apr), Torbat-e-Heydariyeh (8 Apr), Umi (9 Apr), Buriabad (10 Apr), Dughabad, Abdolabad, and Feyzabad (11 Apr), Miandehi (12 Apr), Nusi and surrounding Bejestan desert (13–16 Apr), Marandiz (16 Apr), Chopal (16–17 Apr), Bejestan (17 Apr), Zeinabad (18 Apr), Firdaus (19 Apr), Burut (19–20 Apr), Surun (20 Apr), Sarayan (21–23 Apr), Dostabad (23 Apr), Mohammedabad (24–25 Apr), Chahak (26 Apr [encountering *Podoces pleskei* as new for science after leaving the village on the way to Rabatkazy]), Kalat-e Haj Yusef (27–28 Apr), Birjand (28 Apr–2 May), Bagryan-Kuh mt. and nearby Rekut (3–6 May), Khuf (7 May), Fadesh (8 May), Hamur (9–10 May), Sar Chah (11 May), Feyzabad (12 May), Basiran (13–14 May), Rume (15 May), Ku Buvak valley (17 May), Sumofat and Chahar Farsakh (18 May), Nih (= Nehbandan, 19–20 May), Khunik-e Bala (21 May), Aliabad (22 May), Bandan (23–25 May), Neyzar at W shore of Sistan lakes (25–26 May and 3 Jun), Afzalabad at E shore Sistan lakes (27 May and 3 Jun), Husseinabad and Nasirabad (near present-day Zabol, 28 May–2 Jun). Return voyage over Bandan (4–6 Jun), Aliabad (7 Jun), Nehbandan (8–9 Jun), Arviz, Neyzabad and Khunik-e Bala (10 Jun), Tarq and Shivar (11 Jun), Larak and Esmailabad (12 Jun), Sahlabad and Ebrahimi (13 Jun), Kaidasht and Dastgerd (14 Jun), Golander (14–15 Jun), Gurid (16 Jun), Chahkand (17–18 Jun), another Dastgerd (18 Jun), Bojd (19 Jun), Birjand (19–20 Jun), Kalateh-ye Hajji Javad (21 Jun), Piranj (22 Jun), Rubokht, Nuk and Saqi (22 Jun), Sedeh (23 Jun), Owj and Rum (24 Jun), Qayen (25 Jun), Khunik-e Bala (25–27 Jun), Garmab (29 Jun), Boniabad (30 Jun), Soltanabad (= Aliabad, 1 Jul), Zuzan (2 Jul), Bokhsani (3–5 Jul), Khvaf (= Rud, 5 Jul), Laj and Salami (6 Jul), another Sedeh (7 Jul), Fathabad (8 Jul), Jarf (10–11 Jul), Chahar Takab and neighbouring Kale-Minar Mts. (11–13 Jul), Qalandarabad and Fariman (14 Jul), Hoseynabad (15 Jul), Sang Bast and Baz Howz-e Pain (16 Jul), Toroq (17 Jul), Mashhad (17–19 Jul), Kjardy (21 Jul), Jank (22–23 Jul), Marish (23 Jul), Hazar Madjed Mts. pass (25 Jul), Khakistar (26–27 Jul), and Kheyrahad (28 Jul, at border S of Kaakhka in Turkmenistan)]
- 87** Zarudnyi N. 1898. Marshrut' N.A. Zarudnago po vostochnoi Persii v' 1898 g. *Ezhegodnik' Zoologicheskago Muzeya Imperatorskoi Akademii Nauk* **3**: V–XII. [In Russian: Itinerary of N.A. Zarudny in eastern Iran in the year 1898] [Travel 14 Mar to 15 Nov 1898 in Khorasan and Sistan-Baluchestan, reaching south to the Bampur area and east to the Sistan depression. C. 195 localities listed, too many to be all mentioned here, along the following route (all data old Russian style): Goudan (Turkmenistan border S of Geok-Tepe, 14 Mar 1898), Dor Badam (15 Mar), Emam Qoli (15 Mar), Daulat Khaneh and Quchan (16 Mar), Nowbahar and Qasemabad (19 Mar), Mashhad (20–25 Mar), Toroq (26 Mar), Baz Howz-e Pain and Sang Bast (27 Mar), Hoseynabad (28 Mar), Fariman (29 Mar), Qalandarabad (30 Mar), Bardu (31 Mar–1 Apr), Karizun and Sebek-Bala (1 Apr), Khorramabad (2 Apr), Langar (3 Apr), villages in Jam R.

valley (3–5 Apr), Koshkak (5 Apr), Kariz (6 Apr), Hari Rud R. between Kariz and (in Afghanistan) Kafir-Kala (= Eslam Qaleh, 34°39'N, 61°03'E), also visting Tirpul, Ghurian, and Zindajan in Afghanistan (7–10 Apr), back to Iran at Tayyebad and Farmanabad (11 Apr), Karat (12–14 Apr), Hari Shotur R. gorge (15 Apr), Sangan (15 Apr), Niazabad (16 Apr), Mozhnabad (17 Apr), Fandokht (18 & 22 Apr), Bazaa valley (19–21 Apr) towards Hauz-i-Muzaffari watertank (20 Apr), Mirabad, Awis, and Now Deh (22 Apr), Mohammedabad (23 Apr), Ahangaran (24–25 Apr), Shahrakht (25 Apr), Gulmirun (26 Apr), Gazik (27 Apr), Avaz (28 Apr), Tabas (29 Apr), Rازه (30 Apr), Makhunik (1 May), Duruh (2 May), Chah-e Zirun well (4 May), Khvajeh-dow-Chagi well (5 May), Chah-e Guishe well (6 May), and Bandan (8 May), leaving Khorasan 9 May. Sistan depression entered at Vareng bay (W Sistan lakes, 10 May), Afzalabad (E shore Sistan lakes, 11 May), Zabol (12 May), Helmand R. and neighboring meadows and desert (13 May–1 Jun, including visits to Afzalabad, Neyzar valley, and Varmal), Hoseynabad (3–4 Jun), Varmal (5 Jun), Hauzdar (7 Jun), Shila (9 Jun), leaving Sistan depression and entering Baluchestan hills, where travelling SSW: Hormak (10–11 Jun), Chah-e Divan well (12 Jun), Mian Bazar (13 Jun), Zahedan (14–15 Jun), Gal-e-Chah well (19 Jun), Dak-i-Doh well (20 Jun), Korin (20–21 Jun), Shandak (22 Jun), Zaitok and Chah-e Ahmad (23 Jun), Podagi (24 Jun), and Shur-Ab (27 Jun), reaching Bampur depression near Bazman (29 Jun–3 Jul), visiting Kaskin (6 Jul), Bampur (8–12 & 27–29 Jul), upper and middle Bampur R. (15–26 Jul, including Ge = Nikshahr), Chashmeh-e Kaskin (31 Jul), Bazman (2–8 Aug). Bampur depression left at Galgir pass (9 Aug), travelling E over Pansareh (10 Aug), Talab (11 Aug), Shurabad (11–12 Aug), Podagi (14–15 Aug), Hamun-e Jaori reed marsh (15 Aug), Khun-Kaka (17 Aug), Deh-e Pabid (18 Aug) to the Kuh-e Taftan Mts, of which foothills reached 20 Aug. Camp at Tamin (24 and 26–27 Aug), from where peak of Kuh-e Taftan mt. reached (25–26 Aug), then back home over Ladiz (28 Aug), Dar Gibian (30 Aug), Bog (30 Aug), Bid (31 Aug), Zahedan (1–2 Sep), Mian-Bazar (3 Sep), Kuh-e Malik Siah mt. (where borders of Iran, Pakistan and Afghanistan meet, 4 Sep), Chah-e Divan well (5 Sep), Hormak (5 Sep), Shila (6 Sep), Hauzdar (9 Sep), Varmal (10 Sep), deserts of SE Sistan depression (11–23 Sep), Vareng Bay (24–25 Sep, leaving Sistan 26 Sep), Bandan (27 Sep), Chah-e Gyshe well (29 Sep), Khvajeh-dow-Chagi well (30 Sep), Chah-i Zirun well (1 Oct), Chah-i-Bani well (3 Oct), Hoseynabad and Ratuk (4 Oct), Dastgerd (5–6 Oct), Tabas (7 Oct), Gazik (8 Oct), Gulmirun (10 Oct), Ahangaran (11 Oct), Mohammedabad (12 Oct), Bamrud (13 Oct), Mozhnabad (15 Oct), Sangan (17 Oct), Tiz-Ab (18 Oct), Karat (19 Oct), Mashhad Rizeh (20–21 Oct), Pul-e Band (22 Oct), Mardanabad (23 Oct), Torbat-e Jam (24 Oct), Hajiabad (25 Oct), Kariz Now (27 Oct), Qalendarabad (28 Oct), Fariman (28 Oct), Hoseynabad and Sa'adabad (29 Oct), Baz Howz-e Pain (30 Oct), Mashhad (31 Oct–9 Nov), Quchan (12 Nov), Emam Qoli (13 Nov), Dor Badam (14 Nov), and Russian border at Goudan (15 Nov 1898)]

