NEWS FROM : JIM & JENNY ARCHIBALD, 'BRYN COLLEN', FFOSTRASOL, LLANDYSUL, DYFED, SA44 5SB, WALES, U.K. : DECEMBER, 1989

WHERE ARE SECTIONS II AND III ? Although this list is more extensive than usual, you still have only Section I here. As you read this, we shall be proceeding with preparing the two additional parts but - - we do stress this - but - you will not be sent these in January unless you ask for them. As those of you familiar with the format of our seed-lists may recollect, Section II deals with wild-collected seed from Europe and Turkey. As we have spent the 1989 collecting-season in North America, we have no fresh material of our own from this area. We are at the moment preparing a list of those items, mainly from 1988 collections, still available from refrigerated seed in our Seed-Bank. There are plenty good things there : classic European alpines like Androsace alpina, Physoplexis comosa and Saxifraga florulenta, as well as some less well-known ones, like Iberis candolleana, Senecio leucophyllus and Viola nummulariifolia ; little-known Turkish species for the alpine-house, such as Linum aretioides, Jurinella moschus and Campanula troegerae ; for the bulb-enthusiast, there are 1988 collections of Fritillaria tubiformis, Bellevalia rixii and Iris caucasica turcica ; as usual, there are plenty fine larger, herbaceous species, like Verbascum wiedemannianum, Ebenus plumosa speciosa, Eremostachys laciniata, Eryngium spinalba, Helleborus vesicarius and lots of Salvias. While the majority of listings are our own collections from 1988, we do have a few 1989 collections : some Greek material from Peter & Penny Watt ; Leucojum tingitanum collected in N Morocco by John Blanchard. There are also 1989 seeds from cultivated plants of known wild origin : Turkish Salvias grown in Colorado, Euphorbia rigida from an Australian grower, hand-pollinated seed of Lilium pomponium and L. chalcedonicum grown in the U.K. Section III, devoted to a few interesting odds and ends of garden-grown seeds is as varied as ever. All seed here is 1989 vintage : Cyclamen from Dave Hoskins and Melvyn Jope, Hellebores from Will McLewin, Narcissus (several we have never listed before) from John Blanchard, Aroids (including the recently described A. euxinum and A. stevensii) from Mike Tucker, along with all sorts of other things! As we shall explain in a moment, we are reorganising our collecting activities over the 1990-91 period and we shall be designing Section II to remain valid (as long as seed lasts, of course) until the first half of 1991. These will be sent on request in January 1990. Otherwise, you will be sent a copy in July, 1990, along with an updated version of Section III, including we hope fresh 1990 seed from some early-flowering species. What you will not receive, unless you ask for it now, is the current Section III list of 1989 seed. We hope this may mean that we have a decreased demand for some of these cultivated seeds, which we have only in small amounts and which tend to become sold-out rather rapidly. Remember :

IF YOU WANT SECTIONS II AND III FOR 1989 - 1990 YOU MUST ASK US TO SEND THEM

THE FOLLOWING LIST OF NORTH AMERICAN SEEDS WILL BE VALID UNTIL SEPTEMBER, 1990

ORDERING could not be easier. Prices quoted on each page are in US $, £ sterling, DM and French Francs ; we shall accept your personal cheque in any of these currencies. In the case of cheques in US $, these must be on a U.S. bank account (charges for negotiating cheques on foreign accounts are very high in the U.S.A. ; please do not send us Eurocheques in US $). While we try to keep our price-structure steady, fluctuations in exchange-rates may mean it is advantageous to you to select a currency other than your own ; please do so - it makes little appreciable difference to the operation of our business. Apart from personal cheques, payment can be made in bank-notes in any of these currencies (please send by registered mail), a bank draft or International Money Order (in sterling for these please). We do not operate a Giro Account to enable direct transfers. If remitting by sterling cheque, it is a great help to both you and ourselves, if you send us an open cheque, limited to the to total value of your order (obviously, it cannot be made out for more than the limit but it can certainly be made out for less, avoiding annoying credits or refunds ; moreover, you pay only for what we have sent, after the order is despatched). If you cannot do this, a list of some substitutes will be very helpful - we shall not use them unless we have to. Order as soon as you can - the sooner we have your order, the faster the seed can be with you. Remember that we do not pay in your cheque until after your order has been despatched - it is in our interest, as well as yours, to complete orders quickly. Finally, we should stress two points :

THERE IS NO CHARGE FOR AIRMAIL ON THE SEEDS OR ON THE SEED-LISTS : PLEASE PRINT YOUR NAME & ADDRESS CLEARLY

PLEASE UNDERSTAND There may be a delay of some weeks before you receive your seeds. The majority of orders come in very quickly, during the first week or so after we send out a list. We receive your orders very much faster than we can despatch them. You may think that because you ordered as soon as you received this list, we can send seed back just as promptly. A great many other people ordered that same day. We normally send out a list only once each year ; we have to derive our whole year's income from it : we have to handle a lot of orders! We try to avoid listing collect--ions unless we think there will be enough seed to satisfy the demand, so there should be no great concern over this, even if you are not ordering by return. We intend this list of North American material to last until September, 1990. Orders received later in this period may not receive every item but they are likely to be sent more promptly. We shall probably be absent for a month or so at some period between February and July, 1990, to try to collect a few new items for the July list so there may be a delay in sending orders during this period also. If you are concerned and feel that your order is too long in arriving, check with your bank to see if your cheque has been cashed ; we do not pay-in cheques until after an order has been despatched. If it has been cashed, let us know immediately - a very few items do become lost or delayed - and you will find us very sympathetic to any such problem. These are very rare occurrences!

STRIKING THE MOTHER-LODE If you travel in the more remote areas of the American West, you can still find a lingering flavour of former days. It is still a land of opportunism, rather than of opportunity. The latter often only exists in the optimistic minds of those involved. The talk in the cafe in Dinosaur, Colorado, was about the drilling at Currant, Nevada - about how many feet a day they were going down at Currant. It was all happening at Currant - definitely not at Dinosaur. Anyone who has driven through Currant - and there are not very many of us - would be surprised that anything was happening or ever had happened at Currant. While the great Copper Pit at Ruth no longer produces copper and the smelters at nearby McGill stand idle and rusting, there was a definite feel of a boom happening or about to happen in Nevada. Ely was full of pickup trucks with Wyoming or even Alaskan plates. A superfluity of mobile drilling-rigs stood around and a helicopter, chartered from a Salt Lake company, took off from the car-park of the Ely Motel 6 every morning at 5 a.m. Whether playing the tables and slots in Vegas or Reno or gambling for higher stakes in the mining business, it has always been boom or bust in Nevada. Historically, there has been considerably more bust than boom involved in both activities but that never seems to deter the hopeful. To the West, in California, today's gold-prospectors operate in a lower key and a more civilized ambience. There are still plenty people panning for gold, even if only as a weekend amusement. The more serious have staked claims and a sluice yields enough gold-dust for them to subsist without too much effort if they are lucky. It is also quite a popular occupation with the snow-birds, those elderly drop-outs who follow the sun in their luxurious motor-homes - "You wanna get that guy in the Winnebago along there to show you the pictures of his nuggets." When we 'phoned Wayne Roderick from Nevada to tell him that we were about to return to California and descend on him once again, he replied "Great. You're going to be just about right. Calochortus albus should be dropping its seeds about now up in the Mother Lode."

BULB-GROWERS BONANZA Wayne was quite literally referring to the rich gold deposits in Tuolumne Co., along Italian Bar Road in the western foothills of the Sierra Nevada, where they still take gold from the South Fork of the Stanislaus River. We thought at the time he was speaking figuratively of some amazing and numerous colony of Calochortus, a rich vein in their distribution, where we could strike it lucky with an outstanding seed-collection. He might well have been. There is no denying that California is as much a land of riches for the plant-hunter as it was for those early immigrants who struggled for months, if not years, across the plains and mountains and deserts to reach it. When we stayed with Panayoti and Gwen Kelaidis in Denver in 1987, we told them that we might return to North America in 1989 but would start from California. Panayoti replied "Once you've been collecting in California, you won't want to come back here again!" While this is not the case, we can understand now what he meant. Also in 1987 we had a brief and cryptic note from Wayne : "You are coming to the U.S.A. and not to California." We know he is biased but we take his point. In the American West, the Rocky Mts. are a rough equivalent to Switzerland for flowers. Of course, there are places like Pike's Peak or the Mosquito Range with their restricted endemics but,as a generalization, when you have seen one area, you have seen them all. Over on the West Slope and down into the high, dry areas of the Colorado Plateau and Great Basin, you are into connoisseurs' collecting country, where you could spend a lifetime searching out remote and restricted colonies of relic species and specialized endemics, subsisting at the limit of survival in the harsh adversity of the conditions there. This is a land where disappointment is likely to predominate over elation. California combines the best of both worlds : a land of extraordinary diversity both in its climate and structure, resulting in an exceptional range of species, many of them more or less confined to this state. Moreover, many are now thriving and diversifying so that there is a feeling of active evolution proceeding in many genera. For the bulb-enthusiast, the specialist in 'monocots', this is the place. California is not only the centre for Calochortus, Erythronium and the Brodiaea group but it is an important secondary centre for more widespread genera like Fritillaria, Allium and Lilium. Over the past three years we have not listed a vast amount of new material to excite the bulb-grower. This season there is an exceptional range of material for the bulb-grower, who we hope will greet this list with cries of 'Eureka!'

AN IMPOSSIBLE TASK It would have been impossible for us to visit this area and bring you such an extensive range of Californian material without the vast amount of help given to us by Wayne Roderick and John Andrews. Even if we had been able to collect the seeds without them, this list would be full of question-marks and 'sp.'. California is a very large state and it is out of the question for anyone to acquire more than a superficial knowledge of its flora in a single season. Wayne, who worked at the University Botanic Garden at Berkeley for many years and later was in charge of the garden at Tilden Regional Park, is now retired - or 'retarded' as he likes to put it. He has an encyclopaedic knowledge of the Californian vegetation based on a lifetime of growing and collecting. For many years he has distributed a list of wild-collected seed and has probably done more than anyone else to introduce Californian species to wider cultivation. More recently John Andrews, an entomologist at University College Berkeley, has been collecting and sending-out an exchange-list of seeds. While both of them have a wide knowledge and interest in plants, John's personal enthusiasm inclines towards alpines, while Wayne is dedicated to 'monocots.' Between them they organized our time in California much to our - and we hope your - advantage. The fact that they were both actively collecting in California and distributing seed was actually one of the factors which made us decide not to visit the state in 1987. When we explained this to another American friend, he said 'O.K. but how many of us have the chance to get hold of their seed.' This is very true. Each of them runs about fifty copies of their seed-lists. Unlike us, they are not trying to make a living from seed-collecting ; they do not want to spend much of their lives packeting and distributing seed ; what they are doing at present keeps them quite busy enough. On the other hand, like ourselves, they feel "We want to get this stuff around" - widely distributed and established in cultivation in the hands of skilled, enthusiastic and understanding growers. As you will see, we have had three parties in the field this season! While we were off 'wasting our time' in the drought-ridden lands to the East, Wayne and John were picking off such Californian endemics as Fritillaria pluriflora and F. purdyi, Erythronium multiscapoideum and Allium hoffmanii. If it were not for them, such species would not appear here. Not only have we benefited from organisation, advice and seed, we also had a great deal of help from Wayne in cleaning our much-expanded range of seed-collections. If your Penstemon seed is a cleaner than usual, thank Wayne - "Give me that here, I'll get that clean for you." We have never met a more rapacious and insatiable seed-cleaner. Thanks a lot to you both.

COUNTING THE COST Neither Wayne nor John really count the cost of their seed-collecting. Wayne will make a day-trip of several hundred miles often for a single item ; John, who is off every weekend during the season, told us he drives about 20,000 miles a year visiting localities. He has just bought a new four-wheel drive pickup truck to make life easier during his collecting-trips. We very much doubt if many of those who receive seed from such dedicated collectors really appreciate the trouble and expense involved in its collection. How many people do you know in London prepared to drive up to Caithness for a collection of Primula scotica seed or run down over a long weekend to collect some alpine-seeds around Mont Cenis? We never fully appreciated the time, trouble and expense involved in collecting such N American species as Epilobium rigidum or Hulsea nana when we received them from Jim McPhail and Bob Woodward in the 1970's. Now we know. Over a long period in the 1950's and 1960's Carleton Worth made lengthy, self-financed trips from Ithaca, NY, to the Rockies and the Great Basin - every year during his vacation from university. Sometimes his journeys were not very rewarding - "another dry season" was often seen as an excuse for Worth's incompetence when he had failed to collect some hoped-for species. Now we understand and sympathise. We certainly do have to count the cost, not only of travelling but also of dry seasons. This cost is paid by those who support our work by purchasing our seed. We are sure this is a good thing and that most people appreciate something they have paid a fair price for more than some-thing they get for nothing. It is in the interests of the plants that you may be inclined to take just a little more care of the seedlings! Only about 50% of the price you pay for the seed is involved in its collection. About 25% of the price is involved with this list : not only the costs of printing and postages but in the cost of providing you with all the field-data and the research involved in verifying names and giving you snippets of information about each collection. It all takes a long time but we think it is well worth it. If we reduced the price of the seed and sent you a single-sheet names-only price-list (precisely like the numerical check-list you will receive with your seed-order), not only would our work become less meaningful but it would also become scientifically valueless. Our hope is always to supply the needs both of the specialist amateur grower and of the scientifically-orientated botanical collection. We should like to see them coming closer together and we hope we can contribute in a small way to an attitude and purpose common to both.

1991 AND ALL THAT We seem to be approaching the end of the page allowed for this rambling chatter without having said very much. Every year we jot down a few notes of topics and anecdotes to include in this newsletter and every year most of them remain unmentioned. This year we can tell you that you are unable to read about how Jenny was not bitten by a baby rattlesnake and how we were not struck by lightning. We cannot include the paragraph about the numerous forest fires during 1988 and 1989 pointing out their benefits both to the vegetation and the tourist-trade for the areas concerned. We cannot tell you about the Oregon State Troopers curious about our seed-collecting in the Coast Ranges along the Oregon/California line, though their real interest they explained was in "another sort of botanists" engaged in the cultivation of (another sort of) pot-plants in the mountains. In the same negative vein, we cannot tell you precisely what we shall be doing between now and Spring, 1991, because we do not know. We can tell you that we shall not be visiting Turkey or North America before then. We are trying to reorganise the pattern of our lists so that we can spend some of the Summer of 1990 on our land here in Wales and also arrange to have a new list ready for the 6th International Rock Garden Plant Conference at Warwick University from 6-11 April, 1991. We regard these rare events, held every ten years, as of great importance for the opportunity to meet and talk to people one very seldom sees. We shall be there with a small exhibit of photographs and pressed herbarium specimens to provide a focal point where we may be able to meet those of you may attend this. More of this in July, 1990, when we shall send-out another communication and list. Between now and then, the only definite date in our diary is the Birmingham Study Weekend at Solihull on 31 March and 1 April, 1990. John Page who is organising this on the theme 'The World of Bulbs', has turned this into an important event with an amazing assemblage of speakers : Wayne Roderick is coming from California ; Milan Prasil from Czechoslovakia ; there are such British classics as Chris Brickell, Jack Elliott, Derek Fox, Chris Grey-Wilson and Brian Mathew, as well as, 'as they say, yours truly' (what a nauseatingly obsequious and effete expression).

NORTH AMERICAN SEEDS FROM JIM & JENNY ARCHIBALD, 'BRYN COLLEN', FFOSTRASOL, LLANDYSUL, DYFED, SA44 5SB, WALES, U.K.

Unless otherwise mentioned, seeds in Section I have been collected in the United States of America by Jim & Jenny Archibald during 1989. In cases where we have been unable to make a fresh collection during 1989 but we have a sufficient supply in our seed-bank, then we are making available seed from our previous visit to America in 1987. Our seed-bank was instituted in 1984 as a simple storage system for seed from particularly good harvests. Storage procedure is similar to that used by some commercial producers of seed and the centres involved with extensive seed-banks, such as at Kew in England and Fort Collins in Colorado. Under such conditions of low temperature and low humidity, viability of many seeds can, in theory, be preserved indefinitely. In all cases, however, we provide the precise date of collection for all wild-collected material, so that an informed choice can be made.

REFERENCE NUMBERS are our field-numbers and do not run in numerical order in this list, which presents our coll--ections in alphabetical order so that members of each genus appear together. At the end of the list, we provide a separate check-list of the numbers in the numerical order of collection to facilitate identification of the seed-packets, which carry only the field-number. Please order in alphabetical order as seeds are so arranged.

NOMENCLATURE has required some editorial decision. Where possible it follows the 'Intermountain Flora' but this is a very long way from being completed. Stanley Welsh's 'A Utah Flora' (1987) is superlative and a model for a single volume flora. It has almost invariably been followed for taxa which occur in Utah. The names used in Robert Dorn's 'Vascular Plants of Wyoming'(1988) are used where taxa endemic solely to Wyoming are concerned but not necessarily for plants of a wider distribution. William Weber's 'Colorado Flora : Western Slope' is generally disregarded as we feel his predilection for excessive generic splitting is retrograde and of no advantage to those of us who use plant-names for their true purpose - simply as a reasonably efficient and acceptable labelling system for groups of naturally occurring living objects. As far as Californian species are concerned, we have had little alternative but to follow Munz' 'A Californian Flora' (1959). This is somewhat outdated, a little bit insular and often far from being functionally perfect when it comes to actually using it to identify material. Nevertheless, the format is excellent and it is difficult to see how the presentation of an encylopaedic amount of information in a concise manner can be bettered. A revision of Jepson's 'A Manual of the Flowering Plants of California' is now under way and it will be interesting to see in a few years time if 'Munz' is actually dispensible. Our broad approach in all cases is conservative and we usually retain specific level for a taxon where there is disagreement about its appropriate status. Some names may prove incorrect and in cases of considerable uncertainty the name is preceded by '?'. Considerable efforts are made to distribute correctly named material but as only a short time elapses between collection and distribution and often material collected in fruit is inadequate for full determination, it is clearly impossible to be fully accurate. Where seed collected by someone other than ourselves is listed, the identity of the collector is provided and the name used will be the one provided to us by the person involved.

SEED-COUNTS are not given for some Compositae and genera like Eriogonum, where it is very likely that seed will be damaged by further cleaning and it is time-consuming to ascertain how many seeds are contained in each packet. Enough material to raise a reasonable number of plants should be expected.

We have used a few abbreviations to compress more details into the available space :

* : indicates seed from cultivated plants of known wild origin. Field data applies to the original collection.

SB : (= Seed Bank) indicates seed collected prior to 1989 and stored in silica gel at about 0°C.

coll.: collected/collected by/collection

W.R. : Wayne Roderick (Orinda, California)

J.A. : John Andrews (Berkeley, California)

IMF : 'Intermountain Flora' (Cronquist, Holmgren et al.)

UF : 'A Utah Flora' (Welsh et al.)

Munz : 'A California Flora' (Munz & Keck)

SECTION I : SEEDS COLLECTED IN NORTH AMERICA, MAY - SEPTEMBER, 1989, BY JIM & JENNY ARCHIBALD

11583 ACONITUM COLUMBIANUM California, Sierra Co., NNW of Bassetts. 2000 m. Among Salix in a moist meadow among conifers. 12.8.89 (Elegant Monkshood with rich violet-blue helmets on branching, 1.5 m. stems)(20+ seeds) B

11630 ACTAEA RUBRA subsp. ARGUTA California, Humboldt Co., Friday Ridge, SSW of Willow Creek. 1430 m. Steep slopes in coniferous woodland. 20.8.89 (Clusters of glossy red fruits on 60 cm. stems.) (10+ seeds) B

10978 ADIANTUM JORDANII California, Solano Co., Mix Canyon, NW of Vacaville. 300 m. Shady rocks and steep wooded slopes. 15.6.89 (The Californian Maidenhair, a summer-dormant, Pacific Coast endemic - a beautiful fern but not the easiest for the beginner to attempt from spores. Probably best in a shaded alpine-house.) C

11633 ADIANTUM PEDATUM var. ALEUTICUM Oregon, Josephine Co., SW of O'Brien. 610 m. Moist places among rocks by stream. 21.8.89 (A superlative hardy fern, easily grown in the British climate.) C

ALLIUM. This is an important and highly developed genus, especially in California. These W. American species are very little-known in cultivation and include an extremely high proportion of distinctive, choice and worthwhile plants. All listed are bulbous and most flower early, entering a summer-dormancy. The 'tumbleweed' species, in which the stem breaks off after flowering to distribute the seed, bear a very close resemblance to the SW Asian members of Section Acanthoprason (A. akaka, A. cristophii, etc.) and certainly rival the Iranian species. Several are narrow endemics and unlikely to be easy to grow.

11547 ALLIUM ACUMINATUM Idaho, Custer Co., Sawtooth Valley S of Obsidian. 1980 m. Stony clay in valley bottom among Artemisia. 6.8.89 (A pretty plant widely distributed round the perimeter of the Great Basin. Not seen in flower here but usually bright purple-pink. Umbels of flowers on 15-20 cm. stems.) (15+ seeds) B

11249 ALLIUM BISCEPTRUM California, Plumas Co., N of Seneca. 1070 m. Stony clay in clearing in coniferous forest. 29.6.89 (Not seen in flower here but usually pale to deep rose. About 20 cm.) (15+ seeds) B

11136 ALLIUM CAMPANULATUM California, Modoc Co., Warner Mts. E of Davis Creek. 1750 m. Gravelly clay slopes among Artemisia. 20.6.89 (Large heads of pale pink flowers. Similar height & habit to above.) (15+ seeds) B

11820 ALLIUM CRATERICOLA California, Napa Co., Palisades SE of Mt. St. Helena. 900 m. Coll. J.A. 26.5.89 (One of the 'tumbleweeds' with large, almost stemless, purple flower-heads and a single, flat, falcate leaf. A most desirable species of stony, volcanic or serpentine habitats.) (15+ seeds) D

11765 ALLIUM DICHLAMYDEUM California, Sonoma Co., S of Jenner. 20 m. Ledges on coastal cliffs. W.R. coll. 18.7.89 (Maybe the best of the larger ones, 20-30 cm. high with fine heads of pink flowers. We have grown this without trouble in a bulb-frame in the U.K. and it does well in Wayne's garden.) (15+ seeds) B

PRICE CODE A	:	$1.50	£1.00	DM3, -	FF10. -	PRICE CODE D	:	$4.00	£2.50	DM 7,50	FF25. -
B	:	$2.50	£1.50	DM4,50	FF15. -	E	:	$5.50	£3.50	DM10, -	FF35. -
C	:	$3.50	£2.00	DM6, -	FF20. -	F	:	$7.00	£4.50	DM13, -	FF45. -

11766 ALLIUM DICHLAMYDEUM California, Sonoma Co., Stewarts Point. Coastal rocks. W.R. coll. 18.7.89 (We have seen the previous coll. in flower but not this one - a bright cerise form says Wayne.) (15+ seeds) C

11626 ALLIUM FALCIFOLIUM California, Humboldt Co., Friday Ridge SSW of Willow Creek. 1490 m. Loose serpentine talus on steep slope with sparse conifers. 20.8.89 (A choice little plant with two, thick, falcate leaves Heads of red-purple flowers on short, 6 cm. stems. Not uncommon on the Coast Range serpentines.) (15+) C

11767 ALLIUM FALCIFOLIUM California, Glenn Co., Mendocino Pass. 1500 m. W.R. coll. 1.7.89 : "wine red". (15+) C

11393 ALLIUM GEYERI Colorado, Montrose Co., Uncompahgre Plateau, Columbine Pass. 2900 m. Openings in Populus & Abies woodland. 15.7.89 (A very variable species with a wide distribution from Alberta SE to Texas. This is a rather dwarf form, about 20 cm. high, with pale pink flowers.) (15+ seeds) B

11204 ALLIUM ? HAEMATOCHITON California, Ventura Co., Lockwood Valley. 1370 m. Open, gravelly areas among sparse Artemisia. 26.6.89 (We are not quite happy that this is the same species, with distinct, blood-red bulb-tunics, we saw near San Luis Obispo. Possibly pale-pink to white. 20 cm.) (15+ seeds) B

11821 ALLIUM HOFFMANII California, Trinity Co., near Red Lassic, N of Zenia. 1660 m. Serpentine talus on open slopes. J.A. coll. 15.7.89 (An extremely narrow serpentine endemic - one of the handsome 'tumbleweeds' with a single flat leaf and short-stemmed umbel of purple-pink flowers. We saw this just going out of flower on 17.6.89 and John Andrews kindly collected some seed when he returned after a month)(15+ seeds) E

11121 ALLIUM ? LEMMONII (or ? anceps) California, Modoc Co., Devil's Garden N of Canby. 1500 m. Stony clay 'flats' overlaid with volcanic debris. 20.6.89 (Not seen in flower. White or pink. 15 cm.) (15+ seeds) B

10951 ALLIUM PARVUM California, Sierra Co., SE of Sierraville. 1870 m. Gravelly soil in openings among Artemisia. 13.6.89 (An odd, tiny plant. Heads of off-white flowers with purple midribs. 3 cm.) (10 seeds) B

11134 ALLIUM PLATYCAULE California, Modoc Co., Warner Mts. E of Davis Creek. 1750 m. Open, gravelly patches among Artemisia. 20.6.89 (Heads of deep rose, pale-tipped flowers with dark anthers sit on short, flat stems between two thick, falcate leaves. Another 'tumbleweed' species. 5-10 cm. high.) (15+ seeds) D

11072 ALLIUM ? SISKIYOUENSE (or ? falcifolium) Oregon, Josephine Co., SW of O'Brien. 460 m. Open stony 'flats' with sparse scrub. 19.6.89 (May be just a little, skinny form of A. falcifolium but W.R. suggests it may be this species confined to the California/Oregon border area. Not seen in flower.) (10+ seeds) C

11653 ALLIUM VALIDUM California, Trinity Co., Pacific Crest Trail NW of Mt. Eddy. 2300 m. Open, wet meadow. 22.8.89 (Unlike the others, this is a late-flowering plant of moist montane meadows. It can be 1 m. high and this is quite a dwarf form at 50 cm. with deep purple-pink heads.) (15+ seeds) B

9626 ANDROSACE CARINATA Colorado, El Paso Co., Pike's Peak, above Elk Park. 4000 m. Open slopes in granite grit. SB coll. 9.9.87 (No fresh collections from the Colorado Rocky Mts. in 1989 so we are listing this and other Rocky Mt. species again. A superb plant with white, yellow-eyed flowers, blushing pink with age. May be best placed under the Alaskan A. chamaejasme subsp. lehmanniana - much tighter than and absolutely distinct from the European race of A. chamaejasme. Little-known in cultivation.) (10+ seeds) E

11089 ANTENNARIA SUFFRUTESCENS Oregon, Josephine Co., SW of O'Brien. 830 m. Exposed ridge in stony clay. 19.6.89 (Very local serpentine endemic. Stiff shrubby mats of dark leaves, woolly white beneath. 10 cm.) C

AQUILEGIA. Our plan to collect seeds from a richly representative range of the Western Columbines this season appears to have been realised when one reviews the list of species which follow. It was, however, confounded by the extremely adverse season in the Intermountain Region and by our main competitors, the excessive numbers of deer, which, in the absence of natural predators, are of epidemic proportion in many areas and appear to favour fruiting Aquilegia stems above all else! Quantities of many listed are consequently very limited. In the early days of collecting, every collector seemed to find and every botanist describe a new "species" of Aquilegia. The number of taxa to which it might be worth according specific status is in fact quite small but every species appears to have the capacity to cross with any other if it comes in contact with it, so there are innumerable hybrids or intergrades, many of which have been described as species, subspecies or varieties. Fortunately, from our viewpoint, most colonies are very local and geographically isolated, so that wild-collected seed can be expected to produce quite an even range of seedlings - this would not, of course, be the case with open-pollinated plants in cultivation. There is a comprehensive gardeners' account of "The North American Aquilegias" by Dr. C.R. Worth in the Sept. 1950 AGS Bulletin (Bull.Alp.Gard.Soc., Vol.18, p.24). Carl Worth, a lecturer in mathematics from Ithaca, NY, spent his summers for many years travelling in search of plants and coll--ecting seeds through the American West. His particular enthusiasm was Aquilegia and he writes from personal experience of most. This experience, however, is sometimes quite surprising and curious to us and in some cases differs markedly from our own. Quotations from this account are noted (C.R.W.).

11410 AQUILEGIA BARNEBYI Colorado, Rio Blanco Co., above Piceance Creek NW of Rio Blanco. 1980 m. Steep sided gulley in loose, fragmented shale. 19.7.89 (An extraordinary endemic of the 'barrens' of oil-bearing shale in the Uinta Basin of NE Utah and NW Colorado, discovered by Dwight Ripley and Rupert Barneby in 1948. Seed was collected by the discoverers and the name still occurs in seed-lists but it is highly unlikely that this has been maintained in a pure state in cultivation. Tufts of glaucous basal leaves and downy, sticky stems of pink and cream flowers. About 50 cm. in height.) (15+ seeds) E

9404 AQUILEGIA CAERULEA (var. caerulea) Wyoming, Albany Co., Medicine Bow Mts., Snowy Range. 3600 m. Stony slopes in coniferous forest zone. SB coll. 8.8.87 (The incomparable blue and white Columbine of the Rockies - "perhaps the most spectacular of all" (C.R.W.) - too early for seed here in 1989.) (20+ seeds) B

11503 AQUILEGIA CAERULEA var. OCHROLEUCA Wyoming, Fremont Co., Wind River Mts., SW of Lander. 2500 m. Shaded areas among Populus. 29.7.89 (The very beautiful, pale-flowered race - a "truly magnificent plant" (CRW) - predominating to the West. Big, floppy Columbines in white and creamy shades.) (20+ seeds) B

11390 AQUILEGIA ? ELEGANTULA X MICRANTHA Colorado, Montrose Co., Dolores River Canyon NW of Uravan. 1700 m. Sandstone detritus and crevices on steep, shaded slope. 14.7.89 (We saw these lovely things in flower on 5.6.89 and had to return for seed. Leaves and stems varied greatly in their glandular pubescence but the flowers were not excessively variable, though larger than either suggested parent, leading one to suppose our guess is wrong or there is yet another species involved. We were, in fact, tempted to list this as A. ? flavescens var. rubicunda, a taxon Welsh has resurrected in UF but which Munz discarded as a synonym of A. micrantha in his monograph. It is a marvellous genus for making one examine one's concept of what constitutes an acceptable species! Anyway, this is 30-50 cm. high with branching stems of soft-yellow to cream flowers with long spurs tinged with apricot-orange - highly recommended!) (20+ seeds) C

11748 AQUILEGIA FORMOSA California, Alpine Co., S of Carson Pass. 2700 m. Moist meadows. 5.9.89 (Widespread and rather variable species but always with scarlet sepals and spurs. Compact leaves in this.)(20+ seeds) B

PRICE CODE A :	$1.50	; £1.00	; DM3, -	; FF10. -	PRICE CODE D :	$4.00	; £2.50	; DM 7,50	; FF25. -
B :	$2.50	; £1.50	; DM4,50	; FF15. -	E :	$5.50	; £3.50	; DM10, -	; FF35. -
C :	$3.50	; £2.00	; DM6, -	; FF20. -	F :	$7.00	; £4.50	; DM13, -	; FF45. -

AQUILEGIA continued

11651 AQUILEGIA FORMOSA California, Trinity Co., Pacific Crest Trail NW of Mt. Eddy. 2300 m. Open, wet meadow with occasional conifers. 22.8.89 (Not seen in flower here - all forms are worthwhile.) (20+ seeds) B

11566 AQUILEGIA FORMOSA Nevada, Elko Co., Ruby Mts., SE of Elko, between Dollar and Lamoille Lakes. 2600 m. Moist places among Salix scrub and in openings among conifers. 9.8.89 (An isolated colony.) (15+ seeds) B

11484 AQUILEGIA JONESII Wyoming, Big Horn Co., Big Horn Mts., ridge between Duncum Mt. & Sheep Mt. 3200 m. Unstable limestone scree on steep slopes. 26.7.89 (The most fabulous alpine columbine, worth every effort to encourage it to produce its huge, short-spurred, lavender-blue flowers on neat tufts of much--dissected, overlapping, thick-textured, blue-grey foliage. Try limy gritty soil in full sun.)(15+ seeds) E

11451 AQUILEGIA LARAMIENSIS Wyoming, Albany Co., Laramie Mts. above Friend Creek. 2280 m. Granite fissures & ledges, often under overhangs. 23.7.89 (C.R.W., who first collected seed of this in 1939 gives the impression that this, "the scarcest of all American species", survives as a handful of plants on the verge of extinction. While never abundant, we found it widespread and see no reason to assume that it does not occur in suitable habitats throughout the Laramie Mts., which are not the most accessible of N. American ranges. We were also under the impression that this is not the most attractive of plants ; this is also far from the truth. While seed was mature at 2280 m. we were able to see this in flower near the summit of Laramie Peak, at 3110 m., with fine pure-white flowers, opening from creamy buds. In its short, incurved spurs it is reminiscent of some NE Asian species but it is extremely close to A. saxi--montana from Colorado, both probably being derived, as disjunct, relic high altitude populations from the more northern A. brevistyla. A little-known and, in our experience, worthwhile plant.) (20+ seeds) E

10817 AQUILEGIA MICRANTHA Utah, San Juan Co., Sunbonnet Rock above Bluff. 1550 m. Seepage lines on shady sandstone cliffs. 3.6.89 (Branching stems of about 50 cm. hang out a multitude of straight-spurred flowers in palest blue, cream or white. Endemic to the 'hanging gardens' of the Colorado Plateau.) (20+) D

9209 AQUILEGIA SAXIMONTANA Colorado, El Paso Co., Pike's Peak, Elk Park. 3700 m. Loose granite grit at bases of boulders on steep slopes. S.B. coll. 25.7.87 (Short-spurred blue and white flowers. Limited to a few localities in the Colorado Front Range but one of the easiest and loveliest in the garden.) (15+ seeds) C

11333 AQUILEGIA SCOPULORUM Utah, Garfield Co., Red Canyon, above Butch Cassidy Draw. 2600 m. Loose limestone scree on steep slopes. 7.7.89 (Exquisite bluish foliage similar to A. jonesii but the flowers have very long, straight spurs. About 20 cm. high here and usually with entirely blue flowers.) (15+ seeds) E

11156 ARABIS BLEPHAROPHYLLA California, Marin Co., SSW of Tomales. 15 m. Fissures on W-facing coastal cliffs. 22.6.89 (Endemic to low altitude cliffs along the Californian coast, this is surely one of the most spectacular of the genus with richly coloured, large flowers - here according to W.R. in a fine deep carmine pink form. We have grown it outside in the U.K. but it tends to be a little tender and not too long-lived but it is an easy, altogether satisfactory, early-flowering alpine-house plant.) (30+ seeds) B

11769 ARGEMONE MUNITA W.R. coll. 16.8.89 (Big crumpled white poppies with golden stamens. Bristly, cut, grey foliage. This is a spectacular genus rather like dwarfer Romneyas - short-lived perennials probably best sown where they are to be grown in the sunniest driest site available and not transplanted.) (50+ seeds) B

11245 ASARUM HARTWEGII California, Plumas Co., between Caribou & Seneca. 1220 m. Rocky slopes in mixed wood--land. 29.6.89 (A weird, shade-loving member of the Aristolochiaceae, more or less confined to the Californian Sierra Nevada - just entering S Oregon. Cordate leaves overtop the 'flowers' - a brown--purple, 3-parted calyx with long attenuate lobes. For lovers of aroids and the like!) (5 seeds) C

11376 ASCLEPIAS CRYPTOCERAS Utah, Emery Co., Molen Reef SE of Moore. 2130 m. Stony clay on low, eroded shale hills. 10.7.89 (One of the very few dwarf species. Large, flat, bluish leaves on short prostrate stems, which carry big heads of complex flowers in pale greenish yellow and rose-purple. A very beautiful plant in flower and foliage well worth attempting in a deep pot or sunny raised bed.) (15 seeds) C

ASTRAGALUS. This is an extremely large and complex genus in N America, for which Barneby lists 368 spp. in his monograph. They are especially diverse in the Great Basin and Colorado Plateau with well over 100 in Utah alone, where it is the largest genus. These include an extremely large number of horticulturally desirable plants and Elizabeth Neese facetiously suggests that the formation of an Astragalus Society would be appropriate. While the challenge they present to the cultivator must be met one day, for the present they remain plants for pioneers in cultivation. Reports on both N American and Turkish collect--ions we have made in recent years indicate that germination is not usually a problem. In fact it can be rapid, so sowing might be best delayed until spring to avoid the problem of overwintering seedlings. It is traditional to recommend scarification for the seed. This does not seem essential but light scarific--ation and soaking prior to sowing will do no harm. More problems are likely to occur with transplanting and keeping the plants in character. We are listing a few of the outstanding spp. from Wyoming which we were unable to collect again in 1989 and in all cases we have mentioned the Section and Subsection of the genus to which collections belong. This is not so much because we imagine it will be at all meaning--ful to many growers but because it gives an indication of the affinities of the plants. It will be seen that we have been especially interested in Sect. Argophylli, largely tap-rooted, xerophytic, prostrate perennials widespread through the intermountain area and whose attractions often lie as much in their beautiful foliage and seed-pods as in their colourful flowers. We do not find this an easy genus to identify and we are especially grateful to Dr. R.C. Barneby of the New York Botanical Garden for rapidly determining some of our herbarium sheets so that we could list material under the correct names : these are denoted "det. R.C.B." Other names are our responsibility but in most cases there could be little confusion. All listed here will require perfect drainage, full sun and skilled cultivation.

