Notes on the Summer Flora of the Aegean

BY

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Introduction

In 1943 Dr. K. H. Rechinger published his Flora Aegaea, the first comprehensive work to be devoted to the plants of the Aegean islands. Dr. Rechinger has followed up his Flora by the following taxonomic and phytogeographical contributions:

Neue Beiträge zur Flora von Kreta, in Denkschr. Akad. Wiss. Wien, cv, 2 Halbb. 1 Abt. (1943).

Der Polymorphismus in der ägäischen Flora, in Öst. Bot. Zeitschr. xciv, 152–234 (1947).

Florae Aegaeae Supplementum, in Phyton, i, 194–228 (1949).

Phytogeographia Aegaea, in Denkschr. Akad. Wiss. Wien, cv, 2 Halbb. 2 Abt. (1949).

Grundzüge der Pflanzenverbreitung in der Aegäis, in Vegetatio, ii, 55–119, 239–308, 365–386 (1950).

In the summer of 1950 I made a short journey in the Aegean (primarily for the purpose of collecting seeds), followed by an excursion into Western Anatolia (cf. Davis in Notes Roy. Bot. Gard. Edin. xxi, 61: 1952). The three main places visited in the Aegean (as circumscribed by Rechinger) were Karpathos, West Crete and Mykali (in Turkey, opposite the island of Samos). Though none of these areas was unexplored, some new taxa were discovered. The extreme rarity of many of the endemics makes it certain that the Aegean, and other parts of the Eastern Mediterranean (especially Turkey), will continue to be a source of taxonomic discoveries for many years to come.

Itinerary

Karpathos.—The island was reached by steamer from Piraeus on *July* 20, 1950. I landed at Pigadhia, and proceeded the same day by bus to Voladha. *July* 21: Voladha to Lastos by mule, with ascent of Kalilimni on foot, entailing a climb along the western precipice. *July* 22: Lastos to Spoa by mule, via Marmakoui and Holethria on the western flank of Kalilimni, through a Pinetum Brutiae. *July* 23: Spoa to Olymbos by mule. *July* 24: Olymbos to Vurgunda (on the coast N.W. of Olymbos), on foot by way of Avlona, and return to Olymbos. *July* 25: Olymbos to Diaphani (on coast E. of Olymbos), and then by caique to the island of Saria (separated by a narrow channel from Karpathos); return by caique to Pigadhia. *July* 26: Pigadhia to Menetes by bus, with ascent of Mt. Prof. Elias above the village; on to Phiniki by bus. *July* 27: around Phiniki. *July* 28: by caique to Kasos. *July* 29–31: from Kasos to Piraeus by caique, sheltering at the islet of Makra *en route*.

Karpathos was botanised by Pichler (1883), Forsyth-Major (1886) and K. H. Rechinger (1935). Although I tended to follow in Forsyth-Major's footsteps, two new species were found, doubtless due to their late-flowering habit. The southern end of Karpathos and the great sea cliffs west of Spoa need further exploration. The beautiful endemic *Campanula erucifolia* Feer has only been collected by Pichler.

Rechinger recorded 12 taxa as endemic to Karpathos in 1950. To these must be added *Carthamus Rechingeri* P. H. Davis, *C. leucocaulos* Sibth. & Sm. var. *subarachnoideus* P. H. Davis, *Micromeria carpatha* Rech. fil., *Scabiosa cretica* L. subsp. *carpatha* P. H. Davis, *Salsola carpatha* P. H. Davis, and *Teucrium Montbretii* Benth. var. *crenatum* P. H. Davis, bringing the total of endemics to 18.

CRETE.—Canea was reached by steamer from Piraeus on *August* 1, 1950. *August* 2: Canea to Meskla by car, and on to Theriso by mule. *August* 3: Theriso to the shepherd huts of Katsiveli (near Pachnes) by mule. *August* 4: ascent of Svourichti (E. of Katsiveli) on foot, and return to Katsiveli. *August* 5: Katsiveli—Theriso—Meskla—Canea.

The White Mountains (Levka Ori) have been visited by many botanists, including Tournefort (1700), Raulin (1845), Sibthorp, Sieber (1817), Heldreich (1846), Gandoger (1916–17), Lempberg (1936), Baldacci (1893, 1899), and K. H. Rechinger (1942).

Two hundred and nine taxa (excluding *Odontites cretica* Boiss.) are recorded by Rechinger as endemic to Crete—the highest for any Mediterranean island. To these must be added *Carlina Barnebiana* Burtt & Davis, *Crocus oreocreticus* B. L. Burtt and *Nepeta sphaciotica* P. H. Davis, bringing the total to 212.

MYKALI.—On this mountain (Samsun Dağ) I was accompanied by Mr. V. H. Heywood. We reached Söke by train from Izmir on *August* 19, 1950. Thence we took a car on *August* 20 to the ruins of Priene at the east foot of Samsun Dağ; we climbed the limestone mountain on foot, returning the same night to Söke. The slopes are dominated by *Pinus Brutia*, replaced by *P. nigra* subsp. *Pallasiana* above 900 m. on western exposures.

Mykali was visited by Forsyth-Major in June 1886. No route is given, but I suspect that he made for the highest peak, which lies towards the west end of the ridge, and which we were unable to reach from Priene. Bormüller appears to have taken much the same route as ourselves in 1906.

Only two endemics are recorded for Mykali: *Campanula mycalaea* Barbey & Forsyth-Major and *Verbascum maeandri* Bornm. We found neither of these, though we discovered a third: *Helichrysum Heywoodianum* P. H. Davis. It seems possible that the Mykali plant identified as *Origanum Dictamnus* L. by Barbey (Lydie, Lycie, Carie, 81: 1890) may turn out to be a new species. It needs re-collecting.

Cliff Vegetation on Karpathos

On Karpathos most of the cliffs consist of compact Cretaceous limestones ideal for chasmophytes. For convenience the cliffs can be considered under two headings—those near the sea, and those in the mountains, each characterised by several species not seen in the other. For both habitats the majority of the plants are nanophanerophytes or suffrutescent chamaephytes.

1. CLIFFS IN THE MOUNTAINS. These were examined only in the central

part of the island, especially in the neighbourhood of Kalilimni, the island's highest peak. There, just below the summit, there are nearly vertical cliffs (c. 80°) facing N.W. at 1,100 m. These were dominated by *Erica verticillata*, a facultative chasmophyte. Common associates were *Helichrysum orientale* var. *Pichleri*, *Cephalaria mediterranea* var. *Sieberi*, *Pimpinella Tragium* aff. var. *creticae* and *Seseli gummiferum* subsp. *crithmifolium*. More local were *Linum arboreum* and *Brassica cretica* var. *aegaea*. At the foot of these shady cliffs, growing through grazed hummocks of *Erica verticillata* or among moss and stones, was the rare *Origanum Vetteri*, only known from this place. The locality is very favourable for plant life, because of the chilly mist that so frequently shrouds the summits during the hot summer months.

On another cliff in the same area, facing W. at 1,000 m. and sloping at 80°, *Staehelina fruticosa* was co-dominant with *Erica verticillata*; the former tolerates somewhat drier conditions than the *Cephalaria* referred to above. Rocks facing W. and sloping at 50°—very hot in the afternoon sun—were dominated by the xeromorphic *Inula heterolepis*.

On the E. flank of Kalilimni lies the little plain of Lastos at 700 m. The stony slopes around it were covered by the dwarf bushes of *Poterium spinosum*, *Euphorbia acanthothamnos*, *Carlina conformis*, *Lithospermum hispidulum* and *Coridothymus capitatus*. Nearby, the step-crevices of a rather dry S.W. cliff at 650 m. were dominated by the shrubby *Chamaepeuce Alpini* var. *camptolepis*, accompanied by bushes of *Scabiosa cretica* subsp. *carpatha* and *Ephedra campylopoda*; *Allium Bourgaei* occurred on the ledges. On an adjacent N.E. cliff, arid and nearly vertical—or even overhanging—the *Scabiosa* formed bushes over 2 m. across. It had no associates other than a few rosettes of *Silene gigantea*.

2. Cliffs near the Sea. Here three localities were examined: Vurgunda (N.W. of Olymbos), Phiniki and Saria.

(*a*) *Vurgunda*. The vertical sea-rocks at Vurgunda contain four chasmophytes: *Salsola carpatha* (endemic), *Galium canum* (a wide-leaved form), *Lactuca amorgina* and *Capparis rupestris*.

Above, on dry nearly vertical cliffs of limestone conglomerate, facing N. at 30 m. (near the cliff called Akrotirias), *Dianthus arboreus* and *Galium canum* were dominant; they were most commonly accompanied by *Salsola carpatha*, *Capparis rupestris* and *Chamaepeuce Alpini* var. *camptolepis* (the latter mainly in step-crevices); less common were *Campanula carpatha*, *Ephedra campylopoda* and *Brassica cretica* var. *aegaea*. On the same cliff, but chiefly on the overhangs at the mouth of dry caverns, was *Teucrium Montbretii* var. *crenatum*, accompanied by *Galium canum*; both these species, throughout their range, seem to favour very dry and frequently overhanging rocks. On sloping rock in the same locality *Limonium Frederici* was locally not uncommon.

At 60 m. *Senecio gnaphalodes* (confined to Karpathos and E. Crete) occurred rarely on vertical N. cliffs dominated by *Dianthus arboreus*. Higher up, near Avlona, this shrubby *Senecio* was abundant, colonising the dry walls of terraces, as it does further south at Menetes.

(*b*) *Phiniki*. Here a line of limestone cliffs, facing W., descends to within 20 m. of the sea. The vertical rock was dominated by *Staehelina fruticosa* and *Capparis rupestris*. Common associates were *Linum arboreum*, *Dianthus arboreus* and *Teucrium Montbretii* var. *heliotropifolium*—the latter chiefly on dry

overhangs. Rare on the vertical rock were *Alyssum creticum* and *Scabiosa cretica* subsp. *carpatha*. In this maritime locality both the *Staehelina* and *Dianthus* had unusually fleshy leaves. It was here that Rechinger discovered the remarkable cavernicolous *Arabis longistyla* Rech. fil., an endemic which I did not find.

(*c*) *Saria*. On this island I visited the N.E. cliffs at the place called Spatharea; the cliff is of hard crystalline limestone, and at 50 m. slopes at an angle of 75°. The rock face was dominated by two facultative chasmophytes: *Erica verticillata* and *Lithospermum hispidulum*. Growing with them, but decidedly rare, were *Staehelina fruticosa*, *Teucrium Montbretii* var. *crenatum* and *Asperula Tournefortii* var. *Majori*—the latter only known from this locality.

TAXONOMY

The following annotation includes all the plants I collected in the Aegean during the summer of 1950. Material from other Mediterranean areas has been cited where pertinent. Taxa marked with an asterisk (*) are new for the Aegean area as circumscribed by Dr. Rechinger.

The following abbreviations are used in citations:—

BM—British Museum (Natural History), London.
E.—Royal Botanic Garden, Edinburgh.
K.—Royal Botanic Gardens, Kew.
holo.—holotype.
iso.—isotype.
synt.—syntype.

GYMNOSPERMAE

CUPRESSACEAE

JUNIPERUS EXCELSA M.Bieb., Fl. Taur. Cauc. ii, 425 (1808).

Karpathos: above Spoa, 500 m., W. slope, 23 July 1950, Davis 18081.

On Karpathos this species makes a much greener tree than it does in Southern Anatolia, thus resembling *J. foetidissima* Willd.

J. MACROCARPA Sibth. et Smith, Prodr. ii, 263 (1808).

Karpathos: Phiniki, rocky coast, 27 July 1950, Davis 18103.

New for Karpathos.

PINACEAE

PINUS BRUTIA Ten., Fl. Nap. i, p. lxxii (1811–15).

Karpathos: W. side of Kalilimni, 800 m., forest dominant, 21 July 1950, Davis 18060. *Mykali:* Samsun Dağ, 300–900 m., S. side, 20 Aug. 1950, Davis 18370 and Heywood.

Both this species and *P. halepensis* have been recorded for Karpathos, but it seems very probable that the latter species has been confused with *P. Brutia*, both there and on Mykali. Only *P. halepensis* has previously been recorded from Mykali.

PINUS NIGRA Arn. subsp. PALLASIANA (Lamb.) Holmboe, Veg. Cyprus, 28 (1914).

Mykali: Samsun Dağ above Priene, N. side, 900–1,000 m., 20 Aug. 1950, Davis 18371 and Heywood.

The species is new for Mykali.

EPHEDRACEAE

EPHEDRA CAMPYLOPODA C.A. Mey., Vers. Monogr. Eph. 73 (1846).

Karpathos: Lastos, 700 m., rocks, 22 July 1950, Davis 18069.

ANGIOSPERMAE

PAEONIACEAE

PAEONIA CLUSII F. C. Stern in Bot. Mag. t. 9594 (1940).

Karpathos: Lastos, 700 m., N.W. slopes among rocks, 22 July 1950, Davis 18062 (*fruct.*).

CRUCIFERAE

ALYSSUM CRETICUM L., Sp. Pl. 651 (1753).

Karpathos: Phiniki, on W. cliff, 27 July 1950, Davis 18091.

Seed was collected of this remarkable woody chasmophyte, and young plants are being raised at Kew.

ALYSSUM FRAGILLIMUM (BALD.) RECH. FIL., Neue Beitr. Fl. Kreta, 77 (1943).

W. Crete: Svourichti, 2,200–2,300 m., scree, 4 Aug. 1950, Davis 18127a.

* ALYSSUM LEPIDULUM Nyárády in Bull. Grâd. Bot. Cluj. vii, 96 (1928), subsp. LEPIDULUM.—Syn. subsp. *genuinum* Nyár. f. *pauloasperum* Nyár. l.c., 9, 28 (1929)—*passim*.

Mykali: Samsun Dağ above Priene, local on rocky S. slope, 700–900 m., 20 Aug. 1950, Davis 18362 and Heywood.

Our gathering of this Anatolian species closely matches material from Sipylos.

ALYSSUM SPHACIOTICUM Boiss. et Heldr. in Boiss., Diagn. Ser. 1 (8), 35 (1849).

W. Crete: Svourichti, 2,200–2,300 m., in scree with *A. fragillimum*, 4 Aug. 1950, Davis 18127b.

ARABIS ALPINA L. subsp. CAUCASICA (Willd.) Briq., Prodr. Fl. Corse, ii, 48 (1913).

W. Crete: Svourichti, 2,200 m., shady rocks, 4 Aug. 1950, Davis 18118.

BRASSICA CRETICA Lam. var. AEGAEA Heldr. et Hal. apud Hal. in Öst. Bot. Zeit. xlv, 216 (1895).

Karpathos: Vurgunda, on cliff near the place called Akrotirias, 24 July 1950, Davis 18046.

CAPPARIDACEAE

CAPPARIS RUPESTRIS Sibth. et Smith, Prodr. i, 355 (1806).

Karpathos: Vurgunda, on dry N.W. cliff near the place called Akrotirias, 24 July 1950, Davis 18042.

FRANKENIACEAE

FRANKENIA HIRSUTA L. var. HISPIDA (DC.) Boiss., Fl. Or. i, 780 (1867).

Karpathos: Phiniki, sea shore, 27 July 1950, Davis 18095.

The species has not been previously recorded for Karpathos. On the islet of Makra near Kasos I collected a form of this species near to var. *hispida* but with ascending glabrous flowering-stems. The forms of this species, and its relationship with the more westerly *F. laevis* L., need thorough revision.

CARYOPHYLLACEAE

ARENARIA CRETICA Sprengel, Syst. Veg. ii, 396 (1825).

W. Crete: Svourichti, 2,200 m., N. rocks and scree, 4 Aug. 1950, Davis 18123.

The gathering comprises the typical form and var. *stygia* Boiss., as well as intermediates between them. A similar range is shown by some other Cretan gatherings in the Kew Herbarium.

DIANTHUS ACTINOPETALUS Fenzl, Pugill. Pl. Nov. Syr. 11 (1842) var. ACTINOPETALUS.

Mykali: Samsun Dağ above Priene, 200 m., S. cliffs, fl. pink, 20 Aug. 1950, Davis 18342 and Heywood.

DIANTHUS ARBOREUS L., Sp. Pl. 413 (1753).

Karpathos: between Marmakoui and Holethria (W. side of Kalilimni), 700 m., in vertical calcareous rocks facing west, bushes up to 0·75 m. across, leaves dark green, very free flowering, 23 June 1950, Davis 18083 (*forma caulibus abbreviatis, foliis brevibus viridis calycis squamis paucis*); Phiniki, 10 m., W. cliff, 27 July 1950, Davis 18089 (*forma maritima foliis valde carnosis*); Vurgunda, in dry N.W. cliff near the place called Akrotirias, 24 July 1950, Davis 18041.

This beautiful Aegean species is not always easy to distinguish from the rarer *D. fruticosus* L. Botanists have held that *D. fruticosus* differs from *D. arboreus* in its longer calyx, more numerous calyx-scales, broader leaves that are flat and obtuse (instead of subterete and acute) and shorter flowering stems. To evaluate these alleged differences, I have analysed the available herbarium material for variation in the characters summarised in Tables 1 and 2. It will be noted that I have not recognised the two species as occurring on the same islands. This conclusion seems to be justified by the distribution of leaf-shape, which I must consider the most reliable distinguishing character discernible in herbarium material.

