

A new species of *Dysaphis* Börner from Iran and Italy,
and a new subspecies from Iran.

During the latter part of the summer of 1968 I received some samples of *Dysaphis* for study from Dr Hille Ris Lambers. These had been collected in Iran by Dr R. van den Bosch, and consisted mainly of samples of the very difficult *D. foeniculus* group. One species, from *Lepidium draba* (= *Cardaria draba* [L.] Desv. of Clapham, Tutin & Warburg) exhibited characters sufficient to separate it from those other members of the group known to me. This species was subsequently collected also from the same host at Ventimiglia, Italy, by Dr Hille Ris Lambers, and he kindly sent me this material also for comparison.

No species of *Dysaphis* has hitherto been described from *C. draba*. NEVSKY (1929) keyed a species *Dentatus capsellae* from radical leaves of *Capsella*, but did not give a full description of it. SHAPOSHNIKOV (1964) also keyed this species, ascribing it to Mordvilko, but gave no morphological diagnosis. I have been unable to trace any reference to an original description by Mordvilko, and since NEVSKY's key uses no characters adequate to separate the species from other members of the *foeniculus* complex I consider that it is desirable to describe the aphids from *C. draba* as a new species,

***Dysaphis vandenboschi*, sp. n.**

Morphological description.

Apterous viviparous female.

Body broad oval, length 1.77-2.40 mm. Antennae six-jointed, joints III-VI together equal to 0.31-0.49 (mean 0.39, standard deviation 0.04) times body length in Iranian, or 0.41-0.52 (mean 0.45, standard deviation 0.04) times body length in ten Italian specimens. Secondary rhinaria absent. Antennal III with 3-14 hairs, mean 8.3 in Iranian and 11.0 in Italian

specimens; their maximal length 1.00-1.21 (mean 1.08, s.d. 0.07) times basal articular diameter of joint in Iranian specimens, or 0.80-1.14 (mean 1.04, s.d. 0.12) times this diameter in ten Italian specimens. Processus terminalis 2.12-2.71 (mean 2.35) times as long as basal part of antennal VI in Iranian specimens, or 2.50-2.93 (mean 2.73) times as long as base of VI in ten Italian specimens; and 0.67-0.92 (mean 0.75) times antennal III in Iranian, or 0.75-0.95 (mean 0.82) times as long as III in ten Italian specimens. Sclerotic pattern typical of apterous *Dysaphis* s. str., i.e. with sclerotic head capsule and bands across pronotum and abdominal tergites 6-8, that on abd. 7 extending to but not completely engulfing the spiracles, and with small scattered hair-bearing sclerites on the spinal and pleural regions of the remaining tergites, together with well-developed pigmented intersegmental muscle sclerites on the abdominal dorsum. The hair-bearing sclerites of the first five abdominal tergites are normally disposed in a single row of four across each tergite.

Antennal and dorsal body hairs abruptly acute to blunt, the latter with apices not expanded, except for some hairs on eighth abdominal tergite which have the apices slightly flattened into a spear shape. Pronotum without a posterior pleural pair of hairs. Dorsal hairs of middle abdominal tergites (3-5 inclusive) not very numerous, about 10-12 per segment excluding marginal hair groups. Spinal hairs on abdominal tergite 3 maximally 26-39 μ long in Iranian, or 25-34 μ in ten Italian specimens; those on tergite 8 4-6 in number, maximally 54-74 μ long in Iranian, or 54-65 μ in ten Italian specimens. Longest marginal hairs on mid-abdominal tergites from about as long to about twice as long as diameter of marginal tubercles nearest to them.

Siphunculi short, rather thick, with a somewhat expanded base and taper increasing towards apex; faintly striate-imbricate, and with one or two clear transverse striations before the rather marked flange; 0.07-0.09 times body length. In Iranian specimens 1.64-2.00 times as long as cauda, 0.70-0.95 times as long as processus terminalis, 0.93-1.27 times as long as apical rostral segment and 3.14-5.69 times as long as longest spinal or pleural hairs on abdominal tergite 6; in ten Italian specimens the corresponding ranges of variation are 1.56-1.88, 0.54-0.71, 0.88-1.20 and 3.33-4.38 respectively. Cauda of typical *Dysaphis* escutcheon shape, bearing 5, or rarely only 4, hairs.