- 88 Zarudnyi N.A. 1900. *Ekspursiya po severo-vostochnoi Persii i ptitsy etoi strany. Zapiski Akademii Nauk po Fiziko-Matematicheskogo Otdeleniyu*, Seriya 8, vol. 10: 1–262. [In Russian: An excursion to northeast Iran and the birds of its country] [Scientific report of Zarudny's 1896 voyage: see Zarudny (1896b) for itinerary, which is repeated in much more detail (c. 50 pp) in this volume. Includes many individual measurements, notes on habitats, breeding habits, nests, eggs, etc. of all 285 species seen or collected, e.g. text of *Podoces pleskei* fills over 8 large pages. 737 birds collected (29% non-passerines), of which 400 went to the St Petersburg collection, the remainder to Zarudny's private collection or withheld for exchange]
- 89 Zarudnyi N.A. 1901. *Ekspursiya po Vostochnoi Persii. Zapiski Russkogo Geograficheskogo Obshchestva po obshchei Geografii* 36(1): 1–362. [In Russian: An excursion to eastern Iran] [General report on the voyage made by Zarudny in 1898; see Zarudny 1898b for itinerary]
- 90 Zarudnyi N. 1902. *Marshrut' ekspeditsii Imper. Russk. Geogr. Obshchestva pod' nachal'stvom' N. Zarudnago po vostochnoi Persii v' 1900–1901 g. Ezhegodnik' Zoologicheskago Muzeya Imperatorskoi Akademii Nauk' 7: I–IX.* [In Russian: Itinerary of the expedition of the Russian Imperial Society for Geography under direction of N. Zarudny to eastern Iran in the year 1900–1901] [An expedition of N. Zarudnyi, M. Härms, and party across the entire length of E Iran, from N Khorasan to S Baluchestan and back from 5 Oct 1900 to 18 Aug 1901. 213 localities listed, too many to be all mentioned here, along the following route (all data old Russian style): Goudan (Turkmenistan border), Bajgiran (5 Oct), Dor Badam and Emam Qoli (6 Oct), Daulat Khaneh and Quchan (7 Oct), Seydabad and Nowbahar (9 Oct), Mashhad (10–18 Oct), Toroq (19 Oct), Baz Howz-e Pain (20 Oct), Hoseynabad and Fariman (22 Oct), Qalendarabad (23 Oct), Chahar Takab (25–25 Oct), Niz-Ab (27 Oct), another Seydabad (28 Oct), Pul-e Band (31 Oct), Kariz (1 Nov), Pesh Robat (2 Nov), Hari Rud valley (2–3 Nov), Farmanabad (4 Nov), Karat (5 Nov), Tiz-Ab (6 Nov), Sangan (7 Nov), Mozhnabad (8–9 Nov), Bamrud (12 Nov), Mohammedabad (13 Nov), Dezg-e Bala (14 Nov), Gulmirun (15 Nov), Gazik (16 Nov), Tabas (17 Nov), Dastgerd (18 Nov), Rud-i-Shur valley (19 Nov), Ratuk (20 Nov), Hoseynabad (21 Nov), Chah-i-Bani well (22 Nov), Chah-e Zirun well (24 Nov), Khvajeh-dow-Chagi and Chah-i-Guishe wells (25 Nov), and Bandan (26–27 Nov). This relatively rapid southward voyage through areas explored more thoroughly in previous years was followed by a long stay in the Sistan depression during 29 Nov–23 Dec, visiting, e.g. Vareng bay, Afzalabad, Husseinabad, Zabol, Neyzar valley, and Helmand River. Departed over Hauzdar (27 Dec) and the deserts of the SE Sistan basin (28–31 Dec 1900, e.g. Ramrod ruins) to reach the Baluchestan hills at Hormak (2–3 Jan 1901). Then to Zahedan (6–7 Jan) and along the Pakistan border over Bid (9 Jan), Dar Gibian (10 Jan), Ladiz (12–13 Jan), Mirkuh (14–15 Jan), Rig-e Malik (= Shahrak-e Tahlab, 18–19 Jan), Tahlab (21 Jan), Gurani (25 Jan), Naranu (27 Jan), and Mirkala (29–30 Jan) to Maksotag (3 Feb), turning south and west over Shastun (5–7 Feb) and Dehak (9 Feb) to Zaboli (11 Feb). The party then proceeded due south over Kuh-e Birg Mt. (12 Feb), Rud-i-Tud (14 Feb), upper Rud-i-Sarbaz R. (15–18 Feb), Sarbaz (19–20 Feb), Pirdan (21 Feb), Mazan Zamin (22 Feb), Pur (23 Feb), Rask (24 Feb), Kale Posht (25 Feb), Kaptegin-dukan (26 Feb), Bahu Kelat (1–2 Mar), Bal (4 Mar), Mir-Bazar (5 Mar), Kambil (8 Mar), Lekubal (9 Mar), and Tiskupan (10 Mar), reaching the Indian Ocean at Chah Bahar (11–14 Mar) and Tis (15–16 Mar), visiting the sea-shore nearby. Back north over Park (17 Mar), Muman (18 Mar), Geh (= Nikshahr, 24–26 Mar), Kush (28 Mar),

