

**NOTES ON THE ORIGIN OF THE MOSS-ROSE, Part 1**  
**by Major C. C. HURST, D.L., J.P., F.L.S.**  
and MABEL S. G. BREEZE, B.Sc.

Reprinted from the JOURNAL of the ROYAL HORTICULTURAL SOCIETY  
Volume XLVII., Part 1, 1922

Printed for the Royal Horticultural Society  
by SPOTTISWOODE, BALLANTYNE & CO. LTD.  
New-Street Square, London, E.C.4 1922

In 1908 experiments were undertaken at Burbage to investigate the genetics of certain variable species and garden hybrids of *Rosa* (Hurst, 1911).<sup>\*</sup> These experiments were continued until the outbreak of war in 1914, when more urgent affairs demanded priority, and it was not until 1919 that it was possible to resume the experiments and to prepare a report on what had been done. Among the many interesting problems in the genetics of *Rosa*, the question of the Moss Rose presented itself as one of outstanding interest from many points of view. But before attacking the problem genetically it seemed necessary to trace as far as possible the history of the original Moss Rose, its direct descendants, and its parent species. The following notes represent the more important results of these researches.

<sup>\*</sup>Names and dates in brackets refer to the Bibliography at the end of this paper.

**Characters Peculiar to the Moss Rose**

The original Moss-Rose, *R. muscosa* of Miller (1768), appears to be identical in all its external characters with the old Cabbage Rose, *R. centifolia* (Linnaeus, 1753), except that it possesses the following additional characters: The stems, branches, petioles, stipules, pedicels, peduncles, and calyx tubes are densely covered with irregular aciculi and glandular branched bristles, while the sepals are copiously compound and covered on the back and edges with multitudinous branched gland-edged mossy processes, which give off a resinous or balsamic odour when bruised. In other words, the Moss-Rose differs from the Cabbage Rose in its multiplicity of glandular organs. It is important, however, to note that the difference is not simply that of presence or absence of glands, for the Cabbage-Rose is glandular in parts, e.g. petioles stipules, peduncles, and sepals. Nor is it a difference merely of many or few glands, nor even of more extended or less extended glandular areas. It is also a difference of compound or simple glands, and these are multitudinous partly on account of the extension and increased density of the glandular areas, but mainly through the multiply branching of the gland-bearing organs (cf. Blondel, 1889).

Whether the presence of these additional characters in the Moss-Rose entitles it to specific rank, or whether it should be regarded as a variety of *H. centifolia* L. is a question concerning which systematists are divided. Miller, who appears to have been the first to describe the Moss Rose fully (1760), gives it specific rank under the name of *H. muscosa* (1768), which is accepted by the following: Du Roi (1772), Retzius (1779), Curtis (1793), Willdenow (1799), Aiton (1789), (1811), Lawrance (1799), Rossig (1802), Andrews (1805), Persoon (1807), Deleuze and Desfontaines (1809), Thory and Redoute (1817), and Prevost (1829); on the other hand, the following authorities regard the Moss Rose as a variety of *R. centifolia* L. (or its synonym *R. provincialis* Mill.): Linnaeus (1762), Dumont de Courset (1805), Smith (1815; Seringe (1818), Lindley (1820), Guimpel (1825), Rossig (1826), Crepin (1892), and Willmott (1912).

Some modern authors, e.g. Regel (1877), Dippel (1895), Kohne (1895), BoIs (1890), Rehder (1902), and Schneider (1906), place both the Moss Rose and *R. centifolia* L. under *R. gallica* L.

## **Characters Common to the Moss-Rose and the Cabbage Rose**

Whatever the systematic status of the Moss Rose may be, one thing is certain, all authorities agree that the old Moss Rose and the old Cabbage Rose are closely allied. Anyone who has seen the two growing side by side, and has carefully examined them, must acknowledge that they have many characters in common, which are quite distinct from any other species or sub-species. For example, both have very double globular flowers, which are red in the bud and rose pink when open. Both have about a hundred short and broad petals, which are closely incurved and rolled inwards towards the centre, which is frequently quartered like a crown. Both yield the same distinctive fragrance from the petals, which is peculiar to *R. centifolia* L. and distinct from the fragrance of *R. gallica* L. (The resinous and balsamic odour from the mossy glands of the Moss-Rose is naturally much more powerful than the odour from the same area in the Cabbage Rose, which is but faint.) Both have cernuous or nodding flowers, usually solitary or up to three only, unlike those of *R. damascena* Hill., which are usually erect and many, in corymbs or clusters. Both have the sepals spreading and persistent, not reflexed and deciduous as in *R. damascena* Mill. and *R. gallica* L. Both have a medium habit of growth, not so tall and prickly as *H. damascena* Mill., nor so dwarf and bushy as *R. gallica* L. Both have leaves softer to the touch than the more rigid and coriaceous leaves of *H. gallica* L. and the allied forms. Last, but not least in importance, both the old Moss Rose and the old Cabbage Rose are sterile, inasmuch as neither has been known to produce fertile seeds so far as we can ascertain. So far, all attempts to obtain seed from the old Moss-Rose and the old Cabbage Rose at Burbage have failed, both outside and under glass, though miniature fruits were sometimes obtained containing no seeds.\* In view of the fact that some apparently good pollen was found and that some of the styles appeared to be normal and not petaloid, the result is so far unexpected. From the genetic point of view the sterility of the old Moss Rose is a serious disadvantage, but this difficulty is not insuperable, as will be seen later. A full discussion of this important question of sterility must be deferred for a time, and for the present we simply record the fact.

