THE CULTURE

OF

EXOTIC ROSES

IN INDIA

MADE EASY;

OR

PRACTICAL DIRECTIONS FOR THEIR IMPROVED

TRAINING, PROPAGATION,

AND

GENERAL TREATMENT.

NEW EDITION, REVISED AND ENLARGED.

BY

JAMES GRAHAM.

AGRA:

PRINTED AT THE "DELHI GAZETTE" PRESS.

1881.


IMPERIAL
LIBRARY

CONTENTS.

	Page.
ntroductory, ...	1
escriptive List of the most Fashionable Roses,	3
ew Roses, ...	18
ses suitable for Exhibition, Walls, and Pots,...	20
fferent ways of growing Roses, ...	20
w to grow Bedded Roses, ...	20
,, Pillar ,, ...	21
,, Climbing ,, ...	23
,, Weeping ,, ...	23
,, Standard ,, ...	23
e Rose-grub, ...	25
rangement of a Rose-garden, ...	26
ansplanting, ...	27
the preparation of Artificial Soil,...	28
nure, ...	31
nuring, ...	35
uid Manure, ...	36
riching the colour and perfume of Roses, ...	38
tering, ...	40
pagation by Hybridism, ...	40
,, Pipings, ...	44
,, Cuttings, ...	45
,, Layers, ...	46
,, Budding, ...	47
ning, ...	49
clusion, ...	50

PREFACE.

In the following pages I have striven to supply a want long felt by amateur gardeners, namely, lucid instruction in a small compass suitable to the climate and soil of India relative to the cultivation of the Rose, the Queen of Flowers admired by both prince and peasant for its marvellous combination of perfume, form, and colour.

The varieties and multifarious attractions of the Rose have been of late years as wonderfully improved, as their number has been augmented by the process of hybridism, full treated on in these pages. Through exercising one knowledge of its principles, flowers of two species, but claiming a similar genus, are made productive of a hybrid offspring, which, although retaining certain characteristics of the parent plants, will be found the possessor of features peculiar to itself. The existence of most of the charming Roses now adorning the poor man's flower plot, as well as the lordly parterre, is solely attributable to this mode of cultivating them.

No treatise on Floriculture, as practised in India, comprises the hints and directions, without which the amateur floriculturist would find it not far from impossible to rear to perfection the hundred and one varieties of the Rose. The information given in the hand-book now brought within his reach will, it is hoped, supply this *desideratum*. Its compposition has been effected by the aid of works on Indian gardening by Fogson, and others; and also from my own experiments in Rose-culture, and the written experience of amateur and professional gardeners, such as Messrs. Paul, Stephen, Carter, Hole, and some more.

JAMES GRAHAM.

AGRA, *24th January*, 1881.

CULTIVATION OF THE ROSE.

INTRODUCTORY.

" Rose ! thou art the sweetest flower

That ever drank the amber shower ;

Rose ! thou art the fondest child

Of dimpled Spring, the wood-nymph wild ! "

So sang the old Greek poet Anacreon, many centuries go in praise of the " Queen of Flowers." Although the Rose is one of the national emblems of England, and lthough the French are indebted to the enterprise of ritish travellers for several new species ; yet without bubt or cavil the French excel all nations in the growth nd production of new varieties. The great impulse given Rose-culture in France was, at first, of a fashionable haracter. The Empress Josephine being exceedingly fond

of this flower, employed Mr. Kennedy, an Englishman, in collecting varieties, and laying out a Rosary at Malmaison. Under such distinguished auspices, Roses became very fashionable. Through the exertions and skill of the florists by producing more beautiful varieties, our Rose gardens now show White Roses, Striped Roses, Blush Roses, Pink Roses, Rose Roses, Carmine Roses, Crimson Roses, Scarlet Roses, Vermilion Roses, Maroon Roses, Purple Roses, Roses almost Black, and Roses of glowing gold.

The varieties of the Rose have of late years been so multiplied, that considerable difficulty has arisen with respect to their proper classification. In fact, botanists do not agree as regards the different characters which constitute several species; for the florists, by combining varieties have produced so many new *races*, that it is scarcely possible for the most skilful botanist to refer each variety to its proper parent species. Florists of the present day catalogue over two thousand varieties; these they class into groups or sections; arranging the whole into two grand divisions—those classed as Summer Roses, which bloom but once in the year, and those varieties which bloom twice in the year, in summer and autumn too, called Perpetual, which,

> "Ere one flowery season fades and dies,
> Design the blooming wonders of the next,"

The latter are of superior and more enduring beauty than the former.

List of the newest and most fashionable varieties of Exotic Roses.

The existence of such a variety of Roses, one-tenth of which it would be almost impossible to introduce into even the most extensive gardens, renders necessary a judicious selection of the best kinds, in order to compensate for any deficiency in number and variety by the superior beauty of those admitted. My object will be to enable the amateur Rose-culturist to make a judicious selection of the choicest of these truly beautiful flowers, to describe their cultivation, by no means difficult, and to make them more widely known among the community at large, as Roses, being considered the principal ornaments of the flower-garden, throughout the most delightful periods of the year, have great claims to our attention, and should be more extensively cultivated in every pleasure garden.

I trust that this season many will make their first attempts at Rose-culture, and that no one will be deterred by dread of trouble, or doubt of success.

I will now give a descriptive list of 120 of the newest and most *fashionable* of the different varieties of Exotic Roses which grow and bloom so luxuriantly, and to such perfection, in all the public gardens of India. From this list, a suitable selection can be made of the most desirable kinds.

The letter P. placed immediately after the name of each Rose indicates such varieties as are best grown as Pillars; the letter C for Climbers; the letter B for Bedding; the letter S for Standard; and the letter W for Weeping Roses.

Part I.—Summer Roses.

Hybrids of Chinese, Bourbon, and Noisette Roses.

No. of Variety.		Habit of Growth.
	The Roses in this section are Hybrids between the Gallica, Centifolia, &c, and the Chinese, Noisette, and Bourbon. They grow to perfection as Climbing or Pillar Roses. In pruning they should be well thinned out, and the shoots left for flowering shortened but little.	
1	Charles Duval:—C. P. Deep pink, beautiful, large and full.	Vigorous.
2	Charles Lawson:—C. P. Vivid rose, shaded, large and full; one of the best.	Vigorous.
3	General Jacqueminot:—C. P. Purplish crimson, large and full, fine.	Vigorous.
4	Paul Ricaut:—C. P. Bright rosy crimson, large and full; one of the best.	Robust.
5	Paul Verdier:—C. P. Magnificent bright rose, large, full, and perfectly imbricated, a good Rose.	Vigorous.

Part II.—Summer and Autumn Roses.

Chinese, or Bengal Roses.

These Roses are well adapted for growing in small pots, for bedding, or planting in beds on lawns as Standards, or in any situation where an abundance

No. of Variety.		Habit of Growth.
	and constant succession of flowers is desired. Compared with other Roses they are of small growth.	
6	ARCHIDUKE CHARLES :—B. S. Rose, gradually changing to rich crimson, very large, full, and fine.	Moderate.
7	FABVIER :—B. S. Brilliant scarlet, dazzling, semi-double.	Moderate.
8	MRS. BOSANQUET :—B. S. Delicate pale flesh, large and double, free.	Vigorous.

Bourbon Roses.

The Bourbons are free and constant bloomers, with fine foliage, bright colours, and, in general, finely-shaped flowers. They are hardy and of free growth, and are well adapted for Climbing and Pillar Roses.

9	ACIDALIE :—C. P. Blush white, superb, large and full.	Vigorous.
10	EMPRESS EUGENIE :—C. P. Pale rose, purple edges, large and full.	Vigorous.
11	PIERRE DE ST. CYR :—C. P. pink, large and full.	Vigorous.
12	PRINCE ALBERT :—C. P. Fine scarlet crimson, full; the finest bright Bourbon Rose.	Vigorous.

No. of Variety.		Habit of Growth.
13	SOUVENIR DE MALMAISON :—C. P. clear flesh, edges blush, beautiful, very large and full ; one of the best.	Vigorous.

Tea-scented Roses.