Spinal tubercles present on head (normally paired, exceptionally unpaired) and variably on abdominal tergites 8 and/or 7; total number from 1 to 5, modal class 3. Marginal tubercles on pronotum and abdominal segments 1-5 and (variably) 7; of the specimens examined, 26 have paired

and 34 unpaired tubercles on abd. 7, a total of 74 per cent, and 21 are without tubercles on this segment, or 26 per cent. Exceptionally a tubercle may occur on abd. 6, or tubercles may be absent asymmetrically from one or more of the anterior abdominal segments.

Rostrum 0.57-0.68 mm long, its apical segment normal in shape, 0.146-0.165 mm long in Iranian, 0.153-0.171 mm long in Italian specimens, or 1.13-1.36 times as long as 2nd segment of hind tarsus measured without claws and their associated sclerites; and bearing 2-4 (Iranian) or 3-7 (Italian) subsidiary hairs in addition to the three constant apical pairs. Subgenital plate with 2-7 hairs on anterior half and 12-19 in the posterior marginal series. Posterior hair on hind trochanter 0.63-0.81 times as long as diameter of trochantro-femoral suture. First tarsal segments with 3,3,2 hairs. Legs rather uniformly pale brownish sclerotic, hardly darkened at apices of tibiae and on tarsi.

For measurements of individual specimens see Table I.

Alate viviparous female.

Body length 1.76-2.22 mm. Facies typical of *Dysaphis* s. str. Abdominal macula solid and extensive across tergites 4-6, but not extending forward much, if at all, beyond the dorsal hairs on tergite 3; hardly weakened across intersegment 4/5, but more considerably so across 3/4, and with a well-marked membranous line across much of intersegment 5/6. Tergite 6 broadly and solidly dark, in a band extending to and including the marginal sclerites. Tergite 7 with a slightly narrower band also including the marginal sclerites, spiracles and marginal tubercles. Tergite 8 with a yet narrower band. Main part of macula distinctly reticulate. Tergites 1-2 without spinal pigmented sclerites. Antennae six-jointed, joints III-VI together equal to 0.56-0.70 times body length; processus terminalis in Iranian specimens 2.67-3.07 times as long as basal part of antennal VI, and 0.61-0.64 times as long as antennal III; in Italian specimens 2.88-3.60 and 0.62-0.75 times these lengths respectively. Secondary rhinaria normally on III (18-29) and IV (3-10) only, but exceptionally a single one present also on V.

Antennal and dorsal body hairs subacute to blunt, exceptionally on antennal III with apex very slightly thickened; spinal hairs on abdominal tergite 3 maximally 17-25 μ , those on tergite 8 maximally 43-54 μ long and 4-5 in number. Hairs on antennal III 7-13 in number, maximally 12-16 μ long, or 0.48-0.67 times basal articular diameter of III.

Siphunculi less broadened basally than in apterae, about 0.07-0.08 times body length and 1.30-1.56 times as long as cauda; in Iranian specimens 0.64-0.70 times as long as processus terminalis, about equal to apical rostral segment, and 3.71-4.67 times longest spinal or pleural hairs on abdominal tergite 6; equivalent ranges of variation in ten Italian specimens are 0.39-0.48, 0.87-1.00 and 3.33-3.93 respectively. Cauda typical, with 5-6 hairs.

Spinal and marginal tubercles distributed approximately as in apterae. Paired or unpaired marginal tubercles present in 9 and 6 specimens respectively on abdominal segment 7, and tubercles absent from this segment in 7 specimens.

Rostrum as in apterae, its apical segment 0.143-0.159 mm long, or 1.08-1.20 times as long as 2nd segment of hind tarsus without claws, and bearing 3-9 subsidiary hairs as well as the three constant apical pairs. Subgenital plate with 2-3 hairs on anterior half and 9-19 in the posterior marginal series. Posterior hair on hind trochanter 0.43-0.66 times as long as diameter of trochantro-femoral suture. First tarsal segments with 3,3,2 hairs.

For measurements of individual specimens see Table I.

Host plant: *Cardaria draba* (L.) Desv.

Biology.

As no morphs other than the apterous and alate viviparous females are yet known it is not possible to describe the life-cycle of *D. vandenboschi*, sp. n.

Taxonomy.