\*In 1921 a few fruits matured under glass, and one contained a seed, the germination of which has not yet been tested.

### **History of the old Cabbage Rose. (*R. centifolia* L.)**

The old Cabbage-Rose has been freely cultivated in European fields and gardens for more than 2,000 years. About 450 B.C. Herodotus observes that the Roses growing in Macedonia, near the gardens of Midas, have sixty petals, and are the most fragrant in the world. This is a very neat description of the Cabbage-Rose, and at the same time a critical one, because it is difficult to conceive how such a description can be applied to any other known species of *Rosa*. A century later Theophrastus, the first historian of the Rose, mentions the Roses with a hundred petals, and calls them 'Centifolia.' In the first century Pliny, who devotes a whole chapter to Roses, repeats the observations of Theophrastus, and adds that the '*Rosa Centifolia*' grows at Campania in Italy, and near Philippi, a city in Greece (Macedonia). He also states that these Centifolia Roses grow naturally on Mount Pangaeus close by, with a hundred leaves but small, and when transplanted into richer soil do thrive mightily, and prove to be much fairer than those growing on the mountain; all of which seems quite natural. From other classic authors we learn that vast numbers of Rose petals were used by the Greeks and Romans for their decorations and festivities, and it is reasonable to suppose that the Cabbage Rose with its hundred petals and delicious fragrance was cultivated for this purpose in the fields of Italy, Greece, and Macedonia. In these circumstances it does not necessarily follow that the Cabbage Rose is a true native of the South of Europe, as many of the early authorities conclude (Smith, 1815); on the other hand, it appears more probable, as Lindley (1820) believed, that the Cabbage-Rose was introduced into Europe from Asia at a remote period. As a matter of fact, early in the nineteenth century Bieberstein (1808) found the Cabbage-Rose growing apparently wild

on the Eastern side of the Caucasus, on the borders of Armenia and Persia. Rau (1816) states that it is a native of Northern Persia, and Boissier (1872) gives the habitat as Eastern Caucasus, while according to Loureiro (1790) it is a native of China.

Notwithstanding these records we are inclined to believe that the Cabbage Rose has been cultivated in the fields and gardens of Asia from time immemorial, and that its native country can only be surmised. The fact of its sterility suggests an origin under cultivation, and it is worthy of note that *R. centifolia* L., does not "stool" so freely as *R. gallica* L., nor does it root so well from cuttings and layers as *R. damascena* Mill., so that its chances of survival and increase in a wild state would be very small. The fact that the habitats given are on the borders of or in Persia is also significant, for Persia is a country which has been famous for its fragrant Roses from the earliest times. Fluckiger (1862) refers to a Persian document in the National Library in Paris which states that in the year 810, the province of Farsistan was required to pay an annual tribute of 30,000 bottles of Rose-water to the Treasury of Baghdad. The most important cultivations of Roses for distilling Rose water were near Shiraz, and are "even to this day" (Fluckiger, 1883). Lindley (1820) in commenting on the celebrated Roses of Shiraz, praised so enthusiastically by Kaempfer (1712) suggests that the Rose of Shiraz may be the Cabbage-Rose (*a. centifolia* L.) or possibly *R. damascena* Mill. It was at Shiraz that one of the MSS. of the Rubaiyat of Omar Khayyam was transcribed in 1460. The immortal Persian poet and philosopher, who flourished in the eleventh and twelfth centuries, was a passionate lover of the Rose - as well of the Vine - and red, white, yellow and flesh-coloured Roses are referred to in the Rubaiyat.

It is related by FitzGerald (1859) that one day in a garden Omar Khayyam said to one of his pupils, Khwajah Nizami of Samarcand, My tomb shall be in a spot where the North wind may scatter Roses over it, and it was so, for on his grave at Naishapur a Rose tree was planted. In Willmott (1914) the late Dr. J. G. Baker (whose botanical knowledge of Roses was unrivalled) relates how a hip of this Rose was brought home by Mr. Simpson, the artist of the "Illustrated London News", and sent to Kew by the late Mr. Bernard Quaritch, from which seedlings were raised which proved to be *R. damascena* Mill., a species, as we have seen, that is allied to the Cabbage Rose, *R. centifolia* L., but distinct from it. All of which goes to confirm Lindley's conjecture that the celebrated Rose of Shiraz may have been one of these species. The date of the introduction of the Cabbage-Rose to England is unknown; it may have come during the Roman occupation of Britain with the "English" Elm, or it may have come later through the monastery and convent gardens, in which, according to Amherst (1895), Roses were cultivated as far back as the eleventh century, in the reign of William Rufus. On the authority of Anselm it is related that the Red King, in order to see the twelve-year-old Matilda at the convent of Romsey, entered the convent on the pretext of looking at the roses in the garden.

