GARDEN·DESIGN

IN THEORY AND PRACTICE

Madeline Agar

Carry

GARDEN FANCIES

A NEW ANTHOLOGY OF THE GARDEN

Edited by MARY COXHEAD.

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IN THEORY & PRACTICE

BY MADELINE AGAR

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GARDEN DESIGN

IN THEORY AND PRACTICE

By MADELINE AGAR

*Author of 'A Primer of
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FIRST EDITION, December, 1911.
SECOND EDITION REVISED, April, 1913.

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Preface

IN writing this book I have purposely omitted everything of a purely horticultural nature, such as instructions on cultivation and lists of suitable subjects for different soils and situations. There are already numberless good works dealing with that side of garden design. Indeed, in the stress laid upon contents, form has been neglected, and since the gardener's resources have been so enormously developed by the introduction of new plants, and the improvement of old, the art of design in the garden has deteriorated. Within the last few years it has revived, thanks to a band of architects who realized the unity of house and garden, and were not content to see a carefully planned house surrounded by a haphazard arrangement of mixed vegetation.

Without going into the old controversy as to whether or not the architect should also do the garden, I would suggest that there are many men whose knowledge of horticulture is their strength, and who are perfectly capable of laying out grounds artistically, with due regard to the house and the

convenience of management, and in addition will employ their experience with plants to the great benefit of the design. Such a man would do well to co-operate with an architect where questions of buildings are involved; and similarly the architect with a faculty for garden design needs some one to assist him in the wide field of horticulture, for an architect's garden is sometimes an impossible home for plants.

In the portions relating to the practical work of surveying, levelling and plan drawing I have been guided by experience with pupils. Plan drawing alone will never give enough technique, and I recommend a severe course of geometrical drawing, which, apart from some of its problems being of actual use, affords a splendid drill in the accurate use of instruments. Perspective should also be practised for the sake of being able to express one's ideas in the solid.

Constant examination of good work is essential. When seeing a garden the student should decide whether or not its disposition is agreeable to him, and the *reason* for his opinion. There are, fortunately, plenty of fine gardens as originally planned in England, both public and private, and some of the modern work lacks only age to make it equally good. No opportunity should be lost of seeing such. Next to seeing gardens plans may advantageously be studied, and *copied* for the sake of realizing dimensions and propor-

tion ; while for landscape gardening the best school is natural scenery.

There are many good and helpful books worth careful reading—among which may be mentioned : Kemp's *How to Lay out a Garden*, Milner's *Landscape Gardening*, Blomfield's *Formal Garden in England*, Ed. André's great work *L'Art des Jardins*, Mawson's *Art and Craft of Garden Making*, and from the historical side *The History of Gardening in England* by the Hon. Alicia Amherst. The standard work on Japanese gardens is by J. Conder. Many other books might be mentioned, but the above I have found the most interesting from the design point of view, and I make my acknowledgments to the authors who have in any way assisted me in the art of Garden Design.

M. AGAR.

AMERSHAM COMMON,

BUCKS,

June, 1911.

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Section I

HISTORY & DESCRIPTION OF STYLES

"My garden sweet, enclosed with walles strong,
Embanked with benches to sytt and take my rest,
The knottes so enknotted, it cannot be exprest,
With arbours and allys so pleasant and so dulce,
The pestilent ayres with flavors, to repulse."

G. Cavendish.

"From the intimate union of art and nature, of architecture
and landscape, will be born the best gardening compositions
which Time . . . now promises to bring us."

Ed. André.

HISTORY AND DESCRIPTION OF STYLES

Progress of Garden Planning—The Various Styles in Gardening
—The Formal Style—The Landscape Style—The Mixed
Style—England—France—Holland—Germany—Italy—Japan.

THE earliest English gardens belonged to monasteries, as the monks were the only folk with sufficient leisure from war and labour to pay attention to horticulture. The monastic garden was essentially for use. It grew vegetables for food, herbs and roots for medicine, and the flower portion consisted of such things as are suitable for chapel decoration, and for weddings, and burials. Fish ponds were a feature, and have survived the destruction of the garden in many places: for example, at Bosham, the chain of fish ponds gives some idea of the charm of the old place, though they are now merely in a meadow. The old garden was invariably enclosed, generally with walls, and

square was considered the proper shape. Inside the planning was strictly geometrical : the paths were straight, the trees were evenly spaced, and a " mount " was commonly introduced whereby the monks could get a peep of the world.

After the Wars of the Roses a change came over the architecture of the country, with a corresponding effect on gardens. The manor house, lying low, took the place of the castle set on a hill, and the monks were not the only gardeners. The same features, however, were reproduced with more elaboration. For instance, the " mount " became an imposing erection from which a man might shoot deer. At Wrexhall, in Yorkshire, we are told : " In the orchards were mounts, opere topiarii writhen about with degrees like turnings of cockell shells to cum to the top without paine."

Knots of curiously entwined box edging and flowers were laid out on sanded plots. A maze or labyrinth was " a proper adournements upon pleasure to a garden." A labyrinth and its central bower is said to have been the retreat of Fair Rosamund. Pleached alleys, and " galleries " of trellis work covered with creepers (forerunner of pergolas) began to be the fashion, and topiary work was introduced.

Garden design on these lines reached its zenith in Elizabeth's reign. Hampton Court had already been laid out by Cardinal Wolsey and was destined to reflect the changing tastes of time.

But the chief requirements of a Tudor gentleman still remain. "Theobalds," laid out by Lord Burleigh, was considered very fine, and we have contemporary descriptions of it: "It is large and square, having all its walls covered with fillery and a beautiful jet d'eau in the centre. The Parterre hath many pleasant walks, many of which are planted on the sides with espaliers, and others arched over. Some of the trees are limes and elms, and at one end is a small mount called the Mount of Venus, which is placed in the midst of a labyrinth, and is upon the whole one of the most beautiful spots in the world." Hatfield was laid out early in King James' reign, and still retains many of the best characteristics of Tudor taste. The square privy garden with its formal beds and fountain, clipped yew hedge and surrounding alleys of pleached limes, is below the west terrace. The forecourt with its great gates makes a fitting entrance to such a house. The gardens on the east side of the house were added by Lord Cecil, and are a succession of terraces: first an elaborate parterre, then the indispensable bowling green, and on a lower level still the maze.

An interesting and characteristic detail of this period is the painted railing that was set round flower beds, and among the accounts for Hampton Court there are entries for the painting of such rails "with white and greene in oyle."

The planning of the Tudor garden was the

work of the architect, and from Bacon's essay on gardens we may infer that the garden was usually less successful than the house. Definite principles were followed. Leading directly to the chief entrances were broad straight paths known as "forthrights," and crossing these at right angles were lesser paths, the compartments so formed being laid out in knots and parterres, fountains and other devices. From Bacon's essay again we can tell what these devices were, and evidently in his time over-elaboration was already a fault. French influence was beginning to be felt, and manifested in freaks of water works, and in the reign of Charles I most new grounds were modelled on French lines.

The architect's work in the Tudor garden was apparent in the good walls, and in garden houses, which in Stuart times were further developed by Inigo Jones, and beautiful little Banqueting Houses, and Fishing Lodges are characteristic of this period. Carney's Seat, near Chichester, is a typical example, although not belonging to a garden. It is a perfect little building placed to command the finest view from the Downs. After the Restoration Charles II gave a further impetus to the French style. Le Nôtre was then at the top of his power, designing gardens on magnificent formal lines—radiating avenues, closely trimmed trees, and broad tracts of water playing prominent parts. His details included complicated parterres,

statues, fountains and "temples." The radiating avenues and the long canal at Hampton Court date from this period.

It is well known that imitators of great men are more successful in picking up their mannerisms than their methods, and the followers of Le Nôtre brought the grand style into disrepute by the overloading of details, and the extent of their avenues. The Dutch style came in with William and Mary, and topiary work, already practised, became the vogue. Stiff parterres, and orange houses, with the orange trees in tubs outside during the summer, were in every garden of fashion. The drawing on page 9 is taken from an old tapestry, and depicts what must have been considered an elegant arrangement. One of the most charming developments of Queen Anne's time in topiary work was the long alley bordered by trees, generally yew, kept clipped up to about 10 ft. and then allowed to feather naturally. During this reign the revolt began towards "nature"

There was ample material for ridicule in the prevalent style of garden design, and Pope and Addison were not slow to exercise their wit on it. Stow, in Buckinghamshire, was considered to have reached the climax of beauty, and one has only to read accounts of its Temples, Caves, Hermitages, etc., etc., to realize that taste had become corrupt. Bridgeman began it and Kent continued it. A contemporary writer describes it thus: "The

A QUEEN ANNE GARDEN (from a tapestry).

gardens, by reason of the good contrivance of its walks, seem to be three times as large as they are." Loudon, writing in 1826, some seventy years after its laying out says : " When beheld at a distance, this place appears like a vast grove, interspersed with columns, obelisks and towers, which apparently emerge from a luxuriant mass of foliage," and it is " the chief ornament of the county." Stow was thought to be Kent's finest work. He and his follower Brown were all the rage for several years, and looked at now Brown's work has nothing to recommend it. But the landscape garden was the fashion, and owners of old formal gardens were only too anxious to have them modernized, substituting clumps for hedges, sunk fences for walls, and naturalistic ponds for the old canals and basins.

The general revulsion from formality was assisted by the publishing of Sir William Chambers' book on Chinese gardening in 1772, and pagodas and Chinese bridges were added to the confusion. The plan for a garden in the Anglo-Chinese style (page 10) shows to what atrocities bad taste had come. It is by a French designer at the end of the eighteenth century. As the French had carried Le Nôtre's principles to excess so they eagerly embraced the " Jardin Anglais," and the drawing displays the aimless paths and incoherent planting of Brown's feeblest followers. An amusing skit on the taste of the period in landscape

TO THE
MEMBERS OF THE

HISTORY & DESCRIPTION OF STYLES II

gardening is in "Melincourt" by Peacock—see Appendix B.

Throughout the nineteenth century the feeling for garden design has steadily improved, and the unity of house and garden is a recognized principle. About the middle of the century Penshurst garden was laid out, and is an encouraging sign that the art of garden making still exists in England. Its appearance would lead any one to suppose that it was a survival from the old days of formal gardens. The look of maturity is more easily obtained than is generally supposed, for one of the chief characteristics of the old work is the perfection of the details, which taxes a modern designer to produce at one effort. The coloured drawing on page 74 shows the water garden in Kensington Gardens, which was only four years old at the time of painting. The surrounding pleached alley looks quite substantial when covered with foliage, but in the winter its youth is betrayed.

THE FORMAL STYLE

THE parts of a garden near a house, in separate closed in compartments, on or near a terrace, are suited for formal treatment. Houses are frequently built with a portion set back, but with the terrace line unbroken, and the extra breadth thus given to part of the terrace makes an ideal position for formal beds. Terraces over 20 ft,

in width lend themselves to a geometrical arrangement of a string of beds. A few suggestions are given in Diagrams 1, 2, 3. The design can be accentuated by introducing permanent plants

DIAGRAM 1.

DIAGRAM 2.

DIAGRAM 3.

such as yuccas and clipped yews. Such formal series also look well bordering wide paths ; and in conjunction with clipped shrubs, vases and other ornaments, an endless variety of pattern is possible ; the simpler ones being as a rule most effective.

HISTORY & DESCRIPTION OF STYLES 13

The flatness of a series of beds can be broken by raising some by enclosures in low stone or brick walls. The walls should be about 2 ft. high, and may be hidden by trailing plants from the inside ; or if sufficiently ornamental in themselves they can remain exposed. If brick and stone are too expensive split oak posts may be used, driven into the ground and bound by wire or hoop-iron after the fashion of a tub. The commonly seen string of beds (Diagram 4) may be broken by raising the

DIAGRAM 4.

circles with excellent effect. Where a single round bed is wanted over 10 ft. in diameter (a clumsy size for flat planting) it may be raised in two or more tiers. But variety should be introduced with caution, as it destroys the repose and sense of space given by repetition.

Very large spaces treated formally tend to become tedious and overpowering, but few will deny the charm of small plots so treated. The spacious designs of flower beds on grass or gravel, edged with box, are seldom made now, though as the old ones are always admired there must be a difficulty somewhere. The trouble of upkeep perhaps is the reason. They demand constant routine attention, and if allowed to become at all untidy they lose their chief claim to admiration

DESIGN FOR BEDDING SHOB DON COURT.

HISTORY & DESCRIPTION OF STYLES 15

On wide grassy lawns below a broad terrace nothing looks finer than a brilliant parterre. The design at Shobdon Court, on page 14, is laid out below the south-west terrace, and sets off the building, and by contrast increases the charm of the garden beyond. Note how coherent the design is, working round two main points. The open circle of grass at one end gives lightness to the rather large beds that surround it. The box edging gives strength to the outline, and in places serves to bind parts together. The same house has another set piece of flower beds, in quite another style, on the lawn below the south-east front.

There is hardly any garden large or small that has not place for this type of design, which *when suitable* gives pleasure by reason of its daintiness and avowed artificiality. It may be compared to a Dresden china figure which is not so intrinsically artistic as a Greek statue, but is still a source of pleasure. The size of the design is determined by that of the house and the ground. The smaller designs consort well with the terrace, the forecourt, the rose garden or other special departments. In making these designs care must be taken that they are not spotty. An abundance of small beds produces this effect. Diagram 5 shows a set of beds on a lawn, made about the year 1850. It is too scattered, and there are awkward corners in the beds, and very short plants would be needed to

keep the pattern. On the other hand, beds must not be too large, or they will be difficult to fill and keep; 8 ft. is wide enough.

The ordinary rules of design apply to their con-

DIAGRAM 5.

struction. There must be a definite centre, or backbone, to the whole. This is often accentuated by architectural ornaments, such as a statue, sundial or vase, or a chain of tubs with topiary work. The groundwork must be considered as

HISTORY & DESCRIPTION OF STYLES 17

well as the form of the beds. By treating the groundwork, grass or gravel, as the case may be, as paths of uniform width running between the flower beds a coherent effect is certain to be obtained. The parterre designs with the initial letters of these chapters are worked out on these lines.

Rectangular corners are easier to keep than acute angled ones, and also easier for the planting. If the space calls for diagonal lines resulting in thin corners, the latter should be cut off. The same applies to a combination of curves and straight lines : they should be adjusted so as to cut off at least 1 ft. from where the angle would be. This enables plants to be brought to the limit of the soil without overhanging the surrounding grass.

The utmost precision in laying out and upkeep is essential to the beauty of formal gardening. To begin with, the ground must be level, or at least a uniform gradient. On undulating ground a design appears distorted. It is avowedly an artificial style, and Nature must not be allowed to have the upper hand. Some people have the greatest objection to what they term the "barbarous" custom of clipping yews and other shrubs, though they see no harm in cutting grass or hedgerows. This is not the place to argue one way or another, but I would point out to garden designers that there are many trees growing naturally in stiff shapes ; and standards can

be advantageously used in place of clipped shrubs. A combination of the standard form and clipping gives the finest effects. Any one who has seen a design picked out by standard Portugal laurels, 10 ft. high, stems nearly a foot through, and with clipped heads 8 ft. across, will not readily condemn trained trees. For small gardens standard golden privets are particularly charming. Though trained trees are eminently the right thing among geometrically laid walks, too much insistence cannot be laid on the fact that such planning does not *exclude* natural planting. The mixed herbaceous bed is more often than not bordered by a straight walk, and yet the plants are not arranged in rows. The charm of the mixed herbaceous border, so often seen running through the centre of a kitchen garden, is largely due to the contrast between its luxuriant masses, and the neat straight paths, the trained espalier fruit, and the orderly ranks of vegetables. The drawing on page 247 is of a formal garden where the planting is in mixed masses.

There is no doubt that planting of the bedding-out type accentuates a design by leaving the eye undistracted by varied colours and heights. But the design may not be of paramount importance and, indeed, where it was, coloured earths and stones were employed instead of plants. Herbaceous stuff may be fitly used in the stiffest design,

HISTORY & DESCRIPTION OF STYLES 19

but if a stately character is required it is better not to combine more than two varieties in the same bed. At Dropmore may be seen a long stretch of formal beds definitely arranged with a scheme of green porcelain Chinese lanterns, and beds of irises, paeonies and other herbaceous plants form the mass of the planting—each sort being kept to itself. The differing habits of the plants act (in a weaker degree) like the colours of bedding out to pick out the design, whereas if all the beds are filled alike, or all mixed, the eye has no assistance in grasping the whole plan. The colour-drawing (page 122) of the formal garden at West Hall, Byfleet, is an admirable example of the value of bedding, and of clipped yew for background.

Water in pools and fountains consorts well with a formal design. A level ground is required for an architecturally treated garden, and this suggests its fitness for water. The shapes of pools may vary indefinitely, but they should be consistent with the rest of the design, and form part of it. The string of beds recommended for terraces may be diversified by a string of water pools. In conjunction with the water the low parapet round the pool may be planned to take tubs of bright flowers whose reflections will add greatly to the brightness of the whole. Fountains may also be introduced, but unless on such a scale as to be striking in volume and sound it is doubtful

whether they are as pleasant to live with as a clear calm surface with its reflections of sky and flowers.

The formal garden was designed at its best in the Elizabethan time, simultaneously with the fine domestic architecture of the period. The garden was then a setting to the house, and planned by the same hand. To see the principle developed on a large scale one must turn to the French garden designers of the seventeenth century, and their imitators. In their work, long after the house had ceased to be visible or exert any control on the direction of paths, the ground was cut up into sections, each of which was laid out with as much wealth of detail as though it were in the immediate view of the most important windows. A classic temple generally gave an attempt at accounting for such elaboration. The gardens of Versailles are typical of the elaborate formal garden, and being the work of Le Nôtre are a fine example of the style. On flat ground belonging to a grandiose building, where much people live, or are entertained, this extensive scale has its advantages, but otherwise the best method seems to be to keep the garden lines under control of the architecture of the house while the latter is the dominant feature, and on the outskirts to blend with the natural beauties of the place.

The plan of a garden laid out at Beaconsfield by

PLAN OF GARDEN FOR
HOUSE AT BEACONSFIELD.

the writer, gives an example of an awkward shape treated formally. The increasing breadth gave opportunity for a rose garden which adds to the vista across the kitchen garden. The curved line at the end of the tennis courts is to add to the length as seen from the house. It is outlined in treillage work, and posts and chains.

Among the intricate devices often found in a formal garden are labyrinths or mazes. They appear first in the thirteenth century, and became more and more elaborate until their extravagance caused their doom. Theobald's Park, Cheshunt, had a noted one culminating in a "Mount of Venus." A very intricate example was at Versailles, where fountains and bronze figures illustrating Æsop's fables were stationed at the turns. This unfortunately was destroyed when the craze for "English Style" came in, and its place is now occupied by "Le Bosquet du Roi." The one at Hampton Court still remains to delight visitors, and Manningtree, Belton House and Hatfield also have good specimens.

A maze depends entirely on good hedges for its success, and it is probably a lack of patience that prevents their being planted now, as the old ones are always popular features in the garden. The position should be open and well drained without being dry, those being the best conditions for hedges. A good design is necessary, and one diversified by open glades and flower beds would

DESIGN FOR MAZE.

be more interesting than one composed entirely of hedge, as at Hampton Court. The drawing on page 23 gives a suggestion for such a maze. It occupies a little over an acre of land, and gives far more walking space than any other device. The incidental gardens might each be devoted to one special plant.

Seven ft. should be allowed for each track, two ft. for the hedge and five for the path. Yew makes the best hedge, being opaque at all seasons, but beech, hornbeam and privet will also serve, and are quicker growing. If holly or thuja are planted—the latter being soon effective—8 ft. of space must be given, as the hedge will occupy 3 ft. Instead of hedges treillage might be used, which would be a screen at once, with the corresponding disadvantage of not being permanent.

THE LANDSCAPE STYLE

THE attempt to imitate natural effects in gardening has been greatly jeered at by admirers of formal design, but there are circumstances when the latter is out of place, and where a natural style gives the happiest result. The splendid landscape gardens created by such men as Kent and Repton caused a multitude of imitators to spring up, who attempted the same methods in cramped spaces, and villa gardens, producing laughable pretentious muddles. At an earlier date slavish copies of Le

HISTORY & DESCRIPTION OF STYLES 25

Nôtre's style produced gardens which Pope derided in his famous couplet—

“Grove nods at grove, each alley has his brother,
And half the platform just reflects the other.”

Later, when the landscape school had become extravagant, Knight wrote—

“And scattered clumps, that nod at one another,
Each stiffly waving to its formal brother.”

In both cases it was not that the art was bad, but that the exponents were incompetent. Of the two styles—formal and landscape—the natural is undoubtedly the most difficult to handle and the easiest to criticize. Plans of a landscape garden, to begin with, look meaningless. The curved paths may give pleasant lines, but without the undulations the real effect cannot possibly be judged. In the same way the clumps of shrubs look lumpish in plan, but their planting may be very beautiful. A formal plan has more obvious cohesion about it. The strong straight lines link up the whole, and indeed, want of cohesion is one of the gravest criticisms made on the landscape style. Not that it is an unrecognized virtue for Mr. Edouard André writes :—“The first law of a painting and of a picture on the soil is to be a whole. . . . Without principles and without discernment one never attains true beauty.” But whereas cohesion is an almost unavoidable quality

in formal work, in an attempt to follow natural lines a special effort has to be made to secure it.

The advantages of a landscape garden are these : it is easily developed from undulating ground and is less expensive than a style where levels and terraces are required : it affords a greater variety for the same space : and it may give the effect of extent if such is required. Its characteristic features are those of nature—curves abundant, straight lines few, and one part blending easily into another, unless rock scenery is attempted, when boldness is the character aimed at. In the arrangement of a park the landscape gardener has the fullest play for his powers of creating the picturesque, for he is there free from the necessity of providing anything so sophisticated as dry gravel walks, and can model the ground and group the timber with a free hand.

The natural style requires curved lines, and the management of a curved path is a frequent stumbling block, a "curly" path being too often the result. A path should take the easiest, if not the most direct way, and a reason for deviation from an obvious straight line must be introduced, if not already existing. Only one curve must be visible at a time, or a short cut will quickly be set up. A block of shrubs, or better still, a planted mound make good points to turn a curve, for obstacles, or inequalities in the ground are the natural reasons for not walking straight ahead.

HISTORY & DESCRIPTION OF STYLES 27

The modelling of mounds needs considerable skill, particularly where they tail off into the level. The junction must be imperceptible, and should run in a concave curve before the join is complete—thus giving a feeling of elasticity. Contrast this with the modelling of terrace banks where a rigid appearance is required. The concave line makes all the difference between hard artificiality and natural undulation. The contours also require care, not to produce the impression of a lump. Such a shape as in Diagram 6 will serve as an

DIAGRAM 6.

example. The part A being the thickest is also the highest. B is thinner and must also be lower, while at C it may rise again. The silhouette of such a mound is also shown along its major axis (Diagram 7). The planting should be arranged to accentuate the height. Mounds rising from lawns need special manipulation to join the soil with the grass. The best effect is gained if part

of the rise above the original level is turfed, so as to give the appearance of the mound being a bare cap of soil on a natural elevation. The highest point need not necessarily be in the centre. Mounds that are thrown up for screens may have to be longer than is in pleasant proportion to their width, and variety may be obtained by making one side steeper than the other. The southern aspect should be the gentle slope, being more liable

DIAGRAM 7.

to dry up in summer, but it is even more important that the side least in view should be the steepest.

Where the ground possesses natural knolls and hollows these should be preserved, and increased when more effect is required, and it may be taken as a general rule in planting over uneven ground that the higher points be planted in preference to the hollows. Besides accentuating the form of the surface, the elevated trees give a fine silhouette against the sky.

The photograph (page 28) of a valley planted

ARTIFICIAL PLANTING IN A VALLEY.

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by Ed. André is worth examination. The groups running into the hollow show off the lines of the ground, and the path to the left is well managed.

The natural style forbids any straight line planting, and the effect of repetition must be studiously avoided. Single specimens should be provided as well as groups. Certain trees seem by nature gregarious, e.g. silver birches, Scotch firs, spruce; whereas others appear to require solitude, e.g. oak, horse-chestnut, sycamore, cedar. In selecting material this character must be taken into account along with the kind of soil. It is folly to attempt trees in uncongenial conditions, for though it may be possible to start them in suitable soil, it is impossible to provide enough for their full growth, and it is disappointing to see a tree sicken and die just as it begins to be of importance. A little inspection of the trees prevalent in the district will prevent mistakes of this kind.

Any number of trees may be taken to form a group, and even numbers may be as "naturally" set as odd. The triangle and square, and other figures suggested by the numbers must be avoided. There is no need to allow sufficient space for each tree to develop perfectly, as this is not characteristic of a group, but they must not be stinted by too little space. Trees of the same species do not injure each other by contact, and the way they lean outwards to obtain more room is one of the beauties of a group. (Diagrams 8, 9.) While

DIAGRAM 8.

small, at least three times as many trees should be planted as will be ultimately required, for the shelter of company is good and natural for young things, and promotes an erect growth. Mixed

DIAGRAM 9.

groups are difficult to manage. Two sorts together are sufficient, and these should be planted, not alternate, but blocked and merged together at one part only of the group. (See Diagram 10.) Contrasts make the most satisfactory mixture, and in-

deed, unless the two trees are intended to show up each other's characters there does not seem any object in bringing them together. Birch and Austrian pine or larch, beech and wild cherry make effective contrasts of foliage and habit.

Water may advantageously be introduced into a landscape garden *where it could naturally exist.*

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Probably more mistakes are made with artificial ponds than with any other feature. The following conditions are not suitable. Chalk countries where the characteristics of the land indicate that ponds and streams must be sought underground, if anywhere ; sites where a natural piece of water is visible at a lower level. In the latter case an

DIAGRAM 10.

artificial stream in the direction of the water would be permissible.

The best possible situation for a sheet of water is where nature has made a beginning either with pond, stream, or marsh. By excavating and broadening the banks of the first, its area may be increased, and by forming a basin and throwing a dam across the lower end of a stream it will become a pool. Where water has to be brought as well

as a hollow made, the lowest part of the ground should always be chosen, and if the surrounding country shows a further downward inclination a mound must be thrown up between this view and the water.

Artificial ponds should be simple in outline. Small irregularities soon drop away. Pear shaped hollows look well, especially if slightly bent one

DIAGRAM II.

way. The inlet for the water would be at the narrow end. (See Diagram II.) The banks need careful modelling, and the same observation applies to them as to mounds rising from the ground. When the piece of water is large enough to admit of a promontory being thrown forward, this should be made up slightly higher than the surrounding banks, for promontories exist by virtue of their

PLAN OF A MODERN ESTATE [French].

greater resistance to the forces of the weather, and their strength shows in their bulk. The banks should not be uniformly steep, but have an undulating contour, and at one point they should slip down to water level. The planting round water follows the same general rules as for planting undulating land. The gleam of water is a great asset to a landscape, and vistas must be arranged whereby this may be seen. The characteristics of water-loving plants are distinct, and the opportunity of introducing them adds to the designer's resources. In landscape gardening planting is of far greater importance than in the formal style, and any feature that gives scope for planting is of value. Thus rock gardens may with advantage be brought into the general scheme, provided that there is room, and suitable conditions. It is partly the tendency to overload a space with different objects of interest that often makes the landscape garden ridiculous. The general observations on planting should be read in connexion with this section.

The plan on page 33 is a good example of a place treated in the landscape style, beyond the immediate neighbourhood of the house. Note the groups of trees masking the junctions of the curved roads, and the scattered groups of trees and shrubs, small near the house, bolder in the outskirts. The curves are all of the simplest type. Two entrances are shown, both excellent examples of straightforward convenience. A

THE MIXED STYLE (by M. Vacherot).

double avenue comes from a third direction, opening into a circle from which roads lead in four directions, while to make a sixth opening to balance the exits, a recess is made in the shrubbery. The design here begins to be more formal, and lines are straight. The management of the connexions between geometrical shapes and informal curves is worth studying. The straight openings through the wood are for reasons of sport.