10687 ASTRAGALUS AMPHIOXYS (Sect. Argophylli Subsect. Missourienses) (det. R.C.B.) Utah, Washington Co., Pine Valley Mts., above Cottonwood Wash. 1830 m. Gravelly clay slopes with sparse Artemisia. 25.5.89 (Bright purple-pink flowers on short prostrate stems from silvery tufts. Reddish, silky pods.) (15+ seeds) D

9259 ASTRAGALUS ARETIOIDES (Sect. Sericoleuci) Wyoming, Fremont Co., SE of Lander above Sweetwater River. 2100 m. Steep, eroded clay slopes. S.B. coll. 28.7.87 (One of the world's great cushion-plants - a solid snowy silver mound covered in stemless, carmine-purple flowers. The ultimate challenge!) (15+ seeds) F

11373 ASTRAGALUS ASCLEPIADOIDES (Sect. Pachyphyllus) Utah, Emery Co., Molen Reef SE of Moore. 2130 m. Stony clay on low, eroded shale hills. 10.7.89 (Erect stems about 30 cm. high with simple, rounded leaves try to resemble Asclepias cryptoceras. A Colorado Basin endemic ; the most singular of the genus.)(15+ seeds) C

PRICE CODE A :	$1.50	£1.00	DM3, -	FF10. -	PRICE CODE D :	$4.00	£2.50	DM 7,50	FF25. -
B :	$2.50	£1.50	DM4,50	FF15. -	E :	$5.50	£3.50	DM10, -	FF35. -
C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

11735 ASTRAGALUS AUSTINAE (Sect. Chaetodontes Subsect. Andersoniani) Nevada, Washoe Co., SW of Mt. Rose 3080 m. Among stones on exposed summit ridges. 29.8.89 (An extremely local high altitude sp. endemic to a few summits of the Sierra Nevada in the Lake Tahoe area. White flowers shaded with wine-purple nestle in dense, little mats of silver-haired foliage. May be easier than the steppe species.)(10+ seeds) E

11708 ASTRAGALUS CALYCOSUS (Sect. Scaposi) California, Inyo Co., White Mts., N of Schulman Grove. 3160 m. Exposed, stony slopes. 28.8.89 (A widespread and variable species always difficult to collect as ants remove the seed quickly. Here in quite a dwarf alpine form : tufts of tiny grey-white leaves with 3 leaf -lets, about 5 cm. high ; often blue-purple with white tips but not seen in flower here.) (10+ seeds) E

10556 ASTRAGALUS COCCINEUS (Sect. Argophylli Subsect. Coccinei) California, Inyo Co., White Mts. near Toll House Springs. 1980 m. Loose, stony clay slope. 19.5.89 (supplemented with J.A. coll. 22.4.89 towards Westgard Pass nearby) (An incredible plant unsurpassed in the brilliance of its elongated glowing scarlet flowers set against the tufts of woolly white foliage & followed by amazing, horned white velvet pods. A plant of the desert mountains - it might be possible in a deep pot of granite grit.) (8 seeds) F

11717 ASTRAGALUS KENTROPHYTA var. IMPLEXUS (Sect. Ervoidei Subsect. Submonospermi) California, Mono Co., White Mts., Sheep Mt. 3500 m. Exposed stony slopes. 28.8.89 (The most compact, pulvinate form we have seen of this widespread mountain species. Spiny grey pads. Not seen in flower here but often purple.) (10+ seeds) E

10791 ASTRAGALUS MUSINIENSIS (Sect. Argophylli Subsect. Newberryani) (det. R.C.B.) Utah, Emery Co., Molen Reef SE of Moore. 2130 m. Stony clay on eroded shale hills. 2.6.89 (A most distinct endemic of Central Utah. Tufts of grey-green foliage, usually with 3 lanceolate leaflets and short-stemmed (3 cm.) racemes of pink and purple flowers followed by beautiful, inflated, papery pods, pubescent and pinkish.) (10+ seeds) F

10588 ASTRAGALUS NEWBERRYI var. WATSONIANUS (Sect. Argophylli Subsect. Newberryani) (det. R.C.B.) Nevada, Nye Co., NE of Warm Springs. 1550 m. Gravelly and sandy clays. 22.5.89 (A Nevadan race of this rather widely distributed plant with purple-pink flowers on pads of white-felted leaves followed by exquisite pods, all clothed in silver-white velvet. All these are very early-flowering plants.) (10+ seeds) E

8921 ASTRAGALUS NEWBERRYI New Mexico, San Juan Co., NW of Aztec. 1900 m. Eroded clay hills with sparse Pinus. S.B. coll. 4.7.87 (This would appear to be one of the reduced, pulvinate forms of this sp.) (15+ seeds) E

11138 ASTRAGALUS PURSHII var. TINCTUS (Sect. Argophylli Subsect. Eriocarpi) California, Modoc Co., Warner Mts. E of Davis Creek. 1750 m. Gravelly clay slopes among sparse Artemisia. 20.6.89 (Low tufts of white foliage and short-stemmed racemes of purple-pink flowers (whitish in the type-race)) (15+ seeds) D

11226 ASTRAGALUS PURSHII var. TINCTUS California, Kern Co., E of Mt. Pinos. 2530 m. Open gravelly slopes among conifers. 27.6.89 (Both these have exquisitely beautiful silver-haired pods.) (15+ seeds) D

8670 ASTRAGALUS SIMPLICIFOLIUS (Sect. Drabellae) Wyoming, Carbon Co., above Muddy Gap. 2200 m. Shaley lime--stone slope. S.B. coll. 22.6.87 (Listed as an unidentified coll. in 1987, we are now reasonably sure this is this narrow endemic of a small area in the upper Platte Valley. Silver buns with almost stemless purple-pink flowers. Close to the next and rather like a condensed version of it.) (10 seeds) F

9178 ASTRAGALUS SPATULATUS (Sect. Drabellae) Wyoming, Albany Co., NE of Laramie. 2600 m. Exposed level steppe with sparse Artemisia. S.B. coll. 22.7.87 (A distinct little, tightly tufted plant with silver linear leaves and flowers on short, wiry stems. Very compact and especially deep pink & purple here,)(20+ seeds) E

10837 ASTRAGALUS THOMPSONAE (Sect. Mollissimi Subsect. Mollissimi) (det. R.C.B.) Colorado, Mesa Co., East Creek Canyon SW of Whitewater. 1800 m. Stony sandstone slopes with sparse Juniperus. 5.6.89 (A beautiful plant more or less confined to the sandstones of the Colorado Plateau. Tufts of woolly white foliage and many-flowered racemes of purple-pink flowers on 10 cm. stems. Ovoid, densely white-hairy pods.) (15+ seeds) D

9163 ASTRAGALUS TRIDACTYLICUS Wyoming, Laramie Co., S of Cheyenne. 2100 m. Gravelly areas in exposed grass--land. S.B. coll. 22.7.87 (Sect. Sericoleuci, close to both A. sericoleucus and A. aretioides but with mats of larger, trifoliate, densely white-pubescent leaves ; bright purple flowers.) (10 seeds) E

10903 ASTRAGALUS UTAHENSIS (Sect. Argophylli Subsect. Eriocarpi) (det. R.C.B.) Utah, Sevier Co., SE of Salina to Fishlake Plateau. 2000 m. Stony clay in openings among Juniperus & Quercus. 9.6.89 (One of the very few of the early spring-flowering Sect. Argophylli we have seen in flower - blooming here for a second time after rain. A stunning plant with mats of white-felted leaves, short-stemmed racemes of large, brilliant carmine-purple flowers and pods covered in dense, shaggy, shining, cream-white hairs. Marcus Jones, pioneer of Utah botany and devotee of Astragali, considered this the most beautiful flower in the state. It is recorded in cultivation in the U.K. about 1926 ; we hope it can be grown again.) (10+ seeds) E

11709 ASTRAGALUS WHITNEYI (Sect. Cusickiani) California, Inyo Co., White Mts., N of Schulman Grove. 3160 m. Open, stony slopes. 28.8.89 (Bizarre, inflated, papery balloons, more or less mottled crimson, follow lilac-pink, white-tipped flowers on branching stems of about 15 cm. A large-flowered form.) (15+ seeds) C

11823 ASTRAGALUS WHITNEYI California, Kern Co., above Frazier Park. 1510 m. J.A. coll. 4.6.89 (John tells us this is an odd form with enormous unmarked balloons. Not seen in flower here.) (15+ seeds) C

10526 BALSAMORHIZA HOOKERI California, Plumas Co., ESE of Beckwourth. 1520 m. Stony clay slopes with Artemisia 13.5.89 (A very long-lived, slow-growing composite with deeply lobed, pinnatifid, grey-green foliage and magnificent, huge, rich-yellow daisies carried singly on 30 cm. stems. An aristocratic steppe-plant, no doubt not easy to suit but worth attempting in a scree-bed in full sun. Absolutely temperature-hardy.) C

11171 BLOOMERIA CROCEA var. AUREA California, San Luis Obispo Co., NE of San Luis Obispo. 150 m. Ledges on loose serpentine cliff. 26.6.89 (A very attractive, small, Californian genus of cormous plants closely allied to Brodiaea - see below. Wide, open umbels of starry yellow flowers - the segments with dark, median lines - on wiry stems of about 20-30 cm. Not difficult but seldom seen in gardens.) (20+ seeds) C

9623 BOYKINIA JAMESII (Telesonix jamesii, if you wish to 'split' it) Colorado, El Paso Co., Pike's Peak near Elk Park. 4000 m. Crevices among granite boulders. S.B. coll. 9.9.89 (The finest race of this splendid alpine with cherry-carmine flowers from tufts of sticky, toothed, rounded leaves, colouring to orange and scarlet in autumn. Let it become pot-bound to induce flowering. Germinates like cress!) (100+ seeds) E

BRODIAEA. Munz retains this genus as quite a broad grouping. Currently it is generally accepted as more accurate to split it into a number of genera. Consequently, we also list species,which can be placed here, under Dichelostemma and Triteleia. We have seed of only one species which is retained in the reduced genus Brodiaea. All of these have corms and flower in early summer - long-flowering plants too seldom seen.

11770 BRODIAEA PURDYI California, Butte Co., Skyway to Paradise E of Chico. 450 m. W.R. coll. 27.5.89 (Munz includes this under B. minor ; W.R. likes to keep it apart. Quite dwarf with lilac-blue heads)(15+ seeds) C

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B :	$2.50	£1.50	DM4,50	FF15. -	E :	$5.50	£3.50	DM10, -	FF35. -
C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

CALOCHORTUS

The scope and diversity of this amazing genus is little known in cultivation and certainly not appreciated by the many skilled growers of Eurasian bulbs who have developed over the past few decades. Now that some of the North American Fritillarias are being cultivated with reasonable success by a few enthusiasts, Calochortus perhaps constitutes the last extensive genus of bulbs growable without additional heating in the temperate regions of the world, which has still to achieve the recognition and attention it deserves from bulb-specialists.
The genus has somewhat in excess of 60 species and can still be expected to grow - the summer-growing Mexicans of Section Cyclobothra are not well known botanically ; several new taxa have very recently been described from Oregon ; even in California, recent years have seen the recognition of C. raichei and the discovery of the utterly distinct C. tiburonensis (on a hill overlooking San Francisco Bay!). Distribution forms an elongated triangle with the Pacific Coast forming the West side ; the northern limit extends from Washington East to the Dakotas and from there a rough line South can be drawn to Guatemala. Our collections in 1989 are from the central portion of this area, so we lack all the southern species and most of the northern ones. Nevertheless, we are listing seed from about one-third of the genus, an achievement largely due to the freely given expertise of Wayne Roderick and John Andrews in California. The northern portion of this state has to be regarded as the centre of diversity of this genus, with the greatest concentration of species. To the North, South and East the density of species becomes thinner with extensive blanks in the inhospitable desert regions and the Great Basin. More time spent in Oregon and California could have resulted in an even more extensive range being offered but we think we are providing more than enough to whet your appetite, as well as perhaps giving us an excuse to return in a few years.

As far as cultivation is concerned, it is impossible to propose any general recipe for the entire genus. Any generalisations should be regarded as very suspect and it should be stressed that the majority of species are not likely to conform to the regime of the British bulb-frame, conceived for plants with a Mediterranean growth cycle. It is interesting to note that the species considered "easy" in Britain are mainly the members of Subsection Pulchelli (C. albus, C. amabilis, etc.), low altitude Californians from approximately Mediterranean conditions! These will be dropping their seeds about the time most of the members of Section Mariposa are coming into flower in California, in June, while to the East some will not flower for many weeks : C. eurycarpus was in full flower at 2680 m. in Idaho on 6 August and in the Ruby Mts. of Nevada on 9 August ; the mountain meadows at 2700 m. NW of Cody, Wyoming, were full of C. gunnisonii on 28 July. These are genuinely summer-growing, late-flowering plants, which it would seem prudent to keep cool and dry in winter and to water in summer. Unfortunately, the botanical division of the genus into Sections and Subsections is not necessarily correlated with the habitats of the species involved, so there is not much to be gained from making suggestions based on this. In some cases it would even seem unlikely that it is possible to make suggestions for a single species : we collected ripe seed of C. nuttallii at 1700 m. in the Uintah Basin on 8 June ; we saw C. nuttallii flowering on 29 July at 2500 m. in the Wind River Range,Wyoming. The 800 m. altitude should not result in about 3 months difference in flowering, so we are dealing with distinct ecotypes, which would certainly need very different treatment in cultivation. The situation is both complex and a great challenge. Take heart from the statements made by C.H. Grey in 'Hardy Bulbs' (1938) - unquestionably a man before his time : "I am growing in Kent, and have grown for years, about twenty species"...which "almost without exception, set seed...so much so, indeed, that...miscellaneous seedlings are appearing in profusion in a bed out of which their parents were cleared two years ago...I confess to a passion for this genus...anyone who takes the trouble to grow its members well will be enslaved by their beauty."

10997 C. ALBUS California, Tuolumne Co., Italian Bar Road NE of Columbia. 760 m. Steep, scrub-covered slopes in deciduous woodland. 16.6.89 (The Fairy Lantern with pendant, white flowers on branching stems of about 20-30 cm. Generally accepted as an easy species to grow in the U.K. and to raise from seed.) (20+ seeds) B

11168 C. ALBUS var. RUBELLUS California, San Luis Obispo Co., W of Templeton. 300 m. Steep, shady, stony banks in deciduous woodland. 25.6.89 (Not seen in flower by us but W.R. assures us that this population is not just pink-flushed but rich, deep carmine-pink. We were more than impressed by the way Wayne immediately found the wooded banks where this grows after a lapse of over 20 years since his last visit!) (20+ seeds) D

10965 C. AMABILIS California, Solano Co., Mix Canyon NW of Vacaville. 300 m. Among grasses in openings among scrub and deciduous woodland. 15.6.89 (Like both the above, this belongs to Section Calochortus, Sub--section Pulchelli and is of similar habit but with the nodding, globular flowers in a clear, deep yellow. Easily grown according to Grey. No more members of this Subsection are listed here.) (20+ seeds) B

11727 C. BRUNEAUNIS California, Mono Co., N side Conway Summit, S of Bridgeport. 2230 m. Among Artemisia on open 'flats' overlaid with volcanic debris. 28.8.89 (Closely allied to the eastern C. nuttallii but with a distribution in an arc round the NW perimeter of the Great Basin from E California to NW Utah. The green-striped petals are diagnostic otherwise the white flowers with purple spots above the glands are similar to C. nuttallii. For a further late J.A. coll. from NW Nevada see Section III.) (20+ seeds) D

11681 C. CLAVATUS California, San Luis Obispo Co., NE of San Luis Obispo. 150 m. Steep, stony slopes in canyon bottom. 26.8.89 (Like the preceding, this is placed in Section Mariposa, Subsection Nuttaliani - its nearest ally is probably C. kennedyi but it does not seem too demanding in cultivation. It does well in W.R.'s garden and Grey rates it "easily grown". The branched stems can reach 1 m. (Munz) but about 30cm. is more likely. Sumptuous, erect, bowl-shaped flowers of rich golden-yellow with (in this form, seen in flower 26.6.89) brown anthers and a red-brown line surrounding the dense hairs on the petals.)(15+ seeds) C

C. COERULEUS GROUP - Section Calochortus Subsection Eleganti. We have five collections from what appear to be members of this group of dwarf, mountain plants with exquisite, little hairy flowers - appropriate -ly called Cat's Ears - followed by pendant, winged capsules. Unfortunately, we have only seen one out of the five in flower and our knowledge of them is totally inadequate for any expression of opinion as far as acceptable names are concerned. W.R. is inclined to use the name C. coeruleus for all of them but on cleaning seed we were confronted with the fact that we had two utterly distinct groups of seeds. So, right or wrong, are listing those with pale seeds under C. coeruleus and those with small, dark brown seeds under C. tolmiei, a division which also correlates with the geographical distribution outlined in Munz. With their single basal leaf, short stems and fascinatingly complex flowers, we feel that these, more than any other group, will appeal to the grower of alpine-plants. All five collections were made in openings in coniferous woodland ; all are early-flowering plants.

11248 C. ? COERULEUS California, Plumas Co., N of Seneca to Canyon Dam. 1070 m. Stony clay in clearing in coniferous woodland. 29.6.89 (Probably white tinged with rose, about 10 cm. high) (15+ seeds) C

11277 C. ? COERULEUS California, Plumas Co., N of Spanish Ranch. 1220 m. Coniferous woods. 30.6.89 (15+ seeds) C

PRICE CODE A	:	$1.50	;	£1.00	;	DM3, -	;	FF10. -	PRICE CODE D	:	$4.00	;	£2.50	;	DM 7,50	;	FF25. -
B	:	$2.50	;	£1.50	;	DM4,50	;	FF15. -	E	:	$5.50	;	£3.50	;	DM10, -	;	FF35. -
C	:	$3.50	;	£2.00	;	DM6, -	;	FF20. -	F	:	$7.00	;	£4.50	;	DM13, -	;	FF45. -

11824 C. COERULEUS var. FIMBRIATUS California, Trinity Co., Lassics Lookout Road, above Zenia. 1630 m. Stony openings in coniferous woodland over serpentine. JA coll. 15.7.89 (We photographed this in flower on 17.6.89 and John returned for seed - from our photograph Stan Farwig, who is currently writing the account of Calochortus for the forthcoming Jepson Manual, suggests that it may be this - unfortunately we did not press herbarium material. We should interpolate here that Stan Farwig and Vic Girard have made an extensive study of this genus along its Pacific Coast distribution over many years and most successfully cultivate an extremely large collection. This is a delightful little furry thing, a few cm. high with the petals of the little, white cup-shaped flowers almost entirely covered with white hairs becoming stained in the base and around the large gland with wine-purple. This appears to occur sporadically in the N Coast Ranges and, according to Kruckeberg, is exclusive to serpentine.) (15+ seeds) E

11548 C. EURYCARPUS Idaho, Custer Co., Sawtooth Valley S of Obsidian. 1980 m. Stony clay among Artemisia in valley bottom. 6.8.89 (This and its allies in Subsection Nitidi are essentially northern plants, with a West-East distribution from Washington & Oregon to Idaho. The group barely enters N California and N Nevada. Elegant, bowl-shaped flowers on wiry, 30-50 cm. stems. with white or lilac-pink petals, blotched with maroon and broadly striped with green outside. This should be growable, kept cool and dryish in winter - Grey rated it "a very beautiful plant, as easy as ... C. venustus.") (20+ seeds) C

11443 C. GUNNISONII Wyoming, Converse Co., SW of Glendo. 1980 m. Open grassland on low, rolling hills. 22.7.89 (A species of dryish mountain meadows and foothill grassland, mainly distributed to the E of the Rocky Mts., where it is usually white or pale lilac with golden basal hairs, more or less intricately marked with purple. Again a late-flowering summer-grower from an extreme steppe-climate.) (15+ seeds) C

9145 C. GUNNISONII Colorado, Boulder Co., N of Boulder. 2000 m. Among grasses in rock detritus on steep shale ridge. SB coll. 19.7.87 (From a fine vigorous colony we were unable to revisit in 1989.) (20+ seeds) B

11646 C. HOWELLII Oregon, Josephine Co., SW of O'Brien. 500 m. Open stony slopes among sparse Pinus and scrub. 21.8.89 (In the same Subsection as C. eurycarpus, this has an extremely limited distribution just N of the California/Oregon border. A most distinct plant with white petals, all covered with sparse hairs and a large smoky-brown stain above the gland, diffusing into a zone of golden hairs. Surprisingly, Grey states he grew this in the 1930's and found it "very satisfactory in cultivation" - nevertheless this must be regarded as an obscure plant deserving every effort from the specialist-grower.) (10+ seeds) E

11695 C. INVENUSTUS California, Ventura Co., Mt. Pinos. 2680 m. In granite grit among alpine-steppe vegetation in exposed summit area. 27.8.89 (In Section Mariposa, Subsection Nuttaliani, and quite close to C. nuttallii itself, as we have seen it here - flowering 27.6.89, this is a distinct dwarf plant about 15 cm. high with one or two erect, pale lavender flowers basally stained with deep purple. Quite widespread at higher altitudes in the ranges of S California, Munz states this usually grows in openings in pine woods but here it was more numerous higher up. Very little-known in cultivation.) (20+ seeds) C

11691 C. KENNEDYI California, Ventura Co., Lockwood Valley. 1370 m. Open meadows in clay with grasses and rushes & in gravelly clay patches among sparse Artemisia. 27.8.89 (A mythical, reputedly "impossible" species, like the above a Mariposa in Subsection Nuttalliani, and certainly unrivalled in the incredible brilliance of its colour - especially in this western race with flowers of rich, solid vermilion with black anthers. To the East it ranges across the Mojave Desert, through N. Arizona in an orange race. Certainly this is not going to appreciate a superfluity of water at any time - possibly only moist in spring - and will need a high soil temperature in late summer to ripen the bulbs but it can be grown in Britain. Grey exhibited it at the R.H.S. Show in June, 1934, where it received an A.M.) (20+ seeds) C

11704 C. KENNEDYI California, Kern Co., above Cuddy Valley. 2120 m. Openings among Pinus on steep slope. 27.8.89 (The same pure scarlet form as the above collected, for what it may be worth, from a small colony growing at what must be about the altitudinal limit for the species. To correct any misconception that this species only occurs in warm desert conditions with yuccas and cacti, it should be said that this was growing among Artemisia tridentata at the base of Fremontodendron californicum scrub and intermingled with C. venustus, in an area experiencing low temperatures and snowfalls.) (10+ seeds) E

11267 C. LEICHTLINII California, Plumas Co., NNW of Quincy. 980 m. Dryish, gravelly slopes in openings among Pinus. 30.6.89 (This has a North/South distribution down the drier E slope of the Sierra Nevada, parallel to the Nevada border, which it just crosses. Like the others from the perimeter of the Great Basin, this is a plant of montane steppe and will need to be kept cold and dry in winter. It has a close superficial resemblance to C. nuttallii and its allies and has been included with them but because the gland is not (or only slightly) depressed, Ownbey includes it in Subsection Venusti. Usually white but sometimes bluish or pink-tinged flowers with dark spots above the glands & golden bases.) (15+ seeds) D

10988 C. LUTEUS California, Tuolumne Co., near Chinese Camp. 380 m. Open, level grassland. 16.6.89 (The one consistently yellow member of Sect. Mariposa, Subsect. Venusti, quite widespread in the foothills around the Central Valley. Great, golden tulip-shaped flowers, intricately marked and pencilled with brown at the base. Generally accepted as one of the more growable of its Subsection. About 30 cm.) (20+ seeds) B

11771 C. LUTEUS California, Lake Co., near Clearlake. 420 m. Open situations in gritty clay. W.R. coll. 30.6.89 (The preceding is a race from the western foothills of the Sierra Nevada, variable from almost white to deep yellow, this was collected by Wayne on the opposite side of the Central Valley and can be regarded as a Coast Range foothill race, which W.R. tells us is clear yellow, tinged with green towards base, and with particularly fine, brown basal markings.) (15+ seeds) B

10987 C. LUTEUS/SUPERBUS California, Tuolumne Co., near Chinese Camp. 380 m. Among long grasses in streamside meadow. 16.6.89 (Growing near to 10988 but in quite a different habitat and about 60 cm. high, these are probably just robust C. luteus but W.R. suggests they may be C. superbus.) (15+ seeds) B

11540 C. MACROCARPUS Idaho, Butte Co., W of Craters of the Moon. 1520 m. Among volcanic debris on E & SE facing slopes, with Eriogonum, Artemisia, etc. 5.8.89 (A most distinct species, placed in a Subsection of its own within Section Mariposa and with the same northern West-East distribution as C. eurycarpus and its allies from S British Columbia and NE California across to Montana. Large, bowl-shaped flowers with pointed segments, purple with striking green median bands on the petals, carried on stout stems up to 50 cm. high. According to Grey "strikingly handsome, easily grown...") (15+ seeds) D

11264 C. NUDUS California, Plumas Co., NNW of Quincy. 1000 m. Margins of moist meadows among conifers and on drier ridges in or at edge of Darlingtonia-bogs. 30.6.89 (This is a sweet little thing, the only member of Sect. Calochortus, Subsect. Nudi listed here, restricted to mountain meadows in the coniferous forests of NE California. Stems of about 15 cm. with 1-3 erect lavender flowers, quite variable in depth of colour and the internal purple markings. May be best tried outside in the U.K.!) (15+ seeds) D

PRICE CODE A	:	$1.50	;	£1.00	;	DM3, -	;	FF10. -	PRICE CODE D	:	$4.00	;	£2.50	;	DM 7,50	;	FF25. -
B	:	$2.50	;	£1.50	;	DM4,50	;	FF15. -	E	:	$5.50	;	£3.50	;	DM10, -	;	FF35. -
C	:	$3.50	;	£2.00	;	DM6, -	;	FF20. -	F	:	$7.00	;	£4.50	;	DM13, -	;	FF45. -

CALOCHORTUS continued

10885 C. NUTTALLII Utah, Uintah Co., E of Tridell. 1700 m. Ridges of sand, clay and pebbles (ancient river deposits) with sparse Juniperus. 8.6.89 (We are most excited about this, having discussed the Calochortus in this area with Panayoti and Gwen Kelaidis, who visited the region around Tridell in the Uintah Basin in May, 1989. Although it should be stressed they did not see flowers in this precise spot, they assure us that all the Calochortus seen around Tridell were the marvellous sugar-pink race, which we have long wanted to collect. Though we have never seen these early plants in flower, we feel someone should take a much closer look at the taxa assigned to C. nuttallii in Utah, irrespective of colour. Considering the locality and altitude, this flowers so early and is dormant by June, that it may take a normal bulb-frame.) (20+) D

8855 C. NUTTALLII Colorado, Mesa Co., East Creek Canyon, SW of Whitewater. 1800 m. Stony sandstone slopes with sparse Juniperus. SB coll. 30.6.87 (We offer this again in the hope it is the more widespread white form and can complement the above - we did visit this locality on 5.6.89 but there was no trace of flowers or seed - but we have seen a photograph of the bright-pink race from near Grand Junction, not so far from here, and this is obviously also an early flowerer. May also be best in a normal bulb-frame.) (20+ seeds) D

11682 C. OBISPOENSIS California, San Luis Obispo Co., NE of San Luis Obispo. 150 m. Serpentine outcrops and in crevices on loose, serpentine cliffs. 26.8.89 (The only member of Section Cyclobothra listed - this section includes some S Californians and all the Mexicans. This is an extremely local serpentine endemic, one of the most distinct and highly evolved of all species. Slender but stiff, branching stems, about 30-50 cm. high, carry many small flowers with reflexed sepals and hairy-tufted, purple-tipped, bright orange-yellow petals - more like a piece of miniature feather millinery than a flower!) (15+ seeds) D

11683 C. SIMULANS California, San Luis Obispo Co., NE of San Luis Obispo. 170 m. In clay among long grasses on open slopes. 26.8.89 (Growing in the same locality as the preceding but in a completely different situation, this is an even more obscure species. It is not included in the original edition of Munz but is included in the supplement. We have not seen it in flower and have not had time to research the literature on this fully but, as far as we can ascertain, this is a lilac-flowered species belonging to Sect. Mariposa, Subsect. Venusti. We should all be grateful to John Andrews for allowing us to make seed of these little-known species (see also Paeonia californica) widely available by sharing his knowledge of this extraordinary locality, which,one can but hope,will long remain undisturbed.) (20+ seeds) E

11690 C. SPLENDENS California, Ventura Co., Lockwood Valley. 1370 m. Open meadows in clay with grasses and rushes. 27.8.89 (A beautiful, elegant plant, quite widespread in W California. A Mariposa, belonging to Subsect. Venusti, with, in this form seen in flower 26.6.89, wide open flowers of pure, soft lavender with long, wispy white basal hairs and dark anthers, on 30-50 cm. stems.) (20+ seeds) C

11674 C. SPLENDENS California, Lake Co., Walker Ridge E of Indian Valley. 600 m. Openings in Arctostaphylos scrub over serpentine. 23.8.89 (While the preceding is from a southern station, not far N of Los Angeles this is from near the northern limit for the species. Not seen in flower by us but W.R. tells us this is marked basally with deep purple. "Quite easy to grow", says Grey!) (15+ seeds) C

11772 C. SUPERBUS California, Butte Co., Table Mt. N of Oroville. 150 m. W.R. coll. 14.7.89 (Along with C. venustus and C. vestae, this forms a group of plants, extremely variable, not only in the ground--colour of the flowers, but in their spectacular and highly complex basal markings. Belonging to Sect. Mariposa, Subsect. Venusti, they have all at times been included under C. venustus but Ownbey sorts them out on the basis of the shape of the gland ; as this seems correlated with the different populations, it seems reasonably acceptable. C. superbus has a linear gland shaped like an inverted V. We have not seen these in flower but ground-colour is usually white (can vary to cream or pale lavender) with purple basal markings and blotch, surrounded by a yellow zone. Further comments under C. venustus.) (20+ seeds) B

11077 C. ? TOLMIEI Oregon, Josephine Co., SW of O'Brien. 460 m. Open, stony 'flats' with sparse scrub among conifers. 19.6.89 (See our comments on these little Cat's Ear species under C. coeruleus.) (15+ seeds) C

11104 C. ? TOLMIEI Oregon, Josephine Co., E of Takilma. 850 m. Open, turfy and stony slopes among conifers. 19.6.89 (Almost certainly the same species as the preceding. To give some clues as to cultivation, it was accompanied in both places by Silene hookeri, Viola cuneata and Phlox speciosa.) (15+ seeds) C

10998 C. VENUSTUS California, Tuolumne Co., Italian Bar Road, NE of Columbia. Open, steep, stony slopes. 600 - -740 m. 16.6.89 (supplemented by later J.A. coll.) (Further to the remarks under C. superbus, this is distinguished by its rather square gland. Everyone's idea of a Mariposa Lily, it can vary throughout its range from white and yellow to red and purple with an infinity of complex markings. This seed is most likely to produce basically whites intricately patterned with dark red at the base and a striking median red blotch below a golden zone. By no means the most difficult - Grey rated it "very easily grown.")(20+) B

11703 C. VENUSTUS California, Kern Co., above Cuddy Valley. 2120 m. Openings among Pinus on steep slope. 27.8.89 (A very even population, growing intermingled with C. kennedyi (11704), with white or soft lilac-pink ground colour and all with a ghostly thumbprint of pale blood-red towards the tip of each petal, as well as the basal complexity of chestnut-red markings and golden hairs.) (15+ seeds) D

11693 C. VENUSTUS California, Kern Co., Cuddy Valley. 1840 m. Among grasses in openings among Pinus. 27.8.89 (Lower down the foothills of Mt. Pinos from the above colony, grows this population of red-flowered plants, which for pure 'class' is hard to better. This is not the incredible, eye-burning scarlet of C. kennedyi but a series of subtle shades as you might find on a piece of scarlet velvet which had faded to varying degrees. Of course, the complexity of basal markings is lost (having suffused over the entire flower) but the yellow basal hairs and gland stand out against the clean red ground.) (15+ seeds) E

11593 C. VESTAE California, Mendocino Co., E of Willits, S of Mount Sanhedrin. 1240 m. Among long grass on open clay slope. 19.8.89 (Whereas the allied C. superbus & C. venustus are more or less sympatric, this occurs quite apart from them in the N Coast Ranges. Moreover, it has a double-crescent-shaped gland, a different chromosome number and a preference for heavy clays - possibly only those derived from serpentine, according to Kruckeberg. We have not seen this or the next coll. in flower but where we have seen it, to the NW near Garberville (seed here grazed by cattle), any deviation from a pure white ground colour (to a purplish pink) was extremely rare. Expect whites with purple-pencilled bases and big brown-purple blotches surrounded by bright yellow zones - huge spectacular flowers.) (20+ seeds) C

11666 C. VESTAE California, Lake Co., NE of Middletown. 340 m. Among grasses in heavy clay in open sites. 23.8.89 (supplemented by W.R. coll. 30.7.89) (An impressively prolific and vigorous colony!) (20+ seeds) C

11582 CALTHA HOWELLII California, Sierra Co., NNW of Bassetts. 2000 m. With Salix scrub in moist, open meadow among conifers. 12.8.89 (A fine white Marsh Marigold restricted to California & S Oregon - quite distinct from the next in its rounded, reniform leaves : oblong-cordate in C.leptosepala)(20+ seeds) C

11407 CALTHA LEPTOSEPALA Colorado, Mesa Co., Grand Mesa above Mesa. 3000 m. Open moist to wet meadows. 18.7.89 (One of the earliest flowers of the high snow-melt marshes with white, bluish-backed flowers Widespread from Alaska down the Rockies. Both are dwarf in flower, growing later to 50 cm.) (20+ seeds) C

CALYLOPHUS : Retained here under Oenothera q.v. though the separate genus seems fully justified.