The late Canon Ellacombe (1905) believed that the Cabbage-Rose was certainly in cultivation in England in the fifteenth century and probably earlier. He identifies it with the 'Rose of Rone' of Chaucer and with the 'Provincial Rose' of Shakespeare and adds that the name of this Rose would be more properly written 'Provence' or 'Provins'. It is a curious fact that at Burbage the old Cabbage-Rose for eighty years at least has been more commonly called and known as the 'Red Province,' which is the old name used by the English Herbalists, Gerard (1596), Parkinson (1629), and Salmon, (1710). Apparently Miller (1733) was the first to change 'Province' to 'Provence' though he still retained provincialis for the Latin name. It may be that the old name for the Cabbage-Rose, 'Red Province,' has lingered on in remote country districts for centuries, like that archaic word of Chaucer 'glede,' which is still in common use at Burbage to signify the glowing embers in the fire. Baker in Willmott (1914) states that the first botanical figure of the Cabbage-Rose (*R. centifolia* L.) is that of L'Obel (1581) who describes it under the name of *R. damascena maxima*. Gerard (1596) includes it in his catalogue of plants under the name of "R.

damascena flore multiplici, the Great Holland Rose, commonly called the Province Rose." In his Herbal of 1597, however, he describes and figures it under the name of "R. Hollandica sive Batava, the Great Holland Rose or Great Province." Clusius (1601) describes it under the name of *R. centifolia batavica*. Parkinson (1629) describes fully and figures what is undoubtedly the Cabbage-Rose under the name of "R. provincialis sive Hollandica Damascena, the Great Double Damaske Province or Holland Rose, that some call Centifolia Batavica incarnata."

Ellacombe (1905) suggested that Parkinson's (1629) "R. Anglica rubra, the English Red Rose," is the Cabbage Rose, but the description "abideth low and shooteth forth many branches from the roote.... with a greene barke thinner set with prickles...red or deepe crimson colour...with many more yellow threds in the middle, the sent...is not comparable to the excellencie of the damaske Rose, yet this Rose being well dryed and well kept, will hold both colour and sent longer than the damaske, bee it never so well kept," seems to correspond precisely with the characters of *R. gallica* L., the old French Rose, and not at all with *R. centifolia* L., the old Cabbage Rose.\*

\*(It is interesting to compare Parkinson's remarks above, concerning the drying properties of the 'English Red Rose' with the statement of a modern practical chemist, Sawyer (1894), who states that "The fls. of *R. gallica*, which are used officinally, are but feebly odoriferous when freshly gathered; their perfume develops gradually in the proecess of dessiccation, while that of the Damask Rose is almost destroyed by drying." From this it appears that there is a real physiological and chemical difference between *R. gallica* L. and *R. damascena* Mill., apart from their morphological differences which to some modern systematists appear to be negligible.)

Ferrarius (1633), in Italy, describes the Cabbage-hose under the name of *R. Eatava centifolia*. Chabraeus (1677), in Switzerland, describes and figures it under the name of *R. centifolia rubellaplena*. In her monograph of the genus *Rosa* (1914), Miss Ellen Willmott draws attention to the interesting fact that the Cabbage-Rose was a favourite subject with the old Dutch painters, especially Van Huysum (1682-1749) who excelled in portraying it. Ligar (1708), in France, mentions it under the name of "La Rose d'Hollande a cent feuilles, avec odeur." Salmon (1710) describes and figures it as "The Great Double Damask Province, or Holland Rose." Finally, Linnaeus (1753) describes the Cabbage-Rose under its accepted name of *R. centifolia*. Miller (1768), owing to a misunderstanding of Linnaeus' diagnoses of 1753 and 1762 (which it must be admitted were not very clear) describes the Cabbage-Rose under the name of *R. provincialis*, the Provence Rose, and others followed him. Fortunately Lindley (1820) cleared the matter up, and since then the Cabbage-Rose has been known correctly under the original name of Linnaeus, *R. centifolia*. In conclusion it may be useful to mention that the most accurate and life-like coloured drawing of the old Cabbage-Rose is to be found in Redoute (1817). Miss Willmott (1912) considers this to be the most beautiful of all his wonderful drawings of Roses, and we agree.