- Nokhoch (30 Mar), Chanf (3–5 Apr), Shishapust (8 Apr), and Gowhar Posht (11 Apr) to Bampur and surroundings (13–17 Apr), then over Damin (21 Apr), Karevandar (25 Apr), Podagi (26 Apr), Gunich (27 Apr), Sadk (30 Apr–1 May), Nukabad (1 May), Tamandan (4–5 May), Chah Zaman (7 May), Kulkuh (8 May), Lahremba (10 May), Sian Jangal (11 May), Tamin (12 and 14 May), Kuh-e Taftan Mt. (13 May), Ladiz (15 May), Dar Gibian (16 May), Bid (17 May), Zahedan (18 May), and Mian Bazar (19 May) to Hormak (20 May). Another visit made to the Sistan depression, reached over Kunder and Hauzdar (23 May), with much attention spend to the lakes, deserts, and more remote wells in the northern part (25 May–27 Jun, attending, e.g. Adimi, Afzalabad, Deh-e Dust, Deh-e Gazmeh, Deh-e Khammar [= Deh-e Deraz], Deh-e Malek Mohammed-e Oshtorak, Deh-e Najaf, Helmand River, Hoseynabad, Neyzar valley, Vareng bay, and Zabol). On leaving Sistan, travelled 27–28 Jun at night to avoid summer heat, reaching Bandan 28 Jun. Then home over Zeynelabad (29–30 Jun), Chah-i-Guishe well (30 Jun–1 Jul), Khvajeh-dow-Chagi well (1–2 Jul), Chah-e Zirun well (2–3 Jul), Chah-i-Bani well (5 Jul), Hoseynabad (6 Jul), Ratuk (7–8 Jul), Dastgerd (9–10 Jul), Tabas (11 Jul), Gazik (12–13 Jul), Gulmirun (15 Jul), Dezg-e Bala (16 Jul), Rud-e Ahangaran (17 Jul), Bamrud (20–21 Jul), Awis (22 Jul), Mozhnabad (24 Jul), Sangan (26 Jul), Tiz-Ab (27 Jul), Karat (28–29 Jul), Mashhad Rizeh (30 Jul), Pul-e Band (31 Jul), Torbet-e Jam (2 Aug), Langar (3 Aug), Kariz Now (4–5 Aug), Qalendarabad and Chahar Takab (6 Aug), Fariman (7 Aug), Baz Howz-e Pain (9 Aug), Mashhad (10–13 Aug), Chanaran and Seydabad (15 Aug), Quchan (16 Aug), Daulat Khaneh and Emam Qoli (17 Aug), and Goudan (at the Turkmenistan border, 19 Aug)]
- 91** Zarudnyi N.A. 1903. Pitsy vostochnoi Persii. Ornitologicheskije resul'taty ekskursii po vostochnoi Persii v 1898 g. *Zapiski Russkogo Geograficheskogo Obshchestva po obshchei Geografii* **36(2)**: 1–468. [In Russian: Birds of eastern Iran. Ornithological results of an excursion to eastern Iran in 1898] [Scientific report of Zarudny's 1898 voyage: see Zarudnyi (1898) for itinerary]
- 92** Zarudnyi N. 1905. Marshrut' puteshestviya po Zapadnoi Persii v' 1903–1904 g. *Ezhegodnik' Zoologicheskogo Muzeya Imperatorskoi Akademii Nauk* **9**: XLV–LI. [In Russian: Itinerary of the voyage to western Iran in the year 1903–1904] [An expedition of N. Zarudny, G. Gadd, and the taxidermist S.A. Aleksandrov, travelling from the SE Caspian Sea across Iran to the head of the Persian Gulf and from there north to the SW Caspian Sea between 16 Sep 1903 and 25 May 1904 (data old Russian style). 137 localities listed, too many to be all mentioned here, along the following route: Gumish Tepe (near Atrak R. mouth, 16 Sep), Bandar-e Gaz (16–18 and 22–24 Sep), Ashur-Ade island (19 Sep), Mian Koleh sandpit (20–21 Sep), Gorgan Bay (22–24 Sep), Gorgan (26 Sep–4 Oct), Garmabdasht valley (7–10 Oct), south across the Elburz Mts. between Tash (11–14 Oct) and Deh-e Molla (17 Oct), travelling SW over Damgan (19–26 Oct), Farat (27–29 Oct), Ma'abed (30 Oct), and Guleki (31 Oct) to Rashm (1 Nov), then south across the Dasht-e Kavir desert from Hussein-nan (2 Nov) to Howz Ser-i-Howz (5 Nov) and further over Jandaq (6–8 Nov), Howz-e Panj (9 Nov), Howz Ibrahim Jafar (12 Nov), Anarak (14–15 Nov), Robat-i-Fars (17 Nov), Na'in (18 Nov), Gardaneh-ye Balabad (19 Nov), Tudeshk (20 Nov), Kuhpayeh (21 Nov), Sajzi (22 Nov), and Gulnabad (23 Nov) to Jolfa and Esfahan (24 Nov–13 Dec). The party then crossed the Zagros Mts. over Felavarjan (14 Dec), Bistjan (15 Dec), Kharaji (17 Dec), Naghan (18 Dec), Dow Polan (19 Dec), Sarkhun (20–21 Dec), Shahil-ye Bala (22 Dec), and Dehdez (23–25 Dec), reaching lower country at the Malamir basin (Izeh, 27–28 Dec) and on the plains of Khuzestan: Qaleh-ye Tol (29 Dec), Ala Khvorshid (30 Dec), Chashmeh Rughani (31 Dec 1903–1 Jan 1904), Salmiyeh (3 Jan), Veys (4–5 Jan), Naseri and nearby Jabal Tnüe Mt. (6–17 Jan), Kut-e Abdollah (18 Jan), Kut-e 'Omeyr (19 Jan), Mozaffari (20 Jan), Farsiat (21–22 Jan), Seba near Rahmaniye (24 Jan), Kharman (26 Jan), Khorramshahr (29–30 Jan and 2–5 Feb), reaching the Karun R. mouth on 2 Feb. On the way back, a longer period was spend in Ahvaz, Naseri, Jabal Tnüe and surroundings (15–29 Feb), and the party then proceeded north over Band Qir (1 Mar), Shalili-yeh (2–4 Mar), Shushtar (5–6 and 21–22 Mar), Siah Mansur (8 Mar), Dezful (9–19 Mar), Kohnak (20 Mar), Perchestan (23 Mar), Pa Gach (25 Mar), Gulzar (26 Mar), Bid Zard (27 Mar), Ala Khvorshid (30 Mar), Qaleh-ye Tol (31 Mar), and the Malamir/Izeh basin (1–2 Apr). The Zagros was crossed again, from Dehdez (5–6 Apr) over Shahil-ye Bala (7 Apr), Sarkhun (8–9 Apr), Gamdalkal (10 Apr), Dow Polan (11 Apr), Naghan (12 Apr), Kharaji (13 Apr), and Bistjan (15 Apr) to Esfahan (17–21 Apr), but the expedition then travelled north in the direction of the SW corner of the Caspian Sea instead of following a route to the NE parallel to the first part of the voyage: Gaz (22 Apr), Madar Shah (23 Apr), Murcheh Khvort (24 Apr), Gabr Abad (27 Apr), Kashan (28 Apr), Nasrabad (29 Apr), Pa Sangan (1 May), Qom (2–3 May), Reza'abad (5 May), Khoshkrud (7 May), Bu'in (9 May), Qazvin (11 May), Arisht (12 May), Aga Baba (13 May), Mulla Ali (14–15 May), Pa Chinar (16 May), Manjil (17 May), Rostamabad (18–19 May), Kara Rud R. (20 May), Lat (21–22 May), Rasht (23–24 May), Pir Bazar (24 May), ending in the harbour of Bandar-e Anzali (25 May 1904)]
- 93** Zarudnyi ('Sarudny') N. 1911. Verzeichnis der Vögel Persiens. *Journal für Ornithologie* **59**: 185–241. [In German: Overview of the birds of Iran] [Checklist, giving status of all bird species for each of the geographical regions of Iran, but without detailed localities or observation dates]
- 94** Zarudnyi N.A. 1916. Tretiya ekskursiya po Vostochnoi Persii (Khorasan, Seistan i Persiskii Beludzhistan) 1900–1901 gg. *Zapiski Russkogo Geograficheskogo Obshchestva po obshchei Geografii* **50**: 1–448. [In Russian: A third excursion to eastern Iran (Khorasan, Seistan, and Persian Baluchistan) in the years 1900–1901] [Scientific report on the expedition under leadership of N. Zarudnyi and M. Härms along the entire length of E Iran south to the Indian Ocean. For the itinerary, see Zarudnyi (1902), above]
- 95** Zarudnyi N.A. & Bil'kevich S.I. 1913. K ornitofaune Zakaspiiskoi oblasti i sosednikh s neyu chastei Persii /Zur ornitologischen Fauna des Transkaspischen Gebietes und der benachbarten Teile Persien. *Ornitologicheskii Vestnik* **4**: 20–33. [In Russian with German summary: On the ornithology of the Transcaspian area and the neighbouring parts of Iran] [Birds observed and collected by Bil'kevich in 1910–1912 during excursions to Turkmenistan, Uzbekistan, and NE Iran. In Iran, visited Asterabad (= Gorgan), Chatly on Atrak River (= Chat), Bender-i-Gyaz (Bandar-e Gaz), Akh-Iman (= Aq Iman), Tersakan, Gumbet-Khouza (= Gonbad-e Qabus), and some villages in between]