THE MIXED STYLE

A STYLE midway between the formal and landscape is thought a good deal of in France, and known as the "mixed style." The plan on page 35 gives a good example of this on rather a large scale. It is the work of M. Vacherot, and was designed for part of the grounds at the Brussels Exhibition of 1910. Steps and levels, water basins and elaborate bedding out patterns are combined with grass plots of uncertain shape, planted with clumps of shrubs, and single specimens. The repose that an elaborate design expects to gain from its open grass space is thus lost, and except that the gardener has more scope for plant cultivation there does not seem sufficient compensation.

Garden Design in Various Countries

I. ENGLAND

ENGLAND cannot be said to have a national style of gardening unless one adopts the charming mixture of vegetables and flowers on either side of the little flagged path that leads to cottage homes all over the country. The love of gardening is distinctly a national trait, which long freedom from internal warfare has given opportunity to develop. Country people have manifested it from time immemorial. Alongside the path, for use and not for grandeur, runs a narrow band of brilliant flowers interspersed with roses and lilac bushes and anything else that the owner fancies, and behind come vegetables in their rich tones of green and bronze. The mass of colour and luxuriant growth make a lovely picture, but the beauty is in its colouring, and the grouping is mostly nature's own.

Turning to the wealthy classes who deliberately lay out gardens for pleasure, the question of style becomes a question of period. There is no more a national type than there is an English costume, beyond a uniform delight in luxuriant masses of flower which is engrafted on to any type—Italian or Japanese—whatever may be the prevailing fashion, often to the type's confusion. The description—"a real old-fashioned English gar-

den" is equally applied to one of the Elizabethan period, or to one modelled from the Dutch. *Le Jardin Anglais* as known on the Continent is not a style that one would care to have received as representative of the national taste. It was certainly evolved in England and practised by Kent and Brown, but of all styles seen in England surely this is the least artistic and most easily abused.

2. FRANCE

THE French have borrowed so much from other countries, and been so often affected by fashion that they can hardly be said to have a national style in garden design, unless the period of Louis XIV may be held to be more characteristic than any other. Le Nôtre was the giant of the seventeenth century, and his grand achievement, the garden of Versailles, set the fashion, until the English style displaced it, and at the present day the *jardin anglais* is the chosen type for parks and villas. Curved paths in circles and egg shapes are interlaced through shrubberies and lawns. This was a natural reaction from the absurd extravagances that Le Nôtre's followers introduced. He had used the geometrical style for miles around the house, and worked up each section with every device of his ingenuity. His followers planted miles of avenues travelling up hill and down dale,

and so far from their origin that one might find an avenue and no hint of any house with it. Moreover the architectural details were overdone. The best legacy the grandiose French period has left us is good treillage work. It was understood and used to perfection in the eighteenth century, and though its elaboration and subsequent debasement followed, we still look to France for the finest examples.

3. HOLLAND

HOLLAND being a flat country, the Dutch developed the sunk garden by way of obtaining variety. Climate and soil are favourable for turf, and grass is the dominant feature. The abundant water of the country is brought into the general scheme as an oblong pool or canal. The drawing on page 40 shows a modern Dutch garden. The typical Dutch design is purely geometrical and mostly rectangular. The national characteristics of industry, and love of detail and order, are reflected in their gardens by an extravagant development of topiary work. Clipped hedges, standards in pots and elaborate shaped bushes are used abundantly. The patience and skill required to produce these has built up a large export trade in shaped box and yew for the nurserymen. "American" plants thrive in the soil, and all kinds of rhododendrons and azaleas are cultivated,

A · SUNK · GARDEN · BELOW · TERRACES ·

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The Dutch ideal of a flower may be seen in the development of the Dutch bulb industry—the hyacinth and tulip, particularly of the florist type—being most admired. Flowers are used in masses in the gardens—the mixed herbaceous border being a foreign fashion. Trees are mostly planted in avenues or long single lines, and sheared if they become unduly free in their growth.

4. GERMANY

So far, Germany has no particular national manner of laying out gardens. The troubled history of the country partly accounts for this, and also the love of the people for excursions to woods. The desire for a private place for leisure is not so evident as with the Englishman. The German delight in scenery led to their eager acceptance of the landscape style, but of late years the formal style is making way, and small town gardens are often charmingly designed in keeping with the house. Excellent treillage work is also shown of a kind that has a character of its own, distinct from French models. The bedding out system of growing flowers is much admired and introduced into otherwise naturally laid-out grounds.

5. ITALY

THE Italian style has been developed from the natural character of the country. Owing to the unhealthiness of the low lying parts, and also for

defensive reasons the nobles built usually on the hill slopes, and terraces are a leading feature. Marble is abundant, and the art of sculpture well developed, and the result may be seen in the extensive use of sculptured figures, stone water basins and vases. The necessity for shade, and the prevalence of vines and the common method of cultivating them over frames has led to the development of the *pergola*, which has been so largely copied by other countries, for climbers of every description. Summer-heat makes water a grateful feature, and water works of every form, pools, fountains and cascades are found.

Arbutus, ilex, and myrtle are native, and the contrasting beauty of deep evergreen foliage with the white marble is taken full advantage of in planting. Stone and cluster pines, and cypress are also valued, the latter making an effective foil to architectural work. Clipped hedges are common. Flowers are introduced in formal beds. The constant need for watering makes it convenient to concentrate the flower beds, and moreover the architectural character of the design requires formality.

6. JAPAN

THE only people who have carried the art of landscape gardening to its logical conclusion are the Japanese. They deliberately produce miniature landscapes, and as flower beds and mown lawns

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for games have no part in their schemes, it is really possible for them to imitate nature. And not only does a Japanese garden reproduce scenery, but it also presents a definite poetical conception suited to its owner by means of a code of symbols expressed in rock and tree arrangements.

Contrasts of form and line are of the first importance, colour being quite secondary. A twisted pine and a weeping willow are considered a beautiful combination, and architectural features, such as granite lanterns, will be half veiled by the branches of a tree. (Diagram 12.) The colour in azaleas and maples is appreciated, but the bushes are clipped if necessary to the design in spite of the damage to bloom. If chrysanthemums and paeonies are required they are grouped in specially prepared beds near the women's quarters.

DIAGRAM 12.

Form being all important, such trees as conifers are in most request, and those bent by age or craft are valued. The training of trees into fantastic shapes is an important business with the nursery gardeners. Pruning and watchful clipping produce the effects of deformed old age, and the landscape gardener employs these, propped up by bamboo poles, to add to the delusion at picturesque points in his design. Flowering trees,

cherries, plums and magnolias are used, and from a Japanese nursery catalogue one can judge how great the demand must be. Maples also are grown in great variety, and their gorgeous autumn colouring is considered fully equal to flower beauty, and they have the additional advantage of being readily trained and dwarfed. Dwarfing is a high art, and as the gardens are true to scale it is imperative that the natural growth of many trees should be restrained. Designs of different clipped shapes, such as junks and little bridges, corresponding to our usage with box and yew, are sometimes made, but the simulation of natural old age is more often aimed at.

Five styles are recognized, of which the "Hill Garden" is the most important, and several subdivisions exist. Then there are the "Flat Garden"; the "Tea Garden" (planned in reference to the mysteries of Tea Ceremonial); the "Passage Garden" (a style suited to narrow town courts); and the "Fancy Garden," such as a Cherry Tree garden. Whatever the style, water plays an important part, and the preparation of a water basin is the first action in the making of a garden. 7 The flow of the water is under rule as well as every other part. The inlet should be from the east, the main current southerly, and the outlet to the west. For the water to travel the other way is regarded as unpropitious. Both inlet and outlet should be conspicuous.

THE GARDEN OF A MARQUIS (from a Japanese print).

Miniature cascades and islands, stepping stones and bridges all have their part in the picture. The stepping stones are the prettiest part of the design, and the greatest care is taken in placing them so as to give a beautiful line over the water. Their disposition may be compared to the English landscape gardener's method of laying out paths; while the islands are grouped as he would set out shrubbery and flower beds on his lawns, with the same regard to perspective and general effect. Little bridges connect islands with the mainland, or span arms of the lake. In their construction may be seen the artistic superiority of the Japanese gardener when imitating natural scenery. A wooden bridge cannot possibly be a product of nature, and the Japanese does not attempt to make it so by any laboured "rustic" work, but puts human skill into it. Bridges of stone slabs are also used, and then the natural untooled slabs are simply laid on rocks in the water. (See Diagram 13.) The wooden bridges are charming structures, not always there for the obvious purpose of crossing the water, but for the aesthetic purpose of contemplating the scenery, or to better observe the lotus flowers and the gold fish below. They are accordingly not very practical from a western point of view. They may arch to a perfect semi-circle, thus affording an extensive view of the garden from a height, while the reflection, an important consideration, completes a circle.

DIAGRAM 13.

Compare the calculated art of this with a “rustic” bridge of uncouth varnished oak branches! Where a crossing only is required, a plain stone or wooden structure is made. The various forms of bridge are all classified according to their use, and the position they occupy in the general design.

If water is not available, the Japanese is not to be balked of his islands, stepping stones, and bridges, but he constructs a dried-up water course, and has compensation for loss of reflections in additional opportunities for stone placing. The margins are as carefully edged with beautiful rocks as though the banks needed protection against wash.

Stepping stone paths are made to traverse the garden. They are placed with the utmost care to ensure comfort in walking and naturalness in effect. Here, again, their disposition follows

certain recognized rules. Where paths diverge, a specially selected stone is placed at the junction.

DIAGRAM 14.

Sometimes a smaller is placed on a larger, and is known as a "pedestal stone." (Diagram 14.) Somewhere in the garden will be an important one—the "guest receiving stone." The stepping stones are mostly natural flat slabs laid

within 4 in. of each other for convenience of cleaning, but where a person may be desirous to pause and look about, hewn granite slabs are used, known as "label stones." (See Diagram 15.)

Gravel paths are seldom made. Open spaces may be strewn with silver

DIAGRAM 15.

sand raked into elaborate patterns.

Apart from the more obvious usefulness of stones they are set all over the garden, and are of primary importance, their size setting the scale for all ornaments and accessories, and even for the trees. They must, therefore, bear reference to the size of the garden itself, which may vary from 50 sq. yds. to several acres. Those of peculiar shape are sought after, and the extravagance in this direction grew to such an extent that an edict was issued in the middle of the nineteenth century, limiting the price that might be paid. Gardens are famous for rocks, as ours are for special plants. Five principal shapes are recognized, and in groups

of two, three or five in conjunction, with trees, shrubs and ornaments, they occur in various parts of the landscape. The individuals and the groups receive names descriptive of their functions and characters, which are as legible to a Japanese as his language of floral decoration.

The chief garden ornament is the stone lantern. It is not for illumination, but to form an agreeable contrast with the natural features. It is commonly set on an island, at the base of a hill, on the banks of a lake or other water, and accompanied by stones and dwarfed trees. The appearance of age sets the value of a lantern.

An indispensable feature of every Japanese garden is the house for Tea Ceremonial, which is often the *raison d'être* of the garden. A tea house is no piece of rustic work, but a complete artistic creation. Its extreme importance may be imagined when it is realized that the professors of Tea Ceremonial were the first landscape gardeners. The disposition of stones round the tea house have all a direct bearing on the ceremonies, and are of course recognized by the Japanese at once.

After this brief survey of the Japanese art of garden design it is interesting to note that the style appears likely to become a vogue in England, and take its place among garden types along with the Dutch and Italian styles. But it can never be really developed because of the utter inability of the western mind to enter, or wish to enter into

the symbolism expressed in a Japanese landscape design. A Japanese garden in England can never mean more than a dainty arrangement of water and stones, planted with Japanese plants and ornamented with Japanese lanterns and architecture. We could not produce anything intelligible to a Japanese, and only lay ourselves open to criticism similar to that politely offered by a Japanese when shown a garden of this nature in England. He innocently thought to praise it by saying he had never seen anything like it in his own country.

At the Japan-British Exhibition of 1910, in London, two of the most famous landscape gardeners were sent over to construct specimens of their art. The general opinion was that the results were disappointing, most people thinking they had disposed of them by saying there were no flowers to speak of. The fact is, that unless one knows what is aimed at, criticism is futile. Colour is not the *first* consideration in a Japanese garden, and it is a pity for the sake of design that it so dominates the western taste. If we cared more for form our gardens would lose less of their interest when summer is over. At present we rely so much on colour that when the garden is bare its beauty is almost gone, whereas a good design is pleasant whether in colours or monochrome. In how many English gardens is a fall of snow valued for the charm it brings? Yet a Japanese garden is laid out with expectation of

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such seasonal effects. As an instance of the regard to distorted old age and effects may be given the famous pine of Karasaki which spreads over a vast area, its boughs being propped in all directions. Many pilgrimages are made to admire this, and a native guide book writes "The place is one of the eight fine views of Omi, and is specially noted for its fine view on a rainy night." The object and circumstances are far from an European's notion of a fine view.

"The Garden of Peace" at the Japan British Exhibition was, to a native, probably a vision of beauty correctly developed, while "The Garden of the Floating Island" recalled to him the loveliest scenery of his land idealized by artists. The perspective of the latter was apparent, and no one could fail to admire the skill shown in the diminishing size of the hill and its vegetation, with the tiny temple at its summit. However its artifice did not deceive, probably because our eyes are more accustomed to gauging distance by dimness than by size.

But while deprecating any attempts to completely imitate Japanese art we may select many features to naturalize with our own. One excellent principle, applicable to any style, is that the aspect of the garden must be first taken into account as seen from the principal rooms of the house, and secondarily from important points in the garden, such as from bridges, tea houses and import-

ant stones. Other good features are the extreme daintiness and use of small trees for small spaces (there is a plentiful range of naturally little subjects without having recourse to shears): the admiration of stones for their own sakes, and use of them in plant groups: the stepping stone paths: recognition of water value and reflections: a proper use of ornaments: and the introduction of better architecture into garden structures. Then if we admire a Japanese garden, the structures and ornaments may be Japanese, and the plants native to the same country, but all the symbolism, the very soul of the Japanese garden must be omitted, and the origin of the materials is all we have to authorize, our effort being named "Japanese."

Section II

PRELIMINARY CONSIDERATIONS

“A Man ought warily to beginne Charges, which once begun will continue: But in Matters, that returne not, he may be more Magnificent.”

Bacon, “Of Expence.”

“The charges of building and making of gardens are unknown.”
George Herbert.

PRELIMINARY CONSIDERATIONS

The Ideal Site—Co-operation with Architect—Economics.

THE IDEAL SITE

THE garden designer seldom has the good fortune to select the position of his work, but it may be profitable to consider the circumstances of an ideal site, which also apply to the house apart from considerations of a residential nature.

The ground should have a general trend to the south-west, with a view of plains and distant hills. A certain amount of timber should exist so that some selection is possible when planning the garden. Woods to the north and north-east boundaries will afford shelter from cold winds. The ideal soil is loam of medium strength, and if the place has been pasture land so much the better ; and it should be naturally drained by a subsoil of gravel or chalk. The high road would pass along the northern boundary of this favoured spot, by

which circumstance the house could have its living rooms looking into the garden, and in full sunshine, without straining the entrance. The shape of the property would be roughly oblong, its greater length being from north to south, and the side on the high road would, if anything, be

DIAGRAM 16.

shorter than the further one. A garden that grows wider as it recedes from the house and road can be made more secluded than a narrowing plot. A boundary of straight lines is an economical advantage. Irregular boundaries add greatly to the cost of fencing, and the corners and odd pieces

that might be considered to add to the interest of the design can be equally well contrived within straight fence lines. (Diagram 16.)

An ideal town site includes situation on the west or south-west of the town, in order to be as free as possible from smoke. Also freedom from one's neighbours' windows has to be considered. The movement towards definite town planning recognizes the importance of privacy, and equal rights to air and view, and houses are more wisely placed in regard to the common good. Moreover the provision of recreation grounds and open spaces makes the inclusion of lawn tennis courts in each garden plot less needed, to the enormous advantage of the design, and fine trees may be introduced without fear of their intruding on games.

CO-OPERATION WITH ARCHITECT

THE best possible arrangement is for the owner to meet the maker of his house and of his garden on the ground, and together fix the position of the house so that both it and the garden are in the best circumstances, neither being sacrificed to the other. The garden designer should have already seen the land, and have a plan in his head, and better still on paper, as to how to develop the ground with the house as he would place it. The architect's ideas will probably differ, for he will regard the appearance of his building seen from distant points, its aspect, where his principal

windows are to look out, and various points proper to his business. Consultation will generally settle most difficulties. Much trouble is worth giving at this stage when a few feet one way or another may make all the difference in the working out of an approach to the kitchen garden, the placing of green-houses, of tennis lawns, or the utilization of fine timber to the best advantage.

Among the points to be considered the kitchen garden site may be taken first. Where the garden is small this should be on the same side as the kitchen, and the house ought to be placed to give room for it. In larger places the kitchen garden is often a considerable distance from the house, and then an approach from the kitchen must be arranged which can be screened from the pleasure grounds. But a kitchen garden is too interesting a feature to be huddled away, and it ought to be taken boldly into the general scheme, and be accessible to all. Any portion of ground that may have a gentle southern slope should be incorporated into the kitchen garden site, if it can be done without detriment to the whole plan.

The formation of a terrace should be considered. This adds immensely to the appearance of both house and garden besides being a personal convenience. Not less than 10 feet should be allowed for a terrace walk, and it may be run out to a width suitable to the house and the size of the place, 30 ft. being about the limit. A broad one

foreshortens the view beyond. The architect will probably wish to incorporate plans for terrace and steps into the house plans, and the width of terrace and the position of steps is of vital importance to the garden designer, and he ought at least to have a voice in their disposition.

The levelled lawns for games depend greatly on the position of the house. It may happen that a few feet difference may cause the necessary destruction of fine trees in order to get full sized courts. Lawn tennis courts should run north and south. They must not be within 30 ft. of windows, or 10 ft. in a parallel line ; and the most level land should be chosen.

Special attention must be paid to any good trees. A fine tree worked into the general scheme, looking as though it had been planted on purpose gives an air to the newest garden. Near the house the paths largely depend on doors, and it is obviously important that the house in its relation to the trees should be considered. Many a garden design has to be strained in order to make use of fine timber, and contrariwise many a splendid tree has had to go because its shade was irreconcilable with the disposition of flower beds ; whereas extra space gained by shifting the house might have made that tree fill exactly a right position.

The prevalent idea that house and garden are separable leads to disastrous arrangements of

finance. A certain sum is put aside for the house (and generally exceeded) while the garden is left to chance, very often the owner thinking its development will be an amusing hobby. There is no reason why the garden should be laid out in its entirety at once, but a proper plan ought to be prepared simultaneously with that of the house, and portions of it thoroughly well done as time and money permit. The owner ought to name the sum he is ready to spend on his garden, and the designer can plan accordingly.

ECONOMICS

It frequently happens that the cost of the house, or other reasons, makes the immediate development of the garden impossible. A full plan ought still to be prepared. Nothing is so fatal to the final coherency of the garden as to start "just round the house" on no particular scheme. Paths laid, and more especially trees planted, are hard to displace, and one is frequently called in to continue the development of a garden which has been begun without any idea of the whole, and where the owner naturally dislikes the idea of moving trees and shrubs which are beginning to be established and make a show. From a well-planned design portions of the garden may be laid out year by year, and the satisfactory result is obtained of a coherent whole, while the waste of alterations is avoided. The undeveloped land

may be left in its natural field or woodland condition. On bare land any trees required should be planted at once, though the ground adjacent is to wait, as every year adds to the ornamental value of a tree.

In the development of a large estate occupying several years a good plan is to put down potatoes in the spring on the part that is to be undertaken in the ensuing autumn. As garden making is a continual interest, this method of doing it by degrees has much to recommend it, but unless labour is entirely provided by the permanent staff, it is more expensive in the end than putting the job through at one effort. In any case no more laying out should be undertaken than the owner is prepared to do thoroughly well. Scanty preparation of flower beds and lawns, and stinting the gravel are temporary economies from which the garden never recovers.

The cost of laying out, and of subsequent upkeep ought to be in the mind of the designer while drawing the plan ; unless, indeed, he is fortunate enough to be given a free hand. Ill-considered arrangements that involve continual outlay are particularly vexatious. Scattered parts requiring high cultivation cause much wear and tear on the tools which have to be moved about ; mowing-machines and rollers suffer considerably in this manner, and in addition there is the waste of the gardener's time. For his sake potting sheds,

glass houses, frame and rubbish yards should be close together, for one serves the other. It should be possible to introduce a cart into the kitchen garden or its precincts, for shooting manure and loam. The pitching of manure, lifting it again into barrows and wheeling it to its destination is a labour that should be provided against. Odd corners, and occasional flower beds that have to be kept neat also take up time, and their presence adds little to the garden's effect.

As regards the design, the nearer the levels conform to the natural lines of the ground the less earth-moving has to be done. It is unfortunate if the question of expense hampers the designer in what he feels will give the best result, but on the other hand a well-thought-out scheme will not ignore considerations of cost. Initial outlay in gardening, as in other operations, can be made to be a saving for ever after. The cheapest construction costs most in the upkeep. For example, a sown lawn is the least expensive way of dealing with ground, but the after labour is more than for gravel, or shrubberies. Verges take almost as much keeping as a stretch of lawn, and should be avoided if labour-saving is an object. Grass banks also are troublesome to keep nice. Their expensive substitute, retaining walls, need no attention. Steep grass slopes give a good deal of work, and slopes can be more economically kept if planted with dwarf shrubs.

Grass paths often tempt by reason of the cheapness of their formation, but they need continual work on them. The trouble of keeping grass edges in condition can be minimised by the provision of a tile edging set in cement : 6 in. quarries are excellent for the purpose. These, indeed, ought always to be used round intricate designs in grass, where the edging iron would gradually destroy the lines. An edging iron is never required where tiles are used, and shears are easily run along to take off over-hanging blades of grass. Nothing destroys the general appearance of a garden so much as shaggy grass edges, and if the labour supply is to be small, other kinds of edging should be provided. Tiles and bricks last practically for ever, but are far more expensive in the beginning than live edgings, such as grass and box.

Carpet-bedding requires more labour than any other type of flower gardening. Raising the stuff, setting it out, and overlooking it constantly gives a tremendous amount of work, with not sufficient result according to present-day ideas. Bedding-out comes next in the scale of labour ; then permanent planting in herbaceous borders, and rose garden ; and lastly shrubberies where an overhauling twice a year is ample attention. The initial expense of these varies according to the quality of the stuff planted, and as to how much of the stock is home raised and gradually introduced.

Section III

PREPARATION OF THE DESIGN

"Above all things, *Order* and *Distribution*, and *singling* out of *Parts*, is the life of *Dispatch*. . . . To choose Time, is to save Time."

Bacon, "of Despatch."

. . . . Gardens are not made
By singing "Oh how beautiful" and sitting in the shade.

Rudyard Kipling.

PREPARATION OF THE DESIGN

Surveying—Levelling—Setting out the Plan—Finishing the Plan
—Estimating—Working out the Design.

SURVEYING

It is practically impossible to lay out a garden without a properly prepared plan. Working by eye may answer for small areas where the whole can be seen at once, but even so a plan is likely to give the best results.

The skeleton of the plan consists of the boundaries ; the house marked in its exact position with its ground plan in sufficient detail to show doors and windows, and the kind of room to which they belong ; the position of all timber and natural features which are to be preserved ; and enough levels if the surface is uneven. If the house is built there will

be inspection chambers and other accessories of drainage to note. If these are not yet fixed here is a point on which architect and garden designer may well consult, for the modern systems of sanitation with their conspicuous iron inspection lids and hideous ventilating shafts work havoc in a garden scheme. With forethought the inspection chambers could be arranged so as to be set in the paths, whereas more frequently it is the other way about : the paths have to be made to accommodate the drainage.

A plan of the ground with the position of the house and the levels can frequently be had through the architect. Trees and other features will have to be marked in. Where building operations have ceased a survey generally has to be undertaken. For plots under five acres a tape measure and plenty of stakes is all the apparatus required, and this is the only form of surveying that will be described here in detail.

The measurement of areas is always done in triangles, a triangle being the simplest figure enclosing space. The size of a triangle is known by three sets of circumstances. Firstly by the length of two of its sides and the size of the angle between them ; secondly by the length of one side, and the size of the angles made by this side with the remaining two ; thirdly by the length of the three sides. (See Diagram 17.) The second method is mostly used for large sur-

DIAGRAM 17.

veys, where the measuring of straight lines is difficult or tedious. Any method involving the measurement of angles requires special instruments, and considerable after calculation, whereas it is perfectly simple to work out a triangle of which the length of the sides are known, and a tape and stakes are sufficient for its survey.

Suppose a plot of land enclosed by a fence (Diagram 18). Make a rough drawing of the ground, and mark the corners A B C D, in order to have a simple means of recording the measurements taken. Measure along A B, B C, C D and

DIAGRAM 18.

D A respectively, and record the length on the sketch plan, and then cornerwise from D to B. This makes a survey in its simplest form, being within

naturally defined and straight boundaries, and small enough to be taken at one stretch of a hundred foot tape.

To plot this to scale decide on a unit ($\frac{1}{16}$ in. to 1 ft. is convenient) and rule a line A B to represent 78 ft. Open a pair of compasses to the length of D B i.e. 96 ft., and describe part of a circle from B as centre. Alter the compasses to represent 63 ft. and from centre A draw enough of a circle to cut the former one. The intersection is the position D as it fulfills the ground measurements, being 96 ft. from B and 63 ft. from A. Repeat the process with circles from D and B to find C, and the plot of land will be truly drawn at a scale of $\frac{1}{16}$ in. to a foot.

The problem is complicated if the length of the lines to be measured exceeds the length of the tape. Alongside of a fence it is a simple matter to keep the line true when resetting, but if a diagonal such as D B has to be laid several times provision must be made for keeping the line straight from point to point. If working single-handed this can be done by setting stakes across the ground and sighting them to a true line before putting the tape across. If one has an assistant it is possible to direct him by standing at one corner and seeing that he has the line pointing directly to the opposite corner ; or he can speedily set a row of stakes with some one to direct. A small boy who can do as he is told makes an efficient assistant in

a survey, as one's chief need is to have some one at the other end of the tape. There are recognized gestures to obviate shouting orders, which are difficult to hear at a distance, or in wind. The arm is moved to the side to show in which direction the tape must lie to be straight. An upward gesture means "lift your end and follow on"; a downward gesture means "set a stake." Setting out stakes in a straight line requires a good deal of watching. The most common difficulty is that the youth with the poles sets them right at the bottom but leans them out of the perpendicular, which makes them useless for sighting. To correct this incline the head to show which way the top should go.

When the tape has to be laid several times the leader carries a definite number of pointed sticks, or iron pins, one of which he places at the end of the tape. The tape is carried forward, the back man knowing from the stick where to stop, and the process is repeated. The back man picks up the stick as he goes forward again, and at the end the number of sticks in his hand show the number of times the tape has been laid, and with a 100 ft. tape this is readily added to the odd feet of the final section. Until one has tried, it could hardly be believed how easy it is to forget the number of times the tape has been laid, particularly if there have been details to see to on the way. The tape should be wound into its case when

taken up, except when being carried forward in a straight line, and care should be taken not to start a kink in it. Letting the tape pass in between one's fingers is the best preventative of this.

The most complicated figure can be reduced to a number of triangles for surveying, and to measure them is only a question of time. Boundaries frequently are irregular, or consist of an indefinite

DIAGRAM 19.

line such as a hedge.