### **History of the Old Moss-Rose**

The Old Moss Rose is of recent origin compared with the Cabbage Rose. Its mossy flower-buds and stalks, and bristly stems and branches together form such a striking variation that its appearance could hardly fail to be noticed by even the most casual observer. So far as we can trace, no mention of it is made by any of the ancient authors who were familiar with the Cabbage-Rose, nor do any of the old herbalists appear to have noted it. If it had been in existence in their day, the balsamic odour of its mossy glands would surely have attracted them in their search for medicinal virtues and specifics. Gerard (1596) does not mention the Moss Rose in his Catalogue of Plants, but Dr. Daydon Jackson (1876) in his edition of Gerard's Catalogue, suggests that Gerard's *R. holosericea*, The Velvet Rose, may be the Moss Rose (*R. muscosa* Mill.) This plant is described and figured by Gerard (1597) and the flowers and fruits are described as "double with some yellow thrums in the midst

of a deepe and black red colour resembling red crimson velvet. . . when the flowers be faded there followe red berries full of hard seeds." This description does not appear to correspond at all with the old Moss-Rose which has pink flowers when expanded, and is so double that the stamens and styles are seldom exposed, and finally being sterile rarely, if ever, sets either fruits or seeds. The figure (which is identical with that of L'Obel, 1581) shows no trace of the familiar and striking mossiness, while the flowers are "semi-single" (two rows of petals), with stamens and styles fully exposed, and it is bearing rounded fruits. Parkinson (1629) also gives figures of both the single and the double Velvet Rose. In his description he states that they have "very few or no thorns at all upon them . . . very often seven flowers on a stalk . . . yet for all the double rowe of leaves these roses stand but like single flowers . . all of them of a smaller sent than the ordinary red Rose." Salmon (1710) and Andrews (1805) figure both the Single and Double Velvet Rose under the name of *R. centifolia*, but both appear to be forms of *R. gallica* L., the old French Rose. Thory (1817) refers *R. holosericea* to *H. gallica* L., quoting L'Obel's figure which is the same as Gerard's. Finally, Lindley (1820) refers *R. holosericca* to *R. gallica* L.

In any case, judging by the descriptions quoted above, it seems clear that whatever Gerard's Velvet Rose (*R. holosericea*) may have been, it was not the Moss-Rose (*R. muscosa* Mill.), (Dr. Jackson, to whom I submitted this opinion, concurs.) and we can find no evidence that the Moss-Rose was known in England in 1596, to support the repeated statements in the books on garden Roses from Rivers (1840) to Pemberton (1920), that it was introduced in that year from Holland.

So far as we know, there is no mention of the Moss-Rose in Chaucer, Shakespeare, or in any literature of that period. Parkinson (1629) describes in detail twenty-eight forms of Roses, but none corresponds in any way to the Moss-Rose. Ferrarius (1633) in Italy, Chabreaus (1677) in Switzerland, Liger (1708) in France, and Salmon (1710) in England, give long lists, descriptions, and figures of various kinds of Roses, but there is no trace of the Moss Rose in any of them. There is, however, in Ducastel (1746), quoted by Paquet (1845) and Jamain and Forney (1873), a circumstantial account of the existence of the Moss Rose in the south of France, at Carcassonne, as far back as 1696, and this appears to be the earliest date mentioned for the existence of the Moss Rose. The account is that the Hundred-leaved Moss Rose was in cultivation in Cotentin, Messin, and La Manche in 1746, and that it was brought there by Freard Ducastel, who had found it at Carcassonne, where it had been known for half a century,

The first botanical reference to the Moss-Rose is apparently that of Boerhaave (1720) in his Index of Plants cultivated in the Physic Garden at Leyden under the name *Rosa rubra plena spinosissima, pedunculo muscoso*. In 1724 the Moss-Rose is said to have been in cultivation in London, for Miller (1724) states that it is included in Robert Furber's Catalogue of plants cultivated for sale at Kensington. Miller (1760) tells us that he first saw the Moss-Rose "in the year 1727, in the garden of Dr. Boerhaave near Leyden, who was so good as to give me one of the plants." On the whole we consider it safer to accept Miller's 1727 date.

Martyn (1807) refers to what is apparently the first figure of the Moss-Rose in Hort.-Angle., a Catalogue of Trees, Shrubs, Plants, and Flowers cultivated for sale in the Gardens near London, 1730(folio) (66 n. 14, t. 18), in which it is called *Rosa Provincialis spinosissima pedunculo muscoso*, and under the same name it appears in Miller (1733) who adds "or the Moss Provence Rose".