The species-group to which *D. vandenboschi* belongs is composed of a number of Eurasian or cosmopolitan species with a very considerable degree of overlap in their morphological characters. Whether this is due to convergence or to common ancestry within the genus is not clear as yet, and requires to be investigated through experimental work. The morphological analysis of the group is not helped by the fact that some of the constituent species have been described from typical specimens in such a way as to suggest that the diagnostic characters are invariable. That this is untrue for almost any species of organism needs no emphasis here; but the result of such an oversimplification of the problem is to make it impossible to determine the true affinities of such species unless type material, or at least authoritatively determined specimens from the type locality or its close neighbourhood, can be obtained.

The *foeniculus* group of species as a whole is characterised by (1) the absence of posterior pleural hairs from the pronotum; (2) rather short siphunculi that rarely attain twice the length of the cauda; (3) antennal and dorsal body hairs of medium length, with abrupt apices that may be acute or somewhat blunted; and (4) a low to medium range of secondary rhinarial numbers in the alate viviparae. The species of the *Dysaphis crataegi* complex differ in having relatively longer siphunculi (usually 2-2.5 times as long as the cauda in the apterae, and not less than 1.75 times as long) and higher rhinarial numbers in alatae (though with some overlap in small alienicolae). However, the two groups are evidently closely related.

Dysaphis vandenboschi, sp. n., differs from all material that I have seen of *D. foeniculus* (Theob.), *D. tulipae* (B. de F.) and *D. crithmi* (Buckt.) in the range of distribution of the spinal and marginal tubercles. Marginal tubercles are present on abdominal tergite 7 in about three-quarters of all the viviparae seen, and spinal tubercles are present on the head in all but about 2.5 per cent. This character is consistent between the Iranian and Italian samples. I have seen no material of either *D. foeniculus* or *D. crithmi* in which marginal tubercles occur on abd. 7 in any specimen, while in *D. tulipae* such tubercles occur in less than 10 per cent., and in most samples they are absent. In *D. foeniculus* 46 per cent of viviparae seen, and in *D. crithmi* 63 per cent, have no spinal tubercles on the head.

Certain samples collected in Iran by Dr van den Bosch from *Plantago* sp., *Veronica persica* and *Ceratocephalus falcatus* appear all to belong to another species of *Dysaphis*, which Dr Hille Ris Lambers determined provisionally as *D. pulverina* (Nevsky). These aphids differ from *D. vandenboschi* in having shorter siphunculi (1.2-1.6 times as long as cauda in apterae against 1.6-2.0 times as long in *D. vandenboschi*); they also lack marginal tubercles on abd. 7 in all the available specimens, and 88 per cent of specimens lack spinal tubercles on the head. Whether these samples are genuine *D. pulverina* will be discussed further below.

In recent years M. N. NARZIKULOV (1954, 1961, 1967) described a number of *Dysaphis* species from various hosts in the Central Asian Republics of the U.S.S.R. Some of these species appear to be at least convergently similar to species of the *foeniculus* group. I have been able to examine specimens of *D. ligulariae* (Narz., 1954), *D. pseudomolli* Narz., 1961, and *D. cousinia* Narz., 1967. All three differ from *D. vandenboschi* in the absence of marginal tubercles from abd. 7; in addition, *D. pseudomolli* is devoid of spinal tubercles, and its apical rostral segment is about 0.20 mm long, or almost twice as long as the 2nd segment of the hind tarsus without its claws.

There remains the problem of separation of *D. vandenboschi* from species in which marginal tubercles are regularly present on abd. 7. The type material of *D. palaestinensis* (H.R.L.) from *Iris* spp. in Israel possesses such tubercles, but the dorsal hairs on abdominal tergite 3 are 'about twice as long as those on third antennal segment' in apterae, while in *D. vandenboschi* they are only about 1.2-1.3 times as long; and in the alatae the dorsal macula is broken more or less completely into its constituent segmental bars, and the rhinaria are 'rather tubercular', neither of which characters is applicable to the samples of *D. vandenboschi* so far examined.