11218 CALYPTRIDIUM UMBELLATUM (Spraguea umbellata) California, Ventura Co., Mt. Pinos. 2680 m. Open patches of granite grit among alpine-steppe vegetation in summit area. 27.6.89 (A very neat little plant with flat rosettes of dark green, leathery spoon-shaped leaves from which radiate prostrate stems carrying packed umbels of tiny rose-pink flowers, which become papery with age. A Lewisia relative, though it looks more like a little Eriogonum, quite easily grown as a pan-plant, dryish in full sun.) (50+ seeds) B

11108 CAMASSIA ? LEICHTLINII subsp. SUKSDORFII Oregon, Josephine Co., Slate Creek SW of Wonder. 360 m. Among rocks at edge of stream. 19.6.89 (The two species should be separable in fruit but the necessary characteristics are not always wholly obvious! Both these should have erect spires of deep violet-blue flowers in spring. They are moisture-loving bulbs from habitats which can be extremely wet in spring and consequently prove good-garden plants in cool wet climates. This is about 1 m. high.) (20+ seeds) C

11122 CAMASSIA ? QUAMASH subsp. BREVIFLORA California, Modoc Co., Devil's Garden N of Canby. 1500 m. Stony clay 'flats' overlaid with volcanic debris. 20.6.89 (In flower easily distinguished from C. leichtlinii by having 5 perianth segments curving up and only 1 down. This is also a dwarfer plant, about 50 cm. high from a habitat that was much drier in summer, though obviously inundated in spring.) (20+ seeds) B

11657 CAMPANULA SCABRELLA California, Trinity/Siskiyou Co., Mt. Eddy SW of Weed. 2500-2700 m. Loose igneous (serpentine?) talus on steep summit slopes. 22.8.89 (supplemented by J.A. coll. 15.9.89) (This and the following species constitute two closely allied, extremely local, high altitude plants, choice enough and certainly difficult enough to merit the attention of even the most discriminating specialist grower. In California, it is only known from the summit area of Mt. Eddy but it does occur in a few disjunct alpine habitats to the N. We have never seen it in cultivation and it would be likely only to succeed in the hands of an experienced alpine-house grower. These two possibly have some distant affinity to C. piperi, which grows about 500 miles (800 km.) to the N in Washington, but they are much smaller and C. scabrella has a tufted upright habit, 3-10 cm. in height, with a characteristic rough pubescence, narrow leaves and starry pale-blue flowers - a most desirable little plant!) (30+ seeds) F

11844 CAMPANULA SHETLERI California, Siskiyou Co., above Castle Lake, SW of Mt. Shasta. 1820 m Crevices in N-facing, granitic rocks. J.A. coll. 15.9.89 (This one we have grown for several years from seed collect -ed in the 1970's (not long after the species was first described) by Jim McPhail and Bob Woodward. It was not easy to propagate vegetatively and we eventually lost it, though we saw a fine pan of it some years later in the alpine-house of Olga Duchacova in Czechoslovakia and we believe it is now back in limited circulation in Britain. More than the above, this looks like a perfectly proportioned miniature C. piperi as the leaves are toothed and it runs underground - John tells us it is almost mat-forming where its saxatile habitat allows. Certainly growable with care and worth every effort.) (30+ seeds) F

11754 CASSIOPE MERTENSIANA California, Alpine Co., S of Carson Pass above Winnemucca Lake. 2730 m. Moist banks & depressions in turf with Phyllodoce, Kalmia, etc. (over granite). 5.9.89 (Exquisite little Ericaceous shrublet, with profuse white bells, about 20 cm. high. Easy in the U.K. in peat.) (50+ seeds) C

CASTILLEJA. While these must be regarded as plants for the adventurous gardener willing to experiment, they are by no means impossible. Seed from our 1987 collections has germinated and the seedlings survive though there are no reports of flowers yet. One incorrigible optimist has some C. integra established in a tub outside his hotel in the N of Scotland - that's the spirit! Success in the USA has been achieved in a peat-based compost with liquid feeding. This is a fascinating and diverse genus that must be grown successfully sooner or later. To encompass a fair range we are listing some Seed Bank material from species we could not revisit in 1989.

8920 CASTILLEJA CHROMOSA New Mexico, San Juan Co., NW of Aztec. 1900 m. Among sparse Artemisia on eroded clay hills. SB coll. 4.7.87 (Spectacular 30 cm. Desert Paintbrush with stunning scarlet bracts.) (20+ seeds) B

9437 CASTILLEJA INTEGRA Colorado, Park Co., SW of Fairplay. 3100 m. Open, stony steppe among Artemisia. SB coll. 13.8.87 (Upright, 30 cm., grey-leaved stems with brilliant orange-scarlet spikes.) (50+ seeds) B

11151 CASTILLEJA ? LATIFOLIA California, Marin Co., near Nicasio. 15 m. Grassy, coastal hills. 22.6.89 (W.R. suggests it may be this but C. wightii subsp. inflata, endemic to this area, is also possible)(50+ seeds) B

11711 CASTILLEJA NANA California, Inyo Co., White Mts. 3160 m. Steep stony slopes. 28.8.89 (A little alpine about 15 cm. high, the entire plant with subtle purple and cream suffusions.) (50+ seeds) B

9465 CASTILLEJA OCCIDENTALIS Colorado, Park Co., Mosquito Range. 4300 m. Exposed slopes. 15.8.87 (Lemon-yellow bracts and purplish leaves and stems. 15 cm. Often grows isolated on 'rock-stripes'.) (30+ seeds) B

10782 CASTILLEJA SCABRIDA Utah, Emery Co., Coal Cliffs SE of Moore. 1980 m. Eroded ridges with overlying sandstone layers. 2.6.89 (Woody-based species about 20 cm. high with spectacular brilliant red bracts and flowers - well illustrated on Plate 25 of "Rocky Mountain Alpines".) (20+ seeds) B

11774 CEANOTHUS CORDULATUS California, Amador Co., Pedlar Hill. 2040 m. W.R. coll. 15.8.89 (The Snow Bush, a stiff, twiggy widespreading shrub, 1-2 m. high, widely distributed through the Sierra Nevada and N Coast Ranges usually on open slopes in the coniferous forest zone. The whole plant has a greyish appearance and covers itself with dense clusters of white flowers in early summer.) (15+ seeds) B

11775 CEANOTHUS PROSTRATUS California, Shasta Co., S of Shingletown, ESE of Redding. 1060 m. W.R. coll. 19.7.89 (Totally prostrate species forming rooting mats 1-2 m. across. Blue flowers vary in depth of colour. We have grown this in the U.K. (the name is frequently misapplied to prostrate forms of totally unrelated species in cultivation) and it is, of course, completely hardy but it does need a really hot dry position to flower well. The more tender coastal spp. perform better in British gardens.) (15+ seeds) B

11609 CERCIS OCCIDENTALIS California, Mendocino Co., N of Potter Valley. 500 m. Open slopes and woodland margins. 19.8.89 (Both this coll. and the next are from selected clones of the Western Redbud, which are absolutely stunning in fruit with clusters of purple-tinted pods. Rather shrubby, 2-5 m. high)(15+ seeds) C

11670 CERCIS OCCIDENTALIS California, Lake Co., SE side of Clear Lake. 410 m. Open scrub. 23.8.89 (The sp. is generally similar to the Eurasian C. siliquastrum with purple-pink flowers in spring.) (15+ seeds) C

PRICE CODE A	:	$1.50	;	£1.00	;	DM3, -	;	FF10. -	PRICE CODE D	:	$4.00	;	£2.50	;	DM 7,50	;	FF25. -
B	:	$2.50	;	£1.50	;	DM4,50	;	FF15. -	E	:	$5.50	;	£3.50	;	DM10, -	;	FF35. -
C	:	$3.50	;	£2.00	;	DM6, -	;	FF20. -	F	:	$7.00	;	£4.50	;	DM13, -	;	FF45. -

11738 CHAENACTIS NEVADENSIS Nevada, Washoe Co., SW of Mt. Rose. 3080 m. Loose talus on steep slopes. 29.8.89 (By far the best of the genus we have seen so far, a high-alpine Composite endemic to the Sierra Nevada, quite close to the more widespread C. alpina but more caespitose with its rosettes of densely grey-felted lobed leaves clustered on a woody tap-root. Tight, short-stemmed flower-heads, packed into purplish involucral bracts, open creamy white from deep pink buds. 5-10 cm. high.) D

11616 CHIMAPHILA UMBELLATA California, Trinity Co., Lassics Lookout Road above Zenia. 1600 m. In shade of coniferous woodland. 20.8.89 (A very beautiful, shrubby, evergreen member of the Pyrolaceae, about 20 cm. high with complex, fleshy rose-pink flowers. Usually peaty conditions are recommended in cultivation but it nature it always grows in dryish shade. Seed is minute and doubtless very difficult.) (100+ seeds) C

10993 CHLOROGALUM ANGUSTIFOLIUM California, Mariposa Co., above Coulterville. 610 m. In clay on open grassy slopes. 16.6.89 (This belongs to a small genus of Californian bulbs. Slender, wiry stems to about 60 cm. carry many small, white, starry flowers - somewhat similar to Anthericum ramosum.) (20+ seeds) B

10984 CLARKIA BILOBA California, Tuolumne Co., W of Chinese Camp. 360 m. In clay on open grassy slopes. 16.6.89 (We have to list at least one member of this spectacular and complex genus of about 30 spp. of Californian annuals. Wiry stems of around 50 cm. with purple-pink flowers. The unprejudiced might try it in the bulb-frame or a sunny raised bed if they garden in cold, wet climates.) (50+ seeds) A

11773 CLEMATIS LASIANTHA Butte Co., Cherokee Road N of Oroville. 300 m. W.R. coll. 14.7.89 (Californian endemic climber with downy stems and leaves. Creamy flowers about 5 cm. across.) (20+ seeds) B

11191 CONVOLVULUS SUBACAULIS California, Ventura Co., Lockwood Valley Road. 1220 m. Open areas in sandy clay with sparse Pinus. 26.6.89 (Almost stemless with small, triangular, grey-felted leaves and large, flat cream flowers. A very fine dwarf plant in nature but likely to be difficult to keep in character.) (8) D

10851 CORYDALIS AUREA Colorado, Rio Blanco Co., above Piceance Creek NW of Rio Blanco. 1980 m. Steep, loose slopes of fragmented shale. 6.6.89 (A very variable dwarf species extremely widespread in N America but we have never found it at all numerous when we have found it. This is a compact perennial form from the oil shales of NW Colorado, with dissected, glaucous foliage and short-stemmed racemes of bright yellow flowers, about 10 cm. high, - not unlike the Chinese C. wilsonii. Good drainage & full sun.) (15+ seeds) D

11400 CORYDALIS CASEANA subsp. BRANDEGEI Colorado, Delta Co., Grand Mesa above Cedaredge. 2750 m. Wet areas, often among boulders near running water, in openings in Abies forest. 18.7.89 (It is extraordinary that this amazing relic species never appears to have become established in European gardens. While this is a tuberous-rooted Corydalis, devotees of this fashionable group of plants may find their excitement waning when they learn it can grow more than 2 m. high! This is truly a mega-corydalis ideally suited to the surroundings of a woodland garden or moist, shaded border, where it has to be growable in any cold, moist climate. In appearance, it is more or less as might be expected, except for its stature - branched, fleshy stems, profusely clothed below with glaucous, compound leaves, are topped with dense panicles of white, or occasionally pale pink, flowers, tipped with purple. This subsp. occurs only on Grand Mesa and in a few places in the San Juan Ra. ; it crops up again in the N Wasatch Mts in Utah in subsp. brachycarpa ; the type race grows in the N Sierra Nevada in California. We have only seen it here - it is an extremely local plant, occurring in abundance where it does grow but severely limited to localities which are literally few and very far between. We optimistically look forward to seeing this well established in cultivation - particularly in our own wet woodland!) (15+ seeds) D

10767 CORYPHANTHA VIVIPARA var. ARIZONICA Utah, Sevier Co., Hogan Pass NE of Fremont. 2730 m. Open gravelly slopes with Astragalus. 1.6.89 (An extremely high altitude collection of this little ball-cactus - a depressed hemisphere 5-10 cm. in diameter with 5 cm. flowers with purple-pink petaloids. For the alpine-house where it can be kept cold and dry in winter. Very difficult to harvest seed!) (8 seeds) E

CRYPTANTHA. We are still very dubious that it will be possible to grow the more desirable members of this extensive genus (about 150 spp. in the Boraginaceae, close to Eritrichium) sufficiently in character for them to be worth attempting in cultivation. The majority are too coarse to appeal to current tastes but many can be extremely attractive plants in the wild, especially early in the season. The following three are undeniably among the best. All belong to Subgenus Oreocarya with white, yellow-centred flowers.

10579 CRYPTANTHA HUMILIS Nevada, Nye Co., Monitor Range E of Tonopah. 2130 m. Gravelly slopes and ledges on granite outcrops. 22.5.89 (Widespread in the areas around the Great Basin. About 10 cm.) (8 seeds) D

11337 CRYPTANTHA OCHROLEUCA Utah, Garfield Co., Red Canyon above Butch Cassidy Draw. 2600 m. Loose limestone scree on steep slopes. 7.7.89 (Grey cushions and 4 cm. stems. Endemic to this area only.) (8 seeds) D

10827 CRYPTANTHA PARADOXA Colorado, Montrose Co., above Paradox Valley NW of Bedrock. 1800 m. Gravelly clay on open sandstone slopes. 4.6.89 (Silver-leaved rosettes and especially large flowers. 10 cm.) (8 seeds) D

10972 CYNOGLOSSUM GRANDE California, Solano Co., Mix Canyon NW of Vacaville. 300 m. Deciduous woodland - on dry, shady slopes. 15.6.89 (Soundly perennial from a deep, heavy rootstock - summer-dormant in nature. A beautiful Boraginaceous herbaceous plant, around 50 cm. high, when carrying its panicles of deep, pure blue flowers. Maybe best attempted in colder climates in a well-drained site in full sun.) (5 seeds) C

11644 DARLINGTONIA CALIFORNICA Oregon, Josephine Co., SW of O'Brien. 500 m. Wet depressions on open slopes. 21.8.89 (This page has had more than its share of odd individualists but none is more eccentric than this monotypic genus of insectivorous plants restricted to Oregon and N California. The great winged, translucent pitchers, about 50 cm. high, are overtopped by the equally bizarre yellow-green and dull purple flowers, which droop on stems of almost 1 m. While this is a montane plant and perfectly temperat--ure hardy, it does have very specialised cultural requirements (in particular it likes a cool root-run so does not appreciate being stood in a saucer of water under glass in summer!) and is also demanding to raise from seed, so is best left to those who are already growing carnivorous plants or those who are prepared to make the effort to learn about them - plenty good literature available!) (50+ seeds) C

DELPHINIUM. Collecting seed from the several desirable summer-dormant species is a great trial. We completely failed to collect the apparently ubiquitous (in flower!) D. nelsonii in the Rockies in 1987 but a few interesting species appear this year - more by luck than foresight. Those listed are all summer -dormant plants for well-drained sites. There are no large summer-growers from wet places this season.

11825 DELPHINIUM ? DEPAUPERATUM California, Nevada Co., Monumental Ridge above Yuba Cap. 1770 m. J.A. coll. 29.7.89 (May be this or may be D. nuttallianum (q.v.). Dark-blue flowered and about 30 cm.) (20+ seeds) C

PRICE CODE A :	$1.50	£1.00	DM3, -	FF10. -	PRICE CODE D :	$4.00	£2.50	DM7,50	FF25. -
B :	$2.50	£1.50	DM4,50	FF15. -	E :	$5.50	£3.50	DM10, -	FF35. -
C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

11442 DELPHINIUM GEYERI Wyoming, Converse Co., SW of Glendo. 1980 m. Open grassland on low, rolling hills. 22.7.89 (A fairly dwarf prairie form, about 50 cm. high, of one of the best of the more eastern species with branching stems of azure-blue flowers. A dryland plant dying back in summer.) (30+ seeds) C

11017 DELPHINIUM NUDICAULE California, Trinity Co., Lassics Lookout Road above Zenia. 1660 m. Among scrub on rock outcrop. 17.6.89 (An extremely interesting collection - not only are the elegant, long-spurred flowers, held out on long pedicels, entirely of a brilliant, solid scarlet but they are carried on branching stems approaching 1 m. in height! This was so different from our idea of this species, based on the material cultivated in the U.K.,that we at first thought it might be D. cardinale which occurs far to the South. Less than a week later, W.R. showed us the dried (empty!) capsules of D. nudicaule growing on coastal cliffs in Marin Co.where its height and appearance conformed more to our preconception of this species. When J.A. returned to this area on 15.7.89 he tried to collect more seed of this for us but he could find no trace of the plant - just what we have come to expect from Delphiniums!) (20+ seeds) C

10949 DELPHINIUM NUTTALLIANUM California, Sierra Co., SE of Sierraville. 1870 m. Open areas in river gravels with sparse Pinus. 13.6.89 (We did see these in flower on 13.5.89 but this seed is probably from plants which flowered about two weeks afterwards. This is the name which is suggested by Welsh, Dorn and even Weber as acceptable for the entire group of more eastern species, including D. nelsonii. A further 'lumping' would place the lot under D. menziesii, the earliest name, with which they apparently inter--grade in the NW part of their range. While they are all possessed of a little bundle of tuberous roots, they vary enormously in pubescence, height and colour. We have grown members of this group in the past in the alpine-house and have always found them to be both trouble-free and rewarding. They are not for the nurseryman as the dormant roots are all but impossible to find and they will do little but generate complaints for over 9 months in the year. We commend them to the discriminating amateur. This colony was of plants about 30 cm. high and with flowers in purple rather than the more usual blue.) (20+ seeds) C

11606 DICENTRA CHRYSANTHA California, Mendocino/Lake Co., Hull Mt. NNE of Lake Pillsbury. 1880 m. Open slopes in recently burned scrub. 19.8.89 (This surpasses Corydalis caseana as one of the most 'way-out' members of the Fumariaceae. A Californian endemic and a classic fire-follower, which may exist in an area only as the occasional plant or even not be seen at all until fire sweeps a hillside clean. Then it can build up a huge population until it is eventually smothered out by the rejuvenated woody vegetation. Its general appearance is somewhat unexpected when one is used to more conventional members of the genus : from a stout perennial root rise several stiff stems clothed basally with equally stiff blue-grey, dissected leaves and carrying, erect terminal panicles of many bright yellow flowers, of the expected bleeding--heart shape but facing upwards, not nodding, as in most species. More or less 1 m. high. This collection is from around the northern limit of the species and from about the highest altitude it attains. It should be growable in a well-drained site in full sun but don't ask us how to germinate the seed - some scarification between sandpaper might be easier than burning it over or putting it an an oven!) (20+) C

11179 DICENTRA CHRYSANTHA California, Santa Barbara Co., Cuyama River Valley E of Santa Maria. 460 m. Steep, open, stony slopes. 26.6.89 (Not growing here in a recently burned habitat.) (20+ seeds) C

11083 DICENTRA FORMOSA subsp. OREGANA Oregon, Josephine Co., SW of O'Brien. 610 m. Loose talus on steep open slopes. 19.6.89 (supplemented by J.A. coll. 21.5.89) (Not only a very choice perennial but a very local race indeed, a strict serpentine endemic confined to the inner ridges of the Coast Ranges which run across the Oregon/California line between Gasquet and O'Brien. We have grown material under this name but it is difficult to say in retrospect how authentic it might have been - its influence is obvious in several garden cvs. The dwarf habit (15-20 cm.), shallowly cordate corolla and colour - cream with a rose tip - are diagnostic. We hope this material can be widely established and maintained by vegetative propagation, so its authenticity might be retained - always a plant of sunny scree in nature.)(20+ seeds) D

DICHELOSTEMMA. See comments under Brodiaea - distinct in the leaves being keeled beneath.

11622 DICHELOSTEMMA IDA-MAIA California, Humboldt Co., Friday Ridge, SSW of Willow Creek. 650 m. & above. Among grasses on steep banks and open slopes at margins of woodland. 20.8.89 (An amazing and spectacular plant. Stems from 30 cm to almost 1 m. in height carry an umbel of pendant, tubular flowers in the most glowing of pure, brilliant reds. The red buds are tipped with bright green and in the open flowers the short greenish cream segments curve back around the plug of white staminodes. This is a plant of northern California, entering Oregon in Curry Co., and it is surprising to read that it is "not very hardy" in the U.K. - more likely inadequate drainage leading to excessively wet conditions is the problem. It grew well and survived a succession of severe winters in the stony soil of one garden we know well.) (20+ seeds) C

11235 DICHELOSTEMMA MULTIFLORUM California, Butte Co., N Fork Feather River at Pulga Bridge. 400 m. Among scrub on steep, rocky slopes. (About 50 cm. high with rounded umbels of violet flowers.) (20+ seeds) B

11776 DICHELOSTEMMA MULTIFLORUM California, Butte Co., N of Oroville. 150 m. W.R. coll. 14.7.89 (20+ seeds) B

10982 DICHELOSTEMMA PULCHELLUM California, Tuolumne Co., W of Chinese Camp. 360 m. Open grassy slopes and among sparse scrub. 16.6.89 (Tight umbels of lilac-blue flowers above purplish bracts. Around 50 cm. high. The only species which extends beyond California E to N New Mexico.) (20+ seeds) B

10969 DICHELOSTEMMA VOLUBILE California, Solano Co., Mix Canyon NW of Vacaville. 300 m. Among scrub on open slope. 15.6.89 (Another individualist - one of the few climbing 'bulbs'! Sturdy, contorted flower stems, anything up to 2 m. long, twine through and over bushes carrying quite large, compact umbels of rose-pink flowers with white staminodes. Quite growable in warm dryish conditions.) (20+ seeds) C

DIPLACUS. For expediency we retain this shrubby genus based in California under Mimulus (q.v.)

DODECATHEON. This extremely beautiful genus of the Primulaceae is neither fully appreciated nor under-stood by most gardeners. The reason is doubtless partly due to a lack of knowledge of the cultural requirements of the two distinct groups : summer-dormant plants from habitats which are wet in spring but dry out completely later in the year and those from places which remain moist throughout the summer. Further disillusionment is certainly engendered by the fact that the major proportion of material which circulates in cultivation is incorrectly named with the result that raising seed under a variety of names produces the same species, often D. meadia! The situation has hardly been helped by the considerable amount of botanical 'splitting' which it has been subjected to. The number of distinct species only extends to little more than a dozen and, while all are on the same general pattern, all merit the garden--er's attention. We have not seen all of the colonies from which the following seed was collected in flower but it can be assumed these will be reasonably distinct. We have tried to draw particular attent--ion to the habitat : those from sites permanently wet in summer are likely to succeed in the U.K. in the open garden - in a peat bed or in a moist place in the rock garden. Summer-dormant species will require dry conditions in summer - under glass in wet climates.

PRICE CODE A	:	$1.50	;	£1.00	;	DM3, -	;	FF10. -	PRICE CODE D	:	$4.00	;	£2.50	;	DM 7,50	;	FF25. -
B	:	$2.50	;	£1.50	;	DM4,50	;	FF15. -	E	:	$5.50	;	£3.50	;	DM10, -	;	FF35. -
C	:	$3.50	;	£2.00	;	DM6, -	;	FF20. -	F	:	$7.00	;	£4.50	;	DM13, -	;	FF45. -

DODECATHEON

11744 D. ALPINUM Nevada, Washoe Co., SW of Mt. Rose. 2740 m. Among Salix scrub in open, wet meadows. 29.8.89 (A small, dainty form from the Sierra Nevada. The species is only found in permanently wet meadows at high altitudes, where it flowers in July and August, and is distinct from the others in the corolla and calyx being only 4-lobed - others, except D. jeffreyi, which varies, are 5-lobed.)(30+ seeds) C

9542 D. ALPINUM Nevada, White Pine Co., Snake Range. 3500 m. Among long grasses in wet, streamside meadow. S.B. coll. 24.8.89 (We list this again as it was such a fine form, from one of the species most eastern localities. Taller and more robust than the above with lavender-pink flowers ; black anthers.)(50+ seeds) C

11778 D. CLEVELANDII California, Santa Clara Co., Del Puerto Road (E of San Jose). 370 m. W.R. coll. 29.5.89 (A beautiful and distinct, though variable, low altitude Californian endemic, about 30 cm. high with magenta-pink flowers with yellow noses. Flowers very early in spring and is dormant in summer)(30+ seeds) C

11133 D. CONJUGENS California, Modoc Co., Warner Mts. E of Davis Creek. 1750 m. Gravelly clay slopes among Artemisia. 20.6.89 (Quite close to D. clevelandii but essentially a cold-climate, northern plant extending E to Montana and Wyoming and just entering the NE corner of California. Relying on snow-melt water this grows with other summer-dormant steppe-plants : Sisyrinchium douglasii, Alliums, etc.) (30+ seeds) C

11271 D. HENDERSONII California, Plumas Co., NNW of Quincy. 980 m. Among scrub in stony clay in shade of coniferous woodland. 30.6.89 (Quite widespread through the western ranges N to British Columbia, often a shade-lover, growing here in summer-dry conditions with Erythronium, Calochortus, etc.) (20+ seeds) C

11650 D. JEFFREYI California, Trinity Co., Pacific Crest Trail NW of Mt. Eddy.2300 m. Wet open meadow. 22.8.89 (Closest to D. alpinum, with which it may intergrade, this extends N to Alaska and E to Montana - always a plant of permanently wet, montane habitats, flowering from June to August.) (30+ seeds) C

11456 D. PULCHELLUM Wyoming, Albany Co., Laramie Mts., Laramie Peak. 2590 m. Moist, shaded slope in coniferous woodland with Salix, Smilacina, Linnaea, etc. 23.7.89 (A rather small, delicate form of this more eastern species - the only one occurring S from here into the Colorado Rockies.) (30+ seeds) C

9174 D. PULCHELLUM Wyoming, Laramie Co., Horse Creek. 2300 m. Among long grass in moist meadow. S.B. coll. 22.7.87 (From a robust prairie form, up to 1 m. high in seed, with especially deep magenta-carmine flowers, growing in a more typical open, wet meadow situation.) (50+ seeds) C

11481 DOUGLASIA MONTANA Wyoming, Sheridan Co., Big Horn Mts., Duncum Mt. 3300 m. Stony, windswept summit area. 26.7.89 (An exquisite high alpine - one of the smallest Douglasias (possibly more sensibly placed under Androsace as A. montana). A tiny plant of exposed tundra forming little clumps of rosettes with big pink flowers. Demanding but cultivated to a high standard by many specialist growers.) (10+ seeds) E

11777 DUDLEYA CYMOSA California, Nevada Co., ENE of Nevada City. 1000 m. W.R. coll. 19.8.89 (We are somewhat ashamed that we did not get round to collecting any of this genus ourselves - the Californian speciality in Crassulaceae (most spp. have been in Sedum or Echeveria). Most of the 20 or so spp. are low altitude saxatile plants but this grows higher than most with beautiful, tight glaucous-white rosettes and dense inflorescences of bright yellow to reddish flowers. Worthy of the alpine-house.) (100+ seeds) B

DRABA. The following are three extremely choice plants from very high altitudes. All are deserving of every attention from the alpine-house enthusiast. All are yellow but otherwise distinct.

11826 DRABA DENSIFOLIA California, Placer Co., Tinker Knob N of Squaw Valley. 2720 m. Among rocks in summit area. J.A. coll. 29.7.87 (Confined to a few summits in the Sierra Nevada but ranges NE to Montana. (20+) D

11827 DRABA OLIGOSPERMA Nevada, Washoe Co., SW of Mt. Rose. 3100 m. Exposed rocky places on summit ridges. J.A. coll. 30.7.89 (One of the most widespread and perhaps the finest of the N American Drabas - this is an exceptionally tight, compact form, which we saw here on 29.8.89 - seed dispersed.) (20+ seeds) D

11721 DRABA SIERRAE California, Mono Co., White Mts., Sheep Mt. 3500 m. Rock fissures. 28.8.89 (A Californian endemic confined to high altitudes in Mono and Inyo Co. and extremely impressive in its true pulvinate habit with compact cushions squeezed tightly into rock crevices - of considerable potential!) (20+ seeds) D

10811 ECHINOCEREUS TRIGLOCHIDIATUS var. MELANACANTHUS Utah, San Juan Co., Sunbonnet Rock above Bluff. 1550 m. Among rocks on steep sandstone slopes. 3.6.89 (A very beautiful member of the Cactaceae forming compact colonies of fat, ribbed stems about 10 cm. high with spectacular scarlet flowers in spring. This should be perfectly temperature-hardy and growable under alpine-house conditions.) (15+ seeds) D

11189 ENCELIA FARINOSA California, Ventura Co., Lockwood Valley Road. 1220 m. Open 'flats' in sandy clay with sparse Pinus. 26.6.89 (A very attractive, rounded desert shrub, usually less than 1 m. high, with aromatic, grey leaves and showy orange-yellow daisies. Distributed eastward from here to S Utah and S into Mexico this can sadly only be considered by those who garden in hot, dry climates.) (20+ seeds) B

10789 ENCELIOPSIS NUDICAULIS Utah, Emery Co., Molen Reef SE of Moore. 2130 m. Stony clay on eroded shale hills. 2.6.89 (A herbaceous perennial, closely related to the preceding, which exudes 'class'. Even if it never flowers - which it may never do in cultivation - the exquisite tufts of silver-white leaves would alone justify its cultivation in any alpine-house. The huge orange-gold flower-heads, on white stems, anything from 10 to 30 cm. or more in height, are the ultimate in refined perfection of the 'daisy' form. The species is of unquestionable desert origins but is stranded in what are now very cold areas indeed - up through Nevada and Utah as far N as Idaho. It is always, however, a very local species restricted to what are among the most arid, inhospitable habitats within arid, inhospitable areas - favouring the tops of barren, gravelly ridges where little, if anything, else grows. There you may find its compact, silver clumps of foliage, which, if the season has suited it, may have produced these incredible flowers. You may look at many colonies, however, without seeing any evidence of flowering. There are but 3 spp. in the genus, endemic to the SW U.S.A. One lacks the spectacular ray florets (E. nutans) ; the other has the famed Panamint Daisy as a disjunct race in the Panamint Mts., which border Californias Death Valley - E. argophylla var. grandiflora. The eastern races of E. nudicaulis have flower-heads only marginally smaller than the last and, as they frequent much colder habitats, may be the only members of this genus growable in colder climates. A magical plant worth every optimistic effort in cultivation.) (15+ seeds) D

10674 ENCELIOPSIS NUDICAULIS Nevada, Lincoln Co., W side of Panaca Summit. 1780 m. Gravel ridges with sparse Juniperus. 25.5.89 (Unlikely to be much different to the above ; a second attempt?) (15+ seeds) D

PRICE CODE A : $1.50 ; £1.00 ; DM3, - ; FF10. - PRICE CODE D : $4.00 ; £2.50 ; DM 7,50 ; FF25. -
B : $2.50 ; £1.50 ; DM4,50 ; FF15. - E : $5.50 ; £3.50 ; DM10, - ; FF35. -
C : $3.50 ; £2.00 ; DM6, - ; FF20. - F : $7.00 ; £4.50 ; DM13, - ; FF45. -

EPILOBIUM OBCORDATUM GROUP. Too close an association with the more perniciously weedy members of a genus all too often blinds gardeners to the fact that the genus might include some exquisite jewels, sufficiently intractable to challenge even the most skilled grower and of a quality to justify lavishing every care and attention on them. Such is certainly the case with Convolvulus and also we assure you with Epilobium. The 3 taxa with which we are concerned here are closely allied and on a generally similar pattern. They all flower late, from July into September, and, having seen them all in flower in the wild, we should be hard-pressed to choose the most beautiful. E. obcordatum is the basic taxon and, according to Munz (who is rather "woolly" about these and only delineates subsp. siskiyouense clearly in the supplement) it extends NE from the Sierra Nevada through Oregon into Idaho. Reginald Farrer, writing in 1913, was well aware of its qualities : "... the rock-garden establishes its claim to one species especially, and this is the really beautiful and gorgeous little E. obcordatum...a mass of leafy shoots...ending in clusters of very large and very brilliant full-petalled flowers of glowing rosy-pink...a rare choice treasure." Seen flowering on 5.9.89 at 2740 m. above Winnemucca Lake - little cushions of magenta satin glowing on the dreary granite scree - this was stunning but it is generally considered the least desirable of the trio. It runs underground and tends to produce flowers only at the tips of the shoots in the kinder conditions of cultivation. E. o. subsp. siskiyouense, however, has a more caespitose, suffrutescent base. It has a restricted distribution in the mountains of Siskiyou and Trinity Cos. About 100 miles (160 km.) to the NW on the ridges of the Coast Ranges along the Oregon/California border and just as local, if not even more so, grows E. rigidum. The last is definitely a pure serpentine endemic and one suspects this is also the case with E. o. subsp. siskiyouense (Kruckeberg, in his book on the "California Serpentines" only suggests it might be but admits he has not seen the plant in the wild). If one feels it necessary to maintain 2 spp., it would appear more sensible to separate E. o. subsp. siskiyouense from E. obcordatum and place it with E. rigidum, to which it is obviously closely allied. Of the 3, we have only grown E. rigidum. Like many choice westerners, this came from a collection by Jim Macphail and Bob Woodward in the 1970's. While we grew it for many years, we were never successful in propagation. We never had the chance to raise it from seed again - you do not get the chance of this sort of thing very often in life! It is extremely difficult to make a worthwhile seed-collection from any of these - plump capsules taken at the right moment when the silky hairs are just oozing out of the split, might contain one or two fertile seeds if you are lucky. Treasure the seedlings and try to propagate from them ; these are not impossible to grow but grown well they could be among the finest plants in an alpine-house.

11742 EPILOBIUM OBCORDATUM Nevada, Washoe Co., SW of Mt. Rose. 2900 m. Stable granite talus. 29.8.89(10 seeds) D

11649 EPILOBIUM OBCORDATUM subsp. SISKIYOUENSE California, Trinity Co., NW of Mt. Eddy. 2100 m. Exposed, stony slopes. 22.8.89 (supplemented by J.A. coll. 16.9.89). (10 seeds) F

11642 EPILOBIUM RIGIDUM Oregon, Josephine Co., SW of O'Brien. 720 m. Exposed stony areas. 21.8.89 (supplemented by J.A. coll. 23.9.89) (The lowest altitude race but perhaps the most desirable!) (10 seeds) F

ERIGERON. We have still not overcome our doubtless unjustified prejudice against collecting members of of this widespread and ubiquitous genus of Compositae, which provides so many delightful and colourful wildflowers yet which so often seems to fall just a little short of one's ideals. There is one quite devastating exception here, however, in the superlative E. compactus, and we take the opportunity to list two of our favourite Rocky Mt. collections again, from 1987 S.B. material.