Let $A B C D$ (Diagram 19) represent a field whose boundaries are not directly measurable. Begin by setting poles as near the corners as possible, at $a b c d$, and measure the four lines.

A diagonal $a d$ or $b c$ must be taken. Either

will do, and the one that affords the easiest line should be chosen. Besides the diagonal one tie or proof line should be taken, or if a diagonal is difficult to manage two tie lines will serve instead, and they should always be on the same base. In the figure they both are from $b d$, and are measured at 50 ft. from the corners. The irregular boundaries are obtained by offsets from the straight tape. When it is down—say from a to b at intervals of 20 ft., or other convenient number, perpendicular measurements are taken from the

tape to the boundary. If a uniform distance be adopted it need not be noted more than once. Any feature such as a fine tree or a gate is noted as opposite the figure on the tape. Offsets should not be longer than 12 ft. By forming another triangle two more lines are laid from which offsets can be taken, and this is more accurate than using long offsets.

The following example where the actual boundaries are obtained from artificially placed points is often seen when altering an old garden. One may be asked to deal with a piece of lawn of no

DIAGRAM 20.

particular shape, and yet its exact dimensions have to be determined. Diagram 20 is an example of such a problem. Shrubberies and herbaceous borders of sinuous outline partially surround a piece of lawn, and at one end it runs out into the main tennis courts. As an open space it is mean-

ingless, and to place a design on it "by eye" would entail many attempts and failures, whereas with the exact shape on paper it is comparatively easy to make experiments. Here it is possible to carry the tape over the boundary, and in B C this has been done, which considerably shortens the offsets. The proof line was taken across the diagonal. When the line was laid from A to C at 100 ft. from A a tall stake was put, and sighting behind this and D a stake was pitched on the line B C, and its distance from B or C taken. This gave a proof without having to stretch the tape on purpose.

Surveys on cleared ground are naturally simpler than when obstacles exist, but when the beginner has grasped the principle of building up a survey by measured triangles he can use his ingenuity to get over difficulties. A rough sketch of the ground is first prepared, with the house and other features marked on it in *approximately* correct positions. It is of course impossible to get them more than relatively correct, but the better this preliminary sketch is, the easier it is to set down the measured figures and to understand them afterwards. A careful inspection of the ground should be made before deciding on the method of triangulating it. Care at this stage may save much time when the actual measuring begins, and a full scheme must be prepared, and kept to. A change of plan may lead to an omis-

THE WATER GARDEN: KENSINGTON GARDENS.

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sion which might cause all the measurements to be useless. There are many ways of tackling a complicated piece of ground, and not two persons would set to work on the same lines. In scheming the work aim to have at least one line the full length of the ground ; make all as long as possible ; and avoid taking the tape through shrubberies or high herbaceous borders. The position of minor features can often be determined simply by noting that as the tape lay such an object was, say, 3 ft. away from the line at 142. Before lifting the tape all possible information should be taken from it. The preliminary sketch may have to be supplemented by enlarged details for which space should be left at the side of the paper. The positions of trees, and other separate features are found by making the object one of the three corners of a triangle, of which the two other corners are known through other measurements on the survey. The commonest failure in a survey is caused by thinking a point is located because it has two measurements relating to it, whereas they may be valueless from being taken from points whose positions have not been found. A careful attention to the preliminary scheme is the best safeguard against such errors.

Practice in surveying leads to a confident dealing with awkward corners and obstacles. Water is the most serious obstacle as it is impossible to get the tape across an arm of a lake, a bend of a

DIAGRAM 21.

stream, and have it taut enough to measure by. However, one can generally *see* across water, and thus be able to stake out a straight line. Suppose the line AB is set to be measured, but an obstacle CD intervenes; either water or beds of some frail plant that might be injured by the tape being put across them. (See Diagram 21.) At C put up a line at right angles of sufficient length to clear the bend, and at D do the same, dD being equal to cC , then cd is equal to CD , and the survey can be continued again from D .

Sometimes it is necessary to find the position of a point inaccessible to the tape, such as an island or a promontory coming from the farther bank of a lake. Diagram 22 represents such a difficulty. The point A is known, and P on the island across the water is wanted. Set up a sighted line from A to P , in order to lay the tape at right angles to AP , giving the line AB , which for the sake of accuracy should be run out rather longer than the

DIAGRAM 22.

distance of A to P. Halve A B at C, putting in a stake. Set a line D B at right angles to A B, and move along this line until a point E is found in a line with C and P, and E B equals A P and is the distance required.

Although it has been stated that surveying by line alone leaves angles out of the question, yet it is necessary to be able to set up a right angle, both

DIAGRAM 23.

in taking measurements and in setting out land from a plan. Three methods are possible. From A on the line A B a right angle is required. (See Diagram 23.)

1. Extend B A to C so that $C A = A B$. Fix the tape at B and C giving considerably more than the length B C, if B C is 30 ft. let the tape run to 50. Take the middle of the tape, in this case at 25 ft., and pull it out taut, put in a peg at 25 and from the apex of the triangle so formed to A is a right angle. This is a convenient method of setting paths at right angles to buildings where a base line already exists. By making two trian-

gles three points can be found from which an accurate line can be sighted.

2. Find the length of A B, or a convenient portion of it, and stretch the line as in the previous method making C B and C A the same length as the base. Leave the tape fixed at B, release it at A and carry it in the same direction as C B to the same length that it was from B, giving a point D. A line from D to A is at right angles to A B. This is a practical application of the proposition that the three angles of a triangle are together equal to two right angles. In the diagram the value of the angles has been marked, and it will be seen that the equilateral triangle A B C has its angles each worth 60° . The line C A with B D must cause 180° , which leaves 120° on the other side of the angle A C B. Then if C D and C A are equal the isosceles triangle formed has the angles at the base equal, and with 120° at the apex, 30° must be their respective values ; 30° added to 60° makes 90° , which is the right angle required. An isosceles triangle set up on the base gives the same result, but the proof is not so evident.

3. This method depends on the Euclid proposition that "the square on the sides subtending a right angle is equal to the squares on the sides containing the right angle." The measurements of 3, 4 and 5, and their multiples fulfil these conditions. $3 \times 3 = 9$. $4 \times 4 = 16$. $9 + 16 = 25$ which is 5×5 . In practice 3, 4 and 5 ft. make

too small a triangle for accuracy, and it is better to take 6, 8 and 10, or even 9, 12 and 15. On A B mark off the equivalent of 3 ft., and stretch out the tape to complete the required triangle, remembering to have the side representing 5 opposite where the right angle is required. Stretch all tight and the point C will be obtained which can be extended as far as necessary, from A. This last method is said to be the way by which the bases of the pyramids were squared.

In stretching triangles two people are needed to prevent the tape riding up the stake while the apex is being found. The angle where the ring is can be secured by using two pins instead of one thrust through, and on many occasions besides the two pins is a useful device.

The foregoing operations in surveying have all been said to be performed by a tape. The surveyor more often uses a chain composed of 100 links, the length of which may be seen marked at the back of the measuring tape, and it is 66 ft. long. At every ten links is a brass tab showing the number of links from the ends, as 10, 20, 30, 40, and the centre is distinguished by a circular disc. Thus the chain can be easily read from either end. The link measure assists in the calculation of areas as 100,000 square links is an acre.

It is a heavy instrument, and has that advantage over a tape in windy weather, but in measuring through shrubberies and herbaceous beds it

does much damage. Also the garden designer is more interested in distances than areas, and the link measure has not the same convenience for him.

LEVELLING

GROUND is seldom, if ever, perfectly level, and mostly one has to do with decided slopes. The levels of the ground must be known to the designer, for his opportunities (and difficulties) lie in changes of level. The formal style requires most levelling, and unless the gradients are known it is impossible to reckon steps and retaining walls, while even with the landscape style which accepts, more or less, the natural contours, levelled spaces need to be formed for games.

The simplest and most laborious method of measuring a gradient is by means of a spirit level and straight edge. The former needs no description. A straight edge is a plank of seasoned wood about 5 in. broad and $\frac{3}{4}$ in. thick, and 10 ft. long. With these and plenty of square headed pegs the fall from point to point can be found. When a gradient is uniform start at the highest part and drive in a peg to ground level. On this peg rest one end of the straight edge and drive in a second for the other end to rest on, knocking it down gently until the spirit level laid on the middle of the board shows it to be exactly horizontal.

Repeat the process for as long as required, not omitting to *reverse* the straight edge at each levelling. That is to say if the board is represented by A B, it is used alternately A B, B A, all along the line, the object of this change being to counteract any inaccuracy caused by warping or other injury. Pegs over 2 ft. long are difficult to keep steady and to obviate this at any point a peg may be driven in alongside of the true level at a definite distance below it, and the line continued. The foot or so subtracted can be reckoned in at the end. When the surface is undulating it is sometimes a good plan to start with a peg a few inches above the ground, to avoid having to excavate at any point. The resulting line is so many inches above the starting point and can be allowed for. Very good practice in levelling can be had by working round a piece of ground and seeing that the last peg comes level with the first one.

For large surveys a dumpy level is required. This (without accessories) is a spirit level mounted on a tripod and fitted with a telescope through which a number on a staff can be read. Fine wires are stretched across the glass and when the spirit level of the instrument is true the horizontal wire on the telescope shows the level on a staff held perpendicularly by an assistant. It is not proposed to enter into details about the construction and setting up of the dumpy level, but only to show its working, for if a survey is on a scale to

need a dumpy level pays to employ a surveyor to do the work rather than hire the instruments. But its working should be understood as it is often brought into requisition while the plan is being carried out, and the garden designer should be able to check and follow its use.

Diagram 24 is supposed to represent a section of undulating ground where levels are to be taken at

DIAGRAM 24.

every 50 ft., unless it seems advisable to take others in addition. The level is shown by a tripod and a dotted line shows the line of vision from it to the various positions of the staff—the vertical lines. The first position of the level is marked 1. Looking to the staff at A 5.2 is read. Revolve the telescope, carry staff to B and 2.35 is read. A is a backsight and B a foresight. Leave the staff at B and carry the level forward to position 2, which in this case is taken past C and set up between that point and D. Read B, which as the dumpy level is now on lower ground shows only .5. This is a backsight. Take the staff to C and read 4.7. As only one reading is to be taken from C it counts as an intermediate, but is entered in the

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same column as the foresights. The actual height of the dumpy 4.9 may be taken in passing as it will indicate that the gradient from C to D is not uniform. This is also an intermediate and should be further remarked as "instrument" with its distance (30 ft.) from C. Revolve the telescope and read D 2.42, which is a foresight. Change the position of the dumpy to 3, leaving staff at D. Take backsight at D 1.2, and foresight at E 9.5, which completes the line. A line parallel to this is taken by using E as backsight, and the first of the new line as foresight. In practice it is convenient to plan out the ground in squares 50 ft. each way, and take the levels in lines up and down.

Back-sight.	Fore-sight.	Rise.	Fall.	Reduced Level.	Remarks.
5.2	2.35	2.85	—	2.85	All at 50 ft. distances— * = Intermediate. Instrument 30' from C.
.5	*4.7	—	4.2	—1.35	
—	*4.9	—	.2	—1.55	
—	2.42	2.48	—	.93	
1.2	9.5	—	8.3	—7.37	
6.9	14.27	5.33	12.7	—	
—	6.9	—	5.33	—	
—	7.37	—	7.37	—	

The field book now shows just the readings from the staff in two columns, backsight and foresights, and any necessary remarks. The next process is

to reckon rise and fall which is done by finding the difference between backsights and foresights or between intermediates. An *increase* in reading on the staff means a *fall* in the ground. Enter the differences into their correct columns as rise or fall.

In the example we have the difference between A and B, B showing a rise of 2.85. The next reading gives a fall of 4.2 and the next .2 and so on. The final process is to find the reduced levels which gives a progression of figures showing the relative changes in the surface. As the reckoning is from zero at A the first reduced level is the rise at B 2.85. The fall from this gives—1.35 and the rest of the column can be readily made out.

These reckonings have to be proved both for arithmetical mistakes and for errors of entering rises into the fall column and vice versa. Add up the backsights, and the foresights (not including intermediates), and subtract. Add up rises and falls and subtract. The results should both equal the final reduced level.

Working from zero over falling ground involves minus quantities, which can be avoided by taking a figure to work from. This is quite arbitrary, and is usually 50 or 100, and is termed the *datum*. With a datum of 50 the previous example would appear as follows.

Backsights.	Foresights.	Rise.	Fall.	Reduced Levels.
5.2	2.35	2.85	—	52.85
—	4.7	—	4.2	48.65
—	4.9	—	.2	48.45
—	2.42	2.48	—	50.93
1.2	9.5	—	8.3	42.63
6.9	14.27	5.33	12.7	—
—	6.9	—	5.33	—
	7.37		7.37	

The reduced level 42.63 is 7.37 below datum 50.

The datum of a survey i.e. its starting point should be at a place easy to locate, as all future levels have to be referred to it for comparison. Strong square pegs are driven at the places where the staff has been set up to be read, and numbered, and on the plan the numbers and the reduced levels for each peg are entered. It is convenient in preparing a ground to set it out in squares for then the same levels enable sections to be plotted from north to south as well as from east to west.

Proving the figures in the level book is no guarantee that the levelling itself has been accurately done : figures on the staff may have been misread, or the instrument may not have been truly set up. It is therefore necessary to check the figures by levelling back over the ground to the

starting point. Only back and foresights need be taken, and the same stations need not be used throughout.

We now come to the application of these levels to the work of moving soil to the desired line. The simplest way is to consider this first as though a path of uniform width was required to level itself i.e. using only, and all, the soil on the place. Take a line of reduced levels as in diagram 25, all 10 ft.

DIAGRAM 25.

apart. The area of soil in block A is $\frac{10 + 8}{2} \times 10 = 90$ sq. ft.

$$B \text{ is } \frac{8 + 5}{2} \times 10 = 65 \text{ sq. ft.}$$

$$C \text{ is } \frac{5 + 6}{2} \times 10 = 55 \text{ sq. ft.}$$

$$D \text{ is } \frac{6 + 4}{2} \times 10 = 50 \text{ sq. ft.}$$

$$E \text{ is } \frac{4 + 2}{2} \times 10 = 30 \text{ sq. ft.}$$

$$F \text{ is } \frac{2 + 4}{2} \times 10 = 30 \text{ sq. ft.}$$

Total, $90 + 65 + 55 + 50 + 30 + 30 = 320$ sq. ft. This area and breadth of path 10 ft. gives

3,200 cub. ft. There are six blocks over which this amount has to be distributed which gives an average of $\frac{3200}{6}$ cub. ft = $533\frac{1}{3}$ cub. ft. Dividing by 10 for the breadth, and 10 for the distance between the levels gives $5\frac{1}{3}$ for the height of the horizontal line to which the whole surface can be worked.

An examination of the foregoing method shows that every figure has been taken twice except the first and last, and a shorter method may accordingly be followed. *Add half the sum of the first and last perpendiculars to the sum of all the rest, and divide the result by the sum of their number minus one.* Thus from the same example we have

$$\left(\frac{10 + 4}{2} + 8 + 5 + 6 + 4 + 2\right) \div 7 - 1.$$

$$= (7 + 8 + 5 + 6 + 4 + 2) \div 6 = 32 \div 6 = 5\frac{1}{3} \text{ ft.}$$

Unless the levels were taken at uniform distances this last method is unworkable, as difference in the space between the perpendiculars is ignored by it. Therefore if levels have been taken irregularly the first method must be used, each block being reckoned by itself.

Supposing that the aforesaid strip of land is not to be levelled but to be laid in a uniform slope, moving as little soil as possible proceed in the following manner.

Divide the strip into two equal portions and reckon each half separately for its mean level.

From A to C will give $\left(\frac{10+6}{2} + 8 + 5\right) \div 4 = 7$ sq. ft. $= (8 + 8 + 5) \div 3 = 21 \div 3 = 7$. From D to F will give $\left(\frac{6+4}{2} + 4 + 2\right) \div 4 = 5 + 4 + 2 \div 3 = 11 \div 3 = 3\frac{2}{3}$.

Set up these two levels at either end and connect. It will be noticed that the centre coincides with the horizontal line at $5\frac{1}{2}$.

But whole areas and not strips are more usually the problem. The system is exactly the same and if one is understood the principle can be readily applied.

Obtain levels at even distances all over the ground. Treat A B as a strip, also C D, E F G H and I J. Add the result of A B to I J ; halve it ; and add the sum of the other results. Divide the total by the number of strips minus one, and the mean level of the whole is the result.

$$A B \quad \left(\frac{10+4}{2} + 7 + 5 + 4\right) \div 5 = 5.75$$

$$C D \quad \left(\frac{8+6}{2} + 6 + 5 + 5\right) \div 5 = 5.75$$

$$E F \quad \left(\frac{6+8}{2} + 5 + 6 + 6\right) \div 5 = 6$$

$$G H \quad \left(\frac{6+8}{2} + 5 + 3 + 5\right) \div 5 = 5$$

$$I J \quad \left(\frac{3+5}{2} + 4 + 3 + 6\right) \div 5 = 4.25$$

$$\frac{A B + I J}{2} = \frac{5.75 + 4.25}{2} = 5$$

$$C D + E F + G H + 5 = 5.75 + 6 + 5 + 5 = 21.75; 21.75 \div (5 - 1) = 5.4375, \text{ which is the mean}$$

DIAGRAM 26.

level for the whole. The truth of this can be checked by working the sections the other way, i.e. A I and so on. A "hanging" level, i.e. one which runs on a uniform slope, can be made from this by raising and lowering the corners, still keeping the average 5.4375.

By merely taking an average of all the levels an approximate result is obtained, but it comes out rather more than the correct mean. An average of the levels on Diagram 26 works out to 5.56, and it will be found that such calculation usually work out slightly greater than the correct figure.

If the levels have not been taken at even distances the working is complicated in the same way as when the example of a strip was irregular. Unless there are strong reasons against it, levels should always be taken regularly.

An even line between two points, whether sloping or horizontal, can conveniently be laid by the use of "boning" or "borning" rods. These are three pieces of wood, preferably shod with metal, of uniform length with a cross piece. Four feet is a good length. The first and last levels being determined, a rod is held at one end, and an observer goes to the other extremity with a second rod, while an assistant holds the third wherever a level is required. The first and last rods are fixed, and the intermediate one has to be raised or lowered according as the observer directs in order to bring its top in a line with the other two. As many intermediate stations can be taken as may be wanted.

This is a quick way of testing the surface of a lawn or of a sloping path.

When drawing sections it is customary to make the vertical distances at double the scale of the

horizontal ones. Thus if the length is represented by 10 ft. to 1 in. the vertical will be 5 ft. to 1 in. The vertical distances are so much smaller that this convention serves to increase their importance and assist in the drawing, and the eye soon becomes used to the exaggeration.

SETTING OUT THE PLAN

THE necessary instruments for setting out a plan on paper are not many or elaborate. The designer needs a pair of compasses with lengthening bar, interchangeable for pen, pencil and divider; a ruling pen; a set of scales; a T square, and two set squares 45° and 60°, and a few French curves of simple form. These should be all of the best workmanship. Needle points to the compasses are recommended as least damaging to the paper. Two or three extra pairs of dividers are a convenience when the same measurements are constantly repeated, and for fine work a set of bow springs may be added. An inaccurate plan is useless, and if the instruments are unsteady it adds a hundredfold to the difficulties of drawing. No instruments will stand neglect or rough treatment. Ink should never be allowed to dry in the pen, and if not needed for a few minutes the drop should be shaken out, and before being put away pens should be wiped with a chamois leather,

which cannot leave minute hairs as cloth or blotting paper will.

The use of compasses for plotting from a survey has been described. A beam compass consisting of a rod of wood fitted with point and adjustable pencil is convenient when the curve to be described is outside the stretch of the metal compass, even with extending bar added. A strip of stout paper and a pin make an efficient substitute.

The T square is used against the side of the drawing board for parallel lines, and in conjunction with the set squares for drawing right angles. The paper should be arranged so that when a number of parallel lines is required—as for a building—the T square may be in a position to take them. After a plan has been plotted it often happens that the house is askew on the paper, and it is worth while—if the size of the board permits—to unpin the paper and twist it to bring the lines of the house under the T square, as from it all right angles and paths running direct from the house can be most readily drawn.

The set squares are for ruling parallel lines by sliding one against the other ; for use in conjunction with the T square for right angles and the other angles they contain. They are wonderfully handy, and with practice they can be used in many ways. Those made of a framework of wood with ebony edges are most serviceable for general purposes. Small celluloid ones are useful for

small detail work owing to their transparency, but large celluloid set squares are inclined to warp and become spoilt. Vulcanite is a strong material and lies flat on the paper, but has a drawback in that one cannot see whether it is clean or not.

French curves are made of thin pear-wood, and are for ruling in curved lines, *not* for setting them out which should be done first by hand. Such portion of the curve as exactly fits is set against the drawing, and ruled in, and the curve is shifted until another part fits, and that is used. To join these portions is difficult, but if the draughtsman refrains from using the *whole* of the curve that seems available he will find the parts run together more readily. The wooden curve should overlap the previous portion to make a good blend. Curves can of course be inked in freehand, but the handmade line has a different character and it does not look well with ruled lines.

The pen is best filled with a quill which is supplied fixed in the cork of some brands of drawing ink. It should never be dipped. A good pen is a treasure and should be treated as such.

Another useful form of pen is the "road pen" which consists of two in one handle. A screw enables one to set the pens at the distance required and for taking parallel lines round a curve it saves time.

Pencils must be good. H.B.'s are good for

preliminary drafting, and F. for ruling in before inking. Pencils used for ruling should be sharpened to a chisel point and used edgewise, as a carpenter uses his pencil, and for the same reason.

Paper must be stout and able to bear much correction without the surface being spoilt, or a hole appearing. Gentle use of good rubber assists in its preservation. The surface must be fairly smooth, sufficiently so to enable the ruling pen to run freely. Drawing pins are usually employed to hold it to the board, and they are often troublesome and catch the T square. A better plan when the paper is likely to be some time in use is to strain it. The edges all round are turned up about three-quarters of an inch, and all the inside paper is wetted with a sponge until quite soft. The edges are covered with thin paste and turned back on to the board, and while all is still wet the paper is stretched by dragging the pasted edges outwards as far as they will go. Weights should be laid on the edges while drying, which should be done slowly while the board is perfectly horizontal. Straining is best done over night and next day a perfect sheet of tight paper is presented for work. Another advantage of the absence of drawing pins is that two plans can be done on the same board without the least fear of deranging the strained paper.

The accurate use of the foregoing instruments lies at the root of all plan drawing. Technique

may seem a dull affair, but the greater mastery one has over mechanical means of expression the freer one is to develop ideas. Undoubtedly the best ground work for the would-be plan drawer is geometrical drawing. Apart from the fact that many of the problems in that subject are actually useful the accuracy required to bring any exercise to a successful conclusion is splendid practice.

The scale to which a plan is worked depends on the size of the ground depicted, and the amount of detail involved. One-tenth of an inch to one foot is an ordinary scale. One-eighth may be needed for a small garden where brick paths in parquet patterns have to be shown. For larger plans one-sixteenth or even one-thirty-second may be employed, but with the latter the plan would probably need supplementing with details on a larger scale.

Whatever scale is used the plan must be furnished with one by which distances can be reckoned. The accompanying Diagram 27 shows the setting out of a scale of one-eighth inch to a foot. Note that only the first block of ten is divided into units, and that the figuring of the rest begins after this. This method saves dividing the whole scale. Suppose a length of 23 ft. is wanted, the dividers are placed at the 20 and stretched backwards to obtain the 3 ft. from the unit divisions. Whatever the scale it is made out in blocks of ten, whether

one-eighth, one-tenth, one-sixteenth etc., to the inch.

Scale drawing is a severe test of accuracy, and should be practised frequently before putting one on to a plan. A convenient method of making a very small scale is as follows—

Draw out an ordinary horizontal scale, and supposing that fractions of the units may be required, say halves and quarters, draw a vertical line against the scale dividing it into quarters. The length of the vertical line is of no moment except that it should not make the scale look clumsy (see Diagram 28). Diagonal lines are drawn across. The space between the vertical and the oblique line on the horizontal line marked $\frac{3}{4}$, is three-quarters of the unit, and if $12\frac{3}{4}$ may be required the dividers are opened out on the third line vertically below the right figures on the upper scale, and the fraction only appears from the lower.

A plan of an estate may often

DIAGRAM 28.

be had without having to survey it. The bill of sale usually has one attached. Large old places are always on the ordnance map, and for alterations the latter is most useful as it supplies the boundaries and main features while small ones can be filled in by tape measure. The ordnance is also useful in that it shows the ownership of fences which are marked T on the side to which the fence belongs. In any case the plan is usually on too small a scale for working on. There are two simple methods of enlarging. By means of the scale supplied with the plan the area can be surveyed in triangles as though it were the actual ground, and when the dimensions are all secured the plan is worked out as from a survey of one's own to any desired scale. This is certainly the simplest method when the area is mostly composed of straight lines. Where curves are numerous and much offset work would be required, the better way is to rule out the plan supplied into squares, say of 20 feet each way. Rule out a sheet of paper into squares representing 20 ft. on the new scale, and copy square for square. For a large area the squares are best numbered along

the margin for easy identification in the same way that town plans are often marked for the ready locating of streets. The greatest accuracy is needed in the ruling of the squares, and the finished copy should be tested by a few cross measurements from point to point.

Plans can be directly copied either by tracing or by pricking off the main points. In the first case a sheet of tracing paper is laid over the plan and all lines are copied. The tracing thus prepared is laid over the paper destined for the new plan, and between them a sheet of carbon paper is inserted, and the lines of the tracing are again gone over, when an impression will appear on the lowest sheet. This is a quick method, but owing to the two tracing processes is liable to inaccuracy.

The pricking method is most recommended when the main lines are more straight than curved, and if the original plan is not too valuable to be pricked. The paper and the plan must be both firmly confined to the drawing board, and all corners and principal points are pricked through with a fine needle. The points are first connected by pencil and if seen to be correct they are inked in.

FINISHING THE PLAN

COLOUR is a great help in expressing the parts of a plan. Green is most in request, and a ready

made tint such as Hooker's pale is recommended as if a blend of blue and yellow has to be mixed up fresh to finish off a wash there is difficulty and delay in getting the shade just right. Particular care should be taken to lay on the green wash for grass quite smooth. In reality the grass sward is a setting for the broken masses of colour in flower border and shrubberies, and the smooth green colour on the plan may serve the same purpose to the other painted features.

For *gravel* yellow ochre or raw sienna may be used—the latter is a warm tint ; for *flower beds* brown madder, vandyke brown or raw umber ; for *buildings* light red or Indian red. *Shrubberies* are best painted in a blend of greens and browns deeper in tone than the grass.

As regards the actual material the old fashioned water-colour cake rubbed on a china palette, or back of a saucer, answers capitally. Or ordinary tubes of soft paint may be used, squeezing out the quantity required each time.

Plans in plain line drawing have definite ways of indicating the different parts, which can be seen by examining the various plans in this book. In the main the signs are the same as used by the Government Ordnance Survey.

The general finish of a plan is important. The design may be good, and the drafting accurate, yet most people are impressed more by the finish than by the solid virtues. This is not so unrea-

sonable as may appear. Every one is not capable of appreciating the proportions and the general art of a design, but a nicely got up plan is evidence that the designer thought his work worthy, and was himself willing to take trouble. The final plan for the client's approval should be completed with as much care as though it were a competition drawing.

The title and compass points are necessary items and afford opportunities for a little display. A written name of the place, and a plain arrow pointing north are all that is absolutely necessary. A good piece of lettering, however, adds greatly to the appearance of the whole. Lettering should be assiduously practised. On any hoarding almost, good forms of letters can be seen, and a style that suits the handwriting should be developed. It should be legible, simple, and consistent—i.e. not showing fancy tails to some letters while others are straight backed. For the beginner the best type to start on is the severe Roman, each letter exactly occupying a square. There is also scope for artistic feeling in the placing of the title, the block of lettering often being the means of balancing an awkward shaped plan.