The second illustration of the Moss-Rose that we can trace is in that exquisite little book, "The Flower Garden Display'd" by Furber (1732) under the name of 'Moss Provence Rose'. The coloured drawing, though rather fantastic, is unmistakable. In the letterpress it is called the 'Moss Province Rose,' and it is said to be "like the Province Rose, and bears blossoms almost as double as that, only somewhat redder; and all the stalks are covered

with a green Down, like Moss, which gives it its name." The drawing is said to have been "coloured from the life." Willmott (1912) mentions that there is a specimen of the Moss-Rose in the British Museum from the Chelsea Physic Gardens (Miller's) with the date 1735. About the year 1735 is the period which Shailer (nicht Thailer)<sup>1</sup> (1852) quoted by Darwin (1868, nicht 1893)<sup>2</sup> gives as the first introduction of the old Red Moss-Rose into England. He states, "It was sent over with some orange trees from the Italian States to Mr. Wrench of the Broomhouse Nurseries, Fulham, in or about the year 1735. It remained in that family 20 years without being much noticed and circulated, until a nurseryman of the name of Grey of Fulham brought it into note." In 1746, as we have already noted, the Moss-Rose was in cultivation in France in four districts of the South and West. Linnaeus (1753) does not mention the Moss Rose. Miller (1760) published a coloured drawing of the Moss Rose, with an interesting description of the plant, and following Boerhaave (1720) describes it as "*Rosa rubra plena, spinosissima, pedunculo muscosa*. The most prickly double red Rose with a mossy footstalk, commonly called the Moss Provence Rose . . . This sort sends out but few stalks from the root. These are covered with a dark brown bark, and closely armed with sharp thorns, the leaves are composed of five oblong oval lobes, which are hairy and sawed on their edges; the footstalks of the flowers are strong, standing erect, and are covered with a dark-green moss, as is also the Empalement of the Flowers. The flowers are the same shape and colour as the common Provence Rose, and have the like agreeable odour. It flowers in June or July, but is not succeeded by fruits."

Linnaeus (1762) adds *R. rubra plena spinosissima pedunculo muscoso* of Miller (1760) to *R. centifolia* as probably belonging to it. Martyn (1807) quotes Retzius' (1779) description of the Moss Rose, which is worth re-quoting for its originality and acute observation, "Stem very prickly and hispid: peduncles long, beset with curled strigae terminated by a resinous globule, as are also the whole calyxes: these strigae are often branched. Petioles less hispid and unarmed. Leaflets very large 3 or 5, smooth. The colour and smell of the clammy resinous glands are very much the same as in the Flowering Raspberry, or *Rubus odoratus*." (It is, of course, the fragrant foliage of the *Rubus* to which Retzius refers and not the flowers.) De Grace (1784) mentions the Moss Rose in France.

It is said (Wright, 1911) that in 1785 the Moss-Rose was sent from Caen Wood, Highgate, by Lord Mansfield, to Mine. de Genlis in France as a new introduction to that country. (Cf. Vibert's reference below.) We have already seen that it was in cultivation in four districts in France in 1746, and at Carcassonne in the south of France as far back as about 1696.

Rossig (1802) gives under the name of *R. muscosa* the figure of a pink Moss Rose, less mossy than usual, and states that it is found on the Alps.

Brotero (1804) includes *R. muscosa* in his "Flora of Portugal," while Rivers (1840) alludes to a traveller's report that the Moss Rose grew wild in the neighbourhood of Cintra, but considers that most likely the plants were of garden origin.

Andrews (1805) states of the Moss Rose (*R. muscosa provincialis*) "There can be little, if any doubt, that this beautiful variety is the spontaneous effusion of Nature in this country, of which we ever shall regard it as indigenous, since we have never heard of any importations of this species, but frequent exportations."

Thory (1817) appears to have taken this "effusion" of Andrews quite seriously, and replies as follows: "A cet egard, independamment de ce qu'une conclusion de cette espece est inadmissible en histoire naturell, nous ferons observer qu'il n'est pas rare de voir les Iconographes anglais considerer beaucoup de plantes comme indigenes au sol de leur pays, toutes les fois que le lieu dans lequel elles vegetent naturellement leur est inconnu, circonstance qui doit faire refuter toutes les assertions de ce genre." Apparently Thory had not seen Ducastel.

---

1, 2 Fehlerhafte Angaben im Originalartikel

**NOTES ON THE ORIGIN OF THE MOSS-ROSE, Part 2**  
**by Major C. C. HURST, D.L., J.P., F.L.S.**  
and MABEL S. G. BREEZE, B.Sc.

Reprinted from the JOURNAL of the ROYAL HORTICULTURAL SOCIETY  
Volume XLVII., Part 1, 1922

Printed for the Royal Horticultural Society  
by SPOTTISWOODE, BALLANTYNE & CO. LTD.  
New-Street Square, London, E.C.4 1922

**Origin of the Moss-Rose**

We have reviewed the history of the Old Moss-Rose and have traced it back to about the year 1696, when it wets apparently in cultivation at Carcassonne, in the south of France, until it was found there by Ducastel, and introduced by him to the gardens of three districts in the North-West of France. We have seen that it was in cultivation in Holland in 1720, in England in 1727, and in Italy in 1755. Andrews (1805) states that ". . . The origin of this beautiful Rose has ever been considered as enveloped in obscurity, but we have no hesitation in assigning it to the Province, to which it assimilates in every particular - - with the addition of a rich luxuriant Moss, that gives it a decided superiority, and at the same time a specific distinction. There can be little, if any doubt, that this beautiful variety is the spontaneous effusion of Nature in this country."