The Tea Roses are celebrated for their extreme delicacy of colouring, and delicious fragrance. They are rather tender, and require protection from frost during winter. The moderate growers are adopted for bedding, or planting on lawns as Standards, and the vigorous, as Climbing or Pillar Roses.

14	ABRICOTE :—B. S. Fawn, apricot centre, large and double.	Moderate.
15	ALBA ROSEA :—C. P. White, rose centre, large, full, very sweet.	Vigorous.
16	ALINE SISLEY :—C. P. Flowers varying from deep rosy purple to shaded violet red, a colour altogether new, and most desirable amongst Tea Roses ; large, full and fine.	Vigorous.
17	AMABILIS :—B. S. Yellow, shaded with copper.	Moderate.
18	AUGUSTE VACHER :—C. P. Flesh colour.	Vigorous.
19	BURET ; OR FRENOH :—C. P. Red.	Vigorous.

No. of Variety.		Habit of Growth.
20	COMTE DE PARIS :—C. P. Flesh-coloured rose, superb, large and full.	Vigorous.
21	CATHERINE MERMET :—C. V. Flesh-coloured rose, large, full, and of exquisite form ; one of the best.	Vigorous.
22	CHESHUNT HYBRID :—C. P. Purplish maroon, shaded with crimson, large and full.	Vigorous.
23	DEVONIENSIS :—C. P. Pale yellow, superb, very large and full, one of the best.	Vigorous.
24	DUC DE MAGENTA :—B. S. Salmon, very large and full.	Moderate.
25	GLOIRE DE DIJON :—C. P. Yellow, shaded with salmon, very large and full, a superb Rose ; one of the best.	Vigorous.
26	HOMER :—C. P. White, tinted with rose, and fawn, large, full and good, very hardy.	Vigorous.
27.	JOSEPHINE MALTON :—C. P. Cream, tinged with buff.	Vigorous.
28	JAUNE D'OR :—B. S. Fine yellowish fawn, reverse of petals rosy, of medium size, full, form globular, very beautiful.	Moderate.
29	L'ENFANT TROUVE :—B. S. Pale yellow.	Moderate.
30	LE PACTOLE :—B. S. Cream, yellow centre, large and full, a beautiful Rose.	Moderate.

No of Variety.		Habit of Growth.
31	LOUISE DE SAVOIE :—C. P. Fine pale yellow, large and full.	Vigorous.
32	MADAME DE ST. JOSEPH :—B. S. Salmon pink, beautiful, very large and double, very sweet.	Moderate.
33	MADAM DE VATRY :—C. P. Deep rose, large and full.	Vrgorous.
34	MADAME HALPHIN .—B S. Salmon pink, centre yellowish, large and full.	Moderate.
35	MADAME PAULINE LABONTE :—C. P. Salmon, large and full, very free bloomer.	Vigorous.
36	MADAM DAMAZIN ·—C. P. Salmon, large and full, free bloomer, very hardy.	Vigorous.
37	MARECHAL NEIL :—C. P. Beautiful deep yellow, large, full, and of globular form, very sweet, and truly splendid.	Vigorous.
38	MADAME FALCOT :—C. P. Apricot yellow, in the way of *Safrano*, but of a deeper shade, and more double; one of the best.	Vigorous.
39	MADAME BERARD :—C. P. Clear salmon rose, large, full, and of free form, good habit; a first-class Rose.	Vigorous.
40	MADAME TRIFLE :—C. P. Salmon yellow; outer petals sometimes deep coppery yellow, large, full, and of	

No. of Variety.		Habit of Growth.
	fine habit and form; a seedling from *Gloire de Dijon*.	Vigorous.
41	MADAME LEVET:—C. P. Yellow, outer petals tinged with violet, large, full, and of fine form, habit good, a seedling from *Gloire de Dijon*.	Vigorous.
42	PERFECTION DE MON PLAISIR:—C. P. Beautiful canary yellow, of medium size, full, freely produced, form fine.	Vigorous.
43	PERLE DE LYON:—B. S. Deep yellow, sometimes apricot, large, full and of fine form	Moderate.
44	SAFRANO:—C. P. Bright apricot in bud, clanging to yellow.	Vigorous.
45	SOUVENIR D'UN AMI:—C. P. Salmon rose, shaded, large and full, one of the best.	Vigorous.
46	SOMBREUIL:—C. P. White, tinged with rose, very large and full.	Vigorous.
47	THERESE LOTH:—C. P. Delicate rose, with brighter centres, of medium size.	Vigorous.

Tea-scented Noisette Roses.

The Noisettes are fine Roses, blooming mostly in large clusters; some of them scarcely cease blooming for months. They

No. of Variety.		Habit of Growth.
	are mostly free growers, and sweet; the true Noisettes are very hardy. They are well adapted for Weeping, Climbing, or Pillar Roses, blooming freely very late in the year.	
48	AIMEE VIBERT:—W. C. P. Pure white, beautiful, full,	Vigorous.
49	CLOTH OF GOLD:—W. C. P. Yellow, edges sulphur, large and very double.	Vigorous.
50	CELINE FORESTIER:—W. C. P. Pale yellow, free bloomer, large and full.	Vigorous.
51	ISABELLA GRAY:—W. C. P. Yellow, large and full.	Vigorous.
52	LAMARQUE:—W. C. P. Sulphur yellow, beautiful, very large and full.	Vigorous.
53	SOLFATERRE:—W. C. P. Fine sulphur yellow, large, and very double.	Vigorous.
54	TRIOMPHE DE RENNES:—W. C. P. Canary, large, full and fine.	Vigorous.

Hybrid Perpetual Roses.

The Hybrid Perpetuals are the finest and hardiest among the Summer and Autumn Roses, and for the most part cannot be too highly recommended to amateurs resid-

No. of Variety.		Habit of Growth.
	ing in any locality where the Tea-scented and Chinese do not thrive well. They are fine forcing Roses, and very sweet. They thrive best in a rich soil, with close pruning, regulated a little by the rate of growth. The vigorous growers succeed well grown as Pillar Roses and the moderate as Bedded, or Standard Roses. *	
55	ALFRED COLOMB :—P. Bright clear red, large and full, form globular and excellent ; one of the best.	Vigorous.
56	ANNIE LAXTON :—B. S. Rose, shaded, with crimson, very double.	Moderate.
57	ANTOINE MOUTON :—P. Flowers bright clear rose, back of petals silvery, very large, very full and of good form ; habit erect, foliage fine.	Vigorous.
58	BEAUTY OF WALTHAM :—P. Cherry colour to bright rosy carmine, large and full, form cupped, one of the loveliest and sweetest, blooming abundantly and late.	Vigorous.
59	BARONNE PREVOST :—P. Pale rose, superb, very large and full.	Vigorous.
60	BLACK PRINCE :—P. Dark crimson, shaded with black, cupped, large, full, and of very fine shape, very hardy, good habit.	Vigorous.

No. of Variety.		Habit of Growth.
61	CHARLES MARGOTTIN :—C. P. Brilliant carmine, centre fiery red, very large, full and sweet.	Vigorous.
62	CHARLES ROUILLARD :—P. Beautiful pale rose, brighter at the centre, large, full and of perfect form.	Vigorous.
63	CAROLINE DE SANSAL :—P. Clear flesh colour, edges blush, large and full.	Vigorous.
64	CAPTAIN CHRISTY :—B. S. Delicate flesh colour, deeper in the centre, large. A very effective and new colour.	Moderate.
65	CLIMBING VICTOR VERDIER:—C. Flowers the same as in *Victor Verdier*, but the habit is more vigorous.	Vigorous.
66	COUNTESS OF OXFORD :—B. S. Bright carmine red, shaded, very large, full and of fine form, foliage handsome.	Moderate.
67	BARONNE DE MAYNARD :—P. Beautiful pure white, medium size, fine form.	Vigorous.
68	CATHERINE GUILLOTT :—B. S. P. Deep pink, perfect form, free bloomer.	Moderate.
69	DUCHESS OF NORFOLK :—P. Purple crimson.	Vigorous.
70	DR. ANDRY :—P. Dark bright red, full and of fine form ; one of the best and most effective.	Vigorous.