The compass point is based on an arrow, and pretty devices can be wrought upon it. Here again simplicity is to be aimed at. It is usually placed close to the title, either above or below.

The scale must be absolutely unadorned. It

is most convenient for use at the bottom of the paper.

The final touches to the plan are the signature of the designer, and the date of its completion, both usually set in the right-hand bottom corner. Some designers enclose the whole in a neatly ruled frame, which gives opportunity for effective corners.

It is convenient to number all plans, and keep a record of them, for as they accumulate it is easier to look them up by number than by title, and large details can merely carry the number instead of the whole name of the work.

Sections and small detail sketches of treillage, pergolas, etc., may be set at the side of the plan proper, but nothing must be added or elaborated so as to confuse the main features.

The designer works on a sheet of tough drawing paper, and when the general scheme has been decided a tracing should be taken off, without details, although their positions may be indicated, and submitted to the client. This may in the end save much time, for the least alteration may mean a general shifting and rearrangement, and it is as well that the lines of the garden should be approved before embarking on what may be wasted labour. A written description of the various parts may accompany the sketch plan, with reasons for anything that seems to require them. Simple sketches are a great

help to the written words, and the designer should practise himself in putting his ideas on paper. An estimate of probable cost can also be supplied at this stage.

He has also to guard against alterations arising from his own changes of mind. Unalterable features such as house and boundaries can be inked in at once, but the whole design, details and all, should be worked out in pencil before inking any of it. After inking in the paper may be cleaned up with rubber, or stale breadcrumbs, to remove all signs of correction and trials, leaving the outline standing clear ready for the next process—the tracing.

The client, if he desires, receives a tracing on tough paper, highly finished, but the plan which serves the work has to be able to stand hard wear and weather. It is taken off on tracing linen, and finished completely except for colouring, of which just enough should be used to guide the eye quickly to the various parts. For instance, the gravel might be painted, but flower beds and grass, being large masses, might be merely outlined in colour. Tracing cloth is uncomfortable stuff to work on owing to its slippery surface. A hot iron, or rubbing with india-rubber makes the ink take better. Painting is done on the back side of the linen, and the colour must be put on much stronger than when painting on the right side.

ESTIMATING

A CERTAIN knowledge of estimating is required of a garden designer : not that he is contractor for the work, but because his client generally requires some idea of the cost before accepting a plan.

A knowledge of the plain rules of arithmetic is sufficient mathematical qualification for this somewhat tedious process, and it is also necessary to know the simple methods of mensuration.

A four-sided rectangular figure needs its length and breadth multiplied together to give its area, and a right angled triangle is half that area. Thus if the figure A B C D (Diagram 29) contains 24 sq. ft., the triangle B C D contains 12 sq. ft. This is sometimes expressed by saying that the area of a triangle is equal to its base multiplied by half the perpendicular—in the example this is $6 \times 2 = 12$. But seldom does one meet with convenient rectangular figures, and surveys generally deal in variously shaped triangles. The principle is, however, the same, although a perpendicular may have to be set up from base to apex. See Diagram 30, where the perpendicular, of which half the height is to be used, is set up either within or without the figure. By means of triangles the area of any complicated figure can be built up to its total. A five-sided figure may be reduced to a

DIAGRAM 29.

DIAGRAM 30.

triangle and reckoned all in one, which is quicker than taking five parts separately. Let $A B C D E$ (Diagram 31) represent a five-sided field. Draw $B E$, and from A draw F parallel to $B E$. Draw $B D$, and from C draw $C G$ parallel to $B D$. $B F G$ is a triangle equal in area to $A B C D E$,

DIAGRAM 31.

whose area can be found in the usual manner. This method is also applicable to a four-sided figure.

As there are several ways of dividing any irregular figure a safe method is to work the area twice on different divisions.

Areas with a curved irregular boundary on one side, such as occur when offsets are used, can be reckoned by connecting the two ends of the curve by a straight line so that as much area is on one side as on the other. A piece of cotton, or a celluloid ruler, should be used to set the line, as it is

an advantage to see both sides at once. The figure is then an ordinary straight sided one, to be dealt with by ordinary methods.

The area of a circle can be arrived at by several ways, of which the two simplest are : (1) Multiply the square of the diameter by $\cdot 78$. (2) Multiply the square of the radius by $3\frac{1}{7}$ or more roughly by 3. Suppose a circle whose diameter is 6 ft. By the first method $6^2 = 36$; $36 \times \cdot 78 = 28\cdot 08$. By the second method $3^2 = 9$; $9 \times 3\frac{1}{7} = 28\frac{2}{7}$. When the diameter is an exact number of feet the latter is the quicker method.

The area of a winding path or bed with parallel sides is easiest found by stepping along the centre a pair of dividers opened out to represent 10 or 20 ft. This finds the length, which multiplied by the uniform width gives the area.

Solid contents are required when working with levels to find amount of soil to be shifted. In a rectangular body its cubic contents are obtained by multiplying length by breadth and again by height. When land is on a uniform slope a figure equivalent to half a rectangular is formed, the depth being taken from so many feet at one end to nil at the other. An undulating surface can be equalized in the same manner recommended for dealing with offsets.

PRICES FOR VARIOUS WORKS, INCLUDING LABOUR
AND MATERIAL AND PROFIT FOR CONTRACTOR.

Digging ordinary soil, 1s. per cub. yd. If hack-
ing is required, or in stiff clay, 1s. 3d. per
cub. yd. For every cub. yd. deeper than 6
ft. add 6d. Shifting 20 yds, add 1s. And
for every 20 yds. afterwards, 6d. Loading
into carts, 2s. per cub. yd.

Removing turf, 10d. sq. yd. If shifted, add as for
digging. Laying turf, turf included, 1s. 6d.
sq. yd.

Gravel for paths from 3s. 6d. to 8s. 6d. cub. yd.
according to locality.

Hardcore from 1s. 6d. to 6s.

Tar paving, including 4 in. hard core, 3s. per sq. yd.

Concrete of Portland cement and Thames ballast
at ratio of 1 to 6, 14s. 6d. per cub. yd.

Trowel facing, 1 in. in Portland cement, 2s. 6d.
per sq. yd.

Land drains, 30s. per thousand.

Brickwork. Find out equivalent of wall in $1\frac{1}{2}$
brick, divide by 272 which gives a rod of
brickwork.

In red Flettons @ 27s. 1,000 cost is £13 15s. per rod
including all labour and materials.

For *pointing* add $2\frac{1}{2}$ d. per sq. ft.

Walls in random rubble, 3s. per cub. yd., above
cost of stone. If in courses and pointed,
add 6d.

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Planting—including labour. Herbaceous borders, 1s. 6d. per sq. yd. Rose gardens, 1s. 6d. per sq. yd. Shrubberies, 1s. per sq. yd. Rock gardens, 2s. 6d. per sq. yd.

These prices give a complete furnishing of ordinary plants.

Specimen trees, 2s. 6d. each. Box edging—including labour, 10d. a yd. Garden edgings, 1s. 3d. a yd.

Another way of taking out labour is to reckon the area at 3d. per sq. yd., in ordinary soils where the work is quite straightforward.

WORKING OUT THE DESIGN

THE process of working out the design may now be considered. First there is the plotting of the ground with the house and other incidents, and these, if not to be touched by him may be inked in at once, and then they will not be affected by pencil work round them. Levels, where known, are figured at their proper stations.

Possibly a terrace can be arranged and some effort is worth making to secure one ; both house and garden profit by even the slightest elevation. On flat land the earth from the foundations may be sufficient to raise a platform 18 in. on one side of the house, and even this slight elevation gives a feeling of dryness and stability. But this cannot be done without the co-operation of the archi-

tect, who must have foreseen a terrace and arranged floor levels accordingly. When the ground has a natural fall a terrace can be added without troubling about floor levels. Occasionally one has to deal with a ground rising from the house, and here the ground should be cut back round the building to form a level as wide as a terrace, with a retaining wall between it and the natural slope.

From his inspection of the ground the designer will already have some idea as to the best way of disposing the different parts, and he has been instructed as to what is to be provided. Also he will have noted where the best views are, and radiating lines can be ruled from the principal windows towards those quarters to remind him not to obstruct. Similarly parts to be blocked out may be indicated. Common requirements are :—kitchen garden, orchard, lawn tennis courts, rose garden with pergola, garden house, rock garden, tank or pond for aquatic plants. Some or all of these may be in the new garden.

The position of the kitchen garden is largely dependent on the position of the kitchen, and easy and private access should be arranged between them. Size has to be settled. An acre is supposed to be enough to supply ten persons with vegetables and small fruit, and the designer can tell from the type of house how many have to be catered for ; and he rules off sufficient space,

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Then come the lawns for games. The most naturally level part should be chosen for them, other conditions being satisfactory. A lawn tennis court measures 78 ft. $\times$ 36 ft., and to ensure ample running back space, 120 ft. $\times$ 60 ft. must be allowed. Croquet requires 115 ft. $\times$ 84 ft. for a full sized game, and 120 ft. $\times$ 90 ft. of levelled lawn should be provided. A fall of 2 in. in the 100 ft. does not affect tennis, but for croquet the lawn must be a true level. A tennis court ought to run north and south in order to avoid the afternoon sun. It must not be too near the windows of the house. The easiest way to place definite sized features is to cut out a piece of paper to scale and shift it about the plan until the best position is found.

Exits from the house have to be borne in mind while arranging the lawns, and the direction of main paths should be laid down next. One straight path the full length of the garden proper gives a kind of backbone to the place, and besides the appearance of such a path, it is pleasant to be able to walk without watching for turns.

With the kitchen gardens, levelled lawns and main paths settled, the ground has probably now irregular spaces still unaccounted for, into which the rose garden and other interests will go. It is at this stage that the owner's approval may be asked, and the future development of unoccupied spaces should be suggested.

Before proceeding to details, attention must be given to the question of levels. The lawns will almost certainly need levelling. The ground may be contrived to do itself ; on the other hand more soil may have to be brought or a surplus disposed of, and other parts of the garden have to be requisitioned. The disposal and provision of soil often affects the treatment of the outlying parts. Path-making produces a quantity of soil—good surface stuff—which may furnish enough if extra is required. A sunk garden is also a method by which soil can be obtained, and a ha-ha division between park and pleasure garden is another source of supply. Surplus soil can be used for filling in hollows, for raising banks, and for increasing the width of the terrace.

The levels having been settled and marked on the plan, working from the same datum as on the original survey, details can be filled in. The coherent planning of these is in some ways more difficult than laying down the general scheme, which often seems to settle itself from the nature of the ground. Unless the different parts are made coherent the scheme has a patchy look, besides being troublesome for up-keep. Meaningless spots of lawn and shrubberies are the marks of a feeble design, and entail more labour to keep them in condition than their effect justifies.

The fit disposal of details constitutes the major part of the work, and no inking should be at-

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tempted until every part is pencilled in. The substitution of grass verge for tile edging ; change in the width of a path, and any other apparently trivial alteration often involves extensive redrawing, which is far more easily accomplished on pencil work. If time permits it is a good thing to put the pencil plan aside for a few days, and then if the designer is satisfied that the ground has been treated to the best of his ability, the lines are carefully gone over with Indian ink. By carrying the pencil lines well beyond corners there will be less danger of overshooting the mark with the ruling pen, and corners not quite joined or overlapping give an untidy appearance to a plan. The drainage system may be added after the inking in, as it must be subservient to the design. A clean up with rubber or stale bread-crumbs prepares the paper for colouring, and the title, compass point, scale, signature and date completes the whole.

Section IV

STRUCTURAL

After you have finished your borders, knots or quarters as occasion serves, then you are to make your walks . . . but do not make the fall on each side of your walk too great or sharp, but rather a fine, almost indiscernable fall ; except your ground be very apt to be wet, so great a fall is both unhandsome and uneasy for such as wear high-heeled shoes.

Leonard Meager.

“ All that is fine is fit.”

STRUCTURAL

Paths and their Making—Edgings—Terraces and Steps—Walls
—Treillage—Garden Furniture—Drainage.

PATHS AND THEIR MAKING

THE planning of the paths is the chief factor in the comfort of a garden, both for work and enjoyment. They should be laid in the directions most needed, and serve their purpose without divergence. Paths are necessary to get round

the house, to go to the kitchen garden, the tennis courts and so forth, and such paths should be straight unless obvious reasons prevent. At a distance from the house paths are needed for walking, to take exercise, and to enjoy the garden and any views there may be. So long as the house dominates the ground the lines of paths

should conform to the architecture, exits and windows being carefully considered. When owing to planting, or natural contours, the house ceases to be visible, or at any rate the chief feature, paths may begin to show curves of un-geometrical character.

It is far more difficult to manage a curved path than a straight one. The formation of foot-tracks across fields and commons is instructive on this point. An indirect approach is made only when some advantage is to be gained by a *détour*, and over flat pasture land a right-of-way is generally seen to be practically straight, running directly across from stile to stile. But over undulating country the track will be seen to curve round the rising ground, returning to the straight after the rise is past. Over steep places where no *détour* can be made the track runs diagonally up the slope, often in a zig-zag. Over commons, clumps of gorse and trees are avoided; and in short the natural direction of a path is the line of least resistance. Thus on flat lands paths are naturally straight, and in hilly country they tend to be sinuous. Therefore when the designer is engaged on a flat garden, and wishes to introduce curves he must at the same time introduce the features that call for curves, either artificially raised beds, or groups of shrubs and trees. This is the art of the landscape gardener which in many ways is more difficult than the formal style.

Geometrical curves, part of a large design involving straight lines as well, need no excuse.

Over an irregular surface paths should be laid with reference to the lie of the land, curving

DIAGRAM 32.

round the high portions, and generally keeping in the valleys. When necessary to carry over a slope they should pass over at the lowest point and take the gradient in wide sweeps. By working at right angles across the dip it is possible to

DIAGRAM 33.

make paths of the easiest gradients, carving the ground as in Diagram 32. The low side should be planted when the slope is great, to increase the appearance of breadth (Diagram 33.) Paths cut

across a slope have this advantage : they can be contrived so as to be invisible from the top, and one frequently needs a connexion between two parts of a garden while not wishing to make a visible line across the grass. The curved paths proper to undulating ground are liable to become tedious, and in planning such a ground an opportunity should be sought to get at least one straight path through the garden.

Sometimes it happens that a path necessarily straight is blocked by a tree in the way, and to curve the path would be out of taste, and to remove the tree too serious a sacrifice. Such an obstacle is an opportunity for widening the path round the tree and placing a circular seat ;

DIAGRAM 34.

it is an excellent place for a junction ; or the introduction of some detail in the adjacent grass or flower beds. (See Diagram 34.)

Straight paths will bear greater width than curved ones, and as a rule they are nearer the house and require more for that reason alone. $4\frac{1}{2}$ ft. is quite the narrowest, and anything up to 30 ft. can be made according to the size of the house, and of length. The latter is an important consideration for the effect of perspective on a

long narrow path reduces it to insignificance. In a small garden $4\frac{1}{2}$ ft. may seem excessive, but the apparent waste of ground is more than compensated for by the effect gained of spaciousness. Like a really nice hall in a little house it gives style to the whole. Moreover two people cannot walk together in comfort on a path narrower than $4\frac{1}{2}$ ft. Paths or alleys merely for convenience of upkeep, and to see beds, may be as small as the materials permit.

Junctions must always occur at right angles, except in very large designs, and when a path divides the two arms should have decided divergence. (Diagrams 35, 36.) Junctions give opportunity

DIAGRAM 35.

DIAGRAM 36.

for introducing various features, for they will be seen from all paths. Architectural features such as vases, statues, sundials, and fountains suit certain styles of building, and can be placed in the parts of the garden that are treated architecturally. Ornaments are also useful to break the point at which a broad path becomes narrow. Arches

may be used where paths divide, a triple arch sometimes being very effective. But arches are difficult to introduce successfully. (Diagrams 37, 38, 39, 40.)

Two reasons may be given for curved paths requiring less width than straight ones: they are in the less used parts of the garden, and no great length is seen at a stretch. Their lines

DIAGRAM 37. DIAGRAM 38. DIAGRAM 39. DIAGRAM 40.

should be very simple, and not more than one bend should be visible at a time, and the curves should all *appear* to be necessary. Over sloping or undulating ground there is no difficulty in presenting a reason, but in a flat garden modelling and planting may have to be done. The Royal Parks present many excellent examples of such "landscape gardening." The directions of the curves should be governed to some extent by the distant views. As one turns a corner it is pleasant to be brought face to face with a prospect of far hills, a peep of the town, or a fine tree in the home park.

Sinuous paths should connect at right angles,

a few feet being brought in straight at the junction, and shrubs may be planted to prevent persons taking a short cut across the corner, though a rectangular corner is less likely to be cut than an acute angle.

DIAGRAM 41.

Occasionally it may be necessary to carry a path some distance through the garden, while there is no object in taking it far enough to join another. An abrupt and aimless termination should be avoided. A garden house or a seat make good finishes. In the sketch (Diagram 41)

the path was required to give access to the flower border, but not further. It was carried round the shrubbery, and a recess was made and a seat placed from which a charming view was obtainable.

The pleasure of a garden depends much on the good condition of its paths. They should not remain muddy or slimy after rain and frost, or be of such harsh material that they are rough under foot. A serviceable path owes its value to its shape, and its material. The ground should be excavated nine inches below the finished level of the verge, and made slightly concave. Over this 6 in. of rough stone, broken brick or clinker should be laid—technically known as hard core. Any hard uncrushable substance will serve. Gardeners frequently take advantage of path making to dispose of broken crockery, old tins, and other rubbish that cannot be burned, well screening it from dirt and soft débris. If an edging is required it is set before laying 3 in. of surfacing material. This differs according to locality. The ideal substance is good binding gravel, such as is found near London. It is a pleasant colour and sets hard. The gravel should be spread dry and carefully raked into shape, and pressed by frequent rolling into a solid mass. It should be kept drenched with water under the roller so that it cannot “pick up” and when shaped and firm no one should tread on it until it has dried,

THE FORMAL GARDEN : WEST HALL, BYFLEET.

by which time a hard crust will have formed on the surface.

In some parts of the country good gravel is not obtainable. If it contains much clay or lime it becomes sticky in wet or frosty weather, and a still more common fault is that of never binding at all owing to its being too clean, or being composed of rounded pebbles. Such shingly gravel is much used in the English lake district. It is harsh under foot, and needs continual raking to keep it neat, and its chief virtue is, that being local, it suits the surroundings. Broken brick and ballast are substitutes for gravel. Their appearance is cheerful, but for long stretches the colour is overpowering. Furnace ash is easy to get as a rule, and makes inexpensive paths—smooth to the feet but uninteresting. Kitchen garden walks are frequently made of ash, the glass-houses' heating apparatus providing the material.

Tar-paving is often seen in small gardens and in kitchen gardens. It is practically everlasting, and is never weedy, but it is not pleasant to the eye. In making such paths hard core and edging are set as above, and a mixture of clean furnace ash is made with sufficient boiling tar to wet the mass thoroughly, and the whole is plastered over the hard core and shaped with the back of a spade. More hot tar is poured over the surface, and brushed in and strewn with dry sand or broken

shell, when it can be rolled without fear of "picking up." The secret of making good tar-paving is to use plenty of tar and have it boiling.

The surface of paths should be concave in shape. A good rule for curvature is to give 2 in. rise in the centre for a path 10 ft. wide and so on in proportion. Thus a 5 ft. path is raised 1 in. in the middle. This rule is limited to a 6 in.

DIAGRAM 42.

rise which is considered sufficient even for a width of over 30 ft.

Concrete is also sometimes used for paths. Paving bricks set in cement are nice for small alleys in formal designs. For long wide paths they are too hard, and besides, the expense would be prohibitive to most people. Bricks laid dry, i.e. without mortar, are also pretty, and they can

be laid in various patterns. (See Diagrams 42, 43.) The additional introduction of stones enables one to make an almost endless range of design, which are charming between formal beds. Lastly, mention must be made of flagstones which are an ideal path material, being smooth and dry, and exceedingly pleasant to the eye. The stones

DIAGRAM 43.

may be in rectangular shapes near the house, and in random setting away from architectural features. In any case dry laying is preferable to using cement, as the growth of moss adds greatly to the charm of stone work. The appearance of old age can be hastened with stone by watering it with liquid manure. Concrete brick and stone paths need only half as much rise in proportion to their width as gravel paths.

It is of the utmost importance that water should be made to pass quickly away from walks of porous material. Water tends to rot the path, and moss and weeds will spring abundantly and continue the process of decay. An under system of drainage may need to be provided. The ground below the hard core may be cut out in either of the two ways shown in Diagrams 44, 45, and land

DIAGRAM 44.

DIAGRAM 45.

drains laid. The first method is most economical and in every way better for paths up to 6 ft. in width. After that the second may be advisable, particularly if the soil is heavy, in order that the water may escape rapidly.

When the path is of impervious material, only surface water has to be considered. At intervals along the walk gullies must be made down which surface water can run. They can be built of brick with a cast-iron grating on top, or better still be glazed ware "yard gullies." Brick gullies are about 24 in. deep, and 8 in. from the bottom a pipe is inserted to carry off the water to the nearest drain, or "soak away." The object of not having the overflow pipe at the bottom is to allow dirt to settle before the water passes on. Yard gullies have the chamber and outflow pipe

in one piece, and are easier to clean. When the deposit of mud accumulates to the level of the outlet pipe, the grating is lifted and the mud raked out. On perfectly level ground, or on a steep gradient gullies should be set 100 ft. apart. On a gentle slope 300 ft. is sufficient, and as far as possible they should occur in clusters to facilitate the disposal of the water.

Carriage drives are merely walks on a larger scale. For a single carriage 10 ft. is wide enough,

DIAGRAM 46.

but unless the drive is very short this has a mean appearance. A width of 14 ft. will just allow two vehicles to pass each other, and 16 ft. is a better allowance. Whatever the gradient of the ground the formation of the drive looked at as a transverse section should be as though the ground were horizontal. The necessary changes of level must be made in adjacent banks. (See Diagram 46.) Curved drives should have the outer edge slightly raised above the inner, in the same way that railway lines are laid. For swiftly moving cars this is almost necessary for safety.

Drives are made of coarser material than garden paths. From 6 to 9 in. of hard core must

be provided, and 4 to 6 in. of finer surfacing, generally gravel. Drainage is needed in the same way, but instead of gullies to carry off surface water, cuts can be made through the verge to spill the water out on to the grass, where the drive passes through park or meadow-land. This is too rough a method for the cultivated parts of a garden.

EDGINGS

EDGINGS can be of various sorts, and should be chosen with regard to the style of the house and design of the garden. Live edgings are particularly charming, but they occupy a good deal of space which cannot always be spared from a small garden. Grass is the most common, and would be more so if it were not for the trouble of keeping it, and the space it occupies. A grass verge should never be laid less than 2 ft. in width, and 3 ft. is a better limit because constant use of the edging iron tends to diminish it. A verge less than 2 ft. wide is in danger of being scorched in the summer.

In forming verges old sods are valuable. They are inverted and laid along the edge of the proposed path, projecting a few inches. On these the turf is laid and then the whole is cut back into the correct line. Such an edging is not readily bruised or displaced. If a path is on a different

level to that of the surrounding ground the verge should be raised or lowered also for a space of from 2 to 4 ft. In fact the verge must be considered as belonging to the path, not as part of a border or shrubbery, and if these are raised the verge proper begins on a level, to run with the walk, and then turns up to connect with the bank.

Clipped box makes a splendid finish, acting as an embossed outline to a design. Its special province is the formal garden, and by thickening or raising it it may take its place as part of the actual design. Some skill is required to keep box edging in order, and the fact that it certainly harbours slugs has made it less used than formerly. The garden at Holland House shows an extensive use of box edging, and the drawing of a fine parterre at Shobdon Court (see p. 14) demonstrates the effective use of box for accentuating outline. It may be noticed that the edging is thickened at certain points to link different parts together.

Thrift is another plant that grows dense enough to separate gravel from soil. Other live edgings such as pinks and saxifrages are not sufficiently solid in themselves; and this brings us to the prettiest of all edgings—the half natural mixture of stone and flowers. Local stone, whether flint or granite, Yorkshire flag, or Surrey Bargate, is right to use in this way. The stones are set as nearly on edge as can be, and small low growing things are planted between and just behind them,

so that the whole is covered with foliage and flowers and looks like a strip out of an Alpine garden. One variety alone may be used, or a mixture.

Such an edging, charming in itself, is not suited to every type of garden, and where stone can be had the designer should arrange beds with a view to making a feature of it. In the Guildford neighbourhood where Bargate stone is plentiful, stone edgings are common, and give a distinct character to the gardens. In conjunction with flagged walks of the same stone they are seen at their best.

In small gardens tile edgings are suitable ; they are exceedingly neat and clean and occupy little space. Many patterns are made, and the cable pattern is the most agreeable, either in red or grey, or blue Staffordshire which goes well with ash and tar-paved paths. The "gothic" types should be avoided, for besides being ugly they are liable to break. A plain rolled pattern can be had from some firms and has a good appearance.

Bricks also make appropriate edgings. They can be set dog tooth fashion, or on their sides, in which case it is better to use mortar or cement at the joints. Ordinary 6 in. quarries such as are used for paving make charming edgings for small beds. They are not easy to set true. I have also used roofing tiles of a flat make. If the hardness of tile and brick edgings is not liked it can be veiled by a line of plants behind.

The set of edgings has an enormous effect on the appearance of a path. They should seem to be composed of one continuous substance, and run absolutely true with the path, and stand $1\frac{1}{2}$ in. above the gravel.

TERRACES AND STEPS

A TERRACE to the house is desirable for several reasons. It gives importance to the building ; it satisfies the eye's desire for solidity ; it makes for health and comfort, and enables one to overlook the garden. Even an 18 in. one is worth having.

A rule has been laid down that the width of a terrace should be the height of the house, from ground line to eaves, but as a matter of fact length is also an important consideration, for unless there is length a wide terrace looks squat and ugly. 10 ft. may be taken as the minimum width. Terraces are more often too narrow than too wide, and particularly when a rapid fall exists and a high retaining wall is necessary. The proportion between the wall and the width of the terrace should not exceed 1 to 3. That is to say a platform 12 ft. wide ought not to be bounded by a retaining wall more than 4 ft. high. If the retaining wall works out at more than 10 ft. it is advisable to make two terraces. The lower one need not be wider than a good

path—say 8 ft., and the double descent gives an opportunity of making fine steps—always the most interesting part of a terrace. Or the lower terrace may finish with a bank instead of a wall—steps being still required. A parapet should be provided to any retaining wall over 3 ft. in height to give a sense of security, and if not of masonry a low hedge, or low posts connected by chains or rails may be substituted. A parapet about 20 in. high, finished with a flat coping makes a pleasant seat, and vases and other architectural details can be placed on it.

In double terraces, and particularly where a succession is necessary, an excellent feature is possible by bringing forward one terrace over the other (see Diagram 47).

The terrace may be sustained by brickwork, masonry or a grass bank ; brickwork or masonry must accord with the style of the house. A slight batter of 1 in 10 gives additional security, while in the event of the wall bulging from pressure behind, it is less noticeable than when a vertical line is upset. The terrace walk should slope away from the house about $1\frac{1}{2}$ in. in 10 ft. Foundations must be on the solid subsoil with at least a foot of concrete under the footings, for walls over 3 ft. in height. "Weep-holes" of land drains thrust through at intervals must be provided to carry off water, and a foot of rubble should be at the back of the wall to let water sink quickly, and not

accumulate and weigh against the brickwork. With weep-holes and drainage there is little fear of bulging.