- 96 Zarudnyi ('Sarudny') N. & Härms M. 1912. Bemerkungen über einige Vögel Persiens I. *Journal für Ornithologie* **60**: 592–619. [In German: Remarks on some birds from Iran I] [Taxonomy, biology, and many distributional data of *Passer moabiticus*, *Nectarinia asiatica brevirostris*, and *Pycnonotus leucogenys*. This and the following three papers of Sarudny & Härms include the only published scientific results of the voyage of 1903–1904. For the itinerary of this voyage, see Zarudnyi (1905), above]
- 97 Zarudnyi ('Sarudny') N. & Härms M. 1913. Bemerkungen über einige Vögel Persiens II, Die Sperlinge Persiens. *Journal für Ornithologie* **61**: 630–661. [In German: Remarks on some birds from Iran II, the sparrows of Iran] [Covers *Passer* only, with many localities mentioned, as in Sarudny & Härms (1912)]
- 98 Zarudnyi ('Sarudny') N. & Härms M. 1923. Bemerkungen über einige Vögel Persiens III, Gattung *Sitta* L. *Journal für Ornithologie* **71**: 398–421. [In German: Remarks on some birds from Iran III, the genus *Sitta* L.] [Details as for Sarudny & Härms (1912)]
- 99 Zarudnyi ('Sarudny') N. & Härms M. 1926. Bemerkungen über einige Vögel Persiens IV, Gattung *Oenanthe* Vieill. *Journal für Ornithologie* **74**: 1–52. [In German: Remarks on some birds from Iran IV, the genus *Oenanthe* Vieill.] [Details as for Sarudny & Härms (1912)]

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## DISCUSSION

### Mapping breeding birds

All localities tabulated in the comments to the papers above form a fairly impressive list of almost 1000 sites, covering entire Iran (Fig. 1). In particular, the travels of Zarudnyi in Khorasan and Sistan-Baluchestan result in dense clusters of observation sites in the east. However, some provinces are hardly covered (e.g. Hamadan and Markazi), or not at all (e.g. Ilam, or Bushehr away from the Bushehr-Kazerun road), and also the Dasht-e Kavir and Dasht-e Lut deserts were clearly underwatched in the 1876–1977 period. Nevertheless, a fair impression of distribution can be gained for species which are mostly or largely sedentary, as for, e.g. House Sparrow *Passer domesticus* (Fig. 2), the Rock Nuthatches *Sitta neumayer* and *S. tephronota* (Figs. 3–4), or the Iranian Ground-Jay *Podoces pleskei* (Fig. 5).

For migratory birds, present in Iran in summer only, the density of localities is far lower. Moreover, though many observations in the literature are dated and a selection of records from May–July can be made to map the breeding distribution, actual proof of breeding is provided only occasionally by the authors. Obviously, many additional field observations from the breeding season would be needed to obtain a good insight of breeding bird distribution in Iran.