Rivers (1840) states: "The Moss-Rose or Mossy Provence Rose is most probably an accidental sport or seminal variety of the Common Provence Rose."

Vibert (1844) of Angers, France, states, curiously enough, that the first Moss Rose, the Common Moss, was discovered in England. He quotes the statement of Mine. de Genlis in her *Botanique Historique* that she brought the first plant of the Moss Rose to Paris from England a few years before the Revolution of 1789, but he seems sceptical about her further statement that in Germany, round Berlin, the Moss Rose grew as high as Cherry trees! Vibert proceeds to say that the Moss-Rose is evidently a sport of Nature, a happy accident that Art has fixed, and that the date of introduction has not been preserved in a positive manner. He remarks that in France in 1810 only the Common Moss was known, and that the species *R. centifolia* has produced more sports or side-steps ("jeux ou écarts") than all the other species of *Rosa* put together.

Loiseleur-Deslongchamps (1844) also states that the Moss Rose originated in England, and that Miller is supposed to have been the first cultivator of it in 1724.

Paul (1848) states: "The history of the Moss Rose is wrapped in obscurity. It was first introduced to England from Holland (in the 1888 edition he adds "in 1596") and it is generally believed that it was a sport from the Provence Rose: that it was not originated by seed, as most new varieties are, but by a branch of the Provence Rose sporting . . . flowers enveloped in Moss.

"Some tribes of plants are more disposed to sport than others; and the Provence and Moss-Roses possess this peculiar property to a remarkable degree."

Finally Darwin (1893) who devoted considerable attention to the question of the origin of the Moss Rose, states: "Its origin is unknown, but from analogy it probably arose from the Provence Rose (*R. centifolia*) by bud-variation." After a careful survey of the facts available to him in 1868, Darwin concludes: "That the original Moss-Rose was the product of bud-variation is probable." Many facts have come to light since the time of Darwin, which more fully confirm this conclusion.

Records show that on three distinct occasions the Moss Rose mutation has appeared

among the Cabbage-Roses. First, about 1696, the Old Moss-Rose appeared, as we have seen, in the South of France. Second, in 1801 the Moss de Meaux appeared in the West of England as a bud-mutation on the Rose de Meaux (Hare, 1818). Third, about 1843, the Unique Moss appeared in France, as a bud-mutation on the Rose Unique (Vibert, 1844; Paul, 1848).

Both the mother parents probably originated as bud-variations of the Old Cabbage Rose, the Rose de Meaux about 1637 in France (Willmott, 1912), and the Rose Unique in 1775 in the East of England (Shailer, 1852).

A confirmation of this view is found in the fact that both the Rose de Meaux and the Rose Unique reverted by bud-variation to the Old Cabbage-Rose (Andrews, 1810; Rivers, 1840).

### **Origin of the Rose Unique**

The Rose Unique, or White Provence, is a white Cabbage-Rose which differs from the Old Pink Cabbage-Rose in colour only. As a matter of fact it is not a true albino, but a tinged white with pink buds.

Usually the flower is pure white when expanded, but the five outer petals are tinged with colour, and occasionally the centre of the flower too. There is an excellent coloured drawing of this Rose in Redouté (1817) under the name of *R. centifolia mutabilis*, or *Rosier Unique*. Andrews (1805) also figures it under the name of *R. provincialis alba*, White Provence or Rose Unique. This Rose was apparently found in a garden in the Eastern Counties in 1775. Andrews (1805) states that "its introduction in 1777 was entirely accidental, through the medium of the late Mr. Greenwood, Nurseryman, a great admirer and collector of Roses, who, in an excursion which he usually made every summer, in passing the front garden of Mr. Richmond, a baker near Needham in Suffolk, there perceived the present charming plant, where it had been placed by a carpenter who found it near a hedge on the contiguous premises of a Dutch merchant, whose old mansion he was repairing. Mr. Greenwood, requesting a little cutting of it, received from Mr. Richmond the whole plant; when Mr. Greenwood, in return for a plant so valuable, presented him with an elegant silver cup with the Rose engraved upon it; and which in commemoration has furnished food for many a convivial hour. It is of dwarf growth and remains in flower nearly six weeks longer than the other Province Roses, which renders it still the more estimable.