No. of Variety.		Habit of Growth.
71	DUC DE ROHAN :—P. Red shaded with vermilion, bright, large and full, form good, foliage handsome.	Vigorous.
72	DUKE OF EDINBURGH :—P. Brilliant scarlet crimson, shaded with maroon, large and full, one of the best.	Vigorous.
73	EDWARD MORREN :—P. In the way of *Jules Margottin*, but of a lighter colour, larger and more double.	Vigorous.
74	EMPEREUR DE MAROC :—B. S. Rich velvety maroon, of a most distinct variety.	Moderate.
75	ETIENNE LEVET :—B. S. Carmine, large, full, and of fine form, produced freely; one of the best.	Moderate.
76	FRANCOISE LACHARME :—B. S. Bright carmine, changing to red, full, globular.	Moderate.
77	GLOIRE DE SANTENAY :—P. Scarlet crimson.	Vigorous.
78	GEANT DES BATAILLES :—P. Crimson shaded with purple.	Vigorous.
79	GLOIRE DES ROSAMANES :—C. P. Brilliant carmine, large and semi-double; a good climbing Rose.	Vigorous.
80	GENERAL JACQUEMINOT :—P. C. Brilliant red, velvety, large and double, fine for massing.	Vigorous.

No. of Variety.		Habit of Growth.
81	GLOIRE DE DUCHER :—C. P. Purple, illuminatad with crimson and scarlet, extra large and double, very handsome foliage, distinct and fine.	Vigorous.
82	GLORY OF WALTHAM :—C. P. Crimson, in the way of *Red Rover*, but more double, very sweet, growth of extraordinary vigour, one of the best Climbing or Pillar Roses.	Vigorous.
83	JOHN HOPPER :—P. Rose, crimson centre, reverse of the petals purplish lilac, large, full, and good.	Vigorous.
84	JULES MARGOTTIN :—P. C. Bright cherry, large and full; a superb Rose.	Vigorous.
85	LA FRANCE :—B. S. Beautiful pale peach, rose centre, very large and full, very free bloomer, a good bedding and decorative Rose.	Moderate.
86	LADY E. PEEL :—P. White and carmine.	Vigorous.
87	LEOPOLD PREMIER :—P. Dark red.	Vigorous.
88	LE RHONE :—B. S. Vermilion, colour rich and brilliant, large, full and of good form.	Moderate.
89	LOUISE PEYRONNY :—P. Silvery rose, very large, full and of fine form.	Vigorous.
90	LOUISE ODIER :—P. C. Fine bright rose, full, very free bloomer.	Vigorous.

No. of Variety.		Habit of Growth.
91	LYONNAISE:—P. Pink, brighter in the centre, very large, full, form globular.	Vigorous.
92	MADAME ALFRED DE ROUGEMONT:—P. Pure white delicately shaded with rose, large and full, one of the best light Roses.	Vigorous.
93	MADAME BOLL:—P. Rose colour, sometimes edged with blush, large, full, handsome Rose.	Vigorous.
94	MADAME CHARLES WOOD:—P. Vinous crimson, very large, full and effective.	Vigorous.
95	MADAME VICTOR VERDIER:—P. Rich bright cherry colour, large, full, and of fine form, cupped, a superb and most effective Rose; one of the best.	Vigorous.
96	MARQUISE DE CASTELLANE:—P. C. Beautiful bright rose, very large and full form, perfect, blooms freely; one of the best.	Vigorous.
97	MADAME DE RIDDER:—P. Fine bright amaranth rod, large, full and of good form, freely produced.	Vigorous.
98	MADAME NOMAN:—B. S. Pure white, blush centre, fine form, medium size, full, very free bloomer.	Moderate.

No. of Variety.		Habit of Growth.
99	MADAME CLEMENCE JOIGNEAUX :—P. Red, shaded with lilac, very large, very double and fine, exquisite foliage, and good habit.	Vigorous.
100	MADAME LAURENT :—B. S. Fine bright rose, large and globular.	Moderate.
101	MADAME GEORGE PAUL :—P. Deep rose.	Vigorous.
102	MADLLE. ANNIE WOOD :—C. P. Beautiful clear red, very large, full, and of excellent form; one of the best.	Vigorous.
103	MADLLE. EUGENIE VERDIER :—B. S. Bright flesh-coloured rose, the reverse of the petals silvery white, very large and full; one of the best.	Moderate.
104	MARGUERITE DE ST. AMAND :—B. S. Rosy, flesh colour, large, full, and of fine form, an abundant bloommer, habit fine; one of the best.	Moderate.
105	MARIE CORDIER :—B. S. Deep carmine, illuminated with fiery red, large, full, and very effective.	Moderate.
106	PAUL NERON :—P. C. Dark rose, very large, of fine form and habit; the largest.	Vigorous.
107	PEACH BLOSSOM :—B. S. Delicate peach blossom, a new and most desirable colour among Roses, large, full and of fine shape, very hardy and free.	Moderate.

No. of Variety.		Habit of Growth.
108	PIERRE NOTTING :—P. C. Blackish red, shaded with violet, very large and full, form globular, habit good, one of the best dark Roses.	Vigorous.
109	PIO NONO :—P. Dark crimson.	Vigorous.
110	PRINCE CAMILLE DE ROHAN :—B. S. Crimson maroon, very rich and velvety, large and full; one of the best.	Moderate.
111	PRESIDENT THIERS :—B. S. Fiery red, globular, very large, and full.	Moderate.
112	PROFESSOR KOCK :—P. Rosy cherry.	Vigorous.
113	PRINCESS MARY OF CAMBRIDGE :—P. Pale rose, large and full.	Vigorous.
114	QUEEN VICTORIA :—P. white, shaded with pink, large and full.	Vigorous.
115	QUEEN OF WALTHAM :—B. S. Beautiful rosy, cherry, a very distinct and lovely color; in sunny weather the circumference of the petals becomes darker than the base, proving a novel and strikingly beautiful feature. It is impossible to convey by a description any idea of the exquisitely charming tint of colour predominating in this variety. It is a large and full flower, perfect in form.	Moderate.

No. of Variety.		Habit of Growth.
116	SOUVENIR DE POITEAU :—C. Bright salmon rose, large, full, and of finely cupped form.	Vigorous.
117	SOUVENIR DE MERE FONTAINE :—B. S. P. Flowers bright red, base of petals shaded with carmine; large full and sweet; habit branching.	Moderate.
118	ST. GEORGE :—B. S. Flowers crimson, shaded with black purple, large, full, and of good form, habit and foliage fine; a splendid new dark Rose.	Moderate.
119	SOUVENIR DE ROMAIN DESPREZ :—B. S. Bright rose, deeper in the centre, large and full, a very floriferous and effective variety.	Moderate.
120	VICTOR VERDIER :—B. S. Rosy carmine purplish edges; a large, showy free-growing Rose, of good quality, and very effective.	Moderate.

New Roses.

The plan which I would advise the amateur to pursue in the formation of a Rose-garden, would be to buy his Rose-trees from the nursery and then to multiply them upon stocks of his own. Once possessed of the most beautiful varieties of the Rose and planting every November such a quantity of seedlings or cuttings of the Dog Rose or

Elward Rose as he may seem desirable for stocks, the independent Rosarian will grow his favourite flower to perfection, year after year, from his own resources, only requiring in addition those *new* Roses which promise to be of superior merit, which are regularly advertised by our English nurserymen in the spring.

In ordering Rose-trees, I advise the amateur to ask for dwarfs or for low standards. The height which I prefer for the latter is about 2 feet from the ground to the budded Rose, because these lesser trees escape the fury of the wind, requiring no stakes to support them after their first year. They should be planted in November, just deep enough to have a firm hold upon the soil; and the surface round them should be covered with a stratum of manure, both to protect and enrich the roots.

For his budding-ground the amateur should select from the cuttings or seedlings of the Edward Rose or Dog Rose put down the year before, young, straight, sapful, well-rooted stocks, that the scion may be as vigorous as the site. Let them be planted at once in rows, the stocks 1 foot, the rows 3 feet apart. The situation and the soil of the stocks must be just as carefully studied as though the Roses were already upon them These stocks are not to be set in bare and barren places, but should occupy a space enclosed by evergreen fences, which, somewhat higher than the trees within, protect them from stormy winds.