Piers add both to the appearance and the strength of a retaining wall, and when carried up

to the coping the enlargements may be used for statues and vases, where other conditions are suitable.

Grass banks are not the most effective method of finishing a terrace. They are best used for the lower ones of a succession, or if the house is of no particular architectural interest. At least 3 ft. of flat grass must be on the top before the slope begins, and in any case a terrace finished by a bank needs to be wider and shallower than one finished by a wall. The bank should be on a slope of 2 to 1; not less, or there will be trouble in keeping the grass, with edges sharply defined top

and bottom, and batter absolutely true. In forming the banks the best way is to make a wooden frame to work the soil against, for the least bulge or hollow spoils the appearance. Except in quite light soils a run of land drains should be laid at the foot of the bank from 2 to $2\frac{1}{2}$ ft. deep, to drain away the soakage of water through the bank.

The steps are an important part of a terrace, and offer great scope in their treatment. The first consideration is to provide easy walking. From $11\frac{1}{2}$ in. to 12 in. tread, and 6 in. rise makes the best proportion. Rise and tread multiplied together should be between 70 and 80 in. Thus 5 in. rise would give a tread of 14 or $14\frac{1}{2}$ in.; $6\frac{1}{2}$ in. rise a tread of 11 in. or a foot. Below 4 and over $7\frac{1}{2}$ in. steps cannot be made comfortable for use or appearance. The proportion of rise to tread may be obtained without the full occupation of space by having the steps "nosed." This affords more width to one tread without encroaching on the tread below, and in a long flight of steps an inch or $1\frac{1}{2}$ gained on every step is worth something on the total flight: moreover "nosed" steps always look well. The dimensions given above do not apply except to steps in conjunction with walls. Steps occurring to break long sloping paths may be made with any tread that is required, care being taken to make each tread definitely for an exact number of strides, taking a stride at 30 in,

DESIGN FOR ENTRANCE TO GARDEN

The extent of the steps must depend on the rest of the terrace, a high terrace requiring more width, and vice versâ. In any case the opening in the wall should not appear square when viewed from the front. The sides would be finished in the same style as the terrace with balustrade, parapet wall or simple plinth, and these may either run out flush with the terrace and drop at the foot of the steps, or they may descend with the steps, in which case they should finish with a pier.

Where space is a consideration landings may be made at which the steps turn. Landings may be very effective, and a means of affording outlooks on the garden below. The drawing on page 135 shows an ascent into a rose garden. Behind the water basin a clear view can be had down the approach path. Besides the interest of a landing afforded by steps turned in this way the line at the foot of the terrace is unbroken by projections. Another way of avoiding the projection of steps is to have them inserted in the width of the terrace, so that the lowest step is flush with its retaining wall, but the terrace to allow this must be of ample width. At Hatfield House the line of the parapet wall and of the path below are both preserved by carrying out a platform on an arch, and having the descent from that. The platform affords good views of the Italian garden below, and underneath it is a good sheltered seat. (See Diagram 48.)

Steps down a grass bank cannot be of grass

owing to the difficulty of keeping them. They may be of stone or brick, when they are best finished at the sides by simple straps of stone or brick on edge, running with the slope of the bank. It is a mistake to build out wing walls, jutting out obtrusively and breaking the line of the bank. When the steps connect with gravel they may be surfaced with gravel, having wooden risers strongly pegged. The sides would be

DIAGRAM 48.

finished either by a board into which the risers are partly set, so dispensing with end pegs, or by turf rolled over a slight bank. Steps made of gravel need no foundation beyond beating the ground and providing hard core.

When a house is built actually on a slope there is opportunity for a terrace on one side, and a sunk platform on the other. The levelled platform should be run out as far as possible, the retaining wall to the natural surface being the limiting factor; 5 ft. is high enough for this. The levelled parts can be repeated up the hill in

the same way as terraces are repeated on the downward slope.

WALLS

MANY gardens are devoid of anything requiring direct architectural treatment except their boundary and kitchen garden walls. These are considered essentials, and it is a pity walls are often grudged to other parts. The kitchen garden wall is commonly such a dull feature that repetition is not coveted, but a wall may be beautiful in itself and interesting through its climbers and fruit trees.

The material should be brick or stone, brick being preferred as it is more suited for nailing in trees, and also has fewer interstices to encourage insect pests. If stone is used a fine grained sort should be selected.

A wall should never be less than 6 ft. in height. The northern boundary, i.e., the south wall may be 10 or 12 ft. high, but the other sides should be less. The height depends somewhat on the size of the area enclosed. An enclosure of from two to three acres can bear 10 ft. walls all round without looking boxed in : an acre is dwarfed by such boundaries, while a 12 ft. wall is high enough for any area. In any case it is advantageous to break the heights. Not only is it unnecessary to have walls of the same heights on all sides, but the change of line is pleasant to the eye.

A thickness of 14 in., i.e., one and a half brick is the usual standard, and will serve any wall up to 12 ft. Greater heights should be built 18 in. Under 7 ft. 9 in. is sufficiently strong, but it is impossible to build neatly on both sides with the

DIAGRAM 49.

one brick thickness, even using the " garden wall " bond (Diagram 49). This, however, is not always considered a prohibitory objection, and with the added strength of piers, 9 in. walls are often made over 8 ft. The piers would be from 12 to 14 ft. apart so as not to interfere with the training of fruit trees, and be $22\frac{1}{2}$ in. wide, projecting $4\frac{1}{2}$ in.

DIAGRAM 50.

from the face of the wall. They need not go right to the top, and should be protected by a coping at the finish. Walls built with recesses, as in Diagram 50, give a fine appearance to a formal design.

Hollow walls retain heat longer than solid ones, owing to air being a very slow heat conductor, and they are as strong as though solid while using considerably less bricks. Diagrams 51 and 52 show two methods of building a hollow 14 in. wall. The second one will be seen to be more economical.

On the question of expense it is interesting to compare the costs of hollow and solid walls.

Thompson gives the following figures for a wall 100 ft. in length and 10 ft. high—

14 in. solid requires about 16,000 bricks.

14 in. hollow requires about 12,800 bricks.

9 in. solid, with its piers, about 11,060 bricks.

Thus it will be seen that where a 9 in. wall will require strengthening by piers, it is almost as cheap to build a 14 in. hollow wall requiring no piers, with far more advantages in the latter,

A very simple and strong wall may be built up to 8 ft. in half brick. Diagram 53 shows its simplicity. Piers of course are necessary to strengthen so thin a structure, and these are contrived by

DIAGRAM 53.

changing the ground line of the wall by an occasional header. Such a wall is useful as an internal division in a garden, between standing grounds, or round a rubbish yard.

Whether of brick or stone a wall requires a coping to prevent wet from penetrating the joints from above. The simplest coping is made by brick on edge set in cement. A line of drip tiles under this is effective and ornamental. Special coping bricks are also made to accommodate different breadths. Kitchen garden walls should have some arrangement for carrying extra copings in spring. Brackets can be built into the top courses to take boards, or movable glass. Milner recommends sections of iron pipe being inserted at the top, through which iron rods can be thrust at the proper season, to support boards and keep nets from contact with the fruit trees. Such copings make a tremendous difference in the culture of wall fruit as they prevent loss of heat by the rising current of warmed air during the night, and assist the fixing of nets.

Foundations of walls in gardens have to be taken deeper than for purely building purposes, owing to the frequent disturbance of the soil near them. Accordingly 3 ft. should be allowed including 9 in. of concrete, resting on firm subsoil and with a base twice as broad as the wall. The width is changed by equal steps on both sides, not more than $2\frac{1}{4}$ in. wide. The same strength may be obtained by building on a series of arches set on firm concrete bases (as for a vinery where the vine roots are to be in an outside border), but it is no advantage for fruit trees to be able to root across under the wall, and the plan is not often followed.

TREILLAGE

TRELLIS-WORK, or treillage, has been a recognized form of garden architecture from the earliest times. The word treillage is more satisfactory than trellis, which is commonly used for any kind of lattice work, while treillage denotes a combination of the latter with posts and rails in a definite design. Frescoes at Pompeii represent various applications of the art to shrines, aviaries and summer-houses. It was common in Roman gardens. The ancient Egyptians knew its decorative value, and modern Egypt still makes characteristic patterns with short carved lengths and bead-like ornaments. The gardens of China and Japan abound with

examples. Although all countries appear to appreciate treillage as a garden accessory, the finest examples belong to France, and in the eighteenth century the treillageur was an important craftsman. He developed his own or architects' designs, and temples and galleries sprang up in every large place.

When landscape gardening became the rage, and visible boundaries of all kinds were at a discount, treillage and hedges alike were swept away, but of late years, and with the revival of interest in formal design, the art is coming into its own again ; and with the modern impatience of delay in obtaining results people are more inclined to put up treillage than to plant hedges, without regard to suitability.

In designing treillage the framework is of the first importance. It must form a solid outline to the structure, if summer-house, or niche for statue, and strong supports to screen or pergola. These strong wooden posts are to treillage as piers are to a pierced brick or stone balustrade, and great care must be exercised in working out their proportions. Iron stays were frequently employed in the more elaborate French designs to strengthen angles and roofs, and to enable a lighter make of wood to be used. The filling in should be mainly square—a 7 in. mesh is pleasant to look on—but of course the size depends on the space to be filled, and ingenuity is often needed to

contrive a square which accommodates both height and breadth. Rounds and ovals can be introduced with good effect. The bars are not as a rule let into one another, but one set, say the vertical, passes over the horizontal and is fastened at contact by wooden pins or nails. Ancient treillage was often secured by wire bands. It is usually better to have the vertical bars outermost, i.e. on the right side, as the vertical shadows accentuate the elevation. Diagram 54 of a simple treillage fence shows the value of vertical shadows.

DIAGRAM 54.

Treillage screens may be designed in endless variety in keeping with the style of the garden. Sound seasoned wood only should be used as any warping is disastrous; oak, teak and Australian hardwoods are preferable to deal, even though the latter be preserved by paint. The old French treillageurs relied largely on chestnut, of which they would have good choice. For laths a useful size is 1 in. by $\frac{1}{2}$, and for lighter wood $\frac{3}{4}$ by $\frac{3}{8}$.

Posts and connecting rails would be in proportion to their height and the amount of space they enclosed.

So much good carpentering goes into treillage that it should not be completely smothered by creepers. It is fairly opaque without any greenery, and if such rampant growers as Dorothy Perkins rose is wanted, a less elaborate structure would serve as well. Twining plants, neatly trained roses and fruit trees are most suitable. Many of the finest French examples are quite bare, but this seems a pity when a light climber would not disguise the design. In the eighteenth century when the art was at its zenith the treillageur was expected to devise metal leaves with which to decorate his work : an artificiality which was a sure presage of a change in public taste.

GARDEN FURNITURE

ONE of the most terrible results of the desire to be naturalistic in gardens was the introduction of "rustic" work. Flowers have been drawn from various countries, the paths are far removed from mere foot-tracks, the grass is carefully tended, and yet structures are introduced which are absolutely uncouth or affectedly simple. The seat or summer-house constructed of peeled and *varnished* branches is surely the climax of bad taste.

In public parks one sees fountains and their basins carefully made of deliberately jagged stone blocks: a structure that could look passable only amidst the roughest surroundings, and rising from mown grass or a made path it is singularly inappropriate. Many objects, involving as much workmanship as paths and laid lawns are proper to a garden, and the same care should be given to them as to other parts. Seats and shelters, gates, vases and pergolas should be accessories and not principal objects. The architect is inclined to design these and look to the garden to display his work, but the garden designer will aim for strong and simple structures appropriate to their purpose, and not obtrusive.

The garden treated in landscape style, with curved paths and undulations, requires the very plainest carpenter's work, and naturally straight timber, such as larch, may be used in its rough state, plain joints being used in putting pieces together. A roof thatched with heather or straw is more appropriate than tiles, but all should be neatly finished. On the other hand in formal surroundings where paths are straight and flower beds patterned, a garden-house would be more suitably built of brick or stone, or of painted woodwork, and repeat the architecture of the house. After summer-houses the most elaborate structures required in gardens are bridges. If "rustic" work is inappropriate for buildings how much worse is it for bridges, whose chief characteristic should be

stability. Even the plainest plank bridge may show intelligent labour. No effort of imagination can pretend a bridge is a natural product, and a sham haphazard structure is absurd. Moreover a bridge with its repeated image in the water below should be doubly beautiful, and no pains should be spared to make it so. The Japanese show artistic taste in garden structures as in everything else. Each little humped up bridge and tea-house has as much care lavished on it as the rest of the garden, and note that though a Japanese garden is a landscape garden in its truest sense, no rustic work has any part in it. A bridge should always be sufficiently above the water for a gleam of light to show beneath it. The semi-circular bridge of the Japanese carries this principle to the fullest extent, a perfect circle being formed by the bridge and its reflection.

The chief beauty of some old gardens is their gateways. The old designers gave great attention to these knowing them to be an integral part of the design. The boundary wall and its gates should go together, and where the wall adjoins or forms the forecourt the architect will generally undertake it at the same time as the house. If they fall to the garden designer let him study the house and conform to its style. Gates between garden and park, and into kitchen garden are generally his business, and in connexion with his own work. Good carpentering is always fit.

DIAGRAM 55.

In making designs for wooden gates certain structural facts must be borne in mind.

In Diagram 55 ABCD is a gate supported at AB, the weight being at B, and acting as a lever of the second order. A corresponding power at D is needed to establish equilibrium. This of course is out of the question, but a support of twice the length at an angle of 45° would serve the same

DIAGRAM 56.

DIAGRAM 57.

purpose. Twice the length would be clumsy, but gates are frequently made as in Diagram 56, with the natural length of the diagonal increased as far as is consistent with the appearance, in order to counteract the ten-

dency to pull away from the post. Gates with concave tops are on the same sound principle (Diagram 57), and it may be noted that they are at the same time more gratifying to the eye than a convex top—the eye being often a truer judge of the beauty in fitness than the reason recognizes.

DRAINAGE

A GARDEN cannot possibly be successful unless efficiently drained. When the subsoil is porous, such as gravel or chalk, or when the ground has a uniform slope, artificial drainage is usually unnecessary. Certain signs among the vegetation indicate to a practised eye the presence of stagnant water, but a more certain way is to open test holes in various parts of the ground. If water appears at 4 ft. drainage is needed. The test holes should be at least 4 ft. deep, and left open for rain, which in a naturally drained soil will disappear after twenty-four hours, even during the winter when the subsoil is at its highest saturation point.

The roots of cultivated plants do not, or at any rate should not, penetrate lower than $3\frac{1}{2}$ ft., and a depth of 4 ft. is generally correct for drains running through a kitchen or flower garden. Under lawns, when the soil is very stiff they may be as near as $1\frac{1}{2}$ ft. to the surface in order to draw

away water from the turf. Supposing the subsoil to be impervious, the following table shows the distance apart at which rows of pipes should be laid, and their depth below the surface.

Soil.	Distance Apart.	Depth.
Stiff clay, under grass	15 ft.	1½ ft.
„ „ cultivated	15 ft.	2 ft.
Heavy loam	25 ft.	2½ ft.
Light „	30 ft.	3 ft.
Sandy „	40 ft.	3½ ft.
Gravel	60 ft.	4½ ft.

A knowledge of levelling is essential to a right laying of drains, which must have a slight fall towards the outlet. If the ground has no natural gradient the fall has to be obtained by the line of drains being laid on a slope within the ground. The outlet should be at the lowest point of the

DIAGRAM 58.

ground. The main drain is first cut, and the branches are laid as they are cut out, beginning at the upper end and carefully joining with the main. Junctions should always be at an acute angle.

Diagram 58 shows a scheme for laying drains over an area with a fall towards one corner.

Ordinary land drains of porous clay 2 in. in diameter are the best, but other patterns are made, such as the horseshoe tile which is rested on a flat sole. Instead of pipes rubble drains can be formed consisting of stones laid at the bottom of a ditch, on a uniform gradient. A good size in section is 7 in. at the bottom, 9 in. at the top, and a depth of 15 in. of broken stone. Finer stone, or a sod, should be between this and the soil, but in any case rubble drains are liable to become choked. They can be laid with advantage in land where young trees or shrubs are to be planted, for while the plants are small drainage may be needed, but as they grow and require more moisture, it is for their good that the drains no longer act. An even more primitive drain on the same principle is made with bundles of brushwood.

In the formation of a garden, drains are laid after the surface has been brought to its determined levels, and before the ultimate preparation of the soil by manuring and trenching. Special draining tools are used for laying pipes which enable very narrow channels to be made without opening a trench sufficient for a man to work in. These and the special scoops form a smooth bottom on which the pipes are laid. They are laid "dry," i.e. without cement at the joints, unless in the case of the main drain passing near tree roots when the

joints must be closed to prevent roots entering and blocking the passage of water. Over the pipes about 6 in. of rubble should be placed with a sod or finer stones on that again.

The usual 2 in. land drain is large enough for all ordinary purposes when natural rainfall only has to be dealt with. If springs have to be tapped a larger size may have to be used ; and where the main drain has many tributaries it may be a 6 in. pipe.

The outlet may connect with the public sewer—the usual means in towns—or it may supply a pond or an open ditch. Where springs are being drained a pond is undoubtedly the best way in a garden, as water can be made such a feature. But rainfall alone is not sufficient in England to keep a pond pleasantly full all the year round, and unless the deficiency can be otherwise supplied the pond will not be a success in summer. Another method is to form a large soakaway, as recommended for receiving surface water from paths. Except in very stiff clay this works satisfactorily. The corner is always rather damp, and willows and other moisture-loving plants should be grouped near it.

In conclusion : the modern tendency is to over-drain land, particularly in towns, where the Borough Surveyors have a horror of dampness, and expect the ground to be dry directly it is not actually raining. The rainfall on a certain area

ought not to be rapidly passed away. It may be stored in a pond for subsequent use, or led into various soakaways, away from parts that require to be kept dry, but to discharge the bulk of the rain on roof and soil into the sewers is acting against nature, and brings its own punishment when dry weather sets in.

WATER SUPPLY

THE question of water supply is intimately connected with that of drainage. Where the surplus water of the wet season is stored it can be pumped up again from reservoir or pond for use in drought. But with the modern system of having water laid on for the house it is more usual to carry the same system into the garden. Where there is a good pressure an immense amount of water can be quickly sent on to the garden through a hose, and the labour saved is generally considered more than compensation for its chilly nature.

Two-inch cast-iron pipes are used for bringing the water from the main. They should be laid at a depth where frost will not affect them—about 18 in. in the London neighbourhood. Branch pipes are 1 in. in diameter and finished above ground either in a standpipe, or a hydrant in a surface box. Hydrants and standpipes are diminished to 1 in. ready for connexion with a hose. Surface boxes are inconspicuous and can

be set on lawns, but standpipes should be in shrubberies or against trees. The number required can be found from the plan of the garden. Sixty feet is a common length for a hose, and circles of 60 ft. radius drawn over the plan will show by their centres where the hydrants or standpipes must be placed.

Section V

THE COMPONENT PARTS OF A GARDEN

“Since the pleasure of a garden depends on the variety of its parts, 'tis therefore that we should well consider of their dispositions.”

Batty Langley.

THE COMPONENT PARTS OF A GARDEN

The Approach—Kitchen Garden and Orchard—Water—The Rose Garden—Rock and Wall Gardens—Wild Garden— Iris Garden— Other specialized Gardens— Recreation Grounds and Public Parks.

THE APPROACH

WHETHER the house be large or small the approach to it needs careful planning, as the first impression of the place will be gained from it. The entry from the highroad has to be first considered. The best position is opposite a junction or an angle, when the gates can be seen from some distance, and vehicles brought straight up to them. They should be set back somewhat from the road. This enables a better turn in to be made, and if there is any delay in opening the gates the road is not being blocked. Also the lodge can be set farther from the dust of the road while yet com-

manding the gates. Setting back is most required where the drive turns off at right angles. It may be variously shaped, the simpler the better. Any space not required for convenience of driving can be laid down in grass or shrubs, and protected by low posts and chains. Diagram 59 shows various entrances of good form.

DIAGRAM 59.

When gates open directly to a straight avenue they can hardly be too stately. When the drive turns and passes through more or less natural scenery simpler gates are permissible. The same principle applies to the junction of a drive with the highroad as to two paths: it should enter at right angles, and take the most direct (or apparently so) line to the house (Diagram 60.) Often the finest view of the house is towards one of its corners, and some manœuvring may be necessary to bring the drive up towards a corner. Judicious planting is the best means of justifying an indirect road. The bends can be planted so as to appar-

DIAGRAM 60.

ently force a curve. (See Diagram 61.) A perfectly straight drive from gate to house may be planted to form an avenue ; or part of it, provided it is straight, may be an avenue, either at the beginning or the end, but a central portion should not be treated thus. Collaboration with the architect is an assistance to making an effective entrance, but by careful planting the sight of the house may be postponed until the best angle is reached. A previous glimpse, too far off to distinguish details, is not amiss.

An avenue should be at right angles to the house, but otherwise the final sweep comes in more conveniently sideways to the building, and the necessary carriage space in front of the house gives an opportunity for an architecturally treated

DIAGRAM 61.

forecourt. These were common at one time, but the fashion for landscape gardening was against their formation, and good examples must be sought mainly in old gardens. Most geometrical shapes can be adapted for forecourts, from a plain rectangle to various polygons, circles and their derivatives. Diagram 62 shows a forecourt recently added to a house, in place of an ordinary carriage sweep. The ground rises from the house—always an awkward circumstance—and soil had to be cut away until the requisite space had been obtained. A stone retaining wall was built to keep up the ground, and the new drive is contrived to come in and pass out on the level. Steps in the centre of the wall give access to the garden beyond.

For lesser places a carriage sweep is more appro-

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priate than the architectural forecourt. They are difficult to plan where space is limited, as unless well set by grass or planting the stretch of bare gravel is apt to look very large. 25 ft. is needed for a carriage turn, and a large car takes a 50 ft. circle to get round in without

DIAGRAM 62.

backing ; and enough space must be left on each side of the front door for vehicles to be able to move without being forced to begin turning immediately.

The approach should be arranged to bring the vehicle to the front door on its left side. This gives a direct descent to the footman, or to any one accompanying the driver. A pear-shaped

space is the most economical. If there is room a larger turn can be made round a centre, and circles or ovals can be formed. (Diagrams 63, 64, 65.)

DIAGRAM 63.

DIAGRAM 64.

DIAGRAM 65.

Centres can be variously laid out. The commonly seen "bun" of mixed evergreens is the ugliest method of dealing with them. If shrubs are used they should be all of one kind. An evergreen sort is undoubtedly best: clipped box, or yew, is suitable. A raised flower bed, treated architecturally in the manner of the house, makes an effective centre piece: but unless centres are at least 10 ft. in diameter they are better omitted, and the whole space gravelled. Small objects, such as sundials and vases, look meagre except on a fairly large plot of grass

and well supported by beds.

When space allows the centre may be more elaborately treated with a set design. Diagram 66 gives a good example. The outer edge of a

carriage sweep may be planted with trees of upright growth, such as some of the *Cupressus*, which emphasize the shape, and give it something of the character of a forecourt.

All the gravelled space should be on the same level, parallel to the house, but a slight downward gradient at right angles is good for drainage, and appreciated by chaffeurs.

DIAGRAM 66.

A carriage drive is unnecessary where the house stands less than 50 ft. from the roadway. A direct path to the front door, and one at the side for tradesmen should be planned instead. The tiny spaces in front of town villas might be made much more interesting than they usually are. To begin with the ostentatious carriage entrance might be omitted and the space gained planned formally, using clipped bushes, or naturally symmetrical trees to suit the nearness of brickwork and railing.

Privacy from the road is generally required and can be best attained by a row of lime trees trained flat. The stems are clean to the fence level, after which branches are trained sideways. The back garden also needs to be screened from view. The most satisfactory way to do this is to carry a wall across the garden in a line with the front of the house ; but the expense is usually prohibitive. Treillage or a hedge can be substituted.

The path from the gate to the front door should be direct, and wide enough for two persons to walk together in comfort. Brick, tile, and flag stones are particularly nice for short entrance paths, as they are dry under foot, suitable in conjunction with buildings, and assist towards the extreme neatness which ought to characterize an entrance.

Repton lays down the following rules to govern the formation of an approach to the house.

1st. It ought to be a road to the house, and to that principally.

2nd. If not naturally the nearest road possible it ought to be made impossible to go a nearer.

3rd. The obstacles introduced for this purpose must appear natural.

4th. When an approach quits the highroad, it ought not to break from it at right angles, or in such a manner as robs the entrance of importance, but rather at some bend of the public road from whence a lodge or gate may be more conspicuous ; and where the highroad may appear to branch

from the approach rather than the approach from the highroad.

5th. After the approach enters the park, it should avoid skirting the boundary.

6th. The house, unless very large and magnificent, should not be seen at so great a distance as to make it appear much less than it really is.

7th. The first view of the house should be from the most pleasing point of view.

8th. As soon as the house is visible, there should be no temptation to quit it (which will ever be the case if the road be at all circuitous) unless sufficient obstacles, such as water or inaccessible ground appear to justify its course.

THE KITCHEN GARDEN AND ORCHARD

THE kitchen garden is essentially for use, and this must never be lost sight of in its design. A walled in kitchen garden is the ideal. The size must be proportioned to the house and its needs. An acre of ground is reckoned sufficient to supply ten persons with all fruit and vegetables, excepting main crop potatoes, which are more a farm than a garden crop.

The space should be enclosed (by a wall if possible), be rectangular in shape, and have paths running all round within 10 ft. of the boundary and also across, dividing it into equal portions. If there is a wall the border that is shaded by it on

the south side of the garden may be only 6 ft. wide, as its use is restricted. Beaten alleys are made if access is required to other points.

Diagram 67 shows the plan of the kitchen

DIAGRAM 67.

garden of a large Hertfordshire place. It is workmanlike and complete in its arrangements and may serve as a model. The enclosed space is about an acre. The north walls are 10 ft. high, and the south are 8 ft., east and west the same,

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The approach from the pleasure garden is through A, and from the back part of the house and the stable through B. The gate C leads directly to small fruit plantations and orchard.

On the northern side are the glass houses, built as lean-tos against the wall. They comprise three vineries and one peach house, and between them is a house more ornamental in structure and used as a conservatory. A low house for carnations is separate from the main range, on the east of the doorway D. The two exits, D and E, from this side give access to an important part of the economy of garden work—viz., the frame yard and forcing pits. These are tidily separated into compartments by privet hedges, and permanent crops such as rhubarb, seakale and asparagus beds also find a place here. A thick belt of evergreens, conifers and rhododendrons stand on the north-east boundary, and break the force of the winds that come across open meadows beyond.

Various offices are attached to the north side of the walled in portion : fruit and flower rooms, bothies, store, stoke hole and small potting shed and office, a large range of sheds is in the standing ground, for housing pots and various implements.

The main paths across the kitchen garden are 8 ft. wide, and the subsidiary ones round are 4 ft. 6 in. The main paths are bordered by espalier or cordon fruit trees, with a border 10 ft. wide between

them and the paths. These are occupied by roses and other flowers.

The garden is well placed in regard to its "slips" (the outer portions), which are generally about 40 ft. wide, and serve for coarser vegetables, reserve flower-garden and small fruits, besides affording another wall surface. In this particular garden a certain amount of ornamental planting has been introduced among the crops. The long path that crosses A is bordered by lavender and monthly roses, behind which come vegetables again. The south slip is naturally a sheltered part, and a sunny pleasant walk should always be contrived here when space can be spared.

This scheme is an excellent model. A decorative feature might be introduced at the centre, or at the most used gate A. The four-square plan makes it easy for the gardener to arrange cropping. It is awkward for him if (for example) the necessary two rows of early peas on one section work out to be two and a half rows for the same quantity on another section ; for every part has to take its turn in the rotation.