10897 ERIGERON ARGENTATUS Utah, Sevier Co., SW of Emery. 1950 m. Clay among igneous detritus on open slopes. 9.6.89 (Rather a handsome species with tufts of silvery basal leaves and big solitary heads in lilac-blue, pale pink or white (all colours present here) but the flower-stems can reach about 30 cm. in height, though usually 15 cm. or less. Nevertheless, definitely worth trying in a hot, dry situation.) C

10933 ERIGERON COMPACTUS Nevada, Eureka Co., W of Eureka. 2100 m. Exposed, bare, alkaline 'flats' with sparse Juniperus. 11.6.89 (A remarkable species from a remarkable habitat, which it shares with that amazing cushion-plant, Lepidium nanum. While a seed-collection from the Lepidium was the main object of our visit (virtually none was set here in either 1989 or 1987), the truth is that this Erigeron is a far more desirable entity as far as the alpine-house is concerned. Of extreme pulvinate habit, the firm round hummocks cover themselves with daisies, usually white but sometimes pale lilac-pink and sometimes tinted red on the reverse or round the yellow disc, on stems of around 5 cm. in length. Dwight Ripley, who visited this locality with Rupert Barneby in 1944, describes it in his usual inspired fashion as "one of the choicest of its race, for the interlacing stems with their minutely linear leaves have been moulded by centuries of Nevada's intolerable climate and searing winds into the stoniest little cakes imaginable, dotted over the snow-white hills like domes of lichen in Iceland.") E

10802 ERIGERON COMPACTUS var. CONSIMILIS Utah, Emery Co., above Eagle Valley, SE of Moore. 2200 m. Gritty clay in open areas among occasional Juniperus. 2.6.89 (While the above type race, with leaves of a rather yellowish green, is endemic to the Great Basin, this, with somewhat greyer green foliage, is endemic to the Colorado Plateau. We have not seen this colony in flower.) E

9473 ERIGERON PINNATISECTUS Colorado, El Paso Co., Pike's Peak, Elk Park. 4000 m. Loose granite grit on steep slope. S.B. coll. 17.8.87 (An oustandingly attractive, cut-leaved species widespread in the Rockies and especially fine here with flowers in rich blue-violet shades on short stems of 5 cm. or so.) B

8911 ERIGERON ? VAGUS Colorado, San Juan Co., San Juan Mts., Molas Divide S of Silverton. 3800 m. Vertical rock fissures. S.B. coll. 4.7.87 (Soft lavender-blue heads on pads of dissected grey leaves, which packed the rock-crevices. A gem in the wild, this has proved reasonably satisfactory in cultivation, retaining its mat forming habit but tending to produce flower-stems up to about 10 cm. high. The name is somewhat doubtful - E. vagus is usually a scree-dwelling, stoloniferous sp. - but we can offer no other.) D

ERIOGONUM. This is another very large and ubiquitous genus of the N American West, exceptionally diverse in habit, from tall annuals and shrubs to tiny mound-forming perennials. Both the diversity and density of the species decreases from West to East with about 80 in California, 60 in Utah and 20 in Wyoming. While few of these might interest the gardener, there are some superlative plants among them. We list a wide range of the westerners plus a few more eastern spp. from S.B. material. This year we have decided to distribute cleaned seed. We are not at all sure this is the best course to adopt as we feel it is all too easy to damage seed in cleaning it. We have been as careful as possible and hope that this has not occurred. It does mean that we can give definite seed-counts per packet, however. Sending out fat packets of part-cleaned inflorescences might have meant some contained no viable seed at all. We have had good reports of germination from several 1987 collections so this was obviously not invariably the case! Reports on germination of cleaned seed will be equally welcome so we can make the best decision

* 11805 ERIOGONUM COMPOSITUM Ex hort. W.R. from seed coll. California, Siskiyou Co., Gazelle Summit NW of Callahan. 1500 m. Gravelly clay. (A woody-based perennial with flat basal rosettes and stout stems of about 50 cm. carrying umbels of creamy flowers maturing to rose. Successful in Wayne's garden.) (8 seeds) B

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B :	$2.50	£1.50	DM4,50	FF15. -	E :	$5.50	£3.50	DM10, -	FF35. -
C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

ERIOGONUM

9162 ERIOGONUM FLAVUM (var. flavum) Wyoming, Laramie Co., S of Cheyenne. 2100 m. Exposed grassland. S.B. coll. 22.7.87 (A neat plains-plant with acid-yellow heads, flushing orange, from tidy mats.) (15+ seeds) B

9579 ERIOGONUM FLAVUM var. XANTHUM Colorado, Clear Creek Co., Front Range, Mts. Evans. 3800 m. Exposed stony slopes. S.B. coll. 30.8.87 (Endemic to the high tundra around the Continental Divide in Colorado. An excellent, growable plant with mats of silvered leaves and short-stemmed bright yellow heads.)(10+ seeds) C

11718 E. GRACILIPES California, Mono Co., White Mts., Sheep Mt. 3500 m. Exposed stony slopes. 28.8.89 (An endemic to the White Mts. belonging to Subgenus Eucycla Sect. Capitata - an extremely choice and wholly desirable group, often, like this,narrow, high altitude endemics and including E. kennedyi and E. shockleyi. This forms little mounds or pads of grey-felted rosettes, from the centre of which rose-pink buds peep in spring. As the season advances, the flower stem lengthens to carry a rounded head of flowers maturing to rose and raspberry shades and finally rust-red tones. Like the other members of its section, of great potential in the alpine-house and deserving every care.) (10+ seeds) F

11779 E. INCANUM California, Amador Co., Pedlar Hill. 2040 m. W.R. coll. 15.8.89 (A rather fine medium-sized endemic of the Sierra Nevada, forming mats of densely woolly grey leaves to 30 cm. across on gravelly slopes. Flower-stems of about 15 cm. carry umbellate heads of pale-yellow flowers.) (15+ seeds) C

11697 E. KENNEDYI California, Ventura Co., Mt. Pinos. 2680 m. Exposed areas of granite grit in summit area. 27.8.89 (Perhaps the most tightly compacted member of the genus forming wide, hard mats, as silvery white as Raoulia mamillaris. According to Reveal, the specialist in Eriogonum, the E. wrightii complex, more obviously shrubby plants up to 25 cm. high, has "suffered considerable confusion" with E. kennedyi, the type-collection of which he "found to compare most favorably with specimens from the lower slopes of Mt. Pinos." Plants from the summit area are assigned by him to E. kennedyi var. alpigenum, a taxon dis--tinguished by the scapes being densely woolly and less than 2 cm. long. However, having seen several hundred plants in the summit area, some virtually stemless in flower and some with scapes considerably more than 2 cm., we have no doubt that this taxon is completely transitional to lower altitude ones and could not possibly be maintained. This collection is from the highest growing, shortest stemmed plants and the name is there to use if you so wish! The capitate heads are composed of white flowers with red midveins from pink buds, maturing to rust tones in fruit, but it is the extreme pulvinate habit with minute, hard-packed, silver-white rosettes which makes it so desirable for the alpine-house.) (10+ seeds) F

11604 E. LOBBII California, Mendocino Co., Hull Mt. NNE of Lake Pillsbury. 2030 m. Loose talus on steep slopes. 19.8.89 (A most distinct plant quite widespread in the N Coast Ranges and N Sierra Nevada. Flat rosettes of round, downy-grey leaves send out one or two, prostrate, wiry scapes, up to 15 cm. long and each carrying a big, rounded umbel packed with pink flowers, maturing to lovely rose and apricot tones. A pot with these radiating flower-stems could be quite stunning in the alpine-house!) (15+ seeds) D

E. OVALIFOLIUM GROUP. This group of wholly desirable plants is extremely widespread - from British Columbia E to Montana and Wyoming and far S in California. In 1989 we made collections from several distinct taxa in Utah, Idaho and Nevada but on cleaning them found there was simply not enough seed to list! So, we are left with 2 Sierran taxa from Wayne and John. We are not convinced that it is possible to divide this group up botanically, except on a very narrow regional basis, as there is so much complex intergradation. As most colonies tend to be quite homogeneous within the limits of their distribution, the gardener might be best to side with the extreme 'splitter' and thus have a label to put on what will appear to be utterly distinct taxa. The following two provide an extremely good example of the problem : Reveal has placed both of them under E. o. var. nivale ; others have described them as quite separate species. Fortunately, in both cases, Mt. Rose is the type-locality so there can be no argument over the legitimate use of the names - it is only a matter of botanical opinion as to the justification for them.

11780 E. OVALIFOLIUM (E. eximium) Nevada, Washoe Co., S of Mt. Rose. 2680 m. W.R. coll. 16.8.89 (Gladys Smith in her 'Flora of the Tahoe Basin' (1984) describes this as "a lovely plant, low and loosely rounded, herbage gray-tomentose and large heads of silvery-buff flowers." Alpine-house.) (10+ seeds) D

11740 E. OVALIFOLIUM (E. rhodanthum) Nevada, Washoe Co., SW of Mt. Rose. 3150 m. J.A. coll. 29.8.89 (This is an extremely fine high altitude race of the sort usually aggregated under E. o. var. nivale. Growing on the most exposed, stony summit ridges, forming little mats of tiny round, white-felt leaves, this race is particularly notable for its short-stemmed flower-heads maturing to deep rose-pink. A gem.)(10+ seeds) E

11781 E. UMBELLATUM California, Alpine Co., Hope Valley NE of Carson Pass. 2130 m. Granite grit. W.R. coll. 15.8.89 (Not seen by us but W.R. tells us this is a fine, compact form of this extremely widespread species. The type race belongs to the Rocky Mts. and this would be assignable to one of several taxa recorded for this area (E.u. var. torreyanum, E.u. var. nevadense, etc.) but the position of many of these seems confused and this is best regarded as a good form with chartreuse-yellow flowers maturing to bronze-yellow tints, about 20 cm. high in flower, worth trying in the open rock-garden.) (15+ seeds) B

9247 E. UMBELLATUM var. MAJUS (E. subalpinum) Wyoming, Carbon Co., Shirley Mts., NNW of Medicine Bow. 2500 m. Meadow near stream with tall Artemisia. S.B. coll. 27.7.87 (The largest here and a splendid thing with wide mats and 20-30 cm. stems carrying huge creamy heads ageing to pink and amber.)(15+ seeds) B

11719 E. UMBELLATUM var. VERSICOLOR California, Mono Co., White Mts. below Sheep Mt. 3400 m. Open gravelly slopes. 28.8.89 (A most distinct dwarf race from the desert ranges along the S California/Nevada border. Mats of dull grey-green rosettes and flowers maturing to deep rose shades. Probably difficult.)(10 seeds) D

11745 ERIOPHYLLUM LANATUM var. MONOENSE California, Alpine Co., S of Carson Pass. 2700 m. Open, stony places. 5.9.89 (The most densely caespitose, densely woolly, dwarf alpine race of this showy Composite)(10+ seeds) D

11491 ERITRICHIUM HOWARDII Wyoming, Park Co., Dead Indian Pass NW of Cody. 2800 m. Limestone gravel patches and rock fissures. 28.7.89 (We have a superb collection this year of this most exquisite of alpine-plants - on the whole our journeys through Nevada, Utah and Wyoming were not so rewarding in 1989 but the occasional collection like this makes everything worthwhile! Absolutely distinct from E. nanum (which follows after Fritillaria!), this is certainly not impossible to cultivate well. We have grown it and it has set seed with us. Of course it needs impeccable drainage and protection from Winter-wet but in Europe it will be best plunged outside in summer - this is a plant of cool northern steppe. Silver rosettes packed into dense cushions, to 10 cm. across, covered with purest blue flowers on 5 cm. stems.)(10 seeds) F

PRICE CODE A	:	$1.50	;	£1.00	;	DM3, -	;	FF10. -	PRICE CODE D	:	$4.00	;	£2.50	;	DM 7,50	;	FF25. -
B	:	$2.50	;	£1.50	;	DM4,50	;	FF15. -	E	:	$5.50	;	£3.50	;	DM10, -	;	FF35. -
C	:	$3.50	;	£2.00	;	DM6, -	;	FF20. -	F	:	$7.00	;	£4.50	;	DM13, -	;	FF45. -

ERYTHRONIUM

Like Calochortus, this genus has its centre of diversity in N California. It is, however, a much smaller genus, comparatively uniform both in habit and habitat, but with an extremely wide circumboreal distribution. These currently fashionable plants have proved generally adaptable to cultivation in cool temperate climates, where most prove totally hardy and tolerant of a wide range of growing conditions. At first glance, this adaptability seems puzzling as many of the western species are of narrow distribution. Doubtless it is partly due to the qualities inherent in what is probably an ancient genus, which evolved and spread during a period when cool northern forests encircled the world. Having seen species such as E. tuolumnense and E. helenae in nature, it is incredible that they can survive far less flourish in some peat-beds in the U.K. The majority of Californian species show a definite partiality for habitats on serpentine, a few are strict serpentine endemics. We have already mentioned serpentine and Prof. Arthur Kruckeberg's work 'California Serpentines' and we shall shortly do so again in the case of the genus Fritillaria. California, with over 1000 square miles of serpentine habitat has more than its share of this inhospitable rock, which weathers to singularly infertile soils. It is deficient in nitrogen and phosphorus and has extremely low levels of calcium coupled with exceptionally high concentrat--ions of magnesium, leading to magnesium toxicity. Knowledge that a plant grows on serpentine tells us not so much what a plant wants in cultivation as what it does not need. Any success achieved growing these in peat is more likely to be due to the fact that it is a low nutrient, lime-free medium than to its physical properties, which we should consider to be distinctly dangerous in many cases. The Californians we have seen all grew in extremely well-drained habitats, usually in light shade. They are all early-flowering, summer-dormant plants adapted to conditions which are dry, even if not necessarily hot, in summer. In no case have we seen them in what could be called "humus-rich" soil, though doubtless the sparse litter-layer does provide them with their source of slow-release nutrition. If they all grow successfully for you in a peat-bed, carry on growing them there! If any do not thrive there for you, however, perhaps our comments might provide a few ideas as to the best methods of cultivation under your particular circumstances.

11624 ERYTHRONIUM CALIFORNICUM California, Humboldt Co., Friday Ridge, SSW of Willow Creek. 1490 m. Loose serpentine talus on steep slopes ; in shade of sparse conifers. 20.8.89 (A Californian endemic quite widespread in the N Coast Ranges. Leaves beautifully mottled with brown on green and one to several flowers in creamy-white deepening to gold in the throat. This is the typical race with white anthers. Generally acknowledged to be an easily grown plant in cool temperate gardens.) (20+ seeds) C

11018 ERYTHRONIUM CALIFORNICUM California, Trinity Co., above Bear Creek, NNE of Weaverville. 960 m. Stony soil in openings in coniferous forest. 18.6.89 (This is a spectacular and interesting race which we have not seen mentioned in cultivation, which has purple anthers, rather than the usual white, making for a striking flower. It is apparently quite uniform in this locality.) (20+ seeds) E

11065 E. CITRINUM California, Del Norte Co., ENE of Gasquet. 400-450 m. Steep, rocky slopes, usually among dense scrub of Rhododendron, Vaccinium, etc. 19.6.89 (More or less restricted, like so many interesting species, to the ridges of the Coast Ranges along the California/Oregon line. A mottled leaf species, closest to E. howellii but with basal appendages on the perianth-segments. Usually creamy-white with a greenish yellow base. This is an area of comparatively high rainfall and humidity and the plants were growing in a shadier, more mesic habitat than most we have seen.) (20+ seeds) D

11393 E. GRANDIFLORUM Colorado, Montrose Co., Uncompahgre Plateau, Columbine Pass. 2900 m. Openings in mixed woodland (Populus & Abies). 15.7.89 (The most widespread of the western spp. extending from Vancouver across S Canada to the Rockies then S to Colorado. An outstanding plant with bright yellow flowers and plain green leaves. Usually with yellow anthers in Colorado. While it is generally accepted as one of the finest species it is not always so easily cultivated. It often grows in quantity as a high-altitude snow-melt plant but we have deliberately collected this in woodland in the hope it is easier.)(20+ seeds) C

11525 E. GRANDIFLORUM Utah, Cache Co., Wasatch Range, Bear River Mts. above Tony Grove Lake. 2400 m. Open, stony 'flats' with Artemisia. 2.8.89 (Again from a rather unusual habitat which may produce material more adaptable in cultivation. Populations from the Wasatch usually have red-brown anthers.) (20+ seeds) C

11678 E. HELENAE California, Lake Co., Butts Canyon Road, SE of Middletown. 450 m. Stony hillsides among Arctostaphylos chaparral. 23.8.89 (supplemented with W.R. coll. 19.5.89) (A serpentine endemic only occurring in a small area around Mt. St. Helena. As we have seen it, it was growing in a comparatively open situation in an area that is hot and extremely dry in summer : a very well-drained site in full sun would seem appropriate in cooler, wetter climates. A beautiful plant with mottled leaves, quite close to E. californicum but with yellow anthers and a definite capacity to increase vegetatively.) (20+ seeds) D

11116 E. HENDERSONII Oregon, Jackson Co., N of Medford. 400 m. Open grassland and openings among scrub. 20.6.89 (Again limited to the California/Oregon borders, this may be restricted to serpentine derived clays but seldom offers any problems in cultivation. A very beautiful robust species with dark, mottled leaves and lavender-pink flowers with dark anthers and a purple base surrounded by a white or yellow zone. Growing here with other summer-dormant species : Calochortus, Sisyrinchium, etc.) (20+ seeds) C

11099 E. HOWELLII Oregon, Josephine Co., E of Takilma. 670 m. Open, turfy and stony slopes among conifers. 19.6.89 (Again limited to a small area on the Oregon/California border, nearest to E. citrinum but with no basal appendages. White flowers usually centrally marked with yellow and turning pink as they age. White anthers. Mottled leaves. Not a well-tried species in cultivation.) (20+ seeds) D

11783 E. MULTISCAPOIDEUM (= E. hartwegii) California, Butte Co., near Magalia. 760 m. On serpentine under Cupressus. W.R. coll. 27.5.89 (Heavily mottled leaves. White flowers, yellow-green at the centres with white anthers. The only western sp. with stoloniferous corms. Little-known in cultivation.) (20+ seeds) D

11784 E. MULTISCAPOIDEUM ("E. cliftonii") California, Butte Co., near Pulga. 460 m. Open, S-facing, serpentine slopes. W.R. coll. 27.5.89 (A distinct local race, more or less a giant form, which it has been suggested should be described as a new species. From what we have been told, the most appropriate status would appear to be E. m. var. cliftonii and we hope it may be described as such.) (15+ seeds) E

11828 E. PURPURASCENS California, Nevada Co., Monumental Ridge near Yuba Gap. 1770-1980 m. J.A. coll. 29.7.89 A most distinct species endemic to the granites of the Sierra Nevada. Plain green leaves and yellow-centred, white flowers tinged purple with age. Up to 11 flowers per stem in this colony.) (15+ seeds) D

11270 E. PURPURASCENS California, Plumas Co., NNW of Quincy. 980 m. Stony soil over granite in coniferous woodland. 30.6.89 (From a low altitude for the species, which is very little-known in gardens)(15+ seeds) D

10996 E. TUOLUMNENSE California, Tuolumne Co., Italian Bar Road, NE of Columbia. 760 m. Steep scrub-covered slopes in deciduous woodland. 16.6.89 (supplemented with W.R. & J.A. colls.) (An extraordinary relic, extremely local in the wild but easily cultivated and increasing well vegetatively. Plain, bright-green leaves and deep yellow flowers with greenish centres - of a good size in some wild forms.) (20+ seeds) C

PRICE CODE A :	$1.50	£1.00	DM3, -	FF10. -	PRICE CODE D :	$4.00	£2.50	DM 7,50	FF25. -
B :	$2.50	£1.50	DM4,50	FF15. -	E :	$5.50	£3.50	DM10, -	FF35. -
C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

FRITILLARIA

About 20% of the species of Fritillaria occur in N America. As with Erythronium and Calochortus, their centre is N California, where they still appear to be actively evolving, sometimes involved in hybridisation and, with the more widespread ones, showing a considerable amount of variation within the current concepts of the species. The most accessible and recently published information is contained in articles by Roger Macfarlane in 'Lilies 1975' and 'Lilies 1988'. You will find some names used here and in other British publications which we have not used in this list. In keeping with our usual conservative policy, we prefer to retain the names used in the standard flora for the area, which in this case is Munz, last updated in 1968. When the projected "Jepson Manual" appears, we should most probably accept the nomenclature used in it. We cross reference the two names with which we are involved here.

Cultivation is the obstruction to these species becoming more widespread in gardens. They have for the most part never been considered "easy" plants and their requirements have never been well understood. Once again, we must point out the predilection of many species for serpentine. Three are strict serpentine endemics but a large number of Californian populations of others occur either on serpentine or in serpentine-derived clays. There has simply been insufficient field-work for any conclusion to be reached at present. Our own knowledge both of geology and of these plants in the wild is totally inadequate for even the start of an opinion to be formulated. We can suggest, however, that bearing in mind the qualities of serpentine (roughly outlined in the introduction to Erythronium on the previous page) lack of success in cultivation is most likely to be due to killing the plants with "kindness". Any compost likely to be used in cultivation will almost certainly contain more than enough nitrogen, phosphorus and calcium for the plants natural requirements. It is more likely that serpentine species have developed a resistance to, rather than a requirement of, the exceptional levels of magnesium and iron which occur in it. If we try growing these in a well-drained, limefree mixture, with the same summer rest as accorded to other summer-dormant species, and avoid poisoning them with excesses of nitrogen, phosphorus and calcium, it might at least be a start to growing them more successfully in cultivation.

FRITILLARIA AFFINIS : see under F. lanceolata, which would appear to be an invalid name.

10500 FRITILLARIA AGRESTIS California, Alameda Co., E of Livermore. 170 m. Heavy clay in open, level grass--land. 13.5.89 (A plant of the grassland of the Central Valley, very closely allied to F. biflora, which has a coastal distribution. Macfarlane has reduced this to F. biflora subsp. agrestis. Stout stems up to about 50 cm. can carry as many as 8 bell-shaped flowers, greenish cream outside and purplish-brown inside. See under F. pluriflora for more comments on these low-altitude, adobe-clay species.) (20+ seeds) C

11538 FRITILLARIA ATROPURPUREA Idaho, Butte Co., NW of Craters of the Moon. 1520 m. SE-facing slopes on low hills of volcanic cinders among Artemisia, Eriogonum, Balsamorhiza, etc. 5.8.89 (While always a very local plant, this has the widest distribution, from Oregon E to N Dakota and S to New Mexico. Although Macfarlane considers this to be a "woodland species", as we know it in Idaho and Utah, it is more typically a plant of montane steppe. We have found it up to almost 3000 m. in alpine, Festuca-grassland. It is in fact a plant of many plant-communities, variable in habit and flower. We have not seen this in flower here but it is a fairly robust form, usually over 30 cm. high with several flowers on a stem - these are usually wide bells mottled in purple-brown and yellow or white. Both this coll. and the next may be best kept only just moist in winter with plenty water in spring only - needs care.) (15+ seeds) C

11552 F. ATROPURPUREA Idaho, Custer Co., above Yankee Fork Salmon River, N of Sunbeam. 1890 m. Open areas among conifers with sparse Artemisia in granite gravel. 6.8.89 (Not seen in flower but stems usually less than 30 cm. and always single flowered here. Reputedly not at all an easy plant to grow)(15+ seeds) D

11679 F. BIFLORA California, San Luis Obispo Co., San Simeon Bay. 5 m. Coastal grassland. 26.8.89 (A low altitude, winter-growing species, flowering as early as February, usually with dark brown-purple, green--striped bells, here on stems 20-30 cm. high. A small, late collection from almost empty capsules!) (15) C

F. EASTWOODIAE : see under F. phaeanthera with further comments on the application of this name.

10504 F. FALCATA California, Stanislaus Co., above Adobe Creek. 490 m. Unstable serpentine talus on steep, N-facing slope. 13.5.89 (A very dwarf serpentine-endemic, possibly derived from F. atropurpurea but not unlike some of the Turkish, scree forms of F. crassifolia in habit. A few glaucous, fleshy leaves, folded and curved, sit on the stones and short-stemmed bowl-shaped flower faces upwards from them - greenish outside and mottled red-brown and yellow inside. This is a species of extremely restricted distribution in the wild which every effort should be made to establish and maintain in cultivation.) (15+ seeds) F

11625 F. GLAUCA California, Humboldt Co., SSW of Willow Creek. 1490 m. Loose serpentine talus on steep, open slope. 20.8.89 (Another serpentine-endemic from similar habitats to the preceding but rather more widely distributed down the western Coast Ranges. Thick glaucous leaves and a stem up to 15 cm., but usually less, normally with a single, nodding bell - in this form a clear greenish yellow often maturing to red--brown tones. There are uniform brown-flowered populations but the one we visited on Hull Mt. had set very little seed in 1989. Like the above, a very choice plant for the skilled specialist.) (15+ seeds) E

10964 F. LANCEOLATA (F. affinis) California, Solano Co., Mix Canyon NW of Vacaville. 300 m. Openings in scrub and woodland among grasses. 15.6.89 (Very widely distributed down the Pacific Coast area from British Columbia into California, as far S as the mountains on the W edge of the Mojave, if you include the disjunct population, F. ojaiensis. It is very variable and many taxa have been named. This is a fairly typical form of low altitude woodland with slender 50 cm. stems with whorled leaves. The nodding, wide bells are usually mottled in brown-purple and yellow. Usually one of the easiest to grow.) (20+ seeds) B

11075 F. LANCEOLATA (F. affinis) Oregon, Josephine Co., SW of O'Brien. 460 m. Open, stony 'flats' with sparse scrub among conifers. 19.6.89 (According to J.A. a yellowish green form with only a few brown lines on the bells. A dwarf, single-flowered plant about 15 cm. high possibly growing here on serpentine.)(15+) D

11786 F. LILIACEA California, Marin Co., near Nicasio. 15 m. Among Baccharis scrub on low, grassy coastal hills. W.R. coll. 26.5.89 (A coastal plant of limited distribution N & S of San Francisco. Stem to about 30 cm. with bright-green leaves and up to 5 pendant creamy white bells, pencilled or tinted with green. A handsome, distinct species and one of the most easily grown in cultivation. We have, however, lost bulbs of this through pots becoming frozen in a severe winter in the U.K. Foliage can also be damaged by frost. Consideration of this should be given in cultivating this in cold areas - as well as with other coastal or low-altitude species : possibly FF. agrestis, biflora, pluriflora and striata, as well as some forms of F. lanceolata. These are winter-growers flowering February to April.) (20+ seeds) C

PRICE CODE A	:	$1.50	; £1.00	; DM3, -	; FF10. -	PRICE CODE D	:	$4.00	; £2.50	; DM 7,50	; FF25. -
B	:	$2.50	; £1.50	; DM4,50	; FF15. -	E	:	$5.50	; £3.50	; DM10, -	; FF35. -
C	:	$3.50	; £2.00	; DM6, -	; FF20. -	F	:	$7.00	; £4.50	; DM13, -	; FF45. -

FRITILLARIA continued

10990 F. MICRANTHA California, Mariposa Co., Greeley Hill above Coulterville. 610 m. Open grassy slopes among sparse Pinus. 16.6.89 (A robust species from the foothills of the Sierra Nevada, which, according to Munz can reach 90 cm. in height with up to 10 nodding bells, usually purplish but varying to paler, greener tones and sometimes faintly mottled, and with whorled leaves. Most plants seen here were about 50 cm. Little-known in cultivation, we can find few references to it in gardening literature.)(20+ seeds) C

11147 F. PHAEANTHERA California, Shasta Co., near Shingletown E of Redding. c. 1000 m. Openings in scrub among Pinus. 20.6.89 (supplemented with W.R. coll. 14.7.89) (Macfarlane has recently published the name F. eastwoodiae (which may or may not be applicable to the population concerned here) as it is argued that F. phaeanthera, described by Eastwood in 1933, is invalidated by the prior application of the name by Purdy in a caption to a photograph of what appears to be F. lanceolata (F. affinis) in the RHS Lily Year Book of 1932. Rather than become involved with the niceties of nomenclatural legality, we should argue that it is of very dubious worth to apply epithets, especially specific ones, to populations such as this. There seems no dispute that these plants are fairly recently derived hybrids between F. recurva and F. micrantha. Macfarlane himself states of another colony in Butte Co. that "it shows quite a diversity of flower shape and colour intermediate between " the two. It would seem most sensible to us merely to designate such variable populations together as F. recurva x F. micrantha. This particular colony leans more heavily towards F. recurva in its redder flowers but expect anything between the two from seed ; these are robust, vigorous plants about 40 cm. high with several flowers.) (20+ seeds) D

11787 F. PLURIFLORA California, Lake Co., Walker Ridge E of Indian Valley. 600 m. Open areas in heavy clay (possibly serpentine-derived) W.R. coll. 19.5.89 (One of the most distinct and beautiful of all the Fritillaria spp. Stems of up to 30 cm. can carry as many as 7 rather conical bells in a rich and pure unmarked pink. It can occasionally vary from white to deep pink but a bright pink is normal. Though this is a classic adobe clay plant, W.R. has shown us plants growing above the locality where this seed was collected, growing on a bare stony patch of a serpentine outcrop. This has never been successfully established for long in cultivation. The clay in which these plants grow deeply is wet and glutinous in winter and early spring but possibly has both insulating and water-retaining properties when it dries in summer, so exposing dormant bulbs to high temperatures may not be the best course.) (20+ seeds) C

10523 F. PUDICA California, Plumas Co., ESE of Beckwourth. 1520 m. Openings among Artemisia on stony clay slopes. 13.5.89 (Unlike any other N American species: in flower, foliage, seed-capsule - and in habitat - this most closely resembles the SE Turkish F. minima. Its bulbil-covered bulb however is quite distinct. This is a northern plant very widely distributed from British Columbia SE through Wyoming to Colorado and S into N Utah & Nevada, entering the NE corner of California. As we have seen it, it is a plant of stony areas in montane steppe, usually associated with Artemisia. Nodding clear yellow bells, sometimes maturing to orange-red shades, on stems of about 20 cm., often less. While this can be well grown in cultivation, it is not always easy and we list 3 colls. in the hope some may prove more growable. With such a wide range it is to be expected to vary a little in habit and adaptability.) (20+ seeds) C

11143 F. PUDICA California, Modoc Co., S of Davis Creek. 1450 m. Open, gravelly sites. 20.6.89 (20+ seeds) C

11542 F. PUDICA Idaho, Butte Co., NE of Carey. 1520 m. Stony E & SE-facing slopes with Eriogonum & Artemisia scrub. 5.8.89 (Growing here with other summer-dormant spp. : Lewisia rediviva, Calochortus, etc.) (20+) C

11829 F. PURDYI California, Humboldt Co., SSW of Willow Creek. 1580 m. Stable talus and stony places on open slopes with occasional conifers. J.A. coll. 15.7.89 (Endemic to the serpentines of the Californian Coast Ranges. Well illustrated both in Brian Mathew's 'Dwarf Bulbs' and in 'The Bulb Book' by Phillips & Rix : the latter also includes several other fine photographs taken in California by Roger Macfarlane. Stems of between 10 and 40 cm. high carry up to 7 nodding bells, white or greenish white spotted and lined with purple. This coll. is from quite a high altitude for the species.) (15+ seeds) E

11029 F. RECURVA California, Trinity Co., above Canyon Creek N of Junction City. 500 m. Among sparse scrub on steep, stony slopes. 18.6.89 (Like nothing else in the genus, this is an amazing adaptation to attract humming-bird pollinators. Elegant stems can reach 90 cm. but usually about 30 - 50 cm. and normally with 2-3 whorls of narrow leaves can carry up to 7 nodding, narrow bells with the segments recurved at the tips - in colour a luminous scarlet inside and outside with just a hint of ghostly chequering. Can vary a little in depth of colour and chequering but is always a stunning flower. By no means impossible - it has been grown successfully outside in Suffolk and Martyn Rix considers it "not difficult to grow... kept dry in summer" but neither is it an easy plant - worth every effort to establish!) (20+ seeds) C

11612 F. RECURVA California, Trinity Co., Lassics Lookout Road above Zenia. 1630 m. Among Arctostaphylos scrub in opening among conifers on stony, serpentine slope. 20.8.89 (Seen in flower 17.6.89) (20+ seeds) C

11830 F. RECURVA X LANCEOLATA (F. affinis var. gracilis) California, Colusa Co., near Frenzel Creek W of Lodoga. 410 m. J.A. coll. 24.6.89 (Unlike F. phaeanthera this hybrid has not been accorded specific status. The colony is obviously not unique as Macfarlane mentions another in Sonoma Co. Here, John tells us, the plants are fully variable between the two parents both in form and height and with flowers from scarlet to brown. Seed has to produce some extraordinary and possibly vigorous plants.) (15+ seeds) D

11831 F. STRIATA California, Kern Co., Greenhorn Mts., Rancheria Road NE of Bakersfield. 760 m. J.A. coll. 26.4.89 (A most distinct and very beautiful species, almost unknown in cultivation. While it seems close--est to F. pluriflora, which grows about 400 km. (250 miles) to the N, it is utterly distinct in several features, most obviously the shape of the flower, a pendant bell with the segments recurved at the tips. Alan Galloway's story of how he and Roy Weston discovered this ('The New Flora & Silva' Vol.7, No.2, p. 131 (Jan. 1935)) is a delight. While judging an exhibition of wildflowers collected by school child--ren in Bakersfield(doubtless not a socially acceptable event nowadays), they saw this in one of the bunches of flowers and tracked it down to the Greenhorn Mts., where it grew "on north slopes" in "a clayey soil", filling "the warm air with the most delicious fragrance." Though Alice Eastwood in her type description states the flowers are "pale pink", Galloway writes that "the usual colour is actually white or creamy, with purplish dotted striae...occasionally almost absent" but which "sometimes coalesce ... to form an almost solid colour". A plant for the skilled and imaginative grower.) (15+ seeds) E

11250 FRITILLARIA SP. California, Plumas Co., N of Seneca. 1070 m. Stony clay in clearing in coniferous woods. 29.6.89 (This and the following, which may or may not be similar in flower, are something of a mystery. J.A. told us he has seen what he considered to be F. atropurpurea here ; Macfarlane also mentions this sp. for Plumas Co. ; W.R. is non-committal but adds F. recurva occurs here ; Munz only mentions F. micr--antha for Plumas Co. but these are usually 1-flowered and 20-30 cm. high.) (20+ seeds) D

11266 FRITILLARIA SP. California, Plumas Co., NNW of Quincy. 980 m. Dryish, gravelly slopes in openings among Pinus. 30.6.89 (Whatever these are, they occur at the extremity of distribution for all the above.) (20+) D

PRICE CODE A :	$1.50	£1.00	DM3, -	FF10. -	PRICE CODE D :	$4.00	£2.50	DM 7,50	FF25. -
B :	$2.50	£1.50	DM4,50	FF15. -	E :	$5.50	£3.50	DM10, -	FF35. -
C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

11491 ERITRICHIUM HOWARDII : This superlative silver cushion is fully described before Erythronium.(10 seeds) F

9197 ERITRICHIUM NANUM var. ARETIOIDES Colorado, El Paso Co., Pike's Peak, near Elk Park. 3500 m. & above. Exposed slopes in granite grit. S.B. coll. 25.7.87 (A few seeds left of this Rocky Mt. race of the classic Arctic-alpine of the N Hemisphere. Purest blue flowers on silver-haired cushions. While more difficult than E. howardii, the N American races seem easier than those from the Alps.) (10 seeds) F