Watching their growth in spring, the amateur should remove the more feeble lateral shoots, leaving two or three of the upper and stronger.

The stocks may be budded the next budding season in the manner directed in the chapter on budding.

Roses suitable for Exhibition.

Of the lists, Nos. 37, 55, 64, 75, 85, 96.

Roses for Walls.

Of the list—not quite hardy—Nos. 23, 37, 49, 52, 53.

Of the list—quite hardy—Nos. 2, 25, 63, 80.

Roses for Pots and Tubs.

Of the list, Nos. 2, 4, 8, 13, 15, 20, 23, 25, 31, 32, 37, 38, 41, 50, 54, 55, 58. 59, 63, 64, 66, 70, 72, 73, 80, 83, 84, 85, 95, 96, 104, 108, 111, 113, 120.

Different ways of growing Roses.

Roses are grown in beds, as standards of various heights, dwarfs or bushes, as pillars, weeping roses, and climbers trained to a wall or trellis.

Bedded Roses.

The most attractive, abundant, and abiding system upon which you can grow Roses, is to plant them in beds, thoroughly drained, dug, and manured, upon their roots, or budded upon dwarf stocks. Of the Chinese, Hybrid Perpetual, and Tea-scented Roses, those of *moderate* growth are suitable for bedding. To succeed in growing and blooming them to perfection, they must be planted in *cultivated* soil of about a foot in depth. When pruning them, thin out the shoots freely; those that you leave should not be shortened, except they are very long and weak, when you may take off four or five inches from the end, and then peg

them down their full length along the ground. By this method all the buds will break and produce flowers on short upright stems, nearly all the length of the main shoots.

Of the Hybrid Prepetuals, which are the finest and hardiest among the Autumn Roses, and thrive best in a rich soil, Nos. 74, 75, 85, 93, 103, 104, 105, 107, 110, 111, 115, 118, 119, and 120 of the list make a splendid appearance when grown in this manner.

The plants should be inserted early in November, and a covering of manure spread lightly all over the bed. The first year they should be pruned down to three eyes of the previous year's growth. In the November of the following year, fork the bed over, and lay on a fresh coat of rotten manure; peg down as many shoots as will cover the bed, shortening them a few inches from their extremities. The shoots not required must be cut down to three eyes. Those pruned and pegged down will produce an abundance of short flower-bearing shoots. In two years these beds will be densely covered with flowers and foliage, and the contrasted beauty of the different Roses will dazzle the eye and bewilder the brain of him who loves the Rose. This method of growing Roses might be amplified to any extent by those who had the desire and the means, beds being planted not only with the mixed varieties for contrast, but with a dozen plants of the same Rose.

Pillar Roses.

Pillar Roses are beautiful additions to the Rosarium, enabling us, like the 'Rose-mounds' hereafter commended,

to enliven with pleasing diversity, that level which is described as dead.

The best plan of growing these Roses is this:—To prepare and enrich your soil, and then to fix firmly therein the pillar which is to support the trees. The supports for Pillar Roses should be of iron, neatly painted. The height and thickness of these single rods will be determined by the position to be occupied, from 5 to 8 feet above the ground being the most common altitudes, and the circumference varying from 1½ to 3 inches. Below the surface, their tripod prongs must be deeply and securely fixed from 1 foot to 18 inches in the soil, so as to bear any weight of flowers and foliage, and defy all the royal artillery of Æolus. The ground and supports being prepared, make a selection from the list of those Roses that are suitable for growing as pillars, such as Nos. 1, 2, 3, 4, 5, 12, 13, 25, 55, 58, 70, 72, 80, 82, 84, 92, 93, 95, 96, 102 and 108 of the list; and these whether on their own roots, or worked upon Dog Rose or Edward Rose stocks, should be planted in November, and safely tied to their rods with tarred twine. Prune closely the following March, removing three-fourths of your wood so as to insure a grand growth in the autumn, which, moderately shortened in October, should furnish your pillar, from soil to summit, with flowing lateral shoots. By the time your tree has attained the dimensions required, your observation will have taught you how, for the future, to prune it so that you may be sure of an annual bloom, cutting away all weakly wood, and regulating the general growth with an eye both to form and florescence. Pillar Roses require more manure than others; in addition to the supply given in Spring, when the soil is

forked over, it is necessary to give a second supply after the plants have flowered.

Climbing Roses.

Climbing Roses, trained to walls facing south or east, require much the same treatment as Pillars, with the exception of pruning all the laterals so close. For an unfavorable aspect, as North-west, West, or North-east, the Bourbons, the Hybrids of Chinese, Bourbon, and Noisette Roses; Tea-scented, and Hybrid Perpetual Roses; all free bloomers, and very hardy, are the best. Nos. 13, 23, 25, 40, 52, 65, 79, 82, and 91 of the list are the most magnificent and effective of Climbing Roses.

Weeping Roses.

Weeping Roses form beautiful objects when planted *simply on lawns*; they are Roses of a pendulous habit, as the Tea scented Noisette Roses, budded on stocks 4 feet and upwards in height. The main shoots ought not to be shortened after the second year, until they reach the earth; prune the laterals only, the flowers will be produced all along the drooping branches from the head to the ground. When they attain their full size, a hoop should be attached midway, supported by two rods, to prevent the branches being injured by the wind.

Standard Roses.

Chinese Roses which, compared with other Roses, are of small growth, and Tea scented Roses of *moderate* habit of

growth, celebrated for their extreme delicacy of colouring, and delicious fragrance, are those adapted for planting on lawns as Standards, or in any situation where an abundance and constant succession of flowers is desired. Nos. 4 and 5 of the list make grand beds on Standards of medium height, moderately pruned, and immoderately manured. In any locality where the Chinese and Tea-scented Roses do not thrive well, the Hybrid Perpetual Roses of a *moderate* habit of growth cannot be too highly recommended as Standard Roses.

Standard Roses are those which are grown independently in open ground, and are classed as large and dwarf Standards. They are well known ornaments of the garden, and look well in any position, but they appear to the greatest advantage when planted in opposite and parallel lines in the centre of two beds, one on each side of a central or principal walk. In pruning, the young shoots should be annually shortened to about two or three inches from the point from which they are started; and if the head becomes too large and straggling, some of the old wood should be cut out, and its place supplied by young shoots, which spring from the centre; keeping in view as you prune, that the beauty of a Standard consists principally in its having a round, compact head, so as to present a favorable appearance when seen from any side. On the planting of Standard Roses, Mr. Carter observes: "Failures of Standard Roses are of no frequent occurrence, as they are often injudiciously planted in a bed scarcely large enough to hold their roots, in a very poor lawn, without any manure, and the turf laid close up to their stems. How, therefore, can they be expected to thrive? Where it is desirable to plant Standard Roses in lawns, a

circle of turf should be removed, not less than five or six feet in diameter. If the first spit of soil be moderntoly rich, it may be placed on one side, and the whole of the sub-soil to the depth of three feet be entirely removed, and replaced with a mixture of good rich loam, strong stable manure, or old night-soil (all well rotted, and of a year's standing), and the top spit next the turf should be well mixed with them. If the top soil is rather light, a good proportion of the sub-soil, if heavy, may be added to it in order to make the compost heavier, as Roses bedded on stocks of the Dog Rose flourish best in a moderately heavy soil. Tread the mixture in the hole to prevent it from sinking, till nearly full; place the plant in the centre, spreading the roots and rootlets in a horizontal direction; and cover them with rich garden mould. Especially avoid planting too deeply. On the top spread a layer of sub-soil, poor sand or road-earth, one or two inches thick over it, to prevent the turf growing more luxuriantly than the rest of the lawn. In replacing the turf, leave a circle of not less than eighteen inches, or two feet in diameter round the stem. This should be filled, instead of sub-soil or poor sand, with a rich compost, which will be washed down to the roots by the rains. To ensure the future health and vigour of the plants, one or two gallons of good liquid manure* should be poured on this circle two or three times every succeeding winter."

The Rose-Grub.

In the flowering season, the bushes must be carefully inspected, and the Rose-grub removed and destroyed. Noth-

---

* See Chapter on *Liquid manure.*

ing but patiently picking off by the hand, can prevent the ravages of this most destructive of little insects. The green fly (aphides) may be killed by tobacco-water, or by dusting the leaves, when damp, with soot.