In Table 1 the figures not in brackets indicate the mean for each island, and those in normal parenthesis the range of variation. The figure in square brackets represents the number of different gatherings examined for each island. In Tables 2 and 3 the length and breadth of the leaves, and the length/breadth ratio, are given for every gathering of both species. When calculating the mean values for each species, I took the mean of the average variation for each island. It can be seen from these tables that the distinguishing characters I have referred to (so far as they are analysed here) are diagnostic only when we consider the mean for each species. When individuals are considered, there is a wide range of overlap in all characters except leaf-shape. In *D. arboreus* (as I interpret it here) the length/breadth ratio of the leaf is always above 6 (except in one short-leaved individual from Amorgos and another from Karpathos), and below it in *D. fruticosus*. When width is considered alone, there is overlap only in the two Cephalonian specimens (and then only where leaves of the flowering stem are concerned) which I have, for reasons to be referred to later, placed under *D. arboreus*. In the Aegean, the leaves of *D. fruticosus* are always more than 3 mm. broad,

TABLE 1: *Dianthus fruticosus* AND *D. arboreus:* MEAN VALUES AND RANGES OF CHARACTERS FOR EACH ISLAND

D. fruticosus L.	Length of calyx (mm.)	Number of scales on one side of calyx.	Length of scaled part of calyx (mm.)	Length of calyx teeth (mm.)	Length/breadth ratio of leaf on flowering stem	Length/breadth ratio of leaf on sterile shoot	Length of flowering stem (cm.) (to top of calyx)
Serephos [4] . . .	23·5 (22–24)	6·75 (6–7)	10·0 (9–11)	7·7 (7–9)	4·8 (4·0–5·2)	4·7 (3·7–5·7)	13·75 (11–17)
Pholegandros [1] . .	23·0	5·0	9·0	6·0	5·2	?	12·0
Sikinos [1] . . .	24·0	9·0	10·0	7·0	5·4	5·5	9·0
Mean for Species . .	23·5	6·9	9·7	6·9	5·1	5·1	11·6
D. arboreus L.							
Karpathos [4] . . .	22·7 (20–25)	5·2 (4–6)	9·0 (7–11)	6·5 (6–7)	10·0 (5–12)	10·4 (6·8–15·0)	7·9 (6·5–11·0)
Amorgos [4] . . .	23·0 (22–25)	5·5 (5–6)	9·2 (8–10)	7·0	10·1 (4–20)	14·5 (9·6–22)	9·2 (7–12)
Kalymnos [1] . . .	22·0	6·0	9·0	8·0	10·8	11·1	15·0
Crete [11] . . .	20·4 (15–25)	7·4 (5–9)	8·0 (6–12)	5·2 (4–7)	16·3 (10·8–21·0)	18·9 (7·7–31·0)	16·8 (9–34)
Cephalonia [2] (wild and cult.) . .	25·0	6·5 (6–7)	10·5 (9–12)	10·0	9·3 (8·5–10·2)	17·2 (7·5–27)	23·0 (16–30)
Mean of Species . .	22·6	6·1	9·1	7·3	11·3	14·4	14·4

TABLE 2: LENGTH, BREADTH AND LENGTH/BREADTH RATIO OF LEAVES IN GATHERINGS OF *D. arboreus* L.

D. arboreus L.	Median leaf of flowering stem			Leaf of sterile shoot		
	Length (mm.)	Breadth (mm.)	Ratio	Length (mm.)	Breadth (mm.)	Ratio
Karpathos [4]						
Fors.-Maj. 24	12·0	1·0	12·0	15·0	1·0	15·0
Davis 18083	11·0	1·0	11·0	11·0	1·0	11·0
Davis 18041	12·0	1·0	12·0	18·0	2·0	9·0
Davis 18089	10·0	2·0	5·0	17·0	2·5	6·8
Mean for island	11·2	1·2	10·0	15·2	1·6	10·4
Amorgos [4]						
Davis 954	19·0	2·0	9·5	?	?	?
Rech. 2357	12·0	1·7	6·8	24·0	2·5	9·6
Heldr. (1881)	8·0	2·0	4·0	18·0	1·5	12·0
Orph.	20·0	1·0	20·0	22·0	1·0	22·0
Mean for island	14·7	1·7	10·1	21·3	1·7	14·5
Kalymnos [1]						
Fors.-Maj. 664	27·0	2·5	10·8	25·0	2·2	11·0
Crete [11]						
Rech. 14040	26·0	2·0	13·0	32·0	2·0	16·0
Rech. 14136	22·0	1·5	14·6	21·0	1·2	16·8
Lempberg 562	22·0	1·5	14·6	25·0	2·0	12·5
Bald. 1	21·0	1·0	21·0	31·0	1·0	31·0
Heldr. (1846)	27·0	2·5	10·8	23·0	3·0	7·7
Sieber (Maleka)	18·0	1·2	14·4	24·0	1·2	19·9
Heldr. (1870)	18·0	1·0	18·0	22·0	1·2	17·6
Baker (1926)	20·0	1·0	20·0	?	?	?
Davis 289	20·0	1·0	20·0	24·0	1·0	24·0
Davis & Barneby (Almyros)	30·0	2·0	15·0	25·0	1·2	20·0
Davis & Barneby (Candia-Neapolis)	18·0	1·0	18·0	18·0	1·0	18·0
Mean for island	22·0	1·4	16·3	24·5	1·5	16·7
Cephalonia [2]						
Davis 1128 (wild)	34·0	4·0	8·5	19·0	2·5	7·5
Cult. Hort. Kew	36·0	3·5	10·2	27·0	1·0	27·0
Mean for island	35·0	3·7	9·3	23·0	1·7	17·2
Mean for species	22·0	2·1	11·3	21·8	1·7	14·4

TABLE 3: LENGTH, BREADTH AND LENGTH/BREADTH RATIO OF LEAVES IN GATHERINGS OF *D. fruticosus* L.

D. fruticosus L.	Median leaf of flowering stem			Leaf of sterile shoot		
	Length (mm.)	Breadth (mm.)	Ratio	Length (mm.)	Breadth (mm.)	Ratio
Serephos [4]						
Davis 870	20·0	4·0	5·0	16·0	3·5	4·6
Orph. 919	20·0	4·0	5·0	15·0	4·0	3·7
Sibthorp	26·0	5·0	5·2	20·0	3·5	5·7
Tournefort	24·0	6·0	4·0	23·0	5·0	4·6
Mean for island	22·5	4·7	4·8	18·2	4·0	4·7
Pholegandros [1]						
Davis 214	31·0	6·0	5·2	?	?	?
Sikinos [1]						
Davis 899	19·0	3·5	5·4	18·0	3·2	5·5
Mean for species	24·2	4·4	5·1	18·1	3·6	5·1

and from 1–2·5 (3·0) mm. in *D. arboreus*. A Scatter Diagram (Fig. 1) is given in which leaf-length in each species is plotted against width. The ringed points indicate two gatherings. It will be seen that correlation is poor between these two variables in *D. arboreus*, but that a positive correlation is shown in *D. fruticosus*.

D. arboreus was originally described from Crete, and *D. fruticosus* (by reference to Tournefort's Voyage, i, 70) from Serephos. A glance at the Tables will show that, so far as length/breadth ratio is concerned, the populations of Crete and Serephos stand at opposite extremes of variation. When only the types are considered, *D. arboreus* and *D. fruticosus* therefore appear more distinct than they really are, since it is on Karpathos and Amorgos that individuals of *D. arboreus* occur with abnormally low leaf-ratios on the flowering shoots. These have leaves that are too short, narrow and fat to be included in *D. fruticosus*.

It may be argued that the differences in leaf-shape (which are not absolute) scarcely justify separation of these two chasmophytes as distinct species. That may be so. The shape of the leaf-apex and the thickness of the leaf (not treated in the Tables) certainly show an overlap, though they are fairly closely correlated with length/breadth ratio. The thickness of the leaf is readily modified by environment. On Karpathos I collected a form of *D. arboreus* on sea cliffs at Phiniki (Davis 18089) with very fleshy leaves having a length/breadth ratio (flowering shoot) falling within the range of *D. fruticosus;* but seedlings raised from this plant at Kew are giving plants almost typical for cultivated *D. arboreus*, which usually has somewhat wider and flatter leaves than it does in the wild (thereby approaching *D. fruticosus*).

In addition to the leaf differences, there is an alleged difference in scent, *D. arboreus* being described as fragrant, and *D. fruticosus* as scentless. I have not been able to verify this, as the true *D. fruticosus* is very rare in cultivation, being apparently less hardy than its ally. It is possible that there is also a difference in the markings on the trunk. In branches of *D. fruticosus* which

I collected on Pholegandros, the old leaf scars completely encircle the trunk, whereas they appear to be interrupted and less pronounced in *D. arboreus*. However, this may not be a constant feature. It may be that, when these plants are better known, they may have to be treated as subspecies of one species. In the meantime, having some respect for Linnaean species and relict chasmophytes, and remembering that other differences may exist that are not brought out by this analysis, I prefer to recognise these plants as specifically distinct.

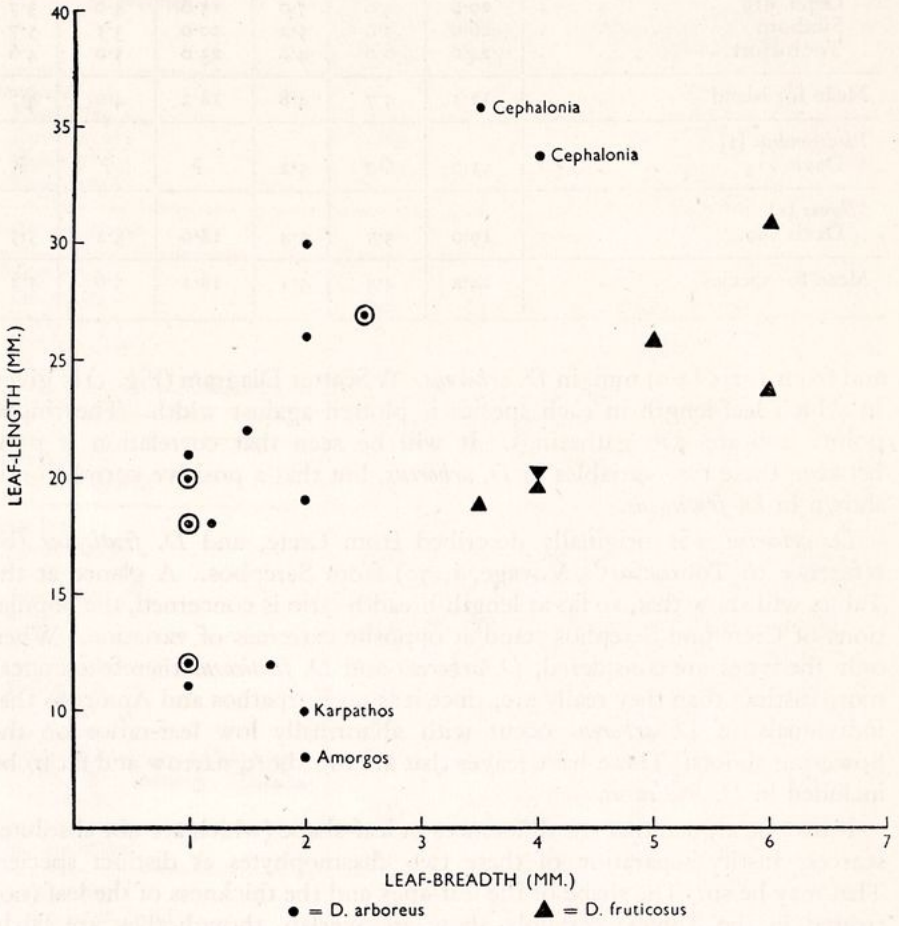

Fig. 1. Correlation of leaf-breadth and length (flowering stems)

It must be stressed that *D. arboreus* is a very variable plant, even on one island. This is particularly true of Karpathos, where the species extends from sea level to 700 m. Special mention must be made of the unusual form from Cephalonia (the only station for *D. arboreus* outside the Aegean). This was first collected by Heldreich, and identified as *D. fruticosus*. I have collected this plant in Heldreich's Cephalonian locality (Assos), where it occurs on the walls of the castle. However, it is common on the neighbouring sea cliffs with *Senecio bicolor* (Willd.) Tod. (which also grows in the Cyclades), and there seems no reason to consider it introduced. The Cephalonian plant certainly approaches *D. fruticosus* so far as the width of the leaves on the flowering stem is concerned, but on other characters (including length/breadth ratio) it

seems better placed under *D. arboreus*. It has remarkably long calyx-teeth (10 mm.). Seed collected at Assos produced plants at Kew which retained the long teeth, but in leaf-shape approached typical *D. arboreus* more closely than did the wild gathering—a fact which supports the inclusion of the Cephalonian plant in *D. arboreus* rather than *D. fruticosus*.

The range of the two species is shown on the map (Fig. 2). If the unverified records of *D. arboreus* are correct, then *D. fruticosus* is surrounded by a broken ring of *D. arboreus*. As forms of *D. arboreus* have not infrequently been referred to *D. fruticosus*, I have mapped only verified records of the latter.

Dr. Rechinger (Fl. Aeg., 156) records the South Italian *D. rupicola* Biv.*

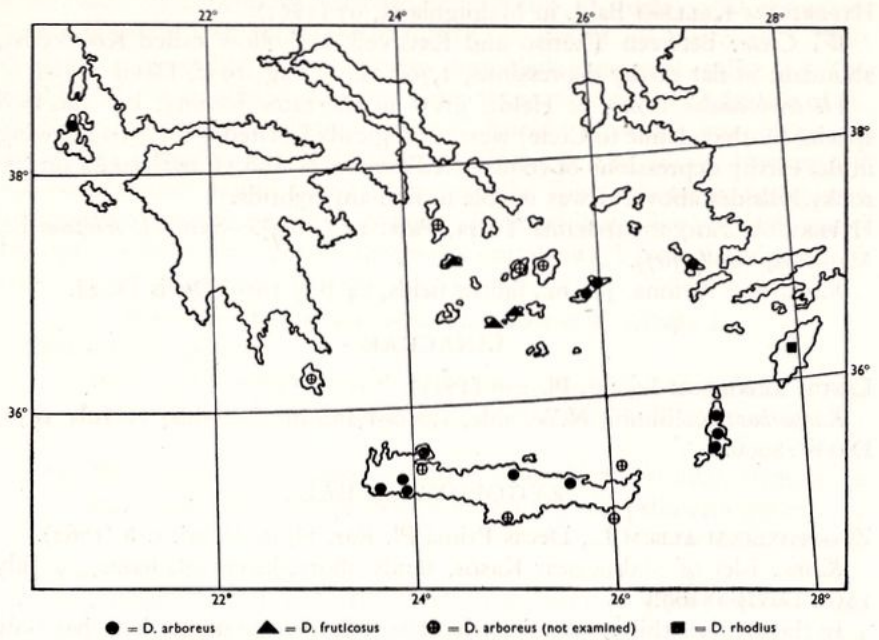

Fig. 2. Distribution of Dianthus arboreus and Aegean allies

from Crete on Giuseppi's evidence. I believe this record to be erroneous, and also that Sibthorp's Cretan record of *D. fruticosus* may well be a mistake. *D. rhodius* Rech. fil., described in bud from Rhodes, needs to be better known, though certainly in its leaf-shape (which resembles that of *D. rupicola*) it appears to be well distinguished from its two Aegean allies, *D. arboreus* and *D. fruticosus*.

MINUARTIA VERNA (L.) Hiern subsp. ATTICA (Boiss. et Spruner) Hayek var. CRETICA Hayek in Öst. Bot. Zeitschr. lxxi, 101 (1922).

W. Crete: Svourichti, 2,200 m., scree, 4 Aug. 1950, Davis 18138.

PARONYCHIA MACROSEPALA Boiss., Diagn. Ser. 1 (3), 11 (1843).

Karpathos: Phiniki, 5 m., rocky coast, 27 July 1950, Davis 18093.

SILENE GIGANTEA L., Sp. Pl. 418 (1753).

Karpathos: Lastos, 700 m., N.W. cliff, 22 July 1950, Davis 18064.

* In the Kew Herbarium there are three gatherings of *Dianthus rupicola* from Majorca, all collected from the sea cliffs of Cabo de Formentor (Bartolome Rotger, 5 Nov. 1935; E. W. Kennedy, 11 May 1936 and 14 July 1936). This Balearic locality constitutes an important new record. West of Sicily, the species has only been previously recorded from Algeria.

HYPERICACEAE

HYPERICUM CUISINII *Barbey* in Bull. Soc. Vaud. Sci. Nat. xxi, 94 (1885).

Karpathos: Phiniki, 10 m., cliff, 27 July 1950, Davis 18086; Olymbos, on schist rocks (Obs.).

HYPERICUM EMPETRIFOLIUM Willd. Sp. Pl. iii, 1452 (1803), var. EMPETRIFOLIUM.

Karpathos: Holethria, W. of Kalilimni, in open Pinetum Brutiae, 22 July 1950, Davis 18061. *Mykali:* Samsun Dağ above Priene, in Pinetum Brutiae, Aug. 1950, Davis 18354 and Heywood.

A new record for Mykali.

HYPERICUM KELLERI Bald. in Malpighia ix, 67 (1895).

W. Crete: between Theriso and Katsiveli, at hollow called Kolokytha, abundant in flat earthy depressions, 1,700 m., 3 Aug. 1950, Davis 18164.

H. trichocaulon Boiss. et Heldr. grew in the same locality, but the two species (both endemic to Crete) were ecologically isolated: *H. Kelleri* growing in flat earthy depressions of transported *terra rossa*, and *H. trichocaulon* on the rocky hillsides above. I was unable to find any hybrids.

HYPERICUM TRIQUETRIFOLIUM Turra, Fars. 12 (1765).—Syn. *H. crispum* L., Mantissa, 106 (1767).