### Problems when assessing data from older literature or specimen labels

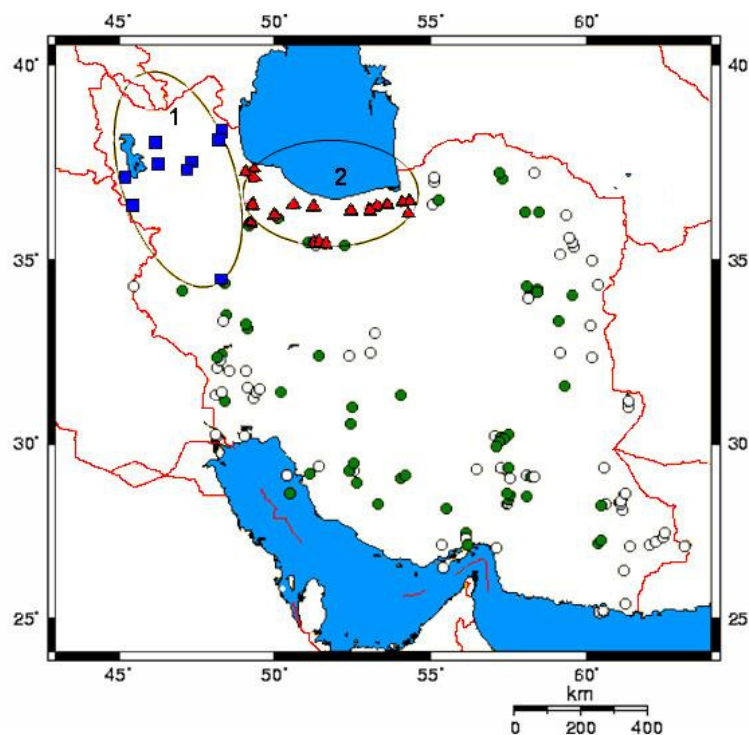
#### (1) Taxonomy and nomenclature

The taxonomy used in the past on specimen labels and in literature is sometimes not quite comparable with the one in use at present. The identity of some birds listed is sometimes hard to trace without thorough knowledge of name changing. Prior to about 1910, it was not considered to be correct to give repeating double names (*Pica pica*, *Petronia petronia*, *Oriolus oriolus*, etc) to birds, and these birds are listed then as *Pica rustica*, *Petronia stulta*, *Oriolus galbula*, etc. In such cases, part of the name gives a clue about the identity of a bird, as it may do for names like *Scops giu* (= *Otus scops*), *Ruticilla rufiventris* (= *Phoenicurus ochruros rufiventris*), *Aedon familiaris* (= *Cercotrichas galactotes familiaris*) or *Argya huttoni* (= *Turdoides caudatus huttoni*).

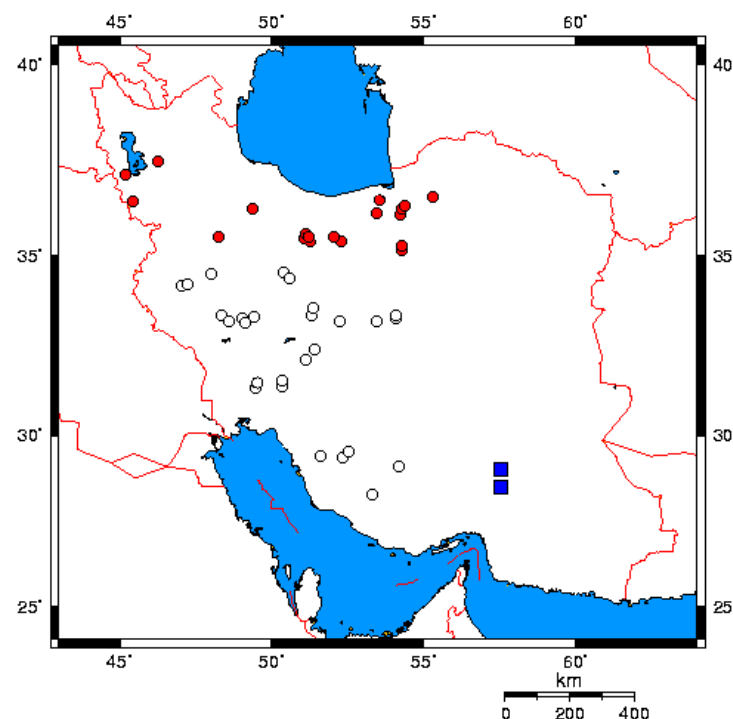
More problematic may be that '*Saxicola*' usually refers to *Oenanthe* and '*Pratincola*' to the present-day *Saxicola*, while, moreover, various morphs of *Oenanthe* were formerly considered to be different species (thus, *Saxicola stapazina* = white-throated morph of *Oenanthe hispanica*). Puzzling names may be *Tinnunculus cenchris* (= *Falco naumanni*), *Fulix cristata* (= *Aythya fuligula*), *Daulias golzi* (= *Luscinia hafizi*) or *Pyrrhacorax graculus* (= *Pyrrhacorax pyrrhacorax*!; the present-day *P. graculus* then was *P. alpinus*), to list only a few.

**(2) Iranian locality names**

Every language has its own method of transcribing Iranian locality names, a common procedure being transliteration, where the approximate sounds in the original are reproduced in the translator's alphabet and language. Consequently, only a person familiar with both languages can appreciate the similarity of seemingly very different names. Material published in English will contain a different transliteration of Iranian place names from that written in French, German or other languages. This difficulty is at its worst in Zarudnyi's papers: many of his itineraries are published in Russian, but sometimes he used German or French – the problem is compounded by his labels being treated similarly. Furthermore, many of his specimens were sold by Härms who replaced the Russian-named localities by German transcriptions. Moreover, other Zarudnyi specimens were sold through French bird dealers, who superseded his original language locality names by French ones. Most English/American names as used by, e.g. Koelz or Witherby are generally easy to understand, e.g. Bushire = Bushehr, Meshed = Mashhad, Dopulan = Dow Polan, Durud = Dow Rud, Isfahan = Esfahan, Istanabad = Estahbanat, Niriz = Neyriz, Gasrishirin = Qasr-e Shirin, Kazvin = Qazvin). More difficult are some French locality names like



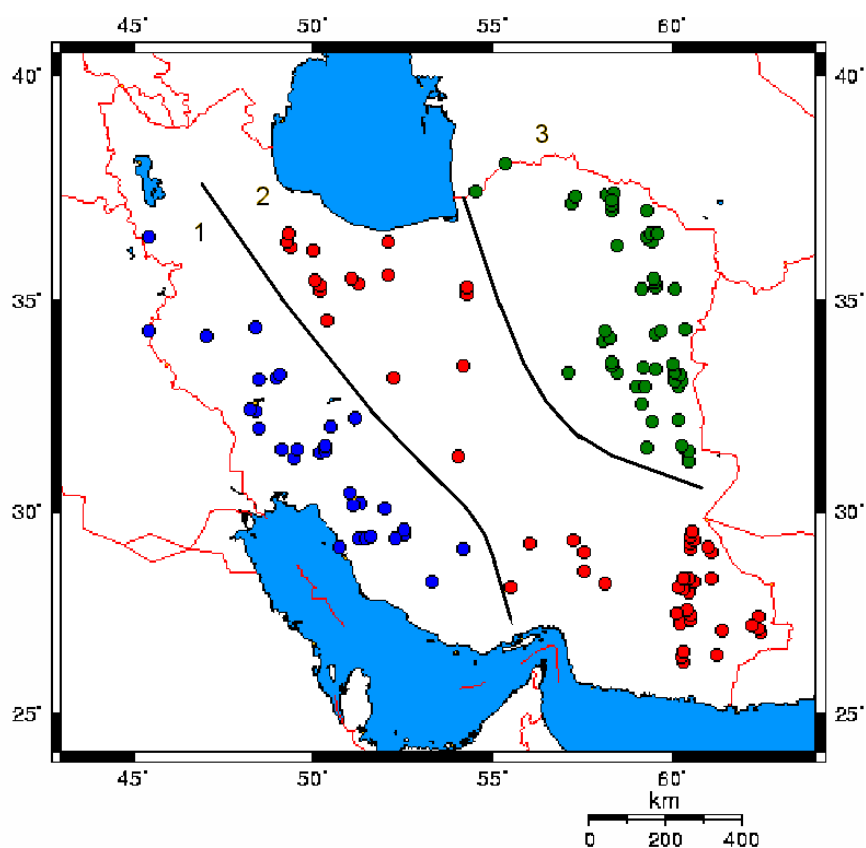
**Figure 2.** Distribution of House Sparrow *Passer domesticus* in Iran, according to published literature from the period 1876–1977. Subspecies listed as far as given by the authors of the papers, but mainly based on the review by Vaurie (1949a; ref. 71 above). Key to symbols: blue square (1) = *Passer domesticus biblicus*, red triangular (2) = *P. d. hyrcanus*, green (or grey) circle = *P. d. persicus* and open circle = *P. domesticus* ssp (white)