Arrangement of a Rose-Garden.

On the arrangement of a Rose-garden, Hole writes :— "No formalism, no flatness, no monotonous repetition should prevail. There should the Rose be seen in all her multiform phases of beauty. There should be beds of Roses, banks of Roses, bowers of Roses, hedges of Roses, edgings of Roses, pillars of Roses, arches of Roses, fountains of Roses, baskets of Roses, vistas and alleys of the Rose. Now overhead and now at our feet, there they should creep and climb. New tints, new forms, new perfumes, should meet us at every turn.

Were it my privilege to lay out an extensive Rose-garden, I should desire a piece of broken natural ground, surrounded on all sides but the south with sloping banks, "green and of mild declivity," on which evergreen shrubs should screen and beautify by contrast the Roses blooming beneath, and in the centre I should have, at regular intervals, Rose clad mounds. On the level from which these mounds arose would be the beds and single specimens; at the corners my bowers and nooks. All the interior space not occupied by Roses should be turf, and this always broad enough for the easy operations of the mowing-machine, and for the trailing garments of those bright visitors: the only

beings upon earth more beautiful than the Rose itself." By which your Rose-garden would be

"A rare Rose garden!
No garden ever glowed or gloomed
With such soft interfuse of shine and shade,
As mingled in the chequered shafts that slanted
Through every winding walk, and leafy glade,
And shadow-dappled silent, still arcade
Where those bright Roses bloomed.
No meaner flowers might therein be seen
Only tall trees and Roses. The thick green.
Of lavish leafage parted, to let peep
Red Roses! From the dusk, cool shadows deep,
Of arched alleys star-wise shone,
White Roses, snowy-soft as Psyche's zone.
And there were winding wildernesses walled
With close-pleached thick espaliers of Rose-bushes,
Whence fluting trills and silver-rippling rushes
Of mellow bird song musically called
In low responses. And those basky mazes
Were dight with colours various as the graces
Of a fair woman. Oh! a world of Roses
Crushed, clustered, clambered there. No dulcet closes
Of Lydian lays voluptuously dying,
Are so soul satisfying
As were the glories of that garden lonely,
That rare Rose-realm by Rose scents incensed only."

Transplanting.

All kinds of Rose-bushes are exhaustive of the soil, and if not frequently manured, should be transplanted to

fresh mould. With proper care any plant may be lifted and transplanted, either during the rainy season, or from November to March, when young shoots are preparing to burst forth. The plan is to dig all round, at a distance equal to the compass of the branches, sinking the trench to a point beneath the sole of the plant; then lift it bodily with the whole mass or ball of earth round the roots. A pit must be prepared for the reception of the ball, and when placed in its new situation, fill in the rest of the pit with artificial soil (the preparation of which will be explained in the next chapter), or a well-rotted compost composed of stable dung, night-soil, earth, decayed leaves, and general refuse of vegetation, all thoroughly decomposed, and of a year's standing, laying the rootlets straight, and packing in all neatly to the surface. A copious stream of water must now be poured from a watering pot upon the newly-placed mould round the stem; this carries the particles of earth to the rootlets, surrounding each with its proper nourishment, and giving solidity to the whole. If likely to be exposed to winds, the plant should be supported till thoroughly rooted in its new abode.

On the Preparation of Artificial Soil.

The preparation of artificial soil has now to be explained. The best natural soil procurable must be selected as the base to be operated on, and as the soil which produces the best crops of sugarcane is the soil best fitted for flowers, the *Malee* should receive orders to visit the sugarcane fields in the vicinity, and to select the

field which produces the most luxuriant crop as the one from which the soil is to be secured. A bargain should be concluded with its *zemindar* or proprietor for removing a certain number of cart-loads of soil, the excavation to be made just beyond the limits of the field, or within its boundaries. The best and most economical form will be that of a blind well, the depth of which will correspond with the depth of sugarcane soil; the excavation to cease as soon as a change of strata indicates a change of soil. The good soil *may extend* to a depth of from 10 to 12 feet, and it *may change* at the third foot of depth. The *Malee* must be instructed accordingly, and if, in spite of these instructions, he brings home the changed soil, he should be fined for his negligence.

When the soil is carted home, have it carefully broken down with mallets; let it dry, and gradually pulverize it.

The soil so prepared should be placed under shelter, and its conversion into an artificial soil should at once be undertaken, by ordering the *Malee* to weigh out as follows, viz :—

1st.—Weigh 900 seers of the pulverized sugarcane soil, but if the latter *cannot* be procured, use ordinary garden soil.

2nd.—Reduce 20 seers of *sael khurree* (soapstone) to powder, run it through a fine wire sieve and mix this with the soil.

3rd.—Sift and add 40 seers of bazar lime or *dhuman* to the above in its dry state.

4th.—*Prepare* 20 seers of bone-ash, and place them in a tub; add thereto five seers of saltpetre, and water sufficient to dissolve it completely. Let it soak all night, and next

morning add thereto 20 seers of *soorkhee*, or brick dust pounded fine and sifted ; mix well together, and then spread it over the soil mass ; cover over with soil, and when quite dry, work it well in by repeated turning over of the mass.

5th.—Take 40 seers of soorkhee and divide it into two equal parts, which place in separate tubs ; to the first add seven seers of saltpetre and three seers of sulphate of soda (*the kharee neemuck* of the bazar) ; mix well together. To the second tub add two seers of common culinary salt, finely pounded and sifted, and then three seers of crude carbonate of soda (the *dhobee's sujjee* of the bazars) ; mix well together.

In a third tub dissolve eleven *seers* of sulphate of iron (the *kussees* of the bazars) in two *mussucks* of cold water. Take a *ghurrahful* of this solution and apply it to tub No. 1, and as much to tub No. 2 ; mix and turn over the contents. This done apply a second *ghurrahful* to each, and to what is left of the iron solution, add 20 seers of charcoal dust, which work well in. Now add sufficient cold water to all three tubs to cover their contents to the depth of one inch, and let them soak all night ; next morning weigh ten maunds of the prepared soil, in heaps of five maunds each. To the first heap add the contents of No. 1, and to the second the contents of No. 2 ; mix each heap and its prepared *soorkhee* well together, and, when dry, run it through a coarse sieve, say quarter inch mesh. This done fill up the third tub with water and divide the contents equally amongst the three tubs. Now fill up each tub with fresh droppings of the camel, sheep, or goat, or a mixture of all three, though

the first and last are to be preferred, as being very much richer in nitrogenous compounds ; work them in with a rake, so as not to break or mash them more than can be helped. Whilst this is being done, cause the soil mass to be evenly spread out, and over the surface apply the contents of *the three tubs*, and mix well together ; now re-level the heap, and to it apply the soil, and prepared *soorkhee* heap No. 1 ; mix and turn over, and then apply heap No. 2 ; mix as before, and allow to dry under cover.

After two or three days, run the prepared soil through a coarse half, or one-third inch mesh sieve, and reduce all hard droppings to powder, so that the prepared mass may be a uniform coarse powder, or pulvurent artificial soil, in which state it is to be kept ready for instant use.

To grow Roses to pefection, the soil must be *cultivated*. Blend the above prepared soil with the parent soil, and then there remains, so far as the soil is concerned, but one addition to be made, and this will be treated on in the next chapter.

Manure.

No garden can be conducted with the least advantage without giving it a regular manuring. If you hunger a garden, it will hunger you in return. In connection with every rightly-managed garden, there must either be a compost heap, in which dung is preparing for use, or there must be some means of readily purchasing old manure when it is required. A compost dung-heap is prepared by putting alternate layers of stable dung, or nightsoil, &c., with earth, decayed leaves, and general refuse of vegetation, turning the

whole occasionally till the mass appears to be sufficiently decomposed for use. A small quantity of this stuff will often be required to place at the roots of your Rose-plants, as being the best diet for the health and beauty of their blooms, the most strengthening tonic for their weakness, and the surest medicine for disease.