11482 ERITRICHIUM NANUM var. ELONGATUM Wyoming, Sheridan Co., Big Horn Mts., Duncum Mt. 3300 m. Exposed stony slopes and ridges on hard limestone in summit area. 26.7.89 (The more northern race here forming tiny tuffets in a tight association of Douglasia, Phlox, etc. While this species varies much more in North America than in Europe, it is always totally distinct from E. howardii in the long, loose hairs on the leaves, giving the rosettes a grey, woolly appearance, whereas the short dense hairs on E. howardii leaves look hard and silver. It is never easy to collect much seed of these - don't miss them.)(10 seeds) F

ERYTHRONIUM : see full page before Fritillaria

11574 ESCHSCHOLZIA CALIFORNICA California, Plumas Co., ESE of Beckwourth. 1500 m. Stony clay slopes with Artemisia. 11.8.89 (We could not visit California without collecting some Californian Poppies! This is an incredibly variable group with over 50 species proposed to subdivide it! This coll. may fit under E. c. var. douglasii. Perennial (though doubtless short-lived) with bright yellow flowers and from a cold inland area with frosts throughout the year - not the usual coastal annual.) (30+ seeds) B

11183 EUPHORBIA ALBOMARGINATA California, Ventura Co., Lockwood Valley Road NE of Ozena. 1070 m. Open, level, gravelly areas among scrub. 26.6.89 (Not to be confused with the tall, annual E. marginata from more eastern plains, this is a surprising and fascinating plant quite new to us. A perennial with close, flat mats of absolutely prostrate stems, about 30 cm. across and covered with tiny, white "flowers" (the ray--let leaves) with maroon glands. This is a desert plant, spread across the southern USA S to Mexico and not too likely to grow well outside in wet climates (though Romneya, Fremontodendron & Yucca whipplei, which do well in the UK, all grow nearby) but would make a marvellous pan-plant under glass.) (20+ seeds) C

9018 FRASERA ALBOMARGINATA Utah, Beaver Co., Wah Wah Mts. 2400 m. Open, stony limestone slopes. S.B. coll. 11.7.87 (A dwarf perennial with beautiful basal rosettes of leathery, white-edged leaves. Branched 20 cm. stems carry many white flowers intricately marked and dotted with green. We saw this in flower in many places in the Great Basin in 1989 but have no new seed collection - something 'different'!) (15+ seeds) D

11803 FRASERA SPECIOSA (Swertia radiata) California, Mono Co., near Virginia Lakes S of Bridgeport. 2750 m. W.R. coll. 17.8.89 (One of the most striking plants of the N. American Mts. Splendid rosettes of smooth, grey-green leaves and stout, statuesque stems up to 2 m. high, whorled with countless starry flowers in pale-green dotted with purple. Usually monocarpic. The genus Frasera is possibly better placed under Swertia but is usually separated in N American floras through tradition, as with Douglasia.) (20+ seeds) B

11785 FREMONTODENDRON CALIFORNICUM California, Shasta Co., S of Shingletown, E of Redding. c. 1000 m. W.R. coll. 19.7.89 (We are most grateful to Wayne for making this coll. from what is probably the most north--ern locality for this marvellous shrub, possibly the only member of the Sterculiaceae growable in cold climates. Stiffly branching with more or less evergreen, 3-lobed, dark green leaves, fawn-felted beneath and a multitude of spectacular, wide open, saucer-shaped, rich-yellow flowers - really the 5-lobed, thick-textured, petaloid calyx. Don't imagine the genus starts and finishes with 'California Glory' mass --produced for U.K. garden centres ; there is an incredible amount of variation to be developed)(15 seeds) C

11705 FREMONTODENDRON CALIFORNICUM California, Kern Co., above Cuddy Valley E of Mt. Pinos. 2120 m. Openings among conifers. 27.8.89 (If Wayne's coll. is the most northern, this has to be from about the highest elevation, almost 1000 ft. higher than the limit quoted in Munz - though remember this is almost 640 km. (400 miles) S from Shasta Co. Both these have to show a considerable degree of temperature hardiness, though they should have optimum drainage and full sun - they usually grow on open, rocky, granite slopes in nature. In addition this coll. is quite a distinct form, not much more than 2 m. high with a rather horizontally branching habit and flowers produced densely along the branches so that they touch wreathing the whole branch with gold. Usually easy from seed but they hate disturbance.) (8 seeds) C

11449 GAILLARDIA ARISTATA Wyoming, Converse Co., S of Esterbrooke. 1980 m. Gravelly clay in open grassland. 22.7.89 (Lovely daisies with pale-yellow rays, red-tinted at the base, surrounding the purplish discs. The perennial half of the lurid hybrids between this and the annual G. pulchella. Around 50 cm. high.) B

11371 GAILLARDIA SPATHULATA Utah, Emery Co., SE of Moore. 1980 m. Stony clay in saline desert scrub. 10.7.89 (This is the sweetest little plant ; endemic to E central Utah around the San Rafael Swell and here only about 10-15 cm. high. Rather thick, grey-green basal leaves and comparatively huge, short-stemmed daisies with a few (7-10) notched pale yellow rays surrounding the big, domed yellow disc. If it can be induced to settle down and remain in character in cultivation, it will have a great future!) D

9420 GENTIANA ALGIDA Wyoming, Albany Co., Medicine Bow Mts., above South Gap Lake. 3800 m. Open slopes in stony turf. S.B. coll. 9.8.87 (A breathtaking plant of the highest tundra, distributed up through the Yukon & Alaska into NE Asia. This seems a far more spectacular plant than the Japanese race - rosettes of strap-shaped leaves produce huge, creamy-white trumpets with external brush-strokes in inky blue--black or purple. Not even in bud when we visited this area on 20.7.89. Has germinated well.) (50+ seeds) D

9416 GENTIANA PARRYI Wyoming, Albany Co., Medicine Bow Mts., W of Lewis Lake. 3600 m. Wet peaty areas. S.B. coll, 9.8.87 (Heads of deep-blue trumpets, not unlike a smaller, wirier G. septemfida. 10 cm.)(30+ seeds) C

11845 GENTIANA SETIGERA California, Trinity Co., along Deadfall Creek W of Mt. Eddy. 2180 m. J.A. coll. 23.9.89 (Endemic to wet places in NW California & SW Oregon. Stems of about 20 cm. carry narrow blue bells - some of these westerners are rather fine but we left too early to collect seed.) (30+ seeds) C

11500 GILIA AGGREGATA (Ipomopsis aggregata) Wyoming, Fremont Co., Wind River Mts., SW of Lander. 2500 m. open, stony meadows. 29.7.89 (A spectacular and widespread plant of the western mountains. This is quite a compact form, about 40 cm. high, with branching stems of pendant, brilliant scarlet trumpets. It is also perennial (though certainly not long-lived) with several basal rosettes of the beautifully dissect--ed leaves. Not difficult in a sunny, well-drained site and irresistible in flower.) (20+ seeds) B

11519 GILIA AGGREGATA var. MACROSIPHON Utah, Weber Co., Wasatch Ridge WSW of Woodruff. 3100 m. Open, stony slopes with Artemisia. 1.8.89 (Very long-tubed flowers, white inside and freckled and dotted with red outside to give a shell-pink impression. About 50 cm. high. Both flower profusely.) (15+ seeds) B

PRICE CODE A	:	$1.50	£1.00	DM3, -	FF10. -	PRICE CODE D	:	$4.00	£2.50	DM 7,50	FF25. -
B	:	$2.50	£1.50	DM4,50	FF15. -	E	:	$5.50	£3.50	DM10, -	FF35. -
C	:	$3.50	£2.00	DM6, -	FF20. -	F	:	$7.00	£4.50	DM13, -	FF45. -

GILIA continued

9610 GILIA GLOBULARIS (Ipomopsis globularis) Colorado, Park Co., above Hoosier Pass. 4000 m. Gravel patches in tundra. S.B. coll. 6.9.87 ("One of the most handsome alpine tundra plants, with a heavy fragrance", writes Weber in his field-guide. An extraordinary endemic of the Colorado Rockies with a very limited distribution. Short-stemmed, woolly heads of amethyst purple. A plant for the specialist.) (10+ seeds) F

11370 GILIA STENOTHYRSA Utah, Emery Co., Coal Cliffs SE of Moore. 1980 m. Gravelly ledges on eroded sandstone slabs. 10.7.89 (If Farrer had travelled through Utah he might well have enthused over this instead of Saxifraga florulenta. It is a plant of similar qualities : a local species of limited distribution with an exquisite basal rosette, in this,overlapping, flat, cut, grey-felt leaves, from which rises a 30 cm. cylindrical flower-spike in white to lavender-blue. Monocarpic and unlikely to be easy.) (10+ seeds) E

11610 HACKELIA CALIFORNICA California, Trinity Co., Lassics Lookout Road above Zenia. 1630 m. Stony openings in coniferous woodland. 20.8.89 (We have seed from some fine larger herbaceous species this year ; this is certainly outstanding among them. A member of the Boraginaceae, growing 50 cm. or a little more high from a long-lived woody crown, with bristly oblong basal leaves and a widely branched panicle of large pure-white 'forget-me-not' flowers. We can find no mention of this in cultivation in Europe, either under this name or under Lappula californica (only a cursory search was made and we should be glad to learn if anyone can point to it in cultivation). If it proves easy to grow, it could prove an eye-catching and distinct addition to the range of hardy plants. It should be tried in a well-drained place in semi-shade and is likely to succeed in poor, dry conditions - it was growing here on serpentine.) (10+ seeds) C

11788 HACKELIA JESSICAE California, Amador Co., Pedlar Hill. 2040 m. W.R. coll. 15.8.89 (About 50 cm. high and of similar habit to the above, this has rather smaller flowers in pale blue. Possibly easily grown in wet climates as it likes moist places in the mountains. Also a heavy-rooted perennial. We know you will have as much "fun" sowing these as we had packeting them. This is H. micrantha in IMF.) (10+ seeds) B

10662 HAPLOPAPPUS ACAULIS Nevada, Lincoln Co., Ely to Pioche, S of Mule Shoe junction. 1830 m. Open slopes in stony clay. 24.5.89 (A widespread plant of the Great Basin and surrounding ranges northwards. Here forming hard, rounded cushions of compacted green rosettes. Short-stemmed orange-yellow 'daisies'.) B

11715 HAPLOPAPPUS ACAULIS California, Mono Co., White Mts., Sheep Mt. 3500 m. Exposed stony slopes. 28.8.89 (Collected at around the altitudinal limit for the species, this is the tightest, most diminutive form we have seen with pads of very small rosettes. Not seen in flower but virtually stemless.) D

10519 HESPEROCHIRON CALIFORNICUS California, Sierra Co., N of Sattley. 1520 m. Sandy clay in openings on Artemisia 'flats'. 13.5.89 (This delightful genus of 2 spp. of the Hydrophyllaceae is widespread right through the American West but is only seen by those who go early into the field. Dormant, or at least underground, for most of the year, they rely on snow-melt for their brief spring appearance. Both are similar with rosettes of rounded basal leaves and short-stemmed (2-5 cm.), bowl-shaped flowers, usually white here but sometimes more or less lilac-tinged. They make the most delightful pan-plants for the alpine-house and, in our experience of growing both over many years in the U.K., are absolutely easy and trouble-free : they can spend most of the year under the bench. Everyone who saw them in flower wanted them but no-one ever obtained plants from us : when they are dormant it is all but impossible to find the tiny dormant roots. The only way to enjoy them is to grow them from seed yourself ; sow thinly and if you have to repot, spread the entire contents of the seed-pan over a larger pan, top up with some fresh compost and chippings and you are set for the next decade. While these are exquisite little things, which we could honestly say deserve every effort to cultivate successfully, they need little.)(50+ seeds) C

11832 HESPEROCHIRON PUMILUS California, Modoc Co., Devil's Garden N of Canby. 1500 m. Margins of coniferous woodland on stony clay 'flats' overlaid with volcanic debris. J.A. coll. (This has flatter flowers (more funnel-shaped in the above) with long hairs inside and usually less downy leaves.) (30+ seeds) C

HEUCHERA. We can offer no improvement on our 1987 colls. of this genus. These are interesting, usually saxatile, plants but few are dwarf enough for the alpine-grower or specious enough for the garden.

9624 HEUCHERA HALLII Colorado, El Paso Co., Pike's Peak, above Elk Park. 4000 m. Granite crevices. S.B. coll. 9.9.87 (Endemic to the Pike's Peak area. Dainty creamy white bells on 20 cm. stems.) (100+ seeds) C

* 9690 HEUCHERA RUBESCENS var. VERSICOLOR Cultivated seed from material coll. at about 3000 m. in the White Mts., E Arizona. Has proved an excellent garden-plant. 30 cm. stems of pink bells. (100+ seeds) C

9508 HEUCHERA PULCHELLA New Mexico, Sandoval Co., Sandia Mts. above Albuquerque. 3600 m. Shady fissures on summit cliffs. S.B. coll. 28.8.87 (Tiny endemic of the Sandias with tufts of little, lobed leaves and dense, 10 cm. spikes of pink bells. Has germinated well and should make a fine pan-plant.) (100+ seeds) E

HULSEA. These are two closely allied, generally similar, Compositae from the screes and rock-slides of the very highest altitudes in the western ranges. In the wild they are arresting and unexpected plants of distinction but like many of the genuine high-growing alpines they are difficult to maintain in cultivation and even more difficult to retain in character. We have grown and flowered H. nana in an alpine-house but a single flowering rosette is an anticlimax. They may be better grown in a scree-bed outside with protection from winter wet or at least plunged outside in full sun for the summer in cool climates. There one might hope for their mounds of fascinating foliage, sticky and pinnately lobed, and huge, yellow, many-rayed heads on sturdy stems, usually around 15 cm. high.

11731 HULSEA ALGIDA Nevada, Washoe Co., SW of Mt. Rose. 3080 m. Loose talus on steep slopes. 29.8.89 D

11833 HULSEA NANA California, Trinity Co., Mt. Eddy (SW of Weed). 2590 m. Loose serpentine talus. J.A. coll. 22.7.89 (This has rather fewer ray florets (up to 25) and more or less leafy stems, naked in H. algida) D

9467 HYMENOXYS ACAULIS var. CAESPITOSA Colorado, El Paso Co., Pike's Peak. 4000 m. Open slopes in granite grit. S.B. coll. 17.8.87 (Tight mats with short-stemmed golden daisies. A good perennial.) B

11341 HYMENOXYS ACAULIS ? var. IVESIANA Utah, Garfield Co., Escalante Summit. 2850 m. Stony slopes in openings among Pinus & Abies. 8.7.89 (A very tidy little yellow daisy, rather longer stemmed at about 8 cm. but looks very promising as a plant for the rock-garden or scree-bed. Neat basal rosettes.) C

11716 HYMENOXYS COOPERI var. CANESCENS California, Mono Co., White Mts., Sheep Mt. 3500 m. Exposed stony slopes. 28.8.89 (Beautifully divided, grey basal foliage and branched stems of yellow daisies. This is a very dwarf high altitude form 15 cm. high. Desirable but at best a short-lived species.) C

11422 HYMENOXYS GRANDIFLORA Wyoming, Albany Co., Medicine Bow Mts., Snowy Range. 3600 m. Open stony slopes and in alpine-turf. 20.7.89 (Surely one of the world's most stunning alpine-plants : tufts of cut, grey leaves produce enormous golden sunflowers on short woolly stems. For inspiration look at the photograph in Clay's 'The Present Day Rock Garden' (under Rydbergia) - usually monocarpic but well worth growing.) B

PRICE CODE A	:	$1.50	;	£1.00	;	DM3, -	;	FF10. -	PRICE CODE D	:	$4.00	;	£2.50	;	DM 7,50	;	FF25. -
B	:	$2.50	;	£1.50	;	DM4,50	;	FF15. -	E	:	$5.50	;	£3.50	;	DM10, -	;	FF35. -
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IRIS

The Pacific Coast Irises of Series Californicae (Subgenus Limniris, Section Limniris) exemplify better than any of the genera mentioned so far (Erythronium, Fritillaria, etc.) the degree to which speciation is actively occurring in this area. Dr. Lee Lenz's classification (as adopted by Munz and also in Brian Mathew's 'The Iris'), while being a totally acceptable compromise, should not mislead one into thinking that his taxa, especially at subspecific level, are clearly defined units. The degree of variation, intergradation and hybridization can be considerable. Fortunately, in this respect, we have far fewer collections of these to list than we should have wished. We were out of their area at the peak time for flowers and also for seed : their behaviour in the U.K. where seed-capsules often fail to open fully and retain seed over a long period does not occur in the warmer, drier atmosphere of their home--land. Nevertheless, there are a few representative collections here and you will find these to be absolutely distinct. Apart from I. douglasiana, all the colonies of these plants we saw were growing in light woodland or among scrub, often on steep slopes. Victor Cohen in "A Guide to the Pacific Coast Irises" states "...the most important single factor in the cultivation of these irises is drainage... the soil itself is usually neutral to slightly acid in nature...and is often full of grit and stone." These plants require a well-drained, lime-free soil - possibly a site in full sun in cool temperate climates. Once again we express a lack of understanding of the British obsession with peat (see Erythronium) ; it is hardly surprising that plants are lost during winter if they are grown in such a water retentive medium, the merits of which are only that it is lime-free and low in nutrients.

11162 IRIS DOUGLASIANA California, Sonoma Co., Coleman Valley N of Bodega Bay. 150 m. Grassy slopes exposed to coast. 22.6.89 (supplemented with W.R. coll. 18.7.89) (The exception to our preceding remarks : a tough, vigorous plant adaptable to a wide variety of soils - we grew this well in a clay in Dorset, which was far from lime-free. We have only grown rather wishy washy lilac ones but Wayne tells us that most here are rich purples. Fine clumps of dark-green leaves and stems to about 60 cm.) (20+ seeds) B

11790 IRIS FERNALDII California, Solano Co., Mix Canyon NW of Vacaville. 300 m. Openings on scrub-covered slopes. W.R. coll. 19.7.89 (This is seed from an exceptionally fine and floriferous clone, seen in flower on 15.6.89 and Wayne returned for seed. Very beautiful narrow, glaucous grey-green leaves provide a fine background for the creamy-yellow flowers, marked with gold. About 30 cm. high.) (20+ seeds) C

10999 IRIS HARTWEGII var. COLUMBIANA California, Tuolumne Co., NE of Columbia. 760 m. Steep stony slopes with sparse scrub. 16.6.89 (This is an extremely local, disjunct population, quite even in its broader leaves and pale yellow flowers veined with gold usually carried 3 to the 30 cm. stems. "A much more attractive plant than the species" writes Victor Cohen who adds its ancestry may involve the (now) distant Iris munzii. Little-known in cultivation, we can but suggest a very well-drained site in sun.) (20+ seeds) D

11595 IRIS MACROSIPHON California, Mendocino Co., NE of Lake Pilsbury to Hull Mt. 1300 m. Stony soil among Pinus. 19.8.89 (The species, widely distributed on the hills either side of the N Central Valley, is a very variable entity. This is a particularly dwarf form forming narrow leaved tufts and, in many cases, virtually stemless, the flowers, which J.A. tells us are all yellow here, being held up on the long tube. This is from a high altitude for the species and there is no question of its temperature hardiness - recommended for a well-drained site in the rock-garden or even a pan in the alpine-house.) (20+ seeds) C

11668 IRIS MACROSIPHON California, Lake Co., SW of Clearlake. 460 m. Stony soil under and in openings among Pinus. 23.8.89 (While still quite dwarf this is short-stemmed, at about 15 cm. W.R. tells us these vary from lilac-tinged white to deeper blue-purples but definitely no yellows!) (15+ seeds) C

11432 IRIS MISSOURIENSIS Wyoming, Albany Co., E of Centennial. 2700 m. Depressions among sparse scrub. 21.7.89 (While in the same Section, this is in a different Series : Longipetalae, from the others here. It has a wide range and is the only Iris in the Rockies, where it washes the damp meadows blue in spring. It is variable here from deep lilac-blue to white and about 70 cm. high. Easy in any good soil.) (20+ seeds) B

11749 IRIS MISSOURIENSIS California, Alpine Co., S of Carson Pass. 2700 m. Moist meadows. 5.9.89 (Rather more compact here at about 50 cm. Usually a fairly even pale blue in the Sierra Nevada.) (20+ seeds) B

11615 IRIS TENUISSIMA California, Trinity Co., Lassics Lookout Road, above Zenia. 1600 m. Among conifers on serpentine. 20.8.89 (A dainty, delicate plant with narrow, greyish foliage and rather flat flowers with horizontal falls in creamy white, sometimes veined with purple. Brian Mathew states it grows well in Surrey (U.K.) in a sunny situation. About 20 cm. high here, it would be in place in the rock-garden)(20+) C

9270 IVESIA GORDONII Wyoming, Fremont Co., Wind River Mts. 3000 m. Open slopes in granite grit. S.B. coll. 29.7.87 (This odd genus of Rosaceae has been included under Potentilla. Neat tufts of ferny leaves send up rounded heads of starry, mustard-yellow flowers on 10 cm. stems. "Worthy of the alpine-house for its curiousness" writes Sampson Clay ; quite a worthwhile, compact high-altitude form here.) (20+ seeds) B

11834 IVESIA LYCOPODIOIDES California, Placer Co., Tinker Knob N of Squaw Valley. 2720 m. Among rocks in summit area. J.A. coll. 29.7.87 (Narrowly endemic to the highest altitudes in the Sierra Nevada. Pads of extraordinary, little thick, sticky cylindrical leaves. Capitate cymes of yellow flowers.) (15+ seeds) C

11756 KALMIA MICROPHYLLA California, Alpine Co., S of Carson Pass above Winnemucca Lake. 2730 m. Moist banks & depressions in turf with Cassiope, Phyllodoce, etc. (over granite). 5.9.89 (A delightful, twiggy, 15 cm. high, Ericaceous shrublet with pink flowers. A genuine candidate for the peat-bed.) (50+ seeds) D

KECKIELLA. This is Penstemon : Section Hesperothamnus. See Penstemon for further comments.

11174 KECKIELLA CORDIFOLIA California, San Luis Obispo Co., NE of San Luis Obispo. 150 m. Steep stony slopes above stream in canyon bottom. 26.6.89 (& 26.8.89) (While this is in cultivation in the U.K., possibly still from the original Hartweg introduction of 1848, it is seldom seen. We have known it over many years on a wall in the garden of Bert Hopwood (Devon, UK) and Bean mentions it at Kew in a similar site : "undoubtedly one of the finest of the shrubby species (of Penstemon)." It is definitely of border-line hardiness in the U.K., however. An evergreen shrub, about 2 m. high in the wild, with panicles of downy, scarlet flowers. This is a southern plant collected here at around its northern limit.) (50+ seeds) C

11618 KECKIELLA CORYMBOSA (Penstemon corymbosus) California, Humboldt Co., SE of Kneeland ESE of Eureka. 660 m. Fissures and ledges on cliffs. 20.8.89 (Closely allied to the above, this is endemic to N California, where we have seen it (on serpentine) up to 1630 m., and essentially saxatile in habitat. Seldom more than 30 cm. and often mat-forming with dark, leathery evergreen foliage and corymbs of soft-scarlet flowers. We were most excited over this dwarf shrub which should prove reasonably hardy.) (50+ seeds) D

PRICE CODE A	:	$1.50	;	£1.00	;	DM3, -	;	FF10. -	PRICE CODE D	:	$4.00	;	£2.50	;	DM 7,50	;	FF25. -
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11144 LATHYRUS RIGIDUS California, Modoc Co., S of Davis Creek. 1450 m. Gravelly soil in open site. 20.6.89 (A neat little plant of Artemisia-steppe distributed from here in a curve through E Oregon into Idaho. More or less summer dormant and of erect habit, about 20 cm. high here, with rather glaucous foliage and white, sometimes pink-tinged, flowers. Not seen in flower but recommended by John Andrews.) (5 seeds) C

10966 LEPECHINIA CALYCINA California, Solano Co., Mix Canyon NW of Vacaville. 300 m. Openings in scrub and woodland. 15.6.89 (A mainly S American genus with 3 or 4 spp. in California - the Pitcher Sages. These are woody-based Labiates, somewhat Salvia-like, with downy, aromatic foliage and quite large, pouting flowers, in this white to pinkish, blotched and veined with purple. About 1 m. high and well worth a trial in a dry, sunny well-drained site, where it may prove basally hardy in colder areas.) (15+ seeds) B

11335 LESQUERELLA RUBICUNDULA Utah, Garfield Co., Red Canyon above Butch Cassidy Draw. 2600 m. Loose lime-talus on steep slopes. 7.7.89 (A dwarf member of this genus of the Cruciferae, between Draba and Physaria in general appearance, endemic to the pink Wasatch limestone of the Paunsagunt Plateau, where its tiny mats of grey-leaved stems wend among the scree. Yellow flowers and inflated capsules. 3 cm.) (15+ seeds) D

LEWISIA. With the forthcoming publication of Brian Mathew's monograph of this genus and the expectation of a further book on it from Roy Davidson, who has a lifetime's experience of the genus in the wild, we can anticipate they will be increasingly fashionable plants. As the centre for the genus once again is N California, we feel rather guilty that we have not made a special effort to confront you with a very comprehensive range of species. Having seen the incredible L. rediviva and become besotted by it (no doubt we should feel the same about the more northern L. tweedyi had we seen it in nature), all others pall before it and we must confess to not being enamoured of the genus as a whole. Nevertheless, with a couple of contributions from Wayne & John, we list almost half the species in the genus here, so that we hope we do not appear too inadequate or incompetent to those who nurture an enthusiasm for these plants.

11791 LEWISIA CANTELOWII California, Plumas Co., SW of Caribou. 860 m. NE & NW-facing (serpentine?) cliffs and in shade of trees. W.R. coll. (An extremely local plant known from a few cliffs on the upper Feather and Yuba Rivers, where it grows in sheets of seasonally wet moss. Close to the L. cotyledon group, it has handsome rosettes of sharply toothed leaves and open, many-flowered panicles, up to about 30 cm. high, of pale-pink flowers veined with deeper pink, opening over a long period.) (20+ seeds) D

11031 LEWISIA COTYLEDON var. HECKNERI California, Trinity Co., N of Junction City above Canyon Creek. 500 m. Ledges, fissures and in moss-sheets on vertical, shaded, serpentine cliffs. 18.6.89 (Flat rosettes of toothed leaves, much broader than the above and with larger flowers than it, in fact one of the largest flowered of the group. Short panicles, about 20 cm. high, of white flowers with pink stripes. Although this name appears in cultivation, it is doubtful if much if any pure material exists. This is a disjunct taxon limited to this area, which every attempt should be made to maintain in a pure form.) (20+ seeds) D

11655 LEWISIA LEANA California, Trinity Co., Pacific Crest Trail, NW of Mt. Eddy. 2400 m. Stony serpentine slopes with sparse Pinus. 22.8.89 (While related to the above two, this has rosettes of succulent, cylindrical leaves and is more widely distributed at high altitudes in NW California into SW Oregon, often on serpentine but sometimes on granite. Here, about 15 cm. high with many-flowered panicles of bright magenta flowers - a dainty and brilliant little plant. Mature seed is dark-brown, not black.)(20+) D

10948 LEWISIA NEVADENSIS California, Sierra Co., SE of Sierraville. 1870 m. Open areas in gravel with sparse Pinus. 13.6.89 (A summer-dormant plant widespread in the western mountains, forming little shining green rosettes with a succession of white flowers hugged tightly in the centres. Quite easy to grow)(20+ seeds) B

11047 LEWISIA NEVADENSIS California, Humboldt Co., SSW of Willow Creek. 1420 m. Stony turf in opening in coniferous forest. 18.6.89 (The few late flowers seen here were a pale shell-pink but this may not be a consistent variation. In any form, the species makes a delightful pan-plant in the alpine-house.) (20+) B

11835 LEWISIA OPPOSITIFOLIA Oregon, Josephine Co., near Waldo E of O'Brien. 550 m. J.A. coll. 21.5.89 (A very local plant, more or less confined to the valley of the E Fork Illinois River on either side of the Oregon/California line. Summer-dormant and near L. nevadensis, this has stems up to about 10 cm. each with up to 6 white, or sometimes pale-pink flowers. Possibly only on serpentine-derived soils.) (20+) D

9591 LEWISIA PYGMAEA Colorado, Clear Creek Co., Mt. Evans. 4500 m. Exposed stony slopes. S.B. coll. 30.8.87 (Close to the above 2 spp. but the taxa assignable to this are invariably extremely high-growing, tiny, summer-dormant, snow-melt plants, here usually a bright magenta-pink, with glandular-toothed sepals. Like most of the genus, while the name occurs in cultivation, the true plant is little-known (20+ seeds) D

11505 LEWISIA REDIVIVA Wyoming, Fremont Co., Wind River Mts., above Fiddler's Lake. 3000 m. Open slopes in granite grit with sparse Pinus. 29.7.89 (Maybe the most beautiful of all N American plants. Typically a plant of middle-altitude steppe, though it descends to quite low altitudes in California, often on serpentine. Always very local but extremely widespread from the Pacific Coast States E to Montana and S into Colorado & Utah. Summer-dormant but unrelated to any others here ; little clusters of fleshy linear leaves, hardly noticeable under the huge, diaphanous, water-lily flowers produced successively on the shortest of stems. Generally a glowing pink here, deeper than those we have seen in cultivation. While it is extremely difficult to collect seed from any of the summer-dormant Lewisia spp. - you have to know precisely where they are - the L. rediviva group is especially critical as the stem disjoints quite soon after flowering. More by coincidence than planning we were in this locality on exactly the same date as in 1987 : a rather poorer, later season in 1989 and not so much seed ready - there should be ample!)(20+) D

LILIUM. The western species are so little-known in cultivation that they deserve a few introductory remarks. While we saw a good number of species in flower, we were not always able to revisit localities for seed and, in fact, in some cases, we left before seed was fully mature, especially of the wet-growers. Consequently, we are most grateful to John Andrews for greatly extending the range of species available here by revisiting several areas specifically to collect Lilium seed. The western species can be divided into 2 groups : dry-growers with ovoid bulbs with longer, unjointed scales ; wet-growers with rhizomatous bulbs with shorter, jointed scales. Almost all the dry-growers are listed here and further comments follow under each species. Of the wet-growers, L. pardalinum, which itself can be regarded as the western equivalent of L. superbum from eastern U.S.A., is the central focus for a number of taxa, possibly derived through introgression but reasonably distinct where they occur in isolated colonies : L. kelleyanum, L. wigginsii, L. vollmeri, etc. L. pardalinum colonies are often themselves extremely variable in flower and in whether the leaves are whorled or scattered so that one suspects introgression continues from sympatric spp. For instance, though L. pardalinum and L. humboldtii are wet and dry growers respectively, they have been crossed in cultivation (the basis for the old 'Bellingham Hybrids') and there is no reason to suppose they will not cross in nature where they overlap. In general, the wet-growers are going to provide less of a problem in cultivation in cool temperate climates, seldom needing the extremely wet conditions they inhabit in nature, and in all cases it should be stressed that these plants grow in lime-free soils : a peat-bed may suit the wet-growers but the others need optimum drainage.