**Figure 3.** Distribution of Western Rock Nuthatch *Sitta neumayer* in Iran, according to published literature from the period 1877–1976. Subspecies listed as given in Vaurie (1950d; ref. 75 above) and as by other authors of our list publishing after 1950, but assessed from plumage description in literature from before 1950. Key to symbols: blue (or solid) square = *Sitta neumayer plumbea*, red (or grey) circle = *Sitta neumayer rupicola* and open circle = *Sitta neumayer tschitscherini* (white).

Bodjnoord/Bodjnour  
 d = Bojnurd, Fanuch  
 = Fannuj, Djarhoun  
 = Jahrom, Doulet  
 Hana = Daulet  
 Khana, Calaposcht =  
 Kale Posht, Camir =  
 Hamir, Chousdar =  
 Hauzdar, Chouram-  
 abad =  
 Khorramabad,  
 Cognok = Kohnak,  
 Chadschi-du-ischagi  
 = Khvajeh Dow  
 Chahi, Ghaen =  
 Qayen, Ghoochan =  
 Quchan, Ghasre-  
 Gand= Qasr-e Qand,  
 and Hassan Cadé =  
 Hasan Kiadeh, and  
 this also applies to  
 German, e.g. Bendun  
 = Bandan, Dshalk =  
 Jalq, Madschun-abad  
 = Mozhnabad,  
 Tschamp = Chanf,  
 Tschapaiu =  
 Chapayu, Tschach-i-  
 Siruh = Chah-e  
 Zirun. Russian  
 locality names are

often the most problematic, because the Russian language has no 'h' or 'j', 'h' being replaced by 'g', 'k', or 'kh', 'j' mostly by 'dzh'. Thus, Bagu Kelat = Bahu Kalat, Chagak = Chahak, Dekh-i-Gyazma = Deh-e Gazmeh, Dzhaori = Jauri, Kharadzhi = Karaji, Badzhistan = Bejestan, Khadzhi-abad = Hajjiabad, Birdzhand = Birjand, Dzhandak = Jandaq, Dzhulfa = Jolfa, Dyz = Dezg. This problem comes next to Iranian localities which themselves have changed name, e.g. Nikh, Ne, or Neh is now Nehbandan, Ge/Geh/Gey/Gikh = Nikshahr, Megas/Magas = Zaboli, Dosab/Duzdab/Duz Ab = Zahedan, Sandsch Bulah/Sauj Bolagh/Saujbulagh = Mahabad, Barfurush = Babol, Enseli/Anzali/Bandar-e Pahlevi = Bandar-e Anzali, Shahrud = Emamrud, Siedehan = Takestan, Kafirkala = Eslam Qalah, Khabis = Shahdab.



**Figure 4.** Distribution of Eastern Rock Nuthatch *Sitta tephronota* in Iran, according to published literature from the period 1877–1976. Derivation of subspecies names as in Fig. 3. Key to symbols: blue circle (1)= *Sitta tephronota dresseri*, red circle (2)= *S. t. obscura* and green circle (3)= *S. t. tephronota*.

### (3) Russian collecting dates

Prior to 1917, a different calendar was used in Russia, lagging 13 days behind the calendar used in the western world. Zarudnyi used many locality names on his labels or in his books and articles that are not shown in his official itineraries, which mostly refer to overnight camps or temporary settlements, but often he collected specimens near villages en route or in nearby mountains, which he did not list in his itinerary. When noting the collecting date on a label and comparing it with the itinerary, it is usually possible to ascertain the approximate position of the collecting locality, because most of Zarudnyi's labels and his itineraries, as listed above (refs. 86, 87, 90, 92) are in the old Russian dating style. However, when recording the dates of those specimens traded by German or French dealers who often have amended the date, tracing a locality on such labels may have to consider the itinerary of 13 days earlier.



**(4) Shifting localities and localities no longer in existence**

Localities on present-day maps may not precisely be on the same site as 100 years previously. Comparison of the Iran map in Andrees allgemeiner Handatlas (1909) or of Radde's old map (ref. 46) of North Khorasan with present-day maps shows some villages with similar names at somewhat differing localities. This may be due to past inaccuracies, but many other sites are correctly positioned. Zarudnyi in his itineraries also gives the distance travelled between two places, another indication of some places appearing to be nearer each other of further away than in the past. It was also common for pastoral villages to move when nearby grazing or arable land became exhausted or wells ran dry. Those of Zarudnyi's localities not found on present-day maps probably fall into this category. For instance, all Zarudnyi's travels in E Iran attended the Sistan depression on both outward and return journeys, apparently because he liked the rich birdlife in these extensive wetlands. Places like Neyzar, Varmal and Vareng Bay where he collected large series of endemic marsh birds like Purple Swamphen *Porphyrio porphyrio seistanicus* or Black-headed Penduline Tit *Remiz macronyx nigricans* now comprise only desert.