Only trained fruit trees are inside this garden. Standard trees are better grown in an orchard to themselves. They take up much room, and cast too broad shadows for crops to thrive near them. Trained shapes such as cordon, espalier, fan and pyramid forms are more suitable to associate with crops, and neat espaliers on strained wires are an

excellent background to any flower beds that may be introduced into the kitchen garden.

The prettiest adjunct to a kitchen garden is the herb garden. It may be situated in one of the angles in order to take advantage of the walls as part of a formal boundary, and for shelter. Or it may lie on either side of the principal entrance, forming a small episode in the general scheme. A herb garden is attractive by its contents alone, and the necessity of having every plant accessible points to small beds and paths. Lavender and rosemary hedges are naturally associated with herbs, and though modern requirements call for less variety than in medieval times, the number may well be increased beyond kitchen needs for the sake of their beauty and fragrance.

The orchard should not be too far away from the house, or there is difficulty in protecting the ripe fruit. Ground sloping to the south or south-west is most suitable. An eastern aspect is not advisable as the early morning sun after frost is most destructive to blossom. Shelter from wind should be provided. The fierce gales from the south-west are particularly destructive, and generally blow just as the apples are nearly ripe. Larch and poplar grow quickly, but whatever shelter trees are used they must be planted far enough away not to impoverish the soil of the actual orchard.

When full grown orchard trees are a protection

to each other, particularly when attention has been paid to planting the hardiest sorts on the outside. They should have from 18 to 25 ft. distance allowed between them, and while young it is a good plan to interplant with varieties in bush form. These will occupy the ground for about ten years, giving good crops, before they need be removed for the sake of the standards.

The best results in fruit are undoubtedly obtained from ground that has been first well trenched and then kept clean. On the other hand grass orchards are prettier, and require less labour in their upkeep. A satisfactory compromise is to start clean and keep the ground open for the first three years after planting, while the trees are making themselves at home, and the strips of open ground between can be used for strawberries, or cabbage crops. In the spring of the third year the orchard may be sown with grass.

If a pasture be allotted to the orchard, and it is not desirable to plough it up, stations must be made for each tree, digging and preparing the soil for a square of 5 ft., and 3 ft. deep, breaking up the bottom ; and for two feet radius from the tree the ground must be kept clean. The advantage of regular spacing without the stiffness may be gained by marking out the ground into regular squares and planting a selection of the stations found. Diagram 68 shows a pasture planted in groups, and yet every tree has been fairly spaced,

DIAGRAM 68.

Varieties should be kept together, whether in blocks or rows, for convenience in gathering the fruit, and also for appearance when the trees are in bloom.

WATER

WATER, always adds a charm to any scene where it is not in direct opposition to nature, as for example, a rushing cascade introduced into a flat garden. Where the ground is sufficiently large and surroundings are suitable, a natural pond may be simulated, but in porous chalk, or artifici-

ally built terraces water must be introduced in prepared basins.

To merely run in water is seldom sufficient to obtain a pond, and even on the strongest clay the surface soil is porous. For gravel and sandy soils a concrete bottom is recommended, for clay may be difficult to procure, and gravel forms the bulk of concrete. The place should be excavated at least 1 ft. below the depth of water required, and 18 in. wider, and the soil carefully put aside for raising plantations and promontories. The bottom and sides must be rammed as firm as possible. The concrete should be composed of six parts pit ballast and clean sand to one of Portland cement. The bottom receives a layer of 1 ft., and the sides one of 18 in. When set, three-quarters to an inch of pure cement is floated over the rough concrete, trowelling it well into every hollow, and leaving a perfectly smooth surface.

Where clay is available puddling is effective and much cheaper. The clay must be free from stones and worked up with water until it is plastic, and then plastered and rammed on the bottom and sides to the same thickness recommended for concrete. It is very messy work, and must be thoroughly done or a few cracks may spoil the whole. It must not be allowed to dry while waiting for the water to come in, and mats or other coverings should be laid over the portions done, until all is finished.

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If the ground is naturally non-porous, it will be sufficient to make the sides watertight by means of puddle gutters. These are on the same principle as a dam. A ditch from 18 in. to 2 ft. wide is dug all round the prepared hollow and filled in with puddled clay. For every foot of depth the thickness of the wall of clay should increase by 2 in., and the wall should finish 1 in. above the intended water level. Sometimes it is necessary to form puddle gutters only at one end, as on falling ground where artificial making up has been done.

When the banks are turfed, sods should be carried below the water line and pegged into the sides. The sides of a concreted pond should have a layer of gravel on the top of the concrete, and large stones imbedded in the foot of the bank beyond. Gravel should also be placed over a puddled bottom to prevent its disturbance, and on the sides where the wind on the water causes a slight wash.

Natural rainfall is not enough to keep a pond at one level the whole year, and an extraneous water supply should be arranged, either regularly flowing, or able to be turned on. Both inlet and outlet may be made occasions of interest. The inlet may take the form of a waterfall if the surroundings are wild enough to justify it. Or it can be a small stream, the pipe feeding it being hidden behind rocks. The outlet cannot be a waterfall except when the pool is one of a series, but it may go

out as a stream, and a bog garden may be combined with it. In short the overflow should be of a gentler nature than the inflowing water.

Unless a pond is wanted for bathing, there is no object in having it more than 4 ft. deep, of which 2 ft. should be soil if water lilies are to be planted in it. The lilies can be planted in the soil by making the roots into a bundle with good fibrous loam tied round with sacking, or in an old basket, and sinking the whole. As the roots develop and the sacking or basket rots away they spread into the soil of the pond. About 2 in. of fine clean gravel should be laid over the soil.

Streams need the same preparation as ponds. The beds of streams feeding or draining ponds must be very hard at their junction with the latter. Moving water has a strong corrosive action, and when the inlet stream has worn itself below the pond's level a backward flow takes place, and the inlet becomes stagnant and sluggish. Or the outlet may wear back, and the water level itself be lowered. The hardening is best accomplished by a concrete channel, or half pipes joined by cement. I have used pantiles successfully, the laps being cemented. The nature of the bottom can be hidden by pebbles.

Basins for fountains or still water are suitable for architecturally treated gardens, particularly when combined with bold designs below, or on a terrace. It is a question whether jets of water

A ROSE GARDEN
FOR HOUSE IN
BEDFORDSHIRE.

are as charming as reflections in a calm surface and in England we seldom have days entirely without wind which destroy the grace of a fountain.

Basins may be any shape, the simple ones being as a rule most effective. Sometimes elaborate shapes may be used to work in with the surrounding design. In the drawing of the rose garden at Blunham House (above) the lily tanks are shaped to fit in with the rose beds, and to enhance the central sundial. Puddle can never be used for lining to formal basins. Concrete or brick laid in cement must be used, 1 ft. for bottom and

18 in. for sides as for ponds, and finished with an inch of cement. The inner wall should slope outwards slightly to give easy expansion to water in the event of its freezing.

Four ft. is ample depth for any basin. When water lilies are required they should be planted in boxes, for which Diagram 69 gives a good pattern.

DIAGRAM 69.

It is 2 ft. every way outside measurement, and put together with strong square corner pieces which project at the bottom about 3 in. This enables a free circulation of water, and makes the boxes easier to handle by passing ropes between the legs. The wood should be oak, teak, or other hard wood, and be tarred as well. There should be holes in the bottom for drainage, and the soil is made up with drainage material and rough stuff in exactly the same way as for ordinary potting, except for a finish of about 2 in. of clean gravel on the top.

Copings of some sort are necessary. A very simple finish can be obtained directly with the material used. The concrete basis should be roughly moulded to a curve, and the final shape worked up with the cement by means of a template. In making a circular basin a strong stake is driven in for the centre, and a piece of wood nailed to

the top to revolve as radius while the concrete sides are being raised. For the moulded coping a template is fastened to the centre and swung round, forming an absolutely true margin. See Diagram 70, which shows a section of a circular

DIAGRAM 70.

basin with moulding bar attached. The stake is pulled out at the end and the hole closed by a plug of cement. Where a centre does not exist a template must be guided over the cement coping by an outside framework.

Stone copings are handsomer than those made from the concrete and cement, and permit of a slight overlap, and the shadow line is valuable. Either in real or artificial stone many shapes are possible. Diagrams 71 and 72 gives varieties. They can be varied again by introducing flat

portions to take vases and other architectural ornaments. In rectangular basins the corners may be effectively treated in this manner, as the enlargement gives a pleasing impression of strength.

The height of the basin wall and its coping above ground level is a matter of taste. Large basins can bear being raised higher than small ones, and where reflections are an object the water level, ground and coping should be as nearly

DIAGRAM 71.

DIAGRAM 72.

as possible the same. The coping should never be more than 18 in. above the water line.

The inlet to basins and formal tanks may be brought in where convenient, and it is usually better to have the opening below the water level, which of course is determined by the outlet. This is supposing that the tank is fed from a higher point and that there is no fear of a back flow.

There is no need for the outlet to be *at* the water line, provided it is bent up to that level after it has left the basin. Indeed it is better to have the outlet hole low down or it is always the warmed water that is drawn away. An inlet 6 in. below

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the water line, and an outlet 1 ft. from the bottom of the basin is recommended, as this gives a cross flow of water. (See Diagram 73.) The outflow

DIAGRAM 73.

must not be absolutely at the bottom or it will become blocked by sediment, and in any case the mouths of all pipes should be protected by fine wire caps.

The highest point in the bend of the outflow pipe controls the level, and where the ground line is the same as the water, it is impossible to conceal a bend. (See Diagram 74.) An outflow *at the desired water level* must be substituted, bending at once through the thickness of the sides so as to clear the ground beyond; or it may be a vertical one inside the basin itself. (See Diagram 74.)

DIAGRAM 74.

The overflow water may be led into the ordinary drainage system, or it may pass into bog beds,

and there be sucked up by plants. The latter is an excellent way of making the most use of the water, provided it does not come too rapidly for the plants to take it up.

THE ROSE GARDEN

ROSES are worthy of a place to themselves, both from the exhibitor's and the ordinary flower lover's point of view. The best spot in the garden is none too good for them. It should be away from encroaching tree roots, exposed to sun and sheltered from wind, and not in full sight of the house, for during winter a rose garden is not very interesting, its most prominent feature then being a mulch of manure.

A yew hedge is the best possible enclosure, for it cuts the wind without excluding the sun, and the blue green foliage is an admirable foil to the flowers. The hedge should have a path between it and the rose beds, or at any rate a three foot beaten track, in order to prevent its roots from intruding.

The beds should be simple in shape, and without acute-angled corners. Beds for polyanthus may be 18 in. wide to take a single row, but for massing the bigger kinds from 5 to 10 ft. can be allowed. A greater width than 10 ft. is not recommended, or the inside bushes will be difficult to get at. A simple geometrical design gives the most satis-

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factory results ; Diagram 75 shows a plan on the plainest possible lines which looks well, although only just redeemed from monotony by the beds being faced different ways. It is easy to plant, being mainly rectangular. Bush roses being more often the same height, the resulting flatness can be relieved by standards, and still more by pillar roses. The latter can be used very effectively standing at definite points in the plan. Where curves have been used pillar roses, or weeping standards, at the centres from which the curves have been struck give coherence to the design.

DIAGRAM 75.

Climbing roses are so beautiful that the rose garden must contain some, and the obvious arch is a difficult feature to use wisely. There might be arches at the entrance, or at a centre where several paths join, but it is a fatal mistake to scatter them about merely because climbers are liked, and supports must be furnished in some form. Poles can be used in many ways. With connecting chains they may make an inner ring to the more solid hedge, and the best way of all is to combine

poles and arches into a pergola, where such is suitable.

A pergola is essentially a covered way, and like other paths should exist to lead somewhere. It can fitly associate with a rose garden, either to lead to, or from it or across it, and no straining is needed to give it good reasons for its existence. In the drawing on page 183 a view is shown of a rose garden where the pergola is a passage way across the rose garden from lawns on one hand to the alpine garden on the other. The ground has a rapid fall which enables one side of the pergola to be flanked by a retaining wall, and a walk on the high side of this gives a view of the rose garden looking downwards through the cross bars of the pergola. The rose garden itself is a levelled space and has a water lily tank in the centre. It is bounded by a retaining wall with a low parapet on which climbing roses can sprawl. The jutting out portion is in order to afford points of view.

Grass makes the best setting to rose beds, and the objection that grass paths are not very serviceable does not apply in this case as a rose garden is for summer and fine weather. It is well to provide a gravelled or flagged path for access, and one all-round path for convenience of working, wheeling manure, and so forth.

A sunk rose garden is extremely pretty, as a fine display of colour is spread out for any one looking down on the beds, and the low retaining

ROSE GARDEN • FOWEY • CORNWALL •

walls or banks give opportunity for various creeping and semi-climbing roses. Water associates well with roses—as indeed with everything, and climbing varieties on posts and chains round a pool provide graceful reflections.

In planting, masses of the same variety give the best effect, and when the design of beds is good it is further improved by masses of the same colour. The hundreds of *C. Testouts* in the beds at Holland House look far finer than any mixture: As it happens *C. Testout* is one of the most reliable

roses for London, and there is an additional reason for such quantity ; but people generally require more varieties. In fact once the rose is cared for it seems impossible to stop adding new sorts. But a mixture of colours confuses the design, and even uniform height is an advantage to be sought after. Contrasts, as of a mass of flaming *Victor Hugo* with a neighbouring bed of *Frau Karl Druschki*, benefit the appearance of both flowers and the design. Two varieties may be planted together, if regularly set out in the bed, and a harmony in colour is recommended above a contrast. In order to accommodate favourites crowded out of the massed beds, other quarters should be set apart for them. The rose garden of the drawing page 183 has a border running along the parapet boundary to take these.

Beds for pegged-down roses should also be included. The semi-climbers such as *Gustave Regis* and *Zephirin Drouhin* are well adapted for such treatment and flower prodigiously under it. Moreover the pegging makes a variety in the habit of the roses, which in bush form may become monotonous. The question as to whether any other flower is to be included with the roses is one for the owner and his gardener to decide. An exhibitor would scout the notion of an edging or underplanting of any kind, but where roses are for decoration only the addition of violas, saxifrages, plain white pinks or bulbs undoubtedly

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adds to the interest of the rose garden in its "off" season.

A very charming sort of rose garden may be formed in the wilder parts of the garden as a rose dell. The one at Kew is a good example, happily made on the site of a disused gravel pit. Climbing roses are planted on the brow of the pit, and fall in masses down the sides, while the approach down the old cart track is lined with sweet briars, *rugosas*, and various species too riotous in growth to be included in the rose garden proper.

ROCK AND WALL GARDENS

THE rock garden, being an imitation of nature, has no place near the house. A formal bed, with stones laid on it purely for the comfort of the plants may be set amidst formal surroundings, and indeed as part of a set design the low growing alpines may be worked in without looking incongruous. But the rock garden that sets out to be a transcript of nature should be well away from the influence of architecture. A change of levels involving a bank with a general south-western aspect is a suitable situation for a rock garden, but not if the bank supports the terrace round the house. The distant view of a building standing apparently on a pile of undressed stone does justice to neither house nor rockery; the two are not compatible.

A natural change of level makes the best site. Undulating ground often has parts which by throwing some soil back would form a restful level, and give an opportunity for rock work on the increased steepness of the slope. Diagram 76 shows a sec-

DIAGRAM 76.

tion through land slightly moulded to afford such a situation. The finest place of all is an old quarry. On gravel soils the material

for concrete and paths is often found on the estate. Here is a chance not to be missed. Let the pit be made at some distance from the house, but within the garden enclosure, and opened from south to north giving a sloping cart track to the pit, ending in an abrupt cliff with a southern aspect. A splendid sunny spot will be the result, where alpenes of all sorts will flourish. A little forethought will enable the interior to be roughly modelled during the excavation, which will save much subsequent labour. Gravel pits are too often considered a necessary evil to be condoned only on account of their previous usefulness, but to any one who cares for rock gardening they are a valuable feature. The coloured drawing (page 186) represents just such a gravel pit built up into an alpine garden. The part drawn is the old cart track, now paved, with a few steps at in-

AN ALPINE GARDEN.

tervals. The effect is that of a rocky gorge, which grows steeper until where the pit itself opens out it is about 12 ft. below the ground level. Water fortunately was found at the lowest part and a small pool has been possible. The sides are all cased with Bargate stone and good loam, representing a natural rock formation. Three flights of steps in rough stone lead out of the pit in addition to the wide pathway shown. The drawing was made thirteen months after its construction.

If a rock garden is wanted on flat ground some moving of soil is required. Excavation will supply material for raising low mounds. The excavated portion should be slightly sinuous and run north and south. Unless the soil is very deep it must not be merely dug up and flung on either hand, but the whole of the surface soil should be removed before modelling the shape, and subsequently replaced. The crest of the mounds should be planted with choice shrubs to shield the interior shelves of rock, and also to prevent their being seen from the rest of the garden.

A study of rock formations *in situ* is the best way of seeing how to put up alpine gardens. A rocky cliff or railway cutting shows lines of bedding running in roughly parallel lines, and prominent points have the return angle approximately at right angles. Curves, and easy rounded corners are never seen except after the action of weathering, and then only in such very hard rocks as gran-

ite. In the Lake District of England one may read endless lessons from the exposed sides of the hills, with little glades of short grass running between rocky promontories. In Switzerland and the Tyrol the same thing is seen more vividly owing to the colonies of bright mountain plants taking advantage of soil and moisture. It will be noticed that the rocks serve for shelter, or to support soil which otherwise would be washed away, and in themselves are necessary to very few plants—for instance *arenaria balearica* which seems to be most thriving when pressed to a moist rock surface.

In designing a rock garden, where elevation is as important as the plan, the most satisfactory method is to work it out in clay or plasticine. A piece of wood to represent the area is required, and sides and back can be added if the rock-work is to be against a bank or in a quarry. The model should be worked to a fairly large scale, say 2 ft. to 1 in., and the vertical scale is twice as large, in this case 1 ft. to an inch. The doubling is a great help to the working, as the vertical dimensions are very much smaller than the horizontal ones, and the increased scale makes the modelling less fidgety to do. With clay one can experiment and alter until a satisfactory miniature rock formation is attained.

The intended ground line is pencilled out on the board, and the clay built up to the required height. While building, the designer must know clearly in

his mind the sort of rock in which his work is to be developed. If in limestone, the ledges will be deep and bluffs bold ; if sandstone, the ledges will be more broken. Also he must not waver in his intention as to the dip of the strata. Should he wish to make effects with prominent bluffs the general dip throughout should be backward towards the "mainland," for only under such circumstances are bluffs naturally formed. It is not at all the same thing to secure stability for the bluff itself by giving a backward dip, for it will merely appear a mass distinct from the neighbouring ledges. Moreover the designer should know what he means to plant : here is a sunny ledge for *gentiana acaulis* ; there is a northern aspect for *ramondia pyrenaica* ; here is a part slightly overhung for *androsace* ; there a steep prominence to display *saxifrage pyramidalis*. Before finally passing the model it should be looked at from various positions ; lengthways from each end as well as full front, and also from above, and again with light falling at different angles. So one may judge how the rock garden will appear from different points, and at different times of day. When all seems satisfactory a sketch should be made on linen, showing the length, height and breadth of each ledge—not forgetting that the model is twice as steep as the real thing will be. The model need not then be taken on to the ground. It will be useful later when the full planting scheme has to

be made out. The linen plan should be ruled out in squares to represent 10 ft. spaces, which are also marked out on the site.

The amount of stone required can be calculated from the model. The ledges, or tiny terraces, are only sustained by rock, and reckoning this at a foot thick throughout, the number of cubic yards required can be found by simple arithmetic. Large bluffs should be taken as extras, for special pieces of stone will probably have to be obtained for them.

The kind of stone employed is largely governed by the locality, that of the place being much the most suitable for the soil. If there is no native stone a kind should be chosen whose colour will blend with the soil. For instance pale grits, or limestone, go with chalky lands, and brown and fawn sandstones with loams.

Building operations should begin some feet away from the foot of the bank or mound, unless the height is to be considerably increased by the rock-work. The front boundary is set out from the plan, and stakes driven in every 10 ft. to represent the 10 ft. spaces marked on the plan. A slight gully is cut along this line to give the first row of stones a grip, and to prevent their being thrust forward by the weight of soil behind, and the gully should be shaped so as to give the stones a slight backward tilt. (See Diagram 77.)

Stones should never be set edgeways. It may

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seem economical of material, but they are more secure on their broadest sides ; moreover it was their natural original position in the quarry. Any signs of bedding marks must be carefully observed and the stones laid accordingly. Attention to these details makes all the difference between an artificial and a natural looking structure. As each ledge is set soil is brought forward from the mound and made firm, before proceeding with the next. Stones of one thickness, as far as possible, should be selected for the same ledge, and when two or more rows are needed to make the required height they should be set over each other with the crevices corresponding to those in the lower layer. Anything approaching such joints as one sees in brick-work must be studiously avoided, partly because they are unnatural to rock, and partly because plants will send their roots down several feet if the cracks permit.

DIAGRAM 77.

The largest stones must be set aside for bluffs. If none can be had big enough in itself, the bluff can be built up of smaller ones, taking care to set them so that their appearance is that of a large rock split in several directions. Overhanging can be safely managed provided the stones dip back to the main body of the work, and extra

security is gained if the next course is laid on the "tail" of the topmost stone. (See Diagram 78.)

The stones must not be sorted so that all the larger ones come at the bottom, for this has no counterpart in nature. When building against a bank it is a good plan to have a certain quantity of stones taken round to the top, and from thence rolled into position, though the bulk of the stones will have to be carried upwards. The trampling over ledges already made is no disadvantage as it tests the stability of the work.

DIAGRAM 78

Upright portions that are to be used for saxifrages, sedums and so forth, may be planted as the work proceeds, but all ledges must be left. Many of them may have to be

given specially prepared soil for particular plants, in which case the soil already there is scooped out and fresh stuff replaced.

In planting, the best effect is made by putting one variety only on each ledge. Mountain plants are usually small, and more than most flowers require massing. Bluffs may be accentuated by dwarf conifers and shrubs. It is a mistake to introduce florist's varieties. There is no lack of species accustomed to wild surroundings, and the

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garden raised sorts are inclined to look out of place.

If opportunity occurs, the introduction of water into a rock garden makes a charming feature. For tiny pools zinc pans, or tubs can be used, which can be completely hidden by sinking them, and laying stones on the rim, and putting pebbles at the bottom. The overflow may take the form of a trickle over stones, and finally be lost in a little bog.

A wall garden has a certain likeness to a rock garden in that it serves to accommodate alpinists, but there is this great difference, that whereas the latter is built to resemble a natural formation, a wall garden is primarily built to retain soil. The stones are laid dry—i.e. without mortar, each one slightly tipped backwards, with joints as far as possible vertical over each other. The face of the wall must show a batter of at least 1 in 10 for stability, and 1 in 6 is better for plants. It is easier to build in the plants as the work proceeds. Such a wall should not be within sight of masonry, but is often useful in the outlying parts of a garden where there is a change of level, and a bank may not be desirable.

In any garden not completely exposed to view from the house a portion may be devoted to growing plants as far as possible in their natural surroundings. The ideal site for such a "wild" garden is a small coppice where primroses, anem-

ones and bluebells have already established themselves, showing that conditions are right for growth. Where a garden is cut out of a wood some should be saved, thinning out if necessary, for this purpose, and if the property includes a wood the made garden should extend a branch in its direction so as to include part of it. A strip of land along the boundary hedge may be converted into a shrubbery walk and so connect the wild garden with the main part.

WILD GARDENS

A WILD garden should be treated strictly in "landscape" fashion, developing the natural resources for the sake of the plants. When a wood can be used trees should be cleared sufficiently to let in patches of sun, and *azalea mollis* (if the soil permits) should be planted in some of the clearings. Pathways of stone, set in the Japanese style, or of beaten earth which soon becomes mossy, may traverse the wood to give dry access to various points of interest. The stepping stone path affords shelter to many dainty ferns which might be smothered amongst the general vegetation. Made paths of gravel or ash should be avoided.

The planting must be in broad masses. Upkeep consists merely in removing interloping weeds, or invasions from the neighbouring groups of

stronger habit. Groups should blend together, but there is always a tendency, which requires watching, for vigorous plants to overwhelm the weaker. One of the most gorgeous mixtures I have ever seen was at Wisley, in the Royal Horticultural Society's garden, where *primula japonica* which riots in the ditches of that enchanted wood had spread up the bank and joined forces with *meconopsis cambrica*. The vivid orange of the latter with the primula's shades of rose and crimson was a wonderful sight.

A place that is too large to be laid out and put entirely under gardener's care may be partially treated as a wild garden, even though no wood exists for a foundation. Meadow grass is charming merely with its English flowers, to which numerous bulbs—crocus, narcissus, tulip and fritillary species may be added. The narcissus family alone is enormous, and from it should be selected species for naturalising. Such aristocrats as Mdme. de Graaf, Emperor and Sir Watkin look out of place in rough grass, and the same applies to most florist's varieties. The principle cannot be too rigidly followed, or many of the finest flowering trees would be excluded, and the various crab apples may be planted in the wildest surroundings. A wild meadow garden should be furnished with groups of crabs, cherries and thorns, birch and other light growing trees. Easy passage ways can be made of mown grass, the mowing machine

being taken regularly over them. Stepping stones are not recommended where a scythe is to be used.

Where streams or ponds exist or can be contrived, they add immensely to the interests of a wild garden by adding to the number of plants that can be grown, and in choosing a site for a wild garden this should not be forgotten. The Wisley gardens are worth studying by any one interested in this type of gardening, for the original wood and streams are now full of beautiful flowers well established, and apparently able to hold their own against the natives.

IRIS GARDENS

THE iris family is worthy of being given a special department in a garden, although they are also fit occupants of the herbaceous border. The flag section alone, properly represented, would occupy several hundred square feet ; and taking in all the species from *I. Danfordiae* to *I. stylosa*, with some situation for *I. Kaempferi* and similar moisture lovers, an iris garden has something of interest in it all the year round, and is at its best at the end of May, when the rose garden has barely begun.

An iris garden looks well laid out on formal lines, particularly when flagged paths are used, as the stone colour blends well with grey foliage, and some grass in the form of a central plot or

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strip may be introduced for the sake of its different green. I have also made an iris garden on grass with beds of various ungeometrical shapes, and standard thorns and crabs in groups amongst them. Even the most formal arrangement may, with advantage, relax at one end for the sake of introducing a pool with marshy margins, and so accommodating other classes of iris besides ordinary border varieties. At this end too would come low rock beds for the tiny mountain species which require absolute drainage. The iris garden set on grass should have one made path for access in bad weather, for irises are worth a visit at all seasons.

Irises are capable of furnishing a plot of ground completely, but if extra display is wanted, pæony beds can be recommended as a combination. The rose-coloured pæonies are perfectly lovely with such a mauve as *Iris pallida dalmatica Princess Beatrice*, and their time of flowering is the same. If a hedge is wanted lilacs are just the right colour to go with flag irises.

OTHER SPECIALISED GARDENS

THE system of setting apart certain portions of the garden for one particular section of plants can be developed. The American garden is a recognised feature in many places, and where the soil is unsuitable for such things as azaleas and rhododen-

drons a specially prepared piece of land is necessary. The term "American" covers all those shrubs that dislike lime, and thrive best in peaty loam. The outlying parts of a garden make the best situation for them, as large masses informally placed are most effective. It may suitably connect with a wild garden and be laid out on the same principles.

An evergreen garden makes a change in the general arrangement. It is pleasant in the winter and also in the summer after the glare of other parts. The sudden transition from a long brilliant herbaceous border through an arch into a grass plot surrounded by clipped yew with ilex behind is a delightful sensation. In the one I have in my mind the very walks have become mossy, and the only ornaments besides the seats are golden yews clipped into balls, standing on the grass.

