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Report on Temperatures and Open-Air Vegetation at the Royal Botanic Garden, Edinburgh, from July 1888 to June 1889

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tears. Some botanical books state that it possesses the same properties as the officinal manna from *Fraxinus Ornus*. But the Alhagi manna is plainly a quite different substance. It dissolves in alcohol, giving crystals of cane sugar, and it appears to consist largely of this sugar. There is, however, mannite present in it also, as shown by the violet colour of the solution obtained by dissolving the manna in water, then adding a few drops of sulphate of copper and a little caustic potash. But the mannite is evidently small in quantity, whereas this substance forms from 40 to 60 per cent. of officinal manna.

Report on Temperatures and Open-Air Vegetation at the Royal Botanic Garden, Edinburgh, from July 1888 to June 1889. By ROBERT LINDSAY, Curator of the Garden.

July 1888.—This was one of the most inclement summer months we have had any experience of. From the beginning of the month until its close there was an almost entire absence of real summer weather. A long spell of cloudy skies, with frequent heavy falls of rain and thunderstorms, completed the record of the month. The lowest night temperature was 35°, which occurred on the 1st and 31st of the month; and the highest was 52°, on the 14th. The lowest day temperature was 54°, on the 15th; and the highest 75°, on the 19th. On the rock-garden 276 species and well-marked varieties came into flower, amongst which were *Campanula Raineri*, *C. Waldsteiniana*, *Cyananthus lobatus*, *Decaspora thymifolia*, *Dianthus carthusianorum*, *Edraianthus dalmaticus*, *Epilobium obcordatum*, *Galax aphylla*, *Gentiana arvernensis*, *Kniphofia caulescens*, *Lewisia rediviva*, *Lilium Krameri*, *Lithospermum graminifolium*, *Mazus pumilio*, *Orobanche elatior*, *O. rubra*, *Primula Warei*, *Saxifraga fimbriata*, *Spraguea umbellata*, *Statice Suvarowi*, *Tropæolum polyphyllum*, *Veronica Bidwilli*, *V. cupressoides*, *V. glaucocœrulea*.

August.—The weather during August was slightly better than that of the previous month; still it was cold and unsettled. The lowest night temperature was 36°, which occurred on the 19th; and the highest 58°, on the 1st.

The lowest day temperature was 55° , on the 11th; and the highest 78° , on the 9th. The show of Roses was very inferior, owing to cold and wet; many buds never opened at all, but rotted on the bushes. One hundred and forty species of plants came into flower in the rock-garden, the best of which were *Adonis pyrenaica*, *Astragalus alopecuroides*, *Campanula isophylla alba*, *Dianthus Atkinsoni*, *D. Seguieri*, *Erythræa diffusa*, *Erica stricta*, *E. ramulosa*, *Gentiana ornata*, *G. tibetica*, *Galium rubrum*, *Linum monogynum*, *Lilium auratum*, *Omphalodes Lucillæ*, *Spiræa astilboides*, *S. cæspitosa*, *S. bullata*, *Ruta patavina*, *Yucca gloriosa*.

September.—This month was a most favourable one, and out-door operations had but little interruption. No frost occurred; there was a fair amount of sunshine, and there were only eight wet days during the month. Late-flowering herbaceous plants and annuals now reached their best, but were much behind the average in quality of blossom. Many trees and shrubs, particularly Oaks, made a second growth. The lowest night temperature was 34° , on the 9th; and the highest 51° , on the 2nd. The lowest day temperature was 51° , on the 30th; and the highest 77° , on the 22nd. On the rock-garden forty-eight species came into flower during September, amongst which were *Aster spectabilis*, *Campanula fragilis*, *Colchicum speciosum maximum*, *Cyclamen europæum*, *Gladiolus Saundersii*, *Gentiana asclepiadea alba*, *Helleborus altifolius*, *Ligularia Hodgsoni*, *Lobelia fulgens*, *Spiræa Bumaldæ*, *Veronica longifolia subsessilis*. Seeds of herbaceous and alpine plants have not ripened well, and a poor crop has been gathered.