Karpathos: Avlona, 300 m., fallow fields, 24 July 1950, Davis 18024.

LINACEAE

LINUM ARBOREUM L., Sp. Pl. 279 (1753).

Karpathos: Kalilimni, N.W. side, 1,000–1,200 m., N. cliffs, 21 July 1950, Davis 18006.

ZYGOPHYLLACEAE

ZYGOPHYLLUM ALBUM L., Decas Prima Pl. Rar. Hort. Upsal. t. 6 (1762).

Kasos: islet of Makra near Kasos, sandy shore, leaves glaucous, 29 July 1950, Davis 18109.

In the Aegean this predominantly Saharo-Sindian psammophyte has only been recorded from two small islands off the south coast of Crete.

RUTACEAE

RUTA CHALEPENSIS L. var. BRACTEOSA (DC.) Boiss., Fl. Or. i, 922 (1867).

Karpathos: Avlona, 24 July 1950, Davis 18031.

RHAMNACEAE

RHAMNUS OLEOIDES L., Sp. Pl. ed. 2, 279 (1762).

Taxonomists have tried very hard to retain R. *graeca* Boiss. et Heldr. as specifically distinct from R. *oleoides* L.—a species in Sect. *Cervispina* Moench—originally described from Spain. The more material that accumulates in herbaria the more difficult it becomes to assign specific rank to R. *graeca*, since the complex is obviously very critical in the Eastern Mediterranean.

The glabrity of the disc in R. *oleoides*, and its pubescence in R. *graeca* (discernible even in fruit if carefully examined under a low-power microscope) is a fairly constant distinction, though forms of R. *oleoides* with a hairy disc do occur, even in Spain. Halácsy (Consp. Fl. Graeca i, 320, 1901) recognised five varieties of R. *oleoides* in Greece (including the islands),

but some of these scarcely seem to merit taxonomic rank; furthermore, by the characters of the disc and leaf-shape, some of them should have been placed under R. *graeca* rather than R. *oleoides*.

The taxonomists task is made more difficult by the seasonal variation in leaf texture and indumentum, and by the environment's effect on the habit of the bush. Only cultivation under uniform conditions could show how much of the variation is genotypic.

Having examined the disc on all material in the Kew Herbarium, I find myself able to recognise four subspecies of R. *oleoides* (incl. R. *graeca*) in the Eastern Mediterranean. These have a partly overlapping distribution, and intermediate specimens are not rare; nevertheless, the differential characters seem sufficiently well correlated to justify this taxonomic treatment. Their distribution (recording only specimens examined) is mapped in Fig. 3. The material I have examined does not seem to necessitate the inclusion of R. *oleoides* within the West Mediterranean R. *lycioides* L., which was the course adopted by Jahandiez and Maire (Cat. Pl. Maroc, ii, 476, 1932). However, if this transference should prove necessary, the four subspecies recognised here could be transferred to R. *lycioides*. In providing a key and differential descriptions (with citations of specimens examined), I have described each subspecies in its more usual form.

Key to the East Mediterranean subspecies of R. *oleoides* L.

1. Disc usually glabrous:
   2. Bush erect; lamina entire, glabrous, coriaceous, 10–25 mm. long, narrowly elliptical (or elliptical), drying yellowish green . . subsp. *oleoides*
   2. Bush prostrate; lamina crenulate, sparsely puberulent, firm, 5–10 mm. long, elliptical-obovate, drying a slightly yellowish green . subsp. *tauricola*
1. Disc usually puberulent:
   3. Lamina obovate, generally entire, puberulent or glabrous, 6–18 mm. long, drying light greyish green . . . . subsp. *graeca*
   3. Lamina narrowly obovate-elliptical, crenulate or entire, glabrous, 6–10 mm. long, drying slightly yellowish green. subsp. *microphylla*

SUBSP. OLEOIDES.

Frutex erecto-divaricatus, ramis griseo-brunneis, spinis 2–6 cm. longis 1–1·5 mm. latis juventute puberulis vel glabris. *Folia* coriacea; lamina anguste elliptica vel interdum elliptica, integerrima, 1·0–2.5 cm. longa, 4–10 mm. lata, inferne attenuata, glaberrima, in sicco luteolo-viridia, subtus nervatura fusca reticulata. *Discus* glaber.

Crete: Chalepa, Sieber. *Amorgos:* Orphanides.

Of the specimens cited, only the Cretan example is typical of this subspecies. The Amorgos plant has a puberulent disc, but is otherwise typical of *oleoides*. I have seen specimens of this subspecies from Spain (where it is widespread), Portugal, Sardinia, Gibraltar and Malta.

Subsp. tauricola P. H. Davis, **subsp. nov.**

Frutex prostratus, divaricato-intricatus, ramis griseis, spinis 1·0–4·5 cm. longis 1·25 mm. latis juventute puberulis. *Folia* firma; lamina ellipticoobovata, 5–10 mm. longa, 2–3·5 mm. lata, utrimque leviter 1–5-crenulata, brevissime pubescens (deinde glabrescens), in sicco viridis, subtus nervatura indistincta notata. *Discus* glaber.

S.W. Turkey: Prov. Antalya, distr. Kemer (Lycia), at Tahtali Dağ, 2,100 m., on limestone rock, rare, 10 July 1948, Davis 15074; distr. Gebiz (Pisidia), on Bozburun Dağ between Boğaz Azzi Yaylâ and Tozlu Çukur Yaylâ, 1,700

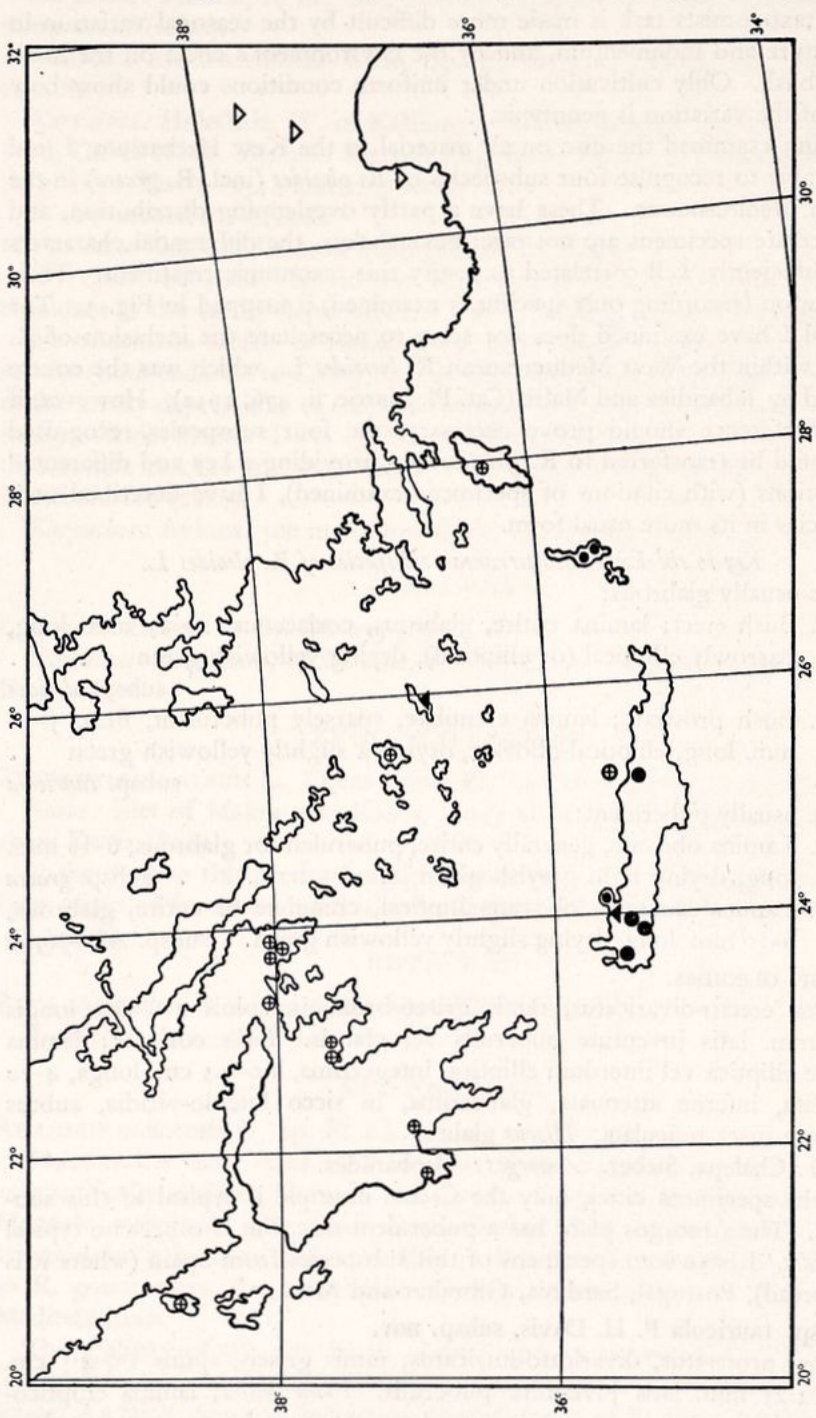

Fig. 3. Distribution of Rhamnus oleoides L. in the Eastern Mediterranean

m., 24 July 1949, Davis 15578; prov. Isparta, on Dedegöl Dağ above Oruz Gaz Yaylâ, 2,000 m., rock, 2 Aug. 1949, Davis 15963 (*holo.* K.).

The above gatherings are fairly uniform and seem to represent a distinctive ecogeographical race in the high mountains of S.W. Anatolia. A specimen from Karakuyu near Dinar at only 400 m. (Davis 15000) could probably be included in this subspecies, but has thicker very glabrous leaves.

Subsp. graeca (Boiss. et Reuter) P. H. Davis, **comb. et stat. nov.**—Syn. R. *graeca* Boiss. et Reuter in Boiss., Diagn. Ser. 2 (5), 74 (1856); R. *oleoides* L. var. *obovata* Hal., Consp. Fl. Gr. i, 320 (1901).

Frutex erecto-divaricatus vel prostratus, congestus, ramis griseis, spinis 1–6 cm. longis 1–2 mm. latis juventute puberulis. *Folia* firma; lamina obovata, 6–18 mm. longa, 4–8 (10) mm. lata, integra, utrimque puberula, in sicco pallide griseo-viridis, subtus nervatura indistincta notata. *Discus* puberulus.

Greece: Lycabettus et Hymettus (Heldreich 79, *synt. K.*); ad radices Mt. Pentelici pr. Geraka, 1 Mar. 1887, Heldreich; Nauplia, in Mt. Palamidi, 28 Mar. 1885, Haussknecht; Tolon (Argolis), Atchley 1087; Greece, 1836, Guccorini; Pylos (Navarino)—Herb. Stuart Mill, leg. 1862; Megara, 10 June 1896, St. Lager; supra Leucadia (S. Maura), Baldacci 28 (*iso. var. obovatae Hal., K.*); pr. Kalamata Messeniae, Orphanides. *Cyclades:* Naxos, Rech. fil. 2235. *Dodecanese:* Rhodes, in Mt. Prof. Elias pr. Salakos, Rech. fil. 7245. *Crete:* ins. Dhia, distr. Megalokastro, Baldacci 302.

Of these specimens, the following are not typical: Orphanides' specimen from Kalamata is very erect; Baldacci 28 has leaves with 1–6 crenulations; Baldacci 302 approaches subsp. *microphylla*. I have not seen the type of R. *graeca* var. *argolica* Hal. (Nauplia, leg. Orphanides), but it seems most likely that it should be included in subsp. *graeca*.

Subsp. microphylla (Hal.) P. H. Davis, **stat. nov.**—Syn. R. *oleoides* var. *microphylla* Hal., Consp. Fl. Gr. i, 320 (1901); R. *oleoides* L. var. *sphaciotica* Hal., *ibid.*

Frutex erecto-divaricatus, quam in subsp. *oleoide* magis nanus et densius ramosus, ramis griseo-brunneis, spinis 1–4·5 cm. longis 0·75–1·0 mm. latis juventute puberulis vel glabris. *Folia* firma vix coriacea; lamina anguste obovato-elliptica, 7–10 (17) mm. longa, 2·5–3·5 (4·5) mm. lata, integra vel utrimque minute glanduloso-crenulata, glabra, subtus nervatura reticulata quam in subsp. *oleoide* minus prominente notata. *Discus* puberulus.

Crete: Mt. Juktas, Atchley 1114; Kissamos, Reverchon 228 (*synt. K.*); Akrotiri, Baldacci 7 (*synt. K.*); Crete, Trevor-Battye; Levka Ori in sax. calc. jugi Xyloscala, Rech. fil. 13747; Samaria distr. Sphakia, Baldacci 218 (*synt. R. oleoidis* var. *sphacioticae, B.M.—forma lamina 10–17 mm. longa*). *Karpathos:* Pigadhia–Aperi, 29 Apr. 1883, Pichler (E.); Kalilimni, 1,100 m., rocks, Davis 18000; Kurup, Pichler 157.

Both crenulate and entire-leaved forms occur in a syntype gathering (Baldacci 7). Of the Karpathos specimens, Davis 1800 and Pichler 157 appear to have glabrous discs.

The following references will be found helpful in identifying the species of Sect. *Cervispina* found in the Near East: Bornmüller in Fedde Repert. xxix (1), 33–38 (1931); Diapoulis, Ta Rhamnaceae (Athens—undated); Feinbrun in Pal. Journ. Bot. (Jer. Ser.) iii, 167–9 (1946); Schneider, Illustriertes Handbuch der Laubholzkunde, ii, 269–291 (1909); Schwarz, O., in Fedde, Repert. liv (1), 26–34 (1944).

* RHAMNUS PICHLERI Schneider et Bornm. ex Bornm. in Fedde, Repert. xxix, 36 (1931), in adnot.—Syn. *R. eriocarpa* O. Schwarz in Fedde, Repert. liv (1), 26 (1944).

Mykali: Samsun Dağ above Priene, 800 m., shady cliff, branches loosely appressed to cliff, 20 Aug. 1950, Davis 18369 and Heywood.

This distinctive chasmophyte, distinguished from all its allies by its velvety fruits, has only been previously recorded from the Lycian Taurus, where I have collected it in several localities. It seems to me that Bornmüller's description of R. *Pichleri*, very brief though it is, is sufficiently definite to validate the name, so that the later name R. *eriocarpa* O. Schwarz (accompanied by a full description which does not include the type of R. *Pichleri*) must be rejected. An isotype of R. *Pichleri* is in the Kew Herbarium.

R. PRUNIFOLIA Sibth. et Smith, Prodr. i, 157 (1806).

W. Crete: Svourichti, 2,200 m., rocks, 4 Aug. 1950, Davis 18141.

ANACARDIACEAE

PISTACIA LENTISCUS L., Sp. Pl. 1026 (1753).

Saria: at the place called Spatharea, dominant on screes at alt. 50 m., 25 July 1950, Davis 18071.

LEGUMINOSAE

ANTHYLLIS AEGAEA Turrill in Kew Bull., 1939, 189 (1939).

Amorgos: above Langadha, 700 m., N. cliffs E. of the place called Stavros between Langadha and Krikilos, very local and inaccessible, saxatile 1 m. shrub, 8 Oct. 1939, Davis 962 (*fruct.*).

The species has previously only been recorded from the Cycladean island of Pholegandros.

ASTRAGALUS ANGUSTIFOLIUS Lam., Encyc. i, 321 (1783), var. ANGUSTIFOLIUS.

W. Crete: Katsiveli in Levka Ori, 1,800 m., fl. whitish, mountainsides, 3 Aug. 1950, Davis 18151.

CICER INCISUM (Willd.) K. Maly in Aschers. et Graeb., Syn. Fl. Mitt. vi (2), 900 (1909).

W. Crete: Svourichti, 2,200–2,300 m., screes, fl. purple, 4 Aug. 1950, Davis 18119.

ONONIS NATRIX L., Sp. Pl., 717 (1753), subsp. NATRIX.

Mykali: Samsun Dağ, 400 m., above Priene, rocky slopes, fl. yellow with reddish brown lines on vexillum, 20 Aug. 1950, Davis 18350 and Heywood.

ROSACEAE

POTENTILLA SPECIOSA Willd., Sp. Pl. ii, 1110 (1800).

W. Crete: Svourichti above Katsiveli, 2,100 m., on N. cliffs near spring, dominant on vertical rock, 4 Aug. 1950, Davis 18114.

The gathering shows every transition between the typical form and var. *minor* Lehm. which appears to be no more than a depauperate modification.

RUBUS ULMIFOLIUS Schott subsp. ANATOLICUS Focke in Aschers. and Graeb. Syn. Fl. Mitt. vi (1), 503 (1904).

Karpathos: between Olymbos and Diaphani, by spring, bush 2 m. tall, fl. deep pink, 25 July 1950, Davis 18059.

ONAGRACEAE

EPILOBIUM PARVIFLORUM Schreb., Spicil, Fl. Lips. Consp. n. 314 (1771), var. PARVIFLORUM.

Mykali: Samsun Dağ, 400 m., above Priene, 20 Aug. 1950, Davis 18351 and Heywood.

UMBELLIFERAE

DAUCUS CAROTA L. subsp. MAXIMUS (Desf.) Thell., Fl. Adv. Montp. 405 (1912).

Karpathos: Voladha, 400 m., edge of fields, 20 July 1950, Davis 18016; Avlona, edge of terraces, 24 July 1950, Davis 18029.

Not previously recorded from Karpathos.