"We wish it had been in our power to have accounted for its having been till so lately a stranger to us, and whence indigenous; but at present our information is entirely confined to the knowledge of its casual introduction, and until some further light is thrown upon the subject to elucidate its genealogy, we shall regard it as a native!" Another account is that of Rivers (1840) who states: "The Unique Provence is a genuine English Rose, which, I believe, was found by Mr. Greenwood, then of the Kensington Nursery, in some cottage garden, growing among plants of the Common Cabbage Rose. This variety was at first much esteemed and plants of it were sold at very high prices. Most probably this was not a seedling from the Old Cabbage Rose, as that is too double to bear seed in this country, but what is called by florists a sporting branch or sucker." A final account is that given by Shailer (1852), and referred to by Darwin (1893). Shailer states: "The Rose Blanche Unique, or White Provins, was discovered by Mr. Daniel Greenwood of Little Chelsea, Nurserman. He was on a journey of business in the County of Norfolk in the month of July 1775, when, riding very leisurely along the road, he perceived a rose of great whiteness in the Mill; he alighted and on close inspection he discovered it to be a Provins Rose; he then sought an interview with the inmate of the Mill, who was an elderly female; he begged a flower, which was instantly given him; in return he gave her a guinea.

"In cutting off the flower he cut three buds; he went to the first Inn, packed it up, and sent it direct to my father, at his Nursery, Little Chelsea, who was then his foreman, requesting him to bud it, which he did, and two of the buds grew: in the following autumn he went



down to the same place, where for five guineas he brought the whole stock away; he then made an arrangement with my father to propagate it, allowing him 5s. per plant for three years; at the expiration of that time he sold it out at 21s. per plant, my father's share amounting to upwards of £300.

"Mr. Greenwood sent the old lady at the Mill a superb silver tankard, etc., to the amount of £60."

Darwin (1893), referring to Shailer's version above, states: "Many other instances could be added of Roses varying by buds. The White Provence Rose apparently originated in this way," with which we agree. The statement that Greenwood paid a guinea for one flower and three workable buds distinctly suggests that only one small shoot of this new White Rose was available at the time, and that it was a bud-variation growing on a Common Pink Cabbage Rose as Rivers suggests. The "stock" that Greenwood bought for five guineas in the autumn was no doubt the original plant from which he cut the sport (cf. Andrews' account), because from his two budded plants and the old "stock" plant Shailer would, with ordinary good fortune, get his 1,200 plants in the three years stated.

### **Origin of the The Rose de Meaux**

The Rose de Meaux is a miniature Cabbage Rose which differs from the Old Cabbage Rose only in the smaller size of all its parts. There is a good coloured drawing of this Rose in Redouté (1817) under the name of Rosa Pomponia or Rosier Pompon. This Rose is an old inhabitant of French gardens, but its precise origin is not known. Miss Willmott (1912) suggests with good reason that it may have come from the garden of Doménique Séquier, Bishop of Meaux (1637), who was a great cultivator of Roses in his day. In any case, wherever it arose, there can be little doubt that it originated from the Old Cabbage-Rose and probably as a bud-variation.

Aiton (1789) mentions two 'Rose de Meaux' as varieties of *R. provincialis* Mill. (i.e. *R. centifolia* L.), viz. 'the Great Dwarf Rose,' which is no doubt the Spong Rose (*R. provincialis hybrida*) of Andrews (1805), a half dwarf; and the 'Small Dwarf Rose,' which is clearly the 'Rose de Meaux.' Both these forms are figured by Miss Lawrance (1799) under tt. 31 and 50 respectively.

During a period of more than 2,000 years, only three Moss-Roses have been recorded that were not derived from Moss Roses. Two of the three are definitely recorded as bud-variations of Cabbage Roses, viz. Moss de Meaux (1801) in England and Unique Moss (1843) in France. The third is the Old Moss Rose whose origin is in question. Each of the two is identical with the particular form which produced it, except in the 'Moss' character, which is additional. Further, the 'Moss' character is apparently identical in the three Moss Roses. None has been recorded as a seed-variation and all are sterile, like the forms which produced them.

Further, on at least seven occasions between 1805 and 1873 the Old Moss-Rose has reproduced the Old Cabbage-Rose by bud-variation or 'bud-reversion' (Andrews, 1805; Hare, 1818; Lindley, 1820; Shailer, 1822; Piper, 1842; Jumain, 1873; Darwin, 1893).

The conclusion, therefore, is irresistible that the original Moss-Rose mutation arose as a bud-variation of the Old Cabbage Rose (*R. centifolia* L.).

We conclude, therefore, that the original Moss Rose first appeared at Carcassonne, in the south of France, about the year 1696, as a bud-mutation of the Old Cabbage-Rose (*R. centifolia* L.).

The second 'Moss' mutation was the 'Moss de Meaux,' which appeared in the West of England in 1801 as a bud-mutation of Rose de Meaux.

The third and last 'Moss' mutation was the 'Unique Moss' which appeared in France about

1843 as a bud-mutation of Rose Unique.

All other Moss-Roses have been derived directly or indirectly from one of the three original mutations. As a matter of fact, between 1788 and 1832 no less than seventeen distinct Moss Roses appeared as bud-variations of the Old Moss-Rose in England and France. One of these had single and fertile flowers (Shailer, 1852), and became the ancestor of many hybrid Moss-Roses raised in England and France between 1824 and 1860.