October.—Remarkably fine and dry weather characterised this month. Frost set in at the beginning of it, later than usual, and not very severe. The thermometer was at or below the freezing-point on six nights, indicating collectively only 9° of frost as against 31° during October 1887. The lowest readings were on the 2nd, 29° ; 3rd, 31° ; 5th, 29° ; 7th, 32° ; 14th, 30° . The lowest day temperature was 48° , on the 6th; and the highest 68° , on the 27th. Dahlias, Pelargoniums, and other tender plants were injured by frost on the 2nd, but not sufficiently so to prevent them flowering, which they are still doing in the open ground. Autumnal tints on deciduous trees and shrubs were late in showing;

very few had their leaves coloured, and, with the exception of *Pavia flava*, *Pyrus latifolia*, *Cornus mas*, and *Azalea pontica*, they have been much less interesting than usual. Rhododendrons, Azaleas, and other ericaceous plants are more sparsely set with flower-buds than I ever remember having seen at this time of year. Want of heat and sunshine during the growing period has doubtless brought about this result. Hollies have produced an exceptional crop of berries this season; most other trees and shrubs are rather deficient in fruit. On the rock-garden nineteen species of plants came into flower during the month, the handsomest being various species of *Kniphofia*, *Helleborus*, and *Crocus*. In consequence of the fine dry weather experienced, a large number of plants which came into flower during previous months are still in good condition, among which *Yucca gloriosa* may be mentioned. There were twenty-one dry days during the month, and very rarely has the ground been so thoroughly dry at the end of October.

November.—The past month has been remarkable for the extreme atmospheric mildness which prevailed; very seldom has there been so little frost to record during November. As a set-off, storms of wind and rain have been unusually frequent, which proved much more harmful than any seasonable amount of frost could have been. The severe gale on the 16th fortunately passed over without doing any very serious damage to the garden, further than the loss of one or two common trees. Broken branches were scattered about in all directions, until it became rather alarming.

The thermometer was at or below the freezing-point on nine mornings, indicating collectively 20° of frost, as against 49° for the corresponding month last year. The lowest readings occurred on the 1st, 30°; 16th, 29°; 21st, 29°; 27th, 25°; 29th, 30°. The lowest day temperature was 36°, on the 20th; and the highest 57°, on the 25th. Rain fell on seventeen days.

Owing to the abnormal mildness, early spring-flowering bulbous plants, such as species of *Scilla*, *Narcissus*, *Iris*, and the like, are already far advanced in growth. Buds are also starting into growth on *Ribes*, *Syringa*, *Pyrus*, and other shrubs. At the close of the month fairly good summer Roses were in flower, in conjunction with Christmas

Roses and Primroses. The Holly is the most conspicuous plant in fruit out-of-doors, the berries being abundant and well coloured.

On the rock-garden a good many plants are still in flower, but eight species only began to flower during November, viz., *Gynerium argenteum*, *Schizostylis coccinea*, *Parochaetus communis*, *Tricyrtis hirta*, *Gypsophila Rokojécka*, *Kniphofia Saundersi*, and *Aster* species.

December.—Like the preceding month, December has been remarkable for the extreme mildness of weather which prevailed. The thermometer was at or below the freezing-point on thirteen occasions, the aggregate of frost registered being 57° only, as against 132° for the same month of 1887, and not since 1883 has this period of the year been so mild. The lowest readings occurred on the 11th, 24°; 19th, 26°; 27th, 26°; 30th, 17°; 31st, 24°. The lowest day temperature was 32°, on the 30th; and the highest 57°, on the 3rd. No snow and comparatively little rain fell. Not a single plant came into flower on the rock-garden during December, other than those previously recorded. The total number of species and marked varieties of alpine and dwarf-growing herbaceous plants which have flowered in the rock-garden during the entire year amounts to 1542, being 134 more than during 1887. This result has been attained by the addition of new plants to the collection from various sources, more than from any favourable circumstances connected with the weather of the past year. The largest number of species came into flower during May and June. The number of species which flowered each month during 1888 was as follows:—January, 24; February, 29; March, 64; April, 137; May, 367; June, 430; July, 276; August, 140; September, 48; October, 19; November, 8; December, 0; total, 1542.

January 1889.—The weather throughout the month was again unusually mild for the season. Rain fell more or less on nine days only, no snow fell, and out-door work suffered no interruption during the month. The thermometer was at or below the freezing-point on fourteen occasions, the aggregate amount of frost registered being 57°, as against 67° for the corresponding month last year. The lowest readings occurred on the 1st, 28°; 2nd, 21°; 7th,

24°; 22nd, 25°; 27th, 21°. The lowest day temperature was 36°, on the 2nd; and the highest 56°, on the 18th. On the rock-garden twenty species and varieties came into flower, amongst which were *Andromeda floribunda*, *Crocus Imperati*, *C. byzantinus*, *Hepatica angulosa*, *H. triloba*, *Helleborus angustifolius*, *H. purpurascens*, *Polygala Chamæbuxus*, and its variety *purpurea*, &c. Considering the mild weather which has prevailed, not so many plants are in flower as might have been expected. Those which have flowered are below the average in quality. This is particularly noticeable on various species of *Helleborus*. The coldness of the past summer seems to have had an injurious effect on herbaceous plants. Of the forty plants whose dates of flowering are annually recorded to the Society, the following came into flower during the month, viz.:—*Dondia Epipactis* on January 3rd; *Tussilago fragrans*, 11th; *Rhododendron atrovirens*, 17th; *Daphne Mezereum*, 26th; *Galanthus plicatus*, 26th; *Leucoium vernum*, 30th; *Galanthus nivalis*, 31st.