FOENICULUM PIPERITUM DC., Prodr. iv, 142 (1830).

Karpathos: Voladha, 400 m., roadside, perennial, foetid, fl. yellow, 19 July 1950, Davis 18021.

PEUCEDANUM ALPINUM (Sieber ex Schultes) Burtt et Davis in Kew Bull. 1949, 227 (1949).

W. Crete: Svourichti, 2,200–2,300 m., screes, perennial, petals maroon, 4 Aug. 1950, Davis 18126.

PIMPINELLA TRAGIUM Vill. var. DEPRESSA (DC.) Boiss., Fl. Or. ii, 871 (1872).

W. Crete: Katsiveli in Levka Ori, 1,850 m., at edge of protected potato patch, 4 Aug. 1950, Davis 18160; Svourichti, 2,200 m., screes, 4 Aug. 1950, Davis 18124.

aff. var. DEPRESSAE (DC.) Boiss.

Karpathos: Kalilimni, N.W. side, 1,100 m., shady cliffs, saxatile, stems erect, 21 July 1950, Davis 18007.

The Karpathos gathering is close to the Cretan var. *depressa*, but differs from it in having stems which, though very variable in height, are invariably erect. It grows in rock crevices at lower altitudes than the Cretan plant which is an alpine of earthy hollows and scree. In Crete the species always has procumbent stems, even when growing in places (cf. No. 18160) protected from grazing. The forms of this polymorphic species require revision.

SESELI GUMMIFERUM Pallas ex J. E. Smith, Exot. Bot. Tab. ii, 121 (1804).

When studying *Seseli crithmifolium* (DC.) Boiss. to decide whether the plant was specifically distinct from its allies, it was found that this taxon, as it is accepted by Hayek and K. H. Rechinger, contains two different elements, one of which evidently requires a new name.

Having examined De Candolle's type of *S. gummiferum* [Pallas ex] Smith var. *crithmifolium* DC., collected by Tournefort on the islet of Nikouria near Amorgos (as reference to Tournefort's Voyage i, 88, makes clear), it was found that this plant had glabrous rosette leaves with linear *laciniae*. When Boissier raised the variety to specific rank, he described a different plant—a *Seseli* collected on Pholegandros by Orphanides (Herb. Boiss.), having densely velutinous leaves with much broader divisions than in De Candolle's plant. It seems very doubtful if Boissier had Tournefort's specimen before him when he described *S. crithmifolium;* he probably saw it earlier, and erroneously considered it to have come from Pholegandros, where Tournefort does not mention having seen a Seseli. However, Boissier cites *S. gummiferum* var. *crithmifolium* as a synonym of his *S. crithmifolium*, so that the former must be taken as the type of the later binomial, even though Tournefort's plant is not covered by Boissier's description. The Seseli from

Pholegandros, provided by Boissier with a description, therefore lacks a valid name. I have called it *S. gummiferum* subsp. *aegaeum*.

Examination of the two Aegean *Seseli*, and of the South Anatolian *S. corymbosum* (all of which I have seen in the field), shows that they are very closely related to one another and to the Crimean *S. gummiferum*. Now that more material is available, several of the characters given by Boissier to distinguish the species in this group do not hold. Consequently I am treating them here as geographical races (subspecies) of *S. gummiferum*. Their allopatric distribution is shown on the map (Fig. 4).

Fig. 4. Distribution of Seseli gummiferum

It is curious that subsp. *crithmifolium*, occupying an area between that of subsp. *aegaeum* and subsp. *corymbosum*, should be the only race of *S. gummiferum s. lato* with glabrous rosette leaves; in the field this was noted to be a constant character. In leaf-form, however, subsp. *crithmifolium* is like subsp. *corymbosum*, although the latter grows at higher altitudes and is geographically more isolated from subsp. *crithmifolium* than the last is from subsp. *aegaeum*. The two races that are geographically the most distant from one another are morphologically the closest: subsp. *gummiferum* and subsp. *corymbosum*.

The three subspecies of *S. gummiferum* that I have collected all grow in

vertical limestone rocks, and appear to be monocarpic or sometimes perennial. They may take several years to flower, the caudex hanging out of the cliff, crowned by the fine glaucous rosette, like a palm. On Amorgos the caudex of subsp. *crithmifolium* can be as much as two feet long. In cultivation at Kew this subspecies took eleven years to flower; however, the plants had evidently been pot-bound and bloomed when they were planted out on the rock garden. Subsp. *crithmifolium* seems to be more variable (even on Karpathos) than subsp. *corymbosum* or subsp. *aegaeum*. The thickness of the leaves in this species can be considerably modified by the environment, but appears to be greatest in subsp. *aegaeum*. The latter and subsp. *crithmifolium* are the only two races now in cultivation.

Apart from subsp. *crithmifolium*, the only plant which has previously been subordinated to *S. gummiferum* is the Bulgarian *S. gummiferum* var. *resiniferum* Vel. There is an isotype of this plant in the Kew Herbarium, and I am sure that it is no more than a form of *S. rigidum* W. & K., a species widespread and variable in Bulgaria.

Key to the subspecies of S. gummiferum [*Pallas ex*] *Smith.*

1. Rosette leaves velutinous:
   2. Divisions of basal leaves linear, 1–3·5 mm. broad, acute, very shortly velutinous:
      3. Central umbel usually 18–30-rayed; peduncles of umbellules at least 10 times as broad as their indumentum (Crimea) subsp. *gummiferum*
      3. Central umbel usually 35–80-rayed; peduncles of umbellules 4–7 times as broad as their indumentum (S. Anatolia) subsp. *corymbosum*
   2. Divisions of basal leaves oblong or even obovate-oblong, 3–6 mm. broad, sub-obtuse, densely velutinous. Central umbel 20–50-rayed (Pholegandros, Sikinos, Crete) . . . subsp. *aegaeum*
1. Rosette leaves glabrous, linear or oblong-linear, acute (Karpathos, Saria, Amorgos, Nikouria) . . . . . subsp. *crithmifolium*

These four subspecies are differentially described below, together with citations of the specimens examined. I am particularly indebted to the Keepers of the Paris and Geneva Herbaria for the loan of material, without which this species could not have been revised.

SUBSP. GUMMIFERUM.

Laciniae foliorum basalium lineares acutae firmae, 2–18 mm. longae, 1–3 mm. latae, glaucae, brevissime velutinae. *Umbella* centralis 18–30-radiata (–50 in cult.), pedunculo 1·5–4·0 (11·0 in cult.) cm. longo breviter velutino. *Pili* pedunculorum umbellularum vix $\frac{1}{10}$ latitudinis pedunculi aequantes. *Fructus* 3·5–4·0 mm. longus, 1·5 mm. latus, oblongus, valleculis quam costis 1–2-plo latioribus.

Crimea: Tauria merid., Steven; Tauria, Karadag, on rocks, 1926, V. Vasiliev; E. Tauria, W. Besser; Tauria, Sokon bis Sudak, 1896, Callier 103; Cult. Jardin des Plantes, Couches, 4 Sept. 1819. *Typus:* Cult. in Oxford Bot. Garden and Hort. Lady Hume (n.v.).*

* The only specimen in J. E. Smith's herbarium (where one would expect the type to be) bears the legend "Mr. Lambert's garden, Boyton, Aug. 1806." I have considered this specimen to be typical of the species.

Subsp. corymbosum (Boiss. et Heldr.) P. H. Davis, **comb. et stat. nov.** —Syn. *S. corymbosum* Boiss. et Heldr. in Boiss. Diagn. Ser. 1 (10), 29 (1849).

Laciniae foliorum basalium lineares acutae firmae, 2–31 mm. longae, 1·5–3·5 mm. latae, glaucae, brevissime velutinae. *Umbella* centralis (22) 35–80-radiata, pedunculo 2–8 cm. longo breviter velutino. *Pili* pedunculorum umbellularum $\frac{1}{4}$–$\frac{1}{7}$ latitudinis pedunculi aequantes. *Fructus* (immaturus) 2·5 mm. longus, 1·0 mm. latus, valleculis quam costis 2–4-plo latioribus.

S. Anatolia: Prov. Isparta, in fissuris rupium Mt. Anemas, 1845, Heldreich (*iso. K.*); W. side of Sarp Dağ, 1,700 m., in crevices of vertical rocks, perennial, 29 July 1949, Davis 15787. Caramania, Heldreich in Herb. Hooker. Prov. Antalya, distr. Gebiz (Pisidia): Bozburun Dağ, 1,400 m., between Pinargazu and Boğaz Azzi, on cliff dominated by *Staehelina Lobelii*, 23 July 1949, Davis 15511; obs. distr. Alanya near Ak Dağ S. of Geyik Dağ, 1947. Prov. Niğde, distr. Ulukişla (Cilicia): between Alihoca and Bulgar Maaden, on limestone cliff, 3 Sept. 1949, Davis 16419. Prov. Mersin, distr. Karaisah (Cilicia): Gulek Boğaz, cliffs, monocarpic or perennial, 31 July 1949, Davis 16468. In Monte Tauro, Kotschy 228.

Subsp. aegaeum. P. H. Davis, **subsp. nov.**—Syn. *S. crithmifolium* (DC.) Boiss., Fl. Or. ii, 962 (1872) *quoad descr. tantum.*

Laciniae foliorum basalium oblongae vel etiam obovato-oblongae, 3–15 mm. longae, 3–6 mm. latae, crassae, valde glaucae, dense velutinae. *Umbella* centralis 20–50-radiata, pedunculo 2–4·5 cm. longo velutino. *Pili* pedunculorum umbellularum $\frac{1}{4}$ latitudinis pedunculi aequantes. *Fructus* 3·5–4 mm. longus, 1·25 mm. latus, oblongus, valleculis quam costis 2–4-plo latioribus.

Aegean: Pholegandros, on cliffs below the town, 30 Sept. 1939, Davis 928; *ibid.*, in scopulis maritimis, June 1864, Orphanides (Herb. Boiss.). Sikinos, cliffs, 27 Sept. 1939, Davis 892. Crete: in fissuris rupium calc. abruptarum pr. Mangasa (prov. Hierapetra), rarius, 18 Sept. 1938, Barneby 1987 and Davis (*holo. K.; cult. E.* 1952).

Subsp. crithmifolium (DC.) P. H. Davis, **stat. nov.**—Syn. *S. gummiferum* [Pallas ex] Smith var. *crithmifolium* DC., Prodr. iv, 145 (1830); *S. crithmifolium* (DC.) Boiss., Fl. Or. ii, 962 (1872), quoad syn. haud descr.

Laciniae foliorum basalium lineares vel oblongo-lineares, ± crassae, glaucae, 2–40 (–45 in cult.) mm. longae, 1–3·5 mm. latae, acutae, glaberrimae. *Umbella* centralis (17) 23–45 (50)-radiata, pedunculo 2·5–10 (16 in cult.) cm. longo dense velutino-pubescente. *Pili* pedunculorum umbellularum $\frac{1}{4}$–$\frac{1}{3}$ latitudinis pedunculi aequantes. *Fructus* 3 mm. longus, 1 mm. latus, valleculis quam costis 2–3-plo latioribus.

Aegean: Insulae maris Aegei [Insula Nikouria pr. Amorgos], Tournefort (*holo. in Herb. Paris*); Nikouria, obs. Davis, 1939. Amorgos, at Langadha, 200 m., N. cliffs, monocarpic with caudex up to 2 ft. long, Davis 940—cult. in Hort. Kew, 3 Sept. 1951; Amorgos, supra coenobium Panagia, 8 Aug. 1881, Heldreich; Amorgos, July 1897, Chr. Leonis; Amorgos, at Khozoviotissa, 5 Sept. 1939, Davis 938. Karpathos, 25 May 1886, Forsyth-Major 94; Karpathos at Holethria on W. side of Kalilimni, 1,100 m., N. cliff, 21 July 1950, Davis 18082. Saria (pr. Karpathos), ad rupes calc. vert. faucis Endi pr. Palatta, 18 July 1886, Forsyth-Major 541.

CAPRIFOLIACEAE

LONICERA ETRUSCA Santi var. ROESERI Heldr. in Boiss., Diagn. Ser. 2 (2), 107 (1856).

Karpathos: Avlona, walls of terraces, 24 July 1950, Davis 18030; Prof. Elias near Menetes, cliffs, 26 July 1950, Davis 18100.

The variety has not hitherto been recorded from Karpathos.

RUBIACEAE

Det. Dr. D. Ehrendorfer (Vienna)

ASPERULA IDAEA Hal., Consp. Fl. Gr. i, 737 (1901).

W. Crete: Katsiveli in Levka Ori, 1850 m., at edge of protected potato patch, 4 Aug. 1950, Davis 18157; Svourichti above Katsiveli, 2,200 m., growing through *Astragalus angustifolius*, fl. pink, 4 Aug. 1950, Davis 18133.

ASPERULA TOURNEFORTII Sieber var. MAJORI (Barbey) Rech. fil., Neue Beitr. Fl. Kreta, 132 (1943).

Saria: place called Spatharea, E. cliffs sloping from 80°–90°, 25 July 1950, Davis 18072—*locus classicus*.

GALIUM CANUM Req. in DC., Prodr. iv, 602 (1830–).

Karpathos: Vurgunda, on dry sea rocks, vertical or overhanging, fl. dark purplish brown, 24 July 1950, Davis 18028; Vurgunda, on cliffs near the place called Akrotirias, 24 July 1950, Davis 18048.

GALIUM FRUTICOSUM Willd., Sp. Pl. i, 585 (1798).

W. Crete: Meskla, 500 m., shady rocks, 5 Aug. 1950, Davis 18152.

GALIUM INCURVUM Sibth. et Smith, Prodr., i, 92 (1806).

Karpathos: Kalilimni, N.W. side, 1,100 m., 21 July 1950, Davis 18009.

GALIUM SAMOTHRACICUM Rech. fil. in Fedde, Repert. Beih. c, 134 (1938).

W. Crete: Katsiveli in Levka Ori, fl. pale yellow, perennial, procumbent-ascending, 4 Aug. 1950, Davis 18162.

RUBIA OLIVIERI Rich. in Mem. Soc. Hist. Nat. Paris, v, 132 (1834), var. OLIVIERI.

Karpathos: Vurgunda, near the place called Akrotirias, 24 July 1950 Davis 18051.

VALANTIA APRICA (Sibth. et Smith) Boiss. et Heldr. in Boiss., Diagn. Ser. 1 (10), 72 (1849), var. APRICA.

W. Crete: Svourichti above Katsiveli, 2,200 m., N. screes, 4 Aug. 1950, Davis 18117.

DIPSACACEAE

CEPHALARIA MEDITERRANEA (Viv.) Szabo var. SIEBERI (Szabo) Szabo in Math. Termsz. Kozl. xxxviii, 149–155 (1940).

Karpathos: Kalilimni, N.W. side, 1,100 m., N. cliffs, fl. cream, 21 July 1950, Davis 18008.

In Szabo's monograph of *Cephalaria* (*l.c. supra*), which I have not seen, this plant is treated as a variety of the rare Corsican-Sardinian *C. mediterranea* (Viv.) Szabo. Szabo recognises three geographically isolated varieties of this species, which, in the material at Kew, differ chiefly in the shape of the bracts. In this character, var. *mediterranea* (var. *latifolia* (Moris) Szabo, *passim*), as it is represented by the one Corsican specimen at Kew, is intermediate between the Aegean var. *Sieberi* and the Majorcan var. *balearica*

(Coss.) Szabo. Var. *Sieberi* was originally described from Crete, whence it has not been collected again. Sieber's Cretan specimen has narrower less dentate leaves than gatherings of this taxon from Karpathos and Ikaria, which, in their broadly elliptical leaves, resemble the Majorcan variety. Indeed, the Karpathos plant (of which a large gathering was made) differs from var. *balearica* only in its bracts, the median and inner ones being oblong and acute (as in the Cretan type), instead of spathulate and more or less obtuse as in the Balearic race.

SCABIOSA CRETICA L., Sp. Pl. 100 (1753).

An intensive study of the available herbarium material of *S. cretica* L. and *S. variifolia* Boiss. has led me to consider these taxa conspecific, and to recognise four subspecies within *S. cretica* L.

Linnaeus's description of *S. cretica* in the Species Plantarum is transcribed almost verbatim from his Hortus Cliffortianus which he cites immediately after his description. It therefore seems that the specimen in Clifford's herbarium must be taken as the lectotype.

In the Species Plantarum Linnaeus described this taxon as coming from Crete and adjacent islands. However, both Linnaeus's description ('*foliis lanceolatis sub-integerrimis*') and the Clifford specimen are clearly referable to the form of this species which grows on Sicily. Material from Sicily has narrower leaves than the Cretan race and sometimes has 1–3 small teeth on the upper part of the blade—a feature present in the type specimen but not seen in Balearic or Cretan material. In short, there is no justification for associating the type of *S. cretica* with Crete. It is doubtful if the species was known to Linnaeus except as a cultivated plant; apart from the specimen in the Clifford herbarium, there are three other early sheets of *S. cretica* at the British Museum, all originating from the Chelsea Physic Garden between 1745 and 1773 and referable to the Sicilian form.

The Sicilian origin of *S. cretica* presents us with nomenclatural difficulties when we come to name both Sicilian and Cretan subspecies. It would not only be illogical, but would lead to confusion, to refer to the Sicilian taxon (which also occurs in the Balearics) as subsp. *cretica*—the name which should be adopted in accordance with the ruling taken at Stockholm (1950). Consequently I have named this plant subsp. *occidentalis* P. H. Davis. This treatment, though it may conflict with the present letter of the law, certainly conforms to it in spirit, since nomenclatural rules are intended to avoid confusion, not to add to it. The Cretan race I have named subsp. *minoana* P. H. Davis, the Karpathos race (hitherto included in *S. variifolia*) subsp. *carpatha* P. H. Davis, and the Rhodian one subsp. *variifolia* (Boiss.) P. H. Davis.