A brown or a golden garden may be contrived by choosing only copper-leaved, or golden variegated shrubs. Gardens in special colours are becoming fairly common, and those devoted to campanulas, or dianthus of different sorts are charming and interesting. The formal style is well adapted to those specialised portions, but the modern tendency is to apply our increased horticultural resources to augmenting the jumble that is the nurseryman's delight.

RECREATION GROUNDS AND PUBLIC
PARKS

CERTAIN elements enter into the planning of recreation grounds and public parks that are absent from private grounds. To begin with, the designer is generally free from the influence of building, a bandstand or public memorial taking its place, if at all.

The need for shade and ample sitting and walking spaces is immensely important, for which the landscape style is more adaptable than any other. All that has been written of landscape gardening is applicable to the laying out of public parks. Grass spaces for games should be a good deal larger than the dimensions the game requires in order to allow some shifting of stumps and goal posts, and belts and clumps of shade trees should separate one set of games from another.

Eight feet is a minimum width for paths, and they can be as much wider as their length and probable use require. If there is need for a main road across the park this may fitly take the form of an avenue, double if possible, with a made road in the centre and grass ways either side. Along a wide road seats can be set without special provision, but when less than 12 ft. wide sites for seats should be recessed 6 ft. to allow people to sit and stretch their legs without being an inconvenience to walkers. Such recesses can be made very pictur-

esque features, and by carefully planting the shrubberies behind, a certain amount of privacy can be obtained. Some recesses may be large enough to make small dry playgrounds, with one or two good shade trees, which will encourage children to play off the paths, and away from seats meant more especially for grown-up people.

The best material for paths is good binding gravel, and it must really bind, as loose stones are very objectionable where children play. In the poorer parts of large towns recreation grounds are often tar-paved, which is wearisome to eye and feet, while it makes the only remedy against the glare—good trees—almost impossible to grow. The motive for this is partly economy in upkeep, and partly dread of stone throwing. A natural, firm sandy soil surfaced with shell gravel is the best substitute for grass, being springy and cool under foot. Failing that, the ground might be well drained, and over a 6 in. layer of hard core 4 in. of fine gravel could be laid and rolled, and shell gravel added. Occasional rolling and an annual dressing of shell would be required to keep it in condition. If tar-paving is ordered by the authorities special preparation should be made to ensure trees thriving, and the method common in Germany may well be copied. Before the streets are paved a broad deep trough of good loam is laid the whole length of the intended line of trees, which are then placed in position with

sufficient space round them for air and moisture to enter. This is far superior to making separate stations for each tree *after* the road has been made up with every sort of hard substance, which is our English way of planting in streets, and a tar-paved recreation ground requires similar preparation.

Water is an indispensable feature in a public park. It ensures an absolutely open space which is restful in a crowded public ground, besides being of universal attraction. One piece should be specially designed for the sailing of toy boats, and have a firm cemented margin. Natural grass margins are too easily broken down, and should be used only round purely ornamental water to which the public do not have complete access. A shelving sandy shore makes a safe approach and cannot be spoilt, but is inconvenient for boat-sailing.

The entrances and gates ought to be regarded as opportunities for really good work. Arrangements of flower beds may be grouped at these points, for they are out of place scattered about a landscape plan, and the paths should at once begin to lead away in various directions so as not to encourage crowding the entrances.

Garden houses for shelter in bad weather will be required to be distributed over the grounds which might be made much more interesting by constructing the shelters in definite styles, and laying out a consistent design on the adjacent space,

The formal styles of different periods might thus be represented, and at the same time give people more purpose in traversing the paths. A maze is almost as great an attraction as a sheet of water, and might be introduced if room can be afforded.

Many architectural details are proper to a public park. One commonly finds gates and railings, seats, drinking fountains and lamp-posts, while statues can often be happily placed. Unfortunately the poorest work is usually put into these—except perhaps the last which must receive individual attention. Seats in particular mostly show common cast-iron patterns, and drinking fountains bear the stamp of the monumental mason. The public park ought to be the opportunity for the designer of handsome ironwork for gates and lamp posts ; shelters and bandstands are worthy of an architect's attention, and drinking fountains may well be from a sculptor's hands.

Section VI

PLANTING

“There is, I conceive, scarcely any tree that may not be advantageously used in the various combinations of form and colour.”

Gilpin.

“If delight may provoke men’s labour, what greater delight is there than to behold the earth as apparelled with plants, as with a robe of embroidered worke, set with orient pearls, and garnished with great diversitie of rare and costly jewels?”

Gerarde.

PLANTING

The Use of Flowers—Preparation of Planting Plans—Shrubberies
and Tree Planting—Avenues—Hedges—Grass—Boundaries
—Privacy.

THE USE OF FLOWERS

WHILE the plan may be compared to the drawing of the garden picture, planting is the painting of it. A good design may be almost entirely spoilt by incongruous planting, and contrariwise a small villa garden in poor sur-

roundings, and not very interesting in plan, may be given character by its contents. A knowledge of colour, habit and season of plants is needed, which constitutes a life-long study in itself, and it is not proposed to deal with that side here. But besides this the designer should have an eye for effective grouping, and the fit disposal of trees and shrubs.

A garden is planted for several reasons : decoration, shelter, privacy, to enhance natural beauties and to hide unsightly objects.

Purely decorative planting is in connexion with the more formal parts of the garden, dominated by the architecture of house and terrace, and exotic plants are in keeping with other evidences of human attention. Brilliance and neatness should be its characteristics, and the bedding out system is undoubtedly suitable for formal beds. That and carpet bedding have fallen in public esteem, for when crude strips of yellow, red and blue were to be seen in every little villa front garden, there came the usual reaction in favour of simpler work. However, no one who has seen Belvoir Castle gardens in spring, or the gardens along Prince's Street, Edinburgh, in summer, can fail to recognise that there are places where bedding out is eminently fit. With the increased selection of colours in the commonly employed bedding plants, such as geraniums and begonias, and the introduction of fixed types, both in colour and height, in hardy things such as snapdragons, pentstemons and violas, and also in tender annuals such as phlox *Drummondii*, asters and stocks, the designer has (so to speak) a greatly enlarged palette which he is beginning to appreciate. Even hardy annuals are now so fixed in named varieties that bedding-out effects may be had for a few penn'orths of seed, and no glass house. With

so much material to command, the designer can arrange delicate harmonies or brilliant contrasts, and this without the old unavoidable expense of storing through the winter ; and no better treatment than broad masses of bright colour can be devised for formal beds near the house. Many a garden must now be regretting the destruction of stately designs on lawn and terrace, destroyed in disgust at the vulgarizing of bedding, and the wearisome struggle to secure sufficient plants. The drawing on page 14 shows a noble design on a lawn below a high terrace. Box edging outlines the beds and enhances the colouring. The clear circle of grass at one end is a touch of high artistic value. Of course such a design is only suitable for a fine building, and spacious grounds, and given these it is a worthy part of the garden.

The characteristics of a plant suitable for bedding are neat habit, clear colours, and continuous blooming. In making out bedding schemes too many colours should not be combined, or the general brilliance is lost. To obviate flatness "dot" plants, such as standard fuchsias and heliotropes, or trained plumbagos, or tall foliage plants can be introduced, but this must be done discreetly or the bright ground colour will be veiled. A certain amount of plants beautiful for foliage should be used, as in the uncertain English climate it is as well to have something reliable, if the summer proves unfavourable to flowers. More-

over, the rich brown reds of beet, perilla and coleus, and the cool greys of cineraria and dactylis grass are excellent foils to flower colours. The yellow beet is also a valuable and reliable plant.

The mixed herbaceous border has its place beyond the formal part. The path that leads out of the formal garden may, with advantage, run between mixed beds ; or they may be planned to give an interest to the connexion between kitchen and flower gardens ; and they are often seen at their best in the kitchen garden itself. Herbaceous borders may be avowedly mixed, that is to say, the clumps of each variety may be planted with regard only to their immediate neighbours. When this is done contrasts between colours are more successful than harmonies. Another method is to take a definite sequence of colour, and keep all plants of the same colour together. Whichever scheme is followed, the groups must be bold—never less than three plants together—and dove-tailed into one another. The planting of herbaceous borders requires an extensive experience with plants at all stages of their growth, so as to have something in bloom at all seasons. Roughly speaking, the tallest plants are put at the back, or through the centre when the bed is accessible from both sides, but to rigidly keep to graded heights would give a sameness to the elevation, and groups of high plants should be brought forward in some places and recessed

in others. A border of pinks or similar edging can be added to the front. If there is a grass verge, another line may be redundant, but a line of some sort has value in giving an appearance of length. The gaps caused by the dying down of bulbs, the death of biennials and so forth, can be made good by annuals. Anything of the nature of a bedding plant ought never to be used as a stop gap.

DIAGRAM 79.

The massed stateliness of formal bedding may be reproduced in herbaceous stuff, and large beds amongst formal surroundings can be most effectively so planted. Diagrams 79 and 80 show two examples. Only half the schemes are shown, as on the other side of the path they are exactly duplicated. The first is backed by clipped hedges, and terminated at one end by a clipped yew arch, spanning both borders and path. The display

begins by a band of purple crocuses behind which iris leaves give a grey background. Bosses of blue hepaticas follow. Then come the crimson and gold of parrot tulips, their own scanty foliage augmented by the growing columbines. The columbines succeed them, and they are barely shabby before the bands of German flags are at their zenith. *Iris pallida dalmatica*—Princess

DIAGRAM 80.

Beatrice, is counted worthy of a position to itself, and is the last of the irises to flower. Madonna lilies and delphiniums complete the year's display.

The second runs through a kitchen garden, and is backed by espaliers. The edging consists of the common white pink, far more satisfactory for the purpose than any of the so-called finer sorts, interplanted are mixed Darwin tulips in a broad band. The blooming of these is an event not to be for-

gotten, while the crimson brown pæony shoots give a warm setting. The pæonies are in blocks of six, repeated on each side of the path, but otherwise all different, in the choicest garden varieties, rose, pink and white. When they are out, looked at from one end, the border appears to be entirely pæonies. A tree pæony stands at the apex of each triangular group. Similarly when the montbretias are out the lengthways view of the border looks all montbretia and michaelmas daisy.

The foregoing examples give some idea how the effect of bedding out may be obtained by careful permanent planting. I have planned large formal designs on lawns, planted in massed herbaceous stuff on the same principle, and the result was almost as though regular bedding had been done.

THE PREPARATION OF PLANTING PLANS

PLANS of planting can seldom be on the same sheet as the general design of a garden. Specimen trees can be named thereon, but a large scale is necessary for herbaceous and shrubby beds. Sectional paper is valuable for this purpose, and a scale of 4 or 5 ft. to the inch must be used if names are to be written in, which is far less trouble in the end than entering numbers and pre-

paring a reference table. The squares automatically make spacing easy. The beds should be divided into ten feet sections, and in mixed shrubbery beds where standard trees occur it is a help to mark these in a different coloured ink.

When the time arrives for the actual planting to be done, a piece of ground should be set aside to heel in the stuff as it comes in from the various nurseries. A shrubbery bed may be set apart for this purpose, and where planting is on a large scale I have found it a help to mark divisions A, B and so on, and to sort the stuff before heeling it in. Much time may be thus saved in picking out plants, and less turning over is required. Moreover if the weather destroys the nurserymen's labels the bundles of roots can be more easily identified. The beds are staked out in 10 ft. sections to correspond with the plan and the more prominent features should be planted first as an additional help to spacing the rest.

SHRUBBERIES AND TREE PLANTING

SHRUBBERIES are far too often used merely to fill up odd corners, otherwise out of the general scheme. Shrubs have as much right in a garden as flowers and fruit trees, and their position should be as deliberately chosen, and individual wants considered. Rhododendrons and azaleas are about

THE WILDERNESS · HAMPTON · COURT ·

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the only shrubs which are really catered for in a garden design, and the result is that people have received the impression that they are far more fastidious than is the case. There is no reason why handsome lawn beds of any shrubs should not be formed with deliberate purpose. Lilacs, spiraeas, berberis, weigalias, all are worthy of better treatment than the mixed shrubbery, and bold groups of shrubs are most useful as the design passes from architectural treatment near the house to the more natural lines on the outskirts. The drawing on page 213 of the wilderness at Hampton Court is an interesting example of the transition stage between the formal and landscape styles. It was laid out by London and Wise in the eighteenth century, and shows an appreciation of the value of shrubs in a garden scheme.

Groups should be restricted in variety. The finest effects can be had by putting two of the same species together, as for example weigalias van Houtteii, and Mont Blanc, or rosea variegata. Or two different kinds may be together, one for an early bloom, and one for late, as kerrià japonica and rhus cotinus. In making out such beds the mixed shrubbery muddle must be avoided, each bed having a distinct character. That is another advantage the rhododendron has gained in being specially catered for : it is not forced to fight with a number of other shrubs of varying habits. A stray rhododendron or azalea in a

mixed shrubbery would be as uninteresting as its neighbours.

Where wind-breaks are required for shelter, evergreens should predominate, and the plants must be close enough to slightly interlace. It is interesting to note that the same species spoil each other less than a mixture. One may see silver birches growing into each other, or a grove of larches, or yews, and though the individuals are slimmer than they would be if independent, they do not seem distressed. The confused jumble of thujas, laurels and privets that too often masks a boundary is nothing but an eyesore to any one who cares for plants. If all one sort had been planted, or one sort at the back and a shorter one in front, a dense screen could have been formed without crippling the individuals. A narrow band of mixed evergreens is often planted where a deliberately clipped hedge would be more suitable.

The practice of clipping trees and shrubs merely to make them conform to a required size is to be deprecated. Stuff that is naturally small ought to be selected where space is limited. Overplanting is a fault most frequently seen in small town gardens, where planes and cedars are set on lawns only big enough to carry thorns and similar flowering trees. And here I would plead for a wider use of fruit trees for shade and ornament on small lawns. They are beautiful in flower

and in fruit, and though the trees will not be as productive as they would be under higher cultivation, yet their beauty is not affected. Some apples in particular have extraordinary fine blossoms.¹ In favoured districts standard peaches may be substituted for almonds.

Clipping is also resorted to when a shrubbery outgrows its original dimensions, and beginning to overhang the grass verge, spoils it and makes mowing a difficulty. The result is that the front line of the shrubbery loses all character, and the trouble grows more acute each season, for clipping is but a temporary remedy, and every time it is done it leaves the shrubs more deformed. The better plan is to remove entirely the front row, letting those behind grow out freely ; or in some cases the bed can be enlarged, either by cutting into the lawn, or by abolishing the grass verge and substituting tile edgings. The designer should consider this inevitable trouble of growth in his original scheme, and arrange that enlargement shall be possible, or that in the planting the second line of shrubs shall make a worthy successor to the first. Where shrub beds consist of one, or two varieties only, this cutting out can be done with little loss to the general appearance.

The stronger growing herbaceous plants such as michaelmas daisies, irises, golden rod, and perennial sunflowers may be introduced into large

¹ See Appendix A.

shrub beds, by omitting some shrubs and running in a bay of the other plants. This is a mixture that has to be carefully done, or the appearance may be muddled.

Shrubs and trees should always be given less space to start with than their growth will need. Close planting affords the shelter which is natural to young stuff, and moreover gives a better effect. But thinning must not be neglected, and when the planting scheme is made out, the ultimate occupants of the ground should be determined, and the remainder cut out, as the former grow. The stuff used for filling up may either be the same sorts, which looks best, or be cheaper things like privet, ribes, and dogwood. It is time to thin directly the foliage of the various shrubs begin to brush against each other. The shrub to be removed may be cut in to begin with, and when the whole space is needed, it is dug up. The designer is fortunate whose client recognises the importance of developing the garden on right lines, and continues to ask for his inspection at intervals. The ideal thing is to overlook the place annually, in the summer one year, and in winter next, so as to judge the effect both with foliage and without. Some gardeners are able to undertake the thinning out, especially if the owner has the original planting plans, and is interested enough to assist.

Shrubberies and trees may be set so as to in-

crease the effect of space. The ground may be well furnished and yet vistas arranged through the groups at the end of which the best views are to be seen. When the ground is already wooded, vistas should be cut if there is a point of interest beyond. I know a case where an unused path became a favourite one simply by removing some trees from a belt of woodland, and thereby exposing a distant view of York Minster, which was an objective well worth a walk, particularly in an evening light. When the belt of trees was planted this view ought to have been marked and a gap left. Diagram 81 shows a number of shrubbery beds placed so as to give two good vistas from the house.

The most difficult trouble to meet is the growth of trees, too beautiful to cut down, and yet which cast overmuch shade, or block a view. Old gardens frequently present such problems. There may have been an error in planting, or the tree may have been first on the place and spared without sufficient thought of its ultimate size. Dense shade may be modified by cutting away branches from the centre of the tree, which allows sunlight to filter through, and a tree may be reduced in size without much disfigurement if limbs are sawn away neatly at a fork. It is possible to remove half a tree without spoiling its character; the only effect noticeable being that the tree is unusually thick in trunk and main branches for its

DIAGRAM 81.

spread. The practice of shortening branches is an absolutely wrong way of reducing size. The immediate effect is ugly, and subsequently a multitude of young shoots break out all over the tree, which completely destroy its characteristic growth, making a solid mass of foliage through which no sun can penetrate.

In selecting trees the planter should note those natural to the locality. A certain number will be planted with a view to furnishing the place with timber, and for this purpose such sorts as are fine in the district should be chosen. The beauty of a full grown tree is its splendid strength, which will never be achieved if it is alien to the soil. What is more disappointing than to see a tree which is beginning to be a feature, stop growth and look out of health? It has struck an uncongenial subsoil, for which there is no remedy. This catastrophe can be avoided by choosing trees seen to be thriving in the district. Some people may not care to have trees already abundant repeated on their estates. Then select different varieties of the same species : where beech thrives use copper beech, and the fern leafed variety ; for the elm—the golden elm, the Huntingdon—and so on.

The garden designer needs an extensive knowledge of trees in order to plant wisely, and he needs to know them from various standpoints—their adult size, their shape, colour, and texture,

besides their requirements for healthy growth. The necessity for knowing a tree's ultimate development is obvious, and has already been sufficiently referred to.

The shape of a tree has a distinct bearing on its fitness for certain situations, and it is interesting to note how every tree has a typical contour when in full leaf, which gives its silhouette a character distinct from others. Some are globular, such as oak and sycamore, some are oval, as the lime ; others are triangular in outline, from a broad base as the horse-chestnut, narrower in the spruce, and still less in the larch. Tall slim trees, of which the Lombardy poplar may be taken as the extreme type, are admirably suited to levels. (Diagrams 82, 83.) Their extensive use is a common remark of travellers in the flat parts of northern France. Indeed, some people complain they are monotonous, but what tree could be suggested as a better substitute ? Hobbema's well-known painting of the poplar avenue shows how picturesque a feature they are. When used alone a Lombardy acts as an exclamation mark in a landscape, and must be used sparingly. Its effect may also be compared to that of a steeple rising among trees or houses. One is effective, but several counteract each other.

Round headed trees suggest solidity, and suit with gently undulating ground ; on the mild slopes of the Weald their value is seen to perfection. Drooping or weeping trees are lovely by

Oak

Sycamore

Elm

Wych Elm

Lime

Beech

DIAGRAM 82.

still water because their reflections complete a curve. Trees with rugged contours, such as Scotch firs accentuate broken ground. These observations apply to single specimens whose outlines are well defined. In groups one relies more on colour and texture for effect.

The colour of trees is a very variable quality. Such freaks as copper and golden varieties are commonly recognized, but few persons, unless unusually observant, or accustomed to sketching, realise the immense range of green displayed by ordinary foliage. The pines strike the deepest note of rich blue green, and between this and the silver grey of willows is a vast range of colours all included in the term "green." Dark greens convey a gloomy wild impression, light greens, as in the beech, are cheerful, and grey greens are peaceful, and trees of these "temperaments" should be planted where the surroundings correspond. Grey is peculiarly suited to still water, for the richness of the shadowed parts reflected in the water blends with the blue sky reflections

or the brightness of sunlight. Bluish foliage gives an effect of distance. A belt of junipers on the confines of a lawn in low light might be many hundreds of yards further away, and an effect of space is sometimes valuable. In fact, the colour of trees has been rightly compared to a palette, and a judicious use of colours is an artist's rarest gift. A feeling for form and composition is more often seen. The introduction of copper leaved beech, plum and hazel, and golden elm, elder, and privet, and so forth, has extended the planter's palette with disastrous results in many cases. The nurseryman who is frequently entrusted with the planting is inclined to think the rarity of a tree is sufficient reason for its being included in a garden, and he introduces dabs of unquiet colour where broad effects are called for by the design. Like the notion that a picture must possess a note of scarlet, a copper beech is dragged

Horse Chestnut

Cedar

Spruce

Larch

Lombardy Poplar

in somehow, and as the scarlet parasol may be the making of a picture so it (and the copper beech) may also be its undoing, if wrongly placed. The safest place for uncommon trees is the home grounds. Out in a park they are very difficult to place. No doubt a clever designer would profit by the additions to his palette even as his brother artist would.

Texture in a tree is rarely taken into account, and yet it and colour are interdependent. The ribbed leaves of a horse-chestnut differ very little in colour from the smooth leaves of a beech, but its whole effect is far more sombre owing to the manner in which it receives light. As a rule, fine leaved trees, such as the beech, have a more sprightly appearance than those with large foliage such as chestnuts, and they are accordingly more suited to small grounds. There is something noble in large leaves. For single specimens on spacious lawns such trees as the yulan, the catalpa and mulberry are particularly suitable, and on a lesser scale one sees semi-tropical foliage plants employed successfully for lawn beds. The uniform texture of a cedar of Lebanon greatly adds to its dignity, while on the other hand the restless surface of an aspen debars it from taking its place among fine trees, although in size it can hold its own with most.

Trees of smooth texture make the best backgrounds. As an example one may note the in-

comparable superiority of clipped yew as a backing to colour. The green of holly is not amiss, but the glancing points of light off its prickly leaves are restless. A yew hedge presents a surface like rich velvet. Alpine scenery owes much to the quiet masses of dark spruce woods. The little copses of birch that abound on the undulating Surrey commons would be absolutely lost in a Swiss landscape, and yet in size birch and spruce are about the same. The light broken foliage of the birch has no dignity, and in the silver birch the texture is still more broken by the pale bark. A group of well-developed birches looks very pretty amongst the dark foliage of gorse and broom, and such groups can be advantageously placed on the outskirts of more serious planting.

As with colour, so texture changes with the seasons. In spring the young sparse foliage gives every deciduous tree a broken surface, and spring time has generally a character of activity, which nature shows in colouring and broken lights. But as the foliage develops, each tree takes on its most permanent character, and the landscape gardener plants for this. He must group his different sorts on the prepared ground, choosing those of quiet character for backgrounds and distance, while those whose form is their chief charm should not be too far away. Mixtures are better in harmonies than contrasts, especially for distance, and large masses. A breadth of Austrian

pine and silver birch—to take an extreme case—is unsatisfactory in its “spottiness,” but two or three carefully placed together on a lawn in the home grounds might form a pleasing feature. Startling shapes and colours tend to diminish distance because they catch the eye and enforce attention.

In autumn comes a general change in the colour of foliage, some trees being at the height of their beauty at this season. The English landscape cannot make the marvellous display that Canada and Japan present (partly owing to our lack of native maples), but there is no reason why an autumn pictorial effect should not be definitely aimed at in one part of a park. Trees of other countries—scarlet oak and maples, liquidambers and sumachs must be used, and for undergrowth the dogwoods and certain of the berberis, and rugosa roses.

AVENUES

Rows of evenly spaced trees are effective where the hand of man is dominant, and a row on either side of an approach road gives dignity to the house, besides affording shade. At least 30 ft. should be allowed between tree and tree, and the first planting should be at half the final distance to make a show and give the shelter that is natural to young things. The distances must be exactly

calculated or there will be great difficulty when the time for thinning arrives. A very common mistake is to plant rather too far apart for future thinning, and the owner hesitates to remove every other one for fear of leaving a scanty avenue.

All our English trees are suitable for avenues, with the exception of elms, which become treacherous in their old age. Those most generally planted are the lime and horse-chestnut as they are quick growers in comparison with most forest trees. Evelyn recommends the lime as "of all other, the most proper and beautiful for walks, as producing an upright body, smooth and even bark, ample leaf, sweet blossom, the delight of bees, and a goodly shade at the distance of 18 or 25 ft." On the continent the lime is more used than any other tree for private residences and in streets. In London the plane is more seen, for it thrives in towns. For long distances a treble avenue looks fine. The centre line is laid for a carriage drive and the outside ones make grass sides. The Château de la Garaye in Brittany has a superb treble avenue of beech trees leading to its ruins. In spring and autumn these are a wonderful sight and beautiful at any time.

Avenues are absolutely out of place over undulating ground which confuses the straight perspective. An even gradient, particularly when it rises towards the house, is not amiss. Curves are also out of character. Radiating avenues

which were popular with such designers as Le Nôtre, London and Wise were only suitable to accompany immense houses, and impressive as they are, natural grouping would be more beautiful.

Avenues of small flowering trees might be more often introduced into small places, or as connecting ways between internal divisions of a garden. A thorn avenue rising from mown grass is a charming feature, and the avenues of fruit trees through a kitchen garden is one of its beauties that might well be copied elsewhere. Whatever tree is used only that variety should be repeated. An avenue of mixed trees has no dignity.

HEDGES

A WELL-GROWN hedge is one of the greatest ornaments a garden can possess. Its colour and expression of finish and well-being makes its value comparable to that of grass, and moreover its service as a screen is without rival. It is the best possible backing to herbaceous beds. When used like this, 2 ft. at least of beaten alley must be left between the planting line of flowers and the hedge, whose roots prevent anything thriving in contact with them. If space cannot be spared, a brick or concrete wall should be sunk 2 ft. away from the centre, descending 3 ft., in order to confine the roots.

Hedges are some years coming to perfection, but are interesting far sooner than is generally imagined, and in ground properly prepared a yew hedge started between 2 and 2½ ft. will be impenetrable in five years. Privet and laurel would be effective in less time.

It is a mistake to start hedge plants too large, and indeed this observation applies to planting in general. Trees and shrubs whose root and branch systems are much developed, receive such a shock when the roots are injured by transplanting, that by the time they have recovered and settled into normal growth again, younger trees would have caught them up. There is nothing more disappointing than to struggle with a hedge and have it finally go off after two or three years of attention, when all the time has been utterly wasted.

In the effort to readjust themselves after a shift the injury to roots is balanced by loss of foliage, and the lower placed foliage suffers most. As the bottom of a hedge is always the most difficult part to keep solid, this is a real misfortune, and frequently the top has to be severely cut back to force fresh growth from the base. Then the owner wishes he had bought the hedge at that size, and saved time and money. I do not recommend severe pruning of evergreen hedges while young. All growth extending beyond the limit *sideways* should be taken off, and any unduly prominent leaders shortened, but otherwise I

believe in letting the hedge get up to 5 ft. before training it stiffly. Roses and plums grow so fast that a hard pruning their first year in order to force up a thicket of bottom growth is a distinct benefit. The idea of giving freedom is to develop the root system, and when that is well grown out, the foliage can be clipped without fear of checking.

The distances at which to plant hedge stuff is determined by the size. A good rule is to have two-thirds of the height between each plant. Thus plants of 3 ft. high would be set 2 ft. apart, and $2\frac{1}{2}$ ft. (a common size for yews) at 20 in. Well grown stuff will be just in contact at this spacing. Single lines are recommended for formal planting. Where shelter is the object, a double line set alternately is more solid.