**Scientific collections of study skins of Iranian birds outside Iran**

For any study of taxonomy and morphological characters a researcher may restrict himself to details as published in the references above. However, much of his published information was based on observations only, not on specimens collected, and thus do not provide reliable taxonomic or morphological data. Other authors collected specimens, but lacked a collection for comparison; if measurements were provided, these may be correct (though in general a bewildering array of non-comparable methods was used to obtain mensural data, especially in the distant past), but geographical variation is difficult to study without birds from outside Iran in comparable stage of plumage wear. Good articles providing an insight into geographical variation of birds in Iran are: Énard & Etchecopar (ref. 13), Haffer (ref. 17), Paludan (refs. 39–40), Stresemann (ref. 63), and the papers in the Koelz collection by Marien and Vaurie (refs. 23–26, 71–78). Personal examination of specimens is far preferable to just a study of literature. However, bird skins that have been collected in Iran are widely scattered among many zoological collections, of which the most important are:

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**Ann Arbor (Michigan, USA):** University of Michigan Museum of Zoology (UMMZ, [www.ummz.lsa.umich.edu](http://www.ummz.lsa.umich.edu)). Includes part of the collection of Walter Koelz (ref. 20). Other parts of this collection are in Chicago, New York, and Cambridge (Mass.). The entire Koelz collection consists of 65,000 specimens, but these include many birds from Afghanistan and India. About 20% of the number is estimated to be from Iran, and this may form the largest set of skins ever taken here, except perhaps for the birds of Zarudnyi. Nearly 25,000 of Koelz's birds are in Ann Arbor. The Koelz collection has partly been worked out by Vaurie (refs. 71–78) and Marien (refs. 23–26), but other parts have never been critically examined and remain unpublished.

**Berlin (Germany):** Museum für Naturkunde, Humboldt-Universität (ZMB, [www.naturkundemuseum-berlin.de](http://www.naturkundemuseum-berlin.de)). 500 birds: see Heinrich (1928, ref. 18) and the report by Stresemann (1928, ref. 63). A small part of Heinrich's Elburz specimens has been sent to other museums in exchange, both to Europe and to the USA. Part of Heinrich's collection (but perhaps no material from Iran) is in Hamburg (Germany).

**Bombay/Mumbai (India):** Bombay Natural History Museum (BNHM, [www.bnhs.org](http://www.bnhs.org)). Includes birds from Baker (refs. 02–03), Capito (ref. 07), Ticehurst (refs. 65–66), Cheesman (refs. 06, 08, 65–66), LaPersonne (refs. 03, 08), and Ludlow (ref. 22).

**Bonn (Germany):** Zoologisches Forschungsinstitut und Museum Alexander Koenig (ZFMK, [www.zfmk.de](http://www.zfmk.de)). Some birds collected by Haffer (1977, ref. 17). Also, relatively small but important samples of birds from Zarudnyi (refs. 82–99) or Zarudnyi & Härms (refs. 90, 94, 96–99) are present, including type-specimens. Other birds from Härms are in Rome (Italy) and Tartu (Estonia).

**Brussels (Belgium):** Institut Royal des Sciences Naturelles de Belgique/ Koninklijk Belgisch Instituut voor Natuurwetenschappen (IRSBN/KBIN, [www.sciencesnaturelles.be](http://www.sciencesnaturelles.be)). See Misonne (refs. 28–32); total number of Iranian specimens included in the collection is unknown because no rapport has appeared of the larger collecting expedition (see ref. 32).

**Calcutta (India):** Zoological Survey of India (ZSI, [envfor.nic.in/zsi](http://envfor.nic.in/zsi)). Probably includes some material from Blanford (ref. 05) and/or Cumming (ref. 09).

- Chicago (USA):** Field Museum of Natural History (FMNH, [www.fieldmuseum.org](http://www.fieldmuseum.org)). About one-third of the Koelz collection is in the Field Museum (see Ann Arbor).
- Copenhagen (Denmark):** Statens Naturhistoriske Museum (ZMUC/SNM, [zoologi.snm.ku.dk](http://zoologi.snm.ku.dk)). About 450 birds from Paludan (refs. 39–40); perhaps also material from Løppenthin (ref. 21), Nielsen and /or Speyer (refs. 35–36), or others. A fine collection, also because Copenhagen has much material taken by Paludan in Afghanistan for comparison.
- Frankfurt am Main (Germany):** Forschungsinstitut und Naturmuseum Senckenberg (SMF, [www.senckenberg.de](http://www.senckenberg.de)). Some material of Radde (refs. 43–46).
- Neuchâtel (Switzerland):** Muséum d'Histoire Naturelle de Neuchâtel (MHNNL, [www.museum-neuchatel.ch](http://www.museum-neuchatel.ch)). Collection of Desfayes (ref. 11).
- New York (USA):** American Museum of Natural History (AMNH, [www.amnh.org](http://www.amnh.org)). Contains at least 3,330 Iranian specimens, of which 1,730 from Koelz, and (mainly from the former Rothschild collection) 1,535 from Zarudny and/or Härms, 45 from Witherby, and 5–36 birds each from A. Mocquerys (collected 1894–95), A. Witthügel (1909), P.A. Buxton (1918–1919), and M. Menzbier (1921–1928).
- Moscow (Russia):** Zoologicheskii Muzei MGU (ZMMU, [zmmu.msu.ru](http://zmmu.msu.ru)) and Darwin Museum (SDM, [www.darwin.museum.ru](http://www.darwin.museum.ru)). Birds from Dementiev (ref. 10), Radde (refs. 43–46), Shestoperov (ref. 62), and Zarudnyi (refs. 82–99).
- München (Germany):** Zoologische Staatssammlung (ZSM, [www.zsm.mwn.de](http://www.zsm.mwn.de)). See Diesselhorst (ref. 12).
- Paris (France):** Muséum National d'Histoire Naturelle (MNHN, [www.mnhn.fr](http://www.mnhn.fr)). At least 500 birds from Petter (see Berlioz 1958, ref. 04) and Énard & Etchecopar (ref. 13); may include also collections of Vielliard, who collected intensively in Iran in the 1970s.
- St. Petersburg (Russia):** Zoologicheskii Institut, Rossiiskoi Akademii Nauk (ZISP, [www.zin.ru](http://www.zin.ru)). Many birds from Zarudny (refs. 82–99), Nikolskii (ref. 37), Radde (refs. 43–46), and other Russian collectors. Radde's collections are possibly also in part present in Tbilisi (Georgia) or Braunschweig (Germany).
- Stockholm (Sweden):** Naturhistoriska Riksmuseet (NRM, [www.nrm.se](http://www.nrm.se)). May include birds of an expedition on which no report appeared: see Gyllin (ref. 16).
- Stuttgart (Germany):** Staatliches Museum für Naturkunde (SMNS, [www.naturkundemuseum-bw.de/stuttgart](http://www.naturkundemuseum-bw.de/stuttgart)). See Diesselhorst (ref. 12), Richter (ref. 49), and Schüz (refs. 54–57).
- Tashkent (Uzbekistan):** Zoological Museum University of Tashkent. Though a considerable part of Zarudny's collections (refs. 82–99) went to St Petersburg or was sold to abroad, the University Museum of Tashkent has 17,000 of his specimens (Votteler 1991). Many of these are not from Iran, however, but taken on his travels in Turkmenistan and west-central Asia. Specimens from the Zarudny collection can now be found throughout Europe, the America's, and Japan. Often it concerns 1–2 specimens of each species only. Thus, singles or pairs of *Passer yatii* (of which Zarudny collected at least 186 specimens) can be found in various European collections. For other Zarudnyi specimens in Europe, see also Bonn, above.
- Torino & Milano (Italy):** Museo Regionale di Scienze Naturali Torino (MRSNT, [www.regione.piemonte.it/museoscienzeaturali](http://www.regione.piemonte.it/museoscienzeaturali)) and Museo Civico di Storia Naturale Milano (MSNM, [www.comune.milano.it/dseserver/webcity/Documenti.nsf/webHomePage?OpenForm&setto=MCOI-6C5J9V\\_HP](http://www.comune.milano.it/dseserver/webcity/Documenti.nsf/webHomePage?OpenForm&setto=MCOI-6C5J9V_HP)). The collection of F. de Filippi: see Schalow (ref. 53). Small numbers of Filippi's birds have been exchanged to other museums.
- Tring (UK):** The Natural History Museum (BMNH, [www.nhm.ac.uk/research-curation/](http://www.nhm.ac.uk/research-curation/)). Includes probably over 2000 Iranian birds: see Baker (refs. 02–03), Blanford (ref. 05), Buxton (refs. 06, 65), Cheesman (refs. 06, 08, 65–66), Cumming (ref. 09), Feeny (ref. 14), Ludlow (ref. 22), Sharpe (refs. 60–61), Ticehurst (refs. 65–66), Trott (refs. 68–69), Witherby (refs. 79–81), and Woosnam (refs. 80–81). Some of the pre-1900 specimens skinned by the boundary commissions (Blanford, Cumming, Sharpe) are in a rather poor state of preservation. Birds of Cumming are perhaps also in Exeter (UK).
- Vienna (Austria):** Naturhistorisches Museum Wien (NMW, [www.nhm-wien.ac.at/NHM/1Zoo/](http://www.nhm-wien.ac.at/NHM/1Zoo/)). At least 100 birds from Zarudny (refs. 82–99), and a small collection of a Dr A. Gabriel taken in 1933.