Boissier described the leaves of *S. variifolia* as being glabrous, whereas those of *S. cretica* (*s. stricto*) are sericeous. However, as Dr. Rechinger (Fl. Aeg., 594) has pointed out, this refers only to the mature leaf, because the leaves of *S. variifolia* are covered with hairs when young; in fact, what appears as a juvenile character in *S. variifolia* is retained in the adult leaf of *S. cretica*.

S. cretica (incl. *S. variifolia*) is confined to the vertical limestone cliffs of a few Mediterranean islands and headlands—indeed, its distribution (shown on the map in Fig. 5) is similar to that of *Dianthus arboreus* and its allies referred to earlier in this paper. Its woody saxatile habit and disjunct distribution

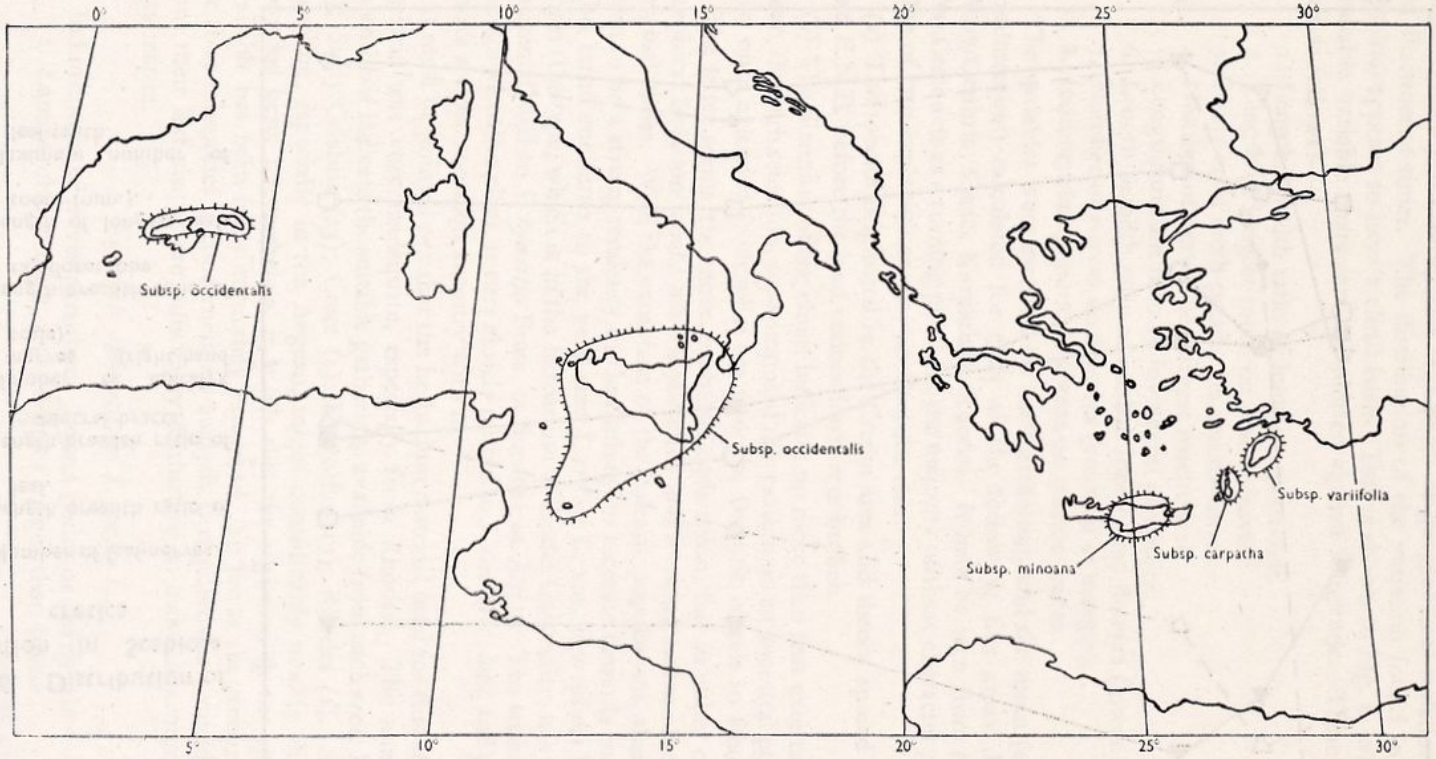

Fig. 5. Distribution of Scabiosa cretica L.

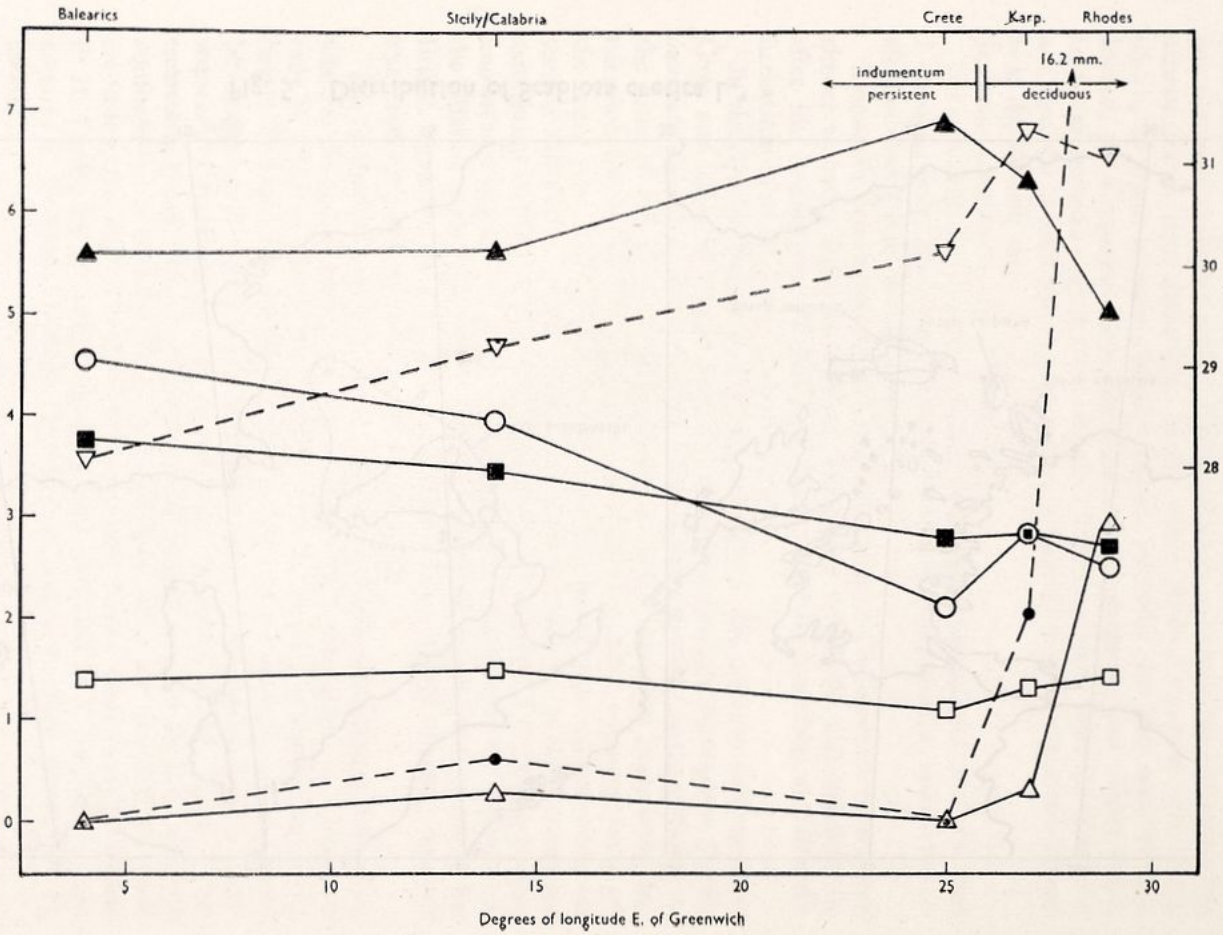

Fig. 6. Distribution of variation in Scabiosa cretica

▲ Number of leaf-nerves.

○ Length/breadth ratio of leaf.

■ Length/breadth ratio of involucral bracts.

▽ Number of epicalyx nerves (right-hand scale).

□ Length/breadth ratio of ray-floret lobe.

● Length of longest leaf-tooth (mm.).

▽ Maximum number of leaf-teeth.

suggest that the Scabious is a Tertiary relict; it probably became differentiated into distinct subspecies as a result of geographical isolation initiated in Pleistocene times. The distribution of the variation found in *S. cretica* (*s. lato*) appears to have a clinal basis. This is shown in Fig. 6, where eight suitable variable characters are plotted against longitude. These variables are as follows:—

1. Length/breadth ratio of longest rosette-leaf.
2. Length of longest tooth on rosette-leaves.
3. Number of teeth present on rosette-leaves.
4. Number of nerves per largest rosette-leaf.
5. Length/breadth ratio of involucral phyllaries.
6. Length/breadth ratio of median lobe of ray flowers (lower lip).
7. Number of nerves on epicalyx (counted at margin).
8. Indumentum present or absent on mature leaves.

The variables were assessed for each gathering, and the mean (except for indumentum) calculated for each of the following five areas: Balearics; Sicily/Calabria; Crete; Karpathos; Rhodes. It may be seen from the figure that Crete acts as a turning point for the majority of these character gradients. One of two explanations may account for this:

(*a*) The species originated in the Cretan area and thence spread W.N.W. and E.N.E. before the land connections were broken.

(*b*) The direction of the clines indicates no more than that external factors have, through selection, superimposed this pattern on an ancestral population that once extended from what are now the Balearic islands to Rhodes.

The latter seems the more probable explanation, but in either case geographical isolation would have interrupted and to some extent obscured the original clines. With the exception of the Balearic populations, there would seem to be a strong tendency for leaf-lobing to increase towards the North. This trend continues to the very rare *S. cretica* L. var. *heterophylla* Pasq. on Capri (the type, which is in the herbarium of Rome University, has not been examined) and to *S. hymettia* Boiss. et Spruner in Attica. The latter species, though a smaller plant, is very closely related to *S. cretica* (*s. lato*) and probably shares a close common ancestry with it.

It must be pointed out that the herbarium material used for this attempted analysis was very inadequate, especially from Rhodes. The numbers in parenthesis indicate the suitable gatherings available from each area: Balearics (5); Sicily/Calabria (23); Crete (5); Karpathos (7); Rhodes (2). Adequate sampling, especially in the Aegean, might considerably modify the trends recorded here. Nevertheless, it is felt that the variation in the specimens available has been fairly accurately expressed. So far as the recognition of the four subspecies is concerned, no analysis is required for their identification: their leaf shapes are sufficiently distinctive to make determination an easy matter.

Key to the subspecies of S. cretica L.

1. Indumentum of leaves persistent. Leaves entire or nearly so:
   2. Lamina oblanceolate, 3·5–5·0 times longer than broad . . . subsp. *occidentalis*
   2. Lamina broadly elliptical-obovate, 1·5–2·6 times longer than broad subsp. *minoana*

1. Indumentum of leaves deciduous:
   3. Leaves all oblong-elliptical, obtuse, the inner sometimes with 1–3 short blunt lobes . . . . . subsp. *carpatha*
   3. Leaves entire at outside and centre of rosette, ± acute, the intermediate ones pinnatifid into 2–5 acute lanceolate lobes . . subsp. *variifolia*

I append differential descriptions of each of the four subspecies, with citation of specimens examined:—

Subsp. occidentalis P. H. Davis, **nom. nov.**—Syn. *S. cretica* L., *sensu orig., haud in Creta crescens.*

Lamina foliorum basalium sericea, oblanceolata, acuta, latitudine plerumque 3·5–5·0-plo longiora, integra (vel in Sicilia—ut in typo—saepe superne minute et parce 1–3-serrulata), 5–7-nervosa. *Folia caulina* plerumque absentia, vel si adsint oblanceolata. *Involucri phylla* latitudine 3–4-plo longiora. *Epicalyx* 24–35-nervosa.

Majorca: Bourgeau 1757, Sennen 1086, Biana 690. *Minorca:* Porta and Rigo, Knoche B. 204. *Sicily:* 1916, H. C. Baker; Mt. Pellegrino, Laconi 309; Palermo, Ross 30, Dörfler, Prior, Todaro 1089, Ross 2546; Taormina, Bornmüller 398, Rigo 4049, Davis 44, Laciata 5/83, Beguinot 2755; pr. Isnello, Strobly; Belmonte (Herb. Hook.); Castelbouno, Strobly; Castelfano pr. Bagheria, Pavillon. *Calabria*; Pallaro, Huter 93; Calabria, L. Thomas. *Cult.* (holo. in Herb. Cliff., B.M.).

* **Subsp. minoana** P. H. Davis, **subsp. nov.**

Lamina foliorum basalium sericea late elliptico-obovata, subobtusa, latitudine, 1·5–2·6-plo longiora, integerrima, 7-nervosa. *Folia caulina* absentia vel si adsint obovato-elliptica. *Involucri phylla* latitudine 2·4–3·1-plo longiora. *Epicalyx* 27–33-nervosa.

Crete: in rupestr. reg. sup. et mediae Mt. Aphendi Sarakeno, distr. Pedhiada, 18 June 1899, Baldacci 125 (1899: Iter Creticum Alterum—holo. B.M.); Kastamonitza, Sept. 1938, Davis and Barneby, Baldacci 126 bis; Nida (Psiloriti), Baldacci 126 ter.; Lassiti (Dikte), Sieber.

* **Subsp. carpatha** P. H. Davis, **subsp. nov.**

Lamina foliorum basalium juventute subsericea, deinde glabra, obovato-elliptica, obtusa, plerumque integra vel interdum folia interiora 1–2-lobata (lobis 1–14 mm. longis obtusis), latitudine 2–3·2-plo longiora, 5–7-nervosa. *Folia caulina* absentia, vel si adsint anguste obovato-elliptica integra. *Involucri phylla* latitudine 2·2–3·5-plo longiora. *Epicalyx* 27–38-nervosa.

Karpathos, 1886, Forsyth-Major 236 (*holo.* K.); Lastos, Pichler 342; Rechinger 8179 and 8291, Davis 18063 (700 m., dominant on dry N.W. cliff, fl. lilac-pink). Saria, Forsyth-Major 198.

In leaf-form the Karpathos plant resembles the Cretan subspecies rather than the one from Rhodes, and, were it not for its leaves being glabrous at maturity, would probably have been referred by earlier authors to *S. cretica* rather than *S. variifolia*. It is beautifully figured in Stefani, Forsyth-Major and Barbey's Karpathos (Tab. VI.: 1895—*sub S. variifolia*).

Subsp. variifolia (Boiss.) P. H. Davis, **comb. et stat. nov.**—Syn. *S. variifolia* Boiss., Fl. Or. iii, 137 (1875).

Lamina foliorum basalium juventute sericea, deinde glabra, subacuta, latitudine 2·2–2·7-plo longiora, 3–7-nervosa, extima et integra ± acuta,

intermedia in lobos 2–5 lanceolatos acutos 10–24 mm. longos pinnatifida. *Folia caulina* subpinnatifida. *Involucri phylla* latitudine 2·7-plo longiora. *Epicalyx* 30–32-nervosa.

Rhodes: Rochers du Mt. Santo Elio près de Salakos, 4 June 1870, Bourgeau 79 (*iso. K.*); *ibid.*, Rechinger 7234.

SCABIOSA SPHACIOTICA Roem. et Schult., Syst. Veg. iii, 86 (1818), var. SPHACIOTICA.

W. Crete: Svourichti, 2,300 m., summit screes on gentle S. slopes, fl. pale lilac-whitish, 4 Aug. 1950, Davis 18128.

COMPOSITAE

ACHILLEA CRETICA L., Sp. Pl. 899 (1753).

Karpathos: Vurgunda, on cliffs near the place called Akrotirias, 24 July 1950, Davis 18047.

Carlina conformis (Barbey et Major) P. H. Davis, **comb. nov.**—Syn. *Atractylis conformis* Barbey et Major in Stef., Fors.-Maj. Barb., Karpathos, 115 (1895).

Karpathos: Voladha, 400–1000 m., rocky slopes, round spiny bush, radii yellow, 19 July 1950, Davis 18012; Vurgunda, rocky shore, radii yellow, 24 July 1950, Davis 18023.

The genera *Carlina* L. and *Atractylis* L. are rather imperfectly distinguished from one another. Nevertheless, on the sum of its characters, the very distinct Dodecanese endemic, hitherto known as *Atractylis conformis*, must be assigned to *Carlina*. Furthermore, it has a closer affinity with the Anatolian *Carlina pallescens* Wetts. (which I know only from the original figure) and *C. oligocephala* Boiss. et Kotschy, than with any known species of *Atractylis*. The characters which generally serve to distinguish these two genera may be tabulated as follows:—

Carlina	*Atractylis*
Outer phyllaries grading into the median phyllaries.	*Outer phyllaries* rather sharply distinguished from the median phyllaries.
Inner phyllaries (*radii*) overtopping the flowers and radiating when dry.	*Inner phyllaries* (*radii*) not or only a little longer than the flowers, erect.
Ligules absent.	*Ligules* present or absent.
Pappus in one row, the plumose setae joined 3 or 4 together in their lower part, thus appearing branched.	*Pappus* in 1–3 rows, the plumose setae joined into a ring at the base, thus appearing simple.