February.—During the month the thermometer was at or below the freezing-point on twenty mornings, indicating collectively 103° of frost, as against 121° for the corresponding month last year. The lowest readings were on the 10th, 18°; 11th, 18°; 12th, 20°; 16th, 24°; and 24th, 24°. The lowest day temperature was 33° on the 9th, and the highest 55° on the 1st of the month. Slight falls of snow occurred on seven days and rain on four days. A good many spring plants have come into blossom, but vegetation generally is making slow progress. There is no perceptible change on the buds of deciduous trees. A few hardy shrubs are fairly well advanced, such as species of *Ribes*, *Cratægus*, and *Nuttallia*. Flowers of *Rhododendron præcox* and *Nobleanum* were injured by the frost on the 10th, but, so far, extremely little injury has been done by frost this winter; many half hardy plants are still quite safe in the open borders without protection of any kind having been afforded them. The following spring plants, annually recorded, came into flower, viz.:—*Scilla præcox*, on February 1; *S. sibirica* on Feb. 3; *Eranthis hyemalis*, on Feb. 3; *Rhododendron Nobleanum*, on Feb. 6; *Tussilago alba*, on Feb. 14; *Crocus Susianus*, on Feb. 14; *Bulbocodium vernum*, on Feb. 18; *Sisyrinchium grandiflorum*, on Feb. 20; *Corylus Avellana*,

on Feb. 22; *Symplocarpus fetidus*, on Feb. 22; *Crocus vernus*, on Feb. 23; *Iris reticulata*, on Feb. 25; *Sisyrinchium grandiflorum album*, on Feb. 26; *Tussilago nivea*, on Feb. 27. On the rock-garden twenty-seven species came into flower during the month, amongst which were *Corbularia nivalis*, *Corydalis angustifolia*, *Cyclamen Atkinsi*, *Crocus annulatus*, *C. Olivieri*, *C. suaveolens*, *Galanthus Elwesii*, *Leucoium carpaticum*, *Narcissus minimus*, *Ranunculus anemonoides*, *Saxifraga Burseriana*.

March.—During March vegetation made only moderate progress; the weather during the month was exceedingly variable. Very severe frost occurred during the first week, but the total amount for the month was rather below the average. Rain, sleet, or snow fell more or less on fourteen days, but the ground was in such a dry condition that little impression was made thereby. Spring-flowering bulbs are fully up to the average in richness and quantity of blossom, but it is evident that many herbaceous and shrubby plants have suffered severely this winter, not so much from excess of cold as from the insufficient ripening they received during the past cold summer. The thermometer was at or below the freezing-point on sixteen mornings, indicating collectively 90 degrees of frost, as against 131 degrees for the corresponding month last year. The lowest readings occurred on the 2nd, 24°; 3rd, 22°; 4th, 16°; 14th, 29°; 27th, 23°. The lowest day temperature was 39°, on the 1st; and the highest 59°, on the 13th of the month. Of the forty spring-flowering plants whose dates of flowering are annually recorded, the following fourteen came into flower, viz.:—

	March		March
Nordmannia cordifolia, .	4	Draba aizoides, . .	22
Scilla bifolia, . . .	6	Corydalis solida, . .	23
„ alba,	12	Narcissus pumilus, .	25
Mandragora officinalis, .	12	Orobis vernus, . . .	26
Scilla bifolia taurica, .	14	Hyoscyamus Scopolia, .	29
Omphalodes verna, . .	16	Ribes sanguineum, .	30
Arabis albida, . . .	18	Erythronium Dens-canis,	30

On the rock-garden sixty species came into flower, being four less than for last March. Amongst the most conspicuous were *Chionodoxa Lucilæ* and *sardensis*, *Coptis brachy-petala*, *Dentaria pentaphylla*, *Draba Mawii* and *brunicefolia*,

Daphne Blagayana, *Hyacinthus azureus*, *Korolkowia Sewerzovi*, *Primula marginata* and *Cashmeriana*, *Pulmonaria arvernensis*, *Saxifraga imbricata*, *juniperina*, *oppositifolia*, and *sancta*, *Soldanella montana*, *Tecophyllea cyanocrocus*.