Manures are of two classes, both of which have distinctive characters, and perform different offices in the economy of vegetation. The first of those comprehends all animal and vegetable decomposing matter, and is principally employed in feeding the plant, augmenting its size, and sustaining the vital energy. The second operates more on the soil and decomposing matter, and in this manner contributes to the support of the plant. The first kind has been called animal and vegetable, and the second fossil or mineral manures. Under this second class are ranked not only lime, marl, gypsum, sand and clay, but the so-called *special manures—nitrate of soda, sulphate of ammonia,* phosphate of lime, &c., which have recently come into use.

The animal and vegetable manures which are putrescent in their nature, are foremost in importance. The essential elements of this excrementitious matter are hydrogen, carbon, and oxygen, either alone or in some cases united with nitrogen. Conveyed by liquids or moist substances into the ground, these elements are sought for as nourishment by the roots of plants, and so form the constituent principles of new vegetation. Inasmuch as flesh consists of a greater concentration of these original elements than vegetables, the manure produced by carnivorous animals is always more strong in proportion to its bulk than that discharged by animals who live only on herbage.

Whatever be the value of the elementary principles of manures, practically they are of no use as manure, till they are disengaged by putrefaction. It may be further observed, that putrefaction is in every case produced by the elemontary principles being set at liberty, either in a fluid or volatilo state. If a quantity of stable dung be piled into a heap, and freely exposed to all varieties of weather, it soon heats and emits a stream of vapour, which is often visiblo as a cloud over it. These vapours, and also the odours sent forth, are gases escaping, and the heap is constantly diminishing in weight and volume; at the end of six months, if there have been alternate moisture and warmth, not above a fourth of the original essential material remains to be spread on the field; there may be in appearance nearly as much substance, but the fertilising principle is gone, and what remains is little better than a mass of worthless rubbish.

It may be safely averred that no principle connected with Floriculture is so little understood, or thought of, as that which has been now mentioned. Generally speaking, the excrementitious matters thrown to the dung-hill, are treated with perfect indifference as to the effects of exposure and drainage away in the form of liquids. It cannot be too strongly stated that this is a gross abuse in gardening. The putrescent stream contains the very essence of the manure, and should either be scrupulously confined within the limits of the dung-hill, or conveyed to fresh vegetable or earthy matter, that it may impart its nutritive qualities. A knowledge of this important truth has led to the practice of making compost dung-heaps, in which the valuable liquids and gases of different kinds of manure are absorbed by earth, or some other substance, and the whole brought into

the condition of an active manure for the garden. Hitherto it has been customary to speak of dung-hills, but there ought to be no such objects. The collection of manure should form a dung-*pit*, not a dung-*hill*. This pit should be three or four feet deep, and of a size proportionate to the quantity of manure your Rose-plants will require. It should slope gently inwards, and deepen gradually towards the centre. It may be covered with alternate layers of earth, to receive the evaporating principles from below, and also prevent the hurtful action of the sun and frosts. If the bottom be found impervious, and capable of containing the juices, no further trouble is requisite, and the work is complete; in many instances, however, it will be necessary first to puddle with clay, and then line the bottom with flag-stones. The pit is now ready to receive all kinds of animal and vegetable manure. The urine of cattle is of great value as a manure, and this is so well known to gardeners that they use it in large quantities. When mixed with vegetable refuse or earth it forms an excellent compost. Do not forget that the dung-heap should be placed in a hollow situation, with a substratum of earth, and should have a scattering of a few inches of earth over it, and around the sides, to keep in the volatile gases.

From every piece of ground a quantity of rubbish may be collected, as withered leaves, stalks, clippings of branches, &c., &c. Improvident persons take no care of this refuse but I strongly advise Rose-cultivators to collect all this inferior stuff into a heap, to which scrape or carry all the mire that can be gathered from pathways, and the whole will make a compost dung-hill; a pailful of cow urine thrown occasionally over the heap will be a valuable addition, and so

likewise will be a shovelful of night-soil. A little lime will hasten the rotting of any compost, but not less than one year ought to be allowed for decomposition, and what is technically called sweetonjng. French gardeners allow several years for certain composts, but one year is sufficient for our purpose. If properly managed, in twelve months all will be rotted, and the compost ready for use, on which *begin taking from one end for manure.* To the other extremity you may keep adding new matter that is collected.

Manuring.

Roses require a strong, loamy soil, and where the ground is naturally not rich, a quantity of rotten manure must be added to it twice a year, once, in the early part of Winter when it should be forked in about the plants, and then again when the flowering season is over, at which time remove the soil to the depth of two inches all round the plants, spread over a spadeful of manure (on no account put fresh manure, but that of a year's standing), cover it with the soil removed, and give water freely if the weather be dry. This treatment should be supplemented with the following powerful confection as a Rose stimulant, of which Mr. Rivers writes as follows. "I have found night-soil, mixed with the drainings of the dung-hill, or even with common ditch or pond water, so as to make a thick liquid, the best possible manure for Roses, poured on the surface of the soil twice a year, when the Rose-buds are formed and swelling, from 1 to 2 gallons to each tree, the soil need not be stirred till two or three months after, and then merely loosened 2 or 3

inches deep with the prongs of a fork. For poor soils, and on lawns, previously removing the turf, this will be found most efficacious. The Chinese, who are very superior gardeners, manure the plant, and not the soil. There is much sound sense and economy in the plan. If the plant food is kept within a radius of from 9 to 12 inches, the roots and rootlets will be most adequately supplied with food; whereas, when it is thinly scattered over a large extent of soil, the roots have to go far in search of it, and may, and very often do, come across injurious substances which act fatally on them.

In every instance the flower stalks should be cut off, as soon as the flowers decay; this not only enhances the neat appearance of the garden, but also prevents the formation of seeds, which if allowed to ripen, would consume the substance that should be stored in the shoots to supply next year's bloom. Where Roses are planted in lawns, the turf should not be laid close round their stems, for the grass will absorb the moisture before it reaches their roots; the air also will in some measure be prevented from permeating the soil.

Liquid Manure.

This manure is a leaf producer, and should be used when the foliage is scanty. In preparing it, the following process should be adopted, *viz* :—In a clean half-cask place 20 lbs weight of sheep or goats droppings, and over them pour a large kettle of boiling water; stir occasionally until cool, when the mass should be reduced to a paste by the "*Tallee*." Next, 20 gallons of cold water are to be poured in,

and the mixture well stirred together. It must now be allowed to stand and settle all night, so that the clear *liquid manure* may be ready for use next morning. One pint of it is to be poured about the stem of the plant, thus manuring the surface roots and rootlets. In India nearly all families keep up a farm-yard or *moorgheekhana*, and as the manure obtained from fowls, ducks, geese, and pigeons is very rich in mineral matters and nitrogen, it should be carefully collected, and kept under cover. Its ammonia may be fixed by sprinkling sulphate of iron water—which is made by mixing five and a half lbs of sulphate of iron (*kussees* of the buzars) in a *mussuck* of water—over the heap, and then strewing some sifted slaked lime (*chunam*) over it. I have shown that with a little management, and suitable orders given to the sweeper, an ample supply of the most valuable manures may be always secured free of cost. It should be remembered that the aqueous solution of sulphate of iron immediately deodorises these substances, which may be kept in a semi-fluid state till required for use. Their dilution with the proper quantity of water is the work of a few minutes.

The effects of ammonia are highly beneficial on vegetation. If you desire your Roses to become more flourishing, you can try it upon them, by adding five or six drops of it to every pint of water that you give them ; but don't repeat the dose oftener than once in a month, lest you stimulate them too highly. The use of ammonia is also to renovate plants that have become exhausted in the soil. This will be apparent by the leaves becoming pale. It may be used when the plants are flowering as well as at other times. The leaves must not be wetted with it. The soil should be dry when it is used, and care should be taken that the drainage be good.

Enriching the Colour and Perfume of Roses.