Certain species in each genus show single characters usually diagnostic of the other, so that the *ensemble* of characters must be considered when assigning a species to its genus. The difference in the *radii* has often been given most weight. The Karpathos plant shows all the characters typical of *Carlina*, except for that of the outer phyllaries.

C. conformis is abundant on Karpathos, ranging from sea level—where it forms spiny domes 1 m. across—up to nearly 1,200 m. on Kalilimni.

CARLINA CORYMBOSA L. subsp. CURETUM (Heldr.) Rech. fil., Fl. Aeg. 644 (1943).

Karpathos: between Olymbos and Diaphani, 25 July 1950, Davis 18057 (forma).

CARTHAMUS DENTATUS (Forsk.) Vahl, Symb. i, 69 (1790) var. DENTATUS.—

Syn. *C. ruber* Link in Linnaea, ix, 580 (1835); *C. Sartorii* Heldr., Florula Aeginensis in Bull. Herb. Boiss. vi, 305 (1898).

Mykali: Samsun Dağ above Priene, 200 m., 20 Aug. 1950, Davis 18368 and Heywood.

New for Mykali.

Examination of copious material in the Kew Herbarium makes it impossible to separate *C. ruber* Link from *C. dentatus* (Forsk.) Vahl. The structure of the pappus, often cited as the crucial difference, is not correlated with the other diagnostics claimed by Halácsy (Consp. Fl. Gr. ii, 170: 1902) to distinguish the two taxa. *C. dentatus* was originally described from Malta (by a *lapsus calami*?) and *C. ruber* from the Peloponnesus. When Link described the latter species, he differentiated it from *C. lanatus* L., *C. creticus* L. and *C. leucocaulos* Sibth. et Smith, but made no reference to *C. dentatus*. *C. Sartorii* Heldr. (cited by Halácsy and Hayek as a synonym of *C. ruber*) must also be considered synonymous with *C. dentatus*.

I am uncertain of the taxonomic position of the rare *C. dentatus* var. *ambiguus* (Heldr.) Hayek, restored to specific rank by K. H. Rechinger (Neue Beitr. Fl. Kreta, 153: 1943). There is a syntype of this plant at Kew, and also Rechinger 14377 (Crete: Lassithi); both these gatherings resemble forms of *C. dentatus* in their involucre, but have a pappus whose innermost series of pales is short, thereby resembling *C. Boissieri* Hal.

In *C. dentatus* (*excl. C. ambiguus*) the median series of pappus pales stands apart from the multiple outer series, and is at least as long as the latter; but this median series generally hides an innermost ring of very short pales that is absent (judging from the description) in the type of *C. ruber*. Specimens with this apparently reduced pappus-structure have been seen from Lycia, Cyprus and S. Greece. However, specimens occur which are intermediate in the form of their pappus between *C. ruber* and typical *C. dentatus*, nor can these differences be correlated with other characters that have been claimed to separate the two taxa. *C. ruber* must be 'sunk.'

*** Carthamus leucocaulos** Sibth. et Sm., Prodr. ii, 160 (1813) var. **subarachnoideus** P. H. Davis, **var. nov.**

A typo foliis et involucri phyllis exterioribus sparsim arachnoideis (deinde glabrescentibus) divergit.

Karpathos: Lastos, 700 m., edge of fields, 20 July 1950, Davis 18019; in lapidosis inter Menetes et Pigadhia, 14 June 1935, Rechinger, 8137.

Whereas *C. leucocaulos* on Crete (*locus classicus*) is always entirely glabrous (except for sessile glands), the two gatherings from Karpathos have slightly cobwebbed leaves and phyllaries. I have therefore described it as a new geographical variety, the smallness of the morphological difference scarcely warranting its description as a subspecies. In its indumentum the Karpathos plant resembles *C. gracillimus* Rech. fil. from Rhodes, which, however, differs specifically from *C. leucocaulos* in other characters. Thanks to Dr. Rechinger, I have been able to examine the type of *C. gracillimus*.

Carthamus Rechingeri P. H. Davis, **sp. nov.**

Affinis *C. Boissieri* Hal. et *C. tenui* (Boiss. et Bl.) Bornm. sed foliis caulinis longius lobatis minus amplexicaulibus, corymbo densiore magis divaricato-ramoso, capitulis minoribus, involucri phyllis externis quam floribus 2–3-plo longioribus basi vix ampliatis, pappo paleis intermediis omnibus obtusissimis retuso- vel fimbriato-truncatis recedit.

Radix tenuis, fusiformis. *Caulis* 30–50 cm. altus, 5 mm. latus, robustus, eburneus, inferne simplex glabrescens leviter striato-sulcatus, superne in paniculam corymbosam 25–35 cm. latam divaricato-ramosus, ramulis terminalibus subarachnoideis. *Folia* basalia emarcida; caulina profunde pinnatifida, sessilia sed vix amplexicaulia, ambitu oblonga, coriacea, elevatim nervosa, minute glandulifera, glabrescentia, virescentia, tamen subnitida, 4–7 cm. longa, rachide lineari 4–6 mm. lata integra vel spinulosa, lobis lateralibus remotis utrimque 4–7 anguste lanceolato-linearibus ad 1–1·5 cm. longis angulo recto patentibus in spinam flavescentem sensim attenuatis integris vel prope basin paululum spinulosis lobo terminale 1–3-plo brevioribus; caulina superiora breviora lobis paucioribus. *Capitula* (phyllis exterioribus exclusis) ovata, 1·5–2·0 cm. longa, numerosa, pedunculis 0·5–2 cm. longis. *Involucri phylla* exteriora profunde pinnatifida patenti-recurva, dense et minute glandulifera, subarachnoidea, inferne paululum dilatata, 3–4 cm. longa, subtus longitudinaliter elevatim trinervata, lobo terminali lobis lateralibus remotis utrimque 2–3 (–4) angustissimis spinosis ad 5–8 mm. longis 2–3-plo longiore, rachide integro vel sparse spinuloso; phylla interiora oblongo-lanceolata, subintegra, acutissima vel etiam acuminata exterioribus 2–3-plo breviora. *Receptaculum* longe fimbrilliferum. *Flores* lilacini. *Corolla* 16 mm. longa; tubus tenuissimus 11 mm. longus; limbus cylindricus fere 5 mm. longus in lacinias aequales lineares 3 mm. longas nervis binis lateralibus praeditas divisus. *Antherae* 3 mm. longae. *Achenia* turbinato-subtetragona, nitida, griseo-eburnea (deinde saepe excavato-punctata flavescentia), 3 mm. longa. *Pappus* paleaceus, pallide fuscus, 4–5 mm. longus; paleae extimae brevissime retusae ad intermedias lineares minutissime nigro-maculatas margine apice obtusissimas retusas vel fimbriato-truncatas acheniam 1½-plo longiores regulariter auctae; paleae intimae 1·5 mm. longae, conniventes, pallidae, apice fimbriato-truncatae. Floret Jul.

Karpathos: between Olymbos and Diaphani, in *phrygana*, fl. lilac, 25 July 1950, Davis 18055 (*holo. K.: iso. E.*); in saxosis calcareis ad Phiniki, 18 June 1935, Rechinger 8305 (*sub. C. Boissieri* Hal. in Rechinger, Fl. Aeg. 670: 1943).

The new species, apparently endemic to Karpathos, is named after Dr. K. H. Rechinger who first collected it. It is closely allied to *C. Boissieri* Hal. and *C. tenuis* (Boiss. et Bl.) Bornm., but differs from both of these in the following diagnostics: stem leaves less amplexicaul and with longer lobes, more markedly branched general inflorescence (here the difference from *C. Boissieri* is particularly well marked), smaller heads with longer outer phyllaries that are scarcely dilated at the base, and pappus with the intermediate pales very obtuse, being shortly lacerated at the apex or retuse. In addition, the outer involucral phyllaries of *C. Rechingeri* have longer lobes than in *C. tenuis*. Rechinger's specimen (which is without fruit) differs from the type in having leaves that have more numerous and shorter lobes, the main rachis being somewhat denticulate. The specific description covers both gatherings.

Material in the Kew Herbarium seems to justify according specific status to *C. syriacus* (Boiss.) Dinsm., *C. tenuis* (Boiss. et Bl.) Bornm., *C. alexandrinus* (Boiss.) Bornm., and *C. Boissieri* Hal., instead of treating them as varieties of *C. glaucus* M.B.—a species of which I have only seen material from the Caucasus and adjacent Iberia. Facies is very important in distinguishing these critical species, particularly the form of the general inflorescence.

CENTAUREA IDAEA Boiss. et Heldr. in Boiss., Diagn. Ser. 1 (10), 119 (1849).

W. Crete: Svourichti above Katsiveli, 2,200 m., fl. yellow, 4 Aug. 1950, Davis 18135.

CENTAUREA RAPHANINA Sibth. et Smith, Prodr. ii, 205 (1813).

W. Crete: Svourichti above Katsiveli, 2,300 m., 4 Aug. 1950, Davis 18139.

CHAMAEPEUCE ALPINI Jaub. et Spach var. CAMPTOLEPIS Boiss., Fl. Or. iii, 554 (1875).

Karpathos: Lastos, 700 m., dry S.E. cliff, 22 July 1950, Davis 18065.

CICHORIUM PUMILUM Jacq., Obs. Bot. (4), 3 (1771).

Karpathos: Avlona, fallow field, fl. blue, 24 July 1950, Davis 18036.

CICHORIUM SPINOSUM L., Sp. Pl. 813 (1753).

Karpathos: Vurgunda, shore, 7 July 1950, Davis 18034.

CIRSIUM CRETICUM (Lam.) Urv., Enum. 107 (1822).

Mykali: Samsun Dağ above Priene, 400 m., by spring, fl. purple, 20 Aug. 1950, Davis 18367 and Heywood.

New for Mykali.

CIRSIUM MORINIFOLIUM Boiss. et Heldr. in Boiss., Fl. Or. iii, 530 (1875).

W. Crete: Katsiveli, 1,800 m., in hollows, stems 1 m., fl. dirty white, 3 Aug. 1950, Davis 18150.

CREPIS SIBTHORPIANA Boiss. et Heldr. in Boiss. Diagn. Ser. 1 (11), 56 (1849).

W. Crete: Svourichti above Katsiveli, 2,200 m., rocky slopes, perennial, 4 Aug. 1950, Davis 18140.

ECHINOPS VISCOSUS DC., Prodr. vi, 525 (1837), subsp. VISCOSUS.—Syn. *E. viscosus* DC. subsp. *creticus* (Boiss.) Rech. fil. et subsp. *glandulosus* (Weiss.) Rech. fil. et subsp. *eu-viscosus* Rech. fil. Fl. Aeg. 641 (1943).

Karpathos: between Olymbos and Diaphani, 25 July 1950, Davis 18056 (a dwarfed form).

E. viscosus was originally described by De Candolle from Sicily and from the Aegean islands of Cos, Tenedos and Samos. K. H. Rechinger (Fl. Aeg. 641) has taken the Sicilian plant as the lectotype. I have not seen Gussone's Sicilian specimen, but at Kew there are specimens from Milazzo in Sicily which appears to be the *locus classicus*. Of this Sicilian material the inner phyllaries are united in Borzi's gathering (as described for the species by De Candolle) but free in Todaro's specimen. However, the latter is in flower, whereas Borzi's specimen is only in bud. There is no doubt that the phyllaries generally are free in this polymorphic species. Although union or freedom of the innermost phyllaries is made the basis of Sect. *Ritrodes* Bunge emend. Boiss. and Sect. *Ritro* Endl., the distinction is an artificial one, for it seems that the species constituting Sect. *Ritrodes* (with phyllaries united) have arisen from different stocks in Sect. *Ritro* (with phyllaries free). The phyllaries may be free or united in a single species, as is not uncommonly the case in *E. Ritro* L., especially in Turkey where forms of this species with united phyllaries are frequent.

I am unable to follow K. H. Rechinger's subspecific classification of *E. viscosus* in the Aegean. He considers *E. viscosus* L. subsp. *creticus* (Boiss.) Rech. fil. to be very close to (and possibly not distinct from) subsp. *bithynicus*; but an isotype of subsp. *creticus*, collected by Heldreich near Kissamos in Crete, is in the Kew Herbarium and is almost identical with the Sicilian plant (subsp. *viscosus*). Nor do I consider that subsp. *glandulosus* (Weiss.) Rech. fil. should be separated from the latter. Indeed, in the Aegean I can

only recognise subsp. *viscosus* and subsp. *bithynicus* (Boiss.) Rech. fil.; the latter includes those Aegean gatherings annotated by K. H. Rechinger under subsp. *creticus*, the type of which he fails to cite.

In Cyprus there appears to be only one Echinops; it has often been erroneously referred to *E. spinosissimus* Turra (*E. spinosus* L.). Although it approaches that Egyptian species in leaf-shape, the habit of the Cyprus plant is essentially that of *E. viscosus*. It is either a new subspecies of the latter or a closely related new species. In the Lebanon and Palestine *E. viscosus* is exceptionally variable, suggesting that hybridisation has occurred in that area. Some forms are difficult to separate from *E. horridus* Desf.

The genus wants careful collecting, with notes on flower-colour and habit (especially the number of flowering stems), these being characters which cannot be seen from the dried specimen. The basal leaves should not be forgotten. Nothing is known of the reproductive system of the genus, but signs of hybridisation should be looked for in the field.

* **Helichrysum Heywoodianum** P. H. Davis, **sp. nov.** (Sect. *Staechadina* DC. ** *imbricata* Boiss.).

Affinis *H. armenio* DC. praesertim var. *glandulifero* (Schultz Bip.) Bornm., sed habitu vix suffruticoso, basi valde compacto e caudicibus crassis nigris composito, turionibus sessilibus, foliis basalibus manifeste trinerviis basi latius ampliatis purpureis, phyllis involucri ad basin dorso semper manifeste tomentosis supra obtusissimis vix inflatis inter alia removitur.

Planta basi caespitosa e caudicibus brevibus crassis lignosis nigris dense composita. *Radix* tortuosa, crassa, cortice fibroso. *Caules* floriferi virgati, 20–40 cm. alti, 1–1·5 mm. lati, araneosi sed glandulis sessilibus praediti, ex toto dense foliati. *Turiones* steriles in caudicibus sessiles. *Folia basalia* linearia sed prope apicem latiora, inferne distincte trinervia, subacuta, 4–7 cm. longa, 3–5 mm. lata, virescentia, glandulis sessilibus aureis dense praedita, sparsim araneosa (pilis deinde deciduis), basi in vaginam late ovatam purpuream persistentem ampliata, bulbum formantia. *Folia caulina* valde numerosa, erecta, internodiis longiora, linearia, acuta, sessilia, 1–3 cm. longa, 1–3 mm. lata, infima trinervia, cetera uninervia, glandulis sessilibus praedita, subaraneosa. *Corymbus* terminalis, e capitulis 10–20 ± dense compositus, pedunculis 5–10 (–15) mm. longis simplicibus vel divisis dense araneosis foliis bracteiformibus lineari-subulatis 2–3 mm. longis praeditis. *Involucrum* turbinato-conicum, 6–7 mm. longum, in sicco 8–9 mm. latum, pallide stramineum vel nonnumquam citrinum; phylla circ. 50, ab infimis brevissimis ad intima 3–4-plo longiora regulariter imbricata; phylla basalia dimidio inferiore viridi oblongo-tomentoso, dimidio superiore membranaceo glabro sublongiore; phylla mediana parte inferiore oblonga pallide viridia, extra tomentosula in partem alteram membranaceam ± aequilongam glabram stramineam obovatam obtusissimam subplanam saepe breviter atque irregulariter fimbriata; phylla intima simillima, sed pars membranacea inferiore 2–3-plo brevior. *Flores* aurei. *Corolla* anguste tubulosa, 4·5 mm. longa, in lobos 0·25 mm. longos triangulari-ovatos regulariter fissa. *Antherae* 2 mm. longae. *Ovarium* 1 mm. longum. *Achenia* 1–1·25 mm. longa, oblonga, teretia, truncata, brunnea, glabra sed sub lente papillis obovoideis unicellularibus

scabridula. *Pappus* albus, 4 mm. longus, persistens, e pilis simplicibus (sub lente brevissime barbulatis) compositus. Floret Aug.

Mykali: Samsun Dağ above Priene, 800–900 m., on sloping limestone rocks with *Inula heterolepis* Boiss., or among rocks in Pinetum Brutiae. Base very woody, stems erect, leaves green and viscid, involucral phyllaries pale straw yellow, flowers yellow, 20 Aug. 1950, Davis 18359 and Heywood (*holo. K.; iso. E.*).

This very distinct new species, the third endemic known for Mykali, appears to be most closely related to *H. armenium* DC. from Armenia, Kurdistan and Persia. As *H. Heywoodianum* belongs to the Mediterranean element (*Pinus Brutia* being the dominant tree on Mykali), its relationship to this distant Irano-Turanian species is remarkable.

In addition to the *differentiae* cited, the new species generally differs from *H. armenium* DC. in having involucral phyllaries that are thinner and have slightly lacerated margins; the basal leaves are also longer and more slender, and the capitulum is more broadly conical. In habit *H. Heywoodianum* resembles *H. Aucheri* Boiss. from Eastern Turkey, but differs from the latter primarily in its more slender stems, more sparse partly glandular indumentum, linear acute green leaves, purple leaf-bases, fewer-headed corymbs, smaller turbinate-conical capitula, and thinner straw-coloured involucral phyllaries. Somewhat less closely related to the new species (which I have named after my friend and fellow-collector Mr. V. H. Heywood) is *H. arenarium* (L.) DC., a Eurasian species of sand-dunes and sandy soils. The latter is not found in the Mediterranean region. Its extension into Europe, from the dry regions of Western Asia, has probably been made possible by its arenicolous habit.