Two species described by NEVSKY (1929) from Central Asia also possess marginal tubercles on abd. 7 according to the original descriptions. These are *D. radicivorans* (Nevsky) from *Cirsium setigerum* and *D. pulverina* (Nevsky) from *Plantago* sp. The former species is described as having the processus terminalis only up to 1.5 times as long as the basal part of antennal joint VI, and as having spinal tubercles on the pro- and mesonotum in typical specimens; neither of these characters agrees with the material of *D. vandenboschi*. *D. pulverina*, however, presents a greater problem. The original description applies well to *D. vandenboschi* in nearly all particulars. The only difference that can be found is that *D. pulverina* is described as having marginal tubercles present on all the first seven abdominal tergites; further, the key couplet in which this character is introduced makes it clear that NEVSKY regarded it as a constant character, since it is opposed by the alternative 'marginal tubercles absent from sixth abdominal segment'. Thus, although I would not normally regard such a character as satisfactory for the separation of two species of *Dysaphis*, in the present case I use it, on the assumption that *pulverina* must at least possess tubercles on abd. 6 in a substantial proportion of specimens, whereas I have only seen one specimen of *D. vandenboschi* in which one is present. The other question raised by NEVSKY's description is whether the aphids from *Plantago* in Iran, referred to earlier, can be rightly placed in *pulverina*. It is possible that the distribution of marginal tubercles varies clinally between one part and another of the range of the species. On the other hand, the distance from Tashkent to Karaj in Iran is little more than one-third as far as that from Karaj to Ventimiglia in North Italy, over which latter range the marginal tubercle distribution of *D. vandenboschi* appears to be rather constant. I am therefore of the opinion that the Iranian samples should be recognised as subspecifically distinct from *pulverina* s. str., and I diagnose them below under the name of *D. pulverina* subsp. *iranica*, subsp. n.

Finally it is desirable to refer to *D. ferulae* (Nevsky), from *Ferula* species in Kazakhstan. This is described as a rather large species (2-2.8 mm), with antennal hairs about 40 μ long, and with marginal tubercles on pronotum and abd. 1-5 only. It probably belongs to the *D. foeniculus* group, but the above two characters serve to distinguish it from *D. vandenboschi*, sp. n., in which the hairs on antennal III in apterae are only 20-27 μ long, and the marginal tubercle distribution is different (see above).

Type material.

Holotype (apterous viviparous female) and paratypes (apterous and alate viviparous females) from Karaj, Iran, 26.iv.1968 and 6.v.1968 (R. van den Bosch leg.). Paratypes (apterous and alate viviparous females) from Ventimiglia, Italy, 5.v.1969 and 7.v.1969 (D. Hille Ris Lambers leg.). Holotype and paratypes in the collection of Dr Hille Ris Lambers; paratypes in the collections of the British Museum (Natural History) and the Plant Pathology Laboratory, Harpenden, England. Reference numbers of type samples: van den Bosch samples 8 (26.iv.1969; includes holotype) and 31 (6.v.1968); H.R.L. samples 648 and 656 (5.v.1969) and 649 (7.v.1969).

Dysaphis pulverina (Nevsky), subsp. ***iranica***, subsp. n.

Morphological description.

Apterous and alate viviparous females differ from the original description of *D. pulverina* in the absence of marginal tubercles from the seventh and sixth abdominal tergites in all material seen. Spinal tubercles absent from head in 79 out of 90 specimens seen (in *pulverina* said to be 'sometimes not apparent'). The alate viviparous female has the dorsal macula rather solid, reaching nearly to the marginal sclerites; abdominal 2 bears only small paired sclerites. Secondary rhinarial numbers in alatae: on III 19-36, on IV 0-9.

For measurements of individual specimens see Table II.

Biology.

Material was collected by Dr van den Bosch from *Plantago* sp., *Veronica persica* Poir. and *Ceratocephalus falcatus* (L.) Pers. at Karaj, Iran. Only apterous and alate viviparae were taken. The cycle of the sub-species can therefore not be described at present.

Table I. Biometric data for specimens of *Dysaphis vandenboschi*, sp. n.