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C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

LILIUM

11641 L. BOLANDERI Oregon, Josephine Co., SW of O'Brien. 720 m. Open, stony slopes and openings among scrub on serpentine. 21.8.89 (One of the most distinct and beautiful members of genus, a serpentine endemic of the Coast Ranges near the California/Oregon line. Usually a dwarf plant, it can reach 1 m. with up to 7 flowers but we have seen it with a single huge flower on a 15 cm. stem ; averages about 30 cm. here. Whorls of thickish, glaucous leaves typical of a dry-growing plant and horizontal to half-nodding, funnel-shaped flowers in an individual shade of muted crimson, glaucous outside and purple-dotted inside with dark purple anthers and orange pollen. Not easy and possibly best attempted in a very well-drained low-nutrient, lime-free mixture in a deep pot with careful watering and in full sun in wet climates - precipitation here is not low by Californian standards but drainage is extremely efficient.) (15+ seeds) E

11591 L. HUMBOLDTII California, Sierra Co., SW of Camptonville. 900 m. Dryish, shady banks at edge of wood--land in heavy soil. 13.8.89 (This type-race is limited to the foothills of the western slope of the N Sierra Nevada. A very handsome plant up to 2 m. high with whorled leaves and large, nodding orange--yellow flowers spotted with purple. Has been grown succesfully in the U.K., possibly best in a well--drained, lime-free loam in full sun. Deer had had almost all the seed-heads here....) (10+ seeds) D

11637 L. KELLOGGII California, Del Norte Co., N of Patrick Creek near Oregon line. 620 m. Among large stones (stable serpentine talus) in openings among Arctostaphylos scrub. 21.8.89 (We found this while looking for L. bolanderi in seed and we have not seen it in flower though there is little doubt about its identity. Sympatric with L. bolanderi but extending over a somewhat larger area in the Coast Ranges and possibly also confined to serpentine. The two can actually grow together but remain distinct : foliage is superficially similar but in this it is green above and only glaucous beneath ; on the whole a larger plant about 2 m. here with more flowers (up to 15 or more) ; these are pendant and the segments reflex markedly with revolute margins to the base, opening ivory and suffusing more and more deeply to pink with a central yellow band and sometimes dotted with purple. Well illustrated in Rix & Phillip's 'The Bulb Book' (as are several others here). Not considered 'easy' and we can but suggest again well-drained, lime-free soil with careful watering in full sun - this is also an extremely beautiful plant.)(20+ seeds) E

11811 L. PARDALINUM California, Butte Co., Clipper Mills NE of Brownsville. 1070 m. Wet areas along creek. Coll. M. Wolf 28.8.89 (We are very grateful to Myrtle Wolf for saving us from the embarrassment of fail--ing to list this most widespread of western lilies. Moreover she tells us this is an especially robust and floriferous colony. We saw this in flower in many places - extremely variable but always spectacular in shades of orange to scarlet more or less speckled with maroon. All the others so far have been dry-growers ; this grows in wet sites and is consequently one of the easiest species to grow in British gardens in any reasonable lime-free soil - best in sun if the site is moist. Usually 1-2 m.) (15+ seeds) B

*11836 L. PARRYI ex hort. J. Andrews (Berkeley, Ca.) from seed coll. Sally Walker (no field data but most possibly in one of the Arizona localities for this species) (This grows much further S in California than we travelled in 1989 (from there E into a few sites in S Arizona) and neither we nor J.A. have seen this in the wild. It apparently grows in moist places between 1200 and 2700 m. in the coniferous forest zone. It is the most southern of the western species and a very beautiful and distinct plant - the nearest thing to a trumpet lily in N America with horizontal, fragrant lemon-yellow flowers, some--times with maroon spots. J.A. has had no great difficulty growing this in a pot keeping it just moist after flowering. Carl Purdy recommended a half and half mix of sand and peat or leafmould (not a bad recipe for any of the "difficult" lilies here) and stressed perfect drainage and a cool situation. This is worth a lot of trouble to cultivate well and will richly reward efforts to maintain it.) (15+ seeds) D

11759 L. PARVUM California, Alpine Co., Hope Valley N of Picketts Junction. 2160 m. Moist slope among Salix at margin of coniferous woodland. 5.9.89 (A wet-grower but quite distinct from the L. pardalinum group (possibly closest to the coastal L. maritimum), with upward-facing, bell-shaped flowers, usually orange but varying to yellower and redder shades and usually purple-spotted - illustrated in Rix & Phillips. Not usually considered a difficult plant in cool, moist lime-free soil but remember this is a high-growing species which is snow-covered for much of the year and may be intolerant of winter wetness.) (20+ seeds) C

11847 L. RUBESCENS California, Humboldt Co., Onion Mt. above Fish Lake, N of Weitchpec. 950 m. J.A. coll. 23.9.89 (A beautiful Coast Range endemic, very close to L. washingtonianum, but with rather smaller flowers which are erect or ascending. They can apparently grow together, in this area, where their range overlaps, and remain distinct. The widely trumpet-shaped flowers open white with minute purple dots, which suffuse with age over the surface until it is wine-coloured. This is a dry-grower, not well known in cultivation but Purdy considered it easier than L. washingtonianum, q.v. for suggestions!) (15+ seeds) D

11848 L. VOLLMERI California, Del Norte Co., ENE of Gasquet. 500 m. Margin of stream in rocky gulley. J.A. coll. 23.9.89 (A wet grower close to L. pardalinum, of which it may be a local serpentine race, and maybe best included under it at varietal or subspecific level ; perhaps partly derived from the coastal L. occidentale. The bulb and anther characteristics are diagnostic. As we have seen it here, it is a handsome, 2 m. high plant with many nodding flowers, basically an even orange-yellow with purple dots. Little known in cultivation and reputedly not as easy as L. pardalinum.) (15+ seeds) D

11849 L. WASHINGTONIANUM California, Humboldt Co., SSW of Willow Creek. 1420 m. Steep, part-shaded slopes at margin of coniferous woodland. J.A. coll. 23.9.89 (A superb species, distinguished from L. rubescens by the larger flowers held horizontally with the segments not overlapping - usually white more or less dot--ted with purple and suffusing purplish with age, in some forms. A dry-grower, which we have always seen on very steep stony slopes. It is going to need perfect drainage and might be best attempted in a pot where watering can be controlled after flowering and in winter. Not easy but magnificent.) (15+ seeds) D

8986 LINUM KINGII Utah, Garfield Co., NW of Tropic. 2500 m. Open areas in stony clay. S.B. coll. 9.7.87 (Not so spectacular as some Turkish spp. but a fine and most unusual plant with close, sedum-like rosettes and 20 cm. stems of straw yellow flowers. Carleton Worth enthused about this but we have never seen it grown in Europe. We saw this in flower in several areas in 1989 but no seed was set.) (20+ seeds) E

10514 LITHOPHRAGMA BULBIFERA California, Sierra Co., N of Sattley. 1520 m. Openings among Artemisia in sandy clay. 13.5.89 (A little, summer-dormant member of the Saxifragaceae relying on snow-melt for its brief spring appearance. About 20 cm. high with pale-pink, fringed flowers. A small confusing genus - this name may be incorrect as not all were bulbiferous - making excellent pan-plants.) (50+ seeds) C

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C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

LUPINUS. As we have but a few representative collections, we shall not deal too thoroughly with the problems this genus presents. California with over 80 species is the centre ; there are only 15 in Utah and 9 in Wyoming. No matter where they occur, there is a great deal of variation, intergradation and possible hybridization. In California the problem of identifying material is acute! From the alpine-growers viewpoint, however, we are involved with comparatively few dwarf, high altitude taxa : the prostrate, mat-forming L. breweri, though it ranges from Mt. Pinos in the S along the length of the Sierra Nevada and into S Oregon, varies very little in the areas we have seen it ; most of the remaining plants, caespitose perennials with basal leaves and only really diverse in the Sierra Nevada, where there may have been introgression from sympatric spp., can largely be fitted around L. lepidus - in fact many have at times been placed under it at subspecific level. To the E L. lepidus is the only dwarf montane species. While the names may not be a great problem with the dwarf species, collecting seed is extremely difficult. With the larger species, the stem can be cut when the first pods open and a reasonable amount of good seed ensues ; the dwarf ones sometimes only mature 1 or 2 pods on each raceme and these often contain only 1-3 seeds so a long search has to be made for pods likely to split imminently - green seed does not mature. Seed of all the dwarf plants here is in small amounts and represents many hours of collecting. Seed is comparatively large and should germinate well ; scarification or soaking may be a help.

11792 LUPINUS ALBIFRONS California, Contra Costa Co., above Orinda. 450 m. W.R. coll. 17.6.89 (A very fine, shrubby, perennial plant, about 1 m. high, with silky, silvery foliage and racemes up to 30 cm. long of pale to deep purple. Grows on stony slopes on the hill above Wayne's home.) (15 seeds) B

11579 LUPINUS BREWERI California, Sierra Co., E side Yuba Pass above Sattley. 2050 m. Openings and slopes in coniferous woodland, in granite grit. 11.8.89 (Prostrate, woody-based mats of dense, silver foliage. Stubby (3-5 cm.) racemes of violet-blue flowers marked white or yellow. When this coll. is finished, we shall use the following as substitutes - there is no appreciable difference between the three and nothing to be gained from selecting any particular one. All grow in similar sites.) (5 seeds) F

11729 LUPINUS BREWERI Nevada, Washoe Co., SW of Mt. Rose. 2750 - 3080 m. Granite grit. 29.8.89 (5 seeds) F

11696 LUPINUS BREWERI California, Ventura Co., Mt. Pinos. 2680 m. Granite grit near summit. 27.8.89 (5 seeds) F

11350 LUPINUS LEPIDUS var. UTAHENSIS Utah, Garfield Co., Aquarius Plateau NNW of Escalante. 3000 m. Exposed alpine steppe and Artemisia 'flats'. 8.7.89 (A very dwarf, caespitose plant with silky, grey-green basal leaves radiating from the stemless raceme, close-packed with many flowers with blue keels and white banners. 2-5 cm. high. A very tight form of the only dwarf species in Utah .) (10 seeds) F

11733 LUPINUS LYALLII Nevada, Washoe Co., SW of Mt. Rose. 3080 m. Open stony areas and in talus. 29.8.89 (The same pattern as the above - also may be best included under L. lepidus - but a much larger plant. Not necessarily the same as plants which are or have been in cultivation under this name and not a synonym of L. lobbii (L. lepidus var. lobbii), which is a different allied taxon. About 10 cm. high.) (8 seeds) D

11167 LUPINUS VARIICOLOR California, Sonoma Co., above Shell Beach S of Jenner. 20 m. Ledges on coastal cliff. 22.6.89 (Another good, woody based perennial with pubescent, greyish leaves, about 60 cm. high. Very variable in colour but those seen here were in pinkish and purplish shades.) (15 seeds) B

11793 LUPINUS VARIICOLOR California, Sonoma Co., Stewart's Point. 8 m. W.R. coll. 18.7.89 (15 seeds) B

MERTENSIA. The dwarf members of this genus are not nearly so numerous or diverse when one leaves the Rocky Mts. and surrounding area. Consequently, we have not so many collections as in 1987. Those listed here are all distinct plants and, in only one case, can there be much confusion over naming.

9630 MERTENSIA ALPINA Colorado, El Paso Co., Pike's Peak. 4500 m. Exposed slopes in granite grit. S.B. coll. 9.9.87 (An exquisite plant with prostrate stems of flat, purest blue flowers. Distributed by Kathleen Marriage as "M. coriacea" before the 1940's and may be still surviving in some gardens as such. We have grown and propagated it from seed in the alpine-house where it remains in character.) (20+ seeds) F

11520 MERTENSIA ARIZONICA Utah, Weber Co., Wasatch Ridge WSW of Woodruff. 3100 m. Meadows and openings in woods. 1.8.89 (A large species, about 60 cm. tall, similar to the better known M. ciliata, with big blue--green leaves and showers of little, sky-blue bells. Easily grown in a moist site.) (15+ seeds) B

11459 MERTENSIA ? HUMILIS Wyoming, Albany Co., Laramie Mts., Laramie Peak. 3050 m. Granite grit among granite boulders. 23.7.89 (Rather variable in this colony and may be nearer M. alpina than this - larger than the Pike's Peak plants at about 10 cm. All attractive, pure-blue flowers on low stems.) (15+ seeds) D

8726 MERTENSIA LANCEOLATA var. NIVALIS Wyoming, Fremont Co., Wind River Mts. 2700 m. Open steppe in granite grit. S.B. coll. 22.6.87 (Azure-blue bells on 15 cm. stems. A good form of a variable group.) (20+ seeds) D

11140 MERTENSIA OBLONGIFOLIA California, Modoc Co., Warner Mts., E of Davis Creek. 1750 m. Among scrub on steep, rocky slopes. 20.6.89 (Intermediate in size, at about 20 cm., between the large M. ciliata group and the dwarf species. This tends to grow in lightly shaded places in summer-dry areas with a continent--al climate, from here E into N Utah. Good panicles of blue bells in spring.) (15+ seeds) C

11589 MIMULUS BIFIDUS California, Sierra Co., E of Downieville. 1200 m. Steep, rocky or gravelly granite slopes. 13.8.89 (About half of the 150 or so species of Mimulus occur in California and among those there is a distinct group of woody plants, almost exclusively Californian in its distribution, which has been separated out into the genus Diplacus. These shrubs are essentially coastal plants, of which one, M. aurantiacus, has been grown in Europe since the 18th Century. Why this species has not become an equally permanent feature in the intervening 200 years is, as yet, an unsolved mystery. Limited to the W slope of the N end of the Sierra Nevada, it has penetrated further inland and to a higher altitude than any other in this group. It has to be fully temperature hardy in a well-drained, sunny site. In nature, it forms low, mounded shrubs about 60 cm. high with narrow, sticky, dark-green, revolute leaves, covered over a long period with large flowers with notched lobes. Munz describes the colour as "warm buff" : apricot-cream, sometimes varying more to cream and sometimes to oranger shades. Known locally as the Rock Azalea - as good a description as any - granite outcrops decorated with colonies of this plant were for us one of the most beautiful floral spectacles California had to offer.) (50+ seeds) C

11565 MIMULUS LEWISII Idaho, Custer Co., below Galena Summit near Big Wood River. 2450 m. Wet areas by stream. 8.8.89 (One of the most spectacular of NW American herbaceous plants. Stems of around 60 cm., clasped by narrow, downy leaves carry a succession of large flowers from the upper axils - here in an especially rich colour, luminous cherry-carmine. Easy in a moist place. Graham Stuart Thomas comments "hardy in our warmest counties" to which we might add "hardy in our coldest counties" (does well in Inverness-shire) and for those in N America "hardy in your coldest states" (does well in Alaska and the Yukon)(100+ seeds) B

11794 MIMULUS LEWISII Nevada, Washoe Co., Slide Mt. NE of Lake Tahoe. 2290 m. W.R. coll. 16.8.89 (W.R. tells us this is pink in the Sierra Nevada, so this may be for those who want a quieter colour.) (100+ seeds) B

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C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

11795 MIMULUS NASUTUS California, Tuolumne Co., Redhill Road near Chinese Camp. 460 m. Seasonally wet area - in winter usually in running water. W.R. coll. (Pretty, 15 cm. yellow-flowered annual.) (100 + seeds) B

10753 MIRABILIS MULTIFLORA Utah, Washington Co., Beaver Dam Mts., SW of Shivwits. 1200 m. Open stony slopes. 30.5.89 (A spectacular herbaceous perennial with leafy decumbent stems bearing a succession of large, brilliant magenta flowers, widely funnel-shaped and opening each summer afternoon. A widespread species but seldom occurring in any number and not easy to collect seed from in reasonable quantity.) (5 seeds) B

11724 MONARDELLA ODORATISSIMA California, Mono Co., Virginia Lakes Road S of Bridgeport. 2740 m. Open gravelly places. 28.8.89 (Another very variable and widespread plant, growing through California N to Washington and E to Wyoming. Here in a particularly richly coloured, reddish purple form. A woody-based mint, about 20-30 cm. high, with branching stems clothed in aromatic foliage, sometimes purplish tinged in this form, and carrying rounded flower-heads. Well worth growing in a sunny, well-drained site.) (30+ seeds) B

OENOTHERA. We have some stunning dwarf plants here this year. With the exception of the shrubby-based O. lavandulifolia, all these are stemless, deep-rooted perennials forming basal rosettes of foliage from which successions of large flowers appear, held up on tubes. The seed is formed at or below ground-level and can be time-consuming to collect but we should have most in sufficient quantities. All these without exception will require a well-drained soil and full sun. The genus as a whole can be conveniently and sensibly 'split' but the majority of the following would, in any case, remain in Oenothera itself.

9143 OENOTHERA BRACHYCARPA Colorado, Boulder Co., SE of Boulder. 2000 m. Stony clay banks. S.B. coll. 19.7.87 (A Great Plains plant, well outside our area for 1989 and here at its western limit. More or less cut, dark green foliage and long-tubed, yellow flowers turning to orange-red as they age.) (15+ seeds) C

OENOTHERA CAESPITOSA. This is surely one of the loveliest of NW American plants. It is widespread but always local and consequently each colony has its own characteristics. It is divisible into a number of more or less intergrading varieties. All are very beautiful and as will be obvious we cannot resist collecting seed if we have the opportunity! All have large white bowl-shaped flowers, which vary a little in size, carried on long tubes from the clumps of variable leaves. The flowers often age to pink and even to purple shades and are produced successively over a long period. We have in the past grown several forms successfully outside in S England - too much food and water mean too many lush leaves and fewer flowers - and also found them easy to propagate from root-cuttings. Some S Hemisphere growers have already flowered 1987 collections in their 1988-89 summer, so they do not take too long from seed. The hairier leaved races will obviously be the ones more likely to need the alpine-house in wet climates.

11414 OENOTHERA CAESPITOSA Colorado, Rio Blanco Co., above Piceance Creek NW of Rio Blanco. 1980 m. Steep slopes of loose, fragmented shale. 19.7.89 (Like so many plants of the oil shales, a distinct local race with glabrous, almost glaucous leaves with irregularly serrate margin. Maybe not so easy.) (15+ seeds) D

11554 OENOTHERA CAESPITOSA Idaho, Custer Co., above Jim Creek to Railroad Ridge, S of Clayton. 2440 m. Unstable rock detritus. 7.8.89 (White flowers mature to magenta-purple, though not so large.) (15+ seeds) C

11372 OENOTHERA CAESPITOSA Utah, Emery Co., Molen Reef SE of Moore. 2130 m. Stony clay on low, eroded, shale hills. 10.7.89 (Very variable here, approaching both var. crinita & var. navajoensis. Hairy.) (15+ seeds) C

9551 OENOTHERA CAESPITOSA var. CRINITA Utah, Millard Co., SSE of Garrison. 1500 m. Steep, loose, stony bank. S.B. coll. 25.8.87 (Dry area race with grey, hairy leaves. We were too early for seed in 1989)(10+ seeds) D

11514 OENOTHERA CAESPITOSA var. MACROGLOTTIS Utah, Rich Co., WSW of Woodruff. 2400 m. S facing clay banks and loose shale slopes. 1.8.89 (Large-flowered race but paler pink in age.) (15+ seeds) C

9343 OENOTHERA CAESPITOSA var. MARGINATA Wyoming, Park Co., Shoshone Canyon, W of Cody. 1700 m. Loose, stony slopes. S.B. coll. 3.8.87 (Deeply cut, pinnatifid foliage ; rather stoloniferous habit.) (15+ seeds) C

10813 OENOTHERA CAESPITOSA var. NAVAJOENSIS Utah, San Juan Co., above Bluff. 1550 m. Among rocks on steep sandstone slopes. 3.6.89 (from 1988 capsules) (Downy leaved race mainly in E Utah.) (15+ seeds) C

11403 OENOTHERA FLAVA Colorado, Delta Co., Grand Mesa, Cedaredge to Mesa. 3000 m. Gravelly clay in open sites. 18.7.89 (Not so large-flowered as some here but still very showy with brilliant yellow blooms)(20+ seeds) B

11375 OENOTHERA HOWARDII Utah, Emery Co., Molen Reef SE of Moore. 2130 m. Stony clay on low, eroded, shale hills. 10.7.89 (Enormous, crumpled, lemon-yellow flowers age to bronze and red. Sumptuous.) (10+ seeds) D

11329 OENOTHERA LAVANDULIFOLIA Utah, Garfield Co., Tropic Canyon NW of Tropic. 2500 m. Stony clay in openings among Pinus. 6.7.89 (Completely different to anything else here and better placed apart in the genus Calylophus. A dwarf, woody based perennial with decumbent wiry stems set rather sparsely with little, linear leaves carry large, 4-petalled flowers in soft-yellow maturing to oranger tints. The shrublets are about 15 cm. high and would be a delight in the rock garden ; the alpine-house may be safer.) (20+) D

11577 OENOTHERA TANACETIFOLIA California, Plumas Co., SE of Beckwourth. 1500 m. Clay in openings among Artemisia. 11.8.89 (A very colourful little plant with flat rosettes of downy, pinnatifid leaves and a profusion of brilliant yellow, stemless flowers over a long period from snow-melt into summer.) (20+) C

11796 OENOTHERA XYLOCARPA California, Mono Co., Mammoth Mt. NW of Bishop. 1830 m. W.R. coll. (An attractive species which we have seen further N in the Mt. Rose area up to almost 3000 m. Pinnately lobed, dull-green, pubescent leaves, often dotted or blotched with crimson. Large, bright yellow stemless flowers age to salmon-orange. Essentially endemic to dryish, gravelly places in the Sierra Nevada.) (20+ seeds) C

11837 OXYRIA DIGYNA Nevada, Washoe Co., SW of Mt. Rose. 3080 m. Loose talus on steep slopes. J.A. coll.30.6.89 (Mountain Sorrel, the classic circumboreal alpine, here in a form with striking scarlet fruits.) C

9428 OXYTROPIS LAMBERTII Wyoming, Albany Co., W of Centennial. 2700 m. Open Artemisia steppe. S.B. coll. 9.8.87 (Erect, brilliant carmine-purple racemes from neat silvery clumps. 30 cm.) (30+ seeds) B

11714 OXYTROPIS PARRYI California, Mono Co., White Mts., Sheep Mt. 3500 m. Exposed stony slopes. 28.8.89 (Tiny alpine with caespitose tufts of silky, grey leaves. Twin purple-pink flowers on short stems.) (15+ seeds) D

9611 OXYTROPIS PODOCARPA Colorado, Park Co., above Hoosier Pass. 4000 m. Gravel patches in tundra. S.B. coll. 6.9.87 (Tight-growing, high-alpine endemic to the Rockies. Inflated capsules & pink flowers.) (10+ seeds) D

9240 OXYTROPIS SERICEA Wyoming, Carbon Co., Shirley Mts., NW of Medicine Bow. 2600 m. Stony slopes. S.B. coll 27.7.87 (30 cm. white-flowered look-alike of O. lambertii. No 1989 colls. were possible of these.) (20+) B

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PAEONIA

North America is not a continent usually associated with this genus, mainly distributed from S Europe to NE Asia. Nevertheless, two species occur in NW America, both very little-known in cultivation. As might be expected, they are closely allied and are best considered together. Both are herbaceous perennials with the heavy, fleshy roots and divided foliage typical of the genus ; they are generally similar in appearance so hereafter we shall stress the differences not the similarities. P. brownii is the more widespread : from N California to Washington, then E just entering W Wyoming and NW Utah. It is a plant of Artemisia-steppe in areas with a continental climate, hot and dry in summer and snow-covered in winter, commencing top-growth with snow-melt in spring and able to withstand the subsequent dry conditions. P. californica, which has been included under P. brownii both as a var. and a subsp., is a completely disjunct race restricted to the W side of the Coast Ranges N and S of Los Angeles, from Monterey to San Diego Co. This is a plant from a Mediterranean climate, most active from autumn to spring and having matured its seed and gone dormant by the end of June. It is recorded as flowering from January to March, whereas P. brownii will not flower until late April and May. As both experience late-summer drought, both might be tried in bulb-frame conditions in wet, temperate climates and there is no reason why they should not be tried in the garden, given good drainage and full sun. Obviously, P. californica might be vulnerable in its early growth in cold areas. P. brownii is the dwarfer, between 30 and 40 cm. high, with fewer, glaucous leaves ; P. californica has more, greener leaves and is 40-70 cm. high. In P. brownii, the globular, nodding flowers have rounded, thick-textured petals in bronze-maroon, thinly margined with yellow. In P. californica, the rather larger black-red petals have pink margins. While these are neither sufficiently spectacular nor vigorous enough to achieve any wide popularity in cultivation, they are precisely the sort of fascinating individualists in the plant-world, which we know are treasured by many of the skilled and discriminating growers of the present-day.

11575 PAEONIA BROWNII California, Plumas Co., ESE of Beckwourth. 1500 m. Stony slopes. 11.8.89 (10 seeds) D

11175 PAEONIA CALIFORNICA California, San Luis Obispo Co., Reservoir Canyon, NE of San Luis Obispo. 150 m. Among scrub on steep, stony slopes above stream in canyon bottom. 26.6.89 (10 seeds) E

11281 PELTIPHYLLUM PELTATUM California, Plumas Co., SW of Snake Lake, NE of Quincy. 1190 m. Among wet rocks by stream. 30.6.89 (Huge, rounded leaves held up on 1 m. stems. A monotypic genus endemic to N California & S Oregon well-known in gardens in Europe - for those who want field data on their plants.) (20+ seeds) B

PENSTEMON

We shall introduce this spectacular and diverse genus a little more briefly than we did in 1987. While it is no less a feature of this list than 2 years ago, we hope those who receive our lists may be able to refer back to the 1987-88 one. Once again, we are mentioning the Sections of the Genus to which each belongs after the specific name. We use the classification adopted by Holmgren in IMF but the one used by Keck and others is given in brackets in the following summary for growers. As we are involved with new areas and new species this year, we have expanded on this. A rough understanding of these sections is a great help in finding one's way around a large, complex genus little-known in cultivation. Distributional comments accept NE Utah as the centre. Among those listed, P. ambiguus, P. laricifolius, P. rostriflorus and P. tracyi are the only members of their sections included. These are most distinct from each other and all others here. The remainder belong to one of these :

Sect. Erianthera. Largely woody-based mountain plants centred to the NW. Some of the best and best-known species of rock-garden plants belong here. We had no wild collections from this section in 1987.

Sect. Penstemon. Generally plants 5-50 cm. high forming woody-based mats or clumps with upright stems ringed with verticillasters of flowers. Montane plants of stony slopes and alpine turf. We did not collect some members of this section, widespread throughout our area, as we felt them to be of less horticul--tural value than those listed and insufficiently distinct to gardeners. Only a few representative ones here.

Sect. Caespitosi (Subgenus Ericopsis, Sect. Caespitosi) All are of great significance to the rock-gardener - small heath-like or thyme-like, tufted or mat-forming subshrubs, ideally suited to trough or pan-cultivation or, with luck, to the choicer places in the rock-garden. Generally plants of the middle elevations centred on the W slope of the Rockies and E Utah. We have an extremely wide range from 1989 collections.

Sect. Cristati (Subgenus Aurator). Usually small, grey-leaved plants, seldom exceeding 20 cm. often with well-developed basal rosettes and thong-like tap-roots. Generally plants of the steppes and cold semi--desert areas of the Great Basin. Little tried in cultivation, these are potentially important for the alpine--house specialist or rock-gardener. A poor season in the Intermountain Area has meant few 1989 collections.

Sect. Coerulei (Subgenus Annularius Sect. Coerulei) These are often plants with thick-textured bluish or greyish leaves, well developed basally from a woody crown. From 3 to 40 cm. in height and usually with flowers in softer, cooler tones than Sect. Glabri. Always plants of drier habitats, often in steppe.

Sect. Gentianoides. Rather similar in foliage and habit to some of the above section but with showy spires of flower rising to heights from 30 cm to 1 m. Southern in distribution and occurring in the dry ranges through the Mojave Desert and up into the Great Basin and Utah. Spectacular but may not be easy.

Sect. Spectabiles. Tall plants, 50-150 cm. high, with toothed leaves and plump ventricose flowers. Again more southern and especially diverse in the ranges of S California, outside our area in 1989. Only P. palmeri penetrates N into Utah and the Great Basin ranges. These will need hot, dry sites to do well.

Sect. Glabri (Subgenus Habroanthus, Sect. Glabri). Very variable in habit and height, from 5-90 cm., including tall meadow-plants, prostrate species of mountain screes and a few dwarf enough for alpine-houses.

Sect. Elmigera. Only two of these tall, to 1 m. high, southern, humming-bird pollinated species with scarlet flowers are listed. Only three penetrate N into the mountains - P. barbatus (no 1989 colls.) is the best known in cultivation of these. The tender hybrids grown in Europe are derived from Mexican members of this section - these inhabit areas with summer rainfall, a very different climate to the Intermountain Area.

Sect. Saccanthera. Woody based perennials, usually with erect, narrow-leaved stems from a branched base. These are most numerous to the W, extending from the Pacific Coast states E into Idaho and Nevada and with a few disjunct species in Utah. We listed only one species in 1987 but we have many more 1989 collections of this section. Many potentially good rock-garden plants here, though variable from prostrate to almost 1 m.

Sect. Hesperothamnus. This group of distinctly shrubby Penstemons centred on S California was 'split' into a separate genus by R.M. Straw (1966 & 1967). Holmgren in IMF follows this so accordingly we have also placed them under Keckiella here. While we dislike generic splitting, this seems a justifiable case.

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C :	$3.50	; £2.00	; DM6, -	; FF20. -	F :	$7.00	; £4.50	; DM13, -	; FF45. -

PENSTEMON

11367 PENSTEMON ABIETINUS (Sect. Caespitosi) Utah, Sevier Co., SE of Salina to Fish Lake Plateau. 2200 m. Stony clay in openings among Juniperus, Quercus & Artemisia. 9.7.89 (A dwarf, distinctly shrubby plant, about 15 cm. high, narrowly endemic to this area. Heath-like in appearance with narrow linear leaves. Erect stems of rich-blue flowers with yellow-bearded palates. Barely known in cultivation and of great potential for both the alpine-house and rock-garden - usually grows on limestone-derived soil)(15+ seeds) E

11447 P. ALBIDUS (Sect. Cristati) Wyoming, Converse Co., S of Esterbrooke. 1980 m. Gravelly clay in open grass -land. 22.7.89 (A neat plains plant with greyish leaves and stiff, 20 cm. stems of white flowers.) (20+) B

9577 P. ALPINUS (Sect. Glabri) Colorado, Clear Creek Co., Squaw Pass below Mt. Evans. 3100 m. Loose, gravelly slopes. S.B. coll. 30.8.87 (A fairly compact form of this magnificent scree-plant with stout, decumbent stems bearing huge heads of "big sprayed flowers in the most heavenly shade of violent clear-blue with a white throat." Accurately described by Farrer writing in 1919 but seldom seen in cultivation.)(30+ seeds) B

9501 P. AMBIGUUS (Sect. Ambigui) New Mexico, San Miguel Co., S of Chapelle. 2300 m. Among large boulders on steep slopes. S.B. coll. 19.8.87 (Unlike any other species and a plant which few would recognise as a Penstemon. Woody-based, wiry, much-branched stems, fine-leaved and fluttering with a myriad shell-pink or white, butterfly-like flowers, long-tubed and phlox-like. Grows S from here into Mexico.) (30+ seeds) C

11438 P. ANGUSTIFOLIUS (Sect. Coerulei) Wyoming, Platte Co., SW of Wheatland. 1830 m. Open sites in stony clay with sparse grasses. 21.7.89 (To Farrer "another queen in the race...spikes of ample blossoms such as only the high gods...could have imagined...not even in Omphalodes is there any matching the tender yet assured magnificence of the pale azures..." This is indeed a very beautiful plant of the northern Great Plains with the 20 cm. stems of pale blue set against the channelled blue-grey foliage.) (20+ seeds) C

10818 P. ANGUSTIFOLIUS var. VENOSUS (Sect. Coerulei) Utah, San Juan Co., NE of Hovenweep. 1600 m. Gravelly clay in openings among Artemisia & Juniperus. 4.6.89 (Somewhat taller, 30-40 cm. high, race endemic to the Four Corners area, with soft lavender flowers and rather broader leaves of the same grey-blue)(20+ seeds) C

10824 P. BREVICULUS (Sect. Cristati) Colorado, Montrose Co., SE of Naturita. 1800 m. Gravelly clay on open sandstone slopes. 4.6.89 (A dwarf, 10-15 cm. high, species, maybe best included under the allied P. ophianthus. Greyish leaves and purple flowers with orange-bearded staminodes. Only a few.) (10+ seeds) D

11331 P. CAESPITOSUS var. DESERTIPICTI (Sect. Caespitosi) Utah, Garfield Co., NE of Ruby's Inn to Antimony. 2600 m. Gravelly banks in full sun. 6.7.89 (The most reduced race of this prostrate, mat-forming species, with little, narrow, grey leaves. Lavender-blue flowers with yellow-bearded palates sit tightly on the mats. Just as good and desirable as P. acaulis (of which no 1989 coll. was possible, in spite of two visits) and possibly the most important here for the alpine-house specialist.) (15+ seeds) E

11190 P. CENTRANTHIFOLIUS (Sect. Gentianoides) California, Ventura Co., Lockwood Valley Road. 1220 m. Open 'flats' in sandy clay with sparse Pinus. 26.6.89 (More or less confined to the S Californian Coast Ranges and just entering Mexico in Baja California, this is the western equivalent of P. utahensis, to which it is generally similar but the blue-grey basal leaves are spatulate and the tubular flowers rather longer and deep, luminous scarlet rather than the pure carmine-red of P. utahensis. These stunning red desert species may not be altogether ungrowable - Fremontodendron & Romneya were neighbours here.) (30+ seeds) D

9529 P. COMARRHENUS (Sect. Glabri) Utah, Garfield Co., Red Canyon. 2600 m. Stony clay in openings among Pinus. S.B. coll. 23.8.87 (Elegant, erect, 60 cm., narrow-leaved stems of large, soft lavender-blue flowers with woolly, white anthers. No seed set here in 1989.) (20+ seeds) C

11533 P. COMPACTUS (Sect. Glabri) Utah, Cache Co., Bear River Mts., above Tony Grove Lake to Mt. Naomi. 2500 m. Open, stony, E-facing limestone slopes. 2.8.89 (A most desirable dwarf plant about 15 cm. high. Holmgren in IMF maintains this as a separate species ; Neese in UF reduces this to a var. of P. cyanan--thus. Having seen this in nature, we should certainly side with Holmgren : it grows with both P. cyanan -thus and P. leonardii but remains a distinct and even population. All have the same chromosome number and there is the possibility its ancestry may involve both these more widespread species. It occurs in a small part of the Bear River Range on either side of the Utah/Idaho line. Woody-based with several ba--sal rosettes of folded, glabrous leaves. Compact verticillasters of deep pure-blue flowers.) (15+ seeds) E

11174 P. CORDIFOLIUS
11618 P. CORYMBOSUS
} These two distinctly shrubby, scarlet-flowered members of Sect. Hesperothamnus can be placed in a separate genus, Keckiella, under which we list them here.