HELICHRYSUM ITALICUM (Roth) Don var. MICROPHYLLUM (Willd.) Boiss. Fl. Or. iii, 234 (1875).

W. Crete: Above Theriso, 1,400 m., 3 Aug. 1950, Davis 18149.

HELICHRYSUM ORIENTALE (L.) DC., Prodr. vi, 183 (1837), var. ORIENTALE.

Karpathos: Vurgunda, near cliff called Akrotirias, 24 July 1950, Davis 18039. The typical form is new for Karpathos.

var. PICHLERI (Barbey) Hayek, Prodr. Balc. ii, 598 (1931).

Karpathos: Kalilimni, 1,100 m., N. cliff, 27 July 1950, Davis 18007.

HYPOCHAERIS TENUIFLORA (Boiss.) Boiss., Fl. Or. iii, 785 (1875).

W. Crete: Svourichti above Katsiveli, 2,300 m., summit screes, perennial, ligules yellow, 4 Aug. 1950, Davis 18125.

INULA HETEROLEPIS Boiss., Diagn. Ser. 2 (3), 12 (1856).

Karpathos: Kalilimni, 1,000 m., sunny rocks, 27 July 1950, Davis 18003; Vurgunda, near cliff called Akrotirias, rocks, 24 July 1950, Davis 18040. *Mykali:* Samsun Dağ at and above Priene, 100–900 m., on sloping rocks and on walls of temples, 20 Aug. 1950, Davis 18343 and Heywood.

LACTUCA ALPESTRIS (Gand.) Rech. fil., Neue Beitr. Fl. Kreta, 160 (1943).

W. Crete: Svourichti above Katsiveli, 2,100 m., ligules 5 lemon yellow, 4 Aug. 1950, Davis 18121.

LACTUCA AMORGINA Boiss. et Orph. apud Hal. in Verh. Zool.-Bot. Ges. Wien, xlix, 188 (1899).

Karpathos: Vurgunda, in vertical sea rocks, 24 July 1950, Davis 18027 (*alabastro*).

New for the Dodecanese. This species has previously been recorded from the Cyclades, Crete and Hydra; on Rhodes it is replaced by the very closely related *L. eburnea* Rech. fil.

ONOPORDON BRACTEATUM Boiss. et Heldr. in Boiss. Diagn. Ser. 1 (10), 91 (1849).

Karpathos: Lastos, 700 m., rocky level places, biennial?, fl. purple, 20 July 1950, Davis 18018. I have not seen the type.

OTANTHUS MARITIMUS (L.) Hoffmgg. et Link, Fl. Port, ii, 364 (1809).—Syn. *Diotis maritima* (L.) Smith, Engl. Fl. iii, 403 (1825).

Kasos: islet of Makra, on sandy shore, 29 July 1950, Davis 18105.

A new record for Kasos.

PULICARIA ULIGINOSA Stev. in DC., Prodr. v, 478 (1836).

Mykali: Samsun Dağ above Priene, 400 m., at springs, 20 Aug. 1950, Davis 18348 and Heywood.

New for Mykali.

SENECIO GNAPHALODES Sieber, Reise Kreta, i, 352 (1823).

Karpathos: Avlona, among rocks and on loose walls of terraces and rubble, 24 July 1950, Davis 18032 (collected to show range of leaf variation); Prof. Elias above Menetes, screes and walls, 26 July 1950, Davis 18102.

The variant with shortly lobed leaves (var. *apricus* Dörfler) is not worth nomenclatural recognition. Every degree of lobing is found in natural populations, both on Crete and Karpathos, though the entire-leaved form (the type of the species) predominates on both islands. There may be as many as nine lobes on each side of the leaf (as represented in Davis 18032), but such extreme forms are rare.

SENECIO FRUTICULOSUS Sibth. et Smith, Prodr. ii, 178 (1813).

W. Crete: Svourichti above Katsiveli, 2,200–2,300 m., 4 Aug. 1950, Davis 18137.

STAEHELINA FRUTICOSA (L.) L., Syst. Nat. ed. 12, ii, 538 (1767).

Karpathos: Kalilimni, 1,000 m., N. cliff, 21 July 1950, Davis 18012; Phiniki, 10 m., vertical west cliff, bushes 1 m. across, 27 July 1950, Davis 18090 (*forma foliis carnosulis prope mare crescens*).

CAMPANULACEAE

SYMPHYANDRA CRETICA DC., Monogr. Camp. 366 (1830).

W. Crete: Meskla, in a ravine leading towards Theriso ¼ hour on foot from Meskla, rare on shady rocks, fl. lilac-blue, Davis 18142.

This beautiful species, endemic to West Crete, has not previously been recorded from the north side of the White Mountains.

Hayek (Prodr. Balc. ii, 549) treated *S. cretica* as consisting of three allopatric subspecies: *eucretica* Hayek, *sporadum* (Hal.) Hayek and *samothracicum* (Deg.) Hayek, from Crete, Jura and Samothrace respectively. However, the morphological differences between these three Aegean taxa seem sufficiently well marked to justify their being given specific rank. Of the three, the Cretan plant is the most distinct, differing from the other two (in addition to the characters given by Hayek) in having the lower part of the petiole ciliate instead of glabrous.

It is curious that the Korean *S. asiatica* Nakai is more nearly related to *S. cretica* than to any other species of *Symphyandra*. It seems probable, however, that the genus has, like *Asyneuma* Gris. & Schenk, evolved from more than one section of *Campanula* L.

ERICACEAE

ARBUTUS UNEDO L., Sp. Pl., 395 (1753).

Karpathos: above Spoa, facing W., 500 m., in Pinetum Brutiae, 23 July 1950, Davis 18079.

ERICA VERTICILLATA Forsk., Fl. Aegypt. Arab. 210 (1775).

Karpathos: between Marmakoui and Holethria, on W. side of Kalilimni, 700 m., slopes in open Pinetum Brutiae, 22 July 1950, Davis 18084.

PLUMBAGINACEAE

LIMONIUM FREDERICI (Barbey) Rech. fil. Fl. Aeg. 427 (1943).

Saria: place called Spatharea, on calcareous sea rocks, 25 July 1950, Davis 18073 (forma depauperata). *Karpathos:* Vurgunda, near cliff called Akrotirias, 30 m., sloping cliffs, leaves glaucous, fl. lilac, 24 July 1950, Davis 18049.

LIMONIUM HYSSOPIFOLIUM (Girard) Rech. fil. Fl. Aeg. 427 (1943).

Karpathos: Phiniki, on sea rocks, damp sand and shingle, 27 July 1950, Davis 18092. *Kasos:* islet of Makra, fl. lavender, 29 July 1950, Davis 18106.

The species is new for Kasos. In the Kew herbarium there is a specimen of *L. hyssopifolium* from my Karpathos locality (Rech. fil. 8298), cited in Flora Aegaea as *L. Sieberi* O. Kuntze. *L. hyssopifolium* seems ill-defined from *L. graeca* Poiret; my Karpathos gathering shows a wide range of tubercle-development, varying from tubercles weakly developed to very prominent.

Pichler 565, cited as *L. Sieberi* in Flora Aegaea, matches the type of *L. pigadiense* Rech. fil. from the same locality (Karpathos: Pigadia).

BORAGINACEAE

ANCHUSA CAESPITOSA Lam., Encycl. i, 498 (1783).

W. Crete: Katsiveli, 1850 m., 4 Aug. 1950, Davis 18159.

It is very difficult to collect seeds of this species as they are carried off (by ants?) just before ripening.

ECHIUM DIFFUSUM Sibth. et Smith var. HALACSYI (Holmboe) Hayek, Prodr. Balc. ii, 94 (1928).

Karpathos: Prof. Elias near Menetes, 26 July 1950, Davis 18099.

CONVOLVULACEAE

CUSCUTA EPITHYMUM L. var. MICRANTHA Boiss., Fl. Or. iv, 116 (1875).

Karpathos: between Voladha and Lastos, 600 m., on *Ononis spinosa*, 20 July 1950, Davis 18015. *W. Crete:* Svourichti above Katsiveli, 2,100 m., on *Verbascum spinosum*, 4 Aug. 1950, Davis 18132.

The species has not previously been recorded for Karpathos.

SCROPHULARIACEAE

DIGITALIS FERRUGINEA L., Sp. Pl. 368 (1753).

Mykali: Samsun Dağ above Priene, 900–1,000 m., Aug. 1950, Davis 18364 and Heywood.

In the Aegean only recorded hitherto from Euboea.

LINARIA MICROCALYX Boiss., Diagn. Ser. 1 (4), 72 (1844).

Karpathos: Vurgunda, gravel beach, leaves fleshy and pilose, 24 July 1950, Davis 18044.

ODONTITES LINKII Heldr. et Sart. in Boiss., Diagn. Ser. 2 (3), 177 (1856).—Syn. *Euphrasia frutescens* Sieber, Avis, 4 (1821), *nomen*; *E. fruticosa* Sieber, Avis, 5 (1821), *nomen*; *Odontites cretica* Boiss., Fl. Or. iv, 477 (1879); *O. frutescens* [Sieber ex] Hal., Consp. Fl. Gr. ii, 438 (1902).

Karpathos: Prof. Elias near Olymbos, N. limestone cliff, leaves bright green, 23 July 1950, Davis 18069; Vurgunda, near cliff called Akrotirias, 24 July 1950, Davis 18038. *Euboea*; gorge of R. Kersus, 100 m., Sept. 1932, S. C. Atchley 1519.

New for Karpathos and Euboea.

Now that more material is available of *O. Linkii* Heldr. et Sart. (hitherto only recorded from the Greek mainland), I find myself unable to separate it from the endemic Cretan *O. cretica* Boiss. (Omalo, leg. Sieber!) which is the only member of the genus recorded by Rechinger from the Aegean. All the characters used by Boissier to distinguish these two plants break down. Although my Karpathos specimens only bear the previous year's capsules, I think they can safely be equated with *O. Linkii*. Specimens of the latter from the *locus classicus* (Parnassus, where R. Barneby and I collected it near Delphi in 1938) have anthers varying from glabrous to lanate.

VERBASCUM MACRURUM Ten., Fl. Nap. Prodr. App. 5, p. 9 (1826).

W. Crete: above Theriso, open hillsides, biennial, fl. large, 3 Aug. 1950, Davis 18156.—Det. Dr. A. Huber-Morath.

VERBASCUM SPINOSUM L., Cent. Pl. ii, 10 (1756).

W. Crete: above Theriso, 1,600 m., 3 Aug. 1950, Davis 18145.—Det. Huber-Morath.

LABIATAE

BALLOTA PSEUODICTAMNUS (L.) Benth., Lab. Gen. et Sp. 594 (1834).

W. Crete: above Theriso, 700 m., 3 Aug. 1950, Davis 18144.

CALAMINTHA CRETICA (L.) Benth. in DC., Prodr. xii, 227 (1848).

W. Crete: Meskla, limestone rocks in gorge, 5 Aug. 1950, Davis 18153.

CALAMINTHA INCANA (Sibth. et Smith) Boiss. ex Benth. in DC., Prodr. xii, 226 (1848), var. INCANA.

Karpathos: Olymbos, through *Poterium spinosum*, on schist, 25 July 1950, Davis 18054; Spoa, 23 July 1950, Davis 18080. *Mykali:* Samsun Dağ above Priene, 400 m., 20 Aug. 1950, Davis 18346 and Heywood.

The species is new for Karpathos and Mykali.

CALAMINTHA NEPETA (L.) Savi var. SPRUNERI (Boiss.) Hayek, Prodr. Balc. ii, 326 (1929).

W. Crete: Meskla, in ditches, erect, fl. lilac, 5 Aug. 1950, Davis 18155.

CORIDOTHYMUS CAPITATUS (L.) Reichb. fil. in Öst. Bot. Wochenbl. vii, 161 (1857), var. CAPITATUS.

Karpathos: Avlona, 24 July 1950, Davis 18035.

MELISSA OFFICINALIS L., Sp. Pl. 592 (1753).

W. Crete: Meskla, in ditches, 5 Aug. 1950, Davis 18154.

The form is the one generally recognised as var. *villosa* Benth. It is much commoner in the Eastern Mediterranean than in the West, but is linked to the typical form by numerous intermediates.

MENTHA LONGIFOLIA (L.) Huds. Fl. Angl. ed. 1, 221 (1762), *sensu lato* (excl. *M. microphylla* C. Koch).

Mykali: Samsun Dağ above Priene, by spring with *M. rotundifolia*, 20 Aug. 1950, Davis 18366 and Heywood.

New for Mykali.

MENTHA ROTUNDIFOLIA (L.) Huds., Fl. Angl. ed. 1, 221 (1762).

Mykali: Samsun Dağ above Priene, 400 m., fl. white, 20 Aug. 1950, Davis 18347.

The species has hitherto been recorded from the Aegean only from Poros, Rhodes, Crete and Cos.

MICROMERIA JULIANA (L.) Benth., Lab. Gen. et Sp., 373 (1834) var. JULIANA

Mykali: Samsun Dağ above Priene, 900 m., 20 Aug. 1950, Davis 18363 and Heywood; *ibid.*, 400 m., No. 18356.

Nepeta sphaciotica P. H. Davis, **sp. nov.** (Sect. *Eunepeta* Boiss., Subsect. *Stenostegiae* Boiss.).

Valde affinis *N. parnassicae* Heldr. et Sart. et *N. pilinuci* P. H. Davis; a priori foliis latioribus grossius crenatis, spicis abbreviatis recedit; ab altera verticillastris superioribus coarctatis, nuculis ad apicem haud pilosis inter alia recedit.

Planta perennis, basi lignosa tortuosa. *Caules* erecti, 12–18 cm. alti, 1–1·5 mm. lati, glandulis sessilibus et pilis eglandulosis breviter viscidulo-tomentosi. *Folia* petiolata; lamina oblongo-ovata, obtusa, basi abrupte truncata vel etiam subcordata, rugulosa, 12–15 mm. longa, 8–10 mm. lata, utrinque regulariter 8–10-crenata, virescens, petiolo 2–10-plo longior, glandulis sessilibus et pilis eglandulosis brevissime tomentosula. *Verticillastra* 4–9-nata, 6–12-flora, infima saepe distantia breviter pedunculata, cetera subsessilia in spicam densam, 2·5–5·0 cm. longam et 1·2–1·4 cm. latam (corollis exclusis) condensata. *Bracteae* anguste oblongo-lanceolatae, tomentosulae, acutissimae, trinerviae, anguste membranaceo-marginatae, tubum calycis aequantes. *Calyx* 7 mm. longus, tubulosus, manifeste nervosus, tomentosus, glandulis sessilibus praeditus, fauce subobliquus, ad $\frac{1}{3}$ vel paulo ultra in dentes lanceolatos acuminatos membranaceo-marginatos ciliatos subaequaliter fissus. *Corolla* 12 mm. longa, alba, tubo exserto; labium superius 2 mm. longum retusum; labium inferius trilobatum, lobo mediano 3 mm. longo profunde dentato immaculato, lobis lateralibus late rotundatis 1·5 mm. longis 2 mm. latis. *Nuculae* late oblongae, 2–2·25 mm. longae, 1·25 mm. latae, obtusissimae, glabrae, granulato-papillosae.

W. CRETE: Levka Ori on Mt. Svourichti (above the shepherd encampment 'Katsiveli' near Pachnes), on N. side of summit, 2,300 m., rare, fl. white immaculate, 8 Aug. 1950, Davis 18116 (*holo. K.; iso. E.*).

With the exception of the very different *N. melissifolia* Lam., no species of *Nepeta* in Subsect. *Stenostegiae* has previously been found in Crete. *N. sphaciotica* P. H. Davis is a very rare plant: only about six clumps were found, among limestone rocks just below the summit of Svourichti. A shepherd told me that he had not seen the plant on any of the surrounding peaks. In its viscid glandular indumentum it resembles *N. parnassica* Heldr. et Sart. (endemic to Mt. Parnassus) and *N. pilinux* P. H. Davis from the Isaurian and Pisidian Taurus of Southern Anatolia. Apart from its dwarf stature (which may be a modification, as similar forms occur in *N. pilinux* in exposed habitats), it differs from *N. parnassica* in its abbreviated spike, and in the form of its apparently greener leaves: the lamina is broader and has fewer, more coarse crenations. From *N. pilinux* (now known from six Anatolian

gatherings), which it resembles in leaf, it differs in its conferted spike and glabrous nutlets; in addition, it usually differs from *N. pilinux* in its larger flowers, longer bracts and more exserted calyx-tube. The length of the calyx-teeth, relative to the calyx-tube, is much more variable in this group of species than the descriptions of Boissier and Hayek suggest. Although *N. sphaciotica* might be treated as a subspecies of either of its two allies, it seems preferable to give it specific rank; it would be difficult to assign it to one species rather than the other, and to reduce *N. pilinux* and *N. sphaciotica* to subspecies of *N. parnassica* would be to throw out of balance the circumscription of allied species of *Nepeta* now generally recognised in the Balkans. In this genus facies, though difficult to define, is particularly important in the delimitation of species. There can be few genera in the Eastern Mediterranean more in need of revision than *Nepeta*.

To *N. camphorata* Boiss. et Heldr. and *N. Heldreichii* Hal. from Taygetos, geographically the nearest allies of *N. sphaciotica*, the new species appears to be less closely related.