Further confirmation of the origin of the Moss-Rose may be found in the interesting fact that twelve of the distinct bud variations of the Old Moss-Rose which appeared between 1788 and 1832 have precise parallels in twelve bud-variations of the Old Cabbage-Rose which appeared between 1637 and 1813, the only difference between them being the presence and absence of 'Moss' respectively. This can only be due to their like factorial composition in all respects except in the presence or absence of the 'Moss' factor.

Presumably this implies a common origin, and here we seem to get a glimpse of the true nature of related species and varieties, for these twelve bud-variations are indistinguishable in kind from the seed-variations that normally arise among seedlings of related species and varieties of *Rosa*.

Another noteworthy fact has become prominent in the course of this inquiry, and that is the comparatively few bud-variations recorded in the fertile *R. gallica* L., and *R. damascena* Mill. compared with the large numbers found in the sterile *R. centifolia* L.

Is it possible that there is a definite connexion between sterility and bud-variation? Are we to regard bud-variation as an alternative mode of expression of variation in the presence of sterility?

The facts in *Rosa* certainly point in that direction. It is interesting to note that no other species of *Rosa* presents the 'Moss' mutation but *R. centifolia* L. No trace of it is ever seen in the closely allied species or sub species *R. damascena* Mill. or *R. lucida* L. The nearest analogues to the mossiness of *R. centifolia* L., are the extreme hairy and glandular forms of *R. rubiginosa* L. (Sweet Briar) and *R. moschata* Brunonii (Musk Rose), which, however, are quite distinct from *R. centifolia* *moscosa* Seringe, both in their structure and their glandular secretions.

### **Genetic Significance**

In concluding this inquiry, it may be of interest to add a few genetic notes on the probable nature and significance of the three definite appearances of this "specific" bud-mutation, after more than 2,000 years of intensive cultivation and vegetative propagation.

That the 'Moss' character in *Rosa* is a genuine bud-mutation, and not a fluctuating variation, or bud-variant, is evident from its somatic persistence through many bud-generations, and its germinal persistence through various seed-generations.

Rivers (1840) states that: "Plants produced by the seed of the Moss-Rose do not always show Moss; perhaps not more than two plants out of three will be mossy, as I have often proved."

Again, Darwin (1869) states that: "Mr. Rivers informs me that his seedlings from the old Single Moss-Rose almost always produce Moss Roses."

We do not yet know definitely whether the 'Moss' character in *Rosa* is to be identified with a single Mendelian factor or not, though all the evidence so far is in favour of its being a simple dominant. If it is, and Rivers' matings of the Single Moss-Rose were, on the average, one-half selfings and one-half crossings with other Roses, as they probably were, judging by his methods, the Mendelian expectation, on the average, would be the actual ratio that he obtained, viz. 2 Moss; 1 Plain. It is evident that 'Moss' is a dominant character, for if it were recessive no hybrid Moss Roses would have the 'Moss' character, and we know

that some have. It is also clear that the Single Moss, a bud-variation from the Old Moss-Rose, is a heterozygous dominant, for according to Rivers (1340) and Darwin (1893) it throws "Plain" as well as 'Moss' Roses from seed in the proportion of about one in three.

We have already seen that the Old Moss-Rose produced "plain" (i.e. "unmossed") Cabbage-Roses. So that it is probable that the first mutation of the Moss-Rose was itself a heterozygous dominant for 'Moss'.

In view of the important results recently reported by Morgan (1919) and his colleagues, in their experiments with *Drosophila*, which have led them to formulate the chromosome theory of heredity, it seems on this hypothesis that if the first mutation of the Moss Rose was a heterozygous dominant, the mutational change would take place in one of the chromosomes in a single locus. In accordance with the "presence and absence" method, this mutational change in a single locus from  $m$  to  $M$  involves the presence of an additional factor  $M$ , which is dominant to the normal allelomorph  $m$  from which the factor  $M$  is absent.

This conception, however, does not necessarily imply the actual presence or absence of a structural gene as Morgan seems to infer, and in the present state of knowledge it seems safer and sounder to continue the use of the non committal term "factor" with its "presence and absence," which need not necessarily involve any assumption as to the nature or constitution of either the factor or its allelomorph, though it does provide an indispensable symbolic method of denoting the difference between them.

On the other hand, the reversionary change by which the Moss-Rose reproduced the Cabbage-Rose by bud-variation involves the absence of the factor  $M$  in a single locus of one of the chromosomes, either by somatic segregation with a reduction division, or it is evident that in view of Morgan's discoveries bud-mutations take on a new importance, and in the case of the Moss Rose is clearly one of considerable genetic significance; for in a simple way it seems to narrow down to a fine point the difficult and usually complex problem of the origin of a definite mutation, and may bring us within measurable distance of the possibility of tracing the origin to a certain cause. For the present, however, we must be content to work and wait patiently for the genetic and cytological facts, which alone can offer even an approximate solution.