11395 P. CRANDALLII (Sect. Caespitosi) Colorado, Montrose Co., Uncompahgre Plateau, Columbine Pass. 2900 m. Thin, gravelly soil in fissures and pockets on flat, sandstone slabs. 15.7.89 (We should be inclined to assign this to var. atratus, were it not for the fact that this taxon is considered to be endemic to the La Sal Mts., just across the Dolores River Valley in Utah. Similar taxa to this occur in the Abajo Mts. to the S. An extremely fine plant which we saw in flower in 1987 ; prostrate, shrubby mats with slightly ascending flower-stems with lavender to blue flowers with yellow-bearded palates & staminodes)(20+ seeds) E

11380 P. CRANDALLII var. ATRATUS (Sect. Caespitosi) Utah, Grand Co., La Sal Mts., ESE of Moab. 2590 m. Open gravelly areas among Artemisia, Juniperus & Pinus. 13.7.89 (A type-locality coll. of this completely prostrate race, forming mats of woody stems with distinct, little obovate leaves. Even the flower-stems are decumbent. We think you will find this and the preceding perfectly distinct from any forms in cultiv--ation and much more desirable plants from the alpine-house specialists viewpoint.) (15+ seeds) E

11517 P. CYANANTHUS (Sect. Glabri) Utah, Weber Co., Wasatch Ridge WSW of Woodruff. 3100 m. Meadows and openings in mixed woodland. 1.8.89 (Surely the most glorious wildflower of the Wasatch Range, which must be given a fair trial by all who seek the best in hardy plants. Stout, 80 cm. high stems ringed with dense verti--cilasters of big, rich gentian-blue flowers. See P. compactus if you want a dwarfer version.)(30+ seeds) C

11556 P. CYANEUS (Sect. Glabri) Idaho, Custer Co., above Jim Creek to Railroad Ridge. 2440 m. Gravelly banks at margins of coniferous woodland. 7.8.89 (Very much an Idaho plant, just entering SW Montana & NW Wyoming. Showy bright blue flowers, typical of this section, on 60 cm. stems. Oblanceolate leaves.) (30+ seeds) C

11391 P. CYANOCAULIS (Sect. Glabri) Colorado, Montrose Co., NE of Nucla. 2000 m. Loose, gravelly clay. 15.7.89 (A very local plant with most distinct, leathery, crisped leaves. Blue-violet flowers. 30 cm.)(15+ seeds) D

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B	:	$2.50	;	£1.50	;	DM4,50	;	FF15. -	E	:	$5.50	;	£3.50	;	DM10, -	;	FF35. -
C	:	$3.50	;	£2.00	;	DM6, -	;	FF20. -	F	:	$7.00	;	£4.50	;	DM13, -	;	FF45. -

11838 PENSTEMON DAVIDSONII (Sect. Erianthera) Nevada, Washoe Co., SW of Mt. Rose. 3050 m. Rocky, W-facing, igneous slopes. J.A. coll. 29.8.89 (An outstanding creeping, mat-forming, shrubby high-alpine. The name has incorrectly been applied in gardens to P. newberryi (q.v.) and plants grown under the confused and illegimate name P. menziesii may correctly belong here. The type-race ranges S from British Columbia into the Sierra Nevada, always at the highest altitudes, with mats of little, rounded, leathery leaves and upright flower-stems, rising to 10 cm. or less with big, ascending blue-violet flowers with the woolly white anthers typical of this section. Quite growable in a trough, scree-bed or pan.) (15+ seeds) C

11289 P. DOLIUS (Sect. Cristati) Nevada, White Pine Co., W side Pancake Summit. 1980 m. Open, gravelly areas among sparse Juniperus. 3.7.89 (A little, greyish-leaved species with decumbent stems rising to carry pale violet-blue flowers with white throats and red-violet guide-lines. About 10 cm. high.) (10+ seeds) D

9086 P. DUCHESNENSIS (Sect. Cristati) Utah, Duchesne Co., E of Duchesne. 1900 m. Stony slopes among sparse, steppe-vegetation. S.B. coll. 14.7.87 (Included by Holmgren in IMF as P. dolius var. duchesnensis but elevated justifiably to specific rank by Neese in UF. The above is dwarf but this is tiny, ideally suited to the alpine-house or trough. Elizabeth Neese points out that it is geographically separated from the above by about 130 km. and that it is "much showier" - "low, gray-puberulent plants form large colorful patches" of blue to blue-purple flowers. This was not the case in 1989. We visited it here on 9.6.89, in the hope of photographing it but buds had aborted and plants were dehydrated ; there was no possibility of a seed-collection. In the case of this and other Utah species, our seed-bank proves its value.) (15+) E

10812 P. EATONII (Sect. Elmigera) Utah, San Juan Co., above Bluff. 1550 m. Steep, stony sandstone slopes. 3.6.89 (A most spectacular plant with stems, as much as 1 m. high, of brilliant scarlet flowers. A wide--spread plant in nature and surprisingly seldom-seen in cultivation. This collection would fit under var. undosus, with finely puberulent foliage but the scarlet flowers do not vary.) (30+ seeds) B

11439 P. ERIANTHERUS (Sect. Cristati) Wyoming, Platte Co., SW of Wheatland. 1830 m. Open sites in stony clay with sparse grasses.21.7.89 (From ashy-grey rosettes rise stiffly erect, 20 cm. stems of pale lavender-violet flowers with prominent, yellow-bearded staminodes. Essentially a prairie plant in the type.) (20+) B

11722 P. FLORIDUS (Sect. Spectabiles) California, Inyo Co., White Mts., SW of Westgard Pass. 2070 m. Loose, stony slopes & gulleys. 28.8.89 (A very showy species near P. palmeri with glaucous, toothed foliage and stems, which can reach 1.2 m., of pouting rose-pink flowers, smaller but much deeper in colour than P. palmeri. The type-race intergrades with the more southern var. austinii around here.) (20+ seeds) C

9545 P. FRANCISCI-PENNELLII (Sect. Glabri) (P. leiophyllus var. francisci-pennellii in IMF) Nevada, White Pine Co., Snake Range, 3400 m. Open stony slopes near conifers. S.B. coll. 24.8.87 (Distinct and handsome with dark, leathery, infolded and curved basal leaves in woody based tufts. Wiry stems of 5-15 cm. carry one--sided spikes of big, blue-violet flowers. Locality not visited in 1989.) (20+ seeds) D

11413 P. FREMONTII Colorado, Rio Blanco Co., above Piceance Creek NW of Rio Blanco. 1980 m. Steep slopes in loose fragmented shale. 19.7.89 (The species is more or less restricted to the Uintah Basin, where it is not uncommon. This is an extremely fine, rather distinct local race from the oil shales with a much-branched almost stoloniferous crown giving rise to many more flower-stems than usual. About 15 cm. high and forming hummocks of pure deep-blue flowers, stunning against the glaring white shale.) (15+ seeds) D

10564 P. FRUTICIFORMIS (Sect. Spectabiles) California, Inyo Co., Panamint Mts. between Wildrose & Charcoal Kilns. 1830 m. Gravelly 'washes'. 20.5.89 (1988 seed from old capsules) (A P. palmeri relative endemic to the Death Valley ranges - the Panamint, Inyo and Argus Mts. Distinctly shrubby with much-branched stems and narrow, glaucous leaves. Pale lavender flowers with purple guide-lines. About 50 cm. high. While this can experience extremely low temperatures, the area is very dry most seasons.) (15+ seeds) D

11448 P. GLABER (Sect. Glabri) Wyoming, Converse Co., S of Esterbrooke. 1980 m. Gravelly clay in open grassland 22.7.89 (A superb plant near P. alpinus (Dorn regards this as a var. of P. glaber) with huge heads of big baggy flowers in the bluest of blues on stout, decumbent stems.) (30+ seeds) B

9090 P. GOODRICHII (Sect. Cristati) Utah, Uintah Co., E of Tridell. 1700 m. Sandy clay and pebble ridges with sparse Juniperus. S.B. coll. 14.7.87 (An extremely narrow, recently described, Uintah Basin endemic. Distinct, regular flowers - not two-lipped as in most Penstemons - in pale blue to blue-lavender. Greyish leaves. About 20-30 cm. tall. Not even a trace of flowering here in 1989 (visited 8.6.89)) (20+ seeds) D

11580 P. GRACILENTUS (Sect. Saccanthera) California, Sierra Co., E side Yuba Pass above Sattley. 2050 m. Openings in coniferous woodland in granite grit. 12.8.89 (Woody based with tall (to 60 cm.), wiry stems clothed in narrow leaves with long-stemmed cymes of deep blue-purple flowers, too small to be spectacul--ar but the overall effect is graceful and airy and there is potential for a good, hardy plant.) (20+) B

11550 P. FRUTICOSUS (Sect. Erianthera) Idaho, Custer Co., above Yankee Fork Salmon River, N of Sunbeam. 1890 m. Loose detritus and ledges on rotten granite outcrop. 6.8.89 (An erect, shrubby species, about 30 cm. high distributed E from British Columbia into W Montana & W Wyoming. P. scouleri, P. barretiae & P. cardwell--iae are closely allied races well-known in cultivation. It varies much and is here in an entire-leaved glabrous form with glossy, leathery leaves. Not seen in flower here and can vary from lavender-blue to purple. All forms are well worth growing and should prove hardy, trouble-free & rewarding.) (30+ seeds) B

9461 P. HALLII (Sect. Glabri) Colorado, Park Co., below Mt. Sherman. 3800 m. Loose stony banks in coniferous forest zone. S.B. coll. 14.8.87 (A marvellous endemic of the mountains around the Continental Divide. Close-clumped rosettes of narrow, smooth leaves with 15 cm. stems of luminous, red-violet flowers - an unusual colour accurately reproduced in a fine photograph on Plate 13 of "Rocky Mountain Alpines") (30+) B

11676 P. HETEROPHYLLUS (Sect. Saccanthera) California, Lake Co., above Grizzly Creek, E of Clear Lake. 500 m. Open, rocky slopes. 23.8.89 (A woody-based, erect-growing species up to about 50 cm. high, rated by Farrer as "one of the loveliest of all" in its "serene dawn-blue" "trumpets of opalescent loveliness". Usually soft lavender-blue shading to rose basally. W.R. tells us this is a fine form here.) (30+ seeds) B

11599 P. ? HETEROPHYLLUS (Sect. Saccanthera) California, Mendocino Co., Hull Mt. NNE of Lake Pillsbury. 2030 m. Exposed, stony slopes. 19.8.89 (Similar in habit to the above but with the narrow leaves distinctly glaucous and about 30 cm. high. Pale lavender-blue flowers from yellow buds. This is from well inside the geographical area of P. heterophyllus, a Coast Range species, but grows very much above the 1500 m. limit usual for it. The "rather tender" criticism could hardly be applied to this. We are not always happy in identifying the Californian members of Sect. Saccanthera but cannot see what else this is.) (30+ seeds) C

11499 P. HUMILIS (Sect. Penstemon) Wyoming, Fremont Co., Wind River Mts., SW of Lander. 2500 m. Subalpine meadow in stony clay. 29.7.89 (A fairly large-flowered, floriferous race of this widespread mountain plant. 12 cm. stems of deep violet-blue flowers from rooting, prostrate mats of rosettes.) (30+ seeds) B

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B :	$2.50	£1.50	DM4,50	FF15. -	E :	$5.50	£3.50	DM10, -	FF35. -
C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

PENSTEMON continued

11851 P. HUMILIS (Sect. Penstemon) Nevada, Humboldt Co., Santa Rosa Range, Granite Peak. 2700 m. J.A. coll. 9.9.89 (From a little-visited area of NW Nevada - not seen in flower by John or ourselves.) (20+ seeds) B

11303 P. IMMANIFESTUS (Sect. Coerulei) Nevada, White Pine Co., Schell Creek Range, NE of McGill. 2130 m. Open stony clay slopes and banks. 4.7.89 (Described from this area by Noel Holmgren in 1978, this is a showy plant with 30 cm. stems dense with lavender-blue flowers. Fleshy, blue-grey foliage.) (20+ seeds) D

9496 P. JAMESII (Sect. Cristati) New Mexico, San Miguel Co., S of Chapelle. 2300 m. Open areas among sparse Pinus in stony clay. S.B. 19.8.87 (A handsome, 30 cm. high species centred on E New Mexico, an area not revisited in 1989. Stiff, upright stems packed with large, blue-violet flowers.) (30+ seeds) B

11701 P. LABROSUS (Sect. Elmigera) California, Kern Co., E of Mt. Pinos. 2250 m. Open slopes among Pinus in loose, granite grit. 27.8.89 (We saw this in flower on 26.6.89 and immediately decided that this could be the best new garden-plant we could bring you in 1989. Endemic to the mountains of the SW corner of California and just crossing into Mexico, this always grows between 1500 and 2500 m. in the coniferous forest zone, so there is no problem about hardiness. It is obviously close to P. barbatus, a plant of proven garden-value, which grows about 1000 km. (625 miles) to the East with a wider North-South range from S Utah & S Colorado down to Mexico. While this has similar elegant stems of orange-scarlet flowers with swept-back, deeply divided lower lips, these are a little larger, it is rather dwarfer at 50-60 cm. and the foliage is much narrower, glossy green and leathery - a really 'classy' hardy plant.) (20+ seeds) C

11797 P. LAETUS (Sect. Saccanthera) California, Nevada Co., ENE of Nevada City. 1370 m. Among rocks. W.R. coll. 19.8.89 (A complex species centred on the Sierra Nevada. Woody-based with erect stems to around 60 cm. clothed with linear leaves and carrying blue-violet flowers. Not seen in flower by Wayne or us.) (30+) B

11496 P. LARICIFOLIUS (Sect. Laricifolii) Wyoming, Hot Springs Co., Wind River Canyon, N of Shoshoni. 1500 m. Fissures on limestone cliffs and boulders. 28.7.89 (Unlike any other species, this is perhaps our favourite among the smaller ones. We are not alone : "one of the most beautiful plants in all the world" writes Norman Deno. Neat, basal rosettes of linear leaves, exactly like little tufts of larch-foliage. Branching, wiry stems, 3-15 cm. high, dance with a succession of salmon-pink flowers. The saxatile habitat here is unusual. It is more often a plant of gravelly patches in exposed sites.) (20+ seeds) D

9231 P. LARICIFOLIUS var. EXILIFOLIUS (Sect. Laricifolii) Wyoming, Albany Co., S of Laramie. 2500 m. Exposed gravel patches among steppe vegetation. S.B. coll. 27.8.87 (We did try to collect this again on 21.7.89 but hardly a seed was set. A diminutive race endemic to the windswept Laramie Plains with their severe climate. Usually even dwarfer and always with pure white flowers. For the alpine-house or trough.) (20+) E

8941 P. LENTUS ALBIFLORUS (Sect. Coerulei) Utah, San Juan Co., W of Blanding to Natural Bridges. 2100 m. Sandy areas among Pinus. S.B. coll. 6.7.87 (Endemic to the foothills SW of the Abajo Mts., a distinct var. with white flowers, sometimes flushed pale-pink or bluish. 30-50 cm. high. Glaucous leaves.) (30+ seeds) C

11515 P. LEONARDII (Sect. Saccanthera) Utah, Weber Co., Wasatch Ridge, WSW of Woodruff. 3100 m. Open stony banks and slopes with Artemisia. 1.8.89 (One of the most eastern members of its section and one of the finest. We enthused about this in 1987 and have not changed our minds. Low, shrubby growth, 15-20 cm. high with thick, narrow leaves and a mass of rich gentian-blue flowers. Outstanding!) (20+ seeds) D

11387 P. LINARIOIDES (Sect. Caespitosi) Colorado, San Miguel Co., SW of Slick Rock. 2150 m. Open, gravelly 'flats' with Artemisia, etc. 14.7.89 (A very fine population here, which we saw in flower on 4.6.89 and made a long detour to return for seed. Neat, woody shrublets with narrow, grey foliage, rather like an Aethionema, send up numerous erect stems to about 15-20 cm. each bearing up to 30 flowers of soft lilac--blue with white throats. This would not key-out satisfactorily in Weber but Panayoti & Gwen Kelaidis agree that P. linarioides is an acceptable name. It would seem to fit in with what Holmgren calls the 'mountain form' of P.l. var. sileri though it comes within the range of P.l. subsp. coloradoensis - the Caespitosi species here are rather confusing. An excellent plant distinct from any other listed.) (20+) D

11397 P. MENSARUM (Sect. Glabri) Colorado, Delta Co., Grand Mesa above Cedaredge. 2600 m. Steep, loose, stony banks in full sun. 18.7.89 (Known only from the isolated massif of Grand Mesa, one of the largest flat--topped mountains in the world. A very fine herbaceous species. Seen in flower in 1987, we could not return for seed. Flat-faced flowers in extremely deep, rich royal-blue on 30-40 cm. stems.) (30+ seeds) D

10834 P. MOFFATII (Sect. Cristati) Colorado, Mesa Co., Gateway. 1600 m. Steep clay slopes in full sun. 5.6.89 (We have a fine collection this year of this little-known and rather local native of the Colorado Plateau in SE Utah & adjacent Colorado. About 20 cm. high with sticky foliage and flowers varying from blue to blue-purple or lavender. It flowers early and we have never seen it here in bloom.) (20+ seeds) D

8800 P. MUCRONATUS (Sect. Coerulei) Utah, Daggett Co., S of Manila. 2250 m. Eroded, stony, clay slopes. S.B. coll. 25.6.87 (In UF reduced to P. pachyphyllus var. mucronatus by Elizabeth Neese, who considers it "one of our most beautiful Penstemons"..."a well-marked taxon in the vicinity of the type-collection", where this seed was gathered. We visited it on 8.6.89 & 1.8.89 but there were few flowers and no seed. A very lovely thing with fleshy, blue-grey leaves and pale lavender-blue flowers, streaked with red--purple inside on 20 cm. stems. Absolutely distinct from our collection of P. pachyphyllus.) (20+ seeds) C

11558 P. MONTANUS (Sect. Erianthera) Idaho, Custer Co., above Jim Creek to Railroad Ridge. 2590 m. Loose, igneous talus on steep slopes. 7.8.89 (A most distinct plant of the high-altitude screes of Idaho, N Utah Wyoming and W Montana. A woody crown, usually buried beneath the stones, gives rise to decumbent stems forming loose mats of toothed, greyish leaves with large, lavender flowers bearded inside.) (30+ seeds) C

11798 P. NEWBERRYI (Sect. Erianthera) California, Amador Co., Pedlar Hill. 2040 m. W.R. coll. 15.8.89 (From woody mats of little, toothed, leathery leaves rise erect stems of vivid rose-red flowers - "baggy bugles of a ferocious aniline red-mauve most terrible and breathtaking to look upon in the sun." Farrer wrote of this under the name P. davidsonii (q.v.) and a form is well-known in gardens under the name "P. roezlii" - this is the type-race from the Sierra Nevada, likely to prove an excellent hardy rock-garden plant with full sun and good drainage. About 15-20 cm. high and likely to vary somewhat from clones we have.) (30+) B

11597 P. NEWBERRYI subsp. SONOMENSIS (Sect. Erianthera) California, Mendocino Co., Hull Mt. NNE of Lake Pills--bury. 2040 m. Exposed rock fissures. 19.8.89 (A race endemic to the peaks of the Californian Coast Range strikingly different for the gardener in its deep carmine-purple flowers. Here rather dwarf with 10-15 cm stems from glaucous-leaved mats. This could prove an outstanding new rock-garden plant.) (30+ seeds) D

PRICE CODE A	:	$1.50	£1.00	DM3, -	FF10. -	PRICE CODE D	:	$4.00	£2.50	DM 7,50	FF25. -
B	:	$2.50	£1.50	DM4,50	FF15. -	E	:	$5.50	£3.50	DM10, -	FF35. -
C	:	$3.50	£2.00	DM6, -	FF20. -	F	:	$7.00	£4.50	DM13, -	FF45. -

11369 P. PACHYPHYLLUS var. CONGESTUS (Sect. Coerulei) Utah, Sevier Co., W of Fremont Junction. 2000 m. Sandy clay in openings among Juniperus. 9.7.89 (Thick, glaucous, basal foliage and 30-50 cm. stems with a multitude of flowers in varying shades of lavender-blue with orange-gold bearded staminodes.) (20+ seeds) C

9550 P. PALMERI (Sect. Spectabiles) Nevada, White Pine Co., Snake Range. 2200 m. Stony areas and slopes. S.B. coll. 24.8.87 (Woody based clumps of blue-grey, toothed leaves and 2 m. wands of huge, pink flowers, marked inside with wine-red and with yellow-bearded staminodes. Unrivalled for size & impact.)(30+ seeds) B

9527 P. PALMERI var. EGLANDULOSUS (Sect. Spectabiles) Utah, Kane Co., N of Kanab. 1900 m. Open stony slopes among Pinus. S.B. coll. 22.8.87 (Technically differs only in the absence of pubescence on the stems but here is rather dwarfer, at 60 cm., more branched and with shell-pink flowers. While we saw both of these in flower in several areas in 1989, we could not arrange to return late enough for seed.) (30+ seeds) B

11543 P. PERPULCHER (Sect. Glabri) Idaho, Butte Co., W of Craters of the Moon. 1520 m. E & SE-facing, stony slopes with Artemisia, Eriogonum, etc. 5.8.89 (Endemic to the area around the Snake River Plains in Idaho and not particularly near to anything else here. Deep-blue flowers on stems of about 50 cm.) (20+) C

11598 P. PURPUSII (Sect. Saccanthera) California, Mendocino Co., Hull Mt. NNE of Lake Pillsbury. 2040 m. Open stony areas. 19.8.89 (Quite narrowly endemic to high altitudes on the Coast Ranges of N California, this is a magnificent dwarf alpine-plant, which we have never seen grown or mentioned in cultivation in Europe - woody, decumbent stems, 10-15 cm. long, spread and root with age ; ash-grey, rounded foliage ; short, dense heads of big, baggy flowers - "unfortunately...nearly always violet rather than blue", writes Sampson Clay. He would not think so if he had ever seen the flowers : by extraordinary good fortune, a rich and luminous imperial purple. We begin to feel self-conscious at saying "outstanding" again.) (20+) E

11725 P. ROSTRIFLORUS (Sect. Bridgesiani) (formerly P. bridgesii) California, Mono Co., Virginia Lakes Road, S of Bridgeport. 2740 m. Open, gravelly banks. 28.8.89 (Distinct and the only member of its section. A low, shrubby base with narrow, leathery, green leaves, sends up stems of around 50 cm. in height, with scarlet, tubular flowers, rather like those of P. barbatus. Spectacular, long-flowering and surprisingly unfamiliar in Europe - coming from this height in the Sierra Nevada, it has to be hardy.) (20+ seeds) C

9097 P. SCARIOSUS var. GARRETTII (Sect. Glabri) Utah, Daggett Co., Uinta Mts., Eagle Basin Trail. 2300 m. Stony clay with Artemisia & Juniperus. S.B. coll. 15.7.87 (A "superb" (Sampson Clay) member of the group around P. strictus. Clumps of shiny green, basal leaves with erect, 30-40 cm. stems of breathtaking blue flowers. Virtually no seed set here in 1989 but we fortunately still have ample from 1987.) (30+ seeds) C

9427 P. SECUNDIFLORUS (Sect. Coerulei) Wyoming, Albany Co., W of Centennial. 2800 m. Open, stony area among Artemisia. S.B. coll. 9.8.87 (A fairly dwarf race, 10-15 cm. high, of this E slope species. Here with one-sided stems of soft-lilac-pink flowers and greyish leaves. No seed set here in 1989 due to construct -ion for a snow-mobile parking area on top of it ; no seed along the road due to the season!)(20+ seeds) B

11728 P. SPECIOSUS (Sect. Glabri) Nevada, Washoe Co., SW of Mt. Rose. 2750-3080 m. Stony slopes & exposed summit ridges. 29.8.89 (A spectacular species aptly named "showy" with large, white-throated deep blue flowers, shading to violet basally. The species is by far the most widespread of Sect. Glabri - from Utah & Idaho across Nevada to the Pacific Coast states - and is correspondingly variable. This coll. & the next would fit under P.s. subsp. kennedyi in Munz, a taxon from above 2500 m. with long attenuate calyx-lobes. The taxon would appear to be valueless and has been discarded by Holmgren in IMF. Height here can vary from prostrate to about 30 cm. If dwarf forms are wanted, these could be selected.) (20+ seeds) C

11707 P. SPECIOSUS (Sect. Glabri) California, Inyo Co., White Mts., N of Schulman Grove. 3160 m. Open, stony, slopes in alpine-steppe vegetation. 28.8.89 (Varies enough to be worth having from different areas.)(20+) C

11852 P. SPECIOSUS Nevada, Humboldt Co., Santa Rosa Ra., above Lye Creek. 2160 m. J.A. coll. 9.9.89 (20+) C

11396 P. STRICTUS (Sect. Glabri) Colorado, Delta Co., Grand Mesa above Cedaredge. 2600 m. Steep, stony banks in full sun. 18.7.89 (In its lavender-blue colour this approaches the allied, more southern P. comarrhenus but it lacks the branched cymes with long pedicels typical of the latter. A fine plant about 50 cm.)(20+) B

11510 P. STRICTUS (Sect. Glabri) Wyoming, Fremont Co., above Louis Lake NE of Atlantic City. 2800 m. Open banks in granite grit. 29.7.89 (A more typical form here, collected in the area of Fremont's 1842 type-collect-ion, Splendid, one-sided spires of rich-blue flowers with woolly white anthers. About 60 cm.)(20+ seeds) B

11364 P. SUBGLABER (Sect. Glabri) Utah, Sevier Co., Fishlake Plateau SE of Salina. 2200 m. Steep, loose banks. 9.7.89 (Another fine deep-blue flowered plant, a robust perennial about 60 cm. high.) (20+ seeds) B

9619 P. TEUCRIOIDES (Sect. Caespitosi) Colorado, Park Co., NE of Como to Jefferson. 3000 m. Steep, open, gravelly bank. S.B. coll. 6.9.87 (Lavender-blue flowers on 9 cm. shrublets with very narrow, grey leaves. We are quite at sea among the Colorado members of Sect. Caespitosi and rely on Panayoti & Gwen Kelaidis for this name. We might add the type-specimen of P. crandallii was collected about here in "vicinity of Como" in 1897 ; this bears little resemblance to P.c. var. atratus (q.v.). A sweet little plant!) (20+) D

11297 P. THOMPSONIAE var. DESPERATUS (Sect. Caespitosi) Nevada, White Pine Co., SE of Little Antelope Summit. 1980 m. Calcareous clay in openings among Artemisia. 3.7.89 (The mat-forming Great Basin race of this comparatively widespread member of Sect. Caespitosi. From a very hot habitat - possibly difficult.) (10) E

11853 P. TRACYI California, Trinity Co., Packers Peak W of Coffee Creek. 2090 m. NE-facing igneous rock crevices. J.A. coll. 17.9.89 (An extremely narrow endemic, unlike anything else in the genus, stranded on one or two mountains in the Trinity Alps of NW California. John Andrews first collected seed of this in 1987. Out of the 50 or so correspondents to whom he sends his exchange-list, only 2 requested seed of this. We might say that we do not think a lot of the other 48 but to be realistic we must accept that few of us have ready access to the necessary literature or the time needed to find out about an unfamiliar name. We are not going to tell you that this is the most spectacular or showy of saxatile Penstemons but it is a choice and worthwhile plant deserving of the same aura of respect that surrounds such other relic species as Saxifraga florulenta, Lepidium nanum or Jankaea. This is a dwarf shrub about 10 cm. high with small, rounded, leathery leaves and densely clustered, tubular flowers, described as pink by Munz but John tells us they are white and mature to pink. Knowing that we had hoped to list seed of this, John made another journey to it one week after we left America ; it is a long hard climb up to its obscure mountain eyrie. We all hope that we can now see it established & treasured in cultivation.) (30+ seeds) F

10833 P. UTAHENSIS (Sect. Gentianoides) Colorado, Mesa Co., Gateway. 1600 m. Steep clay slopes in full sun. 5.6.89 (This is one of the most spectacular of Penstemons. Nearest to the western P. centranthifolius with leathery, blue-grey foliage and 50 cm. wand-like stems of funnel-shaped flowers but the colour is a pure, brilliant carmine-red - not scarlet - "like a fire-engine shouting at you" says Panayoti K.!) (30+) D

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C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

PENSTEMON continued

11450 P. VIRENS (Sect. Penstemon) Wyoming, Albany Co., Laramie Mts., Friend Park. 2250 m. Among rocks in granite grit. 22.7.89 (A low, long-lived, clump-forming plant with many wiry stems of about 15 cm., ringed with bright blue-violet flowers. Mainly a species of the Colorado Front Range.) (30+ seeds) B

9438 P. VIRGATUS var. ASA-GRAYI (Sect. Glabri) Colorado, Park Co., S of Fairplay. 3100 m. Open, stony steppe with sparse Artemisia. S.B. coll. 13.8.87 (Another plant with an E slope distribution, here in a very fine, compact form about 30 cm. high with stems of rich-blue flowers. Tidy and attractive.) (30+ seeds) B

9563 P. WATSONII (Sect. Penstemon) Utah, Piute Co., Tushar Range above Junction. 2700 m. Open, stony steppe. S.B. coll. 26.8.87 (Woody-based clumps with no basal leaves. Erect, 30-50 cm. stems with narrow, green foliage and clustered heads of flowers in a very deep, rich blue. A fine herbaceous plant.) (30+ seeds) B

9504 P. WHIPPLEANUS (Sect. Penstemon) New Mexico, Bernalillo Co., Sandia Mts. above Albuquerque. 3500 m. Open slopes in coniferous forest zone. S.B. coll. 20.8.87 (A characteristic plant of the higher areas through -out the southern Rocky Mts. Smooth basal leaves and 50 cm. stems of big, baggy, drooping flowers. This is from the area where Bigelow made the type-collection during Whipple's survey of 1853 - a much finer colour than the creams and dull purples of N Colorado & Wyoming - rich wine-purple.) (30+ seeds) B

In 1987 we offered two collections of Penstemon seeds in an attempt to make it easier for those unfamiliar with the genus. Making a selection from over 70 items can be rather daunting! These were extremely popular and we are offering three collections this season, presented from a different angle.

6 DWARF PENSTEMONS collected in 1989. These are outstanding species of great potential in the rock-garden or alpine-house, collected for the first time by us and not in general cultivation. All are less than 30 cm. (1 ft.) in height : P. abietinus, P. crandallii (Uncompahgre Plateau form - 11395), P. linarioides (Slick Rock form - 11387), P. newberryi sonomensis, P. purpusii and P. corymbosus (Keckiella corymbosa q.v.).
6 packets of seed (total list price £18.00) for £12.00 (or $18.00 or DM36, - or FF120. -).

8 LARGE TO MEDIUM-SIZED PENSTEMONS collected in 1989. Once again these are species which we have not collected previously and are new to our lists. These vary from about 30 cm. to more than 1 m. (1-4 ft.) in height. P. angustifolius venosus, P. floridus, P. fruticosus (Yankee Fork form - 11550), P. heterophyllus (Lake Co. form - 11676), P. mensarum, P. speciosus (one of the Nevada colls.) and the two scarlet species, P. centranthifolius and P. labrosus.
8 packets of seed (total list price £16.00) for £10.00 (or $15.00 or DM30, - or FF100. -).

10 LARGE TO MEDIUM-SIZED PENSTEMONS FROM OUR SEED-BANK Species from 1987 collections, which we have been unable to repeat, either because we did not visit their local--ities or no seed was set in 1989. Penstemon seed stores well even without refrigeration so reasonably good germination can be expected. P. ambiguus, P. jamesii, P. lentus albiflorus, P. mucronatus, P. palmeri, P. scariosus garrettii, P. secundiflorus, P. watsonii, P. virgatus asa-grayi plus a packet of 1987 cultivated seed of 'Gina', an excellent hybrid of P. fruticosus, about 30 cm. high with rose-pink flowers & silvery leaves.
10 packets of seed (total list price £15.50 excl. 'Gina') for £10 (or $15.00 or DM30, - or FF100. -).

PENSTEMON UPDATE While it is still early to report on results from our 1987 Penstemon collections, we have had fairly encouraging reports of initial germination. As is frequently the case, these seem to have been especially good with some of our Southern Hemisphere customers in Australia & New Zealand. This genus is also going to have great long-term significance for such growers with warmer summer climates. The hot 1989 summer in W Europe should have suited these : we shall be glad to learn of progress. In some instances, while some germination occurred, seedlings were sparse. This is fairly typical of many dry climate species, especially those of long viability such as Penstemon, and it would be well to remove seedlings at an early stage and anticipate further germination in future seasons. The poorest germination seems to have been of P. leonardii, a really superb species of which we had high hopes. Only one grower reported this up. It was the only member of Sect. Saccanthera listed in 1987-88 and we wonder if these (or this in particular) require a more prolonged cold period. We shall be grateful for reports regarding this during the 1988-89 season. Both our 1987 and 1989 collections of this species were made at an optimum time for collection so we feel that it is the treatment of the seed which is the problem.

As far as we have been able to ascertain, after having seen many of the colonies from which seed was collected in 1987 again in 1989, most of the identifications were correct. To give a brief resume of the doubtful ones : 9100 is P. cleburnei, though Dorn has now reduced this to a var. of P. eriantherus, in which case 8649 should also probably be P. eriantherus var. cleburnei ; while 9060 is indeed P. janishiae from the type locality, 9048 and 9051, both collected on Pancake Summit, Nevada, would be likely to be P. dolius and P. confusus. As far as we could see in 1989, there is no P. janishiae here ; P. confusus, which we were unable to collect in 1989, is in Sect. Gentianoides and very worthwhile with lavender-pink flowers (not purple as stated in most floras - it turns purple when dried).

While we are sure most of you will feel that we have presented you with more than enough species from this genus in 1989, the omissions and failures are depressingly numerous. We drove many hundreds, if not thousands of miles, and spent many days checking-out colonies in the hope of seed. Quite apart from the many fine things we have never listed before, several species included in our 1987 list are missing this year. Where we have fortunately seed-bank material - of such as P. duchesnensis, P. goodrichii and P. mucronatus - this is listed. Several, however, such as P. acaulis, P. bracteatus and P. janishiae, all absolutely marvellous things, are missing - we have no seed left of these. We visited such plants as these twice in 1989 in the hope of a small collection but the position was hopeless. There is no chance of us being able to list these again for several years to come.

May we finally stress the basic suggestions about cultivation we supplied in 1987 : as much light and as much drainage as possible. The wetter the climate the more sun and drainage will be needed : raised beds, scree-beds, sand-beds, crushed granite mounds - whatever you need to suit your climate. While Penstemons react to rich soil and moisture in a gratifying manner, they make too much growth too quickly and can collapse. Raise seedlings in as Spartan a manner as possible and grow the plants in poor soil and full sun. This is a very beautiful and diverse genus about which we still have much to learn ; we hope you may discover it yourselves.

PRICE CODE A :	$1.50	£1.00	DM3, -	FF10. -	PRICE CODE D :	$4.00	£2.50	DM 7,50	FF25. -
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C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

11712 PETROPHYTUM CAESPITOSUM California, Inyo Co., White Mts., N of Schulman Grove. 3160 m. Fissures on limestone outcrop. 28.8.89 (One of the very few strictly saxatile, cushion-plants of the N American West. Widespread from Oregon E to S Dakota ; S to Texas & California, usually on limestone, an uncommon rock in N America, but also on granite and sandstone. We have never been convinced that much if any seed still remains in the tempting old flower-spikes which stay on the plants for a year. This is good cleaned seed from 1989 flowers ; it must have flowered early here - in many colonies it does not flower until Septem--ber or October. What looks like larger, darker seeds are follicles which have not dehisced. Moreover, this is an extremely compact form with very small rosettes and very short-stemmed, stubby heads of cream -white flowers. Not usually at all difficult to grow in the alpine-house or trough.) (30+ seeds) C

11411 PHACELIA GLANDULOSA Colorado, Rio Blanco Co., above Piceance Creek NW of Rio Blanco. 1980 m. Steep slope of loose, fragmented shale. 19.7.89 (An extremely fine and handsome plant, always very local and growing here on the Green River oil-shales. Oblong, pinnatifid, glandular-hairy leaves in attractive basal rosettes ; erect stems with numerous cymes of violet-blue flowers, from 10 to 30 cm. high. Monocarpic or biennial but well worth growing as an alpine-house plant and maintaining from seed.) (20+ seeds) C

11511 PHACELIA SERICEA Wyoming, Fremont Co., NE of Atlantic City. 2800 m. Open banks in granite grit. 29.7.89 (Widespread 'classic' Rocky Mt. alpine with much cut, silky grey basal foliage and stiff, upright stems densely packed with tiny violet-purple flowers. Not so showy as the preceding but perennial.) (30+ seeds) B

PHLOX. The despair of the seed-collector. We had some fine things 'lined up' for you in 1989 but the populations of P. gladiformis, P. griseola and some marvellous deep-pink P. austromontana we had hoped to collect from hardly set a seed. The capsules on the unrivalled, pulvinate P. tumulosa were far too green when we saw them in Nevada on 24.5.89 ; seed had gone by the time we returned on 3.7.89. Nevertheless, we have some good things here and still have a few items in the seed-bank. While it is extremely time-consuming and often impossible to collect Phlox seed in any quantity, germination is usually reliable ; we have good reports from 1987 seed. If you are interested in these, always take the chance of seed.