April.—During the month of April vegetation made very good progress, and seldom has there been so little frost. Rain fell on twenty-two days, and such an excess, before the leaves of deciduous plants have become expanded, is gener-

Register of Spring-Flowering Plants, showing Dates of Flowering at the Royal Botanic Garden, Edinburgh, during the years 1888 and 1889.

No.	Names of Plants.	First Flowers opened.	
		1888.	1889.
1	<i>Adonis vernalis</i> ,	April 16	April 6
2	<i>Arabis alba</i> ,	Feb. 6	March 18
3	<i>Aubrietia grandiflora</i> ,	April 14	April 16
4	<i>Bulbocodium vernum</i> ,	Feb. 22	Feb. 18
5	<i>Corydalis solida</i> ,	April 6	March 23
6	<i>Corylus Avellana</i> ,	Jan. 25	Feb. 22
7	<i>Crocus Susianus</i> ,	Jan. 26	Feb. 14
8	„ <i>vernus</i> ,	Feb. 23	Feb. 23
9	<i>Daphne Mezereum</i> ,	Feb. 22	Jan. 26
10	<i>Dondia Epipactis</i> ,	Jan. 5	Jan. 3
11	<i>Draba aizoides</i> ,	March 30	March 22
12	<i>Eranthis hyemalis</i> ,	Feb. 8	Feb. 3
13	<i>Erythronium Dens-canis</i> ,	March 31	March 30
14	<i>Fritillaria imperialis</i> ,	April 29	April 30
15	<i>Galanthus nivalis</i> ,	Jan. 26	Jan. 31
16	„ <i>plicatus</i> ,	Jan. 26	Jan. 26
17	<i>Hyoscyamus Scopolia</i> ,	April 13	March 29
18	<i>Iris reticulata</i> ,	Feb. 23	Feb. 25
19	<i>Leucoium vernum</i> ,	Feb. 4	Jan. 30
20	<i>Mandragora officinalis</i> ,	March 8	March 12
21	<i>Narcissus Pseudo-Narcissus</i> ,	April 3	April 7
22	„ <i>pumilus</i> ,	March 17	March 25
23	<i>Nordmannia cordifolia</i> ,	Feb. 11	March 4
24	<i>Omphalodes verna</i> ,	March 23	March 16
25	<i>Orobis vernus</i> ,	March 31	March 26
26	<i>Rhododendron atrovirens</i> ,	Feb. 3	Jan. 17
27	„ <i>Nobleanum</i> ,	April 13	Feb. 6
28	<i>Ribes sanguineum</i> ,	April 10	March 30
29	<i>Scilla bifolia</i> ,	March 19	March 6
30	„ „ <i>alba</i> ,	March 8	March 12
31	„ <i>precox</i> ,	Jan. 26	Feb. 1
32	„ <i>sibirica</i> ,	Jan. 30	Feb. 3
33	„ <i>taurica</i> ,	March 8	March 14
34	<i>Sisyrinchium grand</i>	March 8	Feb. 20
35	„ <i>album</i> ,	March 13	Feb. 26
36	<i>Symphytum caucasicum</i> ,	April 18	April 16
37	<i>Symplocarpus fœtidus</i> ,	Feb. 8	Feb. 22
38	<i>Tussilago alba</i> ,	Feb. 9	Feb. 14
39	„ <i>fragrans</i> ,	{ Dec. 28 } 1887.	Jan. 11
40	„ <i>nivea</i> ,	April 10	Feb. 27

ally beneficial. For newly-transplanted trees and shrubs the weather has been all that could be desired.

The thermometer was at or below the freezing-point on six mornings; the total amount of frost registered was 6° , as against 58° for April 1888. The lowest readings were, on the 2nd, 30° ; 3rd, 29° ; 15th, 31° ; and on the 4th, 9th, and 15th, 32° respectively. The lowest day temperature was 41° , on the 4th; and the highest 67° , on the 17th.

The collective amount of frost registered this season up to the end of April is 342° , as against 589° for the same period last year. The following is the distributions for each month:—October, 9° of frost; November, 20° ; December, 57° ; January, 57° ; February, 103° ; March, 90° ; April, 6° ; total, 342° . The lowest point reached this season was 16° Fahr., which occurred on March 4.

On the rock-garden 134 species and varieties of plants came into flower during the month.

Of the forty spring-flowering plants, annually recorded to show their periods of flowering, five came into flower, thus completing the list, viz.:—*Adonis vernalis* on April 6, *Narcissus Pseudo-Narcissus* on April 7, *Aubrietia grandiflora* on April 16, *Symphytum caucasicum* on April 16, *Fritillaria imperialis* on April 30.