Specimen	Body	Ant. flag.	Joint ratios (III-VI)	Siph.	Cauda	Cdl. hrs.	Ap. seg. rostr.	H. tars. II	H. l./ III	Art. di. III	H. l./ 3T	H. l./ 8T	Secondary rhinaria			Morph
													III	IV	V	
1	2.16	0.68	68:42:34:25+53	0.15	0.09	5	0.148	0.117	0.022	0.020	0.026	0.057	—	—	—	Apt.
2	2.40	0.92	100:57:40:30+73	0.18	0.10	5	0.162	0.133	0.029	0.024	0.034	0.061	—	—	—	»
3	2.29	0.90	94:62:40:31+69	0.19	0.10	5	0.153	0.134	0.025	0.023	0.030	0.065	—	—	—	»
4	2.28	0.95	106:62:43:31+66	0.20	0.10	5	0.165	0.136	0.027	0.024	0.034	0.064	—	—	—	»
5	1.77	0.75	72:46:36:25+66	0.14	0.09	5	0.146	0.120	0.021	0.021	0.030	0.059	—	—	—	»
6	1.83	0.96	98:60:42:30+84	0.14	0.09	5	0.153	0.127	0.020	0.022	0.025	0.059	—	—	—	»
7	2.17	0.93	102:54:42:30+78	0.17	0.10	5	0.164	0.130	0.022	0.022	0.030	0.061	—	—	—	»
8	2.13	1.22	144:84:51:30+92	0.15	0.10	5	0.151	0.130	0.015	0.024	0.022	?	21/22	5/8	0/0	Al.
9	1.98	1.10	132:74:44:30+80	0.14	?	5	0.143	0.132	0.015	0.024	0.020	0.043	22/18	8/7	0/0	»
10	1.84	1.20	148:70:52:30+94	0.14	0.09	5	0.143	0.133	0.014	0.022	0.020	0.043	27/27	8/7	0/0	»
11	1.76	1.24	144:78:52:32+102	0.13	0.09	6	0.150	0.133	0.012	0.025	0.020	0.044	28/25	7/7	0/0	»
12	2.22	1.32	160:78:54:32+108	0.16	0.11	5	0.159	0.138	0.015	0.025	0.025	0.054	29/24	8/10	0/0	»

Specimens 1-5 and 8-9 from Karaj, Iran (v.d.B. 8 and 21); 6-7 and 10-12 from Ventimiglia, Italy (D.H.R.L. 656). Specimen 1 is the holotype; remainder are paratypes.

All length measurements in millimetres. Abbreviations used are: Ant. flag., antennal flagellum (joints III-VI inclusive); Siph., siphunculus; Cdl. hrs., caudal hairs; Ap. seg. rostr., apical segment of rostrum; H. tars. II, 2nd joint of hind tarsus; H. l., hair length (III on third antennal joint, 3T on third abdominal tergite, 8T on eighth abdominal tergite); Art. di. III, basal articular diameter of third antennal joint.

Table II. Biometric data for specimens of *Dysaphis pulverina iranica*, subsp. n.

Specimen	Body	Ant. flag.	Joint ratios (III-VI)	Siph.	Cauda	Cdl. hrs.	Ap. seg. rostr.	H. tars. II	H. l./ III	Art. di. III	H. l./ 3T	H. l./ 8T	Secondary rhinaria			Morph
													III	IV	V	
1	2.02	0.96	96:58:48:30+84	0.16	0.11	5	0.157	0.133	0.027	0.021	0.034	0.066	—	—	—	Apt.
2	2.31	1.00	100:64:48:32+84	0.17	0.12	5	0.159	0.143	0.023	0.020	0.040	0.069	—	—	—	»
3	1.85	0.76	76:42:36:28+68	0.14	0.09	5	0.148	0.121	0.027	0.021	0.032	0.066	—	—	—	»
4	1.98	0.93	90:54:44:32+84	0.15	0.10	6	0.153	0.133	0.025	0.023	0.044	0.064	—	—	—	»
5	1.83	0.96	102:58:46:30+78	0.15	0.10	5	0.143	0.140	0.029	0.024	0.036	0.066	—	—	—	»
6	2.42	1.06	120:68:44:32+84	0.18	0.13	4	0.161	0.147	0.031	0.028	0.039	0.066	—	—	—	»
7	2.00	1.21	142:74:54:32+96	0.12	0.11	5	0.146	0.129	0.014	0.021	0.025	0.043	29/28	6/5	0/0	Al.
8	2.07	1.27	150:78:52:36+100	0.13	0.11	5	0.138	0.135	0.015	0.023	0.025	0.052	30/31	6/5	0/0	»
9	1.77	1.15	116:62:53:32+115	0.11	0.09	6	0.143	0.133	0.015	0.022	0.025	0.044	29/28	5/5	0/0	»
10	1.94	1.27	132:76:56:38+116	0.11	0.10	5	0.144	0.133	0.014	0.022	0.021	?	24/25	3/3	0/0	»
11	1.92	1.11	126:72:54:32+80	0.13	0.10	6	0.133	0.133	0.020	0.020	0.027	0.049	26/30	7/7	0/0	»
12	1.99	1.03	124:64:44:32+74	0.13	0.10	5	0.135	0.128	0.017	0.023	0.025	0.054	19/27	0/5	0/0	»