The Rose requires a rich soil, and the more sulphur it contains the better. The scent of the flower is due to the presence of sulphur, and hence it follows that when it is not freely present in the soil, the flowers announce the fact by their want of perfume. The sulphate of iron *(kussees)* and the *sulphate of lime* in aqueous solution, will at all times supply the roots of the growing Rose with the sulphur needed. The former is sold in the bazar, and the latter is made by subjecting sifted slaked lime, or *chunam*, to sulphuration. The *modus operandi* is as follows, *viz* :—Obtain a large *chatty*, or earthen pot, and oil its outside well, using common bazar oil. This is done to prevent the pot from cracking when strongly heated. See that a suitable cover is supplied. Have some *seers* or pounds weight of *chunam* sifted through a fine sieve, so as to be as fine as sifted wheat flower. Obtain a pound of sulphur (*gundhuck*) and reduce it to powder. Fill the *chatty* with sifted lime, and then weigh its contents, emptying it in the act. For every pound of *chunam* weigh out two ounces of sulphur, and place it in a small burnt clay vessel, which wrap up in paper and place, bottom upwards, in a metal saucer or the cover of a copper cooking-pot (*deckchee*). Place the above at the bottom of the *chatty*, and gradually fill up with the *chunam*. This done, put on the cover and *lute it down* with kneaded dough. Have a fire lit in a brazier (*ungeethee*) and when the charcoal is fully ignited, place the luted *chatty* on the fire, and let it heat gradually for twenty minutes; after which, put more fuel on, and increase the heat by using a pair of hand-bellows. Keep up the fire until a decided smell of burning sulphur is

evident to the olfactory organs, when the blowing is to be discontinued. Allow the fire to burn out and the pot to cool. When cold, remove the cover, and run the contents through a wire sieve (an old wire dish cover answers well), when the sulphate of lime will be ready for use. It must be kept in a canister, or in any earthen vessel which can be closed with a cover.

This substance is easily dissolved in water, and when required for use, one ounce of it should be allowed to the gallon of water, which may be still further enriched by adding to it half an ounce of *sulphate of iron*, which is essentially necessary for not only the successful growth of Roses, but the colouring of their flower-buds and petals. Through its use the reds and crimsons will be of the richest hue, the yellows bright and clear, the pinks perfect, as the brightness of their colours is due to the oxides of iron, and to various combinations of sulphur with the alkalies and alkaline earths. The production of rich scent or perfume is intimately connected with the presence and action of sulphur. Hence it follows, that if these substances are deficient, or scantily represented, the *petals* will be imperfect, the *colouring* poor and defective, whilst the *fragrant odour*, so desirable in Roses, will be of the most subdued kind.

A pint of the above solution will be ample for each Rose-bush, and it may be used every other day, or twice a week at least, during the flowering season. The *Malee* should be supplied with a tin pint measure, and be instructed to apply that quantity to each plant in the *evening* only. Next morning the usual quantity of water is to be used, which will carry some portion of the lime downwards, and so supply the underground roots.

Watering.

In dry seasons artificial irrigation is of great use for giving due aliment to plants, and is indispensable to those newly transplanted, in order to consolidate the soil round the roots. Watering, for whatever purpose, is most advantageously performed in the morning or evening. If done during the time the sun is shining, care should be taken not to water the leaves of the plant, for the heat will raise the temperature of the liquid, and the leaves will be scalded. If the day be cloudy and cool, watering the tops of plants can do no harm. The watering, in any case, should resemble as nearly as possible a soft shower, and be performed with a rose watering-pot. The greater number of flowers are injured by watering, if the water touches their petals.

Do not allow the water to stagnate around the roots of your plants, as they will be deprived of air and warmth which are alike essential to their health, nay life. Cut your drains, with a good fall, straight and 4 feet deep; and do not forget when you have made them, to look from time to time, in seasons of wet, whether they are doing their duty.

Having provided channels of escape for the superabundant moisture, make it as easy as may be in the next place, for the moisture to reach them. Trench your ground, and, by exposing it to atmospheric influence, make it as porous and friable as you can.

Propagation.

HYBRIDISM.

The *Hybridism* of plants is closely allied to the subject of morphology, and is a transformation of character produced

by artificial means. As among animals two distinct species of the same genus will produce an intermediate offspring, so amongst vegetables two species belonging to the same genus can be made to produce a *hybrid*; that is a new plant possessed of characters intermediate between its parents. This power of hybridising is more prevalent among vegetables than animals; for the different species of almost every genus of plants are capable of producing this effect, if the pollen of one species be put upon the stigma of another. According to modern botanists the character of the female predominates in the flowers and organs of fructification of the hybrid, while its foliage and general constitution are those of the male parent. Unless hybrids be perpetuated by artificial processes, they all soon die out or revert to their original stock; for though occasionally fertile in the second and third generations, they have never been known to continue so beyond the fourth. But though incapable of propagating beyond a very limited period, the pollen of the parent species may be made to fertilize them, or their pollen to fertilize the parent; but in either case the new offspring gradually merges into the original species. Thus nature has wisely set a limit to the intermingling of species, by which they are preserved from ultimately running into confusion and disorder. For the benefit of those who are not botanists I shall explain what the *pollen* and *stigma* of a flower are.

Within the corolla are observed small filamentous objects, on some of which are particles of fine-coloured matter like dust. These are parts of the reproductive organisation, and consist of stamens and pistils. In general a stamen consists of two parts, a filament (from *filum*, a thread), which is usually white, and the *anther* which surmounts it,

which is generally yellow or purple. The *anther* is a roundish-shaped body, delicately poised on the filament, and ready to vibrate and impart its dust to objects beneath or near it. The *pollen* is contained in these *anthers*. When a grain of pollen is dropped into water, it swells and bursts, and a minute quantity of matter escapes, which is supposed to be the fecundating principle of the pollen. The *stigma* is united to the ovary or seed-bag beneath by the pistil, which is a kind of tube with a communication from the *stigma* through its style or stalk, to the seed bag, and down this the *pollen* is permitted to exercise its influence.

The means used in the process of artificially fecundating the stigma or female parts of the blossom of one flower with the pollen or male dust of another, have been fully described and explained by Knight and others. That eminent pomologist has obtained thousands of apple-trees from seeds, many of which are of first-rate quality, by cutting out the stamens of the blossom, to be impregnated before their own pollen was ripe enough for the purpose, and afterwards, when the stigma was mature, by introducing the pollen of the other parent, either by shaking the pollen of it over the flower containing the stigma only, by introducing the flower when deprived of its petals or coloured leaves, or by transferring the pollen upon the point of a camel-hair pencil from the one flower to the other. By these means he prevented the possibility of the natural fecundation of the blossom within itself, and thus greatly increased the chances of obtaining intermediate varieties by making use of two distinct parents.

This process is called cross-impregnation, and is in its nature highly curious. Dr. Lindley describes the action as follows :—"Pollen (the male dust) consists of extremely

minute hollow balls or bodies; their cavity is filled with fluid, in which swim particles of a figure varying from spherical to oblong, and having apparently spontaneous motion. The stigma (the female organ) is composed of very lax tissue, the intercellular passages of which have a greater diameter than the moving particles of the pollen. When a grain of pollen comes in contact with the stigma, it bursts, and discharges its contents among the lax tissue upon which it has fallen. The moving particles descend through the tissue of the style, until one or two find their way, by routes specially destined by nature for their service, into a little opening in the integument of the ovulum or young seed. Once deposited there, the particle swells, increases gradually in size, separates the radicle and cotyledons, and finally becomes the embryo—that which is to give birth, when the seed is sown, to a new individual. Such being the mode in which the pollen influences the stigma, and subsequently the seed, a practical consequence of great importance necessarily follows—namely, that in all cases of cross fertilisation, the new variety will take chiefly after its polliniferous or male parent; and that, at the same time, it will acquire some of the constitutional peculiarities of its mother." According to modern phytologists, the character of the female parent predominates in the flowers and organs of fructification of the hybrid; while the foliage and general constitution are those of the male parent.

In an economical point of view, hybridism is of great value to man. By a knowledge of its principles, he has been enabled to modify the characters of natural species, so as to adapt them to his special purposes; and thus have arisen most of those beautiful sorts and varie-

ties of blossom which now adorn the flower-garden. So also by crossing varieties of the same species, our grains, fruits, and kitchen vegetables have been brought to a high state of perfection. The size of one species has been assiduously amalgamated with the durability of another; the beauty of a third with the flavour or odour of a fourth; and so on with other qualities. The principles of hybridism will yet be more extensively applied; and it is not too much to expect that the perfection of our field and forest produce will yet rival that of our orchards and gardens.

Pipings.