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Some zoological collections have Iranian specimens from collectors who apparently never published reports on their travels. For instance, see Mocquerys and Witthügel listed under New York above, or Dr Gabriel under Vienna. Several European collections contain series of birds from the Kopet Dag or from Sarakhs without a collector on the label. These

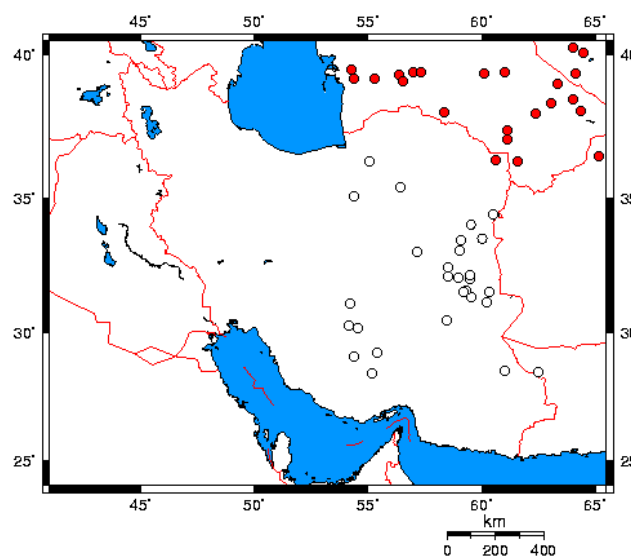
may either be from the Iranian or from the Turkmenian side of border. Most were apparently obtained from Russian or German bird dealers, and may have derived from the Zarudny or Glasunov collections, who both travelled in Turkmenistan as well as in Khorasan. Part of the collections of Zarudny and Koelz have never been reported upon.

### A note on the possible occurrence of Pander's Ground-Jay *Podoces panderi* in Iran

No confirmed records of *P. panderi* exist for Iran. However, several records in the literature suggest that it may occur: (1) According to Rustamov (1958), the species occurs south to at least Messerian (38°15'N, 54°35'E) in SW Turkmenistan. This abandoned city is only 60 km N of the Iranian border. As semi-desert along the E shore of the Caspian Sea stretches uninterrupted from here southward into N Golestan, the species may occur in the latter area, too. (2) Zarudnyi (1896a, see ref 85 above) records *P. panderi* in the same general area as Rustamov, stating that it occurs 'between the E shore of the Caspian Sea and the western foothills of the Khorasan mountains'. No detailed localities are given, but the foothills of the W Khorasan mountains are largely situated in the Moraveh Tappeh and Gonbad-e Kavus areas of Iran. A minor part of the W Khorasan hills extend towards the basins of the upper Sumbar and Chandyr rivers in Turkmenistan, though this area is more properly called 'foothills of the western Kopet Dag mountains'. (3) Radde & Walter (1889, ref 46 above) note that two specimens of *Podoces panderi* were collected by F.K. Lorenz 'below Sarakhs' along the Tedzhen/Hari Rud River [see p. 167 of the paper, or p. 131 in its bundled reprint]. These birds are probably now in the Darwin Museum in Moscow. The locality is not more precise than this and could either be on the Iranian or on the Turkmenian side of the Tedzhen River.

However, judged from Google Earth maps, sand-dune habitat probably suitable for this species is only situated just NW of Sarakhs (e.g. at 36°38'N, 60°59'E), in part within the utmost NE corner of Iran (which is at 36°40'N, 61°08'E), and the species may have been collected here. NE of Sarakhs, on the Turkmenian side of the river, sand-dune habitat starts only north of 37°N, but this can hardly be called 'below Sarakhs'. These records are suggestive, but require confirmation, and for the moment the occurrence in Iran of *P. panderi* is hypothetical.

Both N Golestan and the Sarakhs area should be thoroughly investigated to get information on the possible occurrence of



**Figure 5.** Distribution of Iranian Ground-Jay *Podoces pleskei* in Iran, according to published literature from the period 1876–1977, with some additional information from specimens examined and from more recent literature (Farnsworth 1992, Hamedanian 1997, Londei 2001). Includes also some possible occurrences just east of Iran in Afghanistan (Namakzar basin - D.A. Scott in Hamedanian 1997) and Pakistan (near Nok Kundi - Ludlow 1945). Some data of Zarudnyi (ref. 82, 83, 86, above) and Radde (ref. 44–46, above) for Pander's Ground-Jay *P. panderi* in southern Turkmenistan have been added; for possible occurrence of this species in NE Iran, see the note in the text. Key to symbols: red (grey) circle= *Podoces panderi* and open circle= *Podoces pleskei*.

ground-jays. However D.A. Scott notes (*in litt.* to Editor) that he was, of course, aware of the possibility of the occurrence of the species in Iran in the 1970s. He went on two expeditions to the northeast border areas - from the region of Sarakhs to Maraveh Tappeh, Golestan - in June 1973 and September 1974 without finding the bird or even any suitable habitat. Raffael Aye (*in litt.* to D.A. Scott) also visited the Sarakhs area in April or May 2004 without finding the ground-jay.

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