The height of a hedge can be augmented from the beginning by raising a low bank for the planting. The top of this bank should be flat for at least 2 ft., and if on grass the turf should be brought up the sides of the bank. (See Diagram 84.)

What one may call fancy hedges can be very effective for small enclosures—golden privet, golden yew, silver hollies, *prunus Pissardii* and so forth—but in long stretches they would be tiresome. As a finish to a terrace, and to shelter seats such hedges look well. They are not sufficiently quiet in tone to be used as backgrounds to bright colours. A good effect may also be had

by introducing the golden variety into the prominent parts of a green yew or privet hedge. When the hedge arrives at an age when it can be shaped, these golden corners or buttresses can be made very striking. But such variations must be handled with restraint: to break a stretch of green hedge behind a flower bed would lower the value of the flowers from a decorative point of view. In fact hedges should be elaborated only when they are a feature in themselves; never when they are a background.

There is scarcely a limit to the shaping yew and box will bear, and in many old gardens the

DIAGRAM 84.

topiary work is their finest part. The most durable shapes are those where the hedge narrows towards the top, a shape which encourages the bottom growth and does not keep rain from the roots. In the northern parts of England the top should be cut convexed, or peaked, or there may

be damage from the weight of heavy snow settling on it.

GRASS

GRASS is the chief glory of English gardens, and its beauty has given English gardening a name over the world. Its charm lies in its freshness and even purity of colour which is a refreshment to the eyes and a perfect setting to every other colour. Grass in shadow is another pleasure, and quite distinct from the full sun colour. Again, the mowing, while improving its texture, gives an impression of well-being and care for which the French word *soigné* is the best equivalent.

The smooth-shaven lawn, broken only by lengthening shadows from tree and shrub, is the heart of the garden, and in his plan the designer must bear in mind that the full beauty of the garden rests with the management of the grass space. Its best characteristics are restfulness, and the appearance of well-being. The latter becomes the gardener's part, and the designer must see that good preparation is made, but he alone is responsible for its calm breadth.

It is simplest to give negative instructions towards the attainment of this object. The fault most frequently committed is to dot about beds, specimen shrubs and trees. The man who is keen on individual plants is prone to this, and he sets

off his favourites at the expense of the general effect. Beds and specimens should be kept at the sides of the lawn so as not to break up the expanse more than can be helped. Where the lawn approaches the house, beds of bright flowers may be introduced, but broken colours at the far end detract from the length. At that end shrub beds should generally be placed, with a few specimen trees standing on the grass near them.

No path should cross the grass unless absolutely necessary, and then it should be slightly sunk so that it does not show much. The path makes a fitting division between the end of the lawns and the beginning of the shrubberies, and unless there are strong reasons to the contrary it should not be brought across until this point.

Lawns laid for games must have them in first consideration. There is no need to advise against spotting trees over such, but the warning to avoid cross paths has double force, for in arranging games it is important that there should be opportunity to change the positions of nets, hoops etc., and a path circumscribes the limits of change. Although the boundary of a games court is rectangular the change of level may be made along any shape, and the opportunity of making fine curved banks should not be lost.

Rough grass may be introduced where economy in upkeep is necessary, but it must not be near the house or where the garden is carefully tended, and

a division of some sort should be between it and those parts. A path is an easily arranged division, and a broad verge of mown grass should separate it from the rough part.

ON BOUNDARIES

THE most attractive parts of a garden are enclosed. A rose garden within its yew hedges, the walled-in space by the house, are more admired and used for rest and quiet reading than spacious lawns. Often one hears it remarked, and made a complaint, that the kitchen garden is the best part of the garden. This is largely due to its being an enclosure, which gives it a pleasant feeling of privacy and security, and considering the charms of visible boundaries it is a mistake to obscure them. The smaller the garden the more its owner seems to wish it to represent a boundless park, which is against his own interests, if he desires to get the most beauty out of his plot.

The boundaries of a garden may be actually ugly in themselves—yellow stock brick wall, a cheap fence, or the blank wall of a building. By all means let these be hidden, but not in such a fashion as to pretend no boundaries exist. The most satisfactory way of dealing with an ugly wall or fence is to use it for abundant climbers, and by letting these have their natural growth, that is to say not trained flat, the effect of a living

mass of green is obtained. Trained creepers expose the supporting material beneath, and unless there is good brick or stone it is better hidden. The best effect is obtained from climbers when there is no border of plants in front. An 18 in. border under a wall is enough for creepers loosely grown, and if grass comes up to it 1 ft. width will suffice. Climbers are too often grown as a background to other plants, but they are worthy of being given a place for their own sakes. Moreover the finest wall is improved in appearance by a certain amount of plants on it, and more beautiful walls would be built if they and the climbers were not so generally regarded merely as a background to other interesting features.

If the boundary fence or wall is overhung by trees, or in such shade that healthy climbers are out of the question, a path can be made against it, and a hedge, or trellis screen, for roses etc., be set up on the other side of the path. From the garden this will appear to be the boundary, and though it may seem to be contracted, looking from the inside, yet there is great gain in having a good line instead of a poor one.

Screens of young trees are the quickest means of making a high boundary. Strong poles are set in the ground about 8 ft. tall and 12 ft. apart, and connected by wires. Saplings are planted from 2 to 3 ft. apart, and tied to the wires. The saplings may be 10 ft. high to start with, as the wires will

steady them, and by using " feathered " standards a solid screen of greenery is produced the first year. Laburnums, thorns, various crabs, Lombardy poplar, beech, hornbeam, lime, all are suited to this method. The trees must be kept pleached, and can be made to occupy a narrower space than an ordinary hedge.

A belt of planting of uniform width should never be set round a place. If solid planting is required for shelter or privacy a belt can be planted and trees brought forward in places, and a few isolated ones put near the prominent parts to further break the line.

PRIVACY

EXTENSIVE planting is often necessary to secure privacy, so dear to an Englishman. The love of exclusiveness is carried to an absurd extent, as evidenced by the expenditure on low walls and cast-iron railings to cut off a tiny patch of land from the street. Such patches thrown into a continuous strip would be worth something for the public good, while in their present state they are too small to be valued ; at least one seldom sees any attempt to beautify them. On a larger scale the villa garden is bounded by fence or wall, and each owner tries to hide his neighbour's windows, often at the expense of sunshine and air. It is impossible to circumvent being overlooked by

high windows unless the screen is as tall as the windows. The greater the distance of the screen from the eye, the less is its covering power, and comparatively small trees near the point of vision will prevent the eye from seeing buildings which would require very tall trees to hide if planted away from that point. (See Diagram 85.) Lombardy

DIAGRAM 85.

poplars are useful for high screens, but where a secluded place is needed near the house the best method is to put a lightly roofed structure over that place. Vines and roses can be trained across the rafters and effectually prevent any one from looking into it from high neighbouring windows ; and by using bright paint it will look cheerful even in the winter.

Hedges and shrubberies will provide privacy further from the house. Where a continuous shrubbery is too heavy, and space allows, separate beds can be designed to overlap each other in such a manner that passing along one line they cannot

be seen through, while yet there are clear passage ways. Diagram 86 should make this clear. This arrangement is particularly useful alongside a drive where a hedge might be too stiff, and it effectually prevents the garden behind from being overlooked. Shrubberies, especially when mostly composed of evergreens, make good screens, but it must be remembered that such is not the only object of shrubs. If the planting space is too

DIAGRAM 86.

narrow for shrubs to be allowed their natural growth, rather than resort to clipping, substitute a hedge. Where less than 2 ft. width can be given, treillage and climbers should be used.

Rights of way occasionally destroy the privacy of parks and gardens. Old farmhouses converted into residences often have these across where the garden is to be planned. These rights of way are usually diagonally placed, which gives an ugly line in itself, but can be obviated by planting out as in the Diagram 87. On this particular piece of land the house was placed so that the public path came between it and the park, and by planting in

rectangular masses the path was blocked out while leaving a good line to look upon. The angular bays were worked into the garden plan.

When the ground falls from the house a right of way can be hid-

den by forming a sunk fence between it and the garden, and low planting or a parapet wall can make it impossible for any one to see into the

DIAGRAM 87.

to see into the garden, while not interfering with the outlook from the house. (Diagram 88.)

DIAGRAM 88.

The best way to deal with a public footpath is to obtain leave to divert it. To effect this, the owner of the land must offer another way, nearer and more commodious, and after due notice has been

given of his proposals, and no parishioners have objected, the magistrates will give permission for the change.

The first step in planting is to select the best site for the trees. The site should be in a sunny, well-drained area, and the soil should be rich and moist. The trees should be planted in rows, and the spacing between the trees should be about 10 feet. The trees should be planted in the ground, and the soil should be tamped down around the base of the tree. The trees should be watered regularly, and the soil should be kept moist. The trees should be pruned regularly, and the branches should be kept clear of the ground. The trees should be protected from pests and diseases, and the soil should be kept free of weeds. The trees should be planted in the ground, and the soil should be tamped down around the base of the tree. The trees should be watered regularly, and the soil should be kept moist. The trees should be pruned regularly, and the branches should be kept clear of the ground. The trees should be protected from pests and diseases, and the soil should be kept free of weeds.

Section VII

FINAL CONSIDERATIONS

“That is best which lies the nearest,
Shape from that thy work of art.”

Longfellow.

“And those things which have gone long together are, as it were, confederate within themselves: whereas new things piece not so well.”

Bacon, “of Innovations.”

FINAL CONSIDERATIONS

Special Difficulties—Small Gardens—Making the most of Opportunities—Alterations and Additions—The Work in Progress.

SPECIAL DIFFICULTIES

HE laying out of a large bare estate is discouraging, because with the best thought and skill so much depends on time. I have had to undertake a garden on a hill, away from the house, of which only the chimneys were visible, and

there was nothing besides one good tree and the surrounding magnificent views to inspire the design. One would rather have too many points to take into account than none at all. In this case the tree, and the natural sweeping curves of the ground furnished the direction of the garden's development.

As a rule some particular line is a necessity,

and consistent with that the design grows, and though a free hand has its pleasant aspects it also presents one with a difficulty in imparting that sense of the inevitable which is a sure sign of good work. Any changes in the levels should be made the most of : a dip suggests a sunk formal garden : a view point suggests a garden house which will at once give purpose to the paths in that direction, and indeed, the introduction of any building greatly assists a scheme. The situation of the kitchen garden gives a purpose to paths, and the necessity of providing shelter enforces planting in certain spots. A level part will be the position for tennis and croquet lawns, and their approach will provide another definite note.

A few fast growing trees, and those patient of removal when large, should be chosen in the planting, for the look of a garden where everything is immature is uninteresting. Poplars can be shifted when quite a good size, and grow fast ; sycamores and limes are also useful. But these must not be planted to the exclusion of grander and more permanent trees. The designer should aim to introduce at least one fine timber tree into every garden he lays out—a cedar, oak or beech for the sake of posterity, for we who inherit so much beauty in old trees in old gardens are doing very little for our successors.

SMALL GARDENS

THE small suburban garden presents characteristic difficulties : the boundary fence and the house, and the neighbour's houses dominate it, and it is often

DIAGRAM 89.

of a length out of all proportion to its width. Moreover the house is usually of a nondescript style, in no way a source of inspiration.

The difficulty of the plot's proportions can be met by dividing it into compartments, leaving about two-thirds near the house, and the remainder

DIAGRAM 90.

for vegetables or flowers beyond the partition. The accompanying Diagram 89 shows various methods of dividing a typical plot, while Diagram 90 shows how an extraordinarily elongated piece of land was dealt with, its width being further curtailed by a motor road having to be contrived to a small garage at one end. A prominent inspection chamber occurred near the house and required hiding, which was accomplished by shrubs.

It is impossible to escape from the boundary fence, and the wise designer accepts it as a characteristic feature and makes use of it. There is no necessity to leave fence or wall bare, and the owner may feel fortunate in having a place for climbers, but though its nature may be hidden,

its severe line has an effect on the design which should be geometrical in character.

A SMALL TOWN GARDEN, CHICHESTER.

If the breadth of the plot will allow, it is a good plan to run a hedge of sweet briar, or other interesting shrub, about 6 ft. from the fence, and a walk of gravel or grass can lie between. This gives the effect from the main part of the garden of there being a space beyond.

Simplicity in arrangement is to be aimed at, and the designer must bear in mind that not only does the house command a view of the whole garden, but that the

GARDEN IN
LANDSCAPE STYLE (FRENCH).

neighbours can see most of it also. The temptation in small gardens is to overload details. It is a mistake to gain flower and vegetable space at the expense of grass and breadth of path. Narrow walks always look mean, and moreover they do not make for comfort.

The drawing on page 247 is of a small garden in Chichester. Here, the boundary walls were so fine, that although covered with creepers it was worth while to tear some off to

THE SAME
ALTERED TO FORMAL LINES.

expose the brickwork. A little lawn runs below the open parapet, and the ground has a slight change of level which permits a drop of two steps. The sketch was made of the garden the summer after the March when the laying out was finished. Formerly it had been a garden in the "mixed style," with bedding-out placed without method on a gravel setting.

The drawings on pages 248-9 give a good idea of the suitability of the formal style to small plots. The irregular plan probably looked much better on the ground than it does on paper, but the alterations undoubtedly makes an interesting garden. It is more elaborate than an English designer would approve for so small a house, but allowing for that it is a decided improvement on the previous arrangement.

Owing to the difficulty of making small plots interesting in design, special attention should be given to the planting. A well-thought-out colour scheme goes far to turn the mind from poor surroundings, not that planting should ever be allowed to take foremost place in a garden, any more than colour can atone for bad drawing in a picture.

MAKING THE MOST OF OPPORTUNITIES

EVERY soil has its possibilities—and limitations, and it is truer art to develop natural resources

than to change them. For example, rhododendrons introduced by means of specially prepared beds, look out of place in a chalk district, and palms and tender shrubs preserved by matting through the winter are incongruous among hardy native plants. Exotics are pleasing only when they can be used on such a scale that they form their own background, and in the frankly artificial parts of the garden they are not amiss. Here it is that the skilful gardener has obtained his bad name for design. He delights to exercise his talents in circumventing climate and soil, with the result that he too frequently violates good taste in what he grows and where he places it.

While conforming to the demands of soil and climate, any features of the ground ought to be seized eagerly and made the most of. Fine timber, undulations, water in any form, afford opportunities of giving the garden character. Architects, in laying out gardens, are prone to reduce the whole to levelled plateaux before coming to detail. This tends to monotony, and while a certain amount of flat ground is restful and useful, undulations have their own beauty and are worth developing. J. D. Sedding, the most sympathetic architect that ever laid out modern gardens, wrote:—"The gardener's first duty in laying out the grounds is to study the site, and not only that part of it upon which the house stands, but the whole site, its aspect, char-

acter, soil, contour, sectional lines, trees, etc. Common sense, economy, nature, art alike dictate this. There is an individual character to every plot of land as to every human face, and that man is unwise who, to suit preferences for any given style of garden, or with a view of copying a design from another place, will ignore the characteristics of the site at his disposal."

An old quarry suggests a rock garden. Water, whether pond, stream or marsh gives scope for lovely effects. A scrap of wood or old hedgerow points to a wild garden. Even such a trivial, and apparently awkward feature as a dry ditch may be made of interest. The frontispiece shows how an opportunity of this nature was worked up. The original garden was enlarged, and through the new piece of land ran a dry ditch. Part of it was filled up for cultivation, but the bit planted with trees was not fit to be cultivated, on account of roots and shade. So the idea came that it would make a pretty sunk path. On the right of the painting is the top of the bank, 6 ft. wide, where the trees grow, fir, beech and birch, and they are underplanted with narcissi, alliums, hyacinths, etc. On the bank itself small things were put in such as crocus, scillas and snowdrops, also primroses and polyanthus, and edged with white arabis. The silver birch bending over gives an additional charm. On the left-hand side, a strip 4 ft. wide is covered with

narcissi, tulips and other bulbs, and passes into a piece of rough grass, partly orchard. Two deep steps go down to the path, which is 86 ft. long, and up again to a small group of birch through which can be seen pretty vistas of the garden beyond. The whole affords an excellent example of what may be done with the natural features of a ground.

When one knows the trouble that must often be taken to provide incidents in a garden, it is sad to see ground pared of all its individuality and laid out as though it had none. Aptitude to develop the ground's natural character is as necessary to the designer of the formal garden as for the landscape style. There is not much land in England entirely flat and featureless, and where there is no better model than the Dutch can be found.

ALTERATIONS

ALTERATIONS and additions to gardens are frequently required from a designer. Alterations, in some respects take more skill, and certainly more ingenuity than a new piece of work. He should first find out why alterations are required. Various reasons may be put forward : increased convenience in working the place ; introduction of new features ; the blocking or opening up of views ; changes to the house involving a partial

upset of existing design ; or merely a desire to improve. Obviously, if a reason exists this must count uppermost in the designer's schemes, and the straightforward method is to take a plan of the ground as it is, and mark thereon in red the suggested changes. Or he may follow Repton's more elaborate method and prepare a plan on tracing cloth to lay over the original lines. The client should be asked to name any trees or features that he wishes to retain, which of course should be respected as far as possible.

When mere improvements, or change of fashion is desired, the designer has a more difficult task. He has the architecture of the house to consider, and probably a large number of well grown trees and shrubberies which the client wishes to preserve. Plans of the original ground, and the alterations should be drawn and submitted, and with them the designer is recommended to state in writing his reasons for his scheme, which often weigh more than the most attractive drawings.

Additions to gardens are always interesting work from the difficulty of linking up the extra ground with the existing design. The new piece should never appear as a patch on the old. The simplest method of producing a coherent effect is to carry forward one of the existing main paths into the new part, and from that to make branch paths. The continuation of herbaceous beds and

walls give the same result. When the object of taking in more ground is to add something of a different character, for example a rose garden, the latter should not occupy the whole of the addition, but sufficient margin should be left to permit of a good connexion being made with the old part. An outlying piece of park with a pond, or a dell suitable for a rock garden, can be linked to the existing garden by a shrubbery walk which opens out at the end to any size required. This is a better way than taking in a large plot of land, which may be only an embarrassment, for the sake of one particular feature in it.

A formal garden can be inserted in one of the landscape style by planting a hedge to screen it from its incongruous surroundings. An irregular piece surrounded by shrubberies can be laid out with a formal centre by running a wide grass path round it, and then making a flower bed to take herbaceous stuff, which conforms on one side to the shape of the grass path, and on the other to any geometrical shape required ; this side being planted with a hedge. It is of no consequence that the flower bed will be very uneven in width for its unevenness will show only from the grass side which belongs to the irregular style of the rest of the garden. Entrances through it can be made where convenient, and within, when the hedge is grown, a plot with simple boundary lines is all that will be evident. See Diagram 91,

which represents a bay in a wide lawn prepared for formal laying out.

A scheme for alterations requires, as a rule, more considerations for the client, than designing

DIAGRAM 91.

a whole new garden. The designer is recommended to submit in writing, with his plans, (1) The instructions he has received, (2) reasons for his suggested changes, (3) any additions that may be necessary to the garden staff, (4) directions

for carrying out the work if the staff is to undertake it, (5) an estimate of cost.

THE WORK IN PROGRESS

THE ground may, with advantage, be in the garden designer's hands before the builders come on the spot, because the orchard and the park are as a rule sufficiently removed from the house to be safe from the building operations, and every year tells with trees. This is fitly undertaken by a garden contractor, and is quite distinct from structural work, for which a separate specification and contract is needed. In putting the latter out to contract it is customary to give preference to the builder employed on the house. His tackle is on the spot, which generally enables him to give the lowest quotation, and even if he does not, it may pay in the end to have him, as a double set of workmen may lead to complications. But when planting has to be done, a trained gardener-foreman is required. Builders' men are often capable of planting trees properly, but to sort out shrubs and plant by a plan is laborious and slow if everything has to be identified by its label, and long exposure out of ground may have fatal effects on shrubs and trees. Herbaceous stuff is even more difficult to sort and plant; and no one would question the need of skilled gardening knowledge where an

alpine garden has to be done. The most workable method is to have a contract for constructional work, such as moving soil, making paths and walls, and a separate arrangement altogether for the planting. And because planting is much affected by the state of the soil and the weather I recommend that the *labour* of this part of the work be reckoned by the day, and not by piece, so that there be no difficulty in stopping operations if conditions become unfavourable.

Structural work in the garden can proceed simultaneously with the house. The first deed is to form the drive. I have seen bad mistakes made by the builder being first on the scene, and cutting through the hedge according to his ideas of convenient access, when the future gate was to be in quite another place. An old hedge takes a long time to recover such an injury, and a plan of the entrance ought to have been ready against such a mishap. The drive should be excavated, and receive enough hard core to make it practicable for carts, and the material that comes out can be pitched straight away on the spots where it will be needed.

Posts and ropes should be set round the site of the house if there is grass and timber on the place which is to be preserved, and the builder must keep his materials within the boundary. Any trees that may be within the area required for storage and work should have their trunks protected by a

few boards lashed round them. Beyond the ropes the garden's development may begin.

The main lines are first set out ; the chief paths, the parts that require levelling, the kitchen garden and its boundaries. From all paths and ground to be levelled the turf must be stripped, and it may be saved either for relaying, or stacked near the kitchen garden to rot down for use. If it is to be saved it must be taken up carefully in sods three feet by one, of a uniform thickness of about an inch, and stacked in its rolls. Where carting must be done over otherwise untouched ground it is sometimes wise to roll up an eight feet wide track of turf, to be relaid when the carting is finished. On soft land this precaution saves much after trouble in repairing the surface.

When levelling, all the top spit must be taken off first, and put aside to finish off the surface, and the operation of levelling should be arranged so that carting and wheeling pass over the newly made-up ground to consolidate it, and surplus earth should be carted straight to where it will be needed.

After levelling, the drains are laid, and the pipes for the water supply. The preparation of beds for shrubs and trees is the next item, and at this point the paths may be excavated and the top spit taken to add to the soil of the beds. If all the ground cannot be ready in time for planting before November, the rose garden should have

first attention. Spring planting is possible for most things, and even preferable for evergreens and herbaceous stuff in heavy soils, but roses never do well their first year, unless put in in Autumn. If not planted while the ground is still warm evergreens should in any case be held over until severe frosts, and the bitter March winds have finished. Every tree and standard rose should be staked at the time of planting. A few hours swaying in wind does serious damage to the roots.

With levelling, grass sowing and planting done, the garden begins to assume its character, and the ideal thing is to arrive at this stage by the end of November. Path making is less obstructed by bad weather than other operations, and during the winter it can go on without much loss of time. The kitchen garden can also be trenched and manured, and the greenhouses and other structures erected.

After the hard core of the paths is broken up and in position, and the gullies set, any tile edgings should be laid, and gripped into place by the hard core at the side, and if all planting, and wheeling of soil is over, the gravel may go down. Gravelling is always the final operation, for if the paths are allowed to become in any way messy the appearance of the work greatly suffers.

The garden designer needs to keep a close and constant watch on the work, not only to see that the plan and specification are honestly followed, for this is his foreman's duty, but in order to make

any small changes in the position of certain features which the development of the garden may suggest. Of course, a well-considered plan will not need important alterations, but omissions and additions to the planting scheme may be desirable, and sometimes slight deviations in curved paths. The formal parts rarely need touching, and indeed, an alteration to geometrical planning involves serious rearrangement of the whole.

APPENDICES

APPENDIX A

FRUIT TREES FOR BEAUTY—

Apples.—Irish Peach*, Worcester Pearmain, Cox's Orange, King of the Pippins, Ribston, Stirling Castle (very fine and enhanced by the bronze colour of the young foliage)*, Astrachan, Lord Suffield, Ecklinville, Warner's King, Keswick Codlin, Golden Spire (small but brilliant), Brownlee's Russet.

Pears.—Marie Louise, Louise Bonne of Jersey, Duchess D'Angoulême, Pitmaston Duchess, Jargonelle.

Peaches.—Waterloo, Hale's Early, Noblesse, Sea Eagle.

Cherries.—Especially Morello.

Medlars.

Mulberry.

APPENDIX B

[From *Melincourt*, by Thomas Love Peacock.]

Mr. Milestone had produced his portfolio for the edification and amusement of Miss Tenorina, Miss Graziosa, and Squire Headlong, to whom he was pointing out the various beauties of his plan for Lord Littlebrain's park.

Mr. Milestone: This, you perceive, is the natural

* Fruit splendidly coloured.

state of one part of the grounds. Here is a wood, never yet touched by the finger of taste ; thick, intricate, and gloomy. Here is a little stream, dashing from stone to stone, and overshadowed with these untrimmed boughs.

Miss Tenorina : The sweet romantic spot ! How beautifully the birds must sing there on a summer evening !

Miss Graziosa : Dear sister ! How can you endure the horrid thicket ?

Mr. Milestone : You are right, *Miss Graziosa* : your taste is correct—perfectly *en règle*. Now here is the same place corrected—trimmed—polished—decorated—adorned. Here sweeps a plantation, in that beautiful regular curve : there winds a gravel walk : here are parks of the old wood, left in these majestic circular clumps, disposed at equal distances with wonderful symmetry : there are some single shrubs scattered in elegant profusion : here a Portugal laurel, there a juniper ; here a laurestinus, there a spruce fir ; here a larch, there a lilac ; here a rhododendron, there an arbutus. The stream, you see, is become a canal : the banks are perfectly smooth and green, sloping to the water's edge ; and there is Lord Littlebrain, rowing in an elegant boat.

Squire Headlong : Magical, faith !

Mr. Milestone : Here is another part of the grounds in its natural state. Here is a large rock, with the mountain-ash rooted in its fissures, overgrown, as you see, with ivy and moss ; and from this part of it bursts a little fountain, that runs bubbling down its rugged sides.

Miss Tenorina : Oh, how beautiful ! How I should love the melody of that miniature cascade !

Mr. Milestone : Beautiful, *Miss Tenorina* ! Hideous. Base, common, and popular. Such a thing as you may see anywhere, in wild and mountainous districts. Now, observe the metamorphosis. Here is the same rock,

cut into the shape of a giant. In one hand he holds a horn, through which that little fountain is thrown to a prodigious elevation. In the other is a ponderous stone, so exactly balanced as to be apparently ready to fall on the head of any person who may happen to be beneath : and there is Lord Littlebrain walking under it.

Squire Headlong : Miraculous, by Mahomet !

Mr. Milestone : This is the summit of a hill, covered, as you perceive, with wood, and with those mossy stones scattered at random under the trees.

Miss Tenorina : What a delightful spot to read in, on a summer's day ! The air must be so pure, and the wind must sound so divinely in the tops of those old pines !

Mr. Milestone : Bad taste, Miss Tenorina. Bad taste, I assure you. Here is the spot improved. The trees are cut down : the stones are cleared away : this is an octagonal pavilion, exactly on the centre of the summit : and there you see Lord Littlebrain, on the top of the pavilion, enjoying the prospect with a telescope.

Squire Headlong : Glorious, egad !

Mr. Milestone : Here is a rugged mountainous road, leading through impervious shades : the ass and the four goats characterise a wild uncultured scene. Here, as you perceive, it is totally changed into a beautiful gravel-road, gracefully curving through a belt of limes : and there is Lord Littlebrain driving four-in-hand.

Squire Headlong : Egregious, by Jupiter !

Mr. Milestone : Here is Littlebrain Castle, a Gothic, moss-grown structure, half-bosomed in trees. Near the basement of that turret is an owl peeping from the ivy.

Squire Headlong : And devilish wise he looks.

Mr. Milestone : Here is the new house, without a tree near it, standing in the midst of an undulating lawn : a white, polished, angular building, reflected to a nicety

in this waveless lake : and there you see Lord Littlebrain looking out of the window.

Squire Headlong : And devilish wise he looks too. You shall cut me a giant before you go.

Mr. Milestone : Good. I'll order down my little corps of pioneers.

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