Specimens 1-2 and 7-8 from *Plantago* sp. (v.d.B. 15 and 21); 3-4 and 9-10 from *Veronica persica* (v.d.B. 14); 5-6 and 11-12 from *Ceratocephalus falcatus* (v.d.B. 13); all material from Karaj, Iran. Specimen 1 is the holotype, 2, 7 and 8 are paratypes. All length measurements in millimetres. Abbreviations as in Table I.

Taxonomy.

The very high proportion of specimens without spinal tubercles on the head separates *pulverina iranica* from the other species of the *foeniculus* group known to me in which marginal tubercles are absent from abd. 7. Closest to *iranica* in the percentage absence of tubercles from the head is *D. crithmi* (Buckt.), in which about two-thirds of the individuals lack them. In *crithmi* however, the mid-abdominal hair length maxima range from 14 μ to 32 μ , as against 25 μ to 44 μ in *iranica*; and the alatae of *crithmi* have 36-49 secondary rhinaria on ant. III. Less than half the specimens of *D. foeniculus* (Theob.) that I have seen lack spinal tubercles on the head, but in other respects *foeniculus* resembles *iranica* very closely, and it even seems possible that *iranica* might at a later date prove to be more closely associated with the rather polyphagous *foeniculus* than with *pulverina* s. str. However, in view of the host association with *Plantago* I prefer at present to make it a subspecies of *D. pulverina*.

Type material.

Holotype (apterous viviparous female) and paratypes (apterous and alate viviparous females) from *Plantago* sp., Karaj, Iran, 30.iv.1968 and 2.v.1968 (R. van den Bosch leg.). Non-type samples from *Veronica persica*, Karaj, 30.iv.1968, and *Ceratocephalus falcatus*, Karaj, 30.iv.1968 (R. van den Bosch leg.). Holotype and paratypes in the collection of Dr Hille Ris Lambers; paratypes also in the collection of the Plant Pathology Laboratory, Harpenden, England. Reference numbers of type samples: van den Bosch samples 15 (3.iv.1968; includes holotype) and 21 (2.v.1968). Non-type samples: v.d.B. sample 13 (*Ceratocephalus falcatus*) and 14 (*Veronica persica*).

I have thought it desirable to discuss these two taxa in considerable detail in view of the non-availability of comparable material of a number of the Central Asian species described by NEVSKY and NARZIKULOV, and also of my failure to elicit any information on *Dentatus capsellae* Mordv. In this way I hope that I may have covered all the necessary morphological characters that will ultimately enable their validity, or perhaps their synonymy, to be established with more certainty than is possible now.

Acknowledgments.

I am grateful to Dr Hille Ris Lambers, Bennekom, for the loan of the material described, and for the gift of paratypes.

REFERENCES

- NARZIKULOV, M. N., 1954 - A new species of aphid from *Ligularia* and some problems of endemism in the aphid fauna of the Hissar Range (in Russian). *Izv. Otdel. estestv. Nauk A. N. Tadzhiksk. S.S.R.*, 6: 9-15.
- NARZIKULOV, M. N., 1961 - On new and little known species of aphids of the genus *Dysaphis* Börner from Tadzhikistan (in Russian). *Trudy Inst. Zool. Akad. Nauk Tadzhiksk. S.S.R.*, 20: 77-82.
- NARZIKULOV, M. N., 1967 - A new species and subspecies of aphid of the genus *Dysaphis* Börner from Tadzhikistan (in Russian). *Doklady Akad. Nauk Tadzhiksk. S.S.R.*, 10: 62-63.
- NEVSKY, V. P., 1929, *Tli Srednei Azii*. Tashkent, 425 pp.
- SHAPOSHNIKOV, G. Kh., 1964 - Aphidinea in *Opredelitel' Nasekomykh Evropeiskoi Chasti S.S.S.R.*, ed. G. Ya. Bei-Bienko. I: 489-616, Moscow.