ORIGANUM HERACLEOTICUM L., Sp. Pl. 589 (1753), var. HERACLEOTICUM.

Mykali: Samsun Dağ above Priene, 400–500 m., 20 Aug. 1950, Davis 18349 and Heywood.

The species is new for Mykali.

var. TRICHOCALYCINUM (Hausskn.) Hal., Consp. Fl. Gr. ii, 555 (1902).

W. Crete: Theriso, fl. white, 3 Aug. 1950, Davis 18143.

ORIGANUM MARU (L.) Hayek, Prodr. Balc. ii, 336 (1929).

W. Crete: above Theriso, 400 m., fl. purplish pink, 5 Aug. 1950, Davis 18165.

Origanum x minoanum P. H. Davis, **nom. nov.**—Syn. *Majorana leptoclados* Rech. fil., Neue Beitr. Fl. Kreta, 125 (1943), non *Origanum leptocladum* Boiss., Fl. Or. iv, 548 (1879).

W. Crete: above Theriso, 1,500 m., only one plant seen, growing with *O. heracleoticum*, fl. lilac pink, 3 Aug. 1950, Davis 18149.

I am still of the opinion that this plant is a hybrid between *O. heracleoticum* and *O. Maru*, which were growing nearby.

ORIGANUM ONITES L., Sp. Pl. 590 (1753).

Karpathos: near Holethria (E. of Kalilimni), grazed, 22 July 1950, Davis 18085.

ORIGANUM SIPYLEUM L., Sp. Pl. 589 (1753).

Mykali: Samsun Dağ above Priene, rocky slopes in open Pinetum Brutiae, Aug. 1950, Davis 18360 and Heywood.

ORIGANUM VETTERI Briq. et Barb. in Stef., Fors.-Maj., Barb., Karpathos, 124 (1895).

Karpathos: Kalilimni, N.W. side, 1,100–1,200 m., among rocks at foot of cliff, growing with mosses, decumbent, fl. pink, 21 July 1950, Davis 18005.

The stamens were observed in the field to stick straight out of the corolla instead of ascending under the upper lip. *O. Vetteri* therefore breaks down the main distinguishing character between *Origanum* L. *s. str.* and *Amaracus* Gled. stressed by Briquet (in Engler & Prantl, Pflanzenf. iv (3a), 304–309: 1897), and helps to justify the inclusion of *Amaracus* Gled. and *Majorana* Moench in *Origanum* L.

In cultivation I have found spontaneous hybrids between *O. Dictamnus* L. and *O. Tournefortii* Sibth.—the first cross known between species in Sect.

Amaracus, which in nature are never able to hybridise owing to their allopatric distribution. The generic limits of *Origanum* were recently discussed by the writer (in Kew Bull. 1949, 404).

PHLOMIS FLOCCOSA D. Don in Bot. Reg. xv, t. 1300 (1829).

Karpathos: Voladha, 400 m., 20 July 1950, Davis 18013.

PHLOMIS PICHLERI Vierh. in Öst. Bot. Zeitschr. lxv, 232 (1915).

Karpathos: Voladha, 600 m., 20 July 1950, Davis 18014; Diaphani, near sea level, edge of dry stream bed, 25 July 1950, Davis 18074; Kalilimni above Lastos, 800 m., 21 July 1950, Davis 18001.

On Karpathos this endemic species ascends to higher altitudes than *P. floccosa* D. Don, which is a common plant of the Mariut (Egypt).

SATUREIA BIROI Javorka in Mag. Bot. Lap. xxi, 25 (1922).

Karpathos: above Spoa, facing West, in open Pinetum Brutiae, 23 July 1950, Davis 18077.

SATUREIA SPINOSA L., Sp. Pl. ed. 2, 795 (1763).

W. Crete: Svourichti above Katsiveli, 2,200 m., 4 Aug. 1950, Davis 18136; above Theriso, 1,500 m., fl. white or very pale lilac, 3 Aug. 1950, Davis 18146.

SCUTELLARIA HIRTA Sibth. et Smith, Prodr. i, 425 (1806).

W. Crete: Svourichti above Katsiveli, fl. pale yellow, 4 Aug. 1950, Davis 18129.

SIDERITIS SIPYLEA Boiss., Diagn. Ser. 1 (5), 32 (1844).

Mykali: Samsun Dağ above Priene, 800–1,000 m., among rocks in open Pinetum Brutiae, fl. dirty lemon yellow with 2 thin brown lines on upper lip, 20 Aug. 1950, Davis 18361 and Heywood.

SIDERITIS SYRIACA L., Sp. Pl. 574 (1753).

W. Crete: Katsiveli, stems usually simple, but branched forms not uncommon, 3 Aug. 1950, Davis 18147.

STACHYS MUCRONATA Sieber ex Sprengel, Syst. Veg. ii, 733 (1825).

Karpathos: Kalilimni, 1,000 m., fl. white, 21 July 1950, Davis 18004.

STACHYS SPINOSA L., Sp. Pl. 581 (1753).

Karpathos: Prof. Elias above Menetes, rocky slopes, 26 July 1950, Davis 18097.

TEUCRIUM ALPESTRE Sibth. et Smith, Prodr. i, 395 (1806), var. ALPESTRE.

W. Crete: between Katsiveli and Theriso, above the place called Kapsika, 1,700 m., fl. creamy yellow, 5 Aug. 1950, Davis 18163.

var. MAIUS Boiss., Fl. Or. iv, 819 (1879).

Karpathos: Prof. Elias above Menetes, fl. creamy, 26 July 1950, 18098; Olymbos, schistose hillsides, 25 July 1950, Davis 18052.

In E. Crete this variety is linked to the typical White Mountain form of the species (var. *alpestre*) by intermediate forms.

TEUCRIUM BREVIFOLIUM Schreb., Pl. Vert. Unilab. 27 (1774).

Karpathos: Phiniki, rocky slopes near the sea, 27 July 1950, Davis 18094.

TEUCRIUM DIVARICATUM Sieber ex Boiss., Fl. Or. iv, 816 (1879), subsp. VILLOSUM (Čel.) Rech. fil., Fl. Aeg. 497 (1943).

Karpathos: Olymbos, fl. purple, 25 July 1950, Davis 18053; Prof. Elias above Menetes, 26 July 1950, Davis 18101.

Teucrium Montbretii Benth. subsp. **heliotropifolium** (Barbey) P. H. Davis **comb. et stat. nov.**—Syn. *T. heliotropifolium* Barbey in Bull. Soc. Vaud. Sc. Nat. xxi, 97 (1875).

VAR. HELIOTROPIFOLIUM.

Karpathos: Phiniki, 10–30 m., vertical and overhanging W. cliff, 27 July 1950, Davis 18087. *Syntypi:* Prof. Elias pr. Elympo [Olymbos], Pichler 497, vix florentem detexit; dein ad rupes Kilimni [Kalilimni] tantum cum foliis iterum invenit.

* **var. crenatum** P. H. Davis, **var. nov.**

Folia utrinque manifeste 3–5-crenata (haud integra), crenis obtusis.

Karpathos: Vurgunda, on cliff near the place called Akrotirias, vertical and overhanging cliffs facing N. and in caverns, 50 m., fl. whitish but for pale purplish posterior dorsal lobes, nervature of leaves very pronounced, 24 July 1950, Davis 18050 (*holo. K.*). *Saria*, 18 July 1886, Barbey 486.

The new variety, on account of its crenate leaves, links typical *T. heliotropifolium* (with entire leaves) to *T. Montbretii* subsp. *pamphylicum* Davis, and, if the latter is to be retained within *T. Montbretii* (cf. Davis in Kew Bull. 1951, 116), makes it unnatural not to include *T. heliotropifolium* in the same species. Taking this view, *T. Montbretii* subsp. *heliotropifolium* var. *crenatum* differs from subsp. *pamphylicum* in its fewer leaf crenations, more prominent venation, generally more rounded leaf-base (instead of abruptly truncate or subcordate), and generally shorter indumentum. On Karpathos var. *crenatum* is known only from the north end of the island and adjacent Saria. The crenation was a constant feature in the population I collected. An occasional leaf-crenation occurs in var. *heliotropifolium*, noticeably at Phiniki in the S.W. part of Karpathos.

TEUCRIUM POLIUM L. var. DUMULOSUM (Rech. fil.) Rech. fil. Fl. Aeg. 500 (1943).

Kasos: islet of Makra, 29 July 1950, Davis 18110.

The species is new for Kasos.

TEUCRIUM SCORDIOIDES Schreb., Pl. Vert. Unilab. 37 (1774).

Mykali: Samsun Dağ above Priene, 400 m., 20 Aug. 1950, Davis 18345 and Heywood.

New for Mykali.

CHENOPODIACEAE

ARTHROCNEMON GLAUCUM (Del.) Ung.-Sternb. in Atti Congr. Bot. Firenze, 1874, 283 (1876).

Karpathos: Vurgunda, sea rocks, 5 m., 24 July 1950, Davis 18022.

New for Karpathos.

SALSOLA AEGAEA Rech. fil., Beitr. Fl. Kreta, 67 (1943).

Kasos: islet of Makra, 29 July 1950, Davis 18104.

New for Kasos.

* **Salsola carpatha** P. H. Davis, **sp. nov.** (Sect. *Pseudonoea* Ulbrich).

Affinis *S. canescenti* (Moq.) Boiss., sed foliis latioribus oblongo-linearibus, floribus minus remotis sed magis patentibus bracteolas aequantibus, bracteis brevioribus haud caudatis, bracteolis diversis recedit.

Suffrutex 30–40 cm. altus, e rupibus calcareis maritimis dependens, basi stricte divaricato-ramosus. *Rami* alterni, arcuati, graciles, vetusti grisei cortice longitudinaliter fisso, floriferi sordide eburnei 1 mm. lati, pilis brevibus eglandulosis subappressis (deinde deciduis) canescentes. *Folia* alterna, oblongo-linearia, 5–13 mm. longa, 1·5–3·0 mm. lata, sessilia, acuta, subplana vel obsolete triquetra, canescentia, internodiis sub-breviora. *Spica* interrupta 3–10 cm. longa, e floribus 5–10 mm. (infimis ad 15 mm.) distantibus composita.

Bracteae anguste oblongo-ellipticae, acutae, 4–8 mm. longae, canescentes, infra medium contractae sed ubique in marginem membranaceam ciliatam sensim dilatatae. *Bracteolae* bracteis similes, sed aliquantum breviores. *Flores* 12–20, singuli in axillis bractearum sessiles, late divaricati, bracteis breviores vel nunc aequantes, bracteolis aequilongi. *Perigonii phylla* 5, libera, ovato-lanceolata, subacuta, 3·5–4 mm. longa, extra appresse canescentia, 2 externa, 3 interna, ad ¼ supra basin alis immaturis praedita. *Filamenta* 3·5 mm. longa, linearia. *Antherae* 3 mm. longae appendice lanceolato fere 1·5 mm. longo praeditae. *Ovarium* late ovoideum, 1 mm. longum. *Stylus* 2 mm. longus, ad medium bifidus. *Embryo* horizontalis. *Fructus* ignotus. Floret Jul.

Karpathos: Vurgunda (N.W. of Olymbos) at 5–20 m. alt., on calcareous sea rocks with *Galium canum*, 24 July 1950, P. H. Davis 18025 (*holo. K.; iso. E.*).

As with *Helichrysum Heywoodianum* P. H. Davis described in this paper, *Salsola carpatha* P. H. Davis is most closely related, not to any Aegean species, but to one further East and of a very different habitat and climate: *S. canescens* (Moq.) Boiss., a plant of high arid mountains in Kurdistan, N.W. and S.W. Persia and (according to Boissier) the Lebanon.

S. carpatha differs from *S. canescens* in its shorter bracts and bracteoles that are ciliate and differently shaped, the bracteole being more gradually enlarged by its membranous margin; it is further distinguished by its broader leaves, and less remote and more spreading flowers. Hitherto only *S. Kali* L. and *S. aegaea* Rech. fil. have been recorded from Karpathos, neither of which is nearly related to the new species.

It may be pointed out that Ulbrich, in his treatment of the genus *Salsola* L. (in Engler & Prantl, Pflanzenf. ed. 2, 16c, 566: 1934), describes the species of Sect. *Pseudonoea* Ulbrich (to which *S. carpatha* belongs) as having *opposite* leaves; it is obvious that *alternate* was meant.

SUAEDA FRUTICOSA (L.) Forsk., Fl. Aegypt. Arab. 70 (1775).

Kasos: islet of Makra, 29 July 1950, Davis 18111.

In the Aegean the species has only been recorded from Crete. My specimens are in leaf, so that the determination is tentative.

POLYGONACEAE

POLYGONUM AVICULARE L., Sp. Pl. 362 (1753), subsp. AVICULARE.

W. Crete: Katsiveli, 1850 m., weed in potato patch, 4 Aug. 1950, Davis 18161.

POLYGONUM MARITIMUM L., Sp. Pl. 361 (1753).

Karpathos: Phiniki, sea level, 27 July 1950, Davis 18096.

LAURACEAE

LAURUS NOBILIS L., Sp. Pl. 369 (1753).

Mykali: Samsun Dağ above Priene, 400 m., 20 Aug. 1950, Davis and Heywood.

Not previously recorded from Mykali.

THYMELAEACEAE

THYMELEA HIRSUTA (L.) Endl., Gen. Pl. Suppl. iv. (2), 65 (1847).

Kasos: islet of Makra, 29 July 1950, Davis 18108.

New for Kasos.

EUPHORBIACEAE

EUPHORBIA PARALIAS L., Sp. Pl. 458 (1753).

Karpathos: Vurgunda, gravel beach, 24 July 1950, Davis 18045.

New for the island.

EUPHORBIA PEPLIS L., Sp. Pl. 455 (1753).

Karpathos: Vurgunda, gravel beach, 24 July 1950, Davis 18043.

New for Karpathos.

SANTALACEAE

OSYRIS ALBA L., Sp. Pl. 1022 (1753).

Mykali: Samsun Dağ at Priene, 100 m., 20 Aug. 1950, Davis 18344 and Heywood.

ORCHIDACEAE

HIMANTOGLOSSUM HIRCINUM (L.) Spreng. subsp. CALCARATUM (Beck) Soó in Fedde, Repert. xxiv, 33 (1927).

E. Crete: Mt. Dikte, 1,300 m., fl. purplish maroon with a white throat, 1 June 1937, Davis 25.—Det. Mr. V. S. Summerhayes.

In the Aegean area the species has only been recorded from Euboea.

LILIACEAE

ASPARAGUS APHYLLUS L., Sp. Pl. 314 (1753).

W. Crete: above Theriso, 1,400 m., 5 Aug. 1950, Davis 18166. *Karpathos:* Lastos, 700 m., 22 July 1950, Davis 18068.

New for Karpathos.

ASPARAGUS STIPULARIS Forsk., Fl. Aegypt. Arab. 72 (1775) var. STIPULARIS

Kasos: islet of Makra, sea shore, 29 July 1950, Davis 18113.

New for the Dodecanese.

SCILLA AUTUMNALIS L., Sp. Pl. 309 (1753).

Mykali: Samsun Dağ above Priene, 900 m., in flat turfy hollows, fl. lilac-blue, 20 Aug. 1950, Davis 18365 and Heywood.

A new record for Mykali.

SMILACACEAE

SMILAX EXCELSA L., Sp. Pl. 1029 (1753).

Mykali: Samsun Dağ above Priene, by water, 20 Aug. 1950, Davis 18355 and Heywood.

Rechinger only records this Pontic species from Thasos and Samothrace in the Aegean. It is widespread in northern Turkey, but very local further south. In S.W. Turkey I have collected it at Köyceğiz (Prov. Muğla), where, with *Vitis silvestris* Gmel., it grows in festoons over *Liquidambar orientalis* Mill. In these dry areas it is always found near water, whereas *S. aspera* L. flourishes in dry scrub and woodland.

The number of veins on the leaf and the position of the tendrils are not good characters for distinguishing *S. excelsa* L. from *S. aspera* L. subsp. *mauritanica* (Desf.) Asch. & Gr. *S. excelsa* differs vegetatively from the latter in having leaves of thinner texture that are truncate or only slightly cordate at the base.

AMARYLLIDACEAE

ALLIUM BOURGAEI Rech. fil. in Ann. Nat. Mus. Wien, xlvii, 150 (1936).

Karpathos: Lastos, 700 m., N.W. cliff, in cracks and on ledges, 22 July 1950, Davis 18066.

ALLIUM MARGARITACEUM Sibth. et Smith, Prodr. i, 224 (1806), var. MARGARITACEUM.

Karpathos: Kalilimni above Lastos, 1,000 m., growing through *Poterium spinosum*, fl. whitish with a *green* spot on the petals, 21 July 1950, Davis 18002.

Rechinger records only var. *guttatum* Stev. from Karpathos.

ALLIUM PANICULATUM L., Sp. Pl. ed. 2, 428 (1762).

Karpathos: Lastos, 700 m., fallow fields, 20 July 1950, Davis 18017.

New for the island.

JUNCACEAE

JUNCUS ARTICULATUS L., Sp. Pl. 327 (1753) var. ARTICULARIS.

Mykali: Samsun Dağ above Priene, springs, 400 m., Davis 18357 and Heywood.

A new record for Mykali.

CYPERACEAE

* PYCREUS GLOBOSUS (All.) Reichb., Fl. Germ. Exc. i, 14010 (1830).

Mykali: Samsun Dağ above Priene, 400 m., springs, 20 Aug. 1950, Davis 18358 and Heywood.

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