Roses are propagated chiefly by pipings, cuttings, layers, or bud-grafting. Propagation by piping is an expeditious mode of raising young plants. Take off the upper and young part of each shoot close below a joint with a sharp knife, and cut each off at the third joint, or little knob; and then cut the top leaves down pretty short, and take off the lower or discoloured ones. When you have piped in this way as many as you require, let them stand a week in a tumbler of water, which greatly facilitates their doing well. Indeed I never failed in any pipings, slips, or cuttings, which I allowed to soak and swell in water previous to planting. When you plant the pipings, let the ground be newly dug, raked very fine; and fertilized with *artificial soil**; dibble no hole, but gently thrust each piping half way down into the soft earth round each, to fix it in the bed. Water them often, if the weather be dry, but

* See Chapter on *Artificial soil.*

moderately, just to keep them moist. If pipings, slips, or cuttings are covered with a chatty, which must not be stirred for some days, it being found that a deficiency both of light and air promotes the striking of pipings, &c.,—probably on the principle, that the sick, having no appetite, must avoid the exertion which requires food as well as that which food requires—they root earlier by three weeks than those which are exposed. Laying, piping, slipping, cutting, and bud-grafting are done from November to February in the plains, and May, June, and July in the hills. The plants will be well rooted, and fit to plant out in August, or September. Slips are shoots wrenched off at a joint instead of being cut, and are treated precisely in the same manner as pipings.

Cuttings.

PROPAGATE BY CUTTINGS ROSES OF EVERY KIND.

Cuttings are strong shoots of last year's growth, cut from the parent stem or branches, and set in the ground. The cutting should be about nine inches in length, and should be taken off close to the old wood, with what gardeners term a heel, and planted two joints deep in a shady situation. If you have a quantity, they should be inserted about an inch apart. The operation should be performed from November to February in the plains, and all May in the hills, so that cuttings may root and vegetate in the opening of Spring.

Do not transplant cuttings before August, as several months are required to bring them to a state fit for transplanting. Cuttings of the hardy kinds of Roses,

such as the Hybrids of the Chinese, Bourbon, Hybrid, Perpetual, &c , may be struck in the open ground.

Layers.

Roses grown as dwarfs or bushes, are the kinds most generally layered. The soil about the plant should first be loosened ; then, selecting a good shoot, strip off a few leaves at a distance varying from six inches to two feet from the point of the shoot, then, taking the shoot in the left hand, insert a sharp knife just behind an eye on the upper side of the shoot, and pass it evenly and carefully upwards cutting about half way through the shoot, and for an inch and a half or two inches in length. Bend down the shoot so that you may see the proper place to bury it ; then open a hole, press the shoot into it, peg it down two or three inches beneath the surface, and cover with the soil. It is well to twist the shoot a little after the cut is made, so that the end of the tongue from which the roots will be emitted, may have a downward direction when in the ground. It is also a good plan to split the tongue, and keep the split open by inserting a small stone in it. Each layer should be tied to a small stick to keep it upright, and prevent its being agitated by the wind. November, December, and January are the best months for layering in the plains, and May and June in the hills, if the weather be dry the layers should be watered. About August they will be ready to be taken from the parent plants, by cutting them off within two inches from the tongue ; then transplant them to wherever they are intended to flower. From September to November they should be pruned down to three or four eyes. Many of the

commoner kinds of Roses admit of being propagated by suckers, and by dividing their roots ; the plants thus obtained may be placed at once where they are to flower. The Scotch Rose is peculiarly apt to produce suckers, pushing its shoots along under the ground, till they break through the surface at various distances from the parent stem. It is not always that these can be separated with roots attached to them, still these underground stems if carefully severed and planted out, will soon make roots. November is the best month for separating them, and a sharp-edged spade the fittest implement for the purpose.

Budding.

In the hills and plains the budding of Roses is performed with the greatest facility, and by this method the choicest kinds may be expeditiously multiplied to any extent.

The Edward Rose is generally used as a stock, on account of its vigorous growth, and the bark yielding most freely to receive the bud. This operation may be performed *in the hills in all May ; but in the plains, from* December to February are considered the best months. Budding may also be tried during the month of March.

Budding is a species of grafting, and consists in inserting the fresh-cut extremity of a small bud beneath the bark of another plant. A leaf-bud easily known by its tapering point, should be alone selected, and not a bud on which a flower is developed. The leaf on the selected bud is to be taken off, for if it remained it would exhaust the sap, and the bud would in all likelihood wither and die. Along with the bud, a small slip of bark is to be taken about

half an inch above the bud, and the same below, the technical or professional term for which is a shield. From this shield abstract the wood from the inside without injuring the bark or axis of the bud; if they separate freely, it is a test of there being pulp enough in the bark to form a union. Your next business will be to select the spot in the stock of the tree where you desire the bud to be inserted; on this part make a cross-cut, half way round, through the bark, as deep as the wood, then make a perpendicular incision from the centre of the cross-cuts, half an inch in length, so that the two cuts will resemble a cross without a head. As soon as you have accomplished this portion of the work to your satisfaction, with the handle of your budding-knife, lift the bark on either side of the upright slit, and slip in the shield. As soon as this is done, bind it up with a soft string, or hemp. Should the work have been skilfully performed, the bud will have become established in about three weeks' time, when the bandage may be untied, and tied on again somewhat looser, and remain there for three or four weeks, after which period it may be entirely removed, having answered the purpose for which it was placed there.

About four months after you may shorten the budded shoot to 5 or 6 inches from the bud; four months after you may cut it close to the bud itself. You must now keep a constant supervision over your budded stock, removing all superfluous growth, and having your stakes in position, so that you may secure the growing bud against those sudden gusts which will force it if not safely fastened, "clean out" of the stock. Those stakes must be firmly fixed close by the budded plant, and should rise some 2 feet above it.

To this upper portion the young shoot of the Rose, which grows in genial seasons with marvellous rapidity, must be secured with bast.

A pretty effect is produced by inserting buds of two shades of pink, crimson, or yellow Roses in a white Rose. The Roses produced thus all blooming on one tree, from their diversity of colour, will give and gain beauty by contrast. Thus, the bright red Duc de Rohan with a yellow Rose on his *left*, a white Rose on his *right*, and a cream-coloured Rose below him, form a pleasing sight.

Pruning.

Great diversity of opinion prevails respecting the best time for pruning Roses, the best authorities however are of opinion that they should be pruned from September to November in the plains, and in all March to middle of April, in the hills. The Hybrids of Chinese, Bourbons, and Noisette Roses should in pruning be well thinned out, and the shoots left for flowering shortened but little.

The Hybrid Perpetuals require close pruning, regulated a little by the *rate of growth*.

Mr. Paul, the celebrated Rose-grower, of the Rose Nursery, Cheshunt, in his splendid work informs us, that "a rose in vigorous condition, healthy, and full of sap, requires less pruning than when it is of moderate, or weak growth, The same degree of pruning, applied to each condition, would produce opposite results. Close pruning would be the means of improving the health and flowering of a weak tree: it would induce a strong one to form wood-shoots only,

ch flowers." A summer pruning, or rather thinning o of shoots, is very advantageous, or as soon as the plar have done flowering, when, thin out the weak unhoal shoots, and even some of the stronger ones where th appear too crowded; each shoot left should be exposed every side. Roses of vigorous growth will not flower at s if they are closely pruned.

Conclusion.

I will now bring this to a close, and trust that n endeavours to show how the choicest of exotic Roses may reared in India, will enable the lover of Roses to cultivate t' rarest with success, but it must be remembered that he wl would have beautiful Roses in his garden should have thei *in his heart*. He must love them well and always. To vin, he must woo, though drought and frost consume. He nust have not only the glowing admiration, the enthusiasm, nd the passion, but the tenderness, the thoughtfulness, the everence, the watchfulness of love. With no ophemera nprice, but devotedness ever, in storm-fraught or in sunny ays; not only the first upon a spring morning to gaze dmiringly on glowing charms, but the first, when leave all and winds are chill. To others, when its flowers hav aded, it may be worthless as a hedgerow thorn; to him, in very phase, it is precious. I am no more the Rose, it say ut cherish me, for we have dwelt together; and the glor hich has been, and the glory which shall be, never fad om *his heart*.