9440 PHLOX CONDENSATA (P. caespitosa subsp. condensata in Wherry's monograph) Colorado, Park Co., Mosquito Range, Mt. Sherman above mine. 4200 m. Open, stony turf and exposed tundra. S.B. coll. 14.8.87 (Endemic to the southern ranges around the Continental Divide, the tightest of alpine species - firm-packed pads of tiny rosettes massed with fragrant, white flowers. Probably very difficult to cultivate.) (8 seeds) F

11839 PHLOX DIFFUSA California, Humboldt Co., SSW of Willow Creek. 1580 m. J.A. coll. 16.7.89 (Mainly a plant of the Sierra Nevada & N Coast Ranges in California, a caespitose, mat-forming species with lilac to white flowers. Close to P. hoodii but with softer, greener foliage and usually montane.) (8 seeds) E

11127 PHLOX HOODII California, Modoc Co., NW of Canby. 1500 m. Stony clay 'flats' overlaid with volcanic debris. 20.6.89 (The western races of this widespread species can usually be separated into a different taxon, P. h. var. canescens, distinct from the gardener's viewpoint in its larger flowers. The common eastern race from the plains and sagebrush areas around the Rockies is often straggly and usually white -flowered. This is comparatively compact and John tells us deep pink here. Most desirable.) (8 seeds) F

11506 PHLOX MULTIFLORA (? subsp. depressa of Wherry) Wyoming, Fremont Co., Wind River Mts. above Fiddler's Lake 3000 m. Open slopes in granite grit. 29.7.89 (A very good, compact form here forming cushions of needle--leaves smothered in white, or occasionally palest lilac, flowers. Seen in flower here 22.6.87) (8 seeds) F

9244 PHLOX MULTIFLORA (? subsp. depressa of Wherry) Wyoming, Carbon Co., Shirley Mts. NW of Medicine Bow, 2600 m. Stony slopes of various aspects. S.B. coll. 22.7.87 (Another good, tight, white form.) (10 seeds) F

9154 PHLOX MULTIFLORA (subsp. multiflora of Wherry) Colorado, Boulder Co., Flagstaff Mt. above Boulder. 2200m. Openings among Pinus. S.B. coll. 19.7.87 (Large pink, white-eyed flowers on looser mats.) (10 seeds) E

9076 PHLOX PULVINATA Utah, Wasatch Co., NW of Strawberry Lake. 2600 m. Open gravelly areas. S.B. coll.14.7.87 (Wide, compact but soft green cushions covered with white to pale lilac flowers.) (10 seeds) E

11071 PHLOX SPECIOSA (subsp. occidentalis of Wherry) Oregon, Josephine Co., SW of O'Brien. 460 m. Open, stony 'flats' with sparse scrub among conifers. 19.6.89 (A handsome, larger, shrubby-based species with wide heads of large flowers with notched petals. Here in a rich purple-pink form. 15 cm. high.) (8 seeds) C

11755 PHYLLODOCE BREWERI California, Alpine Co., above Winnemucca Lake. 2730 m. Moist depressions & in turf among granite outcrops. 5.9.89 (A charming, little, shrubby member of the Ericaceae, endemic to high altitudes in the Californian Sierra Nevada. A compact evergreen, about 20 cm. high, with dark, glossy, linear foliage and elongated racemes of rose-purple flowers. For a cool, acid, peaty soil.) (100+ seeds) D

9457 PHYSARIA ALPINA Colorado, Park Co., Mosquito Range. 4200 m. Screes and mine-tailings. S.B. coll. 14.8.87 (The highest-growing, largest flowered of the genus. Chrome-yellow flowers followed by the inflated fruits characteristic of this genus of Cruciferae. Endemic to this area of the Rocky Mts.) (20+ seeds) C

11336 PHYSARIA CHAMBERSII var. MEMBRANACEA Utah, Garfield Co., Red Canyon above Butch Cassidy Draw. 2600 m. Loose limestone scree on steep slopes. 7.7.89 (Endemic to this area and our only 1989 coll. of this genus of eye-catching and confusing plants most numerous in E Utah, Wyoming & the W slope of the Rockies. Rosettes of round, grey foliage, pale-yellow flowers and large, inflated, papery capsules.) (15+ seeds) C

8648 PHYSARIA EBURNIFLORA Wyoming, Natrona Co., SSE of Alcova. 1800 m. Open clay & sandstone slopes. S.B. coll. 21.6.87 (Listed in 1987 as P. ? acutifolia, this would appear to be P. eburniflora, restricted to Carbon & Natrona Cos., Wyoming. One of the dwarfest species with extremely fine grey-white rosettes, cream flowers and little pearl-clusters of fruits. All 3 of these are only a few cm. high.) (15+ seeds) C

10979 PITYROGRAMMA TRIANGULARIS California, Solano Co., Mix Canyon NW of Vacaville. 300 m. Shaded rocks in woodland. 15.6.89 (The Goldenback Fern, a very beautiful, summer dormant species of the Pacific Coast states, growing here with Adiantum jordanii. We have not collected fern-spores before and we do hope someone will try these. Not likely to be easy but would make a marvellous alpine-house pan-plant with leathery fronds, about 20 cm. high densely dusted beneath with golden yellow powder.)(We're not counting) C

POLEMONIUM. We have some great things in this genus this season. In fact, among the desirable N American species we are only missing P. eximium. We have not seen this Sierra Nevadan endemic, allied to the P. viscosum group, but it is extremely close to P. chartaceum, which we do list thanks to John Andrews, so perhaps the omission is not so much of a loss. Results with 1987 seed of these have been excellent. Some plants have flowered very quickly in 1988 and 1989 and we hope they will settle down in cultivation. We were especially pleased to see one or two plants of the yellow form of P. brandegei, raised from our seed collected in the Sandia Mts., New Mexico, in 1987, pretty much true to colour and in character, on the show-bench at the A.G.S. Diamond Jubilee Conference in Exeter on 14.4.89. It was nice too to see that the judges appreciated the skill of those who had grown them.

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C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

POLEMONIUM

11463 POLEMONIUM BRANDEGEI Wyoming, Albany Co., Laramie Mts., Laramie Peak. 3110 m. Granite grit among rocks in summit area. 23.7.89 (In 1987 we listed our collection of the yellow form of this species from the Sandia Mts., New Mexico, with some excitement. This is from an equally isolated and considerably more inaccessible mountain over 700 km. (450 miles) due N of the Sandias. Here it is pure white. The more variable plants from the main chain of the Rockies between these localities have probably all been 'contaminated' to some extent by the P. viscosum group, though they can be assigned to this species. In these pure stands, it is a distinct plant, similar to P. viscosum in foliage but with longer, almost racemose or spike-like inflorescences of longer, more trumpet-shaped, upward-facing flowers. It is a long drive in and a long climb up Laramie Peak, so with only this to tempt us to the summit we very much doubt if we shall ever be able to repeat this collection. If you want this form with snowy white, golden-anthered trumpets on 15-20 cm. stems, take the chance of this while we have the seed.) (15+ seeds) E

9510 P. BRANDEGEI New Mexico, Bernalillo Co., Sandia Mts., above Albuquerque. 3600 m. Fissures on summit cliffs. S.B. coll. 20.8.87 (This is the soft golden-yellow form, 10-15 cm. high, which we have already mentioned - it germinated well and flowered in cultivation during 1989.) (15+ seeds) E

11840 P. CHARTACEUM California, Siskiyou Co., Mt. Eddy SW of Weed. 2740 m. Exposed summit area. J.A. coll. 22.8.89 (The third plant in a row which only grows right on the top of an isolated mountain. Here in a remarkable disjunct population ; the species is otherwise known only from above 4000 m. in the White Mts. far to the South. In effect, a miniature P. viscosum, under which it can be placed as P.v. subsp. chart--aceum, but it is geographically isolated and can be consistently distinguished from both P. viscosum and the allied, dwarf P. eximium by its exserted stamens and the expanded, papery (chartaceous) base of the petioles. Sadly we have not seen this in the wild ; John was about 60 m. above us and already collect-ing this when a screaming blizzard of horizontally driven sleet struck the summit area. We crouched on the lee side of the last scrubby Pinus balfouriana and, while John later tried to convince us he had found shelter higher up, we suspect he was prostrate in the storm collecting this seed.) (15+ seeds) F

11518 P. FOLIOSISSIMUM var. ALPINUM Utah, Weber Co., Wasatch Ridge WSW of Woodruff. 3100 m. Meadows & openings in mixed woodland. 1.8.89 (In spite of the name, this is a tall herbaceous plant, a distinct geographical race of this 1 m. high robust meadow species, always with pure white flowers.) (20+ seeds) B

11732 P. PULCHERRIMUM Nevada, Washoe Co., SW of Mt. Rose. 3080 m. Loose talus on steep slopes. 29.8.89 (This is utterly distinct from plants belonging to this species which we have seen further East in the Rockies N into Montana. We have not seen enough plants in the Sierra Nevada to know how typical this is but we can recommend it very highly as an extremely dwarf, small-leaved alpine forming tight clumps with bright-blue flowers on short stems, about 8 cm. high. This is obviously the plant Margaret Williams (Sparks, Nevada) includes as one of her choice of the 6 best alpines of the Sierra Nevada (Bull.Alp.Gard.Soc. Vol. 39, p. 46 (1971). She mentions it remains compact with her in cultivation and that it "was consider-ed to be a separate species...called P. montrosensis." We can find no trace of the name as a synonym in Munz, IMF or Smith's 'Flora of the Tahoe Basin' but this really is distinct horticulturally.) (20+) D

11349 P. VISCOSUM Utah, Garfield Co., Aquarius Plateau NNW of Escalante. 3000 m. Exposed steppe & Artemisia 'flats'. 8.7.89 (The isolated population in this part of S Utah is quite distinct from those in the Rockies. Extremely short, congested leaves and densely capitate heads of very deep, navy-blue flowers on 15 cm. stems. We suspect the diversity in the Rockies is influenced by P. brandegei.) (20+ seeds) C

9402 P. VISCOSUM Wyoming, Albany Co., Medicine Bow Mts., Snowy Range. 3600 m. Open areas in stony turf. S.B. coll. 8.8.87 (This is a good, fairly typical form of what is certainly one of the finest alpines in the Rockies. Upright tufts of sticky cut foliage, larger than the above, and larger heads of azure-blue flowers on 10 cm. stems. Still flowering on 20.7.89 - a late season here - breathtaking.) (20+ seeds) C

11485 P. VISCOSUM Wyoming, Big Horn Co., Big Horn Mts., Duncum Mt. to Sheep Mt. 3200 m. Unstable limestone talus on steep, W-facing slope. 26.7.89 (We made a very small coll. from this locality in 1987. Seedlings raised from this have flowered with Stan Taylor (Warwick, UK), whose opinion on alpine-house plants we greatly respect, and he was full of enthusiasm for the size of the flowers coupled with the dwarf habit, which have been retained in cultivation with him. Usually paler blue than the above. 8 cm.) (15+ seeds) D

PRIMULA. We have only one new collection of this genus for you in 1989. The result of a combination of laziness (it can be hard work locating obscure relic Primulas!) lack of time and vehicle problems - when your engine will not fire after you have stopped to change a tyre on a desert dirt-road with no other traffic in temperatures of over 105°F (40°C) and you run your battery down, you do not switch your engine off for any Primula once you have pushed it to start it! We still have some good things in the Seed Bank, however, and fortunately Primula seed stores very well. It may need a cold period for germination.

9631 PRIMULA ANGUSTIFOLIA Colorado, El Paso Co., Pike's Peak. 4500 m. Exposed slopes in granite grit. S.B. coll. 9.9.87 (An exquisite, tiny plant. Luminous purple-carmine flowers. Keep cool in summer.)(20+ seeds) F

8769 PRIMULA MAGUIREI Utah, Cache Co., NE of Logan. 1700 m. Mossy fissures in N-facing limestone cliffs. S.B. coll. 24.6.87 (The last time we shall be able to list this local relic mesophyte, which we hope might be established by specialist growers. We have had some reports on germination - more needed!) (10+ seeds) F

9543 PRIMULA PARRYI Nevada, White Pine Co., Snake Range. 3500 m. Moist humus in coniferous wood. S.B. coll. 24.8.87 (A splendid form of this widespread species. 50 cm. stems of rich red-purple flowers.)(50+ seeds) C

8926 PRIMULA SPECUICOLA Utah, San Juan Co., above Bluff. 1550 m. Seepage lines on shady, sandstone cliffs. S.B. coll. 5.7.87 (Endemic to the 'hanging gardens' of the Colorado River canyons. A truly extraordinary relic like a giant P. farinosa. Clumps of dark-green, white-backed leaves. Umbels of up to 40 flowers on 15 cm. stems in lavender, pink or white. We visited this on 3.6.89 but seed was immature.) (50+ seeds) E

11752 PRIMULA SUFFRUTESCENS California, Alpine Co., above Winnemucca Lake. 2740 m. Steep slopes in granite talus & among boulders. 5.9.89 (A magnificent, high altitude endemic of the Sierra Nevada and a very distinct species of Sect. Cuneifolia with shrubby mats of toothed, leathery leaves in neat rosettes and generous heads of bright rose to red-purple flowers on 8 cm. stems. Growable in scree-bed or pot.) (30+) D

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C :	$3.50	£2.00	DM6, -	FF20. -	F :	$7.00	£4.50	DM13, -	FF45. -

11489 PULSATILLA PATENS var. MULTIFIDA Wyoming, Big Horn Co., Big Horn Mts., Hunt Mt. Road. 2900 m. Open, stony slopes & in short turf. 26.7.89 (A beautiful, silky, lavender-blue pasque-flower with clumps of much-cut, downy foliage. Flowers in early spring like its cousins in Eurasia.) (30+ seeds) B

11800 RANUNCULUS HYSTRICULUS California, Butte Co., above Feather River NE of Pulga. 600 m. N-facing granite slopes in seasonally wet conditions. W.R. coll. 27.5.89 (A choice and delightful little summer-dormant Sierra Nevadan endemic, about 20 cm. high with rounded, 3-lobed basal leaves and pure white flowers. This was very successfully grown by Joy Hulme (Surrey, UK) from Wayne's seed in the alpine-house) (20+ seeds) C

9495 RATIBIDA COLUMNIFERA New Mexico, San Miguel Co., S of Chapelle. 2300 m. Open areas in stony clay. S.B. coll. 19.8.87 (A cut-leaved, herbaceous perennial with an E-slope & Great Plains distribution. About 60 cm. high with purple-brown columnar cones surrounded by reflexed mahogany or yellow rays.) B

11687 ROMNEYA COULTERI var. TRICHOCALYX California, Ventura Co., Cuyama Valley near Ozena. 1280 m. Open 'flats' among scrub in sandy clay. 26.8.89 (supplemented by seed coll. from 1988 capsules on 26.6.89 - we have mixed the 2 colls. about half and half) (This monotypic genus is surely one of the most spectac--ular of Californian endemics. Branching, shrubby-based stems with divided glaucous foliage rise to about 2 m. with a profusion of huge, crinkled, white poppies with yellow stamens. Although a S Californian species, distributed from this area (here at its highest elevation) W to the coast, it has proved a hardy long-lived plant once established in British gardens. Reputedly raising it from seed is not easy ; there is a full account of the species in 'The Plantsman' (Vol.11, Part 2 - Sept. 1989) by Philip McMillan Browse : he also states seeds are "notoriously of low viability" - a rather difficult point to prove if they are as difficult to germinate as he claims (sorry, I studied logic not botany!). We should still be inclined to give it a try! Reports on germination will be especially welcome in this case!) (40+ seeds) D

11758 ROSA ? WOODSII California, Alpine Co., S of Carson Pass near Frog Lake. 2650 m. Exposed dry area in steppe vegetation. 5.9.89 (A fascinating little spiny shrub about 30 cm. high, which J.A. tells us is probably a dwarf form of R. woodsii var. ultramontana. The tiny hips have only 1 or 2 seeds.) (5 seeds) C

11178 SALVIA LEUCOPHYLLA California, Santa Barbara Co., Cuyama Valley E of Santa Maria. 460 m. Steep, open, stony slopes. 26.6.89 (A much-branched shrub, about 1 m. high, with both stems and the small, rounded, wrinkled leaves clothed in grey-white down. Capitate whorls of lavender-pink flowers but the leaves are the main attraction. Even in California, the genus Salvia is not greatly developed with only about 19 species, mostly in the S - Mexico is the centre of the genus in the Americas.) (30+ seeds) B

10970 SALVIA SPATHACEA California, Solano Co., Mix Canyon NW of Vacaville. 300 m. Openings in scrub & wooded slopes. 15.6.89 (A stout herbaceous perennial with large, green, woolly-backed, wrinkled, hastate leaves and 60 cm. stems whorled with purple-red flowers. Both stems and calyces sticky & aromatic.) (8 seeds) C

11177 SALVIA SPATHACEA California, San Luis Obispo Co., NE of San Luis Obispo. 150 m. Steep, stony slopes above stream in canyon bottom. 26.6.89 (W.R. thinks this might be a different colour form.) (8 seeds) C

9590 SAXIFRAGA CHRYSANTHA Colorado, Clear Creek Co., Mt. Evans. 4500 m. Exposed stony slopes. S.B. coll. 30.8.87 (A superlative alpine : pads of tiny, lead-green rosettes set with goblet-shaped, golden flowers flushed orange at the centre. Should be tried by those who can grow Himalayan Androsaces.) (100+ seeds) E

11296 SCUTELLARIA NANA var. SAPPHIRINA Nevada, White Pine Co., SE of Little Antelope Summit. 1980 m. Open areas among Artemisia in fine, calcareous clay. 3.7.89 (An amazing Great Basin endemic, from E Nevada, just entering SW Utah, discovered by Dwight Ripley & Rupert Barneby and described by the latter in 1947. The type-race of S. nana grows to the N & W and is dreary purple. This is a deep, rich gentian-blue. Little tuffets with tiny, rounded, downy, grey-green leaves, set with the jewel-like blue skullcap flowers pop up from wide subterranean tuberous rhizomes. This has almost certainly never been attempted in cultivation but it could be a delight if it proved possible in a pot kept in full sun in the alpine--house throughout the year ; above ground it is only about 5 cm. high with a succession of flowers. This was high on our list of desiderata for 1989 but it is not an easy plant from which to collect much seed (especially in temperatures of over 100°F). Treasure it and do let us know of its progress.) (8 seeds) F

11601 SEDUM LAXUM subsp. RETUSUM Mendocino Co., Hull Mt., NNE of Lake Pillsbury. 2030 m. Exposed serpentine fissures. 19.8.89 (Deep pink flowers on 10 cm. stems from clumps of Rosularia-like rosettes.) (100+ seeds) B

11801 SEDUM OBTUSATUM subsp. BOREALE California, Siskiyou Co., above Salmon River. 300 m. Fissures in North--facing cliffs. W.R. coll. 28.7.89 (Glaucous rosettes with 10 cm. stems of yellow flowers.) (50+ seeds) B

11802 SEDUM PURDYI California, Siskiyou Co., above Salmon River. 300 m. Fissures in N-facing cliffs. W.R. coll 28.7.89 (Beautiful flat, yellow-green rosettes. Stems of yellow flowers to 15 cm. high) (50+ seeds) C

11841 SENECIO CANUS Nevada, Washoe Co., SW of Mt. Rose. 3050 m. Exposed, stony areas. J.A. coll. 29.8.89 (Few-rayed, yellow flowers on 20 cm. stems but beautiful, woolly, white foliage. A choice alpine species) C

9454 SENECIO AMPLECTENS var. HOLMII Colorado, Park Co., Mosquito Range. 4200 m. Moist, stony slopes. S.B. coll. 14.8.87 (Nodding flowers like giant yellow Soldanellas. Rather an aristocratic plant, about 20 cm.) C

11588 SIDALCEA ? GLAUCESCENS California, Sierra Co., NNW of Bassetts. 2000 m. Dryish meadow with Aster, grass, etc. 12.8.89 (Slender, erect, 60 cm. stems with long racemes of deep rose-pink flowers from woody crowns. This genus of herbaceous perennials belonging to the Malvaceae is very much another Californian feature with 18 out of the 22 species occurring in the state ; these are both confused and confusing with much variation. It is incredible that one never sees any of the wild species in cultivation - only the tall herbaceous-border hybrids, derived from the variable coastal S. malvaeflora.) (30+ seeds) C

11799 SIDALCEA OREGANA California, Alpine Co., Hope Valley NE of Carson Pass. 2130 m. Moist meadow among grasses and rushes. W.R. coll. 15.8.89 (Widespread pink species occurring E to Wyoming.1 m.) (50+ seeds) B

11105 SILENE HOOKERI subsp. BOLANDERI Oregon, Josephine Co., E of Takilma. 850 m. Opening among conifers in stony turf. 19.6.89 (A beautiful endemic of NW California & Oregon, often on serpentine, in this race with larger flowers more evenly cut into linear lobes. The few flowers still about here were all pale pink. Summer-dormant and not too difficult in the alpine-house, where it is easier to collect seed than in the wild - timing of the collection of capsules is rather critical and we have only a few.) (8 seeds) E

10992 SISYRINCHIUM BELLUM California, Mariposa Co., above Coulterville. 610 m. Open grassy slopes. 16.6.89 (A charming summer-dormant species, widespread and especially variable in California. Not seen in flower here but usually blue-violet to lilac. About 30 cm. high.) (30+ seeds) B

11132 SISYRINCHIUM DOUGLASII California, Modoc Co., Warner Mts. E of Davis Creek. 1750 m. Gravelly clay in openings among Artemisia scrub. 20.6.89 (Surely the most beautiful in the genus - an exquisite species...

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C	:	$3.50	;	£2.00	;	DM6, -	;	FF20. -	F	:	$7.00	;	£4.50	;	DM13, -	;	FF45. -

11132 SISYRINCHIUM DOUGLASII Reginald Farrer writes of it (as S. grandiflorum) with "a succession of most noble, hanging bells in a deep and flashing imperial violet, shimmering and sheeny in the silken exquisiteness of the texture..." This typical violet-purple form is not so often seen in cultivation nowadays ; the white seems more common. We have grown them without any problem for many years, though they did best in Scotland, increasing and setting seed freely. It was more probably the limy water they did not like so much in Dorset than the higher summer temperatures. About 20 cm. high and summer-dormant, this is excellent as an early-flowering pan-plant in the alpine-house but will also thrive in a trough or scree--bed outside in the U.K. If you do not grow it, you are missing a great deal of pleasure.) (30+ seeds) C

11117 SISYRINCHIUM DOUGLASII Oregon, Jackson Co., N of Medford. 400 m. Among grasses in openings among scrub. 20.6.89 (From further W, the species extends from N California up to British Columbia.) (20+ seeds) C

11620 SMILACINA RACEMOSA California, Humboldt Co., ESE of Eureka. 650 m. Moist, shaded banks in woodland. 20.8.89 (A choice slow-growing, herbaceous perennial near to Polygonatum. Astilbe-like panicles of cream -white flowers followed by red berries. It is probably the eastern type-race in cultivation. Both var. amplexicaulis and var. glabra occur in California - unfortunately we did not press specimens.)(10+ seeds) B

11182 SOLANUM XANTII California, Ventura Co., Cuyama Valley near Ozena. 1280 m. Open sites in sandy clay. 26.6.89 (A very attractive, shrubby-based plant, about 30 cm. high here - it can be much taller - with lots of soft-lavender flowers, about 2.5 cm. across, followed by tiny green tomatoes.) (30+ seeds) B

11512 STANLEYA INTEGRIFOLIA Wyoming, Sweetwater Co., Mackinnon. 1900 m. Steep stony slopes with sparse Junip--erus. 1.8.89 (A woody-based, herbaceous perennial with entire (unlike the similar S. pinnata), glaucous basal leaves and 80 cm., wand-like spires of yellow flowers - like Eremurus stenophyllus!) (15+ seeds) B

11457 STREPTOPUS AMPLEXIFOLIUS Wyoming, Albany Co., Laramie Mts., Laramie Peak. 2590 m. Moist slopes & stream -side in coniferous woodland, on granite. 23.7.89 (Another Polygonatum relative, quite near Disporum and for similar moist shaded places but the genus is little-known in cultivation. Yellowish, pendant bells on branched, 50 cm. stems, with alternate, ovate leaves, are followed by orange berries.) (20+ seeds) C

9435 THERMOPSIS MONTANA var. DIVARICARPA Colorado, Park Co., SW of Fairplay. 3100 m. Moist depressions on clay. S.B. coll. 13.8.87 (60 cm. tall, herbaceous perennial. Stubby, yellow, lupin-like heads)(15+ seeds) B

TOWNSENDIA. We did try to locate and collect some of the choice Utah species of this small genus, such as T. montana var. minima, T. jonesii, etc. but the season was once again against us. It was not so much a case of no seed being set as of the flower-buds simply drying-up without even opening.

9166 TOWNSENDIA GRANDIFLORA Wyoming, Laramie Co., S of Cheyenne. 2100 m. Exposed grassland. S.B. coll. 22.7.87 (A very fine, compact form. Huge, white daisies, upward-facing & almost stemless.) (20+ seeds) C

10778 TOWNSENDIA INCANA Utah, Emery Co., SE of Moore. 1980 m. Eroded sandstone ridges. 2.6.89 (Tiny, grey-leaved tufts, about 3 cm. high, with white, lilac-backed daisies.) (15+ seeds) C

8809 TOWNSENDIA MENSANA Colorado, Moffat Co., E of Dinosaur. 1700 m. Open, bare, clay banks. S.B. coll. 26.6.87 (Cushions of ash-grey rosettes. Rounded white or pink-tinged daisies. Very choice, local species) D

9300 TOWNSENDIA PARRYI Wyoming, Big Horn Co., Big Horn Mts., Medicine Mt. 3200 m. Open slopes. S.B. coll. 1.8.87 (Taller than the others here and monocarpic. Huge lavender-blue 'asters' on 10 cm. stems.) B

9464 TOWNSENDIA ROTHROCKII Colorado, Park Co., Mosquito Range. 4300 m. Stony slopes near late snow-patches S.B. coll. 15.8.87 (A name much confused and misapplied in cultivation & horticultural literature. It is doubtful if this high altitude taxon is or has been in cultivation - well illustrated in Weber's 'Colorado Flora : Western Slope'. Enormous, stemless, pale lilac daisies on tight rosettes.) (20+ seeds) E

11437 TRADESCANTIA OCCIDENTALIS Wyoming, Platte Co., SW of Wheatland. 1830 m. Open slopes in stony clay. 21.7.89 (A summer-dormant, herbaceous perennial with thick, fleshy roots. About 30 cm. high with glaucous pointed, narrow leaves and showy clusters of 3-petalled flowers. Not seen in flower here and can vary from violet-blue to magenta. Mainly an E-slope and Great Plains plant in its distribution.) (10+ seeds) C

9600 TRIFOLIUM NANUM Colorado, Summit Co., Front Range above Loveland Pass. 4200 m. Exposed slopes. S.B. coll (The ultimate, high-alpine reduction in clovers and almost certainly the finest dwarf species. Hard mounds covered with stemless, rose-pink pea-flowers. Marvellous but doubtless very difficult.)(10+ seeds) F

11808 TRILLIUM OVATUM California, Sonoma Co., near Gualala. 20 m. Redwood forest. W.R. coll. 10.6.89 (The lovely white, 30 cm. high species of the Coast Ranges, extending N to British Columbia.) (15+ seeds) C

11055 TRILLIUM RIVALE California, Del Norte Co., Gasquet Mt. above Gasquet. 390 m. In dense undergrowth on steep slopes wooded with conifers. 19.6.89 (Much more limited in its distribution than the preceding and restricted, like so many superlative species we have mentioned, to the Coast Ranges on either side of the California/Oregon line. Usually described as a plant of "stream banks", we have only seen it on steep shady, stony slopes. A dwarf plant, not more than 10 cm. high with white flowers marked sometimes with carmine or varying to pinker tones, this is surely the loveliest of the small Trillium spp. if not of the whole genus. Both W.R. and J.A. tell us that these Californian spp. usually germinate reasonably well from dried seed but, like all Trilliums, they may require two winters before they appear.) (15+ seeds) D

11804 TRITELEIA ELEGANS California, Shasta Co., S of Shingletown. 1070 m. W.R. coll. 14.7.89 (A handsome species, about 30 cm. high, with violet to blue-purple flowers, widespread in the Central Valley and adjacent foothills, usually in heavy soils. Not so well-known as some but should be easy.) (20+ seeds) B

10981 TRITELEIA HYACINTHINA California, Tuolumne Co., W of Chinese Camp. 360 m. Open, grassy slopes. 16.6.89 (An excellent grower and increaser with umbels of white flowers - a striking plant which should be seen more often in gardens, about 50 cm. tall. It often grows in seasonally wet areas. Both this and the above are summer-dormant cormous plants which can be placed in the genus Brodiaea, q.v.) (20+ seeds) B

11428 TROLLIUS LAXUS Wyoming, Albany Co., Medicine Bow Mts., Snowy Range. 3500 m. Moist areas among Salix scrub. 20.7.89 (A fine herbaceous species, about 50 cm. high, with palmately cut foliage and cream or white cup-shaped flowers. This taxon can be assigned to var. albiflorus but it intergrades.) (20+ seeds) C

11581 VERATRUM CALIFORNICUM California, Sierra Co., NNW of Bassetts. 2000 m. Moist meadow with Salix scrub. 12.8.89 (The most widespread of the western species but very seldom flowers in nature. The handsome, broad, pleated leaves typical of the genus ; 2 m. stems with panicles of white flowers.) (15+ seeds) C

PRICE CODE A :	$1.50	;	£1.00	;	DM3, -	;	FF10. -	PRICE CODE D :	$4.00	;	£2.50	;	DM 7,50	;	FF25. -
B :	$2.50	;	£1.50	;	DM4,50	;	FF15. -	E :	$5.50	;	£3.50	;	DM10, -	;	FF35. -
C :	$3.50	;	£2.00	;	DM6, -	;	FF20. -	F :	$7.00	;	£4.50	;	DM13, -	;	FF45. -

VIOLA

The summer-dormant Viola species of the American West have never been well-known in cultivation. In the days when we grew alpine-house plants, they were a minor private enthusiasm but it has always been difficult to acquire seed. About 20 species might be considered in this group and it would take a vast amount of preparatory field-work very early in the season to set-up the collection of even half of these - think yourselves lucky that we have enough seed of 3 to list. This is largely due to John Andrews checking-out the localities some weeks before we arrived. Of the 3, we have only grown V. beckwithii. We maintained this for many years without any trouble in an alpine house. The main point to remember is that while the fleshy roots can survive drought in nature, in cultivation a well-drained mixture can result in overdrying. We had no problems with clay pots plunged in damp sand. There tends to be more underground than on top with these and a deep pot is best. We always potted very low and topped up with grit, building this up to a depth of at least 8 cm. (3 in.) over a few years. Once established in a large pot, we found those we grew very little trouble. We do recollect that several species only produced cotyledons the first year after germination (like Helleborus vesicarius - an uncommon but widespread trick of dry-climate species) so do not think seedlings have died when they eventually go dormant - keep them growing as long as possible. We cannot remember which species did this so, if the following do not and grow ahead so much the better ; keep it in mind, however, to avoid a terrible tragedy!

10515 VIOLA BECKWITHII California, Sierra Co., N of Sattley. 1520 m. Openings among Artemisia scrub in sandy soil. 13.5.89 (A lovely thing with the greyish leaves palmately cut into linear segments and two-toned flowers - the 2 upper petals deep red-purple ; the 3 lower ones pale lilac, yellow at the base)(10 seeds) E

11100 VIOLA CUNEATA Oregon, Josephine Co., E of Takilma. 850 m. Openings among conifers on turfy, stony slopes 19.6.89 (Quite different to the above, about 10 cm. high with branching stems and little, somewhat tri--angular leaves, sometimes purple-veined. Small, rounded, white-faced flowers with purple eye-spots are violet on the reverse of the petals - a most striking contrast. This is almost certainly a serpentine endemic confined to the ranges along the Oregon/California border from the coast to Shasta Co.)(10 seeds) E

11046 VIOLA HALLII California, Humboldt Co., SSW of Willow Creek. 1420 m. Stony turf in opening in coniferous forest. 18.6.89 (Very close to V. beckwithii but the leaves are more glabrous and the flowers, usually rather more rounded, have even darker purple upper petals and cream lower ones. Whereas V. beckwithii is spread in a great arc round the Great Basin into Utah, this is restricted to the Coast Ranges around the California/Oregon border. J.A. thinks this is better than V. beckwithii ; we could not choose!) (10) E

11150 WYETHIA ANGUSTIFOLIA California, Marin Co., near Nicasio. 15m. Low, grassy coastal hills. 22.6.89 (A stout perennial Composite with showy yellow heads on 50 cm. stems. Worth trying in a hot, dry site.) B

11639 XEROPHYLLUM TENAX Oregon, Josephine Co., SW of O'Brien. 910 m. Open stony slopes at edges of woodland. 21.8.89 (An aristocratic and spectacular perennial with basal tufts of grass-like foliage and stout stems, about 1 m. or more high, with dense racemes, to 60 cm. long, of creamy-white flowers. Seldom seen in cultivation, it is very slow-growing but by no means impossible. We grew this quite well in Dorset and there used to be a fine clump in the old North Scree at the R.B.G. Edinburgh. A "damp peaty" soil is recommended in cultivation but the plant usually grows in rather open, dryish sites - once again it is the low-nutrient, acid qualities of peat which have led to any success. It often, but by no means always, grows on serpentine. While a peat and sand mix would be excellent for seedlings, it might eventually feel most at home (in the U.K.) in a granite scree - we have never seen it exceed 60 cm. in gardens.) (30+) C

YUCCA. While we saw most of the Utah species in flower in 1989, we could not arrange to return for seed. These are all spectacular dry-climate shrubby evergreens for which maximum drainage and sunlight are essential. Temperature hardiness should not be in question : even the S Utah species can experience lows of -23°C (40°F below freezing) but freezing and thawing in wet conditions will not be to their liking.

11440 YUCCA GLAUCA Wyoming, Platte Co., SW of Wheatland. 1830 m. Exposed grassland. 21.7.89 (Clumps of erect, narrow, grey-blue leaves ; 1 m. stems of lime-green to cream pendant flowers. Very hardy.) (10 seeds) C

9081 YUCCA HARRIMANIAE Utah, Duchesne Co., near Starvation Lake. 2000 m. Open, rocky slopes. S.B. coll. 14.7.87 (Rosettes of shorter, broad leaves with curling, white marginal fibres. A superlative race here with 70 cm. stems densely packed with greenish yellow, purple-flushed bells. Very floriferous.)(10 seeds) C

8983 YUCCA KANABENSIS Utah, Kane Co., S of Cannonville. 2000 m. Open areas in stony clay. S.B. coll. 9.7.87 (A distinct local species up to 3 m. high. Usually unbranched stems and very narrow leaves.) (10 seeds) C

8943 YUCCA TOFTIAE Utah, Garfield Co., above Dirty Devil River NE of Hite. 1400 m. Gravelly areas on sand--stone. S.B. coll. 6.7.87 (Like the above in the Y. angustissima group. Branching stems.) (10 seeds) C

11689 YUCCA WHIPPLEI subsp. INTERMEDIA California, Ventura Co., Lockwood Valley Road. 1280 m. Open slopes in sandy clay. 26.8.89 (Superlative rosettes of narrow, grey-green leaves. Dense panicles of cream flowers tower to over 3 m. This race forms new rosettes after flowering. We have grown and flowered it well from seed in Dorset (U.K.) - the event of a lifetime! Unparalleled in magnificence & quite hardy.) (10 seeds) C

11700 ZAUSCHNERIA CALIFORNICA California, Kern Co., E of Mt. Pinos. 2250 m. Steep banks in granite grit. 27.8.89 (A spectacular, late-flowering, low-growing perennial with downy, greyish foliage and brilliant scarlet flowers. Amazingly successful in a hot, dry site in colder, wetter climates. 20 cm.) (20+ seeds) B

10975 ZIGADENUS FREMONTII California, Solano Co., Mix Canyon NW of Vacaville. 300 m. Open, grassy slopes. 15.6.89 (A fine species, about 50 cm. high. Panicles of creamy stars in spring. Bulbous.) (20+ seeds) B

SECTION II & SECTION III, 1989 - 90 As this list of North American collections is so extensive, we are not includ--ing these sections at this time. Section II normally includes species from Europe, Turkey and N Africa collected in the wild. While we have some 1989 collections by others and some 1989 seed from cultivated plants of known wild origin, we have none of our own 1989 collections from these areas. Most listed will be Seed Bank material from our 1988 collections. Section III comprises a small selection of interesting seeds from cultivated plants ; a range of 1989 seed is available now, as in previous years. An edition of Section II (designed to be valid until the first part of 1991) and Section III (only valid for the first half of 1990) are now being prepared. These will be available on request. Whether or not you ask for these immediately, a copy of Section II will be sent to you around July, 1990, along with a new updated edition of Section III.

SEED PACKETS WILL CARRY ONLY THE COLLECTION NUMBER. AN IDENTIFICATION KEY TO ALL THE NUMBERS IN THIS LIST, ARRANGED IN NUMERICAL ORDER, WILL BE ENCLOSED WITH YOUR SEED-ORDER, SO THAT PACKETS CAN BE NAMED QUICKLY AND WITHOUT TROUBLE

PRICE CODE A	:	$1.50	; £1.00	; DM3, -	; FF10. -	PRICE CODE D	:	$4.00	; £2.50	; DM 7,50 ; FF25. -
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C	:	$3.50	; £2.00	; DM6, -	; FF20. -	F	:	$7.00	; £4.50	; DM13, - ; FF45. -