May.—This month was one of the most favourable experienced for many years, and no frost occurred during the month. This seldom happens in May, as frost has been registered more or less every year since 1882. Vegetation made rapid progress, and in the absence of frost or severe winds has gone on advancing without check of any kind. The foliage of deciduous trees has rarely been seen in such luxuriant condition, the heavy rains which fell during April having assisted in their development. The flowering of the ordinary ornamental trees and shrubs is considerably behind the average. Hawthorn and Holly are almost destitute of flowers, in remarkable contrast to the profuse manner in which they blossomed last year. Rhododendrons and most hard-wooded plants are developing fine, strong growths. Rapid growth is the most notable feature of the month. Herbaceous plants are flowering freely, but those which flowered early in the season have set very little fruit; *Orobis*, Cowslips, *Cynoglossum*, &c., grown here in quantity for class

purposes, cannot this season be had in fruit in anything like sufficient quantity. Very little frost occurred when the plants were in blossom to render them so barren, and I can only attribute their present condition to weakness induced by the cold, dull summer of last year. The lowest night temperature recorded at the Garden was 35°, which took place on the 3rd of the month; other low readings were registered—on the 1st, 40°; 2nd, 37°; 26th, 38°; 30th, 37°; all the other readings were above 40°. The lowest day temperature was 52°, on the 5th; and the highest 77°, on the 22nd.

The rock-garden was very attractive during the month, from the large number of plants in blossom; 380 species and varieties opened their first flowers in May.

June.—This month has been one of the finest recorded, the beneficial effects of which will probably be felt even more next season than this. Just as many of our garden plants are still suffering from the bad effects of the previous cold summer, so we may not expect to reap the full benefit of the splendid weather of the last two months till next season. The foliage of all forest and ornamental trees is now complete, and remarkably fine. Aphides, caterpillar, and other insect pests have been very abundant, owing to the prolonged drought, and in many parts of the country the leaves of Beech, Oak, and Lime trees have been very much injured by their ravages; here no serious damage has been done as yet.

Nearly all variegated plants have developed richly coloured leaves, Conifers being particularly bright. Generally speaking, flowers are less abundant on most plants than usual; Elder seems to be an exception here. A very large number of plants came into flower in the rock-garden during June, no fewer than 444 species and varieties having been counted, many of which went quickly out of flower. The lowest night temperature was 35°, which was recorded on the 11th of the month. Other low readings were—on the 5th, 40°; 6th, 42°; 8th, 39°; 13th, 42°. The lowest day temperature was 56°, on the 2nd; and the highest 85°, on the 26th of the month. Rain fell on five days only. A few of the more interesting plants in flower on the rock-garden were—

Androsace foliosa	Mulgedium alpinum
„ lanuginosa	Nardostachys Jatanansi
„ „ Leichtlini	Orchis maculata superba
Aquilegia pyrenaica	„ foliosa
Cyananthus lobatus	Oxalis braziliensis
Cypripedium parviflorum	Pentstemon pubescens
Campanula Allioni	„ secundiflorus
Edraianthus caudatus	Primula capitata
„ pumiliorum	Rosa pyrenaica
Dianthus neglectus	Rhododendron ferrugineum
„ superbus	album
Eriophorum alpinum	Ranunculus parnassifolius
Exarrhena Lyallii	Saxifraga odontophylla
Gentiana lutea	„ valdensis
Gillenia trifoliata	Saponaria cæspitosa
Leontopodium alpinum	Senecio laxiflorus
Linaria organifolia	Vella spinosa, &c.

OBITUARY NOTICES OF DECEASED FELLOWS.

Professor ALEXANDER DICKSON. By Professor Thomas
R. Fraser.

(Read 11th July 1889.)

Botanical science sustained a great loss by the death of Alexander Dickson. During a life which extended over only fifty-one years, Dr Dickson had for nearly thirty years given his best thoughts and energies to the teaching and advancement of botany. His success in both directions has been recorded in an enduring form in contemporaneous botanical publications, and in the large number of students of botany trained by him during a quarter of a century.

Alexander Dickson was born at Edinburgh on the 21st of February 1836. He sprang from a family which at various times has given members to the legal and medical professions; one of the earliest of whom any special records exist having been John Dickson of Kilbucho and Hartree, a lawyer, who in 1649 was appointed a Senator of the College of Justice, taking the title of Lord Hartree.

Alexander Dickson received his early education at home. In 1855, he entered the University of Edinburgh as a student of medicine; and soon engaged with enthusiasm in those preliminary scientific studies which have so frequently been the