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SYSTEMATIC POMOLOGY

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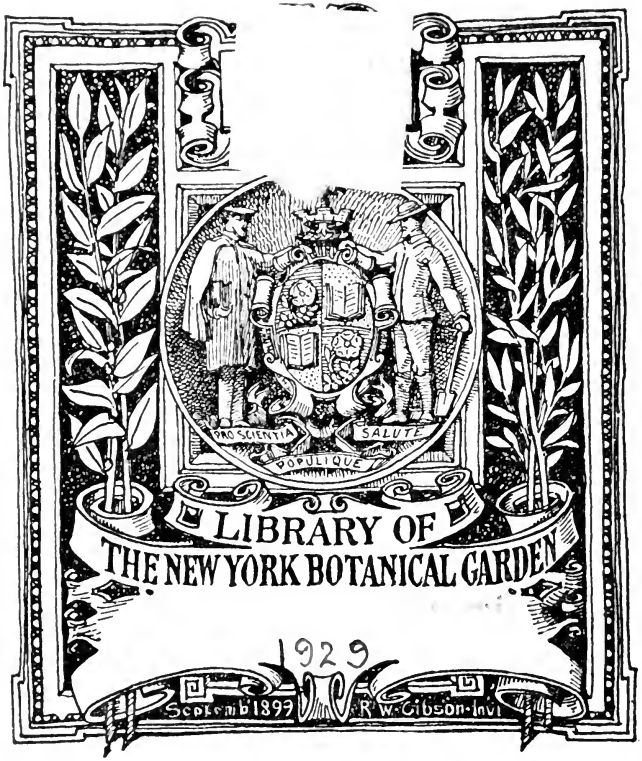
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SYSTEMATIC POMOLOGY

BY

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PREFACE

Twenty-five years ago I published a small book under the title, *A Laboratory Manual in Systematic Pomology.* The book was primitive in treatment and incomplete in material. It could hardly have been otherwise, for at that time there was no accumulated experience in teaching systematic pomology, and few fruits had been fully described either in species or varieties. Through this attempt I came to realize the need of a text for pomological students which would classify, arrange, and fully describe American pomological material, and I conceived the plan of writing such a book. As the years have passed, this plan has been kept in mind; meanwhile opportunity has come to study hardy fruits in many parts of the United States and Canada, and to describe, as they grow on the grounds of the New York Agricultural Experiment Station, nearly every hardy fruit to be found in North America. Now, from this fuller knowledge I offer my second book on systematic pomology.

The present book, it will be found, is based on the several books published by the State of New York on apples, pears, peaches, plums, cherries, grapes, and one in preparation on small-fruits, all of which, with the exception of the work on apples, have been written under my supervision. Much of the material comes even more directly from my *Cyclopedia of Hardy Fruits,* published by The Macmillan Company. All of these books, except the Cyclopedia, are difficult to obtain, and all are too bulky in size and character to be used for school and college text-books for which the work in hand is chiefly intended. There is, however, much that is new in this text, and the material taken from the larger books has been put in simpler and briefer form and has been more suitably arranged for classroom work.

Perhaps the chief innovation in this book, as compared with the larger works mentioned, is the introduction of simple keys to varieties of the tree-fruits and the grape. These keys should

be useful in identifying varieties in northeastern United States and the neighboring parts of Canada. I doubt whether they will be of much use for this purpose in the other fruit regions of the continent. They have greater value, however, as suggestive work for students than for use in identification. I cannot think of laboratory practice more instructive than to set students at the task of making keys for the varieties of any fruit in a locality or region. The keys, then, are published chiefly to serve as models for student work. Such keys may be endlessly varied, and no doubt mine may be greatly improved by one who can give key-making more time and study than I have been able to do.

Only the commonest fruits are described in this brief text. The best commercial and home varieties and those most widely grown have been chosen to represent the several fruits. But few synonyms are given and there are no references to other descriptions of fruits. Fuller descriptions, all synonyms, and citations to literature may be found in the fruit books published by the New York Agricultural Experiment Station or in my *Cyclopedia of Hardy Fruits,* reference books which should be at hand in every institution where this volume may be adopted as a student text. Only a few suggestions for laboratory work are offered; the amount of time for teaching systematic pomology varies greatly in schools and colleges, as do the seasons, materials, and methods, so that suggestions can hardly be made that would be suitable for many classrooms.

The book, it is hoped, will be useful for many besides students in schools and colleges. Fruit-growers, nurserymen, and farm-bureau agents may find it of value in studying and identifying varieties. All of these have been in mind in the preparation of the book. Classification, and therefore systematic pomology, is the foundation of pomological study and not much of a structure in knowledge of the subject can be built without a good foundation. All who are interested in pomology may well take a substantial course in systematic pomology.

In response to letters written to most of the teachers of pomology in American agricultural colleges as to matter and method of presenting systematic pomology to students, many valuable suggestions were received. For these, I now make

acknowledgment and express my regrets that many useful suggestions could not be made use of in this brief text. I shall be glad to consider any criticisms of materials or methods of presentation which readers and students may submit. I want to express my thanks to my associate, Mr. Alwin Berger, for corrections and additions in the botany of the book.

U. P. Hedrick.

New York Agricultural Experiment Station,
Geneva, New York.
February, 1925.

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CHAPTER I

INTRODUCTORY

THE first human beings who used language must have classified plants. Then as now, men were bewildered by the great number of kinds; then as now, some use was made of many plants. It was not possible then, as it is not at present, to interchange ideas about plants without names for the lesser and greater groups. In the dawn of the human race there must have been family names to distinguish fruits from nuts; generic names to separate pomes from drupes; and possibly specific names for some of the kinds of the different fruits. These simple facts make plain the necessity and the naturalness of systematic pomology.

One working with a group of fruits is seldom able to see all of the kinds. No fruit-grower, for example, ever can observe all of the varieties of plums under cultivation; no student of the botany of plums has ever seen all of the species growing side by side. Workers, to obtain even a superficial knowledge of a group of plants, must always be dependent on descriptions and illustrations. To save space and to secure accuracy in these descriptions, so necessary to pomologists, there must be a set of special technical rules and terms which, put in use, constitute descriptive pomology.

1. Systematic pomology defined.—Systematic pomology is the study of the kinds of fruits and their relationships. In practice, the structure and arrangements of the various organs are studied to determine wherein they differ, so that individuals may be put together in groups, the members of which have certain degrees of resemblance. As far as possible, systematic pomology is a classification of fruits according to their natural

relationships. It is now agreed that the best systems of classification are those which show natural affinities as opposed to purely arbitrary methods which do not have in view the expression of relationships and that seek but to name and place a plant. One cannot wholly avoid artificiality, however, in systems which are natural. The classification of plants to show their natural relationships is also called *taxonomy*.

2. Systematic pomology a means not an end.—Any system of classifying plants is but a temporary arrangement of groups and individuals according to the best knowledge of the time, always with the reservation that when more is known the classification must be remade. In particular there can never be a permanent ideal classification of fruits. Fruits are arranged in a classification with the aim of telling what is known about groups so that the knowledge can be easily utilized by the botanist, pomologist, plant-breeder, and fruit-grower. It does not matter much that the systems of classifications of authors seldom agree; in fact, it may be a distinct advantage for students of fruits to see them through the eyes of different systematists.

3. The proper concepts of plant groups.—The student of systematic pomology must keep in mind that botanical groups, of which the species is the chief unit, are often arbitrary artificial creations to aid in the classification of plants in accordance with the facts that have so far accumulated in regard to them. Only such a conception can put pomology in its true light as a branch of knowledge in process of evolution. Only so can it be seen clearly that plants are continually changing, although slowly. Any classification is but a picture of a bit of the vegetable kingdom on a certain day, which at a future date may not be a good picture. For later times there must be new pictures to show the changes that are taking place.

4. Descriptive pomology defined.—Descriptive Pomology is the study of the form, features and structure of fruit-plants and the relative disposition of their organs. In botany similar studies are more often called *structural botany* in which, however, the internal structure of the plant, as of cells, are subjects of investigation; or, such studies may be called *morphology* which differs, possibly, from structural botany in that the meta-

morphosis of organs receives more attention. These are only slight differences but they are worth noting to show as exactly as possible the place of descriptive pomology, to emphasize its slightly closer relationship to systematic pomology. Descriptive pomology has nothing to do with the functions of plants or their organs which is, of course, *plant physiology,* the two quite distinct divisions of botany and pomology being necessary supplements in a full study of plants or fruits.

5. Relations of pomology to botany.—Broadly speaking, all knowledge about plants is botany, but as the term is generally used, it is restricted to the philosophy of plant life, while applied botany, that which has to do with the culture and uses of plants, is agriculture, horticulture, or forestry. Systematic pomology is more closely allied to botany than to horticulture; one phase, putting varieties into species, species into genera, and genera into families, is botany pure and simple. It follows that a student of this text must be equipped with a knowledge of structural and systematic botany. He should, also, know something about ecology so that he can estimate better the influence of environment on fruits; physiology because physiological characters are assuming greater and greater importance in the characterization of species; and genetics in order to follow the development of fruits through hybridization and mutation.

6. Relation of systematic pomology to practical fruit-growing.—Perhaps no other factor is more important to success in fruit-growing than the choice of varieties. To choose well, the fruit-grower must have a vivid knowledge of the characteristics of trees and fruits. The first task of a man contemplating fruit-growing is to make a systematic study of fruits and varieties. He begins with systematic pomology. The progress of his profession depends very largely on the introduction of better varieties, which, in turn, is dependent on intimate knowledge of existing varieties. Contemplation shows that at every turn the practical fruit-grower relates his work to systematic pomology. It is significant that the men who brought fruit-growing into being in America and nourished it to maturity, as Coxe, Prince, Kenrick, Manning, Hovey, Elliot, Cole, Hooper, Warder, the Downings, and Thomas, were first of all systematic pomologists. The literature of fruit-growing

in any country or any time is largely systematic pomology, since it is chiefly discussions of the kinds of fruits.

7. Plant distribution as a part of systematic pomology.— The pomologist's knowledge covering any fruit is not satisfactory until the limits of its profitable cultivation are determined. The fruit-grower must have this information set forth as definitely as possible before he can choose intelligently for a commercial plantation. A notable advance can be made in fruit-growing when the systematist can give accurately the curving boundaries of several hundred well-defined varieties of the different fruits. From this material could be established plant communities which would give about the best expression possible to fruit-growers, farmers, and to botanists of the climates, soils, and the ranges of plants. It would constitute a definite statement of the lines of isothermals, altitudinal contours, degrees of humidity, and boundaries of geological formations. This is a field for further investigation that would yield results of high industrial and scientific importance.

8. Relation of systematic pomology to plant-breeding.— In the arts of crop-production, this may well be called the era of plant-breeding. New knowledge enables breeders to improve plants as never before. New fruits must be put in their proper places with existing fruits in systems of classification. In turn, fruit-breeding is dependent on systematic pomology. The characters of plants are entities, more or less independent, which are thrown together in various relationships in groups. The systematist discovers and describes these "elementary or unit characters"; thus he lays a foundation for the plant-breeder. Moreover, he collects and codifies the facts of variation, a matter of utmost importance to breeder and grower since neither now knows what the kinds of variation are, nor what may be their relations to heredity. As an illustration, the inheritance of bud-variations puzzles growers and breeders and can hardly be solved until looseness of statement and incorrectness of inferences are made less possible by better definitions from systematists as to what variations are. The histories and accounts of origins of varieties which belong to systematic pomology are also helpful to plant-breeders.

CHAPTER II

ROOTS

THE grand divisions of higher plants are root, stem, leaf, flower, fruit. There are other conspicuous external organs, as bark, branch, bud, spines, thorns, prickles and tendrils, but these are lesser divisions that can be best treated as parts of the greater ones. The major divisions begin at one pole of the plant axis and proceed to the opposite pole, and in this orderly manner, from root to fruit, a chapter for each, they are best treated.

9. The root distinguished from the stem.—In all seedling plants there is a descending and an ascending part. The part which grows downward is the *root;* that which grows upward, the *stem*. The point of juncture is the *crown* or *collar*, terms used almost solely by fruit-growers. Roots do not give off branches in regular order as do stems; they do not bear buds in regular intervals, hence have not nodes and internodes as have stems; the growing point of the root is protected by a root-cap, while the growing point of the stem is not so protected; roots of plants with which pomology deals may be white, yellow, red, brown, or black but are never green, that is do not possess chlorophyll. The functions of root and stem furnish even more marked differences, but a discussion of functions in this text would lead too far afield.

Perhaps it should be said that all roots do not descend into the ground, and that all underground parts of plants are not roots. The exceptions, however, are not of great concern in systematic pomology.

10. The root system.—The first root that breaks from a seed is the *primary root*. This takes a downward course which it continues by growth near its tip. If this primary root continues to grow throughout the life of a plant, it becomes the *tap-root* of

the tree, or the *main root* in a system (Fig. 1). More commonly, especially in pomological subjects, the main root divides early in the life of the plant and is soon lost in its branches. Early in the life of the tap-root branches spring from it, similar but thinner, which instead of growing downward extend almost at right angles to it; these are *secondary* or *lateral* roots. From these and the lower part of the tap-root irregular whorls of still smaller and much branched rootlets form a network of fibrous roots. All of these roots, collectively, make up the *root system*. Some plants have swollen more or less succulent roots which contain stored up food; these are described as *fleshy* or *tuberous*, though the latter term is a poor one as it suggests tubers which are underground stems. The Vinifera grape is the only pomological plant of temperate regions that has fleshy roots.

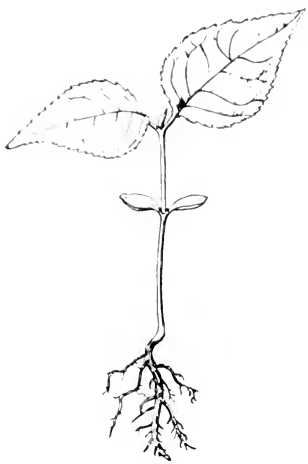

FIG. 1. Young cherry showing root-system, stem, cotyledon and leaves.

11. Adventitious roots.—In many plants roots spring from the stem, or from such modifications of it as tubers, corms, rootstocks and bulbs, or even from the leaves; all roots that do not arise from seeds or as branches of seed roots are *adventitious* (Fig. 2). The roots of monocotyledonous plants, as the onions, lilies and cereals, are mostly adventitious, growing out of lower nodes or joints of the shortened stems. Many dicotyledonous plants, among them some of the common fruits, are dependent for propagation on adventitious roots. These differ little in appearance from seed roots but are usually thinner and more fibrous.

Quinces, dwarf apple stocks, gooseberries, currants, grapes, and strawberries depend on the development of adventitious roots as a means of propagation. Some cranberries, raspberries, blackberries, and plums are so propagated and nearly all other fruit-plants may be induced to throw out adventitious roots. In general, with but few exceptions, any part of the stems of

these fruits may produce adventitious roots but they arise most readily from nodes. Usually there must be favorable circumstances, such as burial in soil, a certain supply of moisture, and darkness to promote growth of adventitious roots. In stems which lie on the ground, as the runners of strawberries, roots originate only at the nodes.

12. Sports or mutations from root-cuttings.—Blackberries are commonly propagated from root-cuttings and most varieties come true; some sorts, however, do not, the most commonly reported cases being Erie, Eldorado, Wilson Junior, and Rathbun. This phenomenon of root-cuttings that produce individuals different from those that come from stem-cuttings has been found in several other plants; as bouvardias, pelargoniums, and many variegated sorts, especially those with roots having a white core and a green covering. Long unexplained, this phenomenon is now called a *periclinal chimaera*, a plant having a core of one variety and a covering or cortex of another. Adventitious buds on true roots are borne from the *plerome* or core of the root, while those of the stem arise from parts of the plant external to the plerome. Adventitious buds on the roots are said to have an *endogenous* origin; those on branches, except those of monocots, an *exogenous* origin. Core and covering in the blackberries that do not come true from root-cuttings, and in the other plants named, according to this theory, are of two varieties.

FIG. 2. A grape cutting with adventitious roots.

13. The use of roots in classification.—Neither botanist nor pomologist make much use of roots in classifying groups except in grapes. In this fruit the structure of the root may be of importance in distinguishing species. Thus, the roots of one species, *Vitis vinifera*, are soft and succulent; in all American species, they are hard and fibrous. The root system of the Labrusca grapes is shallow; that of Rupestris penetrates the ground very deeply and has few lateral branches. One may tell most species of grapes by a glance at the roots, and the grower

must often choose species and variety in accordance with the habits of the roots.

14. Duration of roots.—Roots which live only one year are *annuals;* those which live through two growing seasons are *biennials;* those which survive more than two years, more particularly those which live year after year, are *perennials.* The pomological plants are perennial, but the strawberry is often grown as a biennial. Both plant and root are annual or biennial in any one species, but annual stems may arise from perennial roots; these are *herbaceous* perennials, the stems of which are more or less succulent. Perennial stems are hard and woody, of which all shrubs and trees are examples; these are described as *woody* perennials. Because of lack of facts, it is difficult to set definite figures for ages of perennials, but every species, as with animals, is limited to a certain age.

15. Rooting habits of pomological plants.—Root systems of closely related species and varieties vary greatly both naturally and according to environment. Cherries and pears send their roots deeper in the soil than do peaches, plums or apples; quinces, Mahaleb cherries, Paradise and Doucin apples are very shallow-rooted. The character of the root system, whether deep or surface, is commonly considered when choosing a fruit for a particular soil, but it is not customary to choose varieties in accordance with depth of rooting, yet this can be done and more attention should be paid to it.

It is obvious that in order to give fruit plants the care they most need it is important to take into account their natural rooting habits. On this depends in large measure adaptability to soil, need of water, need, frequency and kind of cultivation, relations to winds, and the application of manures and fertilizers.

16. Roots modified by environment.—The root systems of all plants are greatly modified by external conditions, so much so that they can seldom be used in classification. In particular, the character and depth of soil, the amount of water contained, and the climate modify roots. In deep, light, loose soils roots develop more freely than in heavy compact soils. Plants in dry soils usually have larger and deeper root systems than those in wet soils; the roots of desert species are deep and wide in their ramifications, while those of swamp plants are shallow and

short. If the rainfall is heavy, fruit-trees are shallow-rooted, if light deep-rooted. The want of air, the absence of beneficial lower organisms, an excess of water, and the presence of noxious substances in subsoils check the roots downward. The root systems of all pomological subjects are greatly altered by being transplanted. As a rule, the oftener a plant is transplanted, the more compact and shallow the root system. The depth to which the roots of fruit-plants penetrate the earth is usually much less than is generally supposed, while the spread is far greater. In heavy soils the roots of fruit-trees are mostly in the top ten inches, with a few main roots going deeper to anchor the tree, while the spread of roots is usually much greater than that of the branches,—sometimes twice or even three times as great.

CHAPTER III

STEMS

THE vegetative shoot, the ascending axis of a plant, as distinguished from the root or descending axis, consists of stems, leaves, buds, and flowers. These organs are defined by structure and function. Logically, all of these parts of the stem belonging to the vegetative shoot system could be discussed in one chapter, as was the root, but here details must be given and the matter may be presented better by considering the several organs in separate chapters.

17. The stem defined.—Pomologically, and for most botanical studies, a *stem* is best defined as any axis of a plant which bears geometrically arranged leaves. *Branches* are secondary stems. *Leaves* are lateral outgrowths or appendages of stems and branches. Botanically leaves and stems cannot be separated by accurate definitions, but in all pomological plants the two organs are readily distinguished. In all of the plants with which this text is concerned leaves differ from stems in their flattened form, internal structure, limited growth, and in being geometrically arranged on woody lateral shoots. The places at which the leaves are attached are *nodes*. The zones between the nodes are *internodes*.

18. Grape stems.—In the grape, parts of the stem have special names. Wood of the current season of a vine is called a *cane* (Fig. 3). Parts of the vine older than one year are *old wood*. The unbranched main axis, as in other plants, is the *trunk*. The main divisions of the trunk, or branches, are *arms*. Newly developed succulent stems are *shoots;* those which bear leaves only are *wood-shoots*, while those which bear leaves and flowers are *fruit-shoots*. Secondary shoots arising from the main shoots are *laterals*. The region from which the branches arise is the *head*. After pruning, short pieces of the bases of

PLATE I. Two good apples—Golden Delicious above and McIntosh below.

canes, usually with one or two buds and nodes, are *spurs*. When these are left for the purpose of bearing spurs the following year, they are called *renewal spurs*. In most species of grapes, woody tissue interrupts the pith at the nodes; this is the *diaphragm* (Fig. 4).

19. The growth of stems in length.—A *bud* is an incipient shoot. Growth in length of stem continues from the terminal

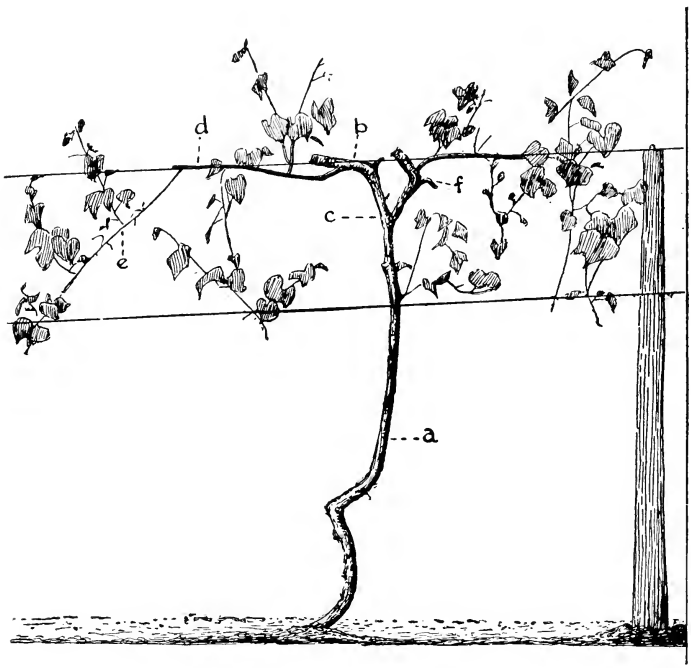

FIG. 3. A grape vine and its parts: a. trunk; b. arm; c. head; d. cane; e. shoot; f. spur.

bud; a stem branches from lateral buds. Growth in length consists in the emergence of new nodes and internodes from the terminal bud. This emergence is due to the elongation of the internodes. The amount of elongation varies in different parts of the same plant and greatly in different plants. When a stem, through its branches or branchlets, has made its season's growth, the internodes do not lengthen in subsequent seasons. Increased length in shoots takes place only by the addition of new inter-

nodes at the growing end. Dormant parts of plants are not elevated above the ground by growth,—a branch springing from the trunk of a tree at any distance from the ground retains the same height throughout the life of the plant.

20. Texture of stems.—Soft succulent stems are *herbaceous* and usually last but one season. Stems which develop within themselves considerable quantities of hard fiber are *woody*. All pomological plants of temperate regions, excepting the strawberry, are woody; the strawberry is *semi-herbaceous*. All stems are herbaceous when young, and all herbaceous stems possess more or less woody fiber, so that the difference between herbaceous and woody stems is only in the degree of development of the woody tissues within them.

FIG. 4. Grape stems. a. *Vitis vinifera* with diaphragm; b. *V. rotundifolia* with pith continuous.

21. Kinds of stems in hardy fruits.—Plants with a well-developed central woody trunk, with the head elevated at maturity more than three or four times the height of man, are *trees*. Plants with no very distinct central trunk, with chief branches much the same in thickness springing from or close to the ground are *shrubs*. Shrubs are usually less than three or four times the height of man. The adjectives *shrubby*, meaning shrub-like, and *arborescent*, tree-like, are common in pomology.

Several species cultivated for their fruits are too weak in stem to maintain an upright position. Some of these, as the dewberries, grow along the surface of the ground; such stems are *prostrate*. Others, as several species of grapes, have stems too weak to stand erect and find support on upright objects over which they clamber; these are *climbing* or *scandent* plants; some climbers are called *lianas*.

Still another modified stem has very long internodes and runs over the ground forming adventitious roots at the nodes, as in the strawberries; these stems, usually destitute of leaves, are *runners* (Fig. 5). They vary much in the character of the internodes. The runner cords in some strawberries are thick

and stout or even fleshy; others are long, slender and wiry. Runners with short internodes may strike root three or four

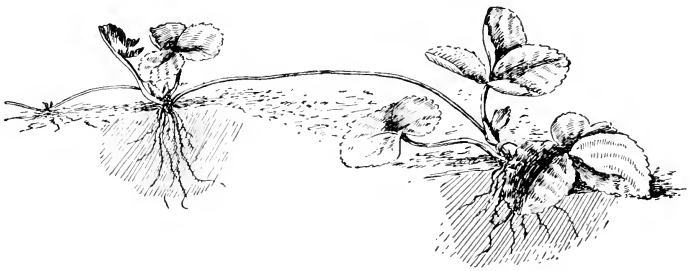

FIG. 5. Strawberry runner.

inches from the plant; with long internodes, twelve or fourteen inches. The length of internode not only helps to classify the variety, but on it depends the method of training, whether in hill, matted row, or hedge-row.

A *turion*, or *sucker*, is a branch arising from a stem underground, as in red raspberries (Fig. 6). In nature, suckers become separate plants through the formation of adventitious roots and the death of the connecting underground stems, a process which has suggested the horticultural practice of propagation by division when the suckers are separated from the parent by cutting the underground stems. Suckers become parasites which rob the parent of food, and unless wanted for propagation should be destroyed.

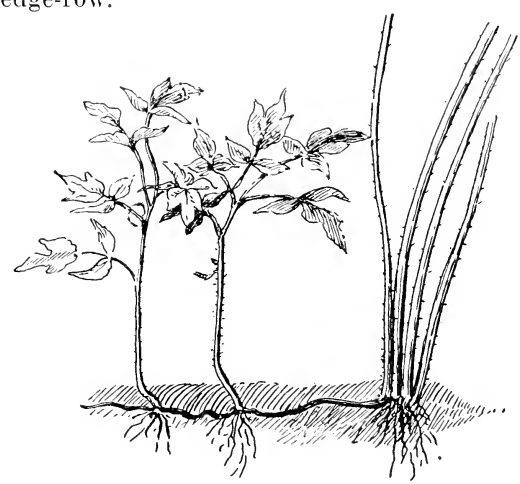

FIG. 6. Turions or suckers and canes of red raspberry.

A *stolon* is a stem above ground which by bending over or

becoming prostrate takes root at the nodes or tips when these touch ground, as in the black raspberry (Fig. 7), currant, and gooseberry. In the horticultural operation of *layering*, plants which may or may not naturally make stolons are bent down, and after rooting at the nodes, as most plants will, are made into separate individuals by cutting the connecting stems. After a turion, stolon, or seedling of a bramble passes its first year the stem is called a *cane*.

22. Size and habit of plant.—Size of plant is a very reliable character in determining any of the hardy fruits. The Rome Beauty apple, Winter Nelis pear, English Morello cherry, and Crosby peach, as examples, are all dwarfs as compared with other varieties of their kinds. Size varies greatly, it must be remembered in using this character, with environment and care. The terms *large*, *small*, and *medium* are commonly employed to designate size. Vigor must not be confused with size. Small trees may have as much vigor, or internal energy, as large ones.

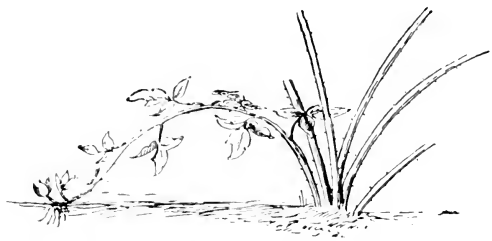

Fig. 7. Stolon and canes of black raspberry.

Habit of growth, as understood by pomologists, has reference to the form of the top. In describing the tops of trees a number of explanatory terms are used; as, *upright, spreading, drooping, tall, low, dense, open-topped, vase-form.* Vines, brambles, bush-fruits, and strawberries may have several of the terms for describing tree-fruits applied to them and in addition: *straggling, sprawling, stout, slender, compact,* and so on. A fruit-grower with a trained eye can tell almost any variety of the several fruits by its habit of growth. European gooseberries are stocky with upright straight branches, while American gooseberries have slender stems, which curve, droop, spread, or sprawl. The form of the top may make a plant easy or difficult to manage in the orchard. Habit of growth is affected very little by environment, culture, or even by pruning.

23. Thorns, spines, prickles, and hairs.—Stems are sometimes much reduced in size, modified in appearance, and take on new functions. Thus, in wild pears and plums some branches are reduced to small, hard, sharp points known as *thorns* or *spines*. That these are modified branches is plain from the fact that they arise in the axils of leaves and show all gradations from spines to spine-like branches, often bearing-leaves or lateral buds. The *prickles* of brambles and gooseberries, often wrongly called thorns, are not modified branches but excrescences of the bark. The stiff prickles of blackberries may help to support the plant.

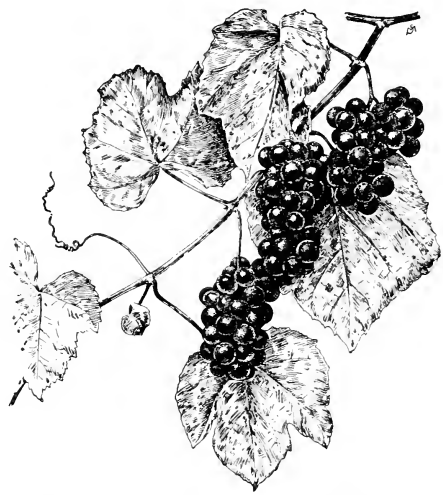

FIG. 8. Fruiting shoot of *Vitis Labrusca* showing continuous tendrils.

In place of thorns or spines, or possibly with them, some plants have on stems or twigs fine soft hairs or down in which case they are said to be *hairy* or *pubescent*. Twigs of some pome-fruits at some stages of growth are very pubescent and later may lose the hairs. Presence or absence of armament, that is of thorns and spines and of bristles, is of capital importance in distinguishing species of brambles and of bush-fruits, nearly all of which are prickly or thorny or both with great variations in the organs. An occasional species is *thornless* or *unarmed*.

In some species the thorns and prickles are of equal size and of the same form; in others, they are of different size and form. In the European raspberry the prickles are slender and nearly straight; in the American red raspberry, they are much stouter; in blackberries and dewberries they are usually stout and curved. Spines and thorns on some fruits are arranged in regular order and in others are not. Some species, as the American red raspberries, bear gland-tipped bristles or hairs on flowering shoots.

Gooseberries have from one to three spines at the base of the leaf with occasional smaller ones along the stems. In American cultivated varieties, the spines are shorter, usually borne singly, and are scattered without order along the stem.

24. Tendrils.—Some plants have highly specialized leaves or branches which aid them in climbing. Whether a tendril is a modified leaf or branch is known by its position. The only fruit with which this text is concerned having tendrils is the grape,

FIG. 9. Fruiting shoot of *Vitis vulpina* showing discontinuous tendrils.

the tendrils of which are modified branches since they either arise in the axils of leaves or terminate stems. The tendril is one of the organs most used in determining species and varieties of grapes. Thus, in *Vitis Labrusca* there is a tendril, or an inflorescence, opposite every leaf on a fruit shoot, but in all other species there are two leaves with a tendril opposite each and then a third leaf without a tendril. In the first case the tendrils are said to be *continuous* (Fig. 8); in the latter, intermittent (Fig. 9). In the many species of grapes, tendrils may be *long* or *short; stout* or *slender; simple, bifurcated,* or *trifurcated; smooth, pubescent,* or *warty.* To study tendrils of grapes properly, it is necessary to have vigorous, healthy, typical canes from mature plants.

25. The shape of the stem.—No two plants have their stems shaped exactly alike, and the differences are so great in all species of fruit that they are of considerable importance in classification. As an example, the trunks of old apple-trees may be studied; it will be noted that they are usually buttressed at the base; the trunk is seldom a perfect cylinder; it is ribbed and ridged as is the trunk of no other tree. The trunks of all other tree-fruits have similar marks of recognition, which often extend to varieties. The stems of some species of Rubus, Ribes, and Vitis may be *circular,* of others *polygonal,* or they may be *fluted* or *channeled,* or a cross-section may show more or less prominent *angles.* The internodes on branches of the tree-fruits are commonly considered cylindrical, but usually they are cylinders with more or less conical ends. Neither are the cross-sections of these internodes always circular. Whether the branches are straight or otherwise often constitutes a fine mark of distinction in some of the fruits; very frequently the internodes zigzag.

26. The branching of stems.—The primary shoot of a plant is a single stem, and in some cases may so continue, but in the cultivated fruits branches or *secondary* axes arise from buds on the primary or central axis; the secondary axes may in their turn bear branches or *tertiary* axes and so on. There may, therefore, be *few* or *many* branches on any of the fruiting plants with which pomology is concerned. The angles at which these branches arise from their axes give shape to the tree, making it *upright, spreading, open-topped, dense, round-topped, vase-formed,* and so on.

27. Fruit-spurs.—All of the tree-fruits, and the currant and gooseberry as well when the fruiting age comes on, bear short much reduced branches which grow very little from year to year and seldom reach a length of more than a few inches. These reduced branches are *spurs* or *fruit-spurs* (Fig. 10). They are easily recognized by the few or many scars which mark the place where buds have fallen from year to year. There are great differences in the age which fruit-spurs attain and in their numbers and position on fruit-plants. Some spurs, as those of the apple and pear, live many years; they persist longer on red than on black currants; some varieties of plums and cherries

bear few fruit-spurs, others many; peaches seldom have real fruit-spurs. Fruit-buds of the grape are borne on shoots of the current year's growth. Cultivation, fertilizers, pruning, and all cultural operations influence fruit-spurs profoundly, notwithstanding which they are used in distinguishing varieties, so that these organs must be fully described for each fruit.

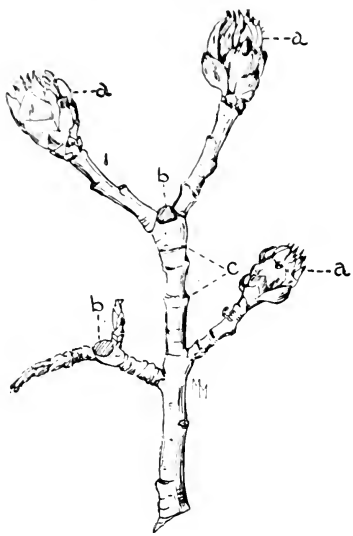

FIG. 10. Fruit-spur from Bartlett pear. a. fruit-buds; b. fruit-scars; c. growth rings.

28. Annual rings.—A smooth cross-section of the trunk of pomological woody plants shows a number of ring-like zones in the wood which represent the wood-tissue produced by the tree in one season of growth; these are called *annual rings.* The width of these rings varies greatly, depending on the growth conditions of the season in which the ring was formed, on the age of the plant, and on the species or even the variety. Thus the annual rings of the peach are wider than those of the apple; and the rings in McIntosh and Seckel wood are narrower than in most other apples and pears. Usually the age of the tree is the same as the number of annual rings, but not always as occasionally two rings form in one year when growth is checked and recommences.

29. Pith, heart-wood, and sap-wood.—It is not within the province of this text to discuss in detail the anatomy of the stem; it suffices to name and describe so that thereby may be identified such organs as may be used in classification. For this purpose, the internal structure of a fully developed stem may be divided as follows: The spongy tissue occupying the center of the woody cylinder composing the stem of dicotyledonous fruit plants is called the *pith,* or *medulla.* Surrounding the pith is a very much thicker zone of hard heavy wood termed

heart-wood or *duramen*. A thinner zone of lighter colored softer wood called *sap-wood* or *alburnum* surrounds the heart-wood. The pith in a mature plant serves no useful purpose. The heart-wood is but a support for the remainder of the tree, as its vessels no longer conduct water and its cells contain no living matter. The sap-wood conducts the sap from roots to leaves and many of its cells are still living; starch, sugar, and other compounds are often stored in the sap-wood.

30. Cambium.—Next outside the sap-wood in the stem is a layer of soft formative tissue from which new wood and new bark originate, the *cambium layer*. The cells in this layer are filled with nutritive sap and in the period of greatest growth activity have so slight a hold that the bark easily peels. The cambium contains most of the growing cells in stems. Besides being rich in nutritive substances, these cells contain the protoplasm necessary to cell division and consequent growth. The cambium layer makes possible, or at least easy, the horticultural method of propagation in which a part of one plant is severed and made to unite with a part of another; this operation is *grafting*. The part removed to be inserted in another stem is the *cion* or *graft*. The plant in which the cion is set is the stock. It is necessary in grafting that the cells of the cambium layers of stock and cion come in close contact, after which the two parts become as one through the union of cells.

31. The bark.—The coverings of a woody stem external to the cambium are roughly designated as *bark*. In the plants now under discussion the bark may be divided into four easily distinguishable structures. The part of the bark next to the cambium which consists of long strong fibers is the *inner bark* or *bast*. Next outside is a layer of tissue the cells of which contain green coloring matter or chlorophyll; this layer is the *middle bark* or *green bark*. The outer layer of bark is made up of corky cells which contain no chlorophyll, but by reason of other colored contents give color, each according to species, to the stems and twigs of trees and shrubs; this is the *corky layer* or *outer bark*. The fourth and outermost covering, made up of empty cells, is the *skin* or *epidermis*. The outer bark on many fruit-trees is rent and torn by growth from within, worn by the weather, and is thrown off in fragments so that only traces

of it may remain. The green layer may be in evidence only in the current season's growth. In some grapes even the bast layer may die and loosen where it hangs in shreds after the first or second year.

Nearly all of the many species of Prunus can be recognized from their bark. Color, thickness, and smoothness are all important. In the drupe-fruits the color of the inner as well as the outer bark must be noted as there are in some species deposits of coloring matter. Bark is usually lighter in color in warm than in cold climates. On young healthy vigorous plants, it is smoother and brighter than on old decrepit or diseased trees. The bark of all perennial plants is shed in scales, strips, or flakes as age progresses from the outside. This process is called *exfoliation*, and the manner of it is often a fine mark of distinction, especially in the drupe-fruits.

In the apple, oblong scales of various sizes detach themselves at ends, at sides, clinging at the middle, and finally fall to the ground. In old pear trees the bark is checked in squares; in the cherry thin strips peel from around the tree; in the peach the manner of exfoliation is more varied than in most other fruit-trees.

32. Lenticels.—Under the strain of growth the epidermis of twigs, branchlets, and branches bursts at the *stomata*, the breathing pores of the epidermis, exposing a corky or powdery mass of cells through lens-like rifts from the shape of which is given the name *lenticel*. The corky cells exposed are usually brownish or whitish. These organs may serve for the admission of air and for the diffusion of gases inward and outward. Lenticels vary greatly in number, position, size, and shape in different genera, species, and varieties and may be very helpful in identifying winter wood of any of these groups. On the apple, pear, plum, peach, cherry, and related fruits they must always be taken into account in describing the wood.

33. Color and bloom of bark.—In young trees the color of the bark is a most valuable diagnostic character. Many if not most pome-fruits can be told in the nursery by the color of the bark, but color does not help much in identifying the drupes. Especial attention must be paid to the color and the bloom of stems in the brambles. The stems of cultivated brambles may be tints

and shades of green, yellow, brown, red, and purple. The color of the turion is often different from that of the cane. The color of winter wood is not the same as of summer wood. The delicate powdery coating on the twigs and stems of many plants is known as the *bloom*. The amount and character of bloom vary greatly on stems and twigs of the different hardy fruits. The bloom must be noted in particular on the stems of brambles.

34. Stem-scars.—Twigs bear buds at their tips and at regular intervals, in a geometrical arrangement around their sides. Just below every lateral bud is a crescent-shaped scar, where once a leaf was attached, therefore called a *leaf-scar*. If these marks are examined with a hand lens, from one to several scars are found of the vascular bundles that pass from the woody twig into the stem of the leaf to which is given the name *bundle-scars*. When flower-clusters fall, an oval or round scar remains, called an *inflorescence-scar*. In the spring when the terminal bud of a twig begins to grow, the bud-scales inclosing the bud and encircling the twig drop away leaving a ring of scars,—the *ring-scar*. The limit of each year's growth is marked by a ring-scar and by them the age of a twig or a branch may be determined. Any and all of these stem-scars may be of use in classification.

CHAPTER IV

BUDS

ANY study of pomology must be preceded by inquiries in botany. In such studies the pomological student should have prepared himself especially as to the nature and function of buds. What are buds? How distinguish the several kinds? How are they borne? What the functions? With these questions unanswered it is impracticable for the student in pomology to proceed. The brief discussion of buds in this chapter is to remind rather than to inform the student as to the parts played by buds in producing fruits. Some applications of the botany of buds to pomology may give the chapter new meaning and interest.

35. A bud defined.—A *bud* is an undeveloped shoot. It consists of a very short stem bearing few or many leaves, packed closely one above another, which grows into a shoot agreeing in structure with the plant producing the bud. Thus, a bud may be considered an individual, proof of which is found in the horticultural operation of *budding* in which a bud from one plant is inserted under the bark in contact with the cambium of another individual to reproduce a shoot of its kind. *Bud-scales* are modified leaves which protect the bud. The buds of fruit-plants are provided with a series of overlapping bud-scales. These serve to protect the bud against extremes of heat, cold, and moisture and in some cases are food storehouses. Green tissue is not required for these functions and bud-scales are usually brownish husk-like structures without the green of true leaves. The bud-scales of some plants, the black currant among fruits, are covered with hairs or glands which excrete viscid resins giving off odors so distinctive as to characterize the species. The protective scales of some buds are covered with woolly pubescence which may prevent rapid changes in temperature in the bud.

36. Leaf-buds and flower-buds.—Buds from which shoots develop bearing only green leaves are *leaf-buds.* Those which produce flowers only are *flower-buds.* Some buds, however, produce shoots which bear both leaves and flowers and are therefore *mixed buds* (Fig. 11). Flower- and mixed buds are commonly called *fruit-buds* by fruit-growers since from them fruits develop.

To undertake budding and pruning successfully, and to estimate the prospective crop for the season, it is necessary for the fruit-grower to distinguish between fruit- and flower-buds. This is usually but not always possible. In apples, pears, and all pome-fruits leaf-buds are readily distinguished from fruit-buds. In the pomes the fruit-buds are larger, plumper, and blunter. In the stone-fruits the differences are not so marked, especially in winter, but as growth begins in the spring, greater size, plumpness, and bluntness show in the buds of plums, cherries, and peaches much as in the pomes. The position upon the twig may be a distinguishing mark between the two kinds of buds, as in the peach where there are usually three buds above a leaf-scar, the middle one of which is a leaf-bud while the two outer ones are fruit-buds (Fig. 12). Flower-buds are borne in triplets in Japanese plums. In the grape there is sometimes a group of three or more buds called a *compound bud* or an *eye.* In a compound bud on a grape the central bud is the *main bud,* while the lateral ones are *secondary buds.*

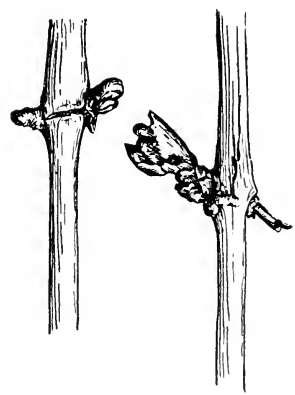

FIG. 11. Leaf- and fruit-buds, embryonic shoots, of the grape.

37. Buds classified as to position on the stem.—Any place on a stem may become the point of inception of a bud, but normally buds originate in an orderly manner as to position. These are *terminal* when the bud terminates a stem; and *lateral* when they are borne on the sides of a stem (Fig. 13). Usually terminal buds are more vigorous than lateral ones, as may be proved by comparing the terminal and side shoots of branches in early summer. Hence, in newly transplanted trees, it is often better

not to head back all of the branches bearing terminal buds. The latter are usually leaf-buds but not always, as in the apple in which it is often a flower-bud. Lateral buds usually arise in the angles or axil formed by the leaf-stem and the branchlet, hence are sometimes called *axillary*. *Accessory* or *supernumerary* buds are those formed in addition to the normal bud in the axil of a leaf.

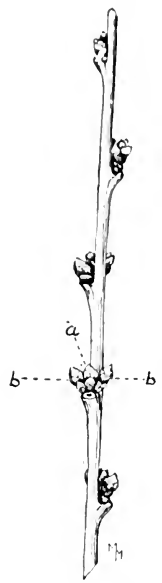

FIG. 12. Buds of the peach. a. leaf-bud; b. fruit-bud. Spiral arrangement.

Buds arising in the axils of leaves may not develop for one reason or another at the normal time, in which case they may be grown over with new wood to become active later in the life of the plant; these are *dormant, latent,* or *resting* buds. These are most often at the base of stems. Above ground the shoots from dormant or adventitious buds are *water-sprouts;* if they come from beneath the surface, whether from roots or underground stems, they are *suckers*. The destruction of the terminal bud and of lateral ones near it may force the growth of dormant buds into water-sprouts, and nearly always causes a more vigorous development of shoots from lateral buds. Plants, therefore, have their tops thickened and made hedge-like by the removal of the ends of branches, a process known as *heading back*. Bending, breaking, or twisting branches, or anything that impedes the flow of sap to the terminal bud tends to force the growth of dormant buds. Normally, branches appear in regular order but often grow out of place from dormant buds. Dormant buds are regular in place of development, but are irregular in period of development.

FIG. 13. Fruiting twig of sweet cherry. a. leaf-bud; b. fruit-spur; c. growth-ring.

38. Adventitious buds.—A wound may cause the formation of buds at any point upon a stem, and sometimes they appear where apparently there has been no injury. They are irregular in that they do not come from the axils of leaves; such buds are said to be *adventitious*. On the power of most plants to produce adventitious buds depends the process of propagation by cuttings. A *cutting* is a part detached from the parent which becomes an independent plant by the formation of new roots. All wounds begin to heal by the formation of loose thin-walled colorless tissue, the *callus* (Fig. 14). Usually before cuttings strike root a callus is formed on the lower end, but the adventitious buds from which the roots come do not spring from the callus, contrary to common opinion, but from internal tissue. Nearly all hardy fruits can be propagated from cuttings, but the common apples, pears, peaches, plums, and cherries, while they form the protective callus readily, do not easily produce adventitious roots. The shoots which break so plentifully from stumps of trunks and branches of hardy fruits come from adventitious buds. Some branches spring from adventitious buds and hence bear no relation to the leaves, that is in particular, do not follow the geometric law which governs the position of branches which arise from the axils of leaves.

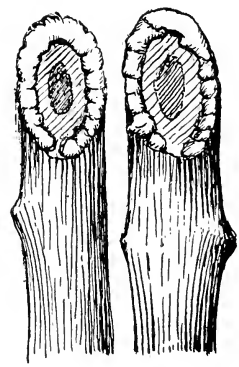

FIG. 14. Callus on grape-cuttings.

39. Buds classified as to arrangement on the stem.—The shape, aspect, and manageableness of woody fruit-plants are largely determined by the arrangement of their branches, which, of course, is dependent on bud arrangement, and buds, in turn, on leaf arrangement. Buds, leaves, and branches of all hardy fruits are either opposite or alternate. They are *opposite* when there are two at the same node, the two in every case being on opposite sides of the stem. They are *alternate* when there is only one from each node. When alternate no one is on the same side of the stem as the one next above or below it. The arrangement of buds on shoots of plants is of prime importance in

classification, and, of course, must receive recognition in pruning as cutting to favored buds gives branches growing in a desired direction.

40. Stalked and sessile buds.—Some buds are attached directly to the stem and are *sessile;* others have short stalks and are *stalked.* Whether buds are stalked or sessile sometimes helps to characterize varieties in a species or species in a genus; as in Ribes in which black and red currants bear buds which are distinctly stalked while those of the gooseberry are sessile. The stalks of black currants are beset with small yellow glands as are the bud-scales. The buds of all hardy tree-fruits are sessile. If the buds lie close to the twigs, they are *appressed;* if they stand away at a considerable angle, *free.*

41. Time of opening of buds.—Life events in plants help very much in classification and are sometimes of supreme importance in orchard operations and, therefore, in determining whether varieties are desirable or not. Thus the time of opening of leaf- and flower-buds are life events that the fruit-grower must take into consideration. The terms *early, mid-season,* and *late* usually suffice, although dates are often helpful.

42. Bud-variations.—Normally, the shoots that develop from the buds upon any plant are very closely alike, much more nearly so than the progeny that springs from seeds of the same pod. Now and then, however, a bud produces a shoot which differs greatly from the other shoots on the plant. All kinds of cultivated subjects furnish examples. Thus, a shoot of a peach produces a nectarine, or of a nectarine a peach; a branch of the Bartlett pear bears russet fruits; purple plums produce yellow plums; blackberries throw white variations; red currants give white varieties, or black grapes bear white ones; and, more frequently than any of these examples, light red or red-striped apples bear dark red sorts. These sudden marked variations are called *bud-variations, mutations,* or *sports.* New varieties of ornamental plants not infrequently originate as bud-variations, but despite popular opinion to the contrary, very few varieties of fruit have so originated, nearly all of which have been due to changes in color, the chief exception being the loss of the felted skin of the peach to make a nectarine or the gain by a nectarine of pubescence to make a peach.

CHAPTER V

LEAVES

For three thousand years leaves were more used in the orderly arrangement of plants than any other organs. It was only after the structure and functions of flowers became well known that these and the fruits developed from them began to be regarded as the principal parts of plants for purposes of classification. It is interesting to note that pomologists are now making a new appeal to leaves for aid in classifying. Shaw, of Massachusetts, has found that most fruit-trees can be identified and classified by leaves alone. While, therefore, classifying by foliage never can have the value to systematists it once possessed, it is of great use, especially to pomologists.

43. An arbitrary definition of leaf.—Leaves have so many offices, functions, types, and disguises, that they are almost impossible to define precisely. However, leaves are comparatively simple as they exist in pomological plants, especially for purposes of classification, so that an easy definition can be given which will suffice. A *leaf* is a lateral outgrowth of a stem, produced in a definite succession from growing points of the stem. In all hardy fruits they are flattened structures and bear buds in their axils. Their growth differs from that of stems and roots in being definite and of short duration, while that of the latter is indefinite in dimensions and in duration. Stems and roots develop buds as lateral appendages, while leaves seldom do so normally. In hardy fruits the leaf embraces the new branch in its axil. Both leaf and branch are borne at the nodes of stems.

44. Kinds of leaves.—It may be helpful in obtaining as clear an idea of leaves as possible to mention the various kinds, even though but few of the modifications of common leaves are found in hardy fruits. The typical flat green organ is distinguished as a *foliage-leaf*. Its chief function is that of food-making. The

modification nearest to green leaves are *scale-leaves* which in fruits envelope the growing points of buds. These are protective structures. The floral and reproductive organs of flowers are a little less like true leaves than scales but are clearly modified leaves. The first leaves a plant possesses, the *seed-leaves* or *cotyledons*, are modifications of foliage-leaves. Spines and tendrils may be modified leaves. Lastly, leaves are not uncommonly storage organs for food, as the fleshy leaves of bulbs of which the onion is an example. Other forms and uses of leaves exist, but these are commonest and most important for the work in hand.

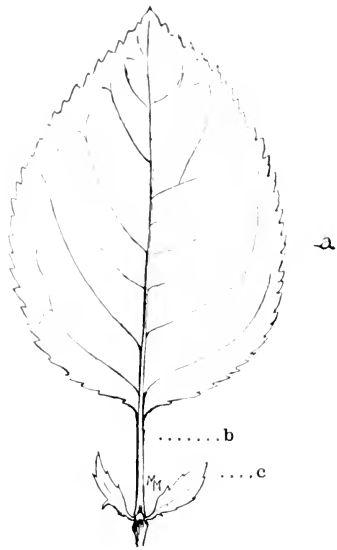

FIG. 15. Leaf of an apple. a. blade; b. petiole; c. stipules.

45. The parts of a leaf.—A typical leaf consists of three parts. The broad green expanded portion is called the *blade* or *lamina* (Fig. 15). The stalk by which the blade is attached to the stem is the *leaf-stalk* or *petiole*. Some leaves, as those of the apple and pear, have two leaf-like basal appendages called *stipules;* leaves possessing them are said to be *stipulate*, those without *exstipulate*. All foliar leaves have an upper surface and a lower one. The upper is exposed to the sun and is smoother and of a deeper green; the lower surface is paler, more roughened by veins and is usually more pubescent.

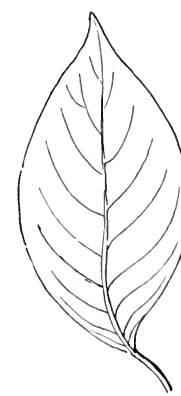

FIG. 16. Leaf of pear. Pinnately veined; ovate; apex acute; base acute; margins entire.

Leaves are almost endlessly diversified, and yet within the limits of either species or variety the characters of its parts are remarkably constant. It follows that the leaf is a most valuable organ in making distinc-

tions between different groups of plants. The blade is the most obvious part and offers several important characters for comparison in classifying. In the mode of veining, in outline, margin, base, apex, and its surfaces, the blade must be studied by the systematist. In the study of leaves those found on water-sprouts, suckers, and those borne on slow-growing shoots or spurs are

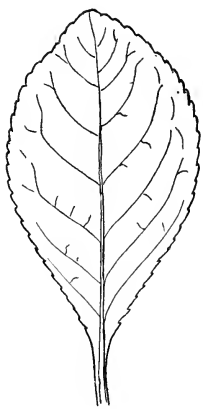

FIG. 17. Leaf of common plum. Pinnately veined; obovate; apex obtuse; base tapering; margin serrate.

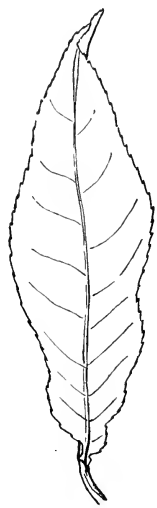

FIG. 18. Leaf of peach. Pinnately veined; lanceolate; apex and base acute; margins sinuate and finely serrate.

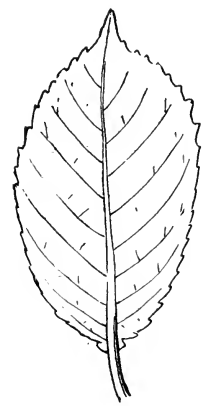

FIG. 19. Leaf of sour cherry. Pinnately veined; obovate; apex acuminate; base abrupt; margins coarsely serrate.

not taken, but, rather those produced by normal free-growing shoots.

46. Mode of veining.—The framework of a leaf consists of tough fibrous veins and ribs which run from the stem through the petiole into the blade and there spread out to the margin of the leaf. The way in which these ribs and veins are distributed is called *venation*. The main branches in a system of venation are called *ribs* of which there is usually a stout central one known as the *midrib*. The ribs subdivide into smaller divisions termed *veins* and these in their turn divide into *veinlets*. There are two common types of venation: these are the *parallel*

in which the veins all run parallel to each other from the base to the tip of the leaf, as in the lilies, and the *reticulate* or *net-veined* in which the veins form a network. All of the hardy fruits have reticulate veins. There are, also, two kinds in accordance with the arrangement of the ribs. In one division the veins all run from the midrib, as in the pome- and drupe-fruits. Such leaves are *pinnately-* or *feather-veined.* In the other division, the ribs spread at the top of the petiole and run across to the margins like the fingers of an outstretched hand, hence are said to be *palmately* or *digitately* veined. Currant, gooseberry, and grape leaves have this mode of venation.

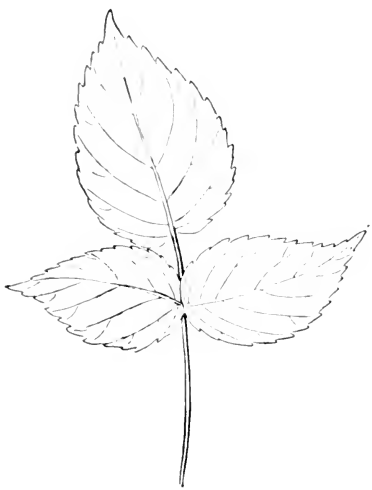

FIG. 20. Leaf of red raspberry. Pinnately compound; leaflets ovate; apex sharp-pointed; base acute; margins doubly-serrate.

The network of veins is much coarser in the leaves of some varieties than in others. The small areas inclosed by the veinlets vary greatly in different varieties in shape as well as size; the areas are more sunken in some leaves than in others; and the coloring of the veinlets is often markedly different. These characters of veins, together with the thickness of the leaf, constitute the ill-defined character called *texture.*

47. The shapes of leaves as to the outline of the blade.—The shape of the blade is given in full descriptions of all species and varieties and is one of the most distinctive marks of these groups. The foliar organs of flowers have similar shapes, defined by the same terms. It is necessary fully and carefully to define such shapes of the blade as occur in the leaves and flowers of hardy fruits.

A leaf is *lanceolate* when considerably longer than wide and tapering toward the apex; *oblong* when two or three times as long as broad; *elliptical* when broad-oblong with rounded ends; *oval* when very broadly elliptical; *ovate* when egg-shaped, the

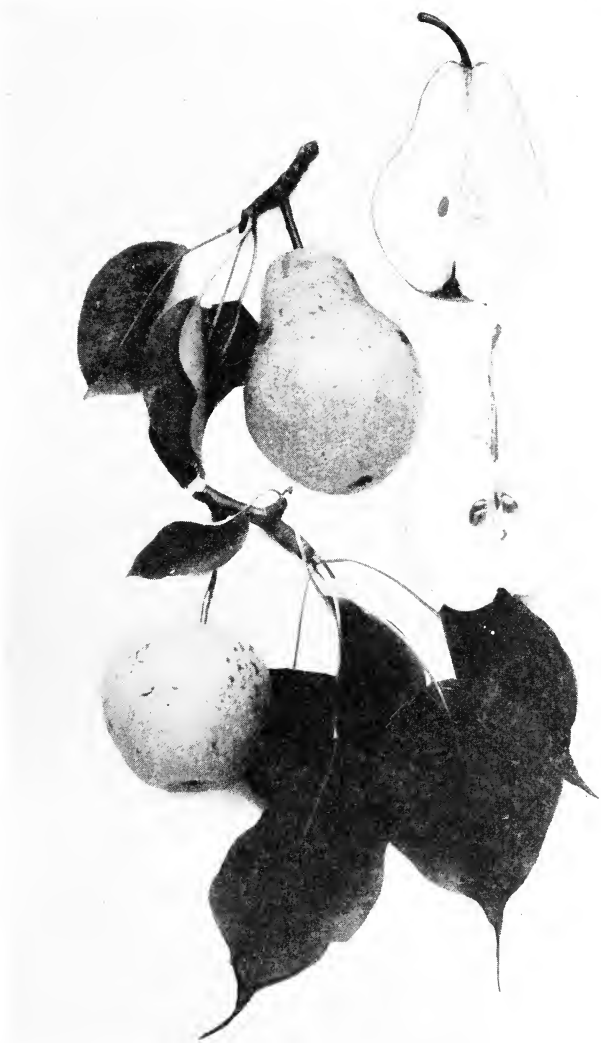

PLATE II. Two species of pears.—Bartlett above, *Pyrus communis*. Chinese Sand below, *Pyrus serotina*.

broad end down; and *orbicular* or *round* when nearly circular in outline; *oblanceolate*, the reverse in direction of tapering or lanceolate; *obovate*, inversely ovate; and *cuneate* or *cuneiform* when wedge-shaped. These terms can be combined and varied to describe thousands of differently shaped leaves (Figs. 16-21).

48. Shapes of the base and the apex.—The base of the leaf is *cordate* or *heart-shaped* when rounded and turned in, forming a wide notch where the petiole is attached; *reniform* or *kidney-shaped* when notched like the last in leaves broader than long. The apex is *acuminate*, *pointed*, or *taper-pointed* when prolonged into a gradual point; *acute* when the sharp point is not prolonged; *obtuse* when the apex is blunt or rounded; *truncate* when the end is cut off squarely; *emarginate* or *notched* when indented at the end; and *mucronate* when tipped with a small sharp point (Figs. 16-21).

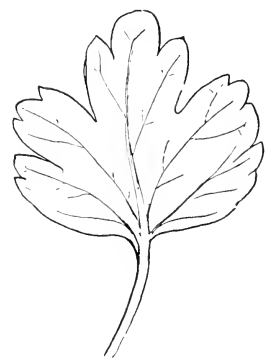

FIG. 21. Leaf of gooseberry. Palmately veined; five-lobed; sinuses narrow; orbicular; coarsely crenate.

49. Size and thickness of the leaf-blade.—The size of the leaf-blade is a very dependable character in identifying varieties of any of the fruits. The King apple has a large leaf-blade; that of Jonathan is small. The leaf of the Elberta peach is large in both dimensions; that of Crosby is short and narrow. The Italian prune may be told from the German in orchard or nursery by its much larger leaves, a distinction of importance since the one is often substituted for the other. So, also, the Niagara grape is easily distinguished in the nursery by its large leaf. These are but a few examples; any of the fruits could furnish others. Environment makes much difference. Poorly nourished plants in sod bear smaller leaves than well-nourished ones under cultivation. Leaves fully exposed to the sun are smaller than those which are less exposed.

Thickness counts in classifying plums, grapes, and currants in particular. In these fruits thickness and texture are usually combined in such expressions as *thick and soft, hard and leathery, thin and membranaceous, thin and pliable.* McIntosh

and Wealthy have stiff rigid leaves, those of Grimes and Fall Pippin are thin and pliable.

In the strawberry, large leaves and vigor are usually correlated. Thick leaves are desirable in varieties of strawberries because they are neither badly torn by wind nor scorched by the sun. The thin leaves of European grapes and strawberries usually suffer in the scorching suns of the New World.

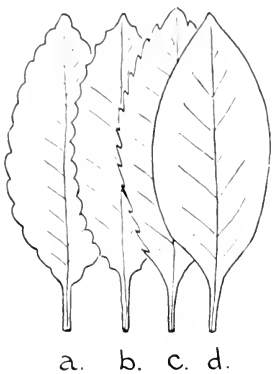

FIG. 22. Leaf margins. a. crenate; b. toothed; c. serrate; d. entire.

50. Simple and compound leaves.—When the divisions of the blade do not reach the midrib, a leaf is said to be *simple*. The leaves of nearly all hardy fruits are simple. When the blade consists of two or more separate pieces, appears to have several distinct blades, each with a stalklet of its own, the leaf is *compound* and each separate part is called a *leaflet*. When the leaves are arranged on the sides of the main leaf-stalk, a compound leaf is said to be *pinnate*; when the leaves are all borne on the tip of the leaf-stalk the compound leaf is *palmate*. Most of the bramble fruits have pinnately compound leaves; Sorbus, a little known tree-fruit has pinnately compound leaves; and the strawberry has palmately compound leaves (Figs. 16-21).

51. Outlines of leaf-margins.—Technically the edge of the leaf-blade is the *margin*. It is said to be *entire* when completely filled out; *serrate* or *saw-toothed* when cut into sharp teeth which point forward; *dentate* or *toothed* when the teeth point outward and not forward; *crenate* when the teeth are broad and rounded; *undulate* or *wavy* when the margin forms a wavy line; *sinuate* when the margin turns strongly inward and outward; *incised* when cut into sharp, deep, irregular teeth; *lobed* when cut about halfway to the midrib; *cleft* when cut more than half way to the midrib. In studying margins, serrations and other marginal markings are most typical in the middle of the sides of leaves, those at the base and apex often being crowded or lacking (Figs. 16-22).

52. The leaf-blade plane.—The blades of very few leaves of the various fruits are flat, and there is much variation in the varieties of any one species. Thus, in the apple, the blade of Gravenstein is almost or quite flat; saucer-shaped in the Baldwin; distinctly waved and more or less folded in Hubbardston and Tolman; and reflexed or folded backward in Grimes. Similar and other variations from a true plane are found in the leaves of all of the fruits, some of which are valuable characters in identifying and classifying varieties. These modifications of the plane are about as constant as any other character of a variety, but behave a little differently at various ages, kinds of weather, and even in different parts of the day. Thus, in dry sunny weather folding is more pronounced in most leaves than in wet cloudy seasons, as it is also in the middle as compared with any other part of a sunny day.

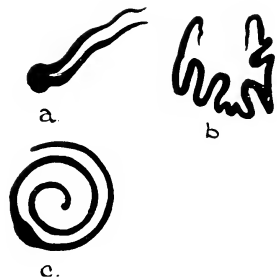

FIG. 23. Leaf vernation. a. conduplicate; b. plaited; c. convolute.

53. The arrangement of leaves on stems.—As noted in the last chapter, buds and, therefore, leaves are arranged on stems in a definite order which is constant for a species. Technically, the attachment of leaves to the stem is spoken of as the *insertion*. The mode of insertion of the leaves of all hardy fruits is alternate or opposite and never whorled as in many other plants. Buds open by the growth of leaves in regular succession on stems, the youngest nearest the apex. When stems or buds are injured, the leaves may not appear in their natural order. By an orderly arrangement of leaves upon the stem, all become equally well exposed to light and air. Therefore, when light and air are much interfered with, the arrangement of leaves may appear to be more or less irregular, a fact to be kept in mind in studying leaves, especially of the grape where the disposition of leaves, tendrils, and inflorescence mean much in classification.

54. Vernation.—The disposition of the leaf-blade in the bud, the manner in which it is packed up, is called vernation. The leaf-bud is commonly *folded* or *rolled* in the bud. When the blade is folded at the midrib so that the halves are face to face,

vernation is said to be *conduplicate*. The leaves of all peaches and cherries are conduplicate in the bud. When the leaves are folded like the plaits of a fan, the vernation is *plaited* or *plicate*. The currant furnishes a good example of plaited vernation. When the blade is rolled parallel with the axis, vernation is *convolute* (Fig. 23). The leaves of some plums are conduplicate in the bud and of others convolute, so that manner of vernation becomes a fine mark of distinction in separating species.

55. The petiole (*leaf-stalk*) is a firm stalk-like support for the green blade, which often turns and twists, raises and lowers on the petiole to positions where it can be illuminated best. Petioles are more or less cylindrical and are usually channeled or grooved on the upper side, these markings being distinctive in different species. Perhaps the character of petioles that serves best in classifying is length, which varies greatly and is commonly constant in the species. Color and whether pubescent or glabrous are marks of distinction that often serve well. The petiole may be used to good advantage to determine species and varieties of Prunus. Thus, in consequence of the great length and slenderness of the petioles of sweet cherries, the leaves droop, while because of the short stout petioles of sour cherries, the leaves are erect, these differences in petiole giving the two species distinctive aspects. The color of the petiole of stone-fruits is usually correlated with that of the fruit.

The petiole offers several important characters in currants. The length distinguishes several varieties, that of Victoria being remarkably long. The color and amount of pubescence are also distinctive. In some currants the petiole is markedly channeled. The angle at which the petiole holds the leaf-blade is a mark in currants. Thus, the leaf-blade of Prince Albert is held stiffly upright; that of Victoria horizontally and lax; while in Fay the leaves point downward.

The petiole of the strawberry leaf is of importance to the systematist and to the grower. Length, color, and pubescence are significant, but the way in which the leaf-blade is held is of prime importance. The leaves of some varieties are erect and those of others prostrate; erect leaves are more desirable, as they are not so likely to be infected by fungi, and the flowers are better protected from frost.

The angle which the petiole forms with the twig has long been recognized as a means of identifying apples, and Shaw has recently discovered that this character is correlated in all varieties with the form of the top.[1] Varieties in which the angle is sharp have an upright head; those in which the angle is broad, a spreading head. Thus the form of the top can be foretold while the tree is in the nursery.

56. Leaf appearance and fall.—There are no true evergreens among the hardy fruits, although the strawberry and a few blackberries and dewberries bear leaves which have two growing seasons. There are considerable differences in related species and varieties as to the time the leaves push from the buds in the spring and drop from the stems in the autumn. In plums, currants, grapes, and gooseberries, leaf appearance and fall are characters of first magnitude in distinguishing species. The fall of leaves is worth noting only as a natural process and counts for nothing when leaves are killed by freezing, disease or other outside agencies.

In mild climates, as in the American South and far West, the differences in leaf appearance and fall are much greater than in colder regions where winter bursts suddenly into spring and autumn into winter. Indeed, in mild climates the preparation for leaf fall, a process of ripening, is so imperfect that the leaves are wrenched off by winter storms or pushed off in the spring by the growing buds beneath them.

Leafing time and leaf fall help greatly in classifying currants, a fruit in which there is much confusion both as to species and varieties. Thus, one group of varieties, of which Wilder is representative, puts out its leaves very early; another group, best represented by Prince Albert, holds the foliage very late in the autumn.

57. Color of leaves.—The color of leaves is very constant in species and varieties, either when studied in individuals or taken in mass. Species and varieties are given a distinct aspect by their summer dress, which is chiefly dependent on the color of the leaves, but may be changed greatly by the size and number of leaves. The color of the upper and lower surfaces of leaves

[1] Shaw, J. K. *Leaf Characters of Apple Varieties.* Bull. 208: Mass. Agr. Exp. Sta. 1922.

differs more or less in all fruits. Possibly every variety bears leaves of a distinctive color and if the means of studying color were more refined it would be possible to classify fruits by color of leaf alone. In several fruits, there are distinct correlations between leaf and fruit color. Thus, there is more yellow in the ribs and veins of leaves and stipules of yellow-fleshed peaches than in white-fleshed sorts. In apples which bear green-colored fruits, the leaf is a pure green; in those which have red fruits, the leaves are darker and have a tinge of blue or purple or sometimes are distinctly reddish.

58. Stipules.—The small and narrow stipules of pears and apples are hardly worth attention in classification, but they may be utilized in distinguishing some of the drupe-fruits, especially in the cherry where they have considerable value in separating closely related varieties. Stipules which appear with the first leaves of the cherry are small and drop before the fruit ripens, but those of later leaves are large, borne in pairs, and remain until the fruit ripens. The time of dropping varies greatly with the variety. Stipules of cherries are variously toothed and bear glands of several colors and shapes which are characteristic.

59. Leaf-glands.—On the leaves, stipules, and petioles of several hardy fruits there are small protuberances, usually organs of secretion, called *glands*. Much use can be made of these glands in classifying peaches and currants. Their presence or absence, size, color, position, number, and whether stalked or sessile must be noted. Two shapes are most common in peaches: *globose*, those which are small globes; and *reniform*, those which are kidney-shaped. The most characteristic glands of peaches are found toward the end of summer. Varieties of peaches with glandless leaves are reputed to be more susceptible to mildew than those bearing glands; on the other hand, they are said to be more resistant to leaf-curl. The yellow resinous dots on the under surface of the black currant are secreting organs akin to glands, which on the stalks of buds and on the bud-scales of this fruit are even more glandular.

60. Leaf-lobing in grapes.—In classifying grapes the lobing of the leaf is a very uniform character within species, although *Vitis Munsoniana* and *V. rupestris* have leaves which are not

lobed, while those of *V. candicans* are more often than not entire. The lobing of grape foliage is characterized by several special terms (Fig. 24). The depression between adjoining lobes is called a *sinus;* a sinus at the apex of a leaf is *terminal;* at the base of the sides of the leaves *basal,* which, however, must not be confused with the *petiolar sinus* in which the petiole is attached to the leaf. The sinuses may be of various widths and depths and may be *closed* or *overlapping.* The lobes may be *acute, obtuse,* or *acuminate.*

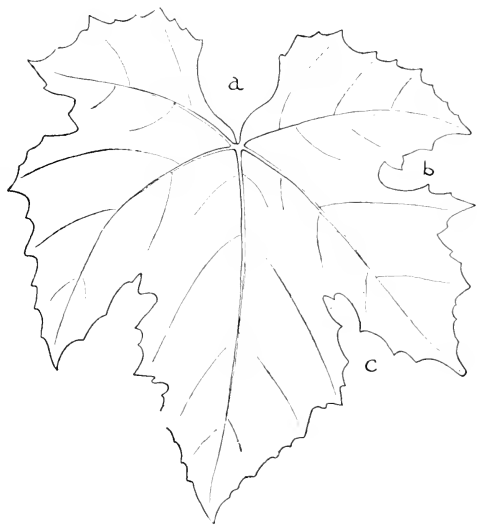

FIG. 24. Leaf of Niagara grape. a. petiolar sinus; b. basal sinus; c. lateral sinus. Palmately veined; five lobed; petiolar sinus deep; basal sinus shallow; lateral sinus deep; teeth coarse and broad.

61. Leaf surfaces.—The surfaces of the leaves of grapes and the small-fruits demand attention. The two surfaces are usually different in color; the upper one is most often glabrous while the lower is usually pubescent. In the grape the character of the pubescence is often typical of a species and may be *hairy, woolly, downy,* or *cobwebby. Vitis Labrusca* is characterized by leaves densely pubescent beneath, whitish at first but dun-colored on mature leaves. The lower surface of the leaves of *V. bicolor* is glabrous but heavily covered with bloom, which, on the green of the leaf, seems light blue. The pubescence on the lower surface of leaves of *V. æstivalis* is *reddish* or *rusty.*

62. The leaves of brambles.—The leaves of the bramble-fruits furnish character on which divisions into species may be made. Besides the number of leaflets, their size, shape and color, the surfaces of the leaflets of some species are *smooth,* of others *wrinkled, plicate,* or *rugose.* In some species the margins are

beset with glandular hairs. The serrations of the margins often furnish serviceable taxonomic characters; in one species the margins are so laciniated as to give the name *Rubus laciniatus* to the group. In some species the teeth are in a single series; in others in a double row. These characters of leaves persist in cultivated plants.

63. The leaves of the bush-fruits.—In currants and gooseberries the upper surfaces of the leaves differ as to whether dull or glossy, as well as in many characters named in the preceding paragraphs. The leaves of some currants are *blistered* or *puckered*, sometimes called *bullate*. The margins of the leaves of species and varieties vary greatly in the amount and character of pubescence, and in several varieties they take on a pronounced silvery tint, a mark which identifies the Ruby currant. The leaves of Ribes are more or less rugose, but the veins are more sunken in some species than in others and the spaces between more elevated. The degree of rugoseness is a particularly valuable mark in distinguishing some gooseberries.

64. Identification of nursery trees from the leaves.—Shaw has shown that trees can be identified in the nursery from leaf characters alone, and gives a key whereby twenty-six standard apples are classified by his method.[2] While Shaw has not published on other fruits, there is little question but that all fruits can be so classified. To be able to identify young trees from their foliage is of particular importance to nurserymen and buyers of nursery stock who want to make sure that trees are true to name.

[2] Shaw, J. K. *Leaf Characters of Apple Varieties.* Bull. 208: Mass. Agr. Exp. Sta. 1922.

CHAPTER VI

THE FLOWER

ALL fruits are aftergrowths of flowers. If any mischance befalls the flowers, as an untimely frost or freeze, all hope for fruit for that season is extinguished. The botanist classifies plants chiefly in accordance with their flowers, but pomologists have paid almost no attention to the flowers of the several fruits. Yet it is hardly too much to say that all hardy fruits could be classified by their flowers. This statement is made to emphasize the point that the flower could be used in classifying fruits much more than it is, admitting at once that classification by fruit alone is better for the pomologist when the fruits suffice. The organs of flowers and their functions should be studied by fruit-growers, also, because of the great importance of hybridization in improving fruits; and because sex, with its problems of sterility and fertility, is modifying the planting of all fruits in every part of the country.

65. Flowers distinguished from shoots and leaves.—In origin, form, and relationship of parts, a flower is a modified shoot and its parts are modified leaves. Sometimes it is difficult to tell which is shoot and which is flower, which is foliage and which floral leaf. The distinction can be best made, at least for the purposes of pomology, by the functions of these organs. Shoot and green leaf, and stem and root as well, serve to maintain the life of the individual which bears them; they are *vegetative* organs. The function of the flower is to reproduce a new generation of plants similar to that upon which the flower is borne; the inner floral leaves are *reproductive* organs. Whether an organ is concerned chiefly with growth or with reproduction constitutes the plainest dividing line between foliage and floral leaf.

66. The parts of a flower and their arrangement.—In the floral shoot the uppermost leaves are closely arranged in whorls;

this assemblage of floral leaves is the *flower*. The stem or axis which bears the flower is the *pedicel*. When the pedicels are two or more in a cluster, they are borne on a common stem or *peduncle*. The arrangement of flowers on the peduncle is the *inflorescence*. The upper part of the peduncle, upon which are arranged the floral organs, all modified leaves, is the *receptacle* or *torus*. Usually there are four quite distinct types of floral organs plainly to be seen in a flower,—calyx, corolla, stamens, and carpels. The lower of the two whorls of floral leaves form the *calyx*, each leaf of which is a *sepal*. Closely set on the receptacle above the calyx is another whorl of

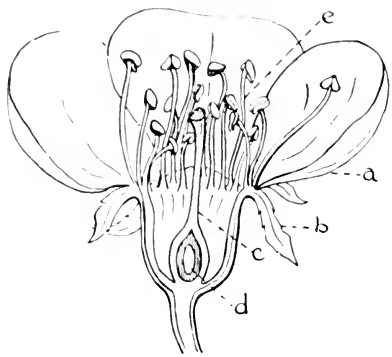

FIG. 25. Section of flower of cherry. a. petal; b. sepal; c. style; d. ovule; e. stamen.

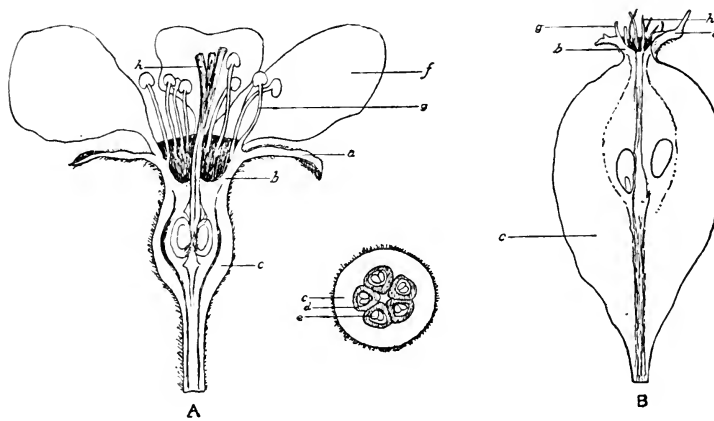

FIG. 26. Flower and fruit of a pome. A. Flower of pome; B. Fruit of pome. a. Sepal; b. calyx-tube; c. receptacle; d. carpel; e. ovule; f. petal; g. stamen; h. style. (Cut from *Cyclopedia of Hardy Fruits*, p. 1.)

floral leaves, the *corolla*, each leaf of which is a *petal*. The third whorl, within and above the corolla, is the *andrœcium*, the separate parts of which are *stamens*. Each stamen is composed of

two quite distinct parts,—a small case called the *anther* and its support, a thread-like stalk termed the *filament*. The anther is the essential part and in it is formed a dust-like powder, usually yellow, known as *pollen*, the male fertilizing element of a plant. The highest and innermost whorl of floral organs bears the name *gynœcium*, the parts of which are *pistils*. A simple gynœcium consists of a single pistil, a compound gynœcium of two or more pistils either distinct or united. The swollen basal portion of a pistil is the *ovary;* the slender stalk leading from the ovary the *style;* the tip of the style, a more or less expanded moist surface, is the *stigma*. In the ovary are a small body or bodies which from analogy with the eggs of animals are called *ovules;* these ovules develop into *seeds* (Figs. 25-30).

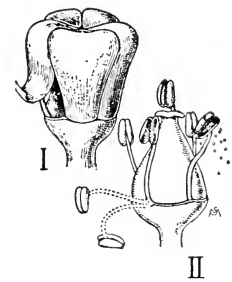

FIG. 27. The grape flower. I. Opening bud showing the way in which the cap becomes loosened at the base. II. Diagrammatic illustration of grape stamens. (*Man. Am. G. Grow.*, p. 305.)

67. The inflorescence.—All plants in which the flowers are not solitary have a typical inflorescence which is always helpful

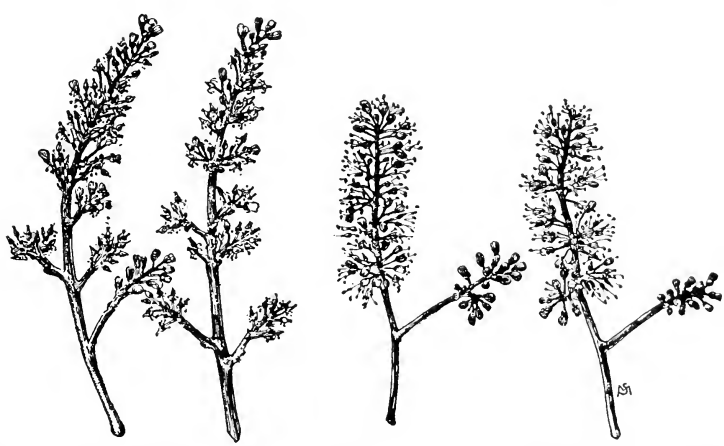

FIG. 28. Grape flowers. Left, upright stamens of Delaware; right, depressed stamens of Brighton. (*Man. Am. G. Grow.*, p. 306.)

in delimiting species. The leaves in an inflorescence, from the axils of which flowers arise, are *bracts;* the individual flower-

stalks are *pedicels* (66). The many kinds of inflorescences of flowering plants are divided into two groups both of which find many examples among hardy fruits. When the flowers arise in the axils of leaves, the inflorescence is said to be *indeterminate* or *racemose;* when from terminal buds, *determinate* or *cymose.* Strictly speaking, inflorescence is the mode of flowering, but the word is commonly used in the sense of *flower-cluster.*

Three hardy fruits have solitary flowers. The quince bears solitary flowers which may be either terminal or axillary; while in the peach and apricot the flowers are solitary and axillary.

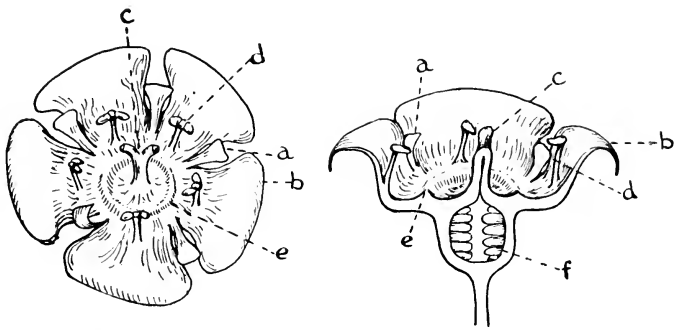

FIG. 29. Flower of Red Dutch currant. a. petal; b. sepal; c. pistil; d. stamen; e. ring; f. ovary.

The racemose types of inflorescence are: the *raceme* in which the flowers are arranged along the sides of a common peduncle with the pedicels of nearly equal length, as in the currant and in the wild black cherry; the *corymb* similar to the raceme but having flowers with pedicels of different lengths, those toward the base of the peduncle being longest so that the cluster is flat-topped, as in sweet and sour cherries and the pear, the flowers of which at the base of the cluster open first; the *panicle,* a modified raceme in which some of the parts are branched and bear flowers while others are simple, as in the grape. The inflorescence in nearly all of the bramble-fruits is racemose but the flowers in a few are solitary.

Of the cymose or determinate types of inflorescence, but one of several are represented in hardy fruits. The *cyme* is a flat-topped flower-cluster as in the corymb, but the inflorescence

arises from a terminal bud. The apple and some plums furnish examples of fruit flowers in which the inflorescence is a cyme. In the apple, the central flower unfolds first, which is the reverse of the corymb of a pear.

Differences in kind of inflorescence distinguish genera and species, but in the varieties characters must be looked for in the inflorescence itself. Thus, the pedicel, which becomes the stem of the fruit, varies greatly in varieties of all hardy fruits. There are many flowers in the inflorescence of some varieties of a species; in others, few. In some, the flowers are loosely arranged; in others, compactly. In the bramble-fruits, the inflorescences vary greatly in the characters named; and the clusters may be long or short, dense or open; peduncles entire or divided; few- or many-flowered; with or without spines, pubescence, bracts, or glands; peduncle erect, spreading, or drooping, and so on, making the inflorescence an invaluable means of distinguishing brambles.

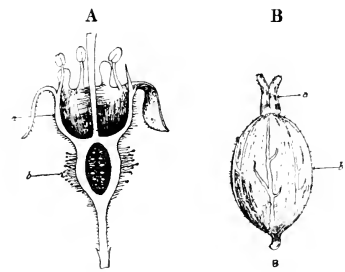

FIG. 30. Flower and fruit of gooseberry. A. flower; B. half-ripe fruit; a. calyx-tube; b. ovary. (Cut from *Cyc. of Hardy Fruits*, p. 295.)

In the strawberry the inflorescence not only offers valuable means of identification, but on its characters commercial importance depends somewhat. Thus, it is desirable that a variety have stout erect fruit-stalks which will hold the berries off the ground and that are not easily broken by the pickers. On the other hand, it is not desirable that the flower-stalk rise above the foliage where frost, rains, and the sun would find flower and fruit unprotected.

68. The receptacle.—The expanded end of the peduncle, the receptacle as it has been defined, offers very marked means of distinguishing plants, and greatly modifies the value of the fruit in one way and another. The flowers of several fruits have many pistils, to accommodate which the receptacle is enlarged, as in the blackberry, other brambles, and the strawberry. In the blackberry the receptacle comes away with the ripe fruits

and is eaten; in raspberries it is the ripened cone left on the plant when the ripe berries are picked; in the strawberry the receptacle is much enlarged and pulpy, bears on its surface the seeds and is the edible part of the fruit. In the apple, pear, and other pome-fruits the peduncle grows directly into the flower and there seems to be no distinct receptacle. In the stone-fruits, the receptacle is a hollow cup to the edge of which are attached the calyx, corolla, and stamens, with the single carpel at the bottom. Currants, gooseberries, and grapes are true berries, which are ripened ovaries, all seated upon relatively inconspicuous receptacles.

69. The floral envelope.—The calyx and corolla, together the *floral envelope*, are not directly concerned with the production of seeds and are, therefore, non-essential parts of a flower as contrasted with the stamens and pistils which are the *essential organs.* The floral envelope serves as a protection to a flower, or to attract insects to it, or for both purposes. One of the whorls of the envelope, or rarely both, may be absent in some plants but are not in any of the hardy fruits. When the parts of the calyx and corolla are identical in color and shape, the floral envelope is called the *perianth.*

70. The calyx.—Usually a whorl of greenish leaves, the calyx is a protective covering for the remainder of the flower it enfolds. Sometimes, but in none of the fruits under discussion, the calyx is brightly colored. In some plants the calyx falls off when the flower opens, in which case it is *caducous;* or it may remain attached to the receptacle long after the flowers open or even until the fruits ripen, when it is *persistent,* which is the case in nearly all hardy fruits. When the calyx-lobes persist on the ripened fruits, as in some pomes, their presence or absence and their characters when present become recognition marks of considerable value. If the sepals are united, as in nearly all hardy fruits, the calyx is said to be *gamosepalous;* if separate, *polysepalous.* The cuplike portion of a gamosepalous calyx is the *calyx-tube;* if toothed, the teeth or divisions are the *calyx-lobes.* Many of the terms describing leaves are applicable to sepals.

The calyx furnishes several fine marks of distinction between the different brambles. The sepals vary greatly in size, shape,

and color; some are pubescent, others glabrous; some glandular, others eglandular. At the time of flowering, the sepals in nearly all brambles are reversed; in some species they remain reversed until the fruits ripen, but in others they change in position from the reversed form through all stages to clasping the fruit, as in the wine-berry.

The calyx also furnishes means of determining varieties of strawberries. The sepals vary greatly in size, color, and position; they may be large or small; raised on the neck of the berry, attached to the flat base, or sunken into the fruit; some are leaf-like, others bract-like. The calyx parts from the fruit easily in some varieties, and with difficulty in others. In commercial varieties of strawberries, the calyx should be large, bright in color, and should part readily from the fruit. Now and then a variety is found in which the calyx remains on the plant when the berry is picked; these sorts are called *shuckless.*

71. The corolla.—The petals of the corolla may be free or united as are the sepals of the calyx, and similar terms, *polypetalous* and *gamopetalous,* apply to the two forms. Free petals may have stalks of greater or less length called *claws,* while the more or less expanded portion is the *limb.* Shapes and marginal markings, as with sepals, are described by much the same terms used in descriptions of leaves, but all characters of the corolla are subordinate to color. Differences in color of the corolla are in themselves recognition marks, as in apples and the drupe-fruits. The color of the corolla is best studied in the bud just before the petals begin to unfold, when the distinctive shade for each variety, other than white, is most intense. As the flower unfolds, the color fades.

72. The stamens of all the hardy fruits are distinct and free and in none, with the exception of the grape, do they offer marks of especial merit in recognizing species or varieties in their structure. Flowers of some varieties of grapes have upright stamens, while others have these organs reflexed. Besides being a mark of recognition, the position of the stamens usually indicates whether or not a variety is capable of setting fruit without cross-pollination, for the upright stamens usually have perfect pollen-grains while the reflexed ones usually bear abortive pollen.

The stamens, or remnants of them, persist on the calyx-tube of the ripened fruits in the pomes and are often serviceable in distinguishing varieties, as will be noted in discussing the characters of fruits in the next chapter.

The relative lengths of pistils and stamens is a character of considerable value in identifying varieties of bramble-, pome-, and drupe-fruits and one which is very constant. In making comparisons of lengths of the two organs, it is well to remember that stamens in these fruits attain full length first.

73. The pistils.—Several characters of the pistils are of taxonomic importance in classifying fruits from their flowers. In pome-fruits the amount and character of the pubescence are easily recognizable marks. In apples there are two quite distinct arrangements of styles. In one the styles are united and form a column about half their normal length, which, however, is variable in different varieties. In the other arrangement the styles are divided to the base. In the first form the whole pistil is usually glabrous; in the second, it is usually, if not always, pubescent. Tolman Sweet furnishes a good example of styles divided to the base and bound together by dense pubescence. The pubescence about the essential organs should be noted in other fruits as well as the pomes, especially in the brambles in which it is often distinctive.

The length of the style is distinctive. Thus, in the Howell pear it is abnormally short. The length varies much with the variety in the bramble-fruits.

74. Arrangements of floral organs.—Flowers in which the perianth and stamens are inserted on the receptacle at a lower level than the ovary are *hypogynous* and the ovary is *superior*. Flowers in which the perianth and stamens are arranged on the edge of a hollow receptacle around free pistils are *perigynous* and the ovary in this case is also superior. The flowers of the plum, cherry, and strawberry are good examples. Some botanists, however, think that the cup of the cherry and plum flower is a hollow receptacle and not a calyx-tube, and that the perianth and stamens are borne upon the receptacle-rim. In some flowers, as in those of the apple, pear, currant and gooseberry, the perianth and stamens are borne above the ovary, in which case the flower is *epigynous* and the ovary *inferior*.

75. Sex in hardy fruits.—Technically, the words "male" and "female" as applied to plants are now used by botanists in a very restricted and specialized sense. Thus, a stamen is not said to be a male organ nor a pistil a female organ. These refinements, necessary enough in some phases of botany, cannot be adopted without unduly burdening pomology with a strictly botanical conception and terminology. Therefore, the old and common conception and language of sex relations in plants is probably best for pomologists.

When stamens and pistils are present in the same flower, as in all hardy fruits excepting some varieties of grapes and strawberries, the flowers are *perfect, hermaphrodite,* or *bisexual.* In some flowers, as in many varieties of grapes and strawberries among fruits, one or another of the essential organs are missing or do not function; such flowers are *imperfect* or *unisexual.* Flowers in which the stamens alone are present are *staminate* or *male;* those in which only pistils are represented are *pistillate* or *female.* When staminate and pistillate flowers are borne on different plants, the species is *diœcious;* when the two kinds of flowers are on the same plant, *monœcious.* When a plant, as the grape, has some perfect and some imperfect flowers, it is *polygamous.*

76. Pollination and fertilization.—The transfer of pollen from the anther of the stamen to the stigma of the pistil is *pollination.* The fusion of the contents of the pollen-cell with the *ovum,* the generative cell in the ovary, is *fertilization.* When the pollen comes from the anther of the flower bearing the ovum, the flower is *self-pollinated;* if followed by fertilization, the plant is *self-* or *close-fertilized;* the first term is often shortened to *selfed.* With many plants the pollen may or must come from another individual in which case the flower is *cross-pollinated,* and if fertilization results the plant is *cross-fertilized* or *crossed.*

There is no intention of discussing physiological processes in this text, but the effects of fertilization, which may change the appearance of the resulting fruits if abnormal, can be shown best by a recapitulation of the physiological process of fertilization. The stimulus of fertilization animates growth in the ovule and the ovary-wall, to the end that the ovules develop into *seeds* and the ovary into a *fruit.* In some cases, and these are of

much interest to the fruit-grower, fertilization incites remarkable growth in the receptacle and pedicel so that what is popularly called a fruit may be a true fruit plus the much changed receptacle or flower-stalk. The pulpy part of the strawberry is an enlarged receptacle and the so-called fruits of the apple and pear are the modified receptacles and flower-stalks.

After fertilization, the corolla and usually the style, including the stigma, wither and may so remain on the growing ovary, or more often fall off. The base of the style in some varieties of apples develops into fleshy tissue which alters the shape of the calyx-tube in the ripened fruit. In a few varieties of apples, the remnant of the style forms a more or less fleshy point in the mature fruits called the *pistil-point*. In some varieties of grapes the stigma adheres to the apex of the fruits, a distinguishing mark worth noting.

77. Abnormal fruits.—The student of systematic pomology must make note of abnormal fruits, for which there may be various causes. Lack of proper fertilization is a common cause of malformed lopsided fruits of apples, pears, and strawberries. It has been demonstrated many times by observation and experiments that when certain stigmas in apple, pear, and strawberry flowers have been pollinated and others not, the fruits from such partly pollinated flowers are unsymmetrical as only the pollinated carpels produce seeds, and the parts of the fruits possessing these grow much more rapidly than those in which the carpels are seedless. The experiments of several workers show that, while only one pollen-grain is necessary to fertilize an ovule and so produce a seed, when more pollen is supplied the resulting fruits are so stimulated as to be larger.

78. Self-sterile and self-fertile fruits.—Some varieties of pome-, drupe-, and vine-fruits are characterized by *self-fertility,* others by *self-sterility,* still others by a condition somewhere between. While these cases are of small significance in systematic pomology, they are of prime importance to the fruit grower and should always be noted in describing varieties if the condition is known. Self-fertility and self-sterility vary greatly in accordance with climate. The pollen of some fruits will fertilize flowers of other varieties of the same species when another set of varieties will not. Some varieties are said, there-

fore, to have *mutual affinity*, but of these "affinities" there is yet much to be learned. In studying flowers of the different fruits the student will find two types that tend to bring about self-sterility. In one type the pollen is discharged from the anthers before the stigmas are ready to receive it; such flowers are said to be *protandrous;* flowers in which the stigmas are mature to receive the pollen before the anthers are ready to discharge are said to be *protogynous.* Flowers of the apple and pear are usually protogynous.

79. Effects of cross-pollination on the fruits.—It is a common belief among fruit-growers that when pollen from one variety fertilizes the ovules of another, the characteristics of the pollen parent are impressed on the resulting fruit. Many experiments have proved that fruits are not changed in any of their characters by foreign pollen, except, possibly, in size which may be increased through pollen stimulation. A better set of crop and greater uniformity in the fruits may also be a result of foreign pollen, especially when there is an excess.

80. Fruit development without fertilization.—Some varieties of all hardy fruits are seedless and occasionally individuals are found without seeds. In these cases fruits have developed without fertilization; this phenomenon is called *parthenocarpy.* In cases very exceptional, if indeed they occur at all in fruits, the ovule may produce a new plant without having previously united with a male cell, a condition known as *parthenogenesis.* While parthenocarpy is not uncommon in any hardy fruit, cases most often occur in the pomes and in grapes. As a rule, however, lack of fertilization is followed by the falling of blossoms, and if all of the ovules are not fertilized by unsymmetrical fruits.

81. Cross-fertilization between varieties, species, and genera.—Varieties of the same species readily cross-fertilize; the resulting progeny are called *cross-breeds, variety-hybrids,* or the plant may be spoken of as *cross-bred.* Cross-fertilization may take place between different species of any of the hardy fruits, as black and red raspberries, plum and apricot, sweet and sour cherries. Cross-fertilization between species is called *hybridization* and the resulting plants are *hybrids.* When the species are of the same genus, the progeny may be designated as *species-*

hybrids of which there are many examples among fruits; when between species of different genera, *genus-* or *bigeneric-hybrids* of which the only one among hardy fruits is between the pear and the quince. There are no means of determining beforehand whether any two varieties, species, or genera will cross-fertilize. More and more, *hybrid* is used to designate all crosses.

Crosses and hybrids may be affected profoundly when they arise from forms noticeably different, and in either classifying or describing fruits it is desirable to know whether the plant has come from self-fertilization, as a cross, or as a hybrid. Plants arising from selfing usually lack vigor; crosses, as a rule, are as vigorous as the parents, or more so; while hybrids, especially among the fruits with which this text is concerned, are more vigorous in growth, more luxuriant in foliage, and often more fruitful than either parent. Some hybrids, however, are less fertile than their parents and some will not bear fruits or seeds; the latter is the case with hybrids between several species of brambles and between the gooseberry and black currant. The reproductive organs are often wholly or in part malformed or missing and ovules and pollen-grains imperfect. Very often the seeds seem to be perfect, as in the pits of hybrid cherries, but may not germinate. Malformation of any part of a hybrid is common. Most fruits are crosses, but many are hybrids, so that the manner of origin must be studied as a possible cause of striking characteristics.

82. Scent in flowers.—Attention has been called to the variety of vivid colors in the corollas of flowers of many fruits. These colors serve to attract insect visitors whereby proper pollination is secured. When size and color of corolla are lacking, as in grapes, gooseberries, and currants, and very often associated with a showy corolla, scent is a potent means of attracting insects. Indeed, flowers of each species of hardy fruits have a characteristic odor and many varieties, especially of plums, cherries, and grapes may be told by this odor. Insects visit flowers for nectar, and color and scent serve as guides. Nectar is secreted by glands called *nectaries*. Although usually too small to be readily seen with the unaided eye, they are sometimes very characteristic.

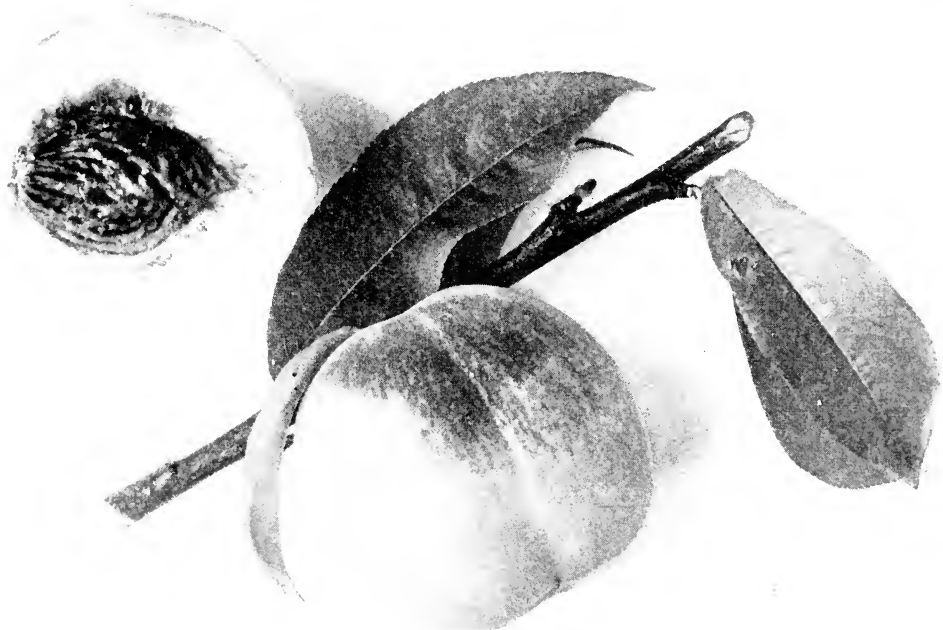

PLATE III. One of the older standard peaches—Late Crawford.

CHAPTER VII

THE FRUIT

PROBABLY primitive groupings of fruits took only the product of the plant in consideration; for, undoubtedly long before the dawn of history men had learned to know, value, and classify varieties, guided solely by their superficial characters. An appeal to other parts of the plant for classification was probably not made in early times, and is now seldom employed, on the theory that if a variety is not noteworthy in characters which attract taste and sight, it stands small chance of being cultivated commonly or widely. It is only at times when fruits cannot be obtained, when differences between the product are slight, and because the cultivator must know the plant as well as its product, that the plant enters into classifications.

83. Fruit defined.—Any product of sexual fertilization, more commonly the ripened ovary of a seed plant and its contents, is the *fruit* of a plant in the botanical sense. The pomologist, however, applies the word "fruit" to several different parts of a plant which are not the ripened ovary and not, therefore, the "fruit" of the botanist. As examples, the edible part of a strawberry is the greatly enlarged receptacle of the flower, while the true fruits are the seed-like structures with which the berry is beset; in the apple, the edible part is the modified receptacle while the true fruit, the ripened ovary, is the core of the apple; the receptacle is a part of the blackberry fruit; the brambleberries and the mulberry consist of several true fruits.

In popular usage the edible product of a woody or perennial plant, consisting of the seeds and the surrounding tissues, is a *fruit*. This definition is a loose one and possibly applies only in America, for in European countries melons and tomatoes are generally regarded as fruits, and rhubarb, when eaten as a dessert, passes on bills of fare as a fruit.

84. Kinds of fruits.—Fruits which develop from a single pistil and consist only of the mature ovary, as a grape or cherry, are *simple*. When a cluster of carpels of the same flower is crowded into one fruit, as in the brambles, it is said to be *aggregate*. When a fruit is composed of more than the ripened ovary and its contents, as in the strawberry and apple, it is *accessory*, *spurious*, or a *pseudocarp*. When formed from several flowers, as in the curious fruits of the mulberry and pineapple, a fruit is *multiple* or *collective*. Besides this rather loose classification of fruits, they may be further divided into family or sub-family types of which the pome, drupe, and berry are of interest to pomologists.

The Pome

A pome is a spurious fruit in which the true fruit is embedded in the succulent receptacle. The carpels and the seeds within them constitute the true fruit of the pome and form a hard central portion, which because it is the heart, both as to position and as the essential and vital part, is the *core*. The apple, pear, and quince are the best-known pomes, closely allied to which are the medlar, hawthorn, juneberry, and mountain ash. Besides the edible receptacle and the inedible core, other parts of a pome are: the stems by which the fruit is attached to the tree; the calyx which persists in most but not all pome-fruits; and the withered stamens and styles, some of which are found on most pomes.

Of the several groups of fruits, pomes lead in importance as foods. It is significant that *pomology*, the name accepted for the science and practice of fruit-growing, is derived from *pomus*.

85. Shapes of pomes.—The shape is usually the first external character of pomes to be used in classification. It is fairly constant in any one locality but varies considerably in different regions. A New York Baldwin differs somewhat in shape from one grown in Oregon, Iowa, or Virginia. Shape is the best of all characters for identification of pomes when the fruits are not quite ready for use, as is very often the case with apples and pears. Color and quality change materially after the fruits come from the tree, but no pome alters in shape after it is ready to be picked.

In determining the shape of a pome, the fruit should be cut in exact halves longitudinally. The outline of a half fruit may be *round, oblate, conical, ovate, oblong, truncate,* or combinations of these and similar terms, definitions of which are not necessary if the student will refer to the accompanying illustrations. If a transverse section of an apple is made at its widest diameter, the shape is *elliptical* if the sides are compressed; or *ribbed, angular, oblique,* or the sides may be *unequal* or *symmetrical, regular* or *irregular,*—all self-explanatory terms.

Besides these terms used in describing apples, additional descriptive terms are necessary in classifying pears by reason of the division into two parts,—the neck and the body. The *neck* of a pear is the narrow portion in which the stem is set; the *body* is the swollen part crowned by the calyx. A pear is *pyriform* when the curves formed by the neck and body are concave; *turbinate,* or *top-shaped,* when the body is nearly round with a short neck. The neck may be *long* or *short, distinct* or *obscure, obtuse* or *acute* (Figs. 31, 32).

The terms describing apples and pears are applicable to the quince and medlar. Nurserymen commonly describe quinces as "apple-shaped" or "pear-shaped," but these terms are not sufficiently accurate.

Simple outline drawings taken from both longitudinal and transverse sections of pomes make a good record of the shape. Such drawings are particularly desirable to accompany descriptions of pears, the shapes of which are most useful in classifying this fruit.

86. The stems of pomes.—The stems of apples and pears are much used in identification. They vary but little in any variety, although as a rule they are shorter in large fruits than in small ones. It should be known from what part of the flower-cluster a fruit has developed in taking note of stems; for the nearer the flower to the center of the umbel in the apple and the tip of the raceme in the pear, the shorter the stem and the larger the fruit.

The stems of apples and pears may be *long* and *slender,* as in the Rome Beauty apple and Beurre Bosc pear; *short* and *thick,* as in the Sutton Beauty and Comice pear; *fleshy,* as in the Peck Pleasant and Louise Bonne pear; *clubbed* when enlarged

FIG. 31. Shapes of apples. 1. Wealthy, round. 2. Wagener, oblate. 3. Spitzenburg, oblong. 4. Ben Davis, conic. 5. Chenango, oblong-conic. 6. York, oblique. 7. Mother, ovate. 8. Rhode Island Greening, round-oblate. 9. Twenty Ounce, round-conic. 10. Baldwin, round-oblong.

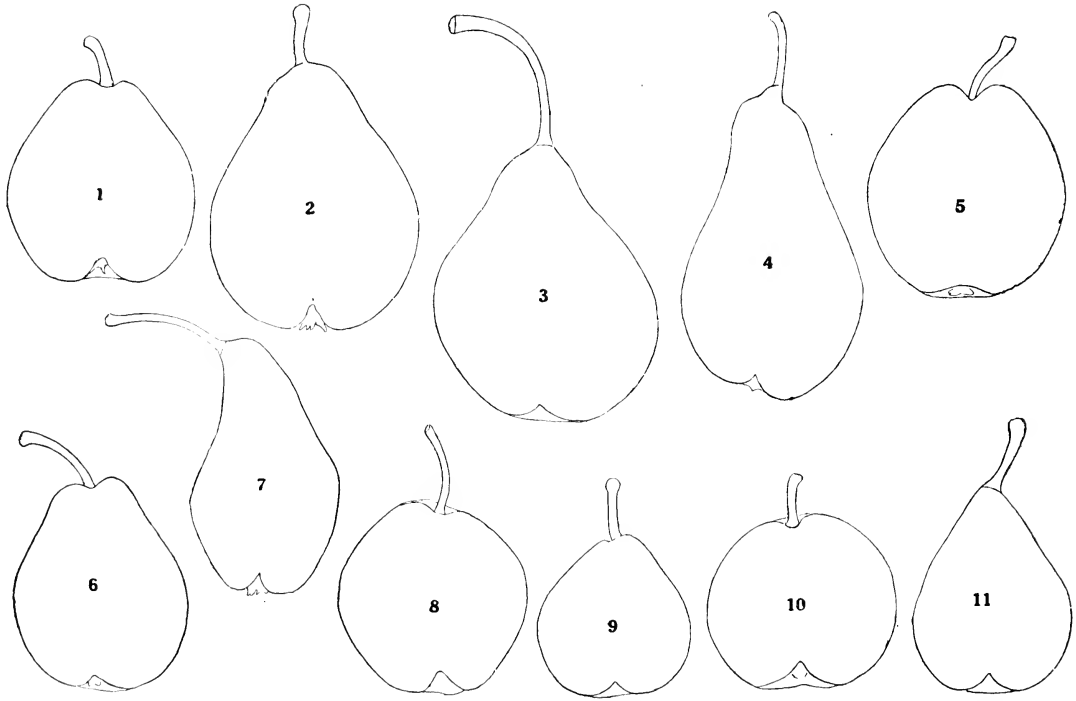

FIG. 32. Shapes of pears. 1. Urbaniste, turbinate. 2. Beurre Clairgeau, oblong-ovate-pyriform. 3. Lincoln Coreless, obovate-acute-pyriform. 4. Vicar of Winkfield, oblong-pyriform. 5. Flemish Beauty, globular-obtuse-pyriform. 6. Beurre Diel, ovate-pyriform. 7. Jargonelle, oblong-ovate-pyriform. 8. Sudduth, ovate. 9. Josephine de Malines, obovate-obtuse-pyriform. 10. Rutter, globular. 11. Marie Louise, globular-acute-pyriform.

at the end, as in the Early Strawberry apple; *lipped* when the flesh forms a protuberance under which the stem is inserted, as in the Pewaukee and Clayton apples; *bracted*, as in the Excelsior Crab. The stems of pears are often set obliquely as in Beurre Clairgeau; or are crooked or curved as in Howell. The stems of some pomes have distinguishing colors; those of others are pubescent. In some pears, as in Bergamot d'Esperen, there are bud-like protuberances on the stem.

87. The cavity.—The depression in the base of the apple in which the stem is set, called the *cavity,* offers several marks which usually enhance the value of a description. The cavity is especially characteristic in apples. It varies greatly in depth and may be *deep, medium,* or *shallow.* In breadth, it may be *broad, medium,* or *narrow.* The bottom may be *obtuse, acuminate,* or *acute.* Sometimes the sides are *furrowed, ribbed, angular, compressed,* or *oblique.* The words *regular* and *irregular* are often definitive. The skin in the cavity is usually more or less *russeted* but may be *smooth;* not infrequently it is *wrinkled, waved, plaited,* or there are radiating lines, rays, or streaks. The color markings of the cavity are usually characteristic and may consist of special stripings of red, russet, green, or yellow. These must be noted. Some varieties of apples and pears have cavities more or less prominently lipped, a condition described under the stem, a characteristic usually determinate.

88. The basin.—The depression in which the calyx is set at the apex of the fruit, therefore opposite the cavity, is called the *basin* or may be spoken of as the *blossom end;* or, together with the calyx, is known as the *eye,* an inexact and unnecessary term the use of which should be discouraged. The basin is as important as the cavity in identifying pome-fruits and should have the same critical study in making a description. For most part it is described by the same terms as for the cavity. The skin in the basin is less often touched with russet and other peculiar color-markings than the cavity, but is more often *wrinkled, plaited, folded,* or *corrugated.* Not infrequently there are fleshy protuberances about the calyx called *mammiform appendages,* as in some crab-apples. Sometimes the five ribs along the sides of the apple end in knobs about the basin in which case

it is *crowned,* as in Yellow Bellflower, Delicious, and Deacon Jones.

89. The calyx.—The withered calyx, or at least its lobes, persists in some species of pomes and not in others and thus may be a certain mark of recognition. For example: the lobes persist in the common apple but are deciduous in the true crab-apple, *Pyrus baccata;* persistent in the common pear, deciduous in most of the Asiatic species; persistent in the common quince, deciduous in the Japanese quince. The calyx may be *open, partly open,* or *closed* in case it persists. In some varieties of apples the segments are separated at the base; in others united. The lobes may stand erect or lie flat on the fruit. When erect, if the tips incline inward, the lobes are said to be *connivent;* if inclined outward, they are *divergent* or *reflexed.* The lobes may be further described by such terms as are employed for the sepals of the flower.

90. Surface characters of pomes.—The appeal to the eye and to a much lesser extent to the touch make the surface characters of all fruits most important in classification. The skin itself is of relatively small importance but in all pomes must be noted. It may be *thick* or *thin, tough* or *tender.* The tough skin of the McIntosh apple is characteristic. In a few varieties of apples it may peel from the flesh easily, but generally it clings tightly. In many varieties the skin or the flesh close underneath has a characteristic flavor which may add to or detract from the flavor of the fruit; thus, the skin of the Seckel pear adds to the flavor while the bitterish gritty skin of Duchesse d'Angouleme detracts.

The roughened outer skin, called *scarf-skin,* is a mark of recognition of several apples. In some red sorts, notably Sweet Winesap and Black Gilliflower, the scarf-skin makes the color appear duller and darker. On the skins of Pumpkin Sweet, Yellow Newtown, and some other varieties the scarf-skin runs outward from the base of the apple in lines or stripes. The scarf-skin is usually colorless and may be rubbed off. It is, of course, the true epidermis of the fruit.

The surface of the fruit may also be covered with a delicate powdery coating, easily rubbed off, called the *bloom.* Apples of the Fameuse or McIntosh and the Pearmain groups are

characterized by the amount and delicacy of the bloom which adds much to their appearance. This bloom is excreted by the epidermal cells and consists of minute scales of wax which prevent evaporation from the fruit skins, and should not, therefore, be removed. The quantity of the bloom varies greatly in different environments. Some varieties of apples are oily or waxy, the material causing the condition being analogous to the bloom in composition and is an excretion from the epidermal cells. Lowell, sometimes called Greasy Pippin, and Tompkins King, are heavily covered with this oily wax. This character must not be confused with glossiness, sometimes spoken of as *waxen*, as exhibited in the glossy skins of Winter Banana and Maiden Blush.

There are various other surface characters usually of minor importance which may in a few varieties help materially in classifying. The presence and character of the pubescence about the calyx is one of these. All quinces are thickly covered with felt-like pubescence, the character of which should be noted. In some apples and pears, a suture-like line extends towards the apex from the base. One recognizes Tolman Sweet at once by a very plain line of this kind.

All other characters of the surface are subordinate to that of color, with which dots and similar markings are included. Its importance must be emphasized by treatment in a separate topic.

91. Color of pome-fruits.—In spite of the fact that no character of pome-fruits varies more in accordance with environment, color is of first importance in identifying varieties and in all methods of classification. Unfortunately, colors are difficult to describe in words and there are no charts helpful in determining the colors of fruits. The difficulty of describing is further complicated by the fact that no two persons see colors quite alike. Great latitude, therefore, must be allowed in interpretation. Red, scarlet, carmine, and pink are applied to the same color in the apples which pass as red sorts.

Fortunately the way in which the colors of pomes are distributed on the fruit are very distinctive and make safe distinguishing marks for most varieties. The ground-color of apples, pears, and quinces is the green or yellow-green of chlorophyll on which there is usually an overcolor of tints and shades of

yellow, red, carmine, or more rarely scarlet. The over-color may be laid on in *stripes, splashes, streaks,* as a *wash* over the whole or a part of a fruit, or as a *blush* on one cheek; or it may *mottle* or *marble* the surface. In whatever way the color is laid on it is usually necessary to add some adjective in describing it, as *dull, dark, light, bright, clear, cloudy.* When a fruit is of two or more colors it is *parti-colored;* when of one color, *self-colored.* The predominating color is usually stated under the head of *prevailing effect;* thus, the Baldwin apple usually shows more or less green but the prevailing effect is red; of the Bartlett pear, yellow.

The bright colors of pomes are usually intensified by sunlight; they are seldom as brilliant on the tree as when full maturity is reached in storage. It is a rule to which there are but few exceptions that there is a tendency in all pome-fruits to redness and that it comes into activity whenever a stimulus provokes it. Some of these stimuli are bright sunlight, cold nights, lack of nitrogen in the soil, injury to the tree, and various disease and insect injuries. Fruit on young trees is seldom as brightly colored as on old ones. Trees in sod bear highly colored fruits, —the hectic flush of fruit from sick or starved trees. The fruit from any two specimens of a variety is not necessarily colored exactly the same, due to different environment, or, very rarely, to a mutation.

The reddish-brown or reddish-gray color called *russet,* very common in both apples and pears, demands special attention. The russet usually overlays a green ground-color and may cover the whole fruit as in the russet apples and some pears, as the Beurre Bosc; or it may occur as *patches, splashes, streaks, lines, dots, veinings,* or the fruit may be *netted* with russet. The russet may be variously modified; the modifying colors are most often *red, brown,* and *cinnamon.* The quantity of russet may vary greatly on the fruits of any one variety, usually in accordance with climate. Thus any of the russet apples or pears may in one season or locality be covered solidly with this color and in another time or place show little or no russeting. The skins of all fruits with little or much russet are more or less roughened. Injury by frost, spraying or dusting may cause russeting which is difficult to distinguish from the natural color.

92. Dots.—The *dots*, found on the surface of all apples and pears, are often very characteristic and must always be noted as to kinds, numbers, and how placed. They may be *few* or *many*, *large* or *small*, *white*, *gray*, *russet*, and very occasionally are red or reddish especially in pears; if star-like, they are *stellate;* when dark or russet and surrounded by a circle of white or gray, they are *areolar;* they may be *round*, *irregular*, or *elongated*. In some varieties they are *obscure;* in others *conspicuous;* in some *raised* and *rough* and in others *sunken* or seemingly *submerged* under the skin. They may be *scattered* miscellaneously over the fruit or *crowded* about base or apex. When very small, they are called *points* or *specks;* when very large the fruit is said to be *flecked*.

93. Cutting pomes to show the internal structure.—In studying the internal structure of pomes it is necessary to make a longitudinal and a transverse section of the fruit. Two fruits at least should be divided in exact halves, lengthwise and crosswise, through the organs to be studied, in every variety of which a full description is prepared. The cuts should be made with a keen thin knife. In the lengthwise cut, the knife should pass from the apex to the base through the center of the calyx to show the remnants of styles and stamens; through the middle of the core-cell to show the outline of the core-cavity; and on through the base of the fruit and the center of the stem. The crosswise cut should sever the core in halves. The core is not always in the center of the fruit and trial cuts to locate it must usually be made. The color and texture of the flesh must be noted from both the long and cross halves.

94. The flesh of pome-fruits.—The edible succulent substance in a fruit is called the *flesh*. Nearly all pomes may be identified from the flesh characters alone. Flavor, odor, and texture of the flesh are distinct in every variety of apple, pear, and quince and appeal strongly to taste and smell. These characters are, however, difficult to describe, strongly as they impress themselves on the minds of those who study them. They vary somewhat in accordance with the conditions under which fruits are grown but are more constant, as a rule, than the external characters of fruits.

It is important in describing the flesh to have the fruit at

the proper stage of maturity, and as immaturity passes imperceptibly into maturity to be followed more or less quickly by decay, each condition affecting the flesh, it is not surprising that differences in opinion arise in judging the flesh characters of fruits. Flavor, texture, aroma, and color of flesh should be described when the fruit is at best for eating or cooking, as the case may be.

The color is first noted in studying the flesh. It may be *white*, as in McIntosh and Fameuse; *tinged with yellow*, as in Baldwin; greenish-white, as in Stark; or *streaked* or *tinged with red*, as in Wealthy. Pears have the same colors of flesh as the apple with the addition of a light salmon never found in the latter. In both the apple and pear an occasional variety occurs with red flesh, although in neither fruit are there standard varieties with flesh so colored. The flesh of the quince is yellow or orange, often turning to light red when cooked. The texture is determined as one cuts the fruit, by pressing with the fingers and by eating. The texture may be *coarse* or *fine; tender* or *tough; crisp, breaking, melting*, or in the pear *buttery*. The flesh in some pomes is *juicy*, in others comparatively *dry*, and in some *mealy*, an undesirable character. In many pears the flesh is *granular*, or *gritty* about the core and just under the skin; sometimes granular nodules are found in the flesh but usually as abnormalities. The flesh of some pears is stringy. Flavor stands out so prominently as a character of the flesh that it is given a separate topic.

95. Flavor, aroma, and quality.—Apples and pears are at once divided into two classes as to *flavor:* they are either *sweet* or *sour*. These divisions are so marked and so important that they are usually the starting point in schemes of classification for the apple; they are less significant in the pear and still less so in the quince. The description of flavor centers about sweetness and sourness, the degrees between being indicated by separate words or by modifying terms: thus a fruit may be *sour, subacid, mild subacid, sweetish* or *sweet*. *Mildly, sprightly, pleasantly* and *very* are the most frequent modifiers of these flavors. Pears and quinces are often more or less *astringent*. When a fruit is sour with more or less astringency, it is said to be *austere*. *Rich* and *refreshing* are often expressive words in

describing flavors. Some pears have a wine-like flavor which is designated as *vinous;* others seem flavored with spices and are said to be *spicy;* subacid pears with a trace of bitterness are denominated as *piquant.* The flesh of every variety of the pome-fruits has a more or less distinct odor which is usually poorly described by the single word *aromatic* when very perceptible; *musky, perfumed* and *fragrant* are occasionally used in describing the odor of pears.

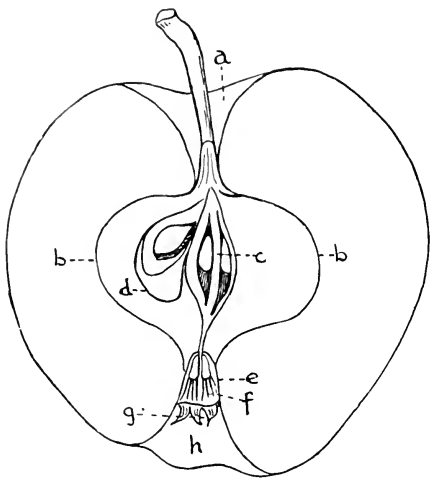

FIG. 33. Lengthwise-section of an apple. a, cavity; b, core-lines; c, core-cavity; d, carpel segment; e, calyx-tube; f, remnants of stamens and pistil; g, calyx-lobes; h, basin.

In giving the flavor of fruits there should be no disagreement of judges; a fruit has this or that flavor or aroma or it does not have it. One cannot properly characterize the flavor as good or bad. These and similar words go with quality. *Quality* is that combination of texture, flavor, and aroma which make a fruit pleasant to the palate. It is always a matter of personal judgment. One man likes McIntosh best, another Northern Spy, and a third Yellow Newton. All will agree that the Kieffer is about the poorest pear in quality, but some will say that Seckel and others that White Doyenne is best. By common consent, pomologists rate quality in five grades; *poor, fair, good, very good,* and *best.* In this rating, good signifies a fruit of but mediocre quality. Depending very largely on quality, varieties of pomes are rated as *dessert* and *culinary* sorts; dessert sorts must be attractive to the eye.

96. The core.—The position of the core must be noted first. If at the very base of the fruit, it is said to be *sessile;* if at the center *median;* if near the apex, it is *distant* from the stem or base. The two to five carpels which with their accessories con-

stitute the core of pomes are modified leaves each folded and united at their edges to form a closed cell. In shape the carpels are *round, oblong, cordate, obcordate, ovate, obovate,* or *elongated.* If the tip of the carpel is indented, it is *emarginate,* if long and pointed, *mucronate* (Figs. 33-37).

In the cores of most pomes there is an open region called the *core-cavity* or *axial sac.* This is a reliable help in identifying pears and is often useful as a recognition mark in apples. When the carpels extend quite to the axis of the fruit they are said to be *axile;* when distant from the axis, they are *abaxile* (Fig. 37). There is, of course, a core-cavity only when the carpels are abaxile, which, however, is usually the case. In some pomes there are many fine hairs in the core-cavity and it is said to be *tufted.* Sometimes the carpels are lined on the inner surface with a white spongy substance, in which the seed are imbedded, in which case the carpels are tufted, as in Tompkins King.

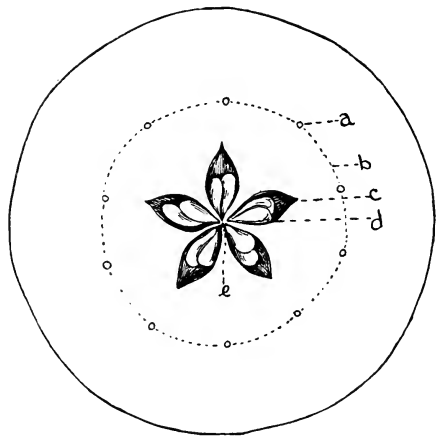

FIG. 34. Cross-section of an apple. a. vascular bundle; b. core-line; c. carpel; d. seeds; e. axial-sac.

The limits of the core are marked by a line, usually very distinct in apples and quinces, which is called the *core-line.* The size and shape of the region inclosed by the core-line are usually distinctive; while the direction which the line takes from the intruded woody stems is a fine mark of distinction. The core-line may proceed at a right angle from the stem; may incline upward or downward. When the core-line joins the calyx-tube along the side it is *clasping;* when in a lengthwise section the core-lines come together at the base of the calyx-tube they are *meeting.* In some species of crab-apples the core separates from the flesh along the core-line so that it may be taken out

leaving a well-defined cavity. Rarely there is a tendency toward such separation in the common apple and pear.

97. Seeds.—The seeds are characteristic in all pome-fruits and ought to be used more generally in identification and classification. In apples and pears the normal number is two in each cell or ten in all, but sometimes there are more, sometimes less, and a very few varieties are seedless. When the number of seeds in a cell is abnormal, one or more than two in the apple and pear, they are seldom quite normal in shape. In quinces there are several or many seeds in each carpel. The seeds of all these fruits vary in size, shape, and color, and are as constant and as reliable as marks of recognition as any other structures of pomes. No special vocabulary is needed in taking note of these characters. Some seeds are *flat*, others are *plump*. The point of the seed may be *acute*, *obtuse* or *acuminate*. Sometimes seeds of apples, pears, or quinces have attached to them a white spongy substance in which case they are said to be *tufted*. The seeds of quinces are arranged in two rows; the coat of a quince seed abounds in a mucilaginous gum not found or not nearly as abundant in the apple or pear.

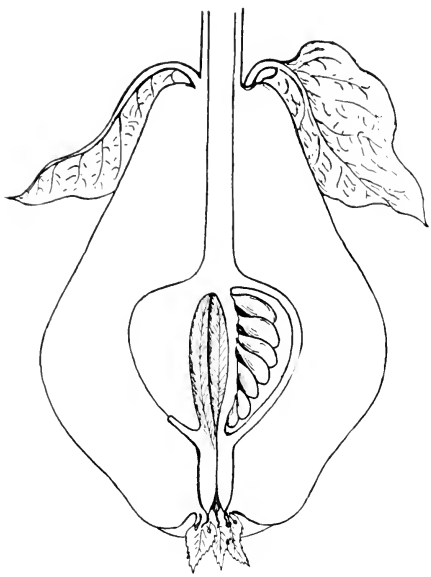

FIG. 35. Lengthwise-section of quince. Compare with Fig. 33, showing a similar section of an apple.

98. Vascular bundles.—The united strands of conducting tissue in plants are called *vascular-* or *fibrovascular-bundles*. Ten of these bundles enter the flesh of pomes from the stem and follow the core-line. These are plainly seen in crosswise sections of apples and quinces as well-marked dots (Fig. 34). They are arranged in two circles; in the outer circle, the bundles

are opposite the dorsal sutures of the carpels; in the inner one they alternate with the carpels. The core-line appears in the transverse section usually on the inner side of the ten bundles looping out between them into the flesh.

No doubt the differences in the size and position of the vascular bundles in the fruits of pomes, and in the outline of the core, marked as a beautiful bit of tracery, are sufficiently plain and constant to be great aids in classification. Several workers in the United States and in Europe lay great stress on these marks in classifying. As a last resort they certainly prove helpful, but there is usually no difficulty in identifying varieties and placing them in systems of classification from characters more easily seen and more readily set forth in a written description.

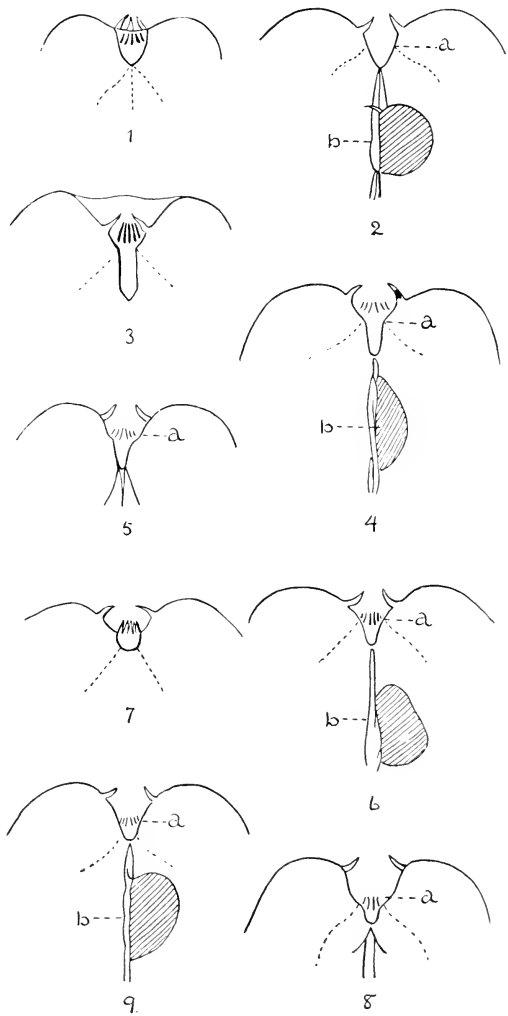

FIG. 36. Stamens, tube, and carpels of the apple. (After Hogg.) See Fig. 37.

99. Stamens.—When a pome is cut in exact halves lengthwise, the top of the section is beset in most species with the

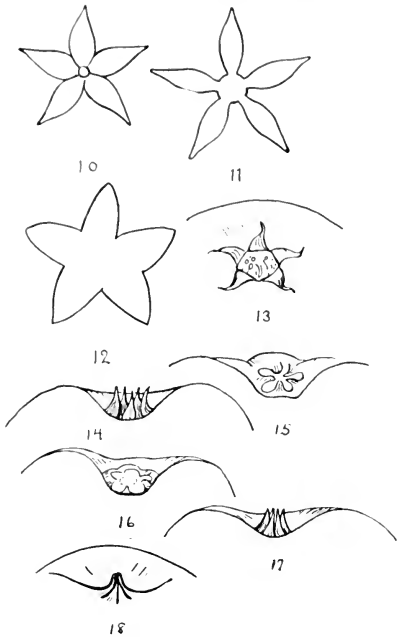

FIG. 37. Carpels and sepals of the apple. (After Hogg.) Explanation of Figs. 36 and 37. *Stamens.* The *marginal* position is shown in 1, 2 a, 3, and 4 a; the *median* in 5 a, 6 a, and 7; and the *basal* in 8 a and 9 a.
Tube. The tube is of two distinct forms—the *conical* and the *funnel-shaped.* The outlines of the conical tube are shown in 1, 2, 6, and 9. The funnel shape is shown in 3, 4, 5, 7, and 8.
Carpels. If a carpel is split down the middle its walls or membranous lining will be either *round*, as represented in 2 b; *orate*, as in 6 b; *oborate*, as in 9 b; or *elliptical*, as in 4 b. Then in relation to the axis of the fruit, they are either axile or abaxile. When the walls extend to the axis, the cells are symmetrical, as shown in 10 and 11, and are said to be *axile*, whether they are open, as in 11, or closed, as in 10. When they are distant from the axis, and the cells are unsymmetrical, as shown in 12, they are called *abaxile.*
Sepals. In 13, the segments are reflexed, so much as to fall back flat on the fruit in the form of a star; they are then said to be *divergent.* In 14, the segments are erect with their margins merely touching and their points divergent; these are *erect convergent.* The *flat convergent* positions are shown in 15 and 16. The *connivent* forms are shown in 17 and 18, in which the segments overlap each other and form a compact cone.

withered remains of the calyx, underneath which is the halved portion of the calyx-tube. Inserted in this tube are the remains of the stamens which show as small bristles. Apples may be divided into three groups in accordance with the arrangement of the stamens in the calyx-tube. In one group the stamens are near the top of the tube and are *marginal;* in a second group they are near the middle of the tube and are therefore *median;* in a third, they are at the base, and are *basal.* An objection to the use of stamens in systematic work is that they are often injured or destroyed by insects or spray (Fig. 36).

100. Calyx-tube and styles. —The calyx-tube is of some use in separating varieties, although it varies greatly with the size of the fruit and is often abnormal in size and shape, either from injuries or abnormalities in other parts of the fruit. Thus, the base of the styles, in some varieties, develops into fleshy tissue which affects the shape of the calyx-tube. The latter may be of three quite distinct shapes: it may be *conical* or *cone-shaped, funnel-shaped,* or *urn-shaped.* When

cone-shaped the broad upper part is called the *limb;* the narrow lower part, the *cylinder.* In varieties in which the remnants of the styles are fleshy, as in the Gano apple, they form a point called the *pistil-point* which projects into the calyx-tube. The calyx-tube in some varieties of pomes is *long,* in others *short;* in some sorts *wide,* in others, *narrow* (Fig. 37).

Hogg, an eminent British pomologist, about 1860 based a system of classification of apples on the characters of the stamens, calyx-tube, carpels, and sepals. This system is now nowhere in general use, as the characters of these structures are not plainly seen, not as constant, and not as easily described as the external characters and those of flesh and flavor in most varieties of apples.

101. Date of ripening and season.—All classifications of pome-fruits take into account ripening dates and the season when ready to eat out of hand. A fruit is truly ripe only when its seeds are mature, but many if not most pome-fruits are picked when more or less green that they may carry to market in suitable condition. The usual rule is to pick pomes when the stem parts readily from twig or branch. Pomologists very generally put this as the *ripening date.* A fruit is *in season* when it is ready to serve as dessert or to be used in culinary preparations. The criteria are color, taste, aroma, and mellowness of flesh. Season is exceedingly variable and depends on the condition in which the fruit has been picked and whether kept in common- or cold-storage. Apples and pears are classed as *summer, fall,* and *winter* varieties and under these headings form important divisions in all classifications of these fruits. Both ripening dates and season vary greatly in accordance with climate, soil, care, and age of tree.

The Drupe

A drupe is a single ripened carpel containing one or rarely two seeds. The walls of the ripened ovary in this and other fruits are called the *pericarp* (Fig. 38). In the pericarp of a drupe there are three layers; the thin skin, called the *exocarp* or *epicarp;* the thick soft succulent middle layer, the *mesocarp;* and a hard bony layer, the *endocarp, pit,* or *stone.* The seed,

often spoken of as the *kernel*, is within the stone, quite free, showing that the walls of the stone could not have been developed from the ovule. The fruits of the almond, apricot, cherry, peach, and plum are drupes. Each carpel in a raspberry, blackberry, or bramble-fruit is a small drupe to which is given the names *drupelet* or *drupel*, and the so-called berry of the brambles is a collection of drupelets, a compound fruit.

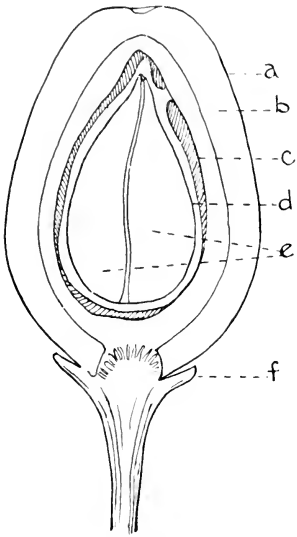

FIG. 38. Lengthwise-section of a drupe. a. epicarp; b. mesocarp; c. endocarp or stone; d. testa; e. cotyledons; f. calyx.

102. Size of drupes.—There is much less variation in the size of drupe- than in pome-fruits, and this character, therefore, is more valuable in classification. Length and breadth of drupes should usually be given in figures. These can be obtained only by the use of calipers, since soft fruits seldom can be sectioned for measurements of diameters. Even when measurements are given, a description should state whether the fruit is large, medium, or small. These relative terms are rightly applied only with varieties of a single species in mind. Montmorency, for example, is a large sour cherry; it would be inaccurate to compare it with Napoleon, a sweet cherry, in which case it would be small.

103. Shapes of drupes.—One of the first characters to be used in classifications of drupes is shape, which is much more constant and reliable than in pome-fruits. The terms for defining shapes of drupes are simple: *round, oval, ovate, heart-shaped, cordate, oblate, oblong, conical,* or *truncate.* Some plums are *egg-shaped* and a few *pear-shaped;* an occasional variety has a more or less distinct *neck.* Many of the stone-fruits are compressed or flattened sidewise, a shape seldom found in pome-fruits; it must be noted whether the compression is along or opposite the suture. In the peach, in particular, some varie-

ties are very *regular* as to shape, while others are markedly *irregular*. In some varieties of any of the drupes, the halves are *equal;* in others *unequal* (Fig. 39).

104. Cavity and apex.—In the pome-fruits cavity and basin help greatly in classifying varieties, but the cavity is of minor importance in drupe-fruits and there is no depressed basin, its place being taken by a more or less prolonged apex, sometimes sunken, seldom of importance in systematic work. The cavity should be described as to its depth, width, shape, and markings, using the same terms suggested for pome-fruits. The apex has special terms of description. It may be *round, flat,* or *depressed;* simply *pointed,* a *prolonged tip,* or abruptly tipped with a short spine when it is said to be *mucronate*. The apex of some peaches is a rounded nipple-like protuberance, in which case it is said to be *mamelon* or *mamelonated.*

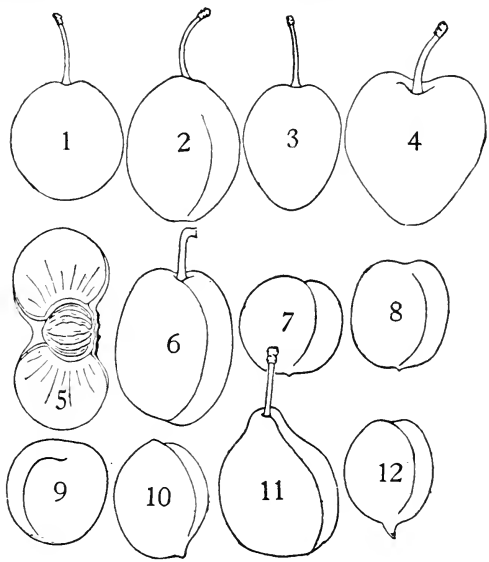

FIG. 39. Shapes of drupes. 1. Imperial Gage plum, round. 2. Arch Duke plum, oval. 3. Gueii plum, ovate. 4. Wickson plum, cordate. 5. Peento peach, oblate. 6. Pacific plum, oblong. 7. Champion peach, round-truncate. 8. Waddel peach, round-oblong. 9. Moorpark apricot, sides compressed. 10. Iron Mountain peach, irregular, sides unequal. 11. Giant prune, obovate, necked. 12. Climax peach, beaked.

105. The stem is much used in the classification of drupe-fruits. Its presence or absence is a definite distinguishing mark with some species. The stem is very short or seemingly absent in peaches and nectarines and is always present and usually long in plums and cherries. The length of the stem is an almost certain mark of recognition in some plums and cherries. Its thickness, color, and the quantity and kind of pubes-

cence should be noted. The ease with which the stem parts from the stone at the one end and the tree at the other is often worth recording as a characteristic. The attachment of stem to stone is so tenacious in some sorts that the stone is plucked from the flesh by pulling the stem. The stems of some drupes are characteristically enlarged at the end; in others they may be curved peculiarly.

106. The suture of drupe-fruits.—In botany the line or seam formed by two adjacent margins is called a *suture*. In drupe-fruits the word is applied in the botanical sense to the stone only, while in the flesh of the fruit it means the crease which runs from the stem to or toward the apex of the fruit. In presence or absence, length, depth, and markings, it is very constant in all of the drupes and its characteristics should always be given in a description. Sometimes its place is taken by a line, usually of darker color than that of the fruit, a fact summed up by the statement *suture a line*.

107. Color of drupe-fruits.—The colors of cherries, plums, peaches, and other drupe-fruits are more varied, more constant, and more attractive than in apples, pears and other pomes. Peaches, nectarines, and apricots may be *white, red, green,* or *yellow,* or almost any combination of these colors. To these colors of the peach may be added for the plum and cherry, *black, amber, crimson,* and *purple,* while some plums are *blue,* a color not found in cherries. While some colors are put down for all of the drupe-fruits, they must not be considered the same for the different fruits: the red of the peach is not the red of the plum or cherry; the purple of the plum is not the purple of the cherry. Nor do modifying words help much in distinguishing between these colors in the several fruits. More often the colors of drupes are laid on solidly; but there are many parti-colored drupes, in most of which the colors are mottled or marbled.

The dots on plums help much in the recognition of varieties; their size, number, color, and distribution should be considered. In all of the other stone-fruits they are either absent or so inconspicuous as to be without value in identification.

The bloom on plums is highly characteristic. The powdery or waxy substance of which the bloom consists is the same in

PLATE IV. One of the beaked peaches—The Climax.

composition and color on all plums but the quantity varies greatly and gives it differentiating value in separating varieties. It suffices to describe it as *light, thin, scant, heavy.* Sometimes there is a trace of bloom on cherries and nectarines but on peaches and apricots it is so obscured by the pubescence of these fruits as to be negligible. It is customary to give colors to bloom, as *blue, gray,* or *lilac,* but all bloom is white and the seeming color comes from the color of the skin. Heavy bloom is sometimes *wax-like.*

108. Skin characters of drupes.—Few characters of the skins of drupes are helpful to the systematist. The skin may be *thick* or *thin, tough* or *tender.* Perhaps the most noteworthy character is that of adherence to the flesh; in most varieties of drupe-fruits the skin adheres tightly to the flesh, but in some it readily peels off, giving rise to the terms *adherent* or *free.* In some plums, especially in several native species, the skin is markedly astringent.

The pubescence on the skins of peaches sometimes furnishes clues to identification in the length of hairs and in their numbers. The nectarine is a smooth-skinned peach between which and the long- and thick-haired Rochester there are all grades in length and quantity. Some cherries, especially *Prunus tomentosa,* and a few plums have some or many hairs. Plums and cherries are described as *hairy,* but peaches and apricots are usually spoken of as *pubescent, tomentose, woolly,* or *felted.* The amount and character of the pubescence on the drupes varies greatly with soil and climate.

109. The flesh of drupes.—The color of the flesh is a plain dividing line between groups of drupe-fruits. In all there are *red-, white-, green-,* and *yellow-fleshed* sorts, while in some plums and cherries there is a purple tint. There is almost no variation in the color of the flesh in any of the drupes, so that a distinct color that can be described positively, as white, yellow, or red, sets an absolute mark on a variety. The color of the juice in cherries is just as positive a mark; one great group of sour cherries, the Amarelles, have colorless juice; another, the Morellos, have reddish juice. In the red-juiced cherries, the red may be *light, dark,* or *purplish.* Some varieties of all drupes are much juicier than others; thus there are *juicy* and *dry* sorts.

The flesh may be *coarse-* or *fine-grained; tough* or *tender; crisp, melting*, or *watery;* and that of peaches and plums may be *stringy.*

110. Flavor.—As in color and form, each of the several thousand sorts of the different drupe-fruits has a flavor and an aroma quite of its own. Those who originate new peaches, plums, and cherries know them by their taste, and many who grow a large assortment can recognize them from flavor and aroma. No pen, however, can depict flavor and aroma so that a reader can identify any variety of fruit. One can only put down the outstanding flavor about which the peculiar flavor of the fruit is centered. Thus, one would first note whether the variety in hand is *sweet* or *sour, tart, subacid*, or *mild;* whether *bitter, astringent*, or *austere;* lastly the kind and amount of aroma. One can be fairly definite in the use of this meagre vocabulary, but must end a description of flavor by an opinion as to quality to which others may not agree. As with pomes, quality is rated as *poor, fair, good, very good*, and *best.* Demarcations of flavor and quality are the most unreliable parts of fruit descriptions.

111. The stone.—The species of drupe-fruits may be distinguished by the stones without recourse to any other structure of fruit or plant; groups of varieties may be differentiated with several species; and it is possible to identify almost every one of the several hundred varieties of the peach at least from their stones. The markings on peach stones are as distinctive as the finger-prints of men. A stone of a drupe may be considered as a leaf which has been folded along the midrib and united at its margins. The midrib of the folded leaf as it appears in the stone is the *dorsal* suture; the united margins form the *ventral* suture. If the suture has but one crease it is *grooved;* the grooves may be *deep* or *shallow.* If there are two or more creases, the suture is *furrowed.* Sometimes there are narrow thin blades projecting at right angles from the suture, in which case it is *winged.*

Within a species the relative size counts; a stone may be *large* or *small, thin* or *plump.* There are divers forms of which the most common are *round, ovate, obovate, oval*, and *elliptical.* The stones of some plums have a short *neck* at the base; or base

and apex may have a *prolonged tip;* or they may be *pointed, blunt,* or *mucronate.* Or, rarely in peaches, plums, and apricots, the stones are *oblique,* usually a mark sufficient to distinguish the variety. Apricots are divided into two great groups as to whether the dorsal suture is *pervious* or *impervious.* The two surfaces of the stones are variously marked; they may be more or less *smooth,* or they may be *pitted* or *grooved,* or the last two characters may be combined. The stones vary in color from red to brown and when red often tinge the adjoining flesh with their color.

A grand division of peaches is made in accordance with the adhesion of the flesh to the stone. Peaches in which the flesh clings to the stone are *clingstones;* those in which it is free, *freestones.* These characters depend somewhat on environment and season, however, and in some varieties it is always doubtful, in which case the stone is said to be *half-free.* There are freestones and clingstones among plums and cherries also, but these characters are not as marked as in the peach. In some peaches the stone is usually cracked in ripe fruits, as in Belle of Georgia. There are so-called seedless drupes, as Burbank's Miracle plum, in which the stone is but a soft scale or shell, with or without a kernel.

A study of seeds would probably show that they vary greatly in quality in all of the drupes as they do in apricots in which fruit there are two great groups, one with sweet and the other with bitter kernels. In some varieties many of the kernels are *abortive;* in some sorts, many have two kernels in which case they are *double meated.*

112. Season.—As with the pomes, the time of ripening of drupe-fruits is very important in classifying and of course is of prime significance to the fruit-grower. Three terms, with various modifiers, are used in giving the season of drupes; these are *early, midseason,* and *late.*

Fruits of the Brambles

The fruits of brambles are aggregations of drupelets. That these drupelets have the same structure as a drupe is easily seen if a comparison is made between a drupelet of a bramble and a peach, plum, or cherry. Each of these fruits contains

one seed; each bears the remains of a style; all are indehiscent; and the seed in all is surrounded by flesh of similar composition. The core of these aggregate fruits is the enlarged receptacle; it remains on the plant in the raspberry, and comes away with the fruit in the blackberry and dewberry. The fruits of brambles, therefore, are not berries as botanists employ the term; however, fruit-growers called them berries long before botanists chose the word for another form of fruit, and its use in the pomological sense rightfully persists (Fig. 40).

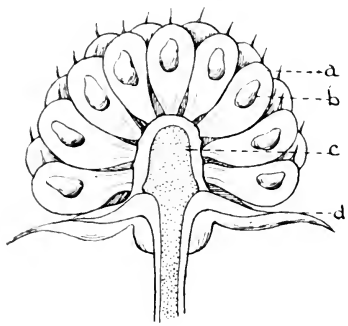

FIG. 40. Lengthwise-section of a red raspberry. a. drupelet; b. seed; c. receptacle; d. calyx-lobe.

113. Adherence to the receptacle.—The drupelets in the raspberry hold strongly to the receptacle in some varieties and part readily in others, conditions of little moment to the systematist but of considerable consequence to those who pick the crop. Similarly, it must be known of every variety of blackberry how well the fruit clings to the pedicel; it should not cling too tightly nor, on the other hand, drop too readily as the crop ripens. When the drupelets of brambles do not adhere to each other well, the berries *crumble*. Crumbling varies greatly in different berries and is of prime importance in marketing the crop, as crumbly berries are unattractive and do not ship well.

The size, texture, and color of the receptacle, commonly called the *core*, must be considered in describing blackberries and dewberries. The core may be *large* or *small*, *hard* or *soft*, each pair of alternatives connoting possible differences in value of the fruit. The core is usually white but may be pink or tinged with red, in either of which cases the color is a valuable varietal characteristic. In shape it may be *cylindrical* or *conical*, *long* or *short;* sometimes its sides are *convex*, sometimes *concave*.

114. Size, shape, and color of berries are of great importance, both in classification and in practical fruit-growing. The

same terms used in describing size in pomes and drupes may be applied to bramble berries, but wholly different ones are necessary to picture the shape. Bramble berries are *long* or *short, broad, round, cylindrical,* or *conic,* and *regular* or *irregular.* If out of the ordinary, the size and shape of the drupelets must be mentioned. If the shape and form of the cluster, with the number and arrangement of flowers, has not been noted in describing the flowers it should be in the description of fruits. After giving the shape, the cavity of raspberries must be described as to whether *deep* or *shallow, narrow* or *broad, rough* or *smooth.* Next, the presence or absence of remnants of the styles should be noted. Statement must be made of the number of drupelets in a berry, whether *few* or *many,* or the exact number may be given.

The color of bramble-fruits is about the best means of separating varieties when only fruit is in hand. The colors range from white through yellow, amber, red, and purple to black. There are many tints and shades of these primary colors and it is most difficult accurately to describe the exact color, but as these berries are always self-colored and never parti-colored it is much easier than with pomes or drupes. The drupelets may be *dull, glossy, bright,* or *clouded,* and some are covered with a characteristic bloom.

115. The flesh of bramble-fruits.—One notes first in testing bramble-fruits whether the berries are *dry* or *juicy, seedy* or having few seeds, and whether *soft, hard* or *melting,*—characters which taken together constitute the *texture* of the fruit. In blackberries and dewberries the core, of course, must be taken into account in describing texture. The color of the juice is a distinguishing mark of some species. As in other fruits, no two varieties of brambles have quite the same flavor but words seldom can be found to make plain the differences between varieties or species. The usual basic terms in descriptions of flavor, as, *sweet, sour, subacid,* qualified by various modifiers, are used, but such expressions do not often convey information that characterizes. Occasionally some peculiar flavor, as bitterness or muskiness, gives character to a variety. Quality is rated as in testing other fruits,—*poor, fair, good, very good,* and *best.*

The Botanical Berry

The berry of the botanist is a soft and succulent fruit having one or more seeds. In pomology these botanical berries are represented by the grape, currant, gooseberry, blueberry, and cranberry. Among vegetables, the tomato and eggplant are the commonest botanical berries from cultivated plants. The difference between a drupe and a berry is well illustrated if one compares a plum, the structure of which has been studied, as a typical drupe, with a date, the "stone" of which is a true seed which must not be compared with the "stone" of a plum which contains a seed. In the grape, the berry is a ripened superior ovary; in the currant, gooseberry, blueberry, and cranberry it is a ripened inferior ovary.

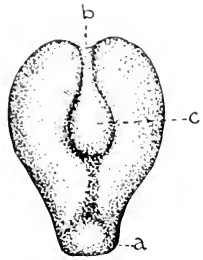

FIG. 41. Dorsal view of seed of grape, *V. Labrusca*. a, beak; b, notch; c, chalaza; hilum and raphe not visible.

The structure of fruits classed as botanical berries are best studied as such in systematic pomology, but it must not be overlooked that any small pulpy seed-fruit is a berry in the language of the fruit-grower. The pomologist has prior rights to the word, as has been said, and in any but a strictly botanical sense a raspberry, blackberry, dewberry, or strawberry, is as properly a berry as a grape, currant, gooseberry, or cranberry.

116. Fruit and seeds of the grape.—The grape, in bunch and berry, furnishes characters whereby almost all species and varieties may be recognized and classified. Substantial steps toward classification are taken in noting the number of berries in a bunch of grapes, the size, shape, and compactness of the cluster, and the number of bunches on a shoot. Still greater progress is made when the size, shape, color, and bloom of the berries are recorded. The adherence of the stigma to the fruit and of the fruit to the pedicel differ greatly in groups of grapes. In the species cultivated commonly in Europe, *Vitis vinifera*, the skin adheres tightly to the pulp; in the several cultivated species native to North America, the skin readily slips from the pulp. The end of the pedicel projecting into the grape is the

brush; the color of the brush is often a fine mark of distinction. The color of the juice is a plain and certain characteristic of some species and varieties. Thinness, thickness, flavor, and color of pigment in the skin have more or less value as marks of identification. Flavor and aroma of flesh are, as in all fruits, very distinctive but most difficult to define. All species and varieties are well distinguished by the time of ripening, and by the keeping quality of the fruit.

FIG. 42. High blueberry.

In no other fruits are the seeds so important in determining species and varieties as in the grape. The size and weight of seed differ greatly in species and varieties. Thus, of native grapes, *V. Labrusca* has the largest seeds, while those of *V. vulpina* are smallest. The shape and color of seeds offer very plain distinguishing marks. The size, shape, and position of the several distinct parts of a grape seed furnish very certain marks of recognition of several species. These parts are: the narrow prolonged base of the seed is called the *beak* (Fig. 41); the scar left where the seed was attached to the seedstalk is the *hilum;* the place where the seed-coats and kernel are connected is the *chalaza;* the line or ridge which runs from the hilum to the chalaza is the *raphe.*

117. Fruits and seeds of gooseberries and currants.—Gooseberries and black currants are usually recognizable from the appearance and taste of the fruits, but it is rather difficult to separate red currants by means of fruit characters. European gooseberries are much larger than those grown from American species, and may be told from them by their greater size. Varieties of all species of gooseberries have distinctive shapes, colors, and flavors; some are smooth, others pubescent, and the texture and juiciness of flesh at time of ripening vary greatly. Varieties of black currants bear fruits of different sizes and each sort has a taste and odor by which it usually may be recognized. Size of fruit is helpful in distinguishing species of red currants,

but shape, color, and flavor signify little. The number of currants to the bunch is a fairly reliable character, as is size of bunch. Transparency of berry characterizes several sorts. In some varieties the berries are borne on one side of the stem. In some the bunches droop while in others they are held up rather stiffly. The stems may be smooth or hairy. Seeds offer few marks of distinction in any of these fruits. The time of ripening, as in all fruits, is important.

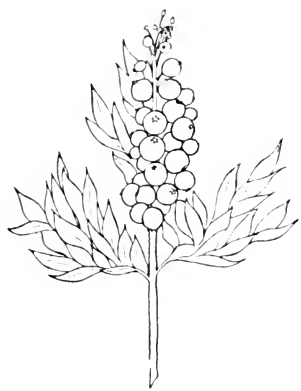

FIG. 43. Low blueberry.

118. Fruits and seeds of heath-berries.—Varieties of heath-fruits are distinguished almost wholly by their noteworthy fruit characters. Very little has yet been done with descriptions of the plants. Much is made of the size of cranberries in classifying varieties. Figures showing length and diameter of the berry are usually given, and size is further emphasized by stating the number of berries required to fill a half-pint cup. Shapes of both cranberries and blueberries are so simple that they are easily depicted in a few words or in an outline drawing. The stem offers means of identification in heath-fruits as in other stemmed fruits. Its length and manner of insertion, whether in a neck or in a depression, the color, and such specific and varietal differences as wartiness and pubescence are important means of identification. The calyx-end of the fruit may be drawn out, flattened or depressed, and the size, shape, and position of the calyx-lobes may be significant.

Cranberries are usually picked with scoops or raked off the vines. In these mechanical methods of harvesting, much foreign matter is gathered with the fruit, making it necessary to run the crop through cleaning machines. The effectiveness of the separation depends on the resiliency of the berries, unsound fruits having little elasticity. It follows that a statement concerning the resiliency of fruit must be made in describing varieties. (Figs. 42, 43.)

Not all blueberries are blue. Some species are *black*, others *bluish-black*, *blue*, or *light blue*, and varieties of some species are *white*, *pink*, or *red*. In all species and varieties of blueberries and huckleberries the amount and character of the bloom are noteworthy. As species of these fruits are improved by the introduction of new varieties, wider ranges in color, size, and shape of fruit may be expected.

In no fruits do the seed and seed-cavities count for as much in classification and value as in the heath-fruits. In cranberries the number of seeds in varieties vary from seedlessness to 150 seeds; the lower the average number for a variety the better. In huckleberries there are commonly ten nutlets, which are large enough to make the fruits unpleasant in eating. In blueberries the seeds are small and numerous; the size and number materially affect the palatability of the fruit. The thickness of the flesh between seed-cavity and surface is important in the classification of cranberries.

The Fruits of the Strawberry

A strawberry is a juicy edible spurious fruit of any species of Fragaria. The spurious fruit is the receptacle, while the true fruits are the seed-like structures borne upon the much enlarged edible receptacle (Fig. 44). The seed-like structures, called *achenes*, are the true fruits because they are the ripened pistils. The fruit-like receptacle, when ripe, is a solid, round, pulpy, cone-shaped structure, usually red, about the base of which is a flat rim to which were attached the floral and reproductive organs.

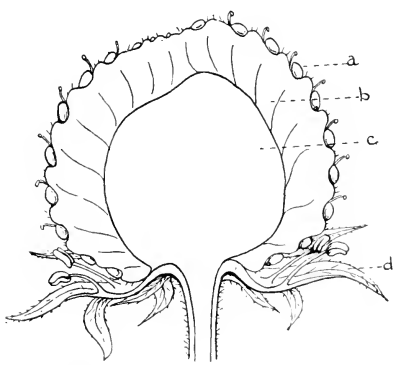

Fig. 44. Fruit of strawberry. a. achene; b. cortex of receptacle; c. medulla of receptacle; d. calyx-lobe.

119. Fruit characters of the strawberry.—The size of berries is usually unreliable for purposes of classification, although the fruits of some sorts run uniformly small and of others large.

Shape of fruit is the most reliable distinguishing mark. The commonest shapes are *oblong*, *oblate*, *conic*, *round*, and *wedge-shape*. A combination of these terms is required to describe the shape of most varieties. Varieties with fruits of *cockscomb-shape* are occasionally found, and berries of any of the shapes given may be *necked*. Berries of some varieties are *furrowed;* of some, markedly *regular;* of others, *irregular*. The apex of the berry in different varieties may be *pointed*, *obtuse*, *indented*, *green-tipped*, *hard*, or *soft* (Fig. 45).

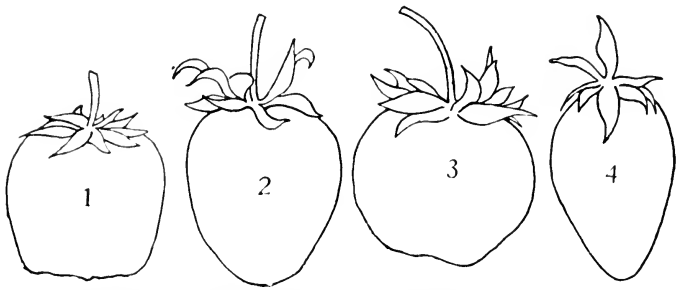

FIG. 45. Shapes of strawberries. 1. Wedge-shaped. 2. Round-conic. 3. Round. 4. Long-conic.

The color of strawberries varies from white to red and sometimes dark maroon. The usual descriptive terms are *light red*, *medium red*, and *dark red* to which *dull*, or *glossy* are often prefixed. Very often the shades and tints of red are *marbled*, although more commonly the color is *uniform*. Dark red varieties are preferred in the markets. White berries are usually blushed with pink. A white apex is a defect.

The color of the flesh is as reliable a guide to identity as that of the surface. The flesh is usually described as *lighter red than the surface*, or *darker red than the surface*. The flesh is whiter toward the center. Dark red flesh is most and white flesh least desired. The red color must persist in canned strawberries in a well-finished product.

Texture and juiciness of pulp are so variable as to have little value in classification, but are most important characters to the berry-grower. For either shipping or canning the flesh must be firm. Descriptions should set forth whether or not the flesh is *dry* or *juicy; coarse*, *fine-grained*, or *stringy;* and whether the

core is *hollow, hard,* or *soft. Fig strawberries* are those so sweet and dry that they may be sun-dried, and so make a fig-like product.

The flavors are *sweet, neutral, subacid, tart,* and *sour,* descriptive terms which are nearly always qualified by *mild,* or *sprightly, insipid,* or *rich.* All strawberries have a more or less distinctive aroma. Subacid sorts are in greatest demand. Climate and soil modify flavor and quality more than in most other fruits. Quality is rated by the usual terms: *best, very good, good, poor,* and *very poor.*

Seeds are of small importance in classification, but should be described, as in several ways they affect the value of the berry. A full description should usually state whether the seeds are *few* or *many, large* or *small, brown* or *yellow, sunken* or *raised.* The seeds in the best berries are few and small. Yellow seeds make a more attractive berry than dark ones. The flesh is better protected when seeds are raised than when sunken; berries with raised seeds carry to market better.

CHAPTER VIII

PHYSIOLOGICAL CHARACTERS

THERE are various phenomena incidental to or a part of the physiology of plants that are often characteristic of species and varieties of fruits. They cannot, as a rule, be used in formal systems of classification but ought generally to be set down when present in full descriptions in pomology. Pomologists usually include these under the very vague term *constitutional* characters. Some of them are of vital importance in the business of growing fruit, and belong rather more properly in a treatise on fruit-growing than in a text on systematic pomology, but have sufficient value to the systematist to merit brief discussion.

120. Hardiness.—The capacity to endure cold, which all pomologists agree in calling *hardiness,* varies greatly in hardy fruits and so helps to characterize varieties. It is, therefore, worth noting as a mark of identification, and since a knowledge of a plant's capacity to endure cold is of prime importance to those who cultivate a fruit, what is known of the hardiness of a species or a variety must be put in its description. The notion is current that acclimatization takes place in varieties of fruit; that is, for example, that a tender sort may become more capable of enduring cold. However, scientific reporters on hardiness, whether observers or experimenters, seem not to have recorded cases of such acclimatization. Varieties are exceedingly variable in hardiness depending on many environmental conditions.

There are other adverse conditions of climate than extreme cold to which plants are more or less resistant, and which may be noteworthy in a description. Plants vary much in capacity to resist heat, wetness, dryness, sunlight, and shade.

In making notes on hardiness, comparisons are valuable. Thus in every locality and with every fruit, it is common knowledge that some sorts are hardy and others less so or tender. A

statement that a new fruit does or does not equal an old and standard sort in this respect puts the matter in the clearest possible way before fruit-growers. In nearly every part of the country, lists showing the relative hardiness of common varieties of the several fruits may be obtained from one source or another, and from these fairly accurate comparisons can be made.

121. Fruit-bearing habits.—The fruit-bearing habits of the several cultivated fruits seem to be fixed, subject to some modification by pruning and other cultural treatment. Some varieties are productive, others less so, and some are unproductive. The age at which plants come in bearing is a marked characteristic of species and varieties, especially in pome-fruits. Wagener, Bismark, and Oldenburg, among apples, are examples of varieties that come in bearing in two or three years from setting or may even bear in the nursery row; Northern Spy and Sutton, on the other hand, often do not bear until set eight, ten or twelve years. These characters are of little worth in classifying but are of prime importance in gauging the value of a variety.

The biennial bearing habit in pomes has long been considered a varietal characteristic, but several reliable experimenters now seem to have proved that it is due to faulty nutrition whereby trees make too great vegetative growth. There can be no doubt, however, that some varieties have a hereditary habit of bearing biennially, others annually, and that there are other characteristic habits in bearing. Such habits are always noteworthy in descriptions.

122. Longevity.—Length of life is another constitutional character that must be noted. Species and varieties have different degrees of longevity. Baldwin, Northern Spy, and Winesap are long-lived apples; Rome Beauty, Wealthy, and Wagener are short-lived. These are true varietal differences due to nature and not to nurture and cannot be greatly changed by culture.

123. Natural resistance to disease and insect pests.—The degree of susceptibility to fungous diseases and insect pests is, in many fruits, a varietal difference which may be used in classifying, especially in grouping varieties. It is to the cultivator and plant-breeder, however, that knowledge of the behavior of varieties to pests is most valuable.

Entomologists and plant pathologists in any region can furnish lists of varieties showing comparative resistance in apples to codlin-moth, the aphids, San José scale, fire-blight, apple-scab, cedar-rust, bitter-rot, and crown-gall; pears show great varietal differences to the dreaded blight or to psylla; peaches to leaf-curl or brown-rot; plums to black-knot; or grapes to phylloxera and the mildews. These are but examples which can be extended in these and other fruits. Descriptions of fruits in every text or treatise, whether bulletin, catalogue, horticultural magazine, pomology, or even note-book should give this information.

124. The adaptation of varieties to different environments.—Varieties of all fruits differ widely among themselves in adaptation to a particular region, soil, or set of conditions. Thus, the the Winesap, Romanite, and Ben Davis groups of apples are preeminently well adapted to southern apple regions; the Fameuse, Blue Pearmain, and Baldwin groups to New York, New England, and Canada. It is hardly too much to say that every variety of every fruit has an ideal soil, climate, and method of culture. Some varieties of every fruit can be grown under more diverse conditions than others, in which case such adaptability becomes a valuable asset; the Baldwin apple, Bartlett pear, Elberta peach, Montmorency cherry, and Concord grape are examples of varieties of great adaptability to soil, climate, and care and thereby have attained the high place which they hold in the fruit-lists of this continent. So far as possible varietal likes and dislikes of all important environmental conditions must be set down in a description.

125. Permanency of varieties.—It is a common belief that varieties change for better or worse. It is thought, on the one hand, that varieties may become more desirable, or better adapted to conditions to which they were not at first suited; or, on the other hand they degenerate through unfavorable variations. As a corollary, some fruit-growers and nurserymen think that they can improve varieties by continuous selection of buds for propagation from trees showing favorable variations. However, the weight of scientific authority is against the theory that varieties propagated from cuttings, grafts or bud do or can be changed through the variations that appear in orchard plants.

Most of the evidence seems to show that heredity is complete in plants propagated from vegetative parts, and that fruit-growers may expect a variety grown under the same conditions to behave indefinitely as did the original plant. The variations which appear in varieties are for the most part due to environment and come and go with changes.

Whether or not varieties are permanent is most important to systematic pomologists. If plants are continually changing or being changed, the task of classification is much more difficult, if, indeed, such instability would not make it worthless. In systematic pomology there is conclusive proof that varieties are not changing except in the rare cases of bud-sports; thousands of varieties of fruits which have passed through many generations of vegetative propagation are today as they were at their time of origin.

126. Correlations.—Some of the organs of plants are so related to each other that a modification in the structure or function of one brings a change in another. Such phenomena are called *correlations*. The nature of these linkages of organs and functions is obscure, but their existence is important and a search for them is imperative to those who describe plants, as knowledge of correlations is most helpful to all who work to improve plants. Correlations are not common phenomena, but the occasional rewards to those who seek them make the search fascinating.

To illustrate the importance of correlations in pomology and plant-breeding a few examples may be given: Luxuriance of foliage and fruit-bearing are mutually antagonistic; high color of fruits in pomes and luxuriant foliage are antagonistic. Black or red color in Labrusca grapes is usually associated with a foxy odor and taste. Short bunches of fruit in all grapes are correlated with short joints in the canes. Varieties of peaches with glandless leaves are most susceptible to leaf mildew. The color of the inside of the calyx-cup of peaches is correlated with the color of the ripened fruits; varieties having calyx-cups with green inner surfaces bear white-fleshed peaches, orange inner surfaces, yellow-fleshed peaches. Reniform glands in peaches are correlated with crenate margins in the leaves; globose glands, with serrate-crenate glands.

According to Shaw, the form of the top of an apple-tree can be foretold from the leaf-angles on a one-year whip; if the angle is sharp, the top will be upright in growth; if broad, the top will be spreading. Shaw also says that varieties bearing green-fruited apples have leaves of a clear green color; leaves of red-fruited varieties are darker and have a purplish or bluish cast.

The leaves and especially the veins of yellow-fleshed peaches have a distinct tinge of yellow; those of white-fleshed peaches are green; of red-fleshed sorts red or reddish.

White-fruited Rotundifolia grapes are borne on plants which have white shoots, nodes, aerial roots and vines; black-fruited grapes of this species are produced on plants in which these organs are reddish. These are but examples and types of many correlations on record.

127. Variations caused by climate.—Fruits vary greatly in different climates, and account must be taken of these variations in all systematic work. Every climate has its own type of plants,—modifications by the environment. Cold climates reduce stature; shorten growths; intensify the colors of fruits; give richer and sweeter flavors; and cut short the growing season. Dry climates reduce the size and number of leaves; diminish growth in length; and develop aromatic flavors in fruits. The farther north, the shorter is the time between life events, as leafing and blooming. A variety is so different grown in New York, Virginia, Texas, Utah, and Oregon, that judged by its fruits it might easily be mistaken for five distinct varieties. Brought from these several states to one locality, trees and fruits snap back into the original variety with uniform characters. It is useless to try to propagate the type that develops in a new or peculiar climate; the modification lasts only as long as the plant remains in the strange environment.

128. Variations caused by soils.—As with climates, so with soils,—each distinctive soil or unusual condition of land brings about modifications in the plant and its product. In dry warm soils, the plant is short and stocky; comes in bearing early; the crop matures early; the fruits are highly colored; and the length of time the fruits will keep is shortened. In cool moist soils, plant and fruit take an opposite trend. In very rich

soils, especially those abundantly supplied with nitrogen, luxuriant growth is induced with diminished fruitfulness, and poorly colored fruits, although the size may be increased. These are general statements, to which there may be exceptions, and which affect different fruits in varying degrees, but they illustrate some of the kinds of variations that may be looked for in classifying fruits taken from different environments.

129. Variations caused by cultivation.—Used in its broad sense to include tillage, pruning, irrigation, fertilizing, spacing plants, thinning and all of the items of care which the cultivator gives his plants, cultivation is as provocative of variations in fruits as soil or climate. Apples grown in sod bear smaller redder fruits than those from cultivated trees. Under irrigation all fruit-plants produce larger fruits which are usually thought to be less richly flavored than those on land not irrigated. Bunch and berry of the grape are modified by the method of pruning the vine. In a study of varieties for classification, identification, or to determine value, the student must take into account the cultural treatment the plants have received.

130. Variations caused by stocks.—To propagate true to name cultivated fruit-trees are nearly always unions of two plants. The fruiting part develops from a graft or bud taken from a parent variety and is the *cion*. The stem or root upon which the cion develops is the *stock*. In the adjustments of stock and cion to each other there are reciprocal influences, which, especially in the case of the cion, must be considered by the systematist in pomology. The stock is found to influence the cion in several ways: It usually modifies the size of the cion; the adaptability of a variety to a soil is regulated by the stock; the relations of the variety to climate may be modified; age of bearing, productiveness, and other fruiting habits are influenced; the time of maturity may be changed; size, color and quality of fruit are usually influenced; some stocks shorten and others lengthen the life of the trees of which they are a part. These examples of variations caused by the stock make plain the necessity of knowledge about the stock upon which the tree and fruit to be classified were produced.

CHAPTER IX

METHODS OF WORK IN SYSTEMATIC POMOLOGY

Some consideration must be given to work in systematic pomology and methods of doing it. The material for laboratory work differs so widely in separate fruit regions, the courses in systematic pomology and the time given to them vary so greatly, that it seems unwise to offer directions for laboratory study, but such there must be and much of it if student or fruit-grower are to learn the principles and facts of systematic pomology sufficiently well to make them useful.

131. Materials for work in systematic pomology.—It is useless to attempt to study systematic pomology without living plants and their fruits. These living specimens must be studied in the scientific spirit; that is, with reference to the relationships of the different groups of fruits and to the structure of plant and fruit, as distinguished from informal nature-study on the one hand, or as to the value of the product for food on the other. Too often systematic pomology is concerned only with a commodity,—the product to the neglect of the plant. Fruits are often obtainable when the plants are not, but in this case the study is incomplete, for material is adequate only when plant and fruit are both at hand.

Museum specimens to the exclusion of fresh material are almost worthless, but a collection of wax models, if well made, especially if well colored, can be used to advantage in laboratory work in schools and colleges. Similarly, the descriptions and colored plates in a series of books on the apple, peach, pear, plum, cherry, and grape published by the New York Agricultural Experiment Station, in which nearly all of those fruits now grown in America are described and illustrated, furnish valuable supplemental material. For the study of leaf, twig, and flower characters, herbarium specimens are almost indispensable.

132. The requisites of a good description.—The first step in the study of a fruit is to make a written description of it. Descriptions are the foundation and framework of systematic pomology. No one can hope to see all of the varieties in any of the major fruits at one time and must, therefore, depend on his own or the descriptions of another in the work of classifying. A good description of plant and fruit, to one equipped to interpret it, is far more satisfactory than models or herbarium specimens which show but parts of what must be studied. There are no definite rules for making descriptions; individuality must have full play, and each worker must describe what he sees. However, some requisites to a good description can be set forth.

133. Two methods of describing fruit.—There are two methods of describing plants. In one, all prominent characters of the plant are described; in the other, for the most part, only the differential characters by which the plant is distinguished from its nearest relatives are depicted. In good descriptions there is always a combination in greater or less degree of the two methods, but one or the other predominates. In a botanical description it is a question whether the second method is not the better if combined with a terse general account of the plant as a whole, but in pomology every character of importance to the systematist or the cultivator must be described, for few who read pomological literature have the knowledge or training to estimate correctly plant differences which can be set forth only by one familiar with the whole field of systematic pomology.

134. The necessity of full descriptions.—In a full pomological description stem, branch, leaves, flowers, and fruit must be described. Insufficient characterization is the chief fault of systematic pomology. The need of fullness is more and more recognized; however, sometimes too much is written. Seldom, indeed, is it necessary to describe every aspect of a fruit, and a judicious selection of the characters must be made. Even when all important characters are to be described, much emphasis must be placed on the differential marks of the plant whereby it can be most easily distinguished from its nearest relatives. Finally, information must be given as to the origin, history, originator, range of the fruit, and a statement of where grown.

135. Descriptive blanks.—The labor of making descriptions is greatly lessened, and usually the result is better, if a formal outline is used. If many are to be made, a printed blank is very convenient. Those shown in this text have been found by the New York Agricultural Experiment Station, where many thousands of fruits have been described, to answer the requirements of full plant portraits. Modifications of particulars in these outlines may improve them for special purposes. There are many advantages in uniformity, and if pomologists would use similar descriptive forms and similar arrangement of material in their published accounts, comparisons would be made much more easily and would be much more accurate. Pomologists have much to learn from botanists in descriptive work,—indeed, thorough grounding in systematic botany is good training, almost indispensable, for the systematist in pomology.

In describing a fruit, the pomologist must use all the keenness of insight he possesses. After he publishes, he can never escape the responsibility for his work, which, especially in the case of new varieties, is of considerable magnitude. His descriptions will be estimated by their clearness, accuracy, and the use of differential characters. The beginner in descriptive work often makes the mistake of following too closely the printed form with the result that his description is a lifeless skeleton; to put life in this skeleton he must indicate the relative diagnostic importance of the characters, note important characteristics that may not appear in the outline, show relationships between the plant in hand and similar ones,—in a word, paint the truest picture possible of the plant he is describing.

136. Terminology of descriptive pomology.—The special terms pertaining to a science or art constitute its *terminology*. It is necessary that every science and art have a technical terminology to increase clearness and save space in descriptive discussions. One who does not know the terminology of pomology might take a large page to describe the Concord grape, while one versed in grape terminology could more clearly describe the fruit and plant in a quarter as much space. A good command of pomological and botanical terminology enables fruit-growers to use more sympathetic means of intercommunication among themselves and to work side by side with those

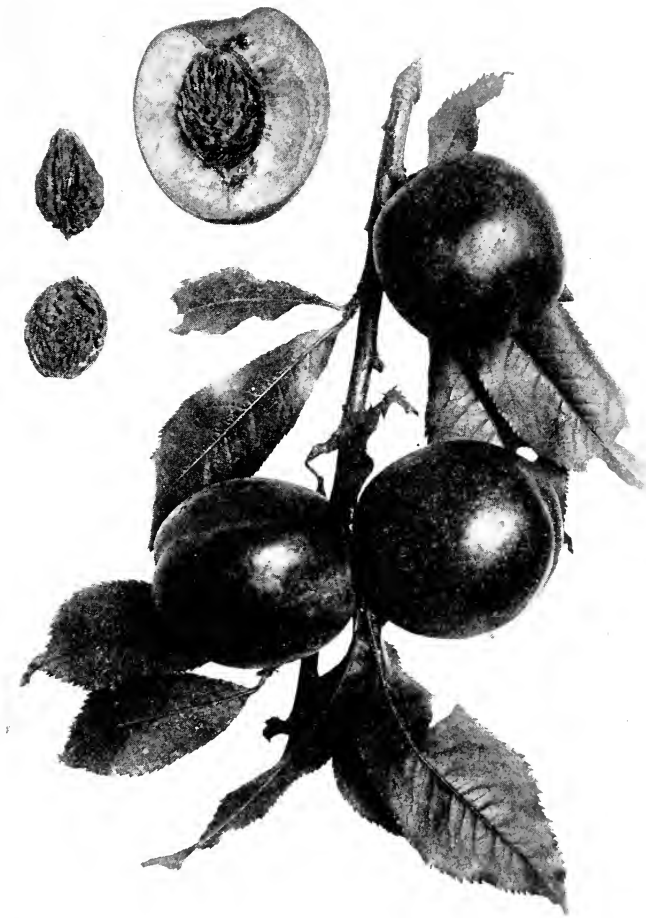

PLATE V. Nectarine—The Hunter.

interested in other studies of plants, for botany and pomology are always in close touch.

The pomologist must have thorough familiarity with the terminology of systematic botany, gained only by study and experience, to describe without doubts as to meanings of words and to choose the most accurate and illuminating terms. Even so, much that he sets down is but an expression of personal judgments and not records of exact facts. This must always be kept in mind in interpreting the descriptions of another. Is the quality good or best? Is the flavor tart or mild? Is a grape foxy or musky? Is a fruit large or very large? Is the bloom light or heavy? The answers are largely personal opinions which carry weight in accordance with the pomological reputation of the describer.

137. Pomological nomenclature.—Classification presupposes nomenclature. Names of plants are names of groups; to group is to classify; naming is classifying. Classification and nomenclature go together in systematic pomology, and are so intimately connected that neither subject can be considered alone. Some systematists seem to deal only with names, and thus have brought systematic work in the natural sciences in disrepute. Controversies over nomenclature there have always been and always will be, most of which arise from attempts to make hard and fast rules that will cover all cases, and because the rules of some codes are retroactive. These faults, when marked, instigate the making of new codes. In horticultural plants, also, the names of varieties have money value to introducers of novelties, so that rigid rules which are retroactive may cause serious financial loss. Unfortunately the nomenclature of pomology has never been governed by a code which the majority of pomologists would recognize.

In the United States by common consent pomologists in experiment stations and agricultural colleges have for many years used the codes of nomenclature adopted from time to time by the American Pomological Society. Nurserymen and fruitgrowers who follow any code also recognize that of the American Pomological Society as the authority, but many workers in the fruit industries are a law unto themselves in the matter of plant names with the result that there is much confusion in pomologi-

cal nomenclature. The following is the present code of the American Pomological Society.

CODE OF FRUIT NOMENCLATURE

American Pomological Society

This code aims to establish a simple and clear system of pomological nomenclature that shall be appropriate and stable. Accordingly it is urged that all persons naming new varieties of fruits choose simple one-word names that are fittingly expressive of some character, quality, place, person, or event associated with the source, time or place or origin of the variety.

The paramount right of the originator, discoverer, or introducer of a new variety to name it, within the limitations of this code, is recognized and established.

The term "kind" as herein used shall be understood to apply to those general classes of fruits which are grouped together in common usage without regard to their exact botanical relationship, as apple, cherry, grape, peach, plum, raspberry, etc.

I. Form of Names

1. Names of new varieties shall be of one word preferably, but two words may be accepted. Names of existing varieties shall not be changed in such way as to lead to confusion or loss of identity.

2. The spelling and pronunciation of a variety name shall be the same as that of the person, place, substance, circumstance, or quality from which it is derived.

3. A possessive noun shall not be used.

4. Initials should not be used as a part of a variety name.

5. A name shall not be formed by the compounding or hyphenating of two or more existing names, but this does not prohibit the formation of a one-word name by the use of parts of two or more existing names. The hyphen shall not be used between the words of a name. Thus, neither Bartlett-Seckel nor Bar-Seek may be used, but Barseek is admissible.

6. Such general terms as seedling, hybrid, beurre, damson, pippin, rare-ripe, bigarreau, should not be used.

7. A variety imported from a foreign country should retain its foreign name, subject only to such modification as is necessary to conform it to this code, and provided that names having a recognized English equivalent may be, but are not necessarily, so rendered.

8. The name of a person shall not be applied to a variety in his lifetime without his consent.

9. The name of a deceased person shall not be applied to a variety except through formal action by some competent pomological body, preferably that with which the deceased was most closely associated.

II. Priority, Usage and Duplication

10. The name first published for a variety shall be the accepted and recognized name except when contrary to the provisions of this code; but names established by usage in American pomological literature may be retained even though they do not conform to these rules.

11. A name once used shall not be used again for a variety of the same kind, except that a name once established through long usage for two or more American varieties shall not be displaced for either or radically modified unless a well-known synonym can be used in its place; or when no such synonym is available, the varieties bearing identical names may be distinguished by the addition of the name of the author who first described each, or by some other suitable distinguishing term.

III. Publication, Description and Citation

12. Publication consists in: (1) The public distribution of a printed name and description or characterization of the fruit; (2) the publication of a new name for a variety described elsewhere under a different name, number, or other untenable designation, the synonym being given.

13. Publication of a name may be made in any book, bulletin, report, trade catalogue or periodical of public distribution and bearing date of issue.

14. But a varietal name may be established by current usage in the locality of its origin, when well-known, and shall be considered as published and have precedence over a later printed name for the same variety.

15. Complete description of a variety consists of a detailed account of the characteristics of the plant, foliage, flowers, fruit, and habit of growth, so as to distinguish it from other varieties of similar appearance.

16. The type of a variety is the fruit of the original plant; and type descriptions or illustrations shall be made from material produced by the original plant, or when this is not available, from a plant as near as possible to the original in asexual reproduction, and preferably grown in the same pomological region.

17. The full citation of a variety name consists of the name of the author who first described the variety, and the name, page, and date of the publication in which the description first appeared. An author-citation following a name refers to the author of the original description of a variety: e.g., Turley, C.P.C. Names of authors and published works may be abbreviated, in accordance with the usages of this Society.

Adopted November 8, 1923, at the
New York meeting of the Society.

138. Fruit exhibits.—Wherever fruits are grown in commercial quantities or widely for home use, competitive exhibitions are held that varieties may be better evaluated. These exhibitions give pomologists opportunities to see new fruits, and

to identify, describe, classify, and make comparisons of the products of the orchard. Here, students in agricultural colleges and schools and professional pomologists gain technical perfection in the appraisement of varieties. The exercise of judging fruits at these exhibitions is in vogue in colleges and schools as a part or as a substitute for a course in systematic pomology. Excellent in itself, such fruit judging should not take the place of work covering a much wider field. The student in judging appraises but a few characters of the fruit, none of the tree, and has no opportunity to study the pomological and botanical relations of fruits. Fruit judging is excellent practice for persons who have completed a course in systematic pomology, but is a poor substitute.

In fruit exhibitions as now conducted the country over the standing of the displays entered are gauged by comparisons. Decisions are reached by deciding whether this fruit or this collection is better than that or than any number of other exhibits in the same class. The display which carries off the palm of merit is usually awarded a prize. Most experienced judges carry the comparisons they must make in the mind but some use a score-card, the footings on which determine where the prizes shall go. In student contests the score-card is indispensable, and those controlling exhibitions usually suggest or insist that the judges follow a particular score-card for the entries in their exhibit. Score-cards are many and almost as varied as the fruits and the regions in which fruit is grown, but the principle is the same in all, and it must suffice for this text to set it down and then give a typical example of the cards now in common use.

139. Score-cards for fruit exhibits.—A *score-card* is a tabulated form giving the chief features of a fruit, in which a number of points is stated for each, the total summing 100, or 1000 for perfection. The judge appraises the characters of the entries against the scale of perfection. Thus, as in the score-card printed in the next paragraph for a plate of apples or pears, form counts 15, size 15, color 25, uniformity 25, freedom from blemishes 20, total 100. The judge decides what rating a plate of fruit should have within the limits set for the five features named. The plate scoring the highest number of points

is awarded the prize. The Society for Horticultural Science recommends the following score-cards for use in the United States and Canada.

SCORE-CARDS FOR FRUITS

Single Plate Score-Cards for Fruit of a Given Variety

Apple and Pear

Form	15
Size	15
Color	20
Uniformity	20
Freedom from blemish	30
Total	100
Quality when scored	25

Peach and Cherry

Form	10
Size	20
Color	25
Uniformity	20
Freedom from blemish	25
Total	100
Quality when scored	25

Plum

Form	10
Size	25
Color	20
Uniformity	20
Freedom from blemish	25
Total	100
Quality when scored	25

Quince

Form	15
Size	20
Color	15
Uniformity	20
Freedom from blemish	30
Total	100

Grape

Form of bunch	10
Size of bunch	15
Size of berry	10
Color	10
Uniformity	10
Freedom from blemish	20
Quality	20
Firmness	5
Total	100

Collection of Fruits with Specified Number of Plates

Value of varieties for purpose stated	50
Condition of fruit (Average of individual plate score)	50
Total	100

Largest and Best Collection

Numbers of varieties	33 1/3
Value of varieties for purposes stated	33 1/3
Condition of fruit (Average of individual plate score)	33 1/3
Total	100

SCORE CARD FOR SWEEPSTAKES PRIZES

Or Other Competitions Between Different Varieties of Packed Fruit

Box		*Barrel*	
Texture and flavor	100	Texture and flavor	100
Value of variety	100	Value of variety	100
Size and form	100	Size and form	100
Color	120	Color	100
Uniformity	100	Uniformity	100
Freedom from blemishes	130	Freedom from blemishes	150
Total	650	Total	650

Box		*Barrel*	
Material	30	Staves	10
Marking	10	Hoops	10
Solidity (Mailing cleats, etc.)	10	Heads	10
		Nailing	20
		Marking	20
Total	50	Total	70

Box		*Barrel*	
Bulge or swell	100	Facing	80
Alignment	20	Tailing	50
Height of ends	60	Pressing	70
Compactness	80	Racking	80
Attractiveness and style of packing	40		
Total	300	Total	280
	1000		1000

For Barrels and Boxes of a Given Variety

Box		*Barrel*	
Texture and flavor	100	Texture and flavor	100
Size and form	100	Size and form	100
Color	150	Color	150
Uniformity	150	Uniformity	150
Freedom from blemishes	150	Freedom from blemishes	150
Total	650	Total	650

Box		*Barrel*	
Material	30	Staves	10
Marking	10	Hoops	10
Solidity (Nailing, cleats, etc.)	10	Heads	10
		Nailing	20
		Marking	20
Total	50	Total	70

Box		*Barrel*	
Bulge or swell	100	Facing	80
Alignment	20	Tailing	50
Height of ends	60	Pressing	70
Attractiveness and style	40	Racking	80
Compactness	80		
Total	300	Total	280
	1000		1000

Definition of Terms

Form in all cases refers to the normal type of the variety, region of growth considered.

Size. The most acceptable commercial size for the variety should be the ideal. This should be somewhat above the average size for the variety in regions where it is well grown. Extremely large size should be discouraged.

Color. In red, blushed or striped pomaceous fruits high clear color is desirable. In typically green or uncolored fruits a blush shall not be considered either favorably or otherwise. In drupaceous and vine fruits the highest color is the most acceptable.

Uniformity. This factor infers that all fruits shall be uniform in form, size and color.

Quality. When scored shall include texture, juiciness, flavor, aroma and any other characters that may give pleasure to the palate.

CHAPTER X

METHODS OF CLASSIFICATION

SYSTEMATIC botany, of which systematic pomology is a part, is concerned with naming, describing, and classifying plants in groups. The orderly arrangement of plants is *classification.* Several systems of classification have been in use, and others proposed, but the one which now meets with the approval of scientific workers has as its basis the theory of evolution. It is assumed for the foundation of this system that all plants have descended from a few original forms, or one form, and that the relationships of these descendants can be shown in classification. In this evolutionary scheme the most prominent and the most peculiar structures of the plants are considered with the view of grouping together those which are most similar in a number of structures, taking it for granted that plants nearest related to each other in descent will fall into the same group. This is the Natural System in contradistinction to Artificial Systems in which one structure, or set of structures, serves as a basis of grouping and in which there is no attempt to express relationships.

The groups employed in the Natural System of classification are :—

140. Individuals.—A single or particular plant as distinguished from a group is an *individual.* If the seeds of an apple are sown, several individual apple-trees may result, which, though never identical, are similar in root, branch, flower, and fruit. Seeds sown from apples grown on another tree bring forth similar plants, showing greater unlikeness from those of the first sowing than the offspring from the seeds from any one apple. Differences between trees become greater until eventually the unlikenesses become more apparent than the likenesses, and another group is proposed, as the pear, possibly, for one set of variants and the crab for another. Such groups, perhaps arti-

ficially and arbitrarily created to aid in classifying, are *species.* As the usual unit in botanical classification, this group must have more particular consideration.

141. Species.—A species is a continuing succession of like individuals. This definition seems to give species a permanency which they do not possess, and must be qualified by the statement that all species are derived from other species and from all may develop still other species. A species may not be a natural but a man-made group delimited from series of plants in the attempt to classify in accordance with the best light at the moment, but with the expectation that when more is known about the plants the groups called species may be reformed. The only object in making species is to group the plants on the earth so that those who work with them, whether agriculturist, forester or botanist, may do so more conveniently. The word *species* is either singular or plural.

142. Varieties.—Individuals in a species are assumed to show close similarity in all essential characters. No two of them, however, as has been said, are exactly alike. Variation is found in all species. When there are groups of variant forms in a species growing in the wild, such an assemblage is a *botanical variety;* or, and more particularly when the variation is well marked and certainly known to be hereditary, a *sub-species.* Thus, in *Prunus americana,* the American plum, a group is readily distinguished by the amount and character of pubescence on the leaves and is, therefore, set off as a botanical variety, *P. americana mollis,* the woolly-leaved plum. Classifiers often differ as to whether a certain group should be called a species or a variety. There is no way of settling the disputes. Usually the opinion is accepted of the man who is considered the best authority on the plants classified.

Those who cultivate plants use the name *variety* to distinguish seed and vegetative variations from botanical varieties, often to the confusion of those employing the terms. Strongly marked variations of farm and garden crops coming true to seed are *seed varieties.* Sorts of onions, peas, beans, wheat, corn, or clover are listed in seedsmen's catalogues as varieties. These seed varieties are commonly annuals or sometimes biennials.

The sorts of tree, bush, vine, and small-fruits, as well as many

tuberous-rooted plants, of which the potato and dahlia are examples, do not as a rule come true to seed but are propagated by division of vegetative parts,—from cuttings, cions, buds, offsets, bulbs, and tubers,—and are hence called *vegetative varieties.* Differences between vegetative varieties seem to be permanent through long series of generations. Heredity is apparently complete in vegetative varieties, except in the rare cases of bud-variations which on trial prove to come true as the nectarine from the peach.

Varieties are the units in the classification of fruits just as species are in botanical classification, with the advantage for varieties that they are far less variable and do not shade off from one form into another as do many species. Nearly all varieties of fruits come from seeds, but rarely they arise as mutations from buds, in which case they are called *bud-varieties;* or more commonly among pomologists they are known as *sports,* which is not so precise a term, as the latter may arise from seeds as well as buds.

143. Genera.—Just as individuals may be grouped in species, so the latter may be put into more comprehensive assemblages. Groups of closely related species form *genera.* Species are commonly brought together in a genus in accordance with similarities in the form, arrangement, and number of parts of the flower and fruit. The peach and common plum belong to distinct species and differ from each other markedly in tree, leaf, fruit, and in the size and color of their flowers, but the form, arrangement, and number of parts of their flowers are so nearly alike that the two species are put in the same genus by most botanists. In some genera there are many species, in others few, and still others are represented by only a single species.

144. Orders, classes, and divisions of plants.—There are still greater groups, more comprehensive assemblages, than genera. Just as species are grouped into genera, genera in turn are brought together in *orders* or *families.* In English parlance *family* is preferred, as Family Rosaceæ; popularly, a botanist would write the Rose Family. Orders having characters in common are assembled into *Classes,* and when classes have distinctive characters that are similar they are finally grouped into *Divisions.*

These several assemblages may be subdivided into *sub-species, sub-genera, sub-orders, sub-classes,* and *sub-divisions.*

145. Botanical names of plants.—The formal or scientific name of a plant consists of two Latin words, the first that of the genus and the second that of the species to which the plant belongs. Thus, *Prunus* is the name of the genus to which all plums belong; *Prunus domestica* is the common plum from Europe, and *P. americana* of a conspicuous native plum. All botanical names are Latinized; those of genera are of one word, a substantive; those of species also one word, commonly an adjective, which must agree with the generic name in grammatical form. The names of botanical varieties, always modifiers, follow the specific names, until recently with the prefix *var.* but now frequently without; as *Prunus americana mollis.* This system of nomenclature is in use by all biologists and is called the *Binomial System,* although in botanical varieties the name is a trinomial, particularly when written without the intermediate *var.*

146. Publication and priority.—Botanists record new species in some recognized text or periodical, and as the same species is often named differently by separate persons, to prevent confusion the one who names and describes a new species has his name or an abbreviation of it affixed to the Latin binomial; as, *Prunus americana,* Marsh., a botanist by the name of Marshall having first described this plum. In monographs of species and similar formal texts it is usual to cite the book, the volume, page, and date of printing showing where and when a species was first described.

147. Pomological names of varieties are seldom Latinized and usually consist of one or two names which commonly record a character of the plant or commemorate a person or place; as, Yellow Transparent, Bartlett, Concord. Rules governing the publication of descriptions and names of pomological varieties are given in the code of nomenclature of the American Pomological Society on page 92. These rules are not as well standardized nor so well recognized by workers in pomology as those in use by botanists, but they are being adopted more and more to the great profit of pomology and the industries that have to do with it.

148. The importance of Latin binomial names.—Practical workers in agriculture and horticulture are sometimes contemptuous of Latin names under the belief that they are needlessly pedantic. There are, however, several advantages in Latin binomials as plant names. Species often have many common names to the great confusion of those who seek to know them; there can be but one accepted binomial name. It is best that the name be Latinized as Latin has for centuries been the commonest language used by botanists and other biologists. The Latin name is, therefore, most common to many different languages.

There is a third great advantage in the specific name in the binomial; it is usually descriptive and so imparts information. The specific name may describe some character; as *Prunus pumila* (dwarf plum). It may indicate distribution of the species; as *P. americana* (American plum). It may show what a former generic name was; as *P. Mahaleb* (Mahaleb cherry); or it may commemorate the name of a friend or fellow worker as in *P. Munsoniana* (Munson's plum). Very often the name suggests the habitat of a species as *P. maritima* (seaside plum).

CHAPTER XI

THE ORDER ROSACEÆ

Four important groups of commonly grown fruits belong to the Order Rosaceæ. These are the pome-fruits, represented by the apple, pear, and quince; the drupe-fruits, to which belong the apricot, cherry, nectarine, peach, and plum; the brambles, which include many species of blackberries, dewberries, and raspberries; and strawberries.

149. Characters of Rosaceæ.—The plants in the Rose Family are trees, shrubs, or herbs, often thorny and sometimes climbing or trailing, as in the dewberries and blackberries. The leaves in all the pomological plants are alternate, and either simple as in the pome- and drupe-fruits, or compound as in some brambles and the strawberry, and with stipules in all. There are several kinds of flower-clusters in the Family, as will be seen in the description of genera, the many different sorts of inflorescences being one of the peculiarities of Rosaceæ. The flowers are regular and perfect in all the cultivated fruits excepting the strawberry in some of which there are imperfect flowers. There are five sepals in the calyx, united at the base, and as many petals which are distinct and inserted with the stamens on the edge of a disk which lines the calyx-tube. The stamens are numerous. The carpels are one to many, separate and superior, or united and inferior. The ovaries bear one to many ovules. The fruits of pomological plants are pomes, drupes, or achenes.

It is interesting that, while there is no plant of importance to the farmer as a fodder crop or as a vegetable, by far the most valuable edible fruits for the temperate zones belong to Rosaceæ. The fruits in this Order encircle the earth in the cultivated parts of temperate climates.

There are about 90 genera and 1500 species in Rosaceæ, which authors variously divide into six to ten tribes with a tendency on the part of some modern botanists to make each of these tribes

a family. Pomologists are concerned with but four of these tribes.

150. Tribe Pomæ, the pome-fruits.—The pomaceous plants in the Rose Family are distinguished by flowers with few carpels, mostly two to five, usually firmly united, and borne within an urn-like depression in the enlarged summit of the flower-stem with which it is also united, the whole forming a fleshy fruit. All of the pome-fruits are trees or shrubs with small deciduous stipules which are free from the petiole.

There are twenty to thirty genera with several hundred species of wide geographical distribution mostly in the north temperate zone. Of these but two genera are of great importance in fruit-growing: namely, Pyrus, to which belong apples and pears; and Cydonia, the quince. Four other genera are of lesser importance; Mespilus, the medlar; Eriobotrya, the loquat; Chænomeles, the Japanese quince; and Amelanchier, the juneberry. The fruits of Crataegus, the hawthorns or thorn-apples, allied to medlars in the structure of the fruit, are edible, and several species offer possibilities for domestication, but none is now cultivated in North America.

KEY TO CULTIVATED GENERA OF POMACEÆ

Mature carpels bony.....*Crataegus* (hawthorns and thorn-apples)
Mature carpels papery or leathery.
  Pome with open top.....*Mespilus* (medlar)
  Pome with closed top.
    Ovules one in each cavity.....*Amelanchier* (juneberry)
    Ovules usually two in each carpel.
      Leaves deciduous.....*Pyrus* (apple and pear).
      Leaves persistent.....*Eriobotrya* (loquat).
    Ovules many in each carpel.....*Cydonia* (Quince).

151. Tribe Pruneæ, the drupe-fruits.—In this tribe the ovary is superior and is not inclosed in the calyx-tube at maturity. The pistil becomes at maturity a drupe- or stone-fruit. The style is terminal. The plants are trees or shrubs, with alternate petioled mostly serrate leaves. The bark of all the representatives of these drupe-fruits exudes a gum, and bark, leaves, and seeds are very bitter and mostly contain small quantities of prussic acid, sufficient in the leaves to poison animals occasionally. There is but one genus, Prunus, to which

belong almonds, apricots, cherries, nectarines, peaches and plums, of which some forty odd species are more or less cultivated, an assemblage of natural esculents probably unsurpassed by any other genus in variety and value of its products. Most of the drupe-fruits are natives of the north temperate zone. Some botanists divide the genus Prunus into several genera.

152. Tribe Rubeæ, the brambles.—In this division of Rosaceæ the pistils are several or numerous and become drupelets at maturity. While there are two ovules, the seed is usually solitary, one ovule aborting. The plants are perennials or in a few species soft-wooded biennials. The plants are erect, decumbent, trailing, or in one or two species climbing, and, with but few exceptions, thorny or prickly. Only one genus, Rubus, is put in this division of Rosaceæ, but here belong blackberries, dewberries, and raspberries, and several less well-known sorts, which pass under the general name of brambles, the fruits of which are called berries, although they are not true berries but aggregations of drupelets. The brambles are of wide geographical distribution, most of which, however, are in the north temperate zone.

153. Tribe Potentilleæ, to which belongs the strawberry.—The members of this tribe differ widely from the three other divisions of Rosaceæ in which fruit-growers are interested. The carpels are many and ripen into dry achenes which are not inclosed at maturity. Of the several genera commonly put in the tribe, pomologists are interestsd in but one, Fragaria, the strawberry, which is separated from the other plants in the group by its pulpy and much enlarged receptacle. The differences between the low herbaceous strawberry and the pomes, drupes, and brambles in plant and fruit would seem to separate the genera to which they belong so widely as to put Fragaria in quite another division of the plant kingdom, but the similarities in the structure of the flowers bring them all into Rosaceæ.

CHAPTER XII

THE POME-FRUITS

THE older botanists placed the apple, pear, quince, medlar, and juneberry in one genus, Pyrus. Most botanists now, however, put these several fruits in distinct genera somewhat in accordance with their common names. There is still, however, great diversity of opinion as to what plants should be placed in Pyrus, particularly as to whether the apple and pear should be in one or two genera. Both are here kept in Pyrus under the belief that the differences are not sufficiently marked to justify placing them farther apart than in two sections of one genus. The quince belongs to Cydonia; the medlar to Mespilus; the loquat to Eriobotrya; and the juneberry to Amelanchier.

154. The genus Pyrus.—Pyrus is the Latin name of the pear-tree. This genus of many diverse plants contains from fifty to sixty species widely scattered throughout the north temperate zone, most of them in south-central and eastern Asia. In North America the genus is represented by five species, while eight or nine are wild in Europe.

Woody plants, trees or shrubs, with smooth or scaly bark. Leaves simple, or sometimes lobed, alternate, usually serrate, deciduous with deciduous stipules which are free from the petiole. Flowers perfect, regular, borne in compound terminal cymes; torus urn-shaped, adnate to the ovary and inclosing it with thick succulent flesh at maturity; calyx-lobes 5, acuminate and reflexed, persistent in some and deciduous in other species; petals 5, white, pink or red, inserted on the thickened border of the disk; stamens 15-20, in three rows; styles 2-5, free or united below; carpels 2-5, inferior, crowned by the styles, usually 2-seeded. Fruit an ovoid, oblate, or pyriform pome; seeds 2 in each cell, brown or brownish, lustrous, mucilaginous on the outer surface.

155. The apple distinguished from the pear.—In the orchard or in the market the apple and pear are easily distinguished in tree or fruit, but there are outlying species and varieties so

similar that one cannot tell at a glance which of the two fruits they may be. Some or all of the following characters distinguish apples from pears:

The *trunk* of the apple-tree is shorter and sturdier than that of the pear, and the bark sheds in irregular scales or plates detached at both ends, while the bark of an old pear-tree is checked in squares which do not curl at the ends in shedding. The *leaves* are usually very different but it is impossible to make generalizations that will hold for all species and varieties of the two fruits. The *flowers* of apples are red, pink, rose-color, and sometimes white and borne in fasicles; those of the pear are white and borne in corymbs. The *ovary* in the apple is three- to five-celled; that of the pear, five-celled. The *styles* in the apple flower are more or less united at the base; those of the pear flower are usually free. The apple *fruit* is more or less globular with a distinct depression at both ends; that of the pear is usually pyriform, sometimes subglobose, and is more often than otherwise conical at the base. The *flesh* of the apple is without grit-cells; that of the pear has grit-cells, especially when ripened on the tree.

The Apple

The true apple is the fruit of *Pyrus Malus,* but the name *apple* is applied to thirty or more species if the crab-apple is included. Apple is also a part of the name of many other edible fruits, as may-apple and rose-apple. Of the thirty species of Pyrus that properly pass as apples, only two are prominent pomological subjects, as all of the others remain wild or are cultivated in a small way for fruit or flower. The two species with which fruit-growers are chiefly concerned are *P. Malus,* from which comes most of the varieties of the common apple, and *P. baccata,* parent of most of the very small cultivated crab-apples. There are many hybrids of these two species under cultivation of which the large-fruited crab-apples, as Hyslop, Florence, and Excelsior are examples.

156. The common apple and the crab-apple distinguished.— The fruit-grower distinguishes between the common and crab-apples by the size, shape, flesh, and flavor of the fruits, but there are many hybrids and varieties in which it cannot always be told

whether characters of *P. Malus* or those of *P. baccata* predominate. Trees and leaves are fairly but not always distinct in the two species, but there is one character of the fruit which always separates the species: The calyx persists on the ripened fruit of the common apple; it falls from the ripe fruit of the true crab-apple, *P. baccata*.

157. Pyrus Malus, the common apple, described.—The systematist is saved much confusion in studying types if he has before him the botanical characters of the species to which cultivated varieties are referred by different botanists. This is particularly true of the apple, since several species and several botanical varieties are given by different authors as the wild form from which the domesticated sorts have sprung. The characters of the species in which the common apple is put in this text are given, therefore, in detail.

1. *Pyrus Malus*, Linn. (Plate I) Plant a large bush or a tree attaining a height of 60-70 feet with a trunk 1-2 feet in diameter which divides into stout spreading branches forming a round open head; bark separating into large, thick, ashy-brown persistent scales; branchlets and twigs glabrous or slightly pubescent, usually bright red-brown and dotted with scattered conspicuous lenticels. Leaves oval, ovate or orbicular-ovate, usually pointed at the apex, rounded or truncate at the base, with serrate margins, dull in color, soft in texture, borne on stout petioles. Flowers large, white, pink or red, borne in close terminal cymose clusters on short pedicels; appearing with the leaves; calyx-lobes 5, acuminate; petals 5, inserted, remotely contracted into narrow claws, usually pink. Fruit exceedingly variable in size, shape, color, flavor and time of ripening, with a cavity about the stem, the calyx persistent and set in a well-marked basin; flesh thick, succulent and homogeneous. Seeds brownish, glossy, mucilaginous, usually two in each of the five carpels forming the core.

158. Habitat and history of the apple.—*P. Malus* has been known as a wild plant in temperate Europe and Asia throughout historic times, but unquestionably its fruits were used long before history began, and no doubt also the plants were distributed by the prehistoric dwellers in the two continents. Students of the origin of cultivated plants now think the species to be indigenous in the northwestern Himalayas, where there are vast forests of wild apples ascending the mountains to a height of nine to ten thousand feet in regions to which man could hardly have introduced the plant.

The apple has been cultivated from remote times in India, Cashmere, and northern China. Carbonized apples are found in the ancient lake habitations of Switzerland, showing that they must have been known in Europe by prehistoric peoples. The apple is mentioned by the earliest writers on agriculture in China, India, Greece, Italy, France, Germany, and England. It was introduced by the first colonists in all temperate parts of the New World. It is now the most valuable fruit-plant of the temperate regions of the world, and by selection and hybridization several thousand varieties have been obtained.

159. Distribution of apples in North America.—Apples may be grown in every part of North America where general agriculture is an industry, excepting subtropical parts of the Gulf States and California. In all of this vast territory they are the commonest fruits of farms and gardens. Apple-growing as an industry is much more localized. Commercial plantations of this fruit are found in numbers that constitute an industry only in about half the states of the Union and less than half of the provinces of Canada. The apple is of most importance, commercially, in North America in Virginia, Pennsylvania, New York, the New England states, Nova Scotia, Ontario, Michigan, Ohio, Illinois, Missouri, the northern states in the Rocky Mountains, British Columbia, Washington, Oregon and in some parts of California.

160. Botanical varieties of Pyrus Malus.—Possibly the cultivated varieties came from two original species; some of the Russian apples seem distinct enough to constitute a distinct species. Varieties have been so fused by hybridization that it is now impossible to separate them into species, although some authors attempt to do so. Others divide *P. Malus* into botanical varieties. Most of these are groups of ornamental plants, but three are recognized which are of interest to pomological students. These are:

Var. *sylvestris*, Linn. This variety is characterized by trees with glabrous shoots and leaves whereas those in the type species are pubescent; the calyx-lobes are glabrous outside but pubescent within. The habitat of the variety is west and central Europe. The distinction between this variety and the species would be hardly worth making, were it not that some European botanists give it the rank of a species and refer most or all of the pomological varieties to it.

Var. *pumila*, Henry. To this botanical variety, described as a species by some authors, most of the cultivated apples are now referred by the leading authorities on Pyrus. The trees are large or small, sometimes bush-like, with the young branches, pedicels, calyx tube, both surfaces of the calyx-lobes and the under surface of the leaves prominently tomentose. The Paradise and Doucin apples, used as dwarfing stocks, are probably dwarf forms of Var. *pumila*. This botanical variety is native to south-eastern Europe and western Asia, although found wild as an escape wherever the apple is cultivated.

Var. *astracanica*, Loud. It is probable that several pomological varieties belong to this botanical variety, which is characterized by large coarsely serrate or double serrate leaves, tomentose beneath, and by the long pedicels; it is a native of Asia, and it is probable that the Russian sorts of apples belong here or are hybrids between it and one of the other two botanical varieties.

161. Strains of varieties.—A group of plants within a variety which differs from the type in one or at most by but a few characters, is a *strain*. Usually a strain retains the varietal name with a modifying word; as, Red Spy, Collamer Twenty Ounce, and Bank Gravenstein, all red-fruited strains of three well-known apples. These strains are all improvements on the parents, for while they answer the same purposes and are adapted to the same fruit regions, they sell better in the markets because of their brighter color. Many real strains have no greater, if as great, value as the parent variety; as, Russet Baldwin and Russet Bartlett.

The strains now recognized in American apple orchards are bud-mutations—that is, they originated from a bud of the parent variety. No strains are on record as having been produced by continuous bud selection. Color of fruit seems to be the only character mutating from which strains have been selected. Out of about 1200 varieties grown by the New York Agricultural Experiment Station in the last thirty years, eight are strains which have originated as bud-mutations.

Many strains are not real but fanciful and were introduced without the originator having taken the trouble to prove whether the supposed mutation would come true. His fancied strain was a variation which appeared and disappeared in an individual tree. Such strains are usually sent out with the word "Improved" before the varietal name; Improved Wagener, Improved Rome, Improved Vandevere and so on. Twenty

PLATE VI. Two choice plums.—Drop d'Or at left, one of the Institia plums. Reine Claude at right.

apples with the modifier "Improved" prefixed have been tested under the eyes of the writer in the past few years, every one of which was literally a "chip of the old block"—not a whit different. Usually they have been sent out with what the introducer calls a "pedigree," with the statement that the improved strain was produced through selection.

162. The classification of varieties of apples.—The first formal attempt to classify apples was made by Valerius Cordus, a German, nearly 400 years ago. Cordus died in 1542, although his *History of Plants,* in which appeared his discussions of varieties of fruits, was not printed until 1561. Many attempts at a classification of apples followed in Germany, chief of which are those of Jonston in 1668, Manger 1780, Diel 1792, and Diel-Lucas 1856. Only two Americans have published classifications worth noting; namely, Thomas, 1849; and Warder, 1867. Two good classifications have also come from England, those of Hogg 1876, and of Bunyard 1920. Besides these major classifications there are many minor ones printed and in manuscript—probably most of the men who have studied varieties of apples have attempted some sort of classification.

All classifications of varieties of apples prove more or less serviceable, but none has been sufficiently satisfactory to assure either permanence or wide use. After recurring periods of studying and using the several systems of classifications of apples, and many attempts to improve them, the writer is forced to the conclusion that a comprehensive classification of all apples for all regions is quite impossible. Tree and fruit are so variable under different conditions, and many varieties are so similar, that distinctions of general application cannot be made. This failure in classification of varieties is the great hindrance to systematic work with cultivated apples. It can be overcome only by having a classification for apple regions of comparatively small territory throughout which varieties are approximately the same in tree and fruit.

In pomologies containing many varieties in many regions, one may choose between two rather unsatisfactory arrangements of varieties. One may arrange them alphabetically as did Downing in his *Fruits and Fruit Trees of America,* and as did the present writer in his *Cyclopedia of Hardy Fruits;* or in a few arbitrary

divisions as did Thomas in his *American Fruit Culturist;* in the latter case one may use a more or less artificial key as in the present text. The key should help the reader with an unknown apple in hand to determine the variety by reading the descriptions of only a few instead of all varieties as he might have to do when they are arranged alphabetically.

The following description blank for the apple sets forth most of the characters students and fruit-growers will use in describing pome fruits.

DESCRIPTION BLANK FOR THE APPLE

Name..... Orchard..... Row..... No....

Date..... 19..

Tree

Large, medium, small
Vigorous, medium, weak
Upright, spreading, drooping
Tall, low, dense
Open, vase-formed, round-topped
Slow growing, rapid growing
Hardy, half-hardy, tender
Very productive, productive
Medium, productive, unproductive
Regular bearer, uncertain bearer

TRUNK
Stocky, medium, slender
Smooth, medium, shaggy

BRANCHES
Thick, medium, slender
Smooth, medium
Shaggy, zigzag
Red, brown, gray, green

Lenticels
Numerous, medium, few
Large, medium, small

LEAVES
Length..... Width.....
Large, medium, small
Wide, medium, narrow
Long, medium, short
Oval, ovate, obovate
Abruptly pointed, taper-pointed
Thick, medium, thin
Light, medium, dark green
Smooth, rugose

Margin
Glandular, crenate
Finely serrate, coarsely serrate

Petiole, length .....
Long, medium, short
Thick, medium, slender

FLOWERS
Date of bloom .....
Early, medium, late
Large, medium, small
White, pink
Fertile or sterile

Fruit

DATE OF RIPENING .....
LENGTH OF SEASON .....
HANGS WELL OR DROPS .....
Large, medium, small
Uniform, variable
Roundish, oblate, conical
Ovate, oblong, truncate
Oblique, ribbed, irregular
Symmetrical, sides unequal
Uniform

STEM
Long, medium, short
Thick, medium, slender

CAVITY
Obtuse, acute, acuminate
Shallow, medium, deep
Narrow, medium, broad
Russeted, smooth
Symmetrical, furrowed
Compressed, lipped

CALYX
Open, closed
Large, medium, small

Lobes
Separated at base
Long, medium, short
Broad, medium, narrow
Obtuse, acute, acuminate

Fruit, continued

BASIN
Shallow, medium, deep
Narrow, medium, wide
Obtuse, abrupt, smooth
Furrowed, corrugated
Symmetrical, compressed

SKIN
Thick, medium, thin
Smooth, rough
Russet, waxen
Glossy, dull, bloom

COLOR .....
.....

DOTS
Numerous, medium, few
Large, medium, small
Gray, russet
Submerged, areolar

FLESH
White, yellow, red
Firm, coarse, medium, fine
Crisp, tender, tough
Dry, juicy, sweet, subacid
Sour, aromatic, sprightly

QUALITY
Best, very good, good
Fair, poor, very poor

CORE
Large, medium, small
Open, closed
Axile, abaxile

CORE-LINES
Clasping, meeting

CALYX-TUBE
Long, medium, narrow
Wide, medium, narrow
Funnel-shaped, conical, urn-shaped

SEED
Large, medium, small
Flat, plump, obtuse
Acute, acuminate, tufted

USE—Dessert, kitchen, market, home

Remarks .....
.....

THE CRAB-APPLE

Originally any small apple was called a crab-apple and that use of the word still persists in England. In America, however, the name is employed for any of several species of apples having small fruits, which have long petioles, a bitterish acid taste, and which are used chiefly for jellies and preserves. In the species from which most of our cultivated crab-apples come, *P. baccata*, the calyx is deciduous but it is persistent on all of the native species. Some of the species of crab-apples have been hybridized with the common apple, and the offspring sometimes fall in with the large apples, sometimes with the smaller crab-apples. Thus, Wealthy is supposed to be a hybrid with a crab, and, as noted before (p. 107), Martha, Hyslop and several other of the best crab-apples are undoubtedly hybrids. One wonders why the name "crab" is applied to an apple; there seems to be no very satisfactory explanation of its applicability, although it is probably used in reference to the roughness and harshness of flavor—a "crabbed apple" in much the same sense one speaks of a "crabbed man."

163. Pyrus baccata, the crab-apple, described.—Proceeding now to the crab-apple of American pomologists, it seems safe to say that all the varieties of this fruit of present commercial importance belong to *P. baccata* or are hybrids with this species and *P. Malus*. In either case they are often called *Siberian crabs*, although this name belongs more properly to pure-bred varieties of *P. baccata*.

2. *Pyrus baccata*, Linn. Plant a small round-headed tree attaining a height of 30-40 feet, with a trunk 10-12 inches in diameter, which divides into many rather slender branches forming a compact head; vigorous, hardy and productive; wood hard and tough, bark much less rough and tree smoother in all of its parts than in the common apple. Leaves ovate, ovate-lanceolate or ovate-acuminate, thin, glabrous, bright green; petioles slender; margins finely and evenly serrate. Flowers large, white, very fragrant, handsome; appearing with the leaves; pedicels very slender, greenish; style usually longer than the stamens, glabrous or lightly pubescent, calyx-lobes long, narrow acuminate; calyx falling away before maturity. Fruit from ½-1 inch in diameter, yellow or red; borne on long and slender stems; basin shallow or none, often wrinkled or having mammiform protuberances; flesh yellow, very firm, subacid, astringent, translucent. Seeds small, short, wide, obtuse, dark brown.

164. Botanical varieties of crab-apples.—There are several botanical forms of *P. baccata*, but to which of these the cultivated crab-apples belong students of the species do not agree. No doubt, there are a number of wild hybrids, as there certainly are of domesticated ones. Among these botanical varieties are twenty or more oriental flowering crab-apples, some of which have been more or less cultivated for their edible fruits, or used as stocks for the common apple in China and Japan. Several of these Asiatic crab-apples are promising, also, for hybridization with the common apple and the Siberian crab.

165. Habitat and history of the crab-apple.—The crab-apple probably came originally from Siberia, northern China, and Manchuria but has been cultivated for its fruit and flowers in China and Japan from time immemorial. The species and some of its botanical varieties were early introduced into Europe, although little grown there until the last century for its fruit. While they may have come earlier as ornamentals, these crabs seem not to have been mentioned as fruit-trees in America until toward the close of the eighteenth century. Since nurserymen

did not list crab-apples until toward the middle of the nineteenth century, this fruit must be considered as a newcomer in this country.

166. The place of crab-apples in American pomology.—Hybrid and pure-bred crab-apples, cultivated for their fruits, number some twenty odd, with probably quite as many more varieties grown in this country as named ornamentals. These crab-apples are the hardiest of the tree-fruits, grow with great rapidity, thrive in many soils, and bear year after year with increasing abundance. They are most valuable additions to the apple flora of America, and particularly, because of great hardiness, promise much for cold regions. The species does not thrive as well as might be wished in southern apple regions, where its usefulness is also much curtailed by its susceptibility to fire-blight. Crab-apple trees are used in all cold climates as stocks upon which to graft the common apple, for which purpose they are in most respects very desirable. The fruits are much used in jellies, preserves, and ciders. No attempts have been made to classify the few varieties, although a rough guide to their identification is offered in the key to varieties in Chapter XX.

167. Native crab-apples.—Five species of native crab-apples grow in northern America. None of these is of sufficient merit to recommend for regions in which the common apple grows, but one, the Soulard crab, *P. Soulardi*, Bailey, probably a natural hybrid between *P. Malus* and *P. ioensis*, is grown in the upper Mississippi Valley where only trees of great hardiness withstand the cold. A typical variety of this species is described as the Soulard crab by botanists. There is some promise of further amalgamation of the common apple and the native crab-apples to secure greater hardiness of tree and longer keeping qualities of the fruit. At present, however, consideration of native crabs belongs to botany rather than pomology.

The Pear

Nearly all of the innumerable pears belong to *P. communis*, of which probably more than 5,000 cultivated sorts have been named. In the author's *The Pears of New York* about 3,000 varieties are described, of which all but a score or thereabouts belong to this species, the small number remaining being a part

of *P. serotina*, the Chinese Sand pear, or hybrids between the two species, of which the well-known Kieffer is a typical one. A third species, *P. nivalis*, the Snow pear, is grown sparingly in Europe for cider but is not cultivated for its fruits in America, nor does it seem to have sufficient value to warrant its introduction to the pomology of the country. Some European pomologists think that *P. nivalis* is a hybrid parent of several pears cultivated in European orchards as varieties of *P. communis*.

168. Pyrus communis, the pear, described.—The two species of pears in which pomologists are interested are so well differentiated in their botanical characters that varieties of both may be recognized without difficulty when the salient characteristics of the species are known.

3. *Pyrus communis*, Linn. (Plate II). A vigorous upright tree attaining a height of 80 feet and a diameter of 4 feet, usually with an oblong or pyramidal and rather compact top; bark on old trees rough with rather large persistent scales. Leaves 2-4 inches long, 1-2 inches wide, oblong-ovate, thin, hard and veiny; upper surface dark green, glabrous; lower surface light green, glabrous; apex acuminate; margin, crenate-serrate or entire, never setose-serrate; petiole 1-2 inches long, becoming glabrous. Flowers 1-2 inches across, white, appearing with the leaves, borne in 4-12 umbel-like clusters on slender pedicels; calyx persistent or rarely deciduous; stamens 15-20. Fruit exceedingly variable under cultivation, usually pyriform, sometimes round-conic, turbinate or occasionally round-oblate; green, yellow, red or russet, or combinations of these colors; flesh of fruits ripening on the tree with few or many grit-cells. Seeds 1-3 in a cell, sometimes abortive or wanting, large, brown or brownish, often tufted at the tips.

Pomologists classify European, as distinguished from Asiatic pears, under this type species. Botanists, however, describe several botanical varieties into which they would put some of the orchard pears, but for the purposes of pomological classification the species may as well be kept intact.

169. Habitat and history of the European pear.—*Pyrus communis* now grows naturally in all but the coldest and warmest parts of Europe and Asia. It probably came originally from the Caucasian countries and northern Persia, where, in elevated regions, there are now forests of wild pears; or, possibly, the original center of distribution was in Cashmere and the northwestern Himalayas, where there are also pear forests. The tree

grows spontaneously as an escape from orchards in nearly all regions where the pear is generally cultivated, but sparingly in North America, because kept down by pear-blight.

The common pear has been cultivated from time immemorial. The ancient Greeks had several varieties; Pliny, the Roman naturalist, describes forty-one. The pear is mentioned in France, Germany, and Great Britain almost with the first written records of agriculture, and it came to America with the earliest permanent settlers in the eastern states. The French brought the pear to Canada and Michigan, and pear-trees said to be two hundred years old are yet standing about mission sites of the French along the St. Lawrence and the Great Lakes to Detroit, Michigan.

Pear-growing began in America as an avocation for men of means. Its period of greatest activity was early in the nineteenth century and passed before the close of the century, during most of which time the pear was the center of interest in American fruit circles. In the first half of the last century many new varieties of pears were introduced from Europe, and a considerable number originated on this side of the Atlantic. In 1859, T. W. Field in his *Pear Culture* gave a list of 854 pears, of which 686 originated in Europe and 168 in America.

For many years past, however, the pear, in comparison with the apple, peach, plum, or cherry, has been losing in popularity. There are now few good collections in the country; nurserymen list fewer and fewer varieties; and the pear is less and less eaten as a dessert fruit, the product being largely used for canning. Pear-culture is failing in America because the pear is not well adapted to the American climate, cultural and commercial conditions make it more difficult to grow and sell than other fruits, and the formidable disease, blight, remains unchecked by any of the remedies now in use.

170. Cultivation of the pear in North America.—The pear is cultivated in the temperate regions of the world wherever agriculture is an industry. In North America, pears thrive particularly well only in the states north of Maryland, west to Wisconsin and on the Pacific. The climate of the southern states is uncongenial to this fruit, being too hot, while that of the Mississippi Valley and Great Plains is too hot in the summer

and too cold in the winter. Blight, also, is more virulent in these regions than in those first named, and makes pear-culture precarious even where climate favors. California and New York are the leading pear-growing states, in both of which the industry is handicapped by blight. The introduction of the Sand pear from China, and its hybridization with the European species, promises to extend the culture of this fruit in the South and Middle West, where, because of blight, it is now hardly possible to grow pears.

171. The Sand pear.—A second species, *P. serotina,* the Sand pear from China, furnishes to the industry in America perhaps a score of varieties. The Sand pear produces handsome fruits in great abundance which can be kept much longer than the European pears, but the fruits are scarcely edible uncooked and are of indifferent quality in culinary preparations. The Sand pear, however, is of much more importance for its hybrids than for its pure-bred varieties. The hybrids of the Asiatic with the European pear are remarkable for vigor, hardiness, productiveness, and freedom from blight. These hybrids, of which Kieffer is best known, are suitable for culinary purposes, and when properly ripened may be used as dessert fruits.

4. *Pyrus serotina,* Rehd. (Plate II) Tree vigorous, upright, attaining a height of 20-50 feet, the branchlets becoming glabrous. Leaves ovate-oblong, sometimes ovate, 3-5 inches long, rounded at the base, long-acuminate, sharply setose-serrate; lower surface cobwebby but becoming glabrous. Flowers white, borne in 6-9 flowered umbellate-racemose clusters; calyx-lobes long-acuminate, glandulose denticulate; petals oval, short-clawed; stamens about 20; styles 4 or 5, glabrous. Fruit subglobose, russet-brown; stalk slender; calyx deciduous.

Pomologists are interested in the type species, which comes from central and western China, only as a possible source of blight-resistant stocks for varieties of the common pear. Stocks from the species were introduced some years ago on the Pacific slope, but have proved unsatisfactory because difficult to bud, very susceptible to leaf-blight, and not immune to pear-blight. There are two botanical varieties to one of which the Sand pear belongs. This variety is described as follows:

Var. *culta,* Rehd. SAND PEAR. JAPANESE PEAR. CHINESE PEAR. Tree strong and rapid in growth, with strong thick shoots. Leaves very large,

often 6 inches long and 3-4 inches broad, broadly ovate, long-pointed, very dark green; margins setose-serrate, the teeth very sharp, almost bristle-like. Flowers very large, appearing somewhat in advance of the foliage. Fruit apple-shaped or pyriform, more or less rough, with a well-marked cavity about the stem; calyx usually deciduous; flesh tough, gritty and poor in flavor.

The Sand pear differs from the type in its larger and differently shaped fruits and much larger, greener leaves. The pear came to America from Japan, where it must have been early introduced from China, and where it is now the most common fruit-tree with the exception of the persimmon. There are several pomological varieties in Japan, although they differ less from each other than varieties of the European pear. The fruits are little liked by those who can grow the common pear, although they are attractive in appearance, long keepers, and not unpalatable in some culinary preparations. Several Japanese pears have been introduced into America, and their apple-like fruits are not uncommon, being readily distinguished from apples by their deciduous calyces, rough skins, long stems, gritty flesh, and potato-like flavor.

172. Hybrid pears.—These Sand pears from Japan hybridize freely with the common pear, and several valuable hybrids are now widely and commonly grown in North America, Kieffer, Le Conte, and Garber, in the order named, being the best known. These hybrids are much stronger, more blight-resistant, more productive, and more rapid in growth than the common pear; the fruits are more pyriform and of much better flavor than those of the oriental parent; the calyx in the hybrid is sometimes persistent and sometimes deciduous. They do not make good stocks and intergraft but poorly with the common pear. Of all pear-trees, these are handsomest in growth, and make excellent ornamental plants. American pomologists look forward to the development of many valuable varieties of these hybrids.

173. The classification of varieties of pears.—Classifications of pears are fewer and even less satisfactory than for the apple. Pomologists and nurserymen seldom go further than to list varieties under the two species with a third group of hybrids. Most nurserymen divide pears into standards and dwarfs which

of course is no classification at all. Sometimes they are divided in accordance with season and shape as in J. J. Thomas's *American Fruit Culturist*. Lucas, the German, whose classification of the apple is one of the best, tried to classify pears by both a natural and an artificial system. In the natural system he made fifteen groups to which he gives names and fairly full descriptions. In his artificial system he groups the varieties he knows in accordance with season, form, color, and as to whether the calyx is open or closed. Thus arranged his varieties fall into 108 groups. Waugh has a similar classification in which varieties are classified as to form, color, and season. In attempts to classify pears, the same difficulties mentioned under apples are found, which are even more marked, and the author has had to content himself with a simple key for finding the names of pears.

The Quince

The quince is a pome-fruit which all modern botanists put in the Genus Cydonia, so closely related to Pyrus that formerly the two were sometimes united, the quince under the name *P. Cydonia*. There are, however, marked differences between the quince and the apple and pear, fruits which now constitute Pyrus, as will be seen in a comparison to be made when the botanical characters of species have been given.

174. Botanical characters of the quince.—Cydonia contains only the species now to be described, to which belong all of the true, as distinguished from the Japanese quinces.

Cydonia oblonga, Mill. Small trees or shrubs 15-20 feet in height, with slender unarmed branches. Leaves alternate, oblong-oval, entire, pubescent beneath, petioled, stipulate, 2-4 inches long. Flowers white or tinged with pink, large, 2 inches in diameter, showy, terminal on short leafy branchlets; petals 5; stamens numerous; styles 5, free; ovary with 5 cells each containing many seeds. Fruit large, round or pear-shaped, yellow, woolly, with hard yellow flesh which becomes pink after cooking.

175. The quince distinguished from the apple, pear, and Japanese quince.—The quince differs from the apple and pear in both tree and fruit sufficiently to put it in a separate genus. The differences in the fruits are those which the pomologists would account most noteworthy. Thus, the pomes of Cydonia

are harder than those of Pyrus; the quince has a woolly surface while that of the apple and pear is smooth; the sepals at the apex of the quince are more leaf-like than those of the apple and pear; the five carpels of the quince contain many seeds, those of species of Pyrus but few; the testa of quince seeds abounds in a gum having mucilaginous and demulcent properties, while there is little or no gum in seeds of the apple and pear; the stem of the quince is so short as to appear to be wanting, while the stem of the apple and pear is distinct, usually slender, and often long.

The Japanese quince is distinguished from the common sort by its serrate or crenate papery leaves, those of the latter being nearly or quite entire, thick, and heavily pubescent beneath; the plant is smaller and not nearly so robust; the flowers are brighter colored and their styles are united at the base whereas they are free in Cydonia. The Japanese quince was long included in Cydonia or Pyrus but is now put by all botanists in Chænomeles.

176. Habitat and history of the quince.—The quince is a native of the Mediterranean and Caucasus regions, and in ancient times grew abundantly in Crete, deriving from Cydon in that country the name Cydonia. From ancient Greece it was taken to Rome before the Christian era, for the writers of the first century mention it as if it were a common fruit. The Romans knew the quince as the *cotonea,* a name in old English as well as in Latin. Spreading from Italy, it was soon cultivated, as agriculture advanced step by step, throughout the mild climates of Europe. In 812, its culture was enjoined by Charlemagne in France under the name *coing.* Chaucer speaks of the quince in the latter part of the fourteenth century in England, calling it *coine* from the French. Early Spanish, English, French, and Dutch settlers brought the quince to America, where it has been sparingly cultivated in gardens, home orchards, and commercial plantations from the earliest settlement of the continent.

177. Pomological status of the quince.—The quince is of but secondary importance in fruit-growing, since it is only sparingly used for culinary purposes. Both the apple and the pear were widely planted in Europe and America when first grown for

cider-making; the quince does not make good cider, another reason for its failing to acquire the popularity of the other pome-fruits. The fruit deserves, however, much more attention than is given it in domestic economy, for it is second to no other for marmalades, jellies, and conserves of all kinds, and is much used for flavoring preparations of apples and pears. There are but few varieties and there seems to be little or no interest in increasing the number, although the quince offers great possibilities in hybridization within the species and with the Japanese quince, while interesting hybrids between the quince and the pear are recorded. Quince stocks are much used whereon to graft the pear, to dwarf the tree and increase the size of the fruit and hasten its bearing.

There are not more than thirty or forty varieties of quinces and no attempt seems to have been made to classify them. Indeed, the fruits of the few varieties are so similar in season, form, color, and quality that it would be almost impossible to make a serviceable classification. A crude attempt is sometimes made by nurserymen who list quinces as "apple-shaped," "pear-shaped," and "orange-shaped."

The Japanese Quinces

178. Japanese quince described.—Four species of Chænomeles are grown for their handsome flowers, and one, *C. lagenaria,* is of some value for its fruit and offers a good field for the plant-breeder. Through hybridization and selection, it is possible that other species of the genus might be made to yield fruits of value.

Chænomeles lagenaria, Koid. Shrub 3-6 feet high, with spreading spiny branches. Leaves sub-persistent or deciduous, alternate, oblong-ovate, glossy above, papery, $1\frac{1}{2}$-3 inches long. Flowers in clusters of 2-6, red or reddish, $1\frac{1}{2}$-2 inches across; calyx-lobes entire or serrate; petals 5; stamens numerous; styles 5, united at the base. Fruit 5-celled, each cell with many seeds; globular or ovoid; yellowish-green, stem lacking.

There are many ornamental forms, most of which bear quinces esteemed for jellies, conserves, and other culinary purposes. The dark green fruits are very hard, but contain a rich, aromatic, lemon-like juice which makes a jelly of very pleasing flavor. The fruits are further characterized by a strong dis-

tinctive odor, to most persons very pleasant, which it imparts to other fruits when cooked with them. The species is a native of China and Japan, but has long been cultivated in Europe and America for its flowers.

CHAPTER XIII

THE DRUPE-FRUITS

THE apricot, cherry, peach, nectarine, plum, and the almond, which passes as a nut rather than a fruit, constituting the drupe-fruits, belong to one genus, Prunus, of the Order Rosaceæ. Perhaps no other genus contains as many distinct natural esculents as Prunus. There are in the genus between forty and fifty species of fruits cultivated widely and commonly enough to be of commercial importance. Perhaps there are a hundred more which have possibilities for further domestication either for their own products or for hybridization. Some students of the drupe-fruits divide the genus by putting peaches and almonds in a group by themselves, making the genus *Amygdalus*, but nearly all pomologists prefer to place all of the drupes in Prunus.

179. The genus Prunus is sharply distinguished from any other genera in Rosaceæ and from all other cultivated fruits. The conspicuous characters of Prunus are:

Trees or shrubs with astringent properties. Leaves conduplicate or convolute in the bud, alternate, simple, serrate, petiolate, deciduous or persistent; stipules free from the petiole, lanceolate, glandular, deciduous. Flowers solitary, in corymbs or racemes, appearing from separate buds before, with, or after the leaves; calyx five-lobed; tube obconic or tubular, deciduous; stamens 15 to 20, inserted with the petals in three rows; pistils with one carpel or rarely with two or more carpels; ovary inserted in the bottom of the calyx-tube, one-celled. Fruit a drupe, with a glaucous or pubescent outer covering, a pulpy, dry or leathery flesh covering a bony, smooth or rugose pit or stone which is one- or rarely two-seeded.

180. The several fruits in Prunus distinguished.—As one names the drupe-fruits,—apricot, cherry, peach, nectarine, and plum—it would seem that no pomologist could possibly mistake any one of them for another, but some species of Prunus are cherries to some and plums to others; and some western desert

forms are almonds to the botanist and peaches to the pioneer, and even cultivated varieties of these two fruits are not always distinguished at a glance. While the fruit-grower could hardly be confused by the common varieties of the drupe-fruits, he very surely would be by some of the uncommon ones. Hence the need of definite distinctions for the six drupe-fruits belonging to Prunus. The following key serves to distinguish sufficiently well all the forms which fruit growers are likely to see.

KEY TO THE DRUPE-FRUITS

Surface of fruit velvety (except in the nectarine); stone pitted or furrowed.
  Flesh soft, thick, juicy.
    Fruit velvety ..... *Peach*
    Fruit smooth ..... *Nectarine*
  Flesh hard, thin, dry ..... *Almond*[1]
Surface of fruit glabrous or nearly so.
  Flowers clustered; stone usually smooth.
    Fruit usually large, sulcate, and covered with bloom; stone compressed, longer than broad, grooved on the dorsal and winged on the ventral suture ..... *Plum*
    Fruit usually small, round, bloomless; stone turgid, round, usually shorter than broad, ridged on the ventral suture... *Cherry*
  Flowers solitary or but two; stone smooth or sometimes pitted. *Apricot*

The Peach

The peach constitutes but one species in Prunus, whereas there are several each which furnish cultivated varieties of apricots, cherries, and plums. The species has, however, been divided by some botanists into several varieties, notably one to include the nectarine and another the Peento peach. However, these two fruits are not more distinct from the type species than the red-fleshed sorts, the snowball varieties, the Yellow Transvaals, the nippled peaches, those that are cleft and those that are beaked, winter peaches, or the pot-grown dwarfs from China. The nectarine, the Peento, and all the other variations of the type probably originated as mutations under cultivation and all probably came from the wild species, *Prunus Persica.*

181. Prunus Persica, the peach, described.—There are many varieties, possibly 3000, of the several pomological groups named

[1] Cultivated for its nut-like stones, scarcely a pomological product, hence not to be further considered in this text.

in the preceding paragraph, the characters of which are becoming interminably confused by hybridization. A description of the species must include the most prominent characters of the different groups of cultivated peaches, and is, therefore, given in more detail for the pomologist than would be needful for the botanist.

Prunus Persica, Stokes. (Plates III, IV.) Tree low and diffuse, branches spreading, slender; twigs slender, glabrous, glossy green changing to shades of red, with numerous conspicuous lenticels. Leaves 4-7 inches long, 1-2 inches wide, oblong-lanceolate; upper surface pale, with little or no pubescence; margin serrate or crenate, tipped with glands or glandless; petioles ¼-1 inch long, grooved, glandless or with 1-8 globose or reniform glands. Flowers from wood of a previous season; of two sizes, the smaller size ranging under 1 inch in diameter, the larger 1½ inches; the floral color pure white, pink, or red; pedicels very short, glabrous, green. Fruit subglobular; surface usually distinct; cavity well marked, abrupt; apex with a mamelon or mucronate pit; color varying from greenish-white to orange-yellow, usually with a red cheek, sometimes covered with red; very pubescent except in the nectarine; skin adherent or free from the pulp; flesh greenish-white or yellowish, often stained with red at the tip, occasionally red, sweet or aciduous, aromatic; stone free or clinging, elliptic or ovoid, compressed, pointed; outer surfaces wrinkled and fluted, inner surfaces polished; ventral and dorsal sutures grooved or furrowed, sometimes winged; the seed almond-like, aromatic, and bitter.

182. Habitat and history of the peach.—The peach comes from eastern Asia, where it now grows wild, and where it has been cultivated at least as long as the earliest Chinese written records,—centuries before the beginning of the Christian era. The word "peach" and most of its equivalents in the countries of Europe are derived from Persia, as it was supposed that the fruit originated in Persia, a statement probably first made by Pliny, the Roman naturalist, in Christ's time, and republished by every historian of pomological plants from then until recent years. Some botanists have supposed the peach to be a modified almond, but there can be little doubt that the two fruits came into cultivation from two wild species.

The peach was brought to the New World by the Spaniards probably on the second or third visit of Columbus. It found such congenial surroundings and won so high favor with the settlers and natives that it spread rapidly and widely, in the wild and under primitive cultivation, and became so common

as an escape that three centuries later botanists thought the peach to be a native of America. In the fruit areas of North America, after two centuries of orchard cultivation, the peach is so plentiful that it is found fresh, canned or evaporated in nearly every home on the continent. In the author's *The Peaches of New York*, 2181 varieties of peaches are described, of which the larger number have originated on this side of the Atlantic, these numbers testifying to the popularity of the peach in North America.

183. Variability of the peach.—The peach is an exceedingly variable fruit, which implies that it is capable of being molded to fit many conditions of soil, climate, and cultivation; and that it may still be greatly improved by the plant-breeder. Yet, paradoxically though it may appear, many of the forms breed true to type: thus, the several races and two or three thousand varieties must be put in one species; many varieties come true to seed; and seedlings seldom revert to worthless forms as do those from almost all other fruits. However, students of the peach must always take variability into account, a character so prominent in this fruit that it may profitably be illustrated by examples.

Americans know varieties with many combinations of round, flat, and beaked fruits, which may have smooth or velvety skins; red, yellow, or white skins and flesh; free or clinging stones; sweet, tart, or bitter flavor; and which ripen in summer or autumn. The Chinese have peaches with all of these characters and several others unknown to Americans. Thus, a Chinese peach is reported the fruits of which weigh a pound apiece; another, of the Honey type, is borne on a tree the maximum height of which is eight feet; the leaves of a Chinese variety are extraordinarily long and narrow; a white-stoned sort is reported from China; and the Feichen peach is said to keep from late September until February. The skin peels readily from a peach raised in the West Indies. The Yellow Transvaal peach in South Africa is said to grow among granite boulders, as a hedge, and beside ditches of running water. A peach with flesh of peculiar fragrance and another with very firm flesh are described as growing in several parts of Asia, in which continent this is a favorite fruit.

184. Classification of varieties of peaches.—Several attempts have been made to arrange the peaches grown in America in natural groups. The Europeans have done little in classifying this fruit, and none of their efforts is comprehensive enough to take in more than a very few of the varieties grown in America, nearly all of which originated on this side of the sea and some of the types of which are unknown on the other side. Onderdonk and Price, both of Texas, toward the close of the last century, grouped the varieties then grown in five natural races. These races may have been distinct at the time of their introduction to this country, but through hybridization became so blended that the groups established overlapped in so many characters that few excepting type sorts could be placed satisfactorily. Year by year the fusion by hybridization has proceeded until it is useless to try to keep the races proposed as a basis of classification. These races of Onderdonk and Price are of interest, however, as they show very well what and whence were the progenitors of American peaches. The following groups, modifications of Onderdonk's and Price's races, serve to show the types of peaches that have been introduced in North America.

(1) The *Spanish* race is characterized by small compact trees, late, rather small round fruits which are streaked and mottled with red; flesh yellow, white, or red; quality good, the flavor often having a suggestion of pineapple. Cabler, Columbia, Florida, Indian, La Reine, Lula, Texas, and Victoria, none of them very valuable, are typical of the Spanish Race. The progenitors of this race were probably brought to America by the first Spanish discoverers.

(2) In the *Persian* race Onderdonk and Price put several types so distinct that it is impossible to define the limits of the group clearly. To name well-known varieties in this comprehensive race will serve to show the characters the group is supposed to contain and at the same time how hopeless is a natural classification of peach varieties. One or another of those who defined this group placed in it the Crawfords, Chairs, Alexander, Heath Cling, Oldmixon, Champion, Salwey, Crosby, and Wager, each sort so different from any other that any one of them might be the type of a distinct group. Progenitors of this group were brought to America by early English settlers.

(3) The *North China* or *Chinese Cling* race was at introduction a well-defined group but is now hopelessly submerged in the mixture of cultivated peaches. The trees of the original varieties were very vigorous, broad-headed, open; leaves large, flat, dark green; flowers very large, usually creamy white and beautifully blushed; flesh predominatingly white, melting, very good; season early. Chinese Cling, Belle, Greensboro, Waddell, Hiley, Carman, and Elberta are of this race although several are not pure to type, notably Elberta. Chinese Cling, the parent, came to England in 1844 and was brought to America in 1850.

(4) *The South China or Honey* race is better defined than the three preceding. The trees are small, compact, tender to cold, very productive. The fruits are small to medium, oblong-oval, tapering at the apex into a nipple or a beak, with a distinct suture; creamy white, washed and dotted with red; flesh creamy white, red at the pit, melting, with a honey-like flavor; pit free; requiring a long season. The original tree was probably brought to this country by Downing about 1860. Honey peaches are grown only in the Gulf States, the commonest sorts being Honey, Climax, Pallas, Triana, Florida Gem, and Taber (Plate IV).

(5) The *Peento* race was originally quite as distinct as the Honey peaches, but by hybridization with the latter group is more and more losing its identity. The trees are vigorous with large willowy branches, very tender to cold; leaves long and narrow; fruit small, flattened endwise in Peento but not so in any of its cultivated progeny; color creamy white, mottled with red; flesh white, red at the pit, melting with a rich sweet flavor. The Peento peaches are now grown profitably only in the Gulf States. Peento, the first of the race, was brought to America previous to 1828 when it was first described; the original home was southern China.

If worth while to attempt a natural classification of peaches, the few groups of Onderdonk and Price should be divided. There are, for example, twenty or more firm yellow-fleshed clings grown in California for canning; twelve or fifteen of the snowball peaches; as many more of the red-leaved red-fleshed sorts; eighteen or twenty sorts that trace back to the

Alberge and Melocoton peaches of Europe; the nectarines form a distinct group; several varieties of the Chinese crooked peach have been grown in America; Russian sorts of which Bokara is the type form a distinct group; and several dwarf peaches have been introduced in recent years. Hybridization, however, shuffles the characters so rapidly in modern peach breeding that further attempts at natural grouping are hardly worth while.

185. Description blank.—The accompanying description blank for the peach sets forth most of the characters students and fruit-growers will use in describing drupe-fruits.

DESCRIPTION BLANK FOR THE PEACH

Name..... Orchard..... Row..... No....
Date..... 19..

Tree
- Large, medium, small
- Vigorous, medium, weak
- Upright, spreading, drooping
- Dense, open
- Vase-formed, round-topped
- Hardy, half-hardy, tender
- Very productive, productive
- Medium productive, unproductive
- Regular bearer, uncertain bearer

TRUNK
- Stocky, medium, slender
- Smooth, medium, shaggy

BRANCHES
- Stocky, medium, slender
- Smooth, medium
- Shaggy, zigzag
- Red, brown, gray
- Green, glossy, dull

Lenticels
- Numerous, medium, few
- Large, medium, small

LEAVES
- Length..... Width.....
- Large, medium, small
- Oval, ovate, obovate
- Acuminate, lanceolate, spatulate
- Abruptly pointed, acutely pointed
- Thick, medium, thin
- Light, medium, dark green
- Smooth, rugose

Margin
- Glandular, crenate
- Finely serrate, coarsely serrate

Petiole
- Long, medium, short
- Thick, medium, slender

Glands
- Average number .....
- Opposite, alternate
- Large, medium, small
- Globose, reniform, mixed
- Red, green
- Position .....

Stipules .....

FLOWER-BUDS
- Hardy, half-hardy, tender
- Large, medium, small
- Long, medium, short
- Obtuse, conic, pointed, plump
- Appressed, free
- Pubescent

FLOWERS
- Date of bloom .....
- Early, medium, late
- Large, medium, small
- Pink, salmon

Fruit
- Early, midseason, late

DATE OF RIPENING .....

KEEPING QUALITY .....

SHIPPING QUALITY .. ..
- Length... Greatest diameter...
- Large, medium, small
- Regular, irregular
- Oval, ovate, roundish
- Oblate, cordate, oblong
- Truncate, conical

PLATE VII. Japanese plum—The Hale.

Fruit, continued
- SHIPPING QUALITY, CONTINUED
  - Compressed long or opposite sutures
  - Halves equal or unequal
- CAVITY
  - Deep, medium, shallow
  - Wide, medium, narrow
  - Regular, irregular
  - Flaring, abrupt
- SUTURE
  - Shallow, medium, deep
  - Distinct, indistinct
  - A mere line, lacking
- APEX
  - Prolonged tip, short tip
  - Roundish, flattened, depressed
- COLOR
  - Red, yellow, green
  - Crimson, white
  - Mottled, blushed, striped
- PUBESCENCE
  - Long, medium, short
  - Thick, medium, thin
- SKIN
  - Thick, medium, thin
  - Tough, medium, tender
  - Adherent, semi-free, free
- FLESH
  - Red, white, green, yellow
  - Juicy, medium, rather dry
  - Coarse, fine-grained, stringy
  - Firm, melting
  - Sweet, subacid
  - Sour, sprightly, aromatic
- Quality
  - Best, very good, good
  - Fair, poor, very poor
- STONE
  - Free, semi-cling, cling
  - Large, medium, small
  - Ovate, roundish, flattened
  - Obovate, oval, plump
  - Conspicuously winged, grooved
  - Pointed, blunt, oblique
  - Smooth, corrugated, pitted
- USE
  - Dessert, kitchen
  - Market, home

Remarks .....

.....

186. The nectarine.—The nectarine is a smooth-skinned peach (Plate V). Some botanists put it in a distinct species; thus DeCandole called it *Persica lævis.* Many botanists prefer to make it a botanical variety of the peach under the name *Prunus Persica* var. *nucipersica,* but nectarines often come from seeds of peaches, and peaches arise from seeds of nectarines; so, too, peaches are often borne on nectarine trees and nectarines on peach trees, so that either may originate from the other by means of bud-variation. The trees of the nectarine differ not at all from those of the peach, and, apart from the smooth skin, the only distinguishable marks between the fruits are smaller size, firmer flesh, and a distinct and richer flavor in the fruits of the nectarine. Dryness of flesh, aroma, and the flavor seem to be correlated with the smooth skin.

In the nectarine, as in the peach, there are free-stone and cling-stone sorts; both fruits have varieties with red, yellow, or white flesh; the flowers of both may be large or small; nectarine leaves in one variety or another show all of the variation in glands and serrations known in the peach; the stones and kernels

are indistinguishable in the two fruits; peaches and nectarines are adapted to the same soil and climatic conditions, and wherever the peach is grown the nectarine may be raised. A drawback to the culture of the nectarine is that the smooth-skinned fruits are more susceptible to fungous diseases and to the curculio than are the velvety-skinned peaches. The history of the nectarine goes back over two thousand years and then merges into that of the peach.

The Apricot

In tree and fruit the apricot is an intermediate between the peach and the plum. The relationship of the three fruits is so close that they may be intergrafted readily, and the apricot has been hybridized with both the peach and the plum. A hybrid between the apricot and plum is called a *plumcot;* between the peach and apricot, *peach-apricot.* Evolution in the fruit seems to progress from the smooth-skinned plum to the slightly hairy apricot, a further development of which is the velvety peach.

187. The apricot distinguished from the plum and peach.— The flowers of the apricot are solitary; those of the peach and plum are two or more. The flowers of the apricot and plum are white when fully out; of the peach, usually pink. The blossoms of the apricot appear much earlier than those of either peach or plum and the fruits ripen earlier. The stone is smooth in most apricots like that of the plum but in a few kinds is pitted much as in the peach. The dorsal suture of the stone is soft and previous, a character not found in either peach or plum. The fruit of the apricot is much like that of the peach in shape and color but is less juicy and the flesh is yellower and the flavor richer and sweeter. The leaves are broad, almost circular, more or less cordate, smooth and shining, very different from those of either peach or plum. The kernels of some apricots are sweet, of others bitter; those of peach and plum are usually bitter.

188. Prunus Armeniaca, the common apricot, described.— Three species of Prunus are known as apricots: *P. Armeniaca,* the common apricot; *P. Mume,* the Japanese apricot; and *P. dasycarpa,* the black apricot. The apricot-plum, *P. Simonii,* is more closely allied to the plums and is classified with them.

1. *Prunus Armeniaca*, Linn. Tree small, with a round spreading top and in color of bark resembling the peach. Leaves round-ovate, thin; margins finely serrate; teeth obtuse; upper surface smooth, bright green; lower surface smooth or nearly so; petioles ½-1 inch long, with one to several glands. Flowers light pink in bud, white when open, 1 inch across, borne singly, nearly sessile, opening before the leaves. Fruits earlier than those of the peach and plum; variable in size and shape, smaller than those of the peach, usually compressed; pubescence fine and short or nearly lacking; yellow with more or less red; flesh yellow, sometimes tinged with red, firm, dry, sweet and rich; stone clinging or free, obovate, flat, smooth, ridged or sulcate on one suture.

189. Habitat and history of the apricot.—The wild form of the apricot grows spontaneously over a wide area in western and central Asia and as far eastward as Pekin, China. Alexander the Great is said to have brought the apricot from Asia to Greece, from which country it was carried to Italy, being first mentioned as a Roman fruit by Pliny in the time of Christ. From Italy, its culture spread slowly northward in Europe, reaching England about the middle of the fourteenth century. There seems to be no mention of the apricot in North America earlier than 1720, when it was said to be growing abundantly in Virginia. In 1792 Vancouver saw apricots in the mission orchards of California. Commercial plantations were not made in the United States until the middle of the past century.

190. Cultivation of the apricot in North America.—The apricot is popular in America only in California and in a few favored spots in the Rocky Mountains and westward. Farther east the crop is destroyed by spring frosts too frequently to make apricot-growing a safe venture. Moreover, the curculio takes too great toll unless combated by rather expensive treatments. Also, the fruit and its requirements are little known in the East. California has a monopoly of commercial apricot-growing for the world, at least nowhere else does the industry attain so great importance. The fruits are preëminently well adapted to canning and evaporating, and California seems to have captured this trade in apricots, an industry which requires more than 3,000,000 trees. Apricots are grown in a small way, however, wherever peaches thrive.

191. Russian apricots.—The Russian apricot is a strain of the common apricot, although it is thought by some to be a distinct

species to which the name *P. sibirica* has been given. This race differs from the type in having a narrower and darker colored leaf and in bearing smaller and poorer fruits. They are supposed to be hardier than the common apricots, but on the grounds of the New York Agricultural Experiment Station, Geneva, New York, they have not proved so. The blossoms come out quite as early as do those of other apricots and are as often caught by frost. The Russian sorts are unique in manner of fruit-bearing,—the small, round, handsome fruits hang in clusters or ropes on the fruit-bearing branches. This race was introduced in the Middle West by the Russian Mennonites soon after the middle of the last century.

192. Japanese apricots.—The Japanese apricot, *P. Mume* is more often grown as an ornamental than for its fruit. Two or three varieties are cultivated in the United States for their small yellow fruits, which are so poor in quality, however, that they have little value except as they add variety. This species is more tender to cold than the other two, and the blossoms open so early that there is not much certainty of success north of citrus-fruit regions, though occasional crops are produced as far north as Geneva, New York. The Japanese grow many varieties, gathering the fruits while green for pickling in a salt solution. Even in Japan, however, these apricots are grown for their flowers, the fruits being of secondary importance. A comparison of the descriptions of the two species shows wherein they differ.

2. *Prunus Mume*, Sieb. & Zucc. Tree small, round, spreading, in shape and size resembling the common apricot, but with bark grayish-green and green branchlets. Leaves smaller than those of the common apricot, duller in color, narrower and long-pointed; lower surface pubescent on the veins; petiole short, ½ inch, pubescent, glandular; margin finely serrate; teeth obtuse. Flowers large, handsome, fragrant, sessile. Fruits small, round, yellow or greenish, flesh firm, dry; poor in quality; stone clinging tightly to the flesh, small, ovate, pitted.

193. The black apricot grows wild and is cultivated in Manchuria, Kashmir, Afghanistan, and Beluchistan. The tree has long been grown in Europe and the United States, but the fruit is small, unattractive in color, and poor in quality. The species is represented only in horticultural collections. In tree and

fruit, the black apricot shows close relationship to the plum, its fruits being easily mistaken for dark-colored round plums. The tree is hardier than that of the other apricots. The following brief description distinguishes this species from the other two apricots. Some authors consider it to be a hybrid.

3. *Prunus dasycarpa,* Ehrh. Tree a little larger and more upright than that of the common apricot or of the peach. Leaves long-ovate, thin, dull green; margins finely serrate; petiole usually glandless. Flowers large, showy; pedicel long. Fruit small, round, smooth, plum-like; stem adhering, dark purple or nearly black; flesh soft, subacid; juicy, poor; stone small, ovate, fuzzy, clinging to the flesh; kernel sweet.

The Plum

The tree and fruit of many species of Prunus are called plums. Twelve or more wild species of plums grow in North America, five of which have few or many cultivated varieties, while five foreign species are under cultivation in this country. The names and relationships of these ten plums are shown in the following key:

A. Flowers single or in twos. (Three in *P. salicina.*)

Old World plums.

B. Leaves drooping.

C. Shoots and pedicels pubescent.

D. Fruit large, more than 1 inch in diameter, variable in shape ..... 1. *P. domestica.*

DD. Fruits small, less than 1 inch in diameter, oval or ovoid ..... 2. *P. insititia.*

CC. Shoots glabrous or soon becoming so, pedicels glabrous.

D. Flowers single; leaves hairy along the midrib on the under side ..... 3. *P. cerasifera.*

DD. Flowers in threes; leaves glabrous..... 4. *P. salicina.*

BB. Leaves upright, peach-like, glabrous, veins very conspicuous, under side barbate at axils of veins; separated from other plums by the large, flattened, brick-red fruits ..... 5. *P. Simonii.*

AA. Flowers in clusters of 3 or more. American plums.

B. Leaves broad, mostly ovate or obovate.

C. Flowers white.

D. Leaf serrations glandless, acute; petiole usually glandless; stone turgid, large, pointed at the apex ..... 6. *P. americana.*

DD. Leaf serrations, glandular, wavy-crenate; petioles glandular; stone turgid, small, prolonged at the ends ..... 7. *P. hortulana.*

CC. Flowers fading to pink: leaf-serrations coarse, rounded, glandular only when young; petioles bi-glandular; stone flat, large ..... 8. *P. nigra.*

BB. Leaves narrow, lanceolate-ovate, folded upward.

C. Fruits small, ½ inch in diameter, cherry-like; petiole bi-glandular; stone small, ovoid, turgid, cherry-like; rarely a tree, tender ..... 9. *P. angustifolia.*

CC. Fruits large, 1 inch in diameter, plum-like; petioles with from 1 to 6 glands; stone compressed and pointed at both ends; usually trees; hardy ..... 10. *P. Munsoniana.*

Domestica plums.

The Domestica, or European plum, is the common plum of fruit-growers in Europe and North America. Its many varieties are the best known, have been cultivated longest and are most widely distributed, and in number, quality of product, and in most of the characters which make a tree a desirable orchard plant, Domestica plums far surpass those of any others of the ten cultivated species.

194. Prunus domestica described.—Some authors make from *P. domestica* two or three species and others divide it into several botanical varieties, but to pomologists there seem to be no sufficiently definite lines of cleavage between the many cultivated varieties to make it desirable to divide the species.

1. *Prunus domestica*, Linn. (Plate VI) Tree vigorous, open-headed, round-topped; trunk attaining 1 foot or more in diameter; bark thick, nearly smooth or roughened with transverse lines. Leaves large, obovate, elliptical, thick and firm; upper surface dull green, rugose, glabrous or nearly so, the lower one paler with little or much tomentum, reticulated; margins coarsely and irregularly crenate or serrate, often doubly so; teeth usually glandular; petioles ½ inch in length, stout, pubescent, tinged with red; glands usually 2, often lacking, sometimes several, globose, greenish-yellow. Flowers appearing with or after the leaves, 1 inch or more across, white; borne on lateral spurs or sometimes from lateral buds on one-year-old wood, 1 or 2 from a bud in a more or less fascicled umbel; pedicels ½ inch or more in length, stout, green. Fruit globular or sulcate, often

necked, blue, red or yellow; stem ½ inch or more in length, stout, pubescent; cavity shallow and narrow; apex variable, usually rounded; suture prominent, a line or indistinct; dots small, numerous, inconspicuous; flesh yellowish, firm, sweet or acid and of many flavors; stone free or clinging, oval, flattened, blunt, pointed or necked, roughened or pitted; walls thick; one suture ridged, the other grooved.

195. Habitat and history of Domestica plums.—Domestica plums came from the region about the Caucasus Mountains and the Caspian Sea. What seems to be the wild form of this species is found in this region. Here the Huns, Turks, Mongols, and Tartars, flowing back and forth in tides of war-like migration, maintained in times of peace a crude agriculture long before the Greeks and Romans tilled the soil. The plum was one of their fruits and the dried prune a staple product. Here, still, plums are among the common fruits, and prunes are ordinary articles of trade. At about the time of Christ, or somewhat before, communication had been opened between the Romans and the countries about the Caspian Sea, and a few centuries later hordes of Asiatics came westward and without doubt brought the plum with them. Plums were introduced into America by the first colonists, but were not much grown in this country until toward the end of the eighteenth century. Certainly, during the first two centuries of colonization in the New World, there were no such plantations of the plum as there were of the apple, pear, and cherry. Among the first importations of plums were those made by the French in Canada, in Nova Scotia, Cape Breton, Prince Edward Island, and in favored situations such as the L'Islet County and the Island of Montreal in the St. Lawrence River. In Massachusetts plums were planted by the Pilgrims, according to Francis Higginson, writing in 1629. The plum was early introduced in several of the southern colonies; so say Beverly, writing in 1722 of Virginia, and Lawson in his history of North Carolina, written in 1714.

196. The cultivation of Domestica plums in North America.—Domestica plums have not attained in America the relative importance among fruits that they hold in Europe. The plum is grown less in this country than the apple, pear, peach, or cherry, while in Europe it is a question whether it does not rank first or second among the tree-fruits. The restricted area which

the Domestica plums now occupy in America is due to the fact that they are not adapted to the trans-Atlantic environment. The plum thrives best in an equable climate like that of eastern and southern Europe and of western America, and cannot endure such extremes of heat and cold, wet and dry, as are found in eastern and central America. Plant and fruit suffer also from several parasites, as curculio, black-knot, leaf-blight and plum-pocket.

In North America, therefore, Domestica plums are confined to favored localities on the Atlantic seaboard, the Great Lakes regions, and the Pacific coast. In the first-named area they thrive to a limited degree in Nova Scotia and parts of Quebec, somewhat in central New England, and particularly well in the fruit-growing sections of New York. South of New York but few plums of this species are grown. The Domestica plums are planted with indifferent success in southern Ontario and in Michigan. In the great Valley of the Mississippi and in the states of the Plains, this plum is hardly known. Westward in the irrigated valleys of the Rocky Mountains and the Great Basin, the climate is favorable and European plums are well known.

It is on the Pacific slope that the foreign plum reaches its highest development in the New World. The trees in California, Oregon, and Washington are very thrifty, and the plums are of large size, handsome appearance, and high quality. Both tree and fruit in this favored region are free from most of the insect and fungous troubles with which eastern plum-growers must contend. Curculio and black-knot, scourges of eastern orchards, are not troublesome on the western coast. In this region the Domesticas, practically the only plums cultivated, succeed on either irrigated or naturally watered lands.

197. Groups of plums.—Plums fall into five natural groups, more distinct than those of the peach, but becoming less so as breeders of new varieties cross and recross them. These groups help materially in classification and all of them are readily recognized by plum-growers.

(1) *The Reine Claude or Green Gage plums.*—This group is so distinct that it is often given as a sub-species, and fruit-growers speak of its varieties as *Green Gages* as if it were quite

a distinct fruit from other Domestica plums. The trees are low with compact round heads; bark dark in color and breaking into deep fissures; shoots thick and do not lose their pubescence. The leaves are broad, wrinkled, coarsely crenate, and sometimes doubly serrate, a character not usually found in domestica plums. The fruit is round or oval, green or yellow, sometimes with a faint blush, stems short and pubescent, suture shallow, bloom thin, texture firm, quality the best, stone free or clinging. The leading varieties are Reine Claude, Bavay, Spaulding, Yellow Gage, Washington, McLaughlin, Hand, Peters, and Imperial Gage.

(2) *The prunes.*—A prune is any plum that can be cured, without removing the pit, into a firm long-keeping product. This classification throws all plums with a high percentage of solids, especially of sugar, into this group. The trees are various, the distinguishing characters of the group being in the fruits which are large, oval, with the one side straighter than the other, usually much compressed with a shallow suture, blue or purple, with a heavy bloom, flesh greenish-yellow or golden, firm, quality good, stone free. Typical varieties of this group in America are Italian, German, Agen, Tragedy, Tennant, Sugar, Giant and Hungarian.

(3) *The Perdrigon plums* constitute an old but comparatively unimportant group. The name comes from an ancient geographical division of Italy. The trees are various, mostly large, spreading, vigorous and hardy. The plums are of medium size, round or oval, dark blue with a heavy bloom, firm flesh, quality rather poor, stone free or clinging. Few of these Perdrigons are grown in America, of which Goliath, Late Orleans, and Royal Tours are best known; even these, however, are now represented only in collections.

(4) *The Imperatrice plums* might almost be combined with the Perdrigons. The chief differences are in the larger and more oval fruits, and the smaller, more compact, more productive and hardier trees. The name comes from the old Imperatrice plum now little grown, but formerly of note as one of the first of the blue plums to receive recognition. This poorly defined assemblage contains a greater number of varieties than any of the divisions outlined for the reason that the color, size

and shape of the plums are all popular characters with growers and consumers. The best known varieties in the group are Diamond, Arch Duke, Monarch, Shipper, Arctic, Quackenboss and Smith Orleans. All are characterized by hardy, thrifty, productive trees which bear thick-skinned firm-fleshed plums of rather poor quality in which the stones usually cling.

(5) *The Lombard plums.*—The reddish and mottled varieties of plums are usually thrown into this group. These plums differ but little from those in the preceding section except in the color of the fruits which have also more obovate shape, a more marked suture, are smaller, and even poorer in quality, though there are a few exceptions. The trees are even hardier and more productive, characters which make varieties of this group popular in northern climates and for the general fruit-grower. The following well known sorts belong here: Lombard, Bradshaw, Pond, Duane, Victoria, Middleburg, and Field.

(6) *The Yellow Egg plums* are a group of few varieties, all of which are very distinct and some the largest and handsomest plums known. The group is readily distinguished by the tall, upright-spreading, vigorous trees, nearly all of which are tender to cold and capricious as to soils. The fruits are the largest size, long-oval in shape, more or less necked, yellow or purple, with firm yellow flesh, free or clinging to the stone; the quality is usually poor although there are one or two exceptions. The best known varieties in the group are Yellow Egg, Red Magnum Bonum, Golden Drop and Monroe.

Insititia plums.

198. Prunus insititia described.—The Insititias are small round firm plums of various colors and flavors of which the well known Damsons are the best representatives. Some botanists put them in *P. domestica*, usually as a botanical variety, but to the writer the several groups and many varieties form a very distinct species in tree and fruit.

2. *Prunus insititia*, Linn. (Plate VI) Tree dwarfish; bark gray, smooth, with transverse cracks. Leaves small, obovate; apex obtuse or abruptly pointed; base cuneate or narrowed and rounded; margins closely, sometimes doubly serrate or crenate, glandular; thin and firm; upper surface rugose, dark green, hairy; lower surface paler, pubescent; petioles ½

inch long, slender, pubescent, tinged with red; glands few or glandless. Flowers 1 inch or less in size; borne in lateral umbel-like clusters, 1, 2 or rarely 3 from a bud; calyx-tube campanulate, glabrous, tinged with red. Fruit globular or oval, often necked, less than 1 inch in diameter, bluish-black or amber-yellow, with a heavy bloom; skin thin, tough; stem slender, ½ inch long; cavity shallow, narrow; apex roundish or flattened; suture indistinct or a line; flesh firm, yellow, juicy, sweet or acid; stone clinging or free, turgid, ovoid, smooth, ridged on one edge and grooved on the other.

199. Insititia distinguished from Domestica plums.—The Insititia plums are readily distinguished from the Domestica sorts in having a dwarfer and more compact habit of growth; smaller and more ovate leaves, with more closely serrate margins; branches more slender, with shorter joints, and bearing spinescent spurs; a more abundant and a more clustered inflorescence, with smaller flowers; a glabrous instead of a pubescent pistil and calyx-tube; reflexed calyx-lobes, whereas in Domestica they are often erect; and flowers which appear nearly a week later. The fruits are smaller, more nearly round or oval, more uniform in shape and never strongly compressed as in Domestica, with a less distinct suture and more often with a pronounced neck. The color is usually the Damson purple or the Mirabelle yellow, with no intermediate colors as in Domestica. The plums are sweet or sour, and have a very much smaller range in flavor in the Insititias. The stones are smaller, more oval, and much more swollen.

Insititia plums are much less variable than the Domesticas. These plums have been cultivated over two thousand years, yet there is seemingly little difference between the sorts described by the Greeks and Romans at the beginning of the Christian Era and those now grown. Also, one often finds half-wild chance seedlings with fruit indistinguishable from varieties under the highest cultivation. This pronounced immutability of the species is one of its chief characteristics.

200. Habitat and history of Insititia plums.—Wild plums of this species are found in nearly all temperate parts of Europe and Western Asia, probably as escapes from cultivation except in southeastern Europe and the adjoining parts of Asia. The recorded history of the Insititia plums is older than that of the Domesticas, going back to the sixth century B. C. Pliny, the Roman naturalist of Christ's time, wrote of an Insititia under

the name Damascene and says of it "long since introduced into Italy." The Damson plums of this species were introduced by the earliest English settlers in the New World, and references to plum-growing in America before the Revolution were nearly all to the Damsons. The reason for this early preference to Damsons by the colonists is that they come fairly true to seed while the Domesticas do not.

201. Cultural status of the Insititias in America.—The hardiness, thriftiness, and productiveness of the varieties of this species commend them to those who cannot give the care required for the less easily grown Domesticas. In America, as in Europe, these plums are to be found in almost every orchard, and in many communities half-wild, thriving with little or no care. The fact that they are easily propagated, growing readily from suckers and coming true to seed, is an added reason for their general distribution. The Insititia plums do not seem to hybridize freely with other species,—at least there are no recorded offspring of such hybrids, though some think the Reine Claudes to be a hybrid group between this species and the Domesticas, and possibly the French Damson and some of the Mirabelles are part Domestica.

202. Groups of Insititia plums.—The species may be subdivided into four groups rather more distinct than those of Domestica plums because of the lack of variability in the species and the difficulty with which these plums are hybridized. The four groups are the Damsons, Bullaces, Mirabelles and St. Juliens, of which, possibly eighty or more varieties have been described.

(1) *The Damsons.*—The description given the species fits this group very closely. The distinguishing characters are the oval, blue, sour, and slightly astringent plums.

(2) *The Bullaces.*—The tree characters of Damson and Bullaces are identical and the fruits of the two groups are so nearly alike that a distinction between them is hardly worth making. Insititias with round fruits are called Bullaces. There are no cultivated varieties of importance in this group.

(3) *The Mirabelles.*—The trees in this group differ but little from those of other Insititias, except, possibly, in being more dwarf. The fruits are round or oval, yellow, about half an inch

in diameter, with free stones. The fruits are of much better quality, especially for dessert, than any other Insititias. Unfortunately these delicious Mirabelles are hardly known in America.

(4) *The St. Juliens* grown in America are vigorous, hardy, healthy Insititias used as stocks upon which to grow other plums both Domesticas and Insititias. In fruit and tree, the St. Juliens are so similar to the Damsoms that they can be said to be but a vigorous Damson used as a stock, although the fruits are occasionally sweet, while Damsons are always sour and astringent.

The Myrobalan plum.

Myrobalan as a name of a plum was used as early as the last half of the sixteenth century, but why applied to this plum is not known. Myrobalan had long before been employed, and is still, as the name of several plum-like fruits of the East Indies, not of the genus Prunus, which are used in tanning, dyeing, ink-making, and embalming.

203. Botanical description of the Myrobalan plum.—Formerly placed by different botanists under several specific names, the Myrobalan plum is now called by all *P. cerasifera.*

3. *Prunus cerasifera,* Ehrh. Tree 25 feet in height; branches upright, slender, twiggy, unarmed or sometimes thorny. Leaves small, short-ovate; texture firm, light green, glabrous on both surfaces at maturity, margins finely and closely serrate; petiole ½ or ¾ inch long, slender, glandless, glabrous. Flowers large, ¾ inch in diameter, expanding with the leaves. Fruit small, ½ inch in diameter, cherry-like, red or yellow; skin thin and tender; flesh soft, juicy, sweet, pleasantly flavored; stone oval, short-pointed at both ends, turgid, ridged on one suture and grooved on the other.

204. Distribution and use of Myrobalan plums.—This species is generally distributed wherever plums are grown, because of its use as stocks for other species. For this purpose it is held in high esteem the world over. It is now employed more than any other stock, and may commonly be fruiting here and there from plants set for or used as stocks. It does not sprout as badly as other stocks, is adapted to many soils, and the young trees grow well and are readily budded, giving at the start a strong and vigorous orchard tree.

Japanese plums.

Japanese plums are now cultivated wherever plums are grown. The wild form is not known. It is, however, almost certainly a native of China, though the habitat of the species cannot be determined accurately until western and southwestern China have been explored by botanists.

205. Botanical description of the Japanese plum.—Long known as *P. triflora*, or the Triflora plums, it was but recently learned that the first tenable botanical name given this group of fruits is *P. salicina*.

4. *Prunus salicina*, Lindl. (Plate VII) Tree 20-30 feet in height; bark thick, rough, reddish or cinnamon-brown, peach-like. Leaves small, oblong-obovate; margins closely serrated, sometimes in two series; teeth usually glandular; petioles ½ inch in length, tinged with red; glands few or several, usually globose, greenish. Flowers first of plum blossoms to appear, ¾ inch in diameter; 3 springing from each flower-bud. Fruit 1-2 inches in diameter, globular, heart-shaped or conical; cavity deep; apex pointed; suture prominent; color bright red or yellow, never blue or purple, lustrous, with little or no bloom; dots small, numerous, conspicuous; skin thin, tough, astringent; flesh red or yellow, firm, fibrous, juicy; stone clinging tenaciously or free, small, rough, oval, one edge grooved, the other ridged.

206. Botanical differences between Japanese and other plums.—The botanical differences between these Asiatic plums and those from Europe and America are most interesting. In general aspect, the trees of the Japanese plums in summer or winter are much more like those of the American species than those from Europe or west Asia; so, also, the fruits are more alike in appearance and in quality, and the peach-like foliage of the Japanese might easily be mistaken for that of the native varieties of Hortulana or Munsoniana. In the manner in which the buds are borne and in vernation, the resemblance of the oriental species to the Americanas, Hortulanas, and Munsonianas is again most striking. In Asiatic and American species the buds are borne in twos and threes, while in the European species they are more often single or double. As might be expected from their nearness of kin, the Japanese plums hybridize readily with the American species and especially with the Hortulanas and Munsonianas, species which they most resemble, and between which there are several valuable hybrids.

207. Status of Japanese plums in American pomology.—In spite of the fact that these plums have been grown in America less than a half century, no less than ninety-two varieties are under cultivation. At first they were considered desirable only for the southern states, but most of them prove to be nearly as hardy as the Domestica plums in the northern states, and they are now widely distributed north and south. Undoubtedly the most valuable attribute of Japanese plums is wide realm of adaptability, it having turned out that they are adapted to a much wider range of conditions than the Domesticas. Even where both types of plums succeed, the newer plum introduces several very desirable features. Thus, as a species, the Japanese are more vigorous and productive than the Domestica plums, earlier in coming in bearing, and freer from diseases, especially black-knot and leaf-blight. They are also less subject to curculio than the native and European species; the fruits keep longer than those of the better-known Europeans, and ship as well. As compared with native varieties, the plums from Japan are larger, handsomer, and better flavored, and keep and ship better.

Some disadvantages are that Japanese plums blossom so early as often to be caught by spring frosts; they are subject to brown-rot; for the most part they are clingstones; the species is less hardy to cold than the Domestica plums; lastly they are inferior in quality to the varieties from Europe. The last fault is so serious that, though the average for the Japanese plums is high, making them unquestionably more desirable inhabitants of the orchard than any of the native species, they cannot compete with the Domesticas where the two types can be equally well grown.

Simon's plum.

This plum came to France from China about 1867, thence to America shortly after. The wild form has not been found.

208. The botanical characters of Simon's plum.—The following description is of plants as they grow in American orchards:

5. *Prunus Simonii,* Carrière. Tree small upright, dense, hardy, unproductive. Leaves folded upward, oblong-lanceolate, narrow, long; upper surface dark green, smooth, shining; lower surface pale green, with promi-

nent midrib; margin crenate; petiole short, thick, with 4 large globose glands on the stalk. Flowers appearing very early, small, pinkish-white; borne singly or in pairs. Fruit early; 1¾ by 2 inches in size, oblate, compressed; cavity deep, wide, russeted; suture swollen near the apex which is depressed; purplish-red, overspread with waxy bloom; stem thick, characteristically short; skin tough, bitter; flesh yellow, juicy, tough, firm, mild subacid with a peculiar aromatic flavor; stone clinging, round, turgid, with rough surfaces; ventral suture narrow, with distinct wing; dorsal suture blunt or acute, not grooved.

209. Horticultural characters of Simon's plum.—The general aspect of the tree of this species is more that of the peach than of the plum, and the drupes are as much like apricots or nectarines as plums; but, when all characters are considered, the fruit can be classed better with the plums than with any of the other stone-fruits named. Simonii is widely grown in America for its fruits, but has not become popular, only one variety of the species being now under cultivation. The plums lack palatability and the trees are subject to too many pests. *P. Simonii* has been successfully hybridized with *P. salicina*, and, as secondary crosses, its blood has been mingled with that of some of the native species as well. Most of its hybrid offspring have more value than the parent, for nearly all of them are free from its disagreeable taste.

Americana plums.

The Americana is the predominating native plum both in the wild and under cultivation. It flourishes in nearly all soils and exposures, and is wild or cultivated from Maine to Florida, and northward from Mexico along the eastern slope of the Rocky Mountains, well into Canada. There are many varieties under cultivation.

210. The botanical characters of P. americana.—Since there are several native plums now to be described, the botanical characters must be given in detail.

6. *Prunus americana*, Marsh. (Plate VIII) Tree attaining a height of 30 feet; bark grayish-brown, shaggy with large scales giving a characteristic aspect; branches crooked, long, often pendulous at the extremities, more or less thorny; lenticels numerous, large and distinct. Leaves oblong-obovate, acuminate at the apex and rounded at the base, becoming coriaceous; margins sharply serrate, the coarse and double serrations charac-

teristic; glabrous or slightly pubescent, coarsely veined; petioles slender, 2/3 inch in length, usually glandless. Flowers 1 inch in diameter, two- to five-flowered; pedicels ½ inch long, slender, glabrous. Fruit globose, conical, oval, or oblique-truncate, 1 inch in diameter, red or yellowish, dull, with or without bloom; dots pale, numerous, conspicuous; cavity shallow or lacking; suture a line; skin thick, tough, astringent; flesh yellow, juicy, fibrous, sweet; stone clinging or free, turgid or flattened, apex pointed, ridged on the ventral and grooved on the dorsal suture; surfaces smooth.

211. Horticultural characters of Americana plums.—The fruit is red or orange with red varieties predominating. Wild or cultivated, the fruits of the Americana plums vary greatly in season, size, shape, and flavor. In the orchard, the period of maturity covers a range of several weeks, beginning in August and ending in October. The size of the cultivated sorts ranges from that of a Damson to that of some of the Gages; the shape is round-oval, sometimes oblique and sometimes truncate, and often more or less compressed. The fruits have a pleasant flavor,—when fully ripe the flesh of some sorts is sweet and luscious, hardly surpassed by the best Domesticas. The skin is usually thick and astringent; this with the tenaciously clinging stones is the chief defect although some sorts have an astringent flavor.

The trees are not very manageable in the orchard. They make a slow growth and are hard to control, producing at maturity many leaning trunks that are often crooked, as are also the branches. Nearly all of the varieties over-bear, and unless thinned the fruits are small; not infrequently trees die from over-bearing. A few varieties are unfruitful because of defective pollination. Nearly all sucker badly on their own roots, and, except in cold regions, should be grown on other stocks. There are fewer pests to combat with these than with European plums, yet they are far from being exempt and require as much spraying as do other plums.

All Americana plums are hardy, and some of the varieties can be grown as far north as general agriculture is practiced. This, with the Nigras, will probably always be the chief group for dry cold regions between the Great Lakes and the Rocky Mountains. The flower-buds as well as the trees are hardy, having been known to withstand a temperature of forty degrees below zero. Since the blossoms open comparatively late, there is less damage

from spring frosts than in most other species, even of the natives.

212. The woolly-leaved Americana plum.—*Prunus americana lanata*, Sudw., is a western and southwestern form of *P. americana*, the sub-species being distinguished from the species by the amount and character of the pubescence on the leaves and shoots. The leaves, petioles and shoots of this plum are soft-pubescent, almost tomentose, the tomentum being pale in color and usually very dense; the calyx-lobes are pubescent on both sides and the pedicels are appressed and densely pubescent. Two varieties of this sub-species, Wolf and Van Buren, are in general cultivation in regions in which Americana plums are grown.

Hortulana plums.

A valuable plum, *P. hortulana*, is wild in the southern and central Mississippi Valley. These Hortulanas, of which there are about twenty named sorts, are adapted to a wide range of climate and soil and serve a somewhat distinct purpose in pomology, that of a very good jelly-making plum.

213. Botanical characters of P. hortulana.—Study of the *P. hortulana* in the description which follows, made from wild and cultivated plants, shows that it is one of the most distinct of the native plums.

7. *Prunus hortulana*, Bailey. Tree 30 feet in height; branches rough and shaggy; spreading, twiggy, slender, thorny; lenticels few, large, raised. Leaves 1¾ inches wide, 3 to 5 inches long, long-oval with a tapering acuminate apex, thin; margins serrate, sometimes in a double series, glandular; veins very pubescent, with characteristic orange color; midrib very prominent; petioles slender, 1 inch in length, tinged with red; glands 2-8, small, globose. Flowers blooming later than any other cultivated plum, ¾ inch across; clusters borne from lateral buds on one-year-old wood only, characterizing the species; 2-6 flowers from a bud; pedicels ¾ inch long, slender, glabrous. Fruit very late, globose, oval, 1 inch in diameter; red or yellow; dots numerous, small, conspicuous; suture shallow or a line; skin thick, tough, astringent; flesh yellow, juicy, coarse, fibrous, firm, sweet, astringent at the pit, aromatic; stone clinging to the flesh, turgid, long-oval, small, prolonged at the ends, the surfaces rough and reticulated.

214. Pomological characters of Hortulana plums.—The Hortulanas are particularly suited to the Mississippi Valley and southern states, and fruit well as far north and east as

New York. The product of Wayland, Kanawha, and Golden Beauty, best known of the plums belonging to this species, is especially suitable for preserves, spicing, and jelly. The fruits are too acid and the flesh clings too tenaciously to the stone for dessert plums or even for ordinary culinary purposes. These plums ship and keep well, and, since they are the latest of the native sorts in ripening, extend the season for this fruit very materially. The Hortulana plums hybridize freely with other native species, and their hybrids are such as to commend this species very highly to plum-breeders.

215. The Miner plums.—*Prunus hortulana Mineri*, Bailey, (Plate IX), is a sub-species which differs from the species in having shorter stiffer branches; leaves smaller, thicker, rougher; the blossoms of the sub-species open a few days earlier; the fruits are larger, lighter red, have more bloom, ripen earlier, yet later than those of any other species, and are quite different in flavor, having more nearly the taste of the fruit of *P. americana;* the stones are very different, being in the sub-species larger, broader, flatter, smoother, scarcely clinging so much, and less pointed.

The chief representatives of the Miner-like plums under cultivation are Miner, Forest Rose, Prairie Flower, and Clinton. In the orchard, the Miner plums behave much like the Americanas. In some respects the fruits are an improvement on those of the Americana varieties. The skin is usually less tough and brighter in color; and the flavor is better. These plums seem to be nearly or quite as hardy as the Americanas, and are adapted to as wide a range of soils. The trees of the Miner plums are more amenable to domestication than those of *P. americana*, having straighter trunks, less unkempt tops, and making larger trees. The fruits ripen so late as to make the varieties of this group especially valuable in prolonging the season for plums in regions in which native varieties are grown exclusively.

Nigra plums.

Nigras are the most northern native plums. They are important pomologically because they can be grown in colder regions than any other plums of this continent.

216. Botanical description of P. nigra.—In fruit and tree, Nigra plums are similar to the Americanas but there are several marked differences, as the description shows.

8. *Prunus nigra*, Ait. Tree small, seldom exceeding 20 feet in height; bark thin, rough, but not shaggy; branches upright, stout, armed with stout spiny spurs. Leaves large, broad-oval, with a long-acuminate apex and cuneate or subcordate base; margins doubly crenate-serrate, with teeth tipped with glands which disappear as the leaves mature; upper surface glabrous, the under surface pubescent when young; petioles 2/3 inch long, stout, with two large dark red glands near the blade. Flowers 1½ inches across; borne in three- or four-flowered umbels on glabrous red pedicels ½ inch in length. Fruit early; round-oblong, 1 inch in diameter, red, orange or yellow in color, with little bloom; skin thick, tough, astringent; flesh yellow, firm, acid or astringent; stone clinging, large, oval, thick-walled, with a sharp ridge on the ventral and a groove on the dorsal suture.

217. Pomological characters of Nigra plums.—The trees not only endure more cold than those of the last-named group, but their tough wood enables them to stand better the weight of snows and the stress of winds. Earliness in ripening, also, prolongs the season for this type of fruit; and, in regions where the season is short, the Nigras may be grown with more certainty than other groups. About forty varieties of this species are under cultivation.

Angustifolia plums.

The Angustifolia plums are native from southern Delaware to Florida and westward to the Panhandle of Texas and southern Oklahoma. They usually grow in rich soils, but are found as well in worn-out fields and pastures, most often in thickets of small trees or thorny shrubs or scraggly bushes, producing under the latter conditions small fruits so like cherries as to give it the name in some localities of "Mountain Cherry" (Maryland), and in others of "Wild Cherry" (Louisiana).

218. Botanical characters of P. angustifolia.—The species has long been known, and is near at hand to fruit-growers, without many of its offspring coming under cultivation. Neither trees nor fruits are promising for the cultivator, but two subspecies have furnished some six or more sorts each.

10. *Prunus angustifolia*, Marsh. Plant usually forming a distinct trunk with a twiggy bushy top; branches slender, zigzag with long thin thorns

PLATE VIII. An Americana plum—The Wood.

or spine-like branchlets. Leaves folded upward, oblong-lanceolate, pointed at both ends, thin, membranaceous; margins closely and finely serrate; teeth tipped with glands; 2/3 inch wide and 1-2 inches long; petioles ½ inch long, slender, bright red with two red glands near or on the base of the leaf. Flowers small, less than ½ inch across, umbels subsessile, 2- to 4-flowered. Fruit ripening early; ovoid, ¾ inch in diameter, bright red, sometimes yellow, glossy, with little or no bloom; dots numerous, very conspicuous; skin thin; flesh tender, juicy, yellow, subacid; stone small, clinging, ovoid, turgid, roughened, cherry-like, edges rounded, the dorsal one grooved.

219. The Sand plum.—*Prunus angustifolia Watsoni,* Waugh, the Sand plum, is an inhabitant of southern and southeastern Nebraska, central and western Kansas, and possibly passes into western Oklahoma. The wild plums are held in high esteem for dessert and culinary purposes, and are occasionally transplanted to the garden or orchard. From such transplantings a half dozen varieties have arisen. The productiveness, hardiness to heat and cold, and the size and quality of the fruits attract plum-growers in the region of its habitat and experimenters elsewhere as well. The Sand plum differs from Angustifolia in its dwarfer habit; shorter-jointed, zigzag, ashy-gray branches; smaller but thicker leaves; large, thicker-skinned, and better-flavored fruit, which ripens later; and in a smaller and somewhat differently marked stone which does not cling as tightly as in the species.

220. The Variable plum.—*Prunus angustifolia varians,* Wight and Hedrick, in the wild forms dense thickets, the larger specimens attaining a height of ten or twelve feet. When grown in the orchard, the plant is a small tree with spreading branches, sometimes armed with slender spinescent branchlets. The sub-species is distinguished from the species by more robust habit; the young twigs less reddish; by pediceled flowers; and by the stone in most cases being more pointed at the apex. It occurs locally from southern Oklahoma through eastern Texas southward to the Colorado River, and westward to the Panhandle region. The fruit is superior to that of the species. Hybrids between this form and *P. Munsoniana* occur freely both in the wild state and under cultivation. The varieties Eagle and El Paso have probably originated in this way. Nearly all of the plums belonging to this species, some twenty in all, are tender to cold, and none succeeds in the North.

African, Chuck, Jennie Lucas, and Yellow Transparent may be named as representative varieties.

Munsoniana plums.

Pomologically the Munsoniana plums constitute the most important group for the South containing a greater number of cultivated varieties than any other native species excepting *P. americana*, no less than sixty sorts, some of which are deservedly the best known of the native plums for either home or market use. The species is widely distributed in the wild in the southern states.

221. Botanical description of P. Munsoniana.—Long confused with *P. angustifolia*, a comparison of the descriptions shows well-marked differences.

11. *Prunus Munsoniana*, Wight and Hedrick. (Plate X) Tree 20-30 feet in height; bark grayish-brown, shaggy, furrowed; branches spreading, slender, zigzag, little or not at all thorny. Leaves 1¼ inches wide, 4 inches long, oblong-lanceolate; apex tapering, rounded at the base, texture thin; margins closely and finely serrate; teeth with small dark red glands; petioles ¾ inch long, reddish, usually with two glands at the base of the leaf-blade. Flowers late; about ¾ inch across; 2 or 4 flowers in a cluster; pedicels ½ inch long, slender, glabrous. Fruit early; globose, 1 inch in diameter; bright currant-red, rarely yellow; bloom thin; dots conspicuous; cavity shallow, narrow; suture a line; apex rounded; flesh light yellow, juicy, soft, fibrous, sweet; aromatic; stone clinging, prolonged at the apex, obliquely truncate at the base, roughened, grooved on the dorsal edge, thick-margined and grooved on the ventral one.

222. Pomological characters of Munsoniana plums.—For dessert or the kitchen the fruits are particularly valuable, having a sprightly vinous flavor which makes them pleasant to eat out of hand or when cooked. Their bright colors, semi-transparent skins, and well-turned forms make them very attractive in appearance. Unfortunately, nearly all of the varieties of this species are clingstones. This group hybridizes more freely than any other of the plums, and there are a great number of promising hybrids. Of all plums, these are most in need of cross-pollination, some of the varieties being nearly, or, as in the case of Wild Goose, wholly self-sterile. While these plums are especially valuable in the southern states, some of them are desirable in the North as well, where all will grow at least as far

north as central New York. The leading varieties under cultivation are Arkansas, Pottawattamie, Robinson, Newman, Wild Goose, and Downing.

CHERRIES

All of the commonly cultivated cherries, now several hundred, although possibly 1500 have been described, belong to two species or are hybrids between the two. Four other species are of interest to pomologists for cultivated varieties of minor importance or for use as stocks. Botanists enumerate more than a hundred wild cherries, some of which may prove of value when domesticated or for hybridization. The two species of prime importance to pomologists are *P. Cerasus,* the sour cherry, and *P. avium,* the sweet cherry.

KEY TO CULTIVATED SPECIES OF CHERRIES

A. Plants trees.

B. Flowers in few-flowered branching clusters; leaves much longer than broad.

C. Leaves small, short, ovate or obovate, firm, short-pointed ..... 1. *P. Cerasus.*

CC. Leaves large, long, oblong-ovate, soft, taper-pointed ..... 2. *P. avium.*

BB. Flowers in many-flowered umbel-like clusters; leaves small, very broad, nearly round, firm, shining, perfumed ..... 3. *P. Mahaleb.*

AA. Plants very dwarf and bush-like.

B. Under surface of leaves tomentose..... 4. *P. tomentosa.*

BB. Under surface of leaves glabrous or nearly so.

C. Leaves less than 2 inches long, narrowly oblanceolate, thin; petiole glandless ..... 5. *P. pumila.*

CC. Leaves more than 2 inches long, broadly oblanceolate, thick; petiole usually with 1 or 2 small globose glands ..... 6. *P. Besseyi.*

Sour cherries.

Because the trees are hardy, relatively free from disease, easy to care for, and very productive, the sour cherry is grown and esteemed in temperate climates the world over. In all northern fruit regions in North America it is a favorite for home and

market plantations; its popularity is checked only because in many localities the cherry crop is the exclusive property of birds of which the robin is the chief offender.

223. Prunus Cerasus, the sour cherry, described.—The systematic standing of this group is much confused, various authors having divided what is here considered one species into two or more or subdivided it into several botanical varieties. Pomologists, however, follow the botanical usage which puts all sour cherries in this species.

1. *Prunus Cerasus*, Linn. (Plate XI) Tree reaching a height of 30 feet, round-topped; bark reddish-brown, smooth; branches spreading, slender. Leaves resinous at opening, 3-4 inches long and ½-2 inches wide, obovate, firm in texture; margins finely serrate, often doubly so; teeth tipped with small dark glands; petioles from ½-2 inches long, slender, grooved; glands 1-4. Flowers 1 inch across, white; borne in scaly clusters on one-year-old wood; pedicels ½-1½ inches in length, slender. Fruit round-oblate or cordate, sides compressed; suture indistinct; color light to dark red; stem slender, ½-2 inches in length; flesh dark red, with dark colored juice or pale yellow with colorless juice, tender, melting, acidulous, sometimes astringent; stone free or clinging, round, smooth; ventral suture ridged.

224. Habitat and history of the sour cherry.—The species is so frequent an escape from cultivation that it is difficult to tell where its wild form grew. Probably it is truly wild in southeastern Europe and southwestern Asia, where at least it now seems most common and at home in the wild form. Wherever cultivated the sour cherry escapes and is multiplied from seed distributed by birds or by growing from suckers which spring so freely from the roots that the species is unfit for a stock in orchard work. The cherry antedates the Christian era—how long it is difficult to tell. Certainly it grew in Rome a few centuries before Christianity and by that time was probably well distributed in every part of Europe where agriculture was practiced. It was grown in Greece and neighboring countries many hundreds of years before it was taken to Rome. The earliest settlers brought the cherry to North America, and pioneers found it easiest to grow and one of the most acceptable fruits as the agriculture of the continent was developed. About 300 varieties are under cultivation.

225. Groups of cherries.—Sour cherries cultivated for their fruits are divided into two groups, each of which has many varieties. A third section is grown for the manufacture of a liqueur. The groups cultivated for their fruits vary greatly in tree and fruit, but have one character on which the division is made; the juice in the fruits of one group is red, in the other it is colorless.

(1) *The Amarelles.*—Cherries with colorless juice are called Amarelles, from the Latin *amarus, bitter,* a name probably first employed by the Germans but now in general use wherever cherries are grown. These Amarelles are pale red fruits, more or less flattened at the ends. Despite the derivation of the name Amarelle, they have less bitterness than the other group of varieties of the sour cherry. They are also less acid than the darker colored cherries, and are therefore more suitable for eating out of hand, the dark-colored sorts being almost exclusively culinary fruits. The common representatives of this group are Early Richmond, Montmorency, and the various cherries to which the word Amarelle is affixed, as King Amarelle and Späte Amarelle.

(2) *The Morellos.*—The second group, the Morellos, are varieties with reddish juice and usually with very dark fruits, which are more spherical or cordate in shape than the Amarelles, the Morellos of several languages or the Griottes of the French. The first term has reference to the color, the word Morello coming from the Italian, meaning *blackish;* while Griotte, from the French, probably is derived through *agriotte* from *aigre,* meaning *sharp,* in reference to the acidity of the fruits. *Weichsel* is a German group name for these cherries, less commonly used than the other two terms. The trees of the Morello-like varieties are usually smaller, bushier, and more compact than those of the Amarelles. The branches, as a rule, are more horizontal, often drooping, are less regularly arranged and more slender. The leaves, in typical varieties, are of a darker green, smaller, thinner, and pendent, while those of the Amarelles are either horizontal or inclined to be upright; the leaves are also toothed less deeply and more regularly. The typical varieties of this group are English Morello, Ostheim, Olivet, Brusseler Braune, Vladimir, and Riga.

(3) *The Marascas.*—A third division of the species is the Marasca cherry from which is made maraschino, a distilled liqueur much used in Europe as a drink, and in Europe and America in the manufacture of maraschino cherries. The Marasca cherry is a native of the province of Dalmatia, in Southern Europe, where the trees grow wild, and are now sparingly cultivated. Botanists include this cherry in the species under discussion as *P. Cerasus marasca*. Marasca cherries differ from the other cultivated forms chiefly in the greater vigor of the trees, relatively finer serrations of the leaves, longer stipules, and a more compact inflorescence. The fruits are much smaller than in the common sour cherries, are deep red or almost black in color, and have intensely red flesh and juice. The cherries are very acid, with a bitter taste that gives flavor to the maraschino made from them.

Sweet cherries.

The botany of the sweet cherry is variously interpreted by botanists and pomologists; but if there are distinct species, as there seem to be subspecies, they have been hopelessly mixed by hybridization under cultivation. Botanists and pomologists now agree in putting all cultivated sweet cherries in the type species, the description of which follows.

226. Prunus avium, the sweet cherry, described.—*P. avium* is everywhere known in temperate climates as the sweet cherry. Wild forms are variously called Mazzard, Bird, Wild, Crab, and Gean cherries.

2. *Prunus avium,* Linn. (Plate XII) Tree reaching a height of 40 feet, upright-spreading, with a central leader; branches stocky, smooth. Leaves resinous at opening; drooping, 4-6 inches long, 2-3 inches wide, oblong-ovate, thin; margin coarsely and doubly serrate, glandular; petiole 1¾ inches long, slender, dull red, with 1-3 small, globose, reddish glands on the stalk. Flowers white, 1¼ inches across; in clusters of 2 or 3; pedicels 1 inch long, slender, glabrous. Fruit early; 1 inch in diameter, cordate; suture a line; yellow, red or purplish-black; dots numerous, small, russet; stem 1½ inches long, adherent to the fruit; flesh yellow, red, or dark purple with colorless or colored juice, sweet; stone semi-clinging, ⅜ inch long, elliptical, flattened, blunt, with smooth surfaces.

227. Habitat and history of the sweet cherry.—While now thriving in many parts of Europe, Asia, and northern Africa,

the original home of the species was probably southern and central Europe and Asia Minor, where it grows in moderately dry soils and seldom in the shade, preferring always warm sunny sites, such as gravelly or stony hillsides. The predilections cling to the species in its cultivated varieties. The sweet cherry has been cultivated in all parts of Europe as far back as written records go. From what is known of the histories of hardy fruits, one may surmise that the sweet cherry was one of the first to come under cultivation; certainly the wild product of no other of these fruits would be as enticing to beginners in agriculture. The first colonists who came to America from all of the European countries brought the sweet cherry, and have taken it with them in all of their migrations from older to newer parts of the continent. The number of cultivated varieties of sweet cherries is about 600.

228. The sweet cherry as a stock.—Under the name Mazzard, the sweet cherry, usually grown as a seedling, is almost universally used as a stock, in North America competing with the Mahaleb for this purpose. Three characters commend Mazzard stocks: the trees are very vigorous and make strong nursery and orchard plants; they do not sucker as do nearly all other cherries; and when well grown, the stocks are easily budded. Faults are: the seedling trees are not hardy enough for cold climate; and the foliage in the nursery is very susceptible to fungi. In most climates, Mazzard is the best stock for sweet cherries, and sour cherries usually make a larger growth on it than on the Mahaleb which is being more and more used in eastern America at least.

229. Groups of sweet cherries.—Wherever sweet cherries are grown, two pomological groups are recognized, the distinguishing characters of which are soft and firm flesh. Each of these groups is divided into two subgroups in accordance with color of fruit and juice.

(1) *The Geans.*—Sweet cherries with soft tender flesh form a group known by the French name Guigne or the English Gean. These are also for the most part the Heart cherries of common parlance. These soft-fruited cherries may be divided into dark colored varieties with reddish juice and light colored sorts with colorless juice. Typical light colored Geans are Coe,

Ida, Elton and Waterloo; dark colored ones are Black Tartarian, Early Purple and Eagle.

(2) *The Bigarreaus.*—The second group is distinguished by the firm breaking flesh of the fruits,—the Bigarreaus of several languages, the name originally having reference to the diverse colors of the fruits. This group is further divisible in accordance with color of fruit and juice into black and light Bigarreaus. Chief of the black cherries falling into this division are Windsor, Schmidt and Mezel; of the light ones, which are much more numerous, Yellow Spanish and Napoleon are representative sorts.

Hybrid or Duke cherries.

230. Hybrid cherries.—The Duke cherries, long placed by most pomologists and botanists in a botanical variety of *P. avium,* are hybrids between the sweet and the sour cherry. A study of the characters of the varieties of Duke cherries shows all gradations between *P. Cerasus* and *P. avium,* though, in the main, the hybrids resemble the sweet more than the sour cherries, differing from the former most noticeably in having acid flesh.

Sterility is a common attribute of hybridism. In this respect, the Dukes behave like hybrids; most of the seeds are sterile, and in none are the seeds so fertile as in varieties known to be pure-bred as to species. Also, shrunken pollen-grains indicate hybridity. A study of the pollen of Duke cherries shows many grains, the greater proportion, to be abnormal, a condition not found in the pollen of varieties true to species. Crosses between sweet and sour cherries at the New York Experiment Station have given many Dukes. May Duke, Reine Hortense, and Late Duke are the leading hybrid varieties.

There are dark-colored Duke cherries with reddish juice and light-colored sorts with uncolored juice, just as in the two parent species. May Duke is a typical variety with colored juice, while Reine Hortense is probably the best-known cherry among these hybrids with uncolored juice. There are about sixty-five cherries listed as "Dukes." The name Duke comes from the variety May Duke, which is a corruption of Médoc, a district in France, whence this variety came. The cherries

of this group are known as Dukes only in England and the United States; in France, the name *Royale* is given to them.

The Mahaleb cherry.

The Mahaleb is never grown for its fruits, but it now furnishes the stocks upon which nearly all the cherries grown in eastern America are propagated and a large part of those of the Pacific states.

231. Prunus Mahaleb described.—The following brief description should enable any student to identify the Mahaleb cherry, a fruit quite different from the edible-fruited species:

3. *Prunus Mahaleb,* Linn. (Plate XIII) Tree small, slender; branches roughened, ash-gray over reddish-brown. Leaves numerous, 1 inch in length, 1¼ inches wide, obovate, thick, leathery; margin finely crenate, with reddish-brown glands; petiole ½ inch long, slender, greenish, with 1-3 small, globose, greenish glands. Flowers small, ½ inch across, white, fragrant; 6-8 scattered on stem 1 inch in length; terminal pedicels ¼ inch long and basal pedicels ½ inch long. Fruit very small, round-ovate; suture a line; apex pointed, with stigma adherent; color black; flesh reddish-black, astringent, sour, not edible; stone free, small, ovate; ventral suture prominent.

232. Habitat of the Mahaleb cherry.—The Mahaleb, known also as the St. Lucie and the Perfumed cherry, is a wild inhabitant of all southern Europe as far north as central France, southern Germany, Austria-Hungary; and eastward through Asia Minor and Caucasia to and within the borders of Turkestan. Wild or cultivated, the Mahaleb is a shallow-rooted plant, a fact that must be taken into consideration in its use as a stock. The Mahaleb is a common escape from cultivation in eastern North America, especially about the nursery centers of central New York. This is called the Perfumed cherry because every part of the plant emits a powerful odor somewhat like that of clematis.

The Tomentose cherry.

233. Pomological characters.—This shrub-like cherry from central Asia is very generally cultivated in China and Japan for its fruit and as an ornamental. It has been introduced in many widely separated places in North America, and appears to be promising for cold regions. The plant is twiggy, close-

jointed, usually with many stems springing from the ground which bear branches quite to the base. Frequently these low-growing branches bend to the ground and take root, forming new plants. The bushes are thickly clothed with leaves densely tomentose on the under side,—in this respect and in shape very unlike the foliage of common cultivated cherries. The fruit ripens in midseason, setting profusely from the many blossoms. The cherries are a half-inch in diameter, bright currant-red, covered with inconspicuous hairs, are pleasantly acid, and very juicy. The tomentose cherry is a most promising plant for domestication and has particular merit for small gardens.

234. Prunus tomentosa described.—A botanical as well as a pomological description is needed to give a complete mental picture.

4. *Prunus tomentosa*, Thumb. (Plate XIII) A dwarf bush-like plant, vigorous, hardy; trunk and branches stocky; branches smooth, grayish-brown. Leaves numerous, 2⅛ inches long, 1½ inches wide, obovate, velvety; upper surface dull, dark green, rugose; lower surface thickly pubescent, with a prominent midrib and veins; margin serrate; petiole 3/16 inch across. Flowers small; borne singly or in pairs; pedicels short, thick, glabrous. Fruit ½ inch in diameter, round; cavity deep, narrow, abrupt; suture shallow; apex depressed, with adherent stigma; color currant-red; dots numerous, small, gray, obscure; stem ¼ inch in length; pubescent; skin thick, tender, covered with light pubescence; flesh light red, with light red juice, stringy, sprightly, sour; stone clinging, pointed, with smooth surfaces.

The Sand cherry.

The sand cherry of eastern America is found on sandy inland shores from Maine to the District of Columbia and northwestward to the Lake of the Woods in Canada. It grows in light sands,—a fact which suggests its use in arid regions and especially on poor soils in cold climates. As yet there seem to be no named varieties of this cherry, since its nearly related species, *P. Besseyi*, offers greater opportunities to the fruit-grower. Both plants and fruits are so variable, the size, color and quality of the crop on some plants being quite attractive, that it is certain that an opportunity is being overlooked to domesticate a worthy native plant. The species ought to have value as a stock on which to work other cherries for sandy soils, dwarf trees, and exacting climates. Recently the sand cherry has been

separated into two species, *P. pumila* proper of the Great Lakes, and *P. depressa* the more eastern plant; the differences have not been worked out pomologically, however, and present treatment may follow traditional lines.

235. The Sand cherry described.—A full description is given that the species may be told readily from the closely related *P. Besseyi.*

5. *Prunus pumila,* Linn. Plant a shrub 5-8 feet in height, decumbent; trunk slender, smooth except for the raised lenticels; branches slender, smooth, twiggy, dark, dull reddish-black with a tinge of gray. Leaves hanging late in the season, small, 1¾ inches long, 1 inch wide, flat, pointed, narrowly oblanceolate, thin; lower surface thinly pubescent on the midrib and veins; midrib small, straight; veins very minute; margin serrate, with teeth tipped with very small glands; petiole short, 1¾ inches in length, glandless. Flowers small, in 2- to 5-flowered umbels, white; pedicels slender, ½ inch in length. Fruit round, pendulous, purple-black, without bloom, ½ inch in diameter; flesh thin, sour and astringent; season late; stone turgid, round.

The Western Sand cherry.

The western sand or Rocky Mountain cherry is found on the prairies from Manitoba and Minnesota to southern Kansas and westward into Montana. In its natural range, it undoubtedly runs into that of the eastern sand cherry and some botanists believe that the two species grade into each other; but the two are as distinct as are many other of the more or less indefinite species of this genus.

236. Prunus Besseyi described.—The following description should be compared carefully with that of the eastern sand cherry.

6. *Prunus Besseyi,* Bailey. Plant a small spreading shrub, 1-4 feet in height; trunk slender, smooth; branches slender, smooth, brownish-black, with numerous lenticels. Leaves hanging late, numerous, small, 2⅜ inches long, 1 inch wide, thick, stiff; apex with a short taper-point, broadly lanceolate; upper surface dark green, glossy, smooth; lower surface with teeth tipped with indistinct glands; petiole thick, ⅜ inch in length, glandless or with one to two small globose glands; stipules leaf-like. Flowers in sessile umbels, small, white. Fruit ½ inch in diameter, globose, oblong-pointed, yellow, mottled or purple-black; more or less astringent; stone large, globose, flattened.

237. Pomological characters of the Western Sand cherry.—Although this cherry has received attention less than a quarter

century, it has aroused much interest, best indicated by the fact that now several varieties are under cultivation. The flesh is tender and juicy, and, while generally astringent, plants bearing aromatic and palatable cherries are often found growing wild, and some of the domesticated plants bear very well-flavored fruits. The western sand cherry is remarkably productive, and has unusual capacity to withstand the vicissitudes of the exacting climate in which it grows. Fruits from different plants vary in size, color, and flavor,—a fact which suggests that, under cultivation, amelioration will proceed rapidly. The plants of this species root freely from layers or root-cuttings, and are, therefore, easily propagated and multiplied.

The sand cherry makes a good stock for peaches, apricots, Japanese and native plums; and, while it does not consort so readily with the true cherries, yet it can be used as a stock for them. On the other hand, larger fruits of the sand cherry can be grown when it is budded on stocks of the American plum, *P. americana*.

238. The Western Sand cherry a parent in many hybrids.— The student in systematic pomology will find many hybrids of the drupe-fruits in which the western sand cherry is one of the parents. There are now hybrids under cultivation between this species and the sand plum (*P. angustifolia Watsoni*), the Hortulana plum (*P. hortulana*), the Simonii plum (*P. Simonii*), the Japanese plum (*P. salicina*), the American plum (*P. americana*), the cherry plum (*P. cerasifera*), *the sweet cherry* (*P. avium*), the peach (*P. Persica*), the apricots (*P. Armeniaca* and *P. Mume*), and the common plum (*P. domestica*). This species seems to be the "go-between" of the many varied types of the genus Prunus.

CHAPTER XIV

THE GRAPE

GRAPES belong to Vitis, the most important genus in the Vine family (Vitaceæ), less notable plants in which are Virginia creeper and several species of Cissus. Pomologists, however, are interested only in Vitis in this family, the chief characters of which are now to be given.

239. The genus Vitis.—It is difficult to determine how many species should be recognized in Vitis, as botanists divide the genus differently. Probably all would agree that there are forty to fifty species widely distributed in the temperate and subtropical regions of the northern hemosphere. Of these, eleven are more or less cultivated in North America for their fruit, for stocks, or have been used in grape-breeding. There are, however, but five species with cultivated varieties of present importance in propagation or hybridization. The fruits are so different as to furnish a usable key.

Plants climbing or trailing, rarely shrubby, with woody stems, and mostly with coiling naked-tipped tendrils. Leaves alternate, simple, palmately lobed, round-dentate, or heart-shaped-dentate. Stipules small, falling early. Flowers polygamous-diœcious (some plants with perfect flowers, others staminate with at most a rudimentary ovary), five-parted; petals separated only at the base and falling off without expanding; disk hypogynous with five nectariferous glands which are alternate with the stamens. Berry globose or ovoid, few-seeded, and pulpy. Seeds usually 4, bony, pyriform, and beak-like at the base.

KEY TO CULTIVATED SPECIES OF VITIS

A. Skin separating from the pulp.

B. Clusters with 3-15 berries; bunch globular; berries falling from the bunch at maturity ..... 1. *V. rotundifolia.*

BB. Clusters with more than 15 berries (at least under cultivation); bunch oblong; berries clinging to the bunch at maturity.

C. Berries ½ inch or more in diameter; purple-black, reddish-brown, greenish-yellow; foxy taste and odor ..... 2. *V. Labrusca.*

CC. Berries less than ½ inch in diameter; with little or no foxy taste or odor.

D. Color of berries purple black, with heavy bloom; sharply acid; seeds notched; chalaza narrow-oval; raphe a groove ..... 3. *V. vulpina.*

DD. Color of berries purplish or reddish; with medium bloom; more or less astringent; seeds not notched; chalaza oval; raphe a ridge... 4. *V. æstivalis.*

AA. Skin and pulp firmly adhering in the ripened fruit 5. *V. vinifera.*

240. Description blank for grapes.—The following blank contains most of the characters students and fruit-growers will use in describing the grape:

DESCRIPTION BLANK FOR THE GRAPE

Name..... Vineyard..... Row..... No....

Date..... 19..

Vine

Vigorous, medium, weak
Upright, horizontal
Straggling, dense, open
Tender, half-hardy, hardy
Very productive, productive
Medium productive, unproductive

TRUNK
Large, medium, small
Stocky, medium, slender

Bark
Loose, adherent
Smooth, shreddy

CANES
Long, medium, short
Numerous, medium, few
Thick, medium, slender
Ash-gray, yellow, green
Red, brown
Sinuous, straight, zigzag

Nodes
Enlarged, angular, flattened

Internodes
Long, medium, short

Tendrils
Continuous, intermittent
Thick, medium, slender
Long, medium, short
Simple, bifurcated, trifurcated
Smooth, warty

FLOWERS
Fertile or sterile
Date of bloom .....
Early, medium, late

Stamens
Upright, reflexed

LEAVES
Large, medium, small
Cordate, roundish
Thick, medium, thin

Upper surface
Light, medium, dark green
Dull, glossy
Smooth, medium, rugose

Lower surface
Pale green, bronze
Bluish, whitish
Pubescent, downy, hairy
Woolly, cobwebby

Lobes
Number .....
Terminal lobe
Obtuse, acute, acuminate

Petiolar sinus
Deep, medium, shallow
Wide, medium, narrow
Closed, overlapping

Basal sinus
Deep, medium, shallow
Wide, medium, narrow

Vine, continued
LEAVES, CONTINUED
Lateral sinus
Deep, medium, shallow
Wide, medium, narrow
Margin
Serrate, dentate, crenate
Teeth
Shallow, medium, deep
Wide, medium, narrow
Fruit
DATE OF RIPENING .....
SEASON .....
Early, medium, late
KEEPING QUALITY .....
SHIPPING QUALITY .....
CLUSTER
Large, medium, small
Long, medium, short
Broad, medium, slender
Roundish, tapering, cylindrical
Regular, irregular
Single, double-shouldered
Loose, medium, compact
Peduncle
Long, medium, short
Thick, medium, slender
Pedicel
Long, medium, short
Thick, medium, slender
Warts
Brush
Long, medium, short
Wine, pink, yellow
BERRY
Strongly or medium adherent, shells
Large, medium, small
Uniform, variable
Roundish, oval, oblate
Black, blue
Light or dark purple
Light or dark red
Light or dark green
Amber, yellow, white
With thick, medium, thin bloom
SKIN
Thick, medium, thin
Tough, medium, tender
Adheres or separates from pulp
FLESH
White, greenish, red
Transparent, translucent
Meaty, medium, soft, melting
Tender, tough, stringy
Juicy, medium, dry
Clear, pink, wine-colored
Sweet, subacid, sprightly
Sour, vinous, musky
Spicy, foxy
Quality
Best, very good, good
Fair, poor, very poor
SEEDS
Separate from pulp easily, with difficulty
Average number
Large, medium, small
Long, medium, short
Broad, medium, narrow
Notched, rounded
Blunt, pointed, beaked
Brown, yellow
Raphe
Obscure, medium, cord-like
Chalaza
Above center, median, below center
Circular, oval
Distinct, obscure
Raised, sunken
USE
Dessert, kitchen
Market, home, raisin

Remarks .....
.....

ROTUNDIFOLIA GRAPES

Fruits of wild plants of Rotundifolia have been used since the first settlements on the mainland of North America, but it is only within comparatively recent years that cultivated varieties, or at least more than two or three, have taken a place in the pomology of the South. Now there are a score or more pure-bred Rotundifolias and a few hybrids, and the species,

though long known through a few varieties, is becoming more and more prominent.

241. Vitis rotundifolia described.—This grape is easily distinguished from other cultivated species by marked differences in wood, foliage, and fruit. It is variously known as the Muscadine, Bull, Bullet, Bushy, Bullace, Scuppernong, and Southern Fox grape.

1. *Vitis rotundifolia*, Michx. (Plate XIV) Vine very vigorous, often sending out aerial roots; bark smooth, without prominent warty lenticels; shoots short-jointed, angled, with fine scurfy pubescence; diaphragms absent; tendrils intermittent, simple. Leaves small, broadly cordate or roundish; petiolar sinus wide, shallow; margin with obtuse wide teeth; not lobed; dense, light green, glabrous above, pubescent along veins below. Cluster small, loose; peduncle short; pedicels short, thick. Berries large, globular, black or greenish-yellow; skin thick, tough and with a musky odor; pulp tough; ripening unevenly and dropping as soon as ripe. Seeds flattened, broadly notched; beak very short; chalaza narrow, depressed with radiating ridges and furrows; raphe a narrow groove.

242. Habitat of the Rotundifolia grapes.—The habitat of this species is southern Delaware, west through Tennessee, southern Illinois, southeastern Missouri, Arkansas (except the northwestern portions), to Grayson County, Texas, as a northern and western boundary to the Atlantic Ocean and the Gulf on the east and south. It becomes rare as one approaches the western limit, but is common in many sections of the region outlined, being most abundant on sandy well-drained bottom lands, along river banks in swampy woodlands. Some ten or twelve Rotundifolia grapes are well known in southern vineyards of which Scuppernong, James, Thomas, Flowers, and Memory are probably the most typical.

243. Pomological characters of Rotundifolia grapes.—The fruit of Rotundifolia is very characteristic. The skin is thick, adheres strongly to the flesh, and is marked with lenticel-like russet dots. The flesh is tough, but the toughness is not localized around the seed as in Labrusca. The fruits are characterized by a strong musky aroma. The most promising outlook for Rotundifolia varieties is for culinary purposes. Rotundifolia does not produce fruit suitable for shipping or dessert as the berries ripen unevenly, and when ripe drop from the cluster. The juice which exudes from the point where the stem is broken

off causes the berries to become smeared and gives them an unattractive appearance. Under favorable conditions, the vines attain great size and when grown on arbors without pruning, cover a large area. Rotundifolia is remarkably resistant to the attacks of all insects and fungal diseases. Phylloxera do not attack its roots, and it is as resistant as any other American species to this pest. The vines are grown from cuttings only with difficulty, and this prevents the use of this species as a resistant stock. There is great difficulty in crossing Rotundifolia with other species, but several hybrids are now on record.

Labrusca Grapes

By far the greater part of the native grapes grown in North America belong to *V. Labrusca.* The berries of this species are largest, most attractive in color, and best flavored. The habitat is in the part of America where agriculture first advanced to the state in which fruits were wanted. The domesticated forms of this grape have recently been separated as *V. Labruscana,* the Labruscans.

244. The botanical characters of V. Labrusca.—This is the Fox and the Skunk grape of the eastern part of North America between the Atlantic Ocean and the Alleghany Mountains from Maine to Georgia. Occasionally it breaks out of its usual range and is found west of the region outlined. As a species, *V. Labrusca* is very distinct although sometimes confounded with *V. æstivalis,* from which, however, by comparing the descriptions it can be distinguished easily.

2. *Vitis Labrusca,* Linn. (Plate XV) Vine vigorous, stocky; shoots cylindrical, densely pubescent; diaphragms thick; tendrils continuous, bifid or trifid. Leaves with long cordate stipules; leaf-blade large, thick, broadly cordate or round; entire or 3-lobed, frequently notched; sinuses rounded; petiolar sinus V-shaped; margin with shallow, acute-pointed, scalloped teeth; upper surface glabrous when mature; lower surface covered with dense pubescence, more or less whitish on young leaves, dun-colored when mature. Clusters usually shouldered, compact; pedicels thick; peduncle short. Berries round; skin thick, covered with bloom, with strong foxy aroma. Seeds two to four, large, distinctly notched, beak short; chalaza oval, indistinct, showing as a depression; raphe a groove.

Two types of the species may be distinguished. Vines are found in the woods of New England which resemble Concord

or Niagara very closely in both vine and fruit, except that the grapes are much smaller in size and more seedy. There are also the large-fruited foxy Labruscas, usually with reddish berries, represented by such cultivated varieties as Northern Muscadine, Dracut Amber, Lutie, and others. Labrusca is peculiar amongst American grapes in showing black-, white-, and red-fruited forms of wild vines.

245. The pomological characters of the Labrusca grapes.—The grapes of Labrusca are large and usually handsomely colored. The skin is thick, covering a layer of adhering flesh, which gives the impression of its being thicker than it actually is; the berry is variable in tenderness, sometimes tough, but in many cultivated varieties is so tender that it cracks in transportation. The skin of this species usually has a peculiar aroma, generally spoken of as *foxy*, and a slightly acid astringent taste. The center of the berry is occupied by dense pulp, more or less stringy, with considerable acid close to the seeds. Many object to the foxy taste and aroma of the grapes of this species, but, nevertheless, the most popular American varieties are more or less foxy.

Labrusca submits well to vineyard culture, is fairly vigorous, and generally productive. It grows readily from cuttings, and in hardiness is intermediate between Vulpina and Æstivalis. The roots are soft and fleshy, and in some localities subject to attacks of phylloxera. In the wild vines, the fruit is inclined to drop when ripe. This defect is known among grape-growers as "shattering" or "shelling," and is a serious weakness in some varieties. Labrusca is said to be more sensitive to mildew and black-rot than any other American species. In the South, and in some parts of the Middle West, the leaves of all varieties of Labrusca sunburn and shrivel in the latter part of the summer.

246. Classification of Labrusca grapes.—Of the 2000 native grapes that have been named in North America, possibly 1500 are Labrusca or contain so much Labrusca blood that they are put in this species. It is seemingly impossible to classify these varieties. About all that can be done is to divide them in groups in accordance with the color, flavor, size, and season of the fruits.

The Vulpina Grapes

The Vulpina grapes are adapted to a great variety of soils and climates, and fruit from wild vines is often attractive in appearance, though small, and of good quality. For these reasons grape-growers have expected much from the species. Expectations have not been fulfilled, however, as after more than a century of grape-breeding there are but few pure-bred varieties of Vulpina of value, and it falls far short of two other native grapes in its hybrids.

247. Habitat and botanical characters of V. vulpina.—This species is found in Canada north of Quebec, and thence southward to the Gulf of Mexico, and from the Atlantic coast westward to the Rocky Mountains. Usually it grows on river banks, on islands, or in upland ravines. Its wide range and popularity are indicated by the number of common names, as: Winter, River, Riverside, Riverbank, and Sweet-scented grape. To many pomologists this grape is best known as *V. riparia.*

3. *Vitis vulpina,* Linn. (*V. riparia,* Michx.) (Plate XVI) Vine very vigorous, climbing; shoots cylindrical or angled, smooth, slender; diaphragms thin; tendrils intermittent, bifid. Leaves with large stipules; leaf-blade large, thin, entire, 3- or lower ones 5-lobed; sinuses shallow, angular; petiolar sinus broad, shallow; margin with incised sharply serrate teeth; light green, glabrous above, glabrous but sometimes pubescent on ribs and veins below. Cluster small, compact, shouldered; peduncle short. Berries small, black with heavy blue bloom. Seeds 2-4, small, notched, short, plump, with very short beak; chalaza narrowly oval, depressed, indistinct; raphe a groove, sometimes distinct.

248. Pomological characters of Vulpina grapes.—Several remarkable physiological characters serve systematists in distinguishing Vulpina grapes. Thus, the species shows greater adaptations to soils and climates than most other sorts. In particular, it withstands high degrees of heat and low degrees of cold, thriving alike where American summers are very hot and winters are very cold. Vulpina blooms among the earliest if not the earliest of cultivated grapes. Roots and leaves of Vulpina are highly resistant to phylloxera. The foliage rarely suffers from fungi but is much liked by the leaf-hopper. The vines grow readily from cuttings and make good stocks for grafting.

Several characters of plant and fruit which do not appear in the botanical description are noteworthy. The vine is remarkable for its great vigor. The roots are small, hard, numerous, branch freely, feed close to the surface, and do not seem to be well adapted to forcing their way through heavy clays. The berries are small, but there are occasional varieties with fruits of medium size or above. The clusters are of medium size or above, but if judged from the standpoint of number of berries, might frequently be called large. The flavor is sharply acid but free from foxiness or any disagreeable wild taste. If eaten in quantity, the acidity is likely to affect the lips and the tip of the tongue. The flesh is neither pulpy nor solid, and dissolves in the mouth and separates readily from the seed.

Clinton, Canada, and Bacchus are probably the best-known varieties of the Vulpina type, all of which are black. Quite as well known are Noah, Taylor, Rommel, and Elvira, white grapes which show a preponderance of Vulpina blood.

The Æstivalis Grapes

In no other cultivated species is there as much confusion as in *V. æstivalis*. The type species is distinct and readily distinguished from the other grapes by the reddish fuzz on the under side of the leaves. The two botanical varieties to which nearly all of the vineyard grapes belong are much mixed. Var. *Bourquiniana*, known only in cultivation, is probably a group of hybrids of the type species with *V. vinifera;* var. *Linsecomii* in some vineyard forms is so similar to Æstivalis as doubtfully to be separated from it, and in others is so distinct as to seem to warrant raising the variety to the rank of a species.

249. Habitat and botanical characters of V. æstivalis.—The type species is confined to the southeastern part of the United States from New York to Florida and westward to the Mississippi. In one locality or another in this region it is known as the Blue, Bunch, Summer, Little, Duck-shot, Swamp, Chicken, and Pigeon grape.

4. *Vitis æstivalis*, Michx. (Plate XVII) Vine vigorous, shoots pubescent or smooth; diaphragms thick; tendrils intermittent, usually bifid. Leaves with short broad stipules; leaf-blade large, becoming thick; petiolar sinus deep, narrow, frequently overlapping; margin usually 3- to 5-lobed; teeth

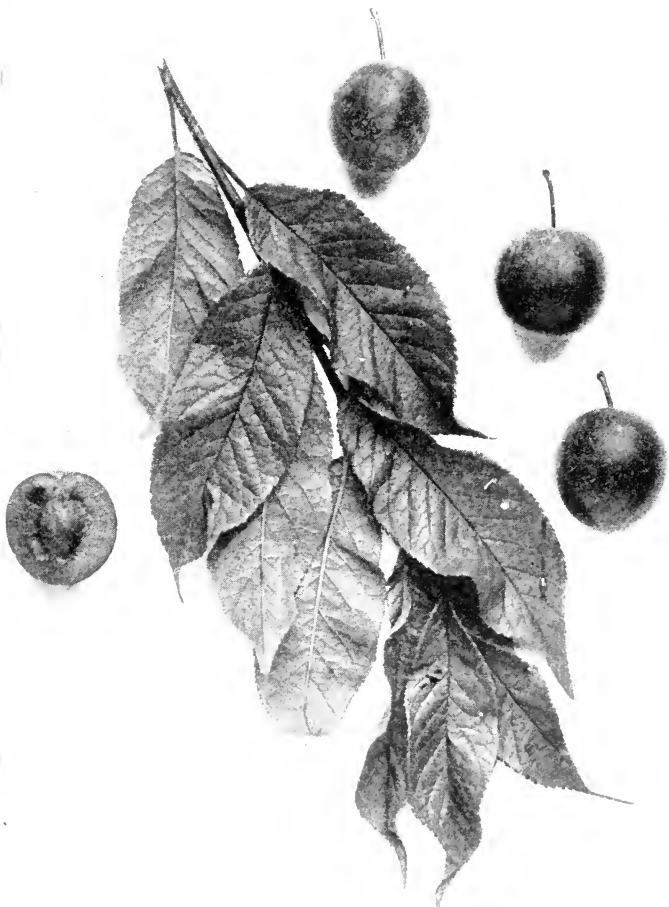

PLATE IX. A Mineri plum—Forest Rose.

dentate, shallow, wide; upper surface dark green; lower surface with more or less reddish pubescence which shows in patches on the ribs and veins; petioles pubescent. Clusters long, with long peduncle. Berries small, with moderate amount of bloom, astringent. Seeds two to three, of medium size, plump, smooth, not notched; chalaza oval, distinct; raphe a distinct cord-like ridge.

250. Pomological characters of Æstivalis grapes.—The berries are destitute of pulp, have a comparatively thin tough skin and a peculiar spicy flavor; they hang to the bunch when ripe much better than do those of Labrusca. The fruit usually has a tart taste, due to the presence of a high percentage of acid, but there is also a large amount of sugar.

The leaves are seldom injured by the sun, and they resist attacks of insects, such as leaf-hoppers, better than any other American species under cultivation. Æstivalis is rarely injured by black-rot or mildew. The hard roots enable it to resist phylloxera, and varieties with any great amount of the blood of this species are seldom seriously injured by this insect. An objection to Æstivalis is that it does not root well from cuttings. Varieties of this species bear grafting well.

There are no pure-bred varieties of the type species under cultivation although there are many varieties showing Æstivalis blood of which Norton, Cynthiana, and Ives are good representatives.

251. Habitat and botanical characters of Linsecomii grapes.—This botanical variety of Æstivalis inhabits the eastern half of Texas, western Louisiana, Oklahoma, Arkansas, and southern Missouri on high sandy land, frequently climbing post-oak trees; hence the name Post-oak grape, by which it is locally known. It is also called the Pine-wood and Turkey grape.

Vitis æstivalis Linsecomii, Munson. Vine vigorous, sometimes climbing high upon trees; canes cylindrical, much rusty wool on shoots; tendrils intermittent. Leaves very large, almost as wide as long; entire or 3-, 5-, or rarely 7-lobed; lobes frequently divided; sinuses deep, smooth above, and with more or less rusty pubescence below. Fruit small to large, usually larger than typical Æstivalis. Seeds pear-shaped; chalaza roundish.

252. Pomological characters of Linsecomii grapes.—This is a promising form from which to secure cultivated varieties for the Southwest. The qualities which recommend it are: vigor,

capacity to withstand rot and mildew, hardiness and capacity to endure hot and dry summers without injury; and the large cluster and berry which are found on certain of the wild vines. The fruit is characteristic because of its dense bloom, firm yet tender texture, and peculiar flavor. The cultivated varieties give satisfaction in many sections of the central and southern states. Like Æstivalis, it is difficult to propagate from cuttings.

T. V. Munson, Denison, Texas, did much to improve this wild grape, his best known varieties being America, Bailey, Beacon, and Munson.

253. Pomological and botanical characters of Bourquiniana grapes.—Bourquiniana is known only in cultivation. It includes many southern varieties, the most important of which are Herbemont and Lenoir. The only northern variety of any importance supposed to have Bourquiniana blood is Delaware. Bourquiniana can be propagated from cuttings more easily than the typical Æstivalis. Many of the varieties of Bourquiniana show a marked susceptibility to mildew and black-rot. The roots are hard, branch rather freely, and are quite resistant to phylloxera.

Vitis æstivalis Bourquiniana, Bailey. Bourquiniana differs chiefly from the type in having thinner leaves; the shoots and under side of the leaves are only slightly reddish-brown in color; the pubescence usually disappears at maturity; the leaves are more deeply lobed than is common in Æstivalis; and the fruit is larger, sweeter and more juicy.

The Vinifera Grapes

Vinifera is the wine-making grape of the temperate parts of the world. In North America it is at present grown well only on the Pacific slope and in the Rocky Mountain regions. In other grape sections of the continent it has failed in the past because the plants do not withstand fungi and phylloxera. Now that fungi and insects are so readily controlled by spraying there are no reasons why varieties of this species cannot be grown wherever native grapes are cultivated in North America, unless, perhaps, in the coldest parts, for Vinifera grapes are more tender to cold than other cultivated species. At present its hybrids with native species are among the best of the cultivated varieties of the country.

254. Botanical characters of V. vinifera.—In fruit and plant *V. vinifera* is very distinct from native species, yet a comparison of the botanical description which follows does not show great differences. It is in its pomological characters that it stands forth from other grapes. In American literature this species appears most commonly as the European or as the Old World grape.

5. *Vitis vinifera*, Linn. (Plate XVIII) Vine not so high climbing as most American species; tendrils intermittent. Leaves round-cordate, thin, smooth, shining, frequently more or less deeply 3-, 5-, or even 7-lobed; usually glabrous but sometimes hairy and even downy when young; lobes rounded or pointed; teeth variable; petiolar sinus deep, narrow, usually overlapping. Berries variable in size and shape, usually oval. Seeds mostly notched at the upper end and characterized always by a bottle-necked elongated beak; chalaza broad, rough, distinct; raphe indistinct. Roots large, soft and spongy.

255. History and habitat of Vinifera grape.—This is the grape of ancient and modern agriculture in the Old World. It is the vine of the Bible and of all ancient literature. When mankind reads, speaks, or thinks of the grape it is this Old World fruit that presents itself. Its history goes back to prehistoric times; its recorded history is interwritten with that of man.

The region about the Caspian Sea is the probable habitat of the Old World grape. Writers do not agree as to the climate desired by Vinifera, for all the varieties in this variable species do not require the same climatic conditions. There are certain phases of climate, however, that are well agreed on; the species requires a dry climate and is more sensitive to change of temperature than American species. Varieties of this species can be grown successfully in a wide range of soils, being much less particular than American sorts.

256. Pomological characters of Vinifera grapes.—Characters of Vinifera not present in native species are: the skin, which adheres tightly to the flesh and which is never astringent nor acid, can be eaten with the fruit; the flesh is firm, yet tender, and uniform throughout, differing in this respect from American grapes, which have a tough and more or less acid core at the center; the flavor has a peculiarly sprightly quality known as

vinous; the berry adheres firmly to the pedicel, the fruit seldom "shattering" or "shelling" from the cluster; the sugar-content averages higher; and the grapes keep longer and ship better.

In hybrids between American and Vinifera varieties, it is found that the desirable qualities of Vinifera are inherited in about the same proportion as the undesirable ones. The fruit is improved as compared with that of the native parent in the hybrid, but the vine is weakened; quality is usually purchased at the expense of hardiness and disease-resisting power.

CHAPTER XV

THE BRAMBLES

ALTHOUGH any prickly shrub may be called a bramble, the name is applied more particularly to species of the genus Rubus. Since there are not less than 400 species of Rubus in the world, to which about 3000 Latin names have been applied, with a thousand or more cultivated varieties, the systematist whether in botany or pomology has in the brambles a task to tax his ingenuity in classification. The task is made more difficult by many natural and cultivated hybrids, some of which are hard to put in their proper places. Twenty or more species of brambles are found in gardens and orchards, the commonest of which are the raspberries, blackberries, dewberries, and loganberries.

257. The genus Rubus.—With the pomes, drupes, and strawberries, the brambles belong to the order Rosaceæ and are closely related to the roses. The cultivated species of Rubus come from temperate Europe and North America, but some promising forms grow wild in temperate Asia, and several furnish wild food in temperate South America. Even the tropics in both hemispheres are enriched by a few edible brambles, none of which, however, is cultivated. The chief characters in this variable genus are:

Plants evergreen or deciduous; shrubby, climbing, or running; thorny, prickly or rarely unarmed; variously pubescent or glabrous, sometimes glandular; tips of canes usually recurving. Leaves alternate, petiolate, stipulate; simple or compound, usually palmately lobed or palmately compound; stipules free or jointed to the base of the petiole. Flowers sometimes solitary but usually many-flowered in corymbs or racemes; white, pink, rose-colored or red; calyx composed of a little cup with 5 persistent sepals crowning it; petals 5, conspicuous, deciduous; stamens numerous, inserted on the margin of the cup; pistils many, inserted on the rising bottom of the cup, becoming juicy drupelets in all of the cultivated species.

Botanists divide the genus into several sub-genera, of which the pomologist is interested in but two: Idæobatus, the raspberries; and Eubatus, the blackberries and dewberries.

Idæobatus.—Red, purple, black, white or yellow raspberries, the fruit composed of coherent drupelets and coming loose from a moist torus; the cultivated species, erect or ascendent shrubs; flowers mostly in short clusters.

Eubatus.—Very dark red, black, or rarely white, blackberries and dewberries, the drupelets adhering to the torus; cultivated species erect, trailing or climbing; flowers panniculate or racemose.

Raspberries

Three species of raspberries are cultivated for their fruits, American red, European red, and the black-cap. Hybrids between these species, called purple-canes, constitute a fourth group. A simple key shows the relationship of the three species.

KEY TO CULTIVATED SPECIES OF RASPBERRIES

A. Fruit dark red or light red, never black, sometimes yellow or white; propagating by tips or suckers; canes bristly.
  B. Stems stiff and erect; fruit borne more or less continuously throughout the season ..... 1. *R. idæus.*
  BB. Stems more drooping and slender; fruit borne less continuously throughout the season; inflorescence glandular ..... 2. *R. strigosus.*
AA. Fruit purple-black, never red, rarely yellow; propagating by tips; canes glaucous, with hooked spines, not bristly ..... 3. *R. occidentalis.*

258. Description blank for raspberry.—Most of the characters necessary for describing bramble-fruits are listed in the following blank:—

DESCRIPTION BLANK FOR THE RASPBERRY

Name..... Plat..... Row..... No....

Date..... 19..

Plants

Tall, medium, dwarf
Vigorous, medium, weak
Upright, spreading, drooping
Prop. by Suckers.....Tips....
Hardy, half-hardy, tender
Very productive, productive
Medium productive, unproductive

Suckers
Numerous, medium, few, none, or many

Canes
Stocky, medium, slender
Red, brown, yellow
Green, gray, purple
Dull..... glossy.....
Pubescent..... glabrous..... glaucous.....
With glandular tips

Spines or prickles
Thick, medium, slender
Strong, medium, weak
Straight..... hooked.....
Sharp..... blunt.....
Numerous, medium, few, none
Distribution .....
Color .....

Leaflets
Number .....
Large, medium, small
Lanceolate, ovate, obovate
Oval, oblong, wedge, roundish

Plants, continued

LEAFLETS, CONTINUED
Upper surface
Light, medium, dark green
Dull..... glossy.....
Smooth or roughened
Lower surface
Whitish, greenish
Pubescent..... glabrous.....
Tomentose
Margin
Dentate, crenate, serrate
Even or uneven
Single or double series
Jagged, hairy
Lobed, glandular
Petiole
Long, medium, short
Thick, medium, slender
Spiny.... prickly.... thorny...
Pubescent..... glabrous.....
glandular.....

FLOWERS
Date of bloom .....
Season early, medium, late
Large, medium, small
White..... rose.....
Glandular, pubescent, glabrous

Fruit
Early, midseason, late

DATE OF RIPENING .....
LENGTH OF SEASON .....
BORNE HOW .....
KEEPING QUALITY .....
SHIPPING QUALITY .....
PICKING QUALITY .....

ADHERENCE
Strong, medium, weak
Large, medium, small
Uniform or variable
Retains size through season, drops
Regular, irregular
Long, medium, short
Broad, roundish, conic

BLOOM .....
STYLES .....

DRUPES
Large, medium, small
Numerous, medium, few
Coherence
Strong, medium, crumbly
Whitish, yellow, amber
Light, medium, dark red
Purple, black
Dull..... glossy.....
Juicy, medium, not juicy
Tough, medium, tender
Firm, melting, seedy
Sweet, insipid, subacid
Sprightly, sour
High-flavored, aromatic
Quality
Best, very good, good
Fair, poor, very poor

USE
Dessert, kitchen, market
Home, drying

DESIRABILITY .....
.....
.....

Remarks .....
.....
.....

European raspberry.

Only one species of raspberry is much grown in Europe, a red berry; the black and purple berries are scarcely known in the Old World.

259. The European raspberry described.—That it may be distinguished from the American red, the botanical and pomological characters of the European should be noted carefully.

1. *R. idæus*, Linn. Canes stiff and upright, light colored, glandular when young, beset with nearly straight slender prickles. Leaves compound with 3-5 leaflets which are oblong-ovate, pointed, irregularly serrate, downy-white underneath, lateral ones sessile, usually more or less wrinkled. Flowers

small, white, borne in long interrupted clusters; peduncles dividing into 2 or 3 pedicels; the flowering shoots as well as the petioles and midribs finely pubescent and sparingly furnished with firm recurved prickles; calyx velvety, sometimes with a few prickles; petals as long as the sepals. Fruit oblong or conical, light or dark red, white or yellow, borne more or less continuously throughout the season.

260. Habitat and history of the European raspberry.—*Rubus idæus* is a native of Europe from Greece and Italy, north into Scandinavia and far eastward into Asia. It was named for Mount Ida, in Asia Minor, and was possibly more or less cultivated in southern Europe in ancient times, although a cursory search does not reveal statements to that effect. In England, Turner, the herbalist, in 1538, stated that it grew in English gardens, and in 1629, Parkinson, another herbalist, mentioned both white and red varieties.

It was early brought to America by colonists from Europe, and prior to the middle of the nineteenth century was the only raspberry commonly cultivated in this country, as many as sixty-seven varieties being described in 1867. Pure-bred European raspberries are now practically driven from cultivation by the hardier, healthier, and more productive American species. No doubt there are some hybrids with American raspberries. The species is occasionally wild in northeastern United States as an escape from cultivation. Antwerp, Fastolf, Franconia, Orange, and Vermont are typical varieties still found in an occasional garden in the United States. The species is propagated from suckers.

American red raspberry.

Most of the raspberries grown in America, in acreage and in number of varieties, are of the American red group. Were it not for several serious cultural troubles, as the mosaic and leaf-curl in particular, which now threaten the very existence of this species, this red raspberry would rival the strawberry in popularity for home and market plantations.

261. The American red raspberry described.—The following description shows the differences in morphology between the European and the American red raspberries, but does not explain why one succeeds and the other fails in the two continents. Perhaps it suffices to say that one succeeds best in the extremes

of cold and heat, of wetness and dryness of America while the other, almost identical in plant and fruit, succeeds only in the more equable climate of Europe.

2. *R. strigosus,* Michx. (Plate XIX) This species is much like the last, and many botanists combine the two. They are separated, however, by several marked differences. Thus, the habit of growth of the American species is more open; the canes are more slender, are darker in color, more glaucous, and the prickles are stiffer; the leaves are thinner; the flowering shoots, petioles and calyx are beset with gland-tipped hairs and bristles; the calyx is less pubescent; the flower-clusters are more open; the fruit is a lighter red, white- and yellow-fruited forms are much rarer; and the tendency to fruit continuously is lacking.

Students of this variable genus have separated several other species and at least two botanical varieties from *R. strigosus,* of which but one other form, var. *albus,* Fuller, is of importance to pomologists. This variety bears amber-white fruits, and to it have been referred some of the white-fruited varieties under cultivation.

262. Habitat and history of the American red raspberry.— The species is common in northern United States and southern Canada, westward to the Rocky Mountains, and on the Pacific coast northward to Alaska. It is found also in Asia. The red species is hardier and ranges farther north than the black raspberry, with which it is often associated in northern United States. Cuthbert, Marlboro, June, and Loudon are typical varieties. Propagation is by suckers.

Named varieties of the American red raspberry were not introduced until about 1860, although it now appears that at least two and possibly three varieties of this species had been passing for some years previous as offspring of *R. idæus.* The cultivation of this fruit, however, received its first impetus with the introduction of the Cuthbert in 1865. Pomological literature contains records of no less than 150 varieties that have been introduced since 1860, although probably not more than forty or fifty kinds are now offered by nurserymen.

The black raspberry.

The black raspberry does so well under cultivation that until the beginning of the present century it was probably more

widely cultivated than the native red raspberry. Its adaptability for evaporation, because of firm flesh and because the crop ripens in a short season, also gives stimulus to its cultivation. However, fungous diseases, especially blue-stem and anthracnose, take so great toll from the black raspberry, and evaporated fruit is giving way to the canned product so rapidly, that the black raspberry is now much less popular than the red, with the prospect that the purple-cane varieties will soon overtake both. Possibly no fruit is more easily improved, however, than the black raspberry so that the introduction of better varieties may give the cultivation of this fruit new impetus. The black raspberry is quite as commonly called "black-cap" and is not infrequently known as the "thimbleberry."

263. The black raspberry described.—No other species of cultivated brambles can be confused with the black raspberry, as a comparison of the following description with that of other raspberries will show:—

3. *R. occidentalis*, Linn. (Plate XX) Canes strong, erect, glaucous, not bristly, beset with hooked spines; recurving and rooting at the tips. Leaves compound with 3 or rarely 5 leaflets which are ovate, pointed, sharply serrate and notched, white beneath; petioles armed with prickles; lateral leaflets usually stalked. Flowers borne in small, dense, prickly clusters; petals shorter than the sepals. Fruit black or sometimes amber-white, rather small, hemispherical, firm; ripens later than the red raspberry.

264. Habitat and history of the black raspberry.—The black raspberry ranges south from New Brunswick and southern Quebec to Georgia and Missouri, and westward to Oregon, Washington, and British Columbia. A botanical form, var. *pallidus*, Bailey, with yellow-amber fruits, is sometimes found growing wild. This species is usually in fence-rows, in copses, and along roadsides, a common and useful food-plant, although sometimes a pestiferous weed in vast regions throughout the extensive territory in which it is native. Gregg, Ohio, Kansas, and Cumberland are typical black raspberries.

Nicholas Longworth, an early horticulturist of note in Cincinnati, cultivated the first named black raspberry, the Ohio Everbearing, a variety which long remained a standard. The growing of black raspberries hardly became an established industry until after 1850, when H. H. Doolittle, Oaks Corners,

New York, introduced the Doolittle. The spread of this variety, together with the discovery that black raspberries could be easily cured into dried fruits, established the cultivation of this berry.

Purple raspberries.

The purple raspberries are placed in a separate species, *R. neglectus,* Peck, by many botanists, but all now agree that they are hybrids between the red and the black species. These hybrids are found in the wild and frequently occur whenever the red species and the black one are cultivated in close proximity. The native red is the berry with which the black has most frequently hybridized, but the European red will as readily hybridize. There are some thirty or forty named purple raspberries. Shaffer and Columbian are now most cultivated. These hybrids may be propagated either by tips or suckers.

265. Purple raspberries compared with the parent species.—While exceedingly variable, sometimes resembling the black and sometimes the red parent, the purple varieties chosen for cultivation have fairly well-marked characteristics. The plants are more vigorous and more productive than those of either parent; the fruit-clusters contain more berries and are more open and straggling; the berries are larger and juicier and range in color from yellow to red and dark purple. While the named varieties of purple raspberries usually may be distinguished as belonging to this group by the marks given, not all are so characterized; for example, Philadelphia, almost certainly a hybrid, and its numerous seedlings, are much more like the red than the typical purple plant, and the berries are very like red raspberries only of a darker color.

266. History of purple raspberries.—Purple raspberries have been cultivated since 1835, in which year the Philadelphia was found wild near Philadelphia, Pennsylvania. Shaffer, still one of the good commercial purple sorts, was discovered near Scottsville, New York, in 1871. This type of raspberry has recently received a great impetus through the development of the canning industry, for the purple varieties are preëminently the best for canning, jams, and conserves. In addition, vigor, health, and productiveness commend them more and more to growers.

Blackberries

The cultivated blackberry is almost wholly an American fruit, derived from several native species. Two sorts only, neither of much importance, the Oregon Evergreen and the Himalaya, belong to Old World species. The blackberry is one of the newest cultivated fruits. Most of the varieties are not more than a generation from the wild, and the domestication of plants from the woods is still under way. Nevertheless, the classification of the few varieties is difficult for the pomologist as is that of the native species for the botanist.

267. Species of cultivated blackberries.—There are many variations in wild blackberries out of which botanists have made many species, and have variously defined the few species-types that have been given general recognition. Species cross and recross in the wild and in the garden. With present knowledge of Rubus, it is almost impossible to classify varieties with reference to the species from which they came; therefore, in a pomological work, it is needless to describe the species that are now represented in cultivated blackberries. It is best to attempt only a brief characterization of well-recognized species-types from which pomological blackberries are derived.

1. *Rubus argutus*, Link. The prevailing group of wild blackberries in eastern America is represented by *R. argutus* which is widely distributed from Canada to North Carolina and westward to Iowa. Several cultivated varieties come from this species of which Early Harvest is the commonest representative. The plant is erect and stout with very prickly stiff stems; leaves small, with short-pointed leaflets, ribs and petioles thorny; flower-clusters short and usually glandless.

2. *Rubus allegheniensis*, Porter. This is a high-bush blackberry with canes medium in height or tall, but more or less recurving, with the old canes purplish and armed with stout slightly curved prickles; the leaflets are ovate, often glandular, pubescent beneath; flower-clusters mostly elongated but not leafy; fruit generally subcylindric, rather small, with many small druplets, and of very good flavor. This species is often known as *R. nigrobaccus*.

White blackberries, usually amber-colored fruits, while occasionally occurring in other species, most often belong to *R. allegheniensis*. The habitat is from Canada to North Carolina and westward to Illinois. A sport of this species with dry

abortive fruits is not uncommon. Most of the commonly cultivated blackberries, as Eldorado, Agawam, Snyder, Ancient Britton, and Early Cluster belong wholly or in part to this species.

3. *Rubus frondosus*, Bigel. The plants of this species are of but medium height, with canes erect or arched-recurving, and with stout straight or slightly curved prickles; the leaflets are broad, becoming glabrous above, velvety-pubescent beneath, flower-clusters cylindrical, elongated, provided for more than half their length with ovate-oblong, petiolate, very persistent bracts; pedicels scarcely or not at all glandular; fruits subglobose, falling before the bracts and with rather few drupelets.

The habitat of *R. frondosus* is from Canada to Virginia and westward to Kansas. This species and perhaps a closely related one, *R. recurvens*, Blanchard, are probably the parents of the short-cluster berries, as Blowers, Lawton, and Mersereau.

268. European blackberry described.—The following species is exotic and of little commercial importance in America. Varieties, however, have been widely advertised, and while probably never to become important as garden blackberries, are likely to be represented permanently in America. The species is very distinct from native blackberries, through its perennial canes, and flowers usually borne on terminal shoots.

4. *Rubus laciniatus*, Willd. CUT-LEAVED BLACKBERRY. EVERGREEN BLACKBERRY. OREGON EVERGREEN BLACKBERRY. Plants vigorous, trailing, half-hardy, very productive; canes long, the lower part perennial and becoming 2 or 3 inches in diameter, dark red, few branches, with long stout somewhat recurved prickles. Leaflets 3, broad-ovate, divided into several linear sharply toothed divisions, ribs and petiole prickly, evergreen in mild climates. Flowers in terminal panicles, 1⅛ inches in diameter, light pink or white, 8 to 10 inches long, open, leafy, prickly clusters. Fruit late, ripening over a long season, medium in size or small, black, of indifferent quality.

269. Habitat and history of the European blackberry.—This blackberry is without doubt a native of Europe. It seems to have been widely scattered at least as long as a century ago, and it has now run wild in several islands in the Pacific Ocean and on the Pacific slope of North America. It is grown for its fruit and as an ornamental in the regions named, but does not thrive in colder climates and nowhere has great value as a commercial

variety. Its very late and long season gives it importance for home plantations. The plants are deep rooted, hence probably more resistant to drought than any other blackberry. The plants root at the tips, the chief method used in propagating. The canes are so heavily armed with thorns that picking is a most unpleasant task.

A variety grown more or less in New Jersey, variously known as Diamond, Black Diamond, Star, Wonder, Ewing Wonder, and Atlantic Dewberry, is probably a seedling of this species. The much advertised Himalaya blackberry is a related species.

Dewberries

270. Dewberries and blackberries compared.—A dewberry is a trailing blackberry with the following differences: Dewberries ripen earlier than blackberries and they are further separated by the flower- and fruit-clusters. In true dewberries, the flowers are few and scattered; in the true blackberries, the clusters are dense. This distinction in flower-clusters does not always hold, and there are hybrids between the two in which these characters are confused. A further distinction is in the method of propagation. Dewberries, in nature or under cultivation, are propagated from tips, while blackberries naturally reproduce themselves from suckers, and under cultivation are propagated from suckers or from root-cuttings. Here, also, there are exceptions as the Evergreen and Himalaya blackberries (which, however, are not true blackberries) and several hybrids between the blackberries and dewberries are propagated from tips. There are many intermediate forms, making it difficult to separate the two fruits.

271. History of cultivated dewberries.—Dewberries are American fruits recently domesticated, for their cultivation as commercial crops did not begin until toward the close of the nineteenth century, although named varieties go back to the middle of the century. It is hardly correct to speak of them as domesticated plants, for many of the varieties have been brought to the gardens from woods and fields, and in the garden they behave more like wild than domesticated subjects,—the most uncertain and unmanageable of all small-fruits. However, the dewberry is a most important addition to pomology, as the fruits ripen earlier, and are larger, handsomer, and better

flavored than blackberries, while the plants are usually more productive. When hardier varieties have been selected, which at the same time are less capricious to soils and less dependent on cross-pollination between varieties, the place of dewberries in home and commercial plantations will be established. At present, several species and a rapidly increasing number of varieties are under cultivation.

272. Species of dewberries.—Of the many species of blackberries and dewberries from which cultivated varieties are certainly derived, pomologists distinguish four as dewberries.

1. *Rubus flagellaris,* Willd. (Plate XXI) This species is characterized by woody canes several feet long, becoming prostrate, usually stoutly armed with recurved prickles; leaflets usually narrowed at the base, nearly or quite glabrous, membranaceous; flowers in leafy racemes; fruit subglobose to short-cylindric with few to many large juicy drupelets.

This is the dewberry of dry open fields from Maine westward and southward. Var. *roribaccus,* Bailey, is a well-marked subspecies from West Virginia, of which the plant is stronger, the flowers larger, with more elongated pedicels and with larger fruits. There are several cultivated varieties of the sub-species, of which the old and well-known Lucretia is the best representative. *R. flagellaris* is the most important type of dewberry in cultivation. It has been known as *R. villosus* and *R. procumbens.*

2. *Rubus invisus,* Brit. This species is similar to the last and seems to have about the same range. The canes are stouter, less procumbent, often making mounds or piles of canes and herbage, not so well armed; leaves more coarsely toothed; pedicels longer, and with large and leaf-like sepals. Several cultivated dewberries are derived from this species of which Bartel is best known and most representative.

3. *Rubus trivialis,* Michx. SOUTHERN DEWBERRY. This species is quite distinct from 1 and 2 and so variable as to be most perplexing to systematists. The canes are very long, usually wholly trailing, slender, armed, as are also the petioles and often the peduncles, with flattish, short, hooked prickles; leaflets leathery, of three kinds, those on fruiting shoots rather small and nearly or quite evergreen; peduncles 1-3-flowered; fruit cylindrical with many drupelets which are sometimes dry and seedy but usually juicy and excellent.

The habitat of *R. trivialis* is from Virginia to Florida and Texas near the coast. Of the few varieties of this species under

cultivation, Manatee is probably the oldest and best known. This is the common dewberry or running blackberry of the southern states, which often becomes a pest, sometimes as an escape from cultivation.

4. *Rubus vitifolius,* Cham. & Schlecht. WESTERN DEWBERRY. CALIFORNIA DEWBERRY. This species is characterized by trailing, sometimes erect, slender pubescent canes with straight or recurved slender prickles; 3-5 evergreen leaflets, about 2 inches long, ovate, doubly serrate, exceedingly variable; flowers often imperfect, the petals of staminate flowers longer than those of the pistillate ones; fruit black, red in the loganberry, oblong, of medium size, sweet and pleasant; the drupelets more or less pubescent.

The western dewberry is an inhabitant of California along streams and in moist places. Of the several cultivated varieties belonging to the species, Aughinbaugh was long best known, but recent investigations show that the widely cultivated loganberry, long considered a hybrid between this species and the European red raspberry, is a cultivated form of this species. Laxton, Mahdi, Mammoth (Lowberry of some), Phenomenal, and Primus are hybrids with or pure-bred varieties from the western dewberry, which by virtue of these valuable offspring becomes a species of prime importance to pomologists.

CHAPTER XVI

CURRANTS AND GOOSEBERRIES

SEVERAL species of Ribes are cultivated in cold temperate and even subarctic climates under the names currants and gooseberries. The two fruits are often grouped as groselles, from the French *groseilles,* a word now applied to gooseberries, which, however, at one time included currants as well. Originally, the word currant was applied to small seedless raisins, produced from several varieties of grapes in the Levant, the name coming from Corinth, which was the center of the industry. The dried currants of modern as well as of ancient commerce are these seedless grapes, adding to the confusion in the nomenclature of the two fruits.

Currants and gooseberries are very different in aspect of plant, and in appearance and taste of fruit, yet their close relationship is shown not only by similarities in the botanical characters on which classifications are founded, but also by the hybridization of species of the two fruits and the ease of intergrafting. Ribes is probably an Arabic name for *Rheum Ribes,* but is supposed by some to be the Latinized form of *riebs,* an old German word for currant. Ribes belongs to Saxifragaceæ, the Saxifrage family, closely related to the Rose family.

273. Saxifragaceæ compared with Rosaceæ.—All of the fruits so far studied, except the grape, are members of the Rose family, but currants and gooseberries belong to the Saxifrage family distinguished from the former, so far as pomological characters are concerned, by having opposite as well as alternate leaves; usually no stipules; the stamens mostly definite in number; the carpels commonly fewer than the sepals, separate or combined into a compound pistil; calyx either free or adherent, usually persistent; and stamens and petals almost always inserted on the calyx. The currant and the gooseberry are the only cultivated fruits among the saxifrages.

274. The genus Ribes.—To this genus belong the red, white, black, and golden currants of the gardens, representing several species; cultivated gooseberries coming from two or three species; and a dozen or more species cultivated as ornamentals for their flowers, fruits, or foliage. There are about 150 species of Ribes well distributed throughout the north temperate regions of both hemispheres and of South America. Many species not now cultivated offer possibilities for the garden. The following characters of the genus are of importance to pomologists:

Low prickly or unarmed shrubs. Leaves deciduous or rarely evergreen, alternate, palmately lobed, often fascicled on the branches, mostly plaited in the bud. Flowers perfect or sometimes dioecious in ornamental species only, 5-parted, borne in few- to many-flowered racemes, in edible-fruited species greenish, reddish or yellow and mostly insignificant; calyx-tube cylindric to rotate, usually colored; petals smaller than the sepals, often minute; ovary inferior, 1-celled; styles 1 or 2. Fruit a many-seeded pulpy berry, crowned by the remains of the calyx, red, white, purple, scarlet, yellow or greenish, the edible species ripening their fruits in early summer.

KEY TO CULTIVATED SPECIES OF RIBES

A. Branches thornless and spineless; flowers in racemes. (Currants)
  B. Leaves not resinous dotted below.
    C. Flower flat or saucer-shaped; fruit light red or white.
      D. Flowers very flat, with a fleshy ring between the stamens and style; fruit-racemes markedly drooping; berries borne freely around the main stem ..... 1. *R. sativum*
      DD. Flowers less flat, without a fleshy ring; fruit-raceme more spreading; berries borne on one side of main stem ..... 2. *R. rubrum*
    C. Flower broadly campanulate, pink or reddish, without ring; sepals ciliate; berries darker red, more acid ..... 3. *R. petræum*
    CC. Flowers tubular yellow; fruit black or yellow.. 4. *R. odoratum.*
  BB. Leaves resinous dotted at the back; flowers campanulate; fruit black; plants of a disagreeable smell ..... 5. *R. nigrum.*
AA. Branches with thorns or spines. (Gooseberries)
  B. Fruit smooth; spines generally solitary and slender 6. *R. hirtellum*
  BB. Fruit prickly, glandular, hairy or pubescent; spines in threes, stout ..... 7. *R. Grossularia*

275. Pomological classification of currants and gooseberries.—There are no other pomological plants with which currants and gooseberries can be confused, and the species constitute

natural groups so distinct that one can hardly be mistaken for another. It is difficult, however, to make sure of the horticultural varieties of the several species. The pomological nomenclature of these fruits is in a state of confusion. Varieties of both currants and gooseberries are often so nearly alike that it is almost impossible to distinguish them. Nurserymen have been remiss in renaming old sorts, and frequently substitute one kind for another; varieties of currants, at least, come nearly true to seed; and few good descriptions have been published of varieties. Those interested in these fruits, therefore, in order to identify varieties, must be well informed as to the differences in species and varieties.

276. Description blank for currant.—The characters necessary in describing currants and gooseberries are set forth in the following blank:—

DESCRIPTION BLANK FOR THE CURRANT

Name..... Plat..... Row.... Date..... 19..

Plants

- Large, medium, small
- Vigorous, medium, weak
- Upright, spreading, drooping
- Tall, medium, dwarf
- Very productive, productive
- Medium productive, unproductive

SUSCEPTIBILITY to

- Insects .....
- Diseases .....

SUCKERS

- Numerous, medium, few, none

CANES

- Stocky, medium, slender
- Rough, medium, smooth
- Long, medium, short
- Straight, angular
- Red, brown, green
- Gray, dull, glossy

Internodes

- Long, medium, short

LEAF-BUDS

- Large, medium, small
- Long, medium, short
- Obtuse, conical, pointed
- Plump, appressed or free

LEAVES

- Large, medium, small
- Roundish, cordate, oval
- Ovate, obovate, wedge
- Abruptly pointed, taper-pointed
- Number of lobes .....
- Lobes deep or shallow
- Wide, medium, narrow
- Long, medium, short
- Light, medium, dark green
- Glossy, dull
- Rough, medium, smooth
- Pubescent..... glabrous.....

Margin

- Crenate, serrate, hairy

Petiole

- Long, medium, short
- Thick, medium, slender
- Color .....

FLOWERS

- Date of bloom .....
- Early, medium, late
- Large, medium, small

Calyx

- Bell or saucer-shaped
- Red, green, purple, yellow

Receptacle red, green

- with or without fleshy ring

Fruit

- Early, midseason, late

DATE OF RIPENING .....
LENGTH OF SEASON .....
PICKING QUALITY .....
KEEPING QUALITY .....
SHIPPING QUALITY .....

Fruit, continued

Susceptibility to
- Insects .....
- Diseases .....

Clusters
- Long, medium, short
- Compact, loose
- Well filled or not
- Lax or held out stiffly

Cluster-Stems
- Long, medium, short
- Thick, medium, slender

Berries
- Numerous, medium, few
- Large, medium, small
- Uniform, variable
- Black, red, whitish, dull, glossy

Skin
- Thick, medium, thin
- Opaque, translucent

Flesh
- Juicy, medium, rather dry
- Colorless, pinkish
- Firm, melting, seedy
- Sweet, subacid, sour
- Sprightly, aromatic

Quality
- Best, very good, good
- Fair, poor, very poor

Use
- Dessert, kitchen
- Market, home

Desirability .....

Remarks .....

.....

.....

Red Currants

Cultivated red currants come from at least three wild species. These are: *Ribes rubrum*, *R. sativum*, and *R. petræum*. White currants are albinos of the red species; *R. sativum* × *R. rubrum* furnishes most of the white varieties.

277. Ribes sativum described.—This is the common red or garden currant; at least most of the red currants belong here.

1. *Ribes sativum*, Syme. (Plate XXII) Upright shrubs attaining a height of 6 feet; young growth pubescent and glandular. Leaves thin, cordate or subcordate, 3-5 lobed, with short-ovate serrate lobes, yellowish-green, more or less folded upward, nearly hairless, 3 inches across. Flowers in long racemes, markedly drooping; rachis glabrous; pedicels filiform, glandless; calyx-tube yellow-green, saucer-shaped; sepals oval; petals narrowly cuneate; a high, narrow, fleshy ring between the stamens and the cleft style. Fruit round, red or white.

The species has been divided into several botanical varieties, but pomologists are interested only in the type species and var. *macrocarpum*, Bailey. This variety differs from the type in its irregular growth, due to the fact that the lateral branches often have blind terminal buds; larger leaves, more deeply cordate, with a very large middle lobe; racemes usually without leaves at the base; and larger fruits. To this botanical variety belong the large-leaved and large-fruited sorts of which Cherry is

PLATE X. A Munsoniana plum—Wild Goose.

typical. The Macrocarpum currants are more tender to cold than the garden sorts belonging to *R. sativum*.

278. Habitat and history of the Sativum currant.—*Ribes sativum* is a native of western Europe, being wild in Great Britain, France, and Belgium. It is a fruit of cold and temperate regions, and its cultivation was not attempted in the warmer parts of Europe; therefore, the species was not domesticated until agriculture was well advanced in northern and western Europe. Its cultivation was no doubt begun in the fourteenth or fifteenth century; at least it is mentioned as a commonly cultivated fruit in the garden books of the sixteenth century and not previously as a garden plant. This currant was brought to America by the earliest settlers in New England.

279. Ribes rubrum described.—This is the northern red currant, and while it is not always easy to distinguish it from the preceding species, there is but little difficulty in separating most of the varieties from those of *R. sativum*.

2. *Ribes rubrum*, Linn. Upright shrub attaining a height of 6 feet; young growth more pubescent than in *R. sativum*. Leaves rarely subcordate, 3-5 lobed, usually tomentose beneath; smaller and thicker than those of *R. sativum* and held more laxly, 3-4 inches across. Flowers greenish or brownish, in spreading racemes, borne on rather stiff short pedicels on one side of the bunch, whereas those of sativum swing freely around the bunch; held out at right angles from the stem, those of *R. sativum* being pendulous; calyx-tube more bell-shaped than in *R. sativum* and without the ring inside. Fruit usually red.

Botanists describe several botanical varieties of which var. *pubescens*, Schwarz, and var. *scandicum*, Hedl. are given as progenitors of cultivated varieties. Several natural hybrids between this and the preceding species are named, and from it come most of the small-fruited hardy garden varieties, either as pure-breds or as hybrids with the two other species under cultivation.

280. Habitat and history of the Rubrum currants.—This species is native of central and northern Europe and Asia eastward into Siberia and Manchuria. How, where, and by whom the species was domesticated is not known. It is rather less promising in the wild than *R. sativum*; there are fewer varieties showing its blood; and since it is not found in regions which came so early under agriculture as those in which *R. sativum*

grows wild, it is safe to say that *R. rubrum* came under cultivation at a later date.

281. Ribes petræum described.—This species is combined with one of the two other red currants described by many botanists. It has, however, good botanical standing, and pomologists find it quite distinct in its fruits which are more acid, darker red, and ripen later.

3. *Ribes petræum*, Wulfen. Stout upright shrubs attaining a height of 7 feet; shoots usually reddish and glabrous; bush larger than in the other two species. Leaves roundish, subcordate, stout, 3-lobed, middle lobe longest, acute, very dark green, usually puckered or blistered, rugose, 3-4 inches across. Flowers in dense racemes, appearing later than those of the other two species, pink or red to claret red; pedicels short; bracts very small; calyx-tube broadly campanulate, with short, rounded, ciliate sepals; petals nearly half as long as sepals, with a callosity below the base.

Several botanical varieties are distinguished from which garden varieties, it is generally agreed, come; one of which, var. *bullatum*, crossed with *R. rubrum*, produced the well-known Prince Albert.

282. Habitat and history of the Petræum currants.—This species comes from the mountains of central and southern Europe, north Africa, Caucasus and from northern Asia, where it does not seem to have early attracted the attention of gardeners, although it must have been seen by civilized men long before the Christian era. It began to be pictured and described accurately enough in the herbals by the middle of the sixteenth century, so that its domestication can be said to date from about that time. No doubt the hybridization of this species with the other two began through natural means as soon as the three types were grown in the same gardens.

The Golden Currant

Several varieties of currants are grown in gardens, chiefly in the South and Middle West, under the group names *Golden currant, Buffalo currant,* and *Missouri currant.* All of these belong to *R. odoratum*, although put by some in *R. aureum. Golden currant* is a misnomer, for the fruits are more often black than golden.

283. Ribes odoratum described.—The habitat of this species is banks of streams, from Minnesota to Missouri and Arkansas westward. The golden currant is just coming under cultivation, only one variety, the Crandall, introduced in 1888, being common in gardens. Three or four other sorts of less repute are occasionally grown.

4. *Ribes odoratum,* Wendl. A spineless shrub attaining a height of 8-10 feet, young branches pubescent. Leaves 3-5 lobed, coarsely dentate, glabrous, ovate, rarely cordate, 1-3 inches broad; petioles pubescent, shorter than the blade. Flowers golden-yellow, fragrant, borne in 5-8-flowered racemes; tube ½ inch long, stout; sepals half as long as the tube, spreading or revolute; petals half as long as sepals, more or less red. Fruit round or ovate, yellow or black, 1/3 inch in diameter.

Black Currants

In plant and fruit the black currant of pomology is so distinct from the red currants that it might well be given another name. It belongs to a species as closely related to the gooseberry as to the red currant. Possibly the relationship is closer, since the black currant inter-grafts and hybridizes with the gooseberry, while it has not been found that it will do so with the red currant.

Black currants are used for medicinal purposes and in cookery, but are little liked as a dessert fruit. The black currant is held in high esteem in Great Britain and parts of western Europe, but has never found favor in America, possibly because of the bitter taste and aroma, described by an old herbalist as "of a stinking and somewhat loathing savour." There are several species of currants with black berries, but only one, *R. nigrum,* is commonly cultivated.

284. Ribes nigrum described.—Botanists describe several natural varieties, one with yellow, another with green fruits. There are also botanical varieties with cut leaves, and still others with variegated foliage. None of these botanical divisions is of especial interest to pomologists, who are concerned only with a dozen or more horticultural varieties derived from the type species.

5. *Ribes nigrum,* Linn. Black Currant. Stout upright shrub attaining a height of 8-10 feet; stem, foliage, flowers, and fruits having a strong unpleasant odor. Leaves cordate, 3-5 lobed, more or less pubescent and bearing resinous dots beneath; margins serrate; lobes broad, irregular,

acute. Flowers borne in loose racemes; calyx-tube broadly campanulate; petals greenish-purple or dull whitish, half as long as sepals; calyx and ovary pubescent and glandular. Fruits round or subglobose, 1/3 inch in diameter, black, with a strong odor and taste.

285. Habitat and history of the black currant.—This black currant is a native of Europe and north and central Asia. The American black, *R. americanum*, is similar to *R. nigrum* in plant and fruit, but differs much in the flower; it is found from Nova Scotia to Virginia and westward to the Rocky Mountains, furnishing wild fruit to those who care to pick it. Were it not for the cultivated black currant from Europe, this native species might well be domesticated. The European black currant is a fruit of modern times, its culture dating back not more than two centuries. The more northern the latitude, the higher the esteem in which it is held.

Gooseberries

American gooseberries belong for the most part to one species, *R. hirtellum*, but probably there are hybrids with two or three other species, as will be noted, one or two of which may have pure-bred representatives under cultivation. European gooseberries all belong to one species, *R. Grossularia*.

286. Ribes hirtellum described.—Under the name American gooseberry this is the species commonly cultivated in the northern fruit regions of this continent.

6. *Ribes hirtellum*, Michx. (Plate XXIII) A shrub 3-5 feet high; branches slender, drooping, armed with small spines at the base of shoots or with few or many whitish prickles. Leaves broader than long, rather thin, 1-2 inches broad, dentate or crenate-dentate, cuneate at the base, incisely 3-5 lobed, pubescent underneath, with some glandular hairs on the petiole. Flowers 1-3, borne on very short peduncles and pedicels; ovary glabrous; calyx-tube campanulate; sepals greenish or purplish, glabrous; petals whitish; style pubescent. Fruit ½ inch in diameter, round, ovate, or oblong; skin smooth; greenish or purple.

287. Habitat and history of R. hirtellum.—This species is wild from Newfoundland to Maryland and West Virginia, and westward nearly to the Rocky Mountains. There are several American garden sorts which are pure-bred varieties of this species, of which Pale Red is best known. Downing and Houghton, leading gooseberries, are hybrids between this and the European species.

Wild gooseberries were used by the Indians before Europeans came to the New World, as they are now by the tribes in the West and North. Trappers and early settlers have always eaten the fruit. While the first settlers from England brought the European gooseberry with them, only to fail in its culture, none tried the native species in the garden until the nineteenth century was well advanced. In 1833, Abel Houghton, Lynn, Massachusetts, planted several English varieties near a plant from the woods. Seeds were saved from fruit of this native, and from it came the Houghton, which, however, was not disseminated until 1848. The domestication of the native gooseberry has, therefore, taken place within less than one hundred years.

288. Little-known species of American gooseberries.—Until recently it was thought that *R. oxyacanthoides*, Linn., was the parent of the score or more American gooseberries, but all these are now put in *R. hirtellum*, or as hybrids of this and the European gooseberry with a few exceptions to be noted. *R. Cynosbati*, Linn., *R. inerme*, Rybd., *R. setosum*, Lindl., and *R. missouriensis*, Nutt., are represented, either as hybrids or pure-breds, among American gooseberries. These and possibly still other native species offer much for the plant-breeder. All of the native species named should be hybridized with the European gooseberry, which bears a much larger, handsomer, and better-flavored fruit, in order to produce varieties capable of withstanding the varied climate and soil conditions of the several native species.

289. Ribes Grossularia described.—This is the European gooseberry, a comparison of the botanical description with that of the American species showing it to be quite a different plant.

7. *Ribes Grossularia*, Linn. (Plate XXIII) An upright, or spreading, seldom drooping shrub 2-4 feet high; spines mostly in 3's, stout, sometimes bristly. Leaves cordate to broadly cuneate, pubescent or glabrous, thick 1-3 inches broad, crenate or dentate, 3-5 lobed. Flowers solitary, rarely 2; ovary pubescent or often glandular; calyx-tube campanulate, its lobes oblong, smooth or pubescent, sometimes glandular or bristly, green, yellow or red.

290. Habitat of R. Grossularia.—The original form of the cultivated European gooseberry is found in Europe, North Africa, and the Caucasus. In this vast region there are several botanical varieties, but the cultivated gooseberries seem to have

been derived chiefly from the type form. While cultivated somewhat on the continent, this fruit belongs almost wholly to Great Britain, where several hundred varieties have been introduced in England, Wales, Scotland, and Ireland. There are but few places in America where the species thrives, as the climate is uncongenial and the gooseberry mildew proves a veritable scourge. There are now, however, a number of hybrids between this species and the American gooseberry which promise much for pomology.

291. History of the European gooseberry.—The gooseberry is not mentioned by ancient agricultural writers, and seems first to have come into prominence as a cultivated plant in England. Tusser, the farmer-poet, mentioned it in 1557. Turner, the English herbalist, wrote of it in 1573; as did Gerard in 1597; and Parkinson, in 1629, named eight varieties. For the last two hundred years, the gooseberry seems to have been the fruit of fruits in England, and many societies have been organized to bring it to its best estate, and many voluminous articles and books have been devoted to its culture.

CHAPTER XVII

THE HEATH-FRUITS

SEVERAL heath-plants are favorite wild fruits in all quarters of the globe. These are variously called blueberries, bilberries, huckleberries, cranberries, whortleberries, whinberries, blæberries, moorberries, deerberries, farkleberries, cowberries, foxberries, and dangleberries. These plants belong to as many species as there are common names, or more, as some of the common names are applied to more than one species. All are members of two genera in the heath family, Vaccinium and Gaylussacia, both of which are composed of woody plants presenting all gradations from slender, delicate, trailing vines to sturdy shrubs. Both genera are of social habit, most of the species, wherever found, covering extensive tracts; both prefer the humus of peat-bogs, swamps, woods, or heath.

292. Common names of fruits in Vaccinium and Gaylussacia. —There is much confusion in the common names of species of Vaccinium. While those in the botanies, as given on this page, may have been used by English-speaking persons somewhere or sometime, they are now seldom heard in America. Heath-fruits pass under three common names in North America—cranberries, blueberries, and huckleberries. Red-fruited species of Vaccinium are almost universally called cranberries, with such qualifying adjectives as large, small, low-bush, or high-bush. It is not so easy to define the use of blueberry and huckleberry. In most parts of the United States, the two names are employed without distinction, but in the North Atlantic and New England states blueberries are fruits of the genus Vaccinium in which the seeds are numerous but so small as not to be noticed in eating, while huckleberries are fruits of the genus Gaylussacia, the berries of which contain ten large hard seeds. In some of the central states, huckleberries are the produce of the high-bush dark-fruited Vacciniums, while the

berries of low-growing species are called blueberries. The New England usage of blueberry for species of Vaccinium and huckleberry for Gaylussacias is best, and the names will be so applied in this text.

293. The genus Vaccinium described.—Vaccinium is much more the important of the two genera of heath plants which have furnished cultivated fruits. Its chief characters are as follows:

Erect or trailing woody plants. Leaves evergreen or deciduous, alternate, leathery or succulent. Flowers axillary or terminal, solitary, clustered or racemed; white or reddish; corolla variously shaped, 4-5 cleft; sepals 4-5 or obsolete; stamen 8 or 10; anthers opening by a hole at the apex. Fruit a berry, 4-5 celled, many seeded, sometimes 8-10 celled by a fake partition from the back of the cell to the placenta; capped by the persistent calyx.

294. Distribution of Vaccinium.—The value of the wild fruits of this genus and its prospective importance under domestication are indicated by its wide distribution and its many species. The genus is represented by more than a hundred species which encircle the globe in the north temperate zone, a few being found in the south temperate zone. In the northern hemisphere, species are native from the mountains of the tropics to well within the Arctic Circle. Vacciniums are most common in temperate North America and the mountains of central and southern Asia.

Cultivated cranberries belong to two species of Vaccinium. Both are slender, trailing, evergreen bog-plants, bearing variously shaped light or dark-red berries in great profusion. The name comes from the fancied resemblance of the bud just before opening, with its slender curving pedicel, to the head and neck of a crane, whence craneberry, shortened to cranberry.

295. Vaccinium macrocarpon, the large cranberry, described.—The large cranberry is grown on thousands of acres in widely separated regions in North America, and is one of the most specialized and interesting of all pomological crops.

1. *Vaccinium macrocarpon*, Ait. Stems slender and creeping, but comparatively stout, 1-4 feet long, the flowering branches ascending. Leaves oblong-elliptic, 1/3 to ½ inch in length, 1/6-1/3 inch broad, blunt or rounded at the tip, flat or inclined to be revolute at the margin, evergreen, leathery, dark green and glossy above, whitened beneath, glabrous. Flowers pale rose-colored, nodding, 1-10, borne on long filiform pedicels, in early

summer; corolla 4-parted; filaments scarcely one-third the length of the anther. Fruit maturing in the autumn; 1/3-1 inch in diameter; oblong, round, ovate or obovoid in shape; light red to dark red; more or less astringent.

296. Habitat of the large cranberry.—The large cranberry is an inhabitant of open bogs, swamps, and damp heaths from Newfoundland to Wisconsin and southward to West Virginia and Arkansas, being more common in the northeastern quarter of its range. In cultivation, its range is extended to the Pacific Coast, where Oregon and Washington have a considerable number of cultivated bogs.

297. History of cranberry culture.—The early settlers in the New England and North Atlantic states were not slow in discovering that cranberries made an excellent sauce to accompany the fare of game on which they chiefly subsisted, but cranberry-culture did not begin until the nineteenth century was well started, 1810 being the date given for the establishment of the first artificial bog. The abundance of the wild crop obviated the necessity of domesticating the cranberry. Also, as there were no bog-plants under cultivation for fruit, methods of treatment had to be invented; the fruit-growing lore of centuries and even the tools for cultivation were useless in beginning the cultivation of the cranberry. The Cape Cod peninsula was the home of the pioneers in cranberry-culture, and still holds first rank among the several cranberry districts of the continent. At first there were no named varieties of this fruit, but cranberries vary greatly in size, color, and shape, so that types soon came into existence, the earliest being the Bell, the Bugle, and the Cherry. Later, about 1890, named varieties began to appear, since which time a score or more, most of which are still under cultivation, have been introduced.

298. Vaccinium Oxycoccus, the small cranberry, described.—The small cranberry is little cultivated, but the wild fruits are an article of commerce, and no doubt it would be found under cultivation that this species could be grown in soils and climates where the large cranberry does not thrive. No one seems to have given attention to the hybridization of the large and the small cranberry, although the two would no doubt hybridize, possibly giving a better flavored fruit in the offspring than in

either of the parents. It is an inhabitant of temperate, subarctic, and alpine regions of the Old and New Worlds, and is usually found in sphagnum swamps.

2. *Vaccinium Oxycoccus*, Linn. Stems very slender, almost hair-like, erect or ascending, more slender and shorter than those of *V. macrocarpon*. Leaves oblong or ovate, acute, ¼ inch long, strongly revolute margins, leathery, evergreen, dark green and glossy above, conspicuously whitened beneath; pedicels 1-4, terminal, the pale rose-colored flowers nodding; corolla 4-parted; filaments one-half as long as the anthers. Fruit maturing in late autumn; smaller than in the last, ¼-½ inch in diameter; roundish and less variable than in the last; red and acid but considered superior in flavor to the large cranberry of more common cultivation.

299. Blueberries and huckleberries.—Several species of blueberries and huckleberries are now under process of domestication, though all attempts in the past to bring these fruits under cultivation have failed. Failure seems to have been due to the fact that two peculiarities in the nutrition of these plants were not recognized. Heath-plants will not grow in soils with an alkaline or neutral reaction; nor without the companionship of a beneficial root fungus. It has been known for many years that these plants will grow only in acid soils, but only recently was the discovery made that there is an association between them and a root-fungus which is indispensable to their well-being. With an acid soil and proper conditions for the root-fungus, it is demonstrated that these fruits can be cultivated profitably. There is now little question that sometime there will be numerous varieties of cultivated blueberries and huckleberries to enrich pine plains, mountain lands, swamps, heaths, and gardens that have proper soil conditions. Cultivated blueberries and huckleberries would add much to fruit-growing, for these are among the best of small-fruits, and by far the most valuable wild fruits of this continent, the crop selling for several million dollars annually.

Blueberries

Several species of Vacciniums are worthy of consideration by the fruit-grower for the blueberries they produce. Two of these, *V. corymbosum* and *V. pennsylvanicum* now have cultivated varieties so that descriptions must be given them in this

text. *V. atrococcum* and *V. virgatum* are similar to *V. corymbosum* and probably have the same pomological possibilities, while *V. canadense* and *V. vacillans* are closely related to *V. pennsylvanicum* with presumably the same value for fruit-growing. These species are widely distributed in North America; all yield valuable wild blueberries; and all give promise for domestication, so that it is not too much to say that the blueberry may sometime become a major pomological fruit.

300. Vaccinium corymbosum, the high blueberry, described.—The high blueberry is the species to which most attention has been given in attempts at domestication and as such merits first attention.

3. *Vaccinium corymbosum,* Linn. (Fig. 44) Plants tall, 4-12 feet high, with yellowish green warty branchlets. Leaves 1½-3 inches long, ovate to elliptic-lanceolate, smooth or slightly hairy beneath, the margins entire, half-grown at flowering time. Corolla white or pinkish, ¼-½ inch long, ovoid to cylindric-urn-shaped. Fruit blue-black with bloom, 1/3-½ inch in diameter; flavor sweet, rich, excellent.

301. Habitat of the high blueberry.—This species inhabits bogs and moist woods, and is sometimes found on heaths and in pastures from Maine to Minnesota and southward. This is an exceedingly variable form, which authorities variously divide into species and natural varieties, or, on the other hand, combine with one or two other species. It is probable that there are many natural hybrids between this and other species. It is commonly considered that the high blueberry grows best in swampy situations, but it is often found on dry lands and in bogs and swamps, and the land must be dry in the root-forming period of summer and autumn. In cultivation, this species does not thrive in land permanently water-logged; on the other hand, it requires moderate soil-moisture throughout the season.

302. Pomological characters of the high blueberry.—The fruit of the high blueberry ripens from August to late September, and is most variable in shape, size, color, and flavor. The plants range from handsome shrubs ten to twelve feet high in boggy places to low bushes four or five feet high in heaths and pastures. This variability in fruit and plant bodes well for improvement under cultivation. The writer knows of a locality in which plants with large black berries, pleasantly piquant,

may be found; near at hand are bushes with blue berries, rich and sweet, at least a half-inch in diameter; while another form has blue fruits with very heavy bloom and a delicate flavor so sweet as to be almost honeyed. These and other forms might easily be hybridized within the species, or with forms of other species, to the great improvement of blueberries. The fruits of the high blueberry are borne on the extremities of branches of the past season's growth. This species is a handsome ornamental.

303. Vaccinium pennsylvanicum, the low blueberry, described.—The low blueberry furnishes most of the market product of this fruit, but seems not to yield to cultivation so readily as the high blueberry, though attempts to cultivate it have not been as numerous or as ardent as with the other species.

4. *Vaccinium pennsylvanicum*, Lam. (Fig. 45) Plant dwarf, ½-2 feet in height; stems and branchlets green and warty, glabrous or pubescent northward. Leaves oblong or lanceolate, serrulate with bristle-pointed teeth, bright green, smooth and glossy on both sides, sometimes hairy on the midrib beneath. Flowers borne on short pedicels; corolla cylindric-bell-shaped, short, greenish-white. Fruit large, bluish-black, black, sometimes red, or rarely dull white, with or without bloom; sweet and pleasant in flavor; earliest to ripen.

304. Habitat of the low blueberry.—The low blueberry covers great areas in dry heaths, pine barrens, and mountain lands from Newfoundland to Saskatchewan, and southward to Virginia and Illinois. The species is most variable, but only two natural varieties are described; var. *angustifolium*, Gray, is a dwarf northern or high-mountain form with narrower leaves; and var. *nigrum*, Wood, called the low black blueberry, has firmer leaves, blue-green, glaucous, with very black bloomless berries. This variety is often associated with the species, or may be found by itself. It is more of a wilding, preferring rocky heaths, pine woods, shady places, and mountains, where often it thrives in soil an inch or two in depth.

305. Pomological characters of the low blueberry.—The berries of the low blueberry ripen in July in central New York, a month earlier than those of the high blueberry, and are the most pleasantly flavored of all the blueberries, having a delicate sugary taste. They are, however, soft and easily bruised, and

must be handled with care for distant shipment, but are well suited for canning and drying. Most of the crop canned in New England and Michigan is of this species; the industry of canning them is now extensive. The berries hang on the bushes until all are ripe, so that pickers can harvest them with great rapidity. The aborigines set the example to early settlers of sun-drying and smoke-drying this blueberry for winter use, and the practice of drying in the sun still survives. This species may sometime be domesticated, in its many forms, for the very poorest soils or for shady places.

Huckleberries

306. Botanical characters of huckleberries.—The huckleberry belongs to the genus Gaylussacia, plants closely allied to Vaccinium, in which genus they were at one time included. Generic differences for separating the two are found in the structure of the fruit and in the leaves. Fruits of Vaccinium are four- or five-celled, with many small seeds, while those of Gaylussacia are ten-celled and contain ten rather large hard-walled seeds which are really nutlets. The leaves of Gaylussacia are liberally besprinkled with resinous dots; those of Vaccinium have no dots. Five species are found in North America, of which four yield fruits esteemed as they come from wild plants, and which give promise of valuable domesticated fruits. These species are *G. baccata,* Koch., the black huckleberry; *G. frondosa,* Torr. & Gray, the blue huckleberry; *G. ursina,* Torr. & Gray, the bear huckleberry; and *G. dumosa,* Torr. & Gray, the dwarf huckleberry.

307. Pomological characters of huckleberries.—The huckleberry is not so popular as the blueberry because of the hard seeds, which are objectionable in eating. There is, however, great variation in the size and hardness of the seeds, and under cultivation forms could be selected with fewer, smaller, and softer seeds. Except for the seeds, huckleberries are as pleasantly flavored and as palatable as blueberries, and in spite of the seeds find ready sale in the markets. There are no data on which to form an opinion as to whether huckleberries will yield readily to cultivation. Presumably, the difficulties of domestication will be no greater than with the blueberry. In the wild,

huckleberries respond markedly to environment; the fruits of the several species show great differences in size, color, and flavor in accordance with soil, moisture, light, and individual plants, indicating that the opportunities will be great for improvement by cultivation and selection. Like the blueberries, huckleberries grow best in bog or heath and are impatient of lime.

CHAPTER XVIII

THE STRAWBERRIES

ALL of the strawberries belong to one genus, Fragaria, a member of Order Rosaceæ. The fragrance of the fruit gives the Latin name to the genus. Fragaria is widely distributed, no continent or large body of land, excepting Australia, being without an indigenous species. While the genus grows most abundantly in temperate climates, yet forms are found in the tropics, and, if not in arctic regions, at least to their very borders. Thus widely diffused, the species are exceedingly variable, and no fewer than 150 names have been applied to the different forms.

308. The genus Fragaria described.—The strawberry is a low creeping perennial herb, thus sharply distinguished from all other hardy fruits in Rosaceæ, since all others are woody and either trees or shrubs. The conspicuous characters of Fragaria are:

Plant a stemless herbaceous perennial with a scaly rootstock; rooting from runners. Leaves palmately three-lobed, toothed; springing from a crown. Flowers white or reddish, borne in corymb-like racemes on slender leafless scapes; calyx five-lobed and having five sepal-like bracts; petals 5, obovate, elliptical or orbicular; stamens many, short; pistils many, on a conical receptacle. Fruit the enlarged pulpy receptacle which bears small, hard, persistent achenes.

309. The Virginian strawberry described.—The first strawberry to be cultivated in America was the Virginian as it was early called. While no pure-bred variety of this species is now under cultivation, its blood may be traced in several garden sorts and it is not uncommon as a wild plant.

1. *Fragaria virginiana*, Duchesne. Plant small, slender, erect, with slender, wiry, deeply-set roots; runners numerous, long, appearing with and after the blossoms. Leaves radical; leaflets large, thin, light green, glabrous at maturity, 3, obovate-wedge-form, coarsely serrate. Flowers

small; borne in a few-flowered cyme at the top of a long, slender, weak, slightly villous scape; calyx small. Fruits small; globular or oblong-conical, usually markedly necked; color light scarlet, sometimes white; flesh usually pink, sprightly acidulous, aromatic; seeds yellow, sunken deeply in angular pits.

310. Habitat of the Virginian strawberry.—Probably no other fruit grows wild under such varied conditions and over such an extended area in North America as this wild strawberry. It is found in every state in the United States, in the mountains of Mexico, and far north into Canada. Naturally plastic, when spread over this vast territory the species runs into many forms, several of which have received specific names from one or another botanist. Among these, var. *illinoensis*, Gray, a larger, more robust plant than the type with scapes and pedicels more hairy, and larger berries, is the only one which has noteworthy pomological characters different from those of the species.

311. Cultivation of the Virginian strawberry.—This species has been more or less cultivated almost from the settlement of North America. It was mentioned by Parkinson as under cultivation in England in 1629, though it was little improved either at home or in Europe until early in the nineteenth century. About 1820, several improved varieties made their appearance, such as Early Hudson, Hudson's Bay, Methven Scarlet, Large Early Scarlet, and Crimson Cone. These and other varieties of this species held the markets until the middle of the century, when improved hybrid sorts began to take their places.

312. The common garden strawberry described.—For a half century after varieties of the strawberry now grown in American gardens appeared, botanists and pomologists could not agree as to the species from which they came, but the present opinion is that these varieties come from the species next to be described:

2. *Fragaria chiloensis*, Duchesne. (Plate XXIV) Plant large, low, stocky, with thick, fleshy, shallow roots; runners short, stout, appearing after the fruit has matured. Leaves radical; leaflets, 3, large, obovate-wedge-form; round-toothed; thick, leathery, smooth and glossy above, tomentose below, strongly reticulate. Flowers white; borne in loose cymes on erect silky scapes; calyx leafy. Berry large, globular or conic, firm; dark-

red; more or less hairy; flesh white, with a hollow core; flavor mild, musky; seeds brown, raised or in shallow pits.

313. Habitat of the common strawberry.—This is the usual wild strawberry from Alaska to California in North America, and from Peru to Patagonia in South America. As would be expected from its great range in latitude, there are many marked variations. The North American form has as yet given no valuable varieties, although it has been used in breeding by several workers, but the South American form is represented in the lineage of nearly all varieties now cultivated in America. To the Chilean strawberry, in particular, is due the large size of modern strawberries.

314. History of the American garden strawberry.—This strawberry was introduced into France in 1712 by Frezier, a French officer, who found it in Chile, both wild and cultivated. In 1727, it was introduced into England, but seems not to have found general favor. The Pine strawberry, the name referring to the pineapple fragrance, now considered the progenitor of cultivated varieties, made its appearance in Europe about the middle of the eighteenth century, but its origin must ever remain a mystery; it is now thought by some writers to be a hybrid. One of the first of the large-fruited strawberries was Keene's Seedling of the Pine strain, originated by an Englishman in 1819. Soon after, this and similar large-fruited varieties were introduced in America, and the cultivation of this group of strawberries was begun in the New World.

315. The Alpine strawberry described.—This species was introduced in America as early as 1750, and while there are now no pure-bred varieties of it under cultivation in this country, it is an occasional escape from domesticated plants of the past and merits a description.

3. *Fragaria vesca*, Linn. Plant low, erect; runners long, slender, rather numerous. Leaves radical; leaflets thin and light green as compared with the foregoing species; silky when young, glabrous at maturity; margins serrate, the teeth very sharp. Flowers small, borne irregularly in loose racemes on weak erect scapes longer than the leaf-stalks; calyx small and recurved. Berries small, firm, round, or round-conic, sometimes pointed; flesh white, rich and delicate, aromatic; seeds small, many, prominent, raised.

316. Habitat of the Alpine strawberry.—This is the wild strawberry of the Old World, which apparently passes without sharp demarcation into var. *americana*, Porter, of the New World. The American form is more slender, with thinner leaves, with more ovoid or conical fruits, which are usually more distinctly necked; its petioles and scapes are sparingly hairy rather than hairy-pubescent. The true *F. vesca* is an escape from the garden in eastern United States. The species is found in all parts of the north temperate zone in the Old World, while the New World form is native from Newfoundland to North Carolina and westward to the Great Plains. This is the strawberry mentioned by ancient writers as a wild plant, but, while possibly cultivated in the medieval period, seems not to have been considered a garden subject until the sixteenth century, when it began to appear in all European books on cultivated plants. Until the advent of *F. chiloensis* and *F. virginiana* to garden-culture in the eighteenth century, this was the chief if not the only cultivated strawberry in Europe.

317. Everbearing strawberries.—Under some conditions of temperature and moisture, nearly all varieties of strawberries bear fruit from early summer to late autumn. Thus, in the Gulf states and on the Pacific slope, the season of most varieties may be made to extend over several months. This tendency is much more marked in certain varieties, and in some of these the season is extended, or a fall crop is produced in the North and East. These ever-bearers of the East, having the everbearing character fixed, constitute a distinct strain. They are descendants of Pan American, which originated in 1898 with Samuel Cooper, Delevan, New York. Whether Pan American originated as a bud-sport or from a seed is in doubt. There are now a score or more so-called everbearers of more or less value, in all of which there is still much to be desired.

The Alpine strawberry, *F. vesca*, of Europe, often gives everbearing varieties which are cultivated in Europe, but these are so unproductive, and the berries run so small that they find little favor in America. With these Alpine sorts, as with varieties of common cultivation, much depends on climate, soil, and care as to whether the season may be extended or a double crop harvested.

318. Description blank for the strawberry.—The following blank sets forth most of the characters students and fruit-growers will use in describing strawberries:

DESCRIPTION BLANK FOR THE STRAWBERRY

Name..... Plat..... Row.... Date..... 19..

Plants

- Numerous, medium, few
- Vigorous, medium, weak
- Tall, medium, dwarf
- Very productive, productive
- Medium productive, unproductive
- Spring-bearing, everbearing

SUSCEPTIBILITY

- Insects .....
- Diseases .....

RUNNERS thick, medium, slender with long, medium, short internodes

LEAVES

- Large, medium, small
- Light, medium, dark green
- Rugose, smooth
- Glossy, dull

PETIOLE thick, medium, slender

FLOWERS

- Perfect, semi-perfect, imperfect
- Date of bloom .....
- Early, medium, late
- Length of blooming season....
- Size: diameter .....
- Large, medium, small

Petals

- Number .....
- Large, medium, small

Stamens

- Numerous, medium, few, none

Receptacle

- Large, medium, small

Fruit-stems

- Long, medium, short
- Thick, medium, slender
- Erect, semi-erect, prostrate

Pedicels

- Long, medium, short
- Thick, medium, slender

Fruit

SEASON

- Early, midseason, late

DATE OF RIPENING .....

LENGTH OF SEASON .....

PICKING QUALITY .....

SHIPPING QUALITY .....

- Large, medium, small
- Retains size, drops in size
- Uniform..... variable.....
- Regular, irregular, furrowed
- Oval, conic, roundish
- Oblong, oblate, wedge
- Cockscomb, necked

APEX

- Pointed, obtuse, indented
- Green-tipped
- Hard, undeveloped

SURFACE COLOR

- Light, medium, dark red
- Dull, glossy
- Unattractive, attractive
- Colors evenly or unevenly

CALYX

- Large, medium, small
- Raised, flat, depressed
- Reflexed, leafy
- Color .....
- Adherence to fruit.....

SEPALS

- Long, medium, short
- Broad, medium, narrow

SEEDS

- Numerous, medium, few
- Raised, sunken

FLESH

- Light, medium, dark red
- Whitish toward center
- Juicy, medium, not juicy
- Stringy, firm, medium, tender
- Sweet, subacid, sour
- Sprightly, high-flavored, aromatic

QUALITY

- Best, very good, good
- Fair, poor, very poor

USE

- Dessert, kitchen, canning
- Market, home

DESIRABILITY .....

Remarks .....

.....

.....

CHAPTER XIX

VARIETIES OF APPLES

Less than 200 varieties of apples can be obtained from American nurserymen and the tendency is to cut down lists. Probably more than 2500 varieties are mentioned in American literature, and twice as many more have appeared in European pomologies. In this text, only standard sorts to the number of 114 are listed. The varieties chosen for description here are those which students in systematic pomology are likely to find in modern orchards the country over.

INDEX TO VARIETIES OF APPLES

Synonyms Are in Italics

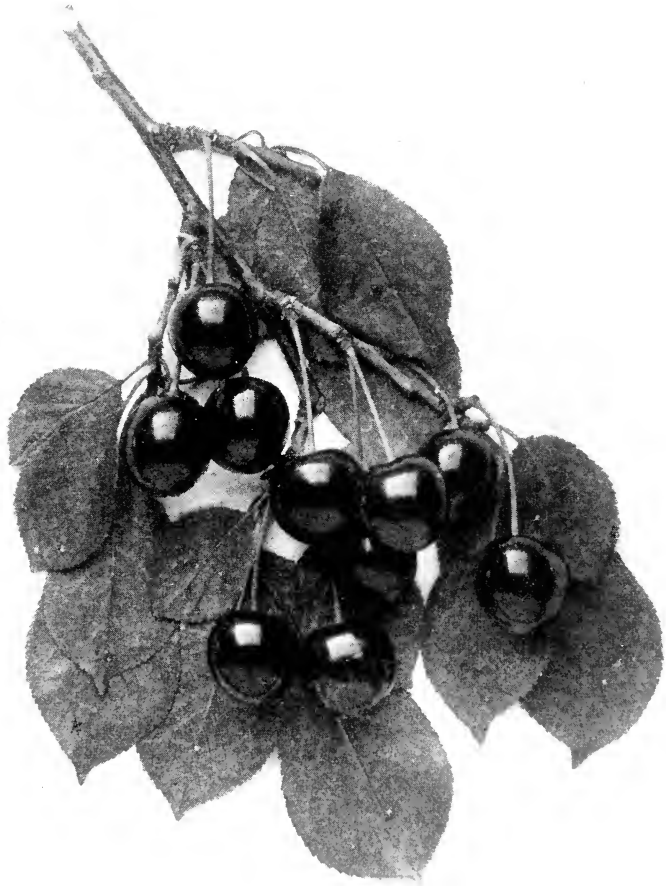

PLATE XI. A sour cherry—English Morello.

Wealthy, 357
Westfield, 401
White Pippin, 386
Williams, 338
Williams Early, 338
Williams Red, 338
Windsor, 397
Winesap, 420
Winter Banana, 383
Wolf River, 362
Yellow Bellflower, 375
Yellow Bough, 319
Yellow Newtown, 385
Yellow Transparent, 330
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KEY TO VARIETIES OF APPLES

A. Apples, sweet.
  B. Ripening early, before or with Oldenburg; greenish-yellow; round-conic; stem short ... 319. Sweet Bough.
  BB. Ripening midseason, with or just before McIntosh.
    C. Color yellow; early-midseason; round; stem long, curved; skin smooth and waxy. 320. Golden Sweet.
    CC. Color red.
      D. Stem short, thick; dots conspicuous; late midseason ..... 321. Victoria Sweet.
      DD. Stem long; dots inconspicuous; early midseason ..... 322. Jersey Sweet.
  BBB. Ripening late, after McIntosh.
    C. Color yellow.
      D. Stem short.
        E. Blushed and waxen; dots obscure; midwinter ..... 323. Jacob Sweet.
        EE. Not blushed; stem very short, lipped; early winter ..... 324. Pumpkin Sweet.
      DD. Stem long, slender; suture line distinct; midwinter ..... 325. Tolman Sweet.
    CC. Color red.
      D. Shape round or round-conic.
        E. Stem short; stripes and dots conspicuous; early winter ..... 326. Bailey Sweet.
        EE. Stem long.
          F. Calyx closed; dots conspicuous, late winter ..... 327. Lady Sweet.
          FF. Calyx open; dots scattering; late winter ..... 328. Sweet Winesap.
      DD. Shape oblong; bloom heavy; dots conspicuous ..... 329. Ramsdell Sweet.
AA. Apples, sour.
  B. Ripening early, before or with Oldenburg.
    C. Color yellow.
      D. Stem long; round-conic; dots obscure.. 330. Yellow Transparent.
      DD. Stem medium; round-oblate; dots conspicuous ..... 331. Early Harvest.
      DDD. Stem short.
        E. Skin and flesh very white; round-oblate ..... 332. Parry White.
        EE. Skin yellow blushed; round-oblate. 333. Primate.

CC. Color red.
D. Stem long.
E. Shape round.
F. Fruit dark red, not striped; small. 334. Red June.
FF. Fruit lighter red, striped or splashed.
G. Flesh brisk subacid; heavy bloom ..... 335. Red Astrachan.
GG. Flesh mild subacid; waxen... 336. Lowland Raspberry.
EE. Shape oblong-conic.
F. Flesh yellow; stem often clubbed.. 337. Early Strawberry.
FF. Flesh white.
G. Fruit dark red, obscurely striped ..... 338. Williams.
GG. Fruit light red, splashed and streaked ..... 339. Charlamoff.
EEE. Shape oblate-conic; small; flesh yellow. 340. Early Joe.
DD. Stem short.
E. Shape round.
F. Size small to medium; mild subacid; round-oblong-conic ..... 341. Benoni.
FF. Size medium to large; brisk subacid; round-oblate ..... 342. Oldenburg.
EE. Shape oblong; medium to large.
F. Fruit ribbed; mild; very aromatic; very conic ..... 343. Chenango.
FF. Fruit not ribbed; sour; not aromatic; sometimes roundish ..... 344. Titovka.
EEE. Shape oblate or round-oblate; small to medium ..... 345. Tetofsky.
BB. Ripening midseason, with or just before McIntosh.
C. Color yellow.
D. Stem long.
E. Golden-yellow, greasy; stem oblique. 346. Lowell.
EE. Yellow with blush; stem upright.
F. Round-conic; bright blush; rather sour ..... 347. Gideon.
FF. Round-oblate; brownish blush; mild; aromatic ..... 348. Dyer.
DD. Stem short.
E. Flesh white.
F. Fruit bright red blush; oblate; medium size ..... 349. Maiden Blush.
FF. Fruit faint brownish blush; round-oblate; large ..... 350. Holland Pippin.
EE. Flesh yellow.
F. Shape round-oblate-conic; waxy yellow .. .. 351. Hawley.
FF. Shape oblong-conic; glossy yellow 352. Porter.

CC. Color red.
D. Stem long.
E. Shapes round-conic; very large; flesh white ..... 353. Constantine.
EE. Shape oblong; flesh yellow.
F. Oblong-ovate; late midseason.... 354. Mother.
FF. Oblong-conic; early midseason.. 355. Late Strawberry.
EEE. Shape oblate; very large; flesh white ..... 356. Bonum.
DD. Stem short.
E. Flesh snow-white, often stained red.
F. Bloom light; subacid ..... 357. Wealthy.
FF. Bloom very heavy; mild; very aromatic.
G. Fruit small to medium..... 358. Fameuse.
GG. Fruit medium to large.
H. Dull red; round-oblate; early winter ..... 359. McIntosh.
HH. Brighter; more oblate; later ..... 360. Cortland.
EE. Flesh yellow.
F. Shape round.
G. Fruit large to very large.
H. Round-conic ..... 361. Alexander.
HH. Round-oblate; larger and later than Alexander ..... 362. Wolf River.
GG. Fruit small or but medium in size; round-oblate.
H. Dots very conspicuous; basin oblique; fruit medium ..... 363. Grosh.
HH. Dots inconspicuous; basin symmetrical; fruit small.
I. Splashed and striped with light red; early midseason.. 364. Fanny.
II. Splashed and striped with dull red; late midseason ... 365. Jefferis.
FF. Shape round-oblong-conic.
G. Fruit large to very large; flesh coarse; quality fair.
H. Stripes and splashes on yellow ..... 366. Twenty Ounce.
HH. Much redder than 366 ..... 367. Collamer.
GG. Fruit medium; flesh fine, aromatic; quality good ..... 368. Ribston.
FFF. Shape oblate or round-oblate.
G. Flesh yellowish; fruit very large; coarse; quality poor .... 369. Bietigheimer.
GG. Flesh yellowish; stained with red; size medium; astringent ... 370. Haas.
GGG. Flesh deep yellow; size medium.

H. Flavor rather sour, astringent, poor ..... 371. Hibernal.
HH. Flavor mild, aromatic, very good.
I. Fruit orange striped with red ..... 372. Gravenstein.
II. Fruit brightly colored Gravenstein ..... 373. Banks.

BBB. Ripening late or in winter after McIntosh.
C. Color yellow.
D. Stem long.
E. Shape round or round-oblong; truncate; large; early winter or fall ..... 374. Fall Pippin.
EE. Shape oblong-conic.
F. Fruit lemon-yellow, waxen, bright blush; acid ..... 375. Yellow Bellflower.
FF. Fruit pale-yellow; similar to 375. 376. Ortley.
FFF. Fruit golden-yellow; dull blush; mild subacid; stem very long and slender ..... 377. Golden Delicious.
EEE. Shape oblate or round-oblate.
F. Fruit light yellow with bright blush; sour ..... 378. Boiken.
FF. Fruit dull yellow with bronze blush and russet dots ..... 379. Swaar.
DD. Stem short.
E. Shape round-conic.
F. Flesh yellow; large or very large; quality poor.
G. Size very large; bronze blush... 380. Gloria Mundi.
GG. Size large; faint pink blush... 381. Northwestern Greening.
FF. Flesh white; medium to large... 382. Holland Winter.
EE. Shape round-oblate.
F. Fruit golden-yellow with brilliant blush ..... 383. Winter Banana.
FF. Fruit greenish-yellow with faint blush.
G. Size large or very large; greenish; bronze blush ..... 384. Rhode Island Greening.
GG. Size medium to large; yellow; pinkish blush.
H. Axis oblique; dots inconspicuous ..... 385. Yellow Newtown
HH. Axis normal; dots large, white ..... 386. White Pippin.
EEE. Shape oblate.
F. Fruit waxen-yellow with orange-red blush; stem fleshy ..... 387. Peck Pleasant.

FF. Fruit greenish yellow.
G. Dots very conspicuous; late winter ..... 388. Mann.
GG. Dots inconspicuous ..... 389. Patten.
EEEE. Shape round-oblong; truncate; golden-yellow ..... 390. Grimes Golden.
CC. Color red.
D. Stem long.
E. Shape round-oblate.
F. Stamens median; late winter; flesh yellow.
G. Core open ..... 391. Lawver.
GG. Core closed ..... 392. Arkansas.
FF. Stamens marginal; late winter; flesh white ..... 393. Ralls.
FFF. Stamens basal; early winter; flesh yellow ..... 394. Salome.
EE. Shape round-conic.
F. Skin red without stripes; small to medium ..... 395. King David.
FF. Skin striped; medium to large.
G. Stamens marginal; very late; core open ..... 396. Rome Beauty.
GG. Stamens median.
H. Flesh white; dots very large. 397. Windsor.
HH. Flesh yellow; dots smaller.
I. Core open; very late..... 398. Cooper Market.
II. Core closed; early winter.. 399. Missouri Pippin.
GGG. Stamens basal.
H. Fruits medium to large.
I. Round-conic to oblong; stem medium to long; dark red; dots small; late winter .... 400. Baldwin.
II. Round-conic to oblate; stem long; light red; dots very large; early winter ..... 401. Westfield.
HH. Fruits small to medium; brilliant red; dots minute; yellow flesh stained red; aromatic; very good ..... 402. Jonathan.
EEE. Shape oblate.
F. Fruit markedly ribbed.
G. Size medium; bright red effect. 403. Wagener.
GG. Size large; duller red with much green ..... 404. Ontario.
FF. Fruit faintly ribbed or not at all; size variable.
G. Size medium to large; dull red. (Stem sometimes short) ..... 405. Smokehouse.
GG. Size medium to small; bright red ..... 406. Akin.

EEEE. Shape conic-oblong; smooth, glossy.
F. Basin smooth or nearly so.
G. Fruit striped; light red ..... 407. Ben Davis.
GG. Fruit scarcely striped; dark red ..... 408. Black Ben Davis.
FF. Basin deeply furrowed or crowned.
G. Nearly black with much scarf-skin ..... 409. Black Gilliflower.
GG. Striped with bright red; no scarf-skin ..... 410. Delicious.
DD. Stem short.
E. Shape round-oblate.
F. Axis oblique ..... 411. York Imperial.
FF. Axis normal.
G. Stem fleshy and cavity lipped... 412. Pewaukee.
GG. Stem and cavity normal.
H. Bloom abundant; bluish cast. 413. Blue Pearmain.
HH. Bloom scant or none.
I. Fruit large to very large.
J. Pinkish red with much scarf skin ..... 414. Fallawater.
JJ. Deep red; without scarf skin ..... 415. Tompkins King.
II. Fruit medium in size.
J. Scarf-skin abundant .... 416. Jewett Red.
JJ. Scarf-skin scant or none 417. Paragon.
EE. Shape round-conic.
F. Fruits large to very large.
G. Skin brilliant abundant red on yellow background ..... 418. Opalescent.
GG. Skin dark scant red on greenish background ..... 419. Stark.
FF. Fruits medium.
G. Flesh sprightly subacid.
H. Veins stained with red; stamens marginal ..... 420. Winesap.
HH. Veins not stained; stamens median ..... 421. Stayman.
GG. Flesh mild subacid or almost sweet.
H. Dots very conspicuous; mid-winter; conic; medium in size. 422. Red Canada.
HH. Dots inconspicuous; early winter; ovate-conic; medium to large ..... 423. Hubbardston.
EEE. Shape oblate.
F. Fruit very small ..... 424. Lady.
FF. Fruit medium to large.
G. Flesh white; sour; early winter. 425. Bismark.

GG. Flesh yellow; mild; late winter ..... 426. Buckingham.
EEEE. Shape oblong-conic.
F. Fruit very large; often lipped.... 427. Deacon Jones.
FF. Fruit medium to large.
G. Stamens basal; fruit medium to large ..... 428. Northern Spy.
GG. Stamens median; fruit medium ..... 429. Esopus Spitzenburg.
CCC. Color russet.
D. Fruit very small; cheek striped with red ..... 430. Pomme Grise.
DD. Fruit medium to large.
E. Size large; dots conspicuous; background greenish-yellow ..... 431. Roxbury Russet.
EE. Size medium; dots inconspicuous; background golden yellow ..... 432. Golden Russet.

DIVISION A. SWEET APPLES

SECTION I. EARLY APPLES

Group 1. Yellow Apples

319. Sweet Bough (Fig. 46). *Autumn Bough. Yellow Bough.* —Sweet Bough is the best summer sweet apple. The fruits are large and handsome, and the trees are all that could be desired, falling short only in hardiness. The apples are too tender for distant shipment, but they are ideal for home use or local market. Sweet Bough is an old variety of American origin, described first in 1817, and now well distributed throughout the United States.

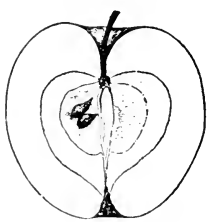

FIG. 46. Sweet Bough.

Tree vigorous, upright-spreading, dense. Fruit medium to large, uniform in size and shape, round-conic or ovate, with broad and flat base, regular, sides often unequal; stem short, thick, usually not exserted; cavity acuminate, deep, broad, sometimes furrowed, smooth; calyx small, closed or partly open; lobes often leafy, long, narrow, acute; basin small, shallow, narrow, abrupt, smooth or wrinkled; skin thick, tough, smooth, pale yellow, sometimes faintly blushed; dots numerous, small, sometimes russet; calyx-tube long, wide at top, conical; stamens median; core large, abaxile; cells closed or open; core-lines clasping; carpels round or cordate, emarginate, tufted; seeds light brown, small, plump, acute; flesh white, firm, fine, crisp, very tender, juicy, sweet, aromatic; good to very good; August.

Section II. Midseason Apples

Group 2. Yellow Apples

320. Golden Sweet (Fig. 47).—This is a standard early variety for home use. The fruits are surpassed by those of few other sweet apples in richness and sweetness of flavor; while of only medium size, they are very attractive in appearance, being uniform in size and shape and having a handsome clear yellow color. The variety is at least a century old, probably from Connecticut, but now grown in all apple regions.

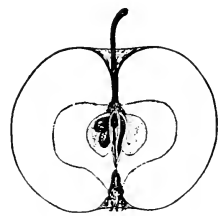

Fig. 47. Golden Sweet.

Tree large, vigorous, spreading or drooping, dense. Fruit large, uniform in size and shape, round, round-oblate or ovate, regular or faintly ribbed; stem very long, thick; cavity acute, of medium depth and width, symmetrical, usually partly russeted, often with outspreading russet rays; calyx small, closed; lobes narrow, acute; basin shallow, narrow, obtuse, smooth, symmetrical, furrowed; skin thin, tender, smooth, waxy, pale yellow; calyx-tube medium in width, cone-shape; stamens median; core small, abaxile; cells often unsymmetrical, open; core-lines clasping the funnel cylinder; carpels ovate; seeds small, narrow, angular, acute, brown; flesh yellow, firm, fine-grained, tender, juicy, very sweet, aromatic; good to very good; mid-August to late September.

Group 3. Red Apples

321. Victoria Sweet (Fig. 48).—The fruits are easily identified by their dark red color and large conspicuous dots, which call to mind varieties in the Blue Pearmain group. In quality, while a little coarse, the apples are good to very good for either culinary uses or dessert. Victoria is now grown only in New York, in which state it came to notice about 1840.

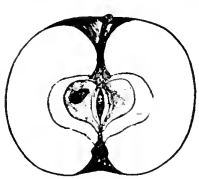

Fig. 48. Victoria Sweet.

Tree vigorous, spreading, with short, stocky, crooked branches. Fruit of medium size, round-conic, flattened at the base, faintly and broadly ribbed; stem short, thick; cavity deep, broad, often lipped, yellow-russet often overspreading the cavity; calyx small, closed or partly open; lobes

short and not separated at base, acute; basin narrow, abrupt, wrinkled; skin tough, smooth, yellow, blushed and mottled with dull red and marked with numerous narrow stripes of deeper red; dots or flecks conspicuous, gray or russet; calyx-tube short, conical; stamens median; core abaxile; cells closed or partly open; core-lines clasping the cylinder; carpels round-cordate, concave, tufted; seeds numerous, dark, flat, acute; flesh yellow, firm, coarse, very tender, juicy, sweet; good to very good; October to January.

322. **Jersey Sweet** (Fig. 49).—There is much in the fruit of Jersey Sweet to commend it for home use and local markets. Its faults are: susceptibility to the scab-fungus, early decay, and failure to color well in most environments. The quality is of the best, making a good sweet apple for either dessert or cooking. The tree characters are excellent. The origin of the variety is unknown, but it has been listed in pomologies since 1845.

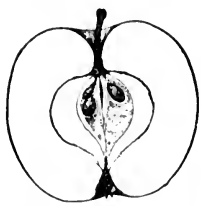

FIG. 49. Jersey Sweet.

Tree large, vigorous, upright or round-topped, open. Fruit medium size, round-ovate, conic or oblate-conic, sides unequal; stem long, slender; cavity acute, deep, medium in width, russeted; calyx small, closed; lobes long, narrow, acute; basin small, shallow, narrow, abrupt, ribbed and wrinkled; skin fine, tender, yellow washed and mottled with brownish-red and overlaid with narrow stripes of carmine; dots inconspicuous, greenish, submerged; calyx-tube narrow, conical, often with fleshy pistil point projecting into the base; stamens median; core large, axile; cells symmetrical, usually closed; core-lines clasping the funnel cylinder; carpels elongated-ovate, tufted; seeds large, acute; flesh yellow, firm, fine, crisp, tender, juicy, sweet; good to very good; September to December.

SECTION III. LATE APPLES

Group 1. Yellow Apples

323. **Jacobs Sweet** has many of the qualities which have made Sweet Bough a universal favorite. The fruits are very tender, crack easily, and are susceptible to the scab-fungus. Add to these faults, unreliability in keeping and great variability in season, and it may be seen why Sweet Bough is thought to be the better apple. The variety is best known in New Eng-

land, where it originated at Medford, Massachusetts, about 1860.

Tree medium to large, vigorous, spreading. Fruit medium to large, round, inclined to conic, sometimes oblate, symmetrical; stem short; cavity wide, deep, acute, sometimes furrowed or compressed, seldom russeted; calyx closed or partly open; basin often abrupt, round, medium in width and depth; skin tough, waxen, glossy, yellow with a bright blush; dots obscure white or russet; calyx-tube cone-shape; stamens median; core large, abaxile; cells symmetrical, open or partly closed; core-lines clasping; carpels large, round to broad-obovate; seeds numerous, acute; flesh yellow, firm, coarse, very tender, crisp, juicy, aromatic, very sweet; good; October to April.

324. Pumpkin Sweet (Fig. 50). *Pound Sweet.*—This is the standard sweet apple of its season. The fruits are esteemed for baking, canning, and stewing, but are too coarse for dessert. In the markets the variety is generally known as Pound Sweet. The trees are very satisfactory excepting in hardiness, as they suffer both from winter-injury and from sun-scald. This variety has been much confused with other sweet apples, but can be distinguished by its large fruits, of greenish-yellow color, sometimes bronzed on the cheek, but never marked with red nor with russet except about the cavity. It originated in the orchard of S. Lyman, Manchester, Connecticut, early in the nineteenth century.

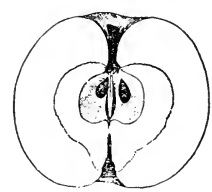

FIG. 50. Pumpkin Sweet.

Tree large, vigorous, upright-spreading, open, with long stout branches. Fruit large or very large, round-conic, sometimes prominently ribbed; stem very short, stout, often inserted under a lip or having a fleshy protuberance; cavity acuminate, deep, narrow, often furrowed or lipped, sometimes russeted; calyx large, open; lobes separated at the base, short, broad, acute; basin small, deep, narrow, abrupt, often furrowed or wrinkled; skin thin, tough, smooth, yellow marbled with greenish-yellow, with stripes of white scarf-skin radiating from the cavity; dots conspicuous, white, often areolar with russet center; calyx-tube wide, conical; stamens median; core large, axile; cells closed or open; core-lines clasping; carpels thin, broadly round, but slightly emarginate if at all, often tufted; seeds small, wide, plump, acute, light brown, tufted; flesh yellow, firm, crisp and juicy, sweet with a peculiar flavor; good; October to January.

325. Tolman Sweet (Fig. 51). *Tallman Sweet.*—This is the leading sweet apple of this continent. The fruit characters

which commend it are attractive appearance, fair size, and good quality. The variety is easily distinguished by a suture line which runs from the cavity to the basin. The trees are hardy, healthy, vigorous, productive, long-lived, hold the crop well, and come into bearing early. The origin of this best of all sweet apples is unknown. It was brought to the attention of fruit-growers in 1822. Tolman is grown in all the leading apple regions of America.

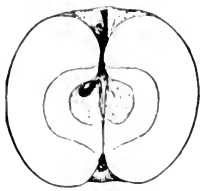

FIG. 51. Tolman Sweet.

Tree vigorous, upright-spreading, drooping, open; branches long, stout, curved and drooping. Fruit medium to large, round-conical, often elliptical or obscurely ribbed; stem medium to long, slender; cavity obtuse, broad, deep, often russeted, obscurely furrowed; calyx small, open or closed; lobes long and acuminate; basin small, often oblique, shallow, abrupt, furrowed, wrinkled; skin tough, marked by a suture line extending from the cavity to the basin; color pale yellow, sometimes blushed; dots inconspicuous; calyx-tube urn-shape; stamens basal; core small, axile; cells symmetrical, closed; core-lines clasping; carpels flat, broadly round, emarginate, tufted; seeds wide, plump, acute, tufted; flesh white, firm, fine, dry, sweet; good to very good; October to March.

Group 5. Red Apples

326. Bailey Sweet. *Howard's Sweet.*—Bailey Sweet is largely grown in many parts of America because of its rich sweet fruits. The trees lack vigor, health, and hardiness,— defects offset by productiveness and regularity in bearing. The fruits do not keep well, are often malformed, and are not uniform in size. The variety was disseminated from Perry, New York, about 1849.

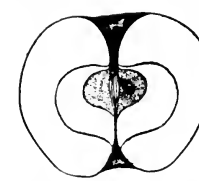

FIG. 52. Sweet Winesap.

Tree upright-spreading, open; branches slender. Fruit large, round-conic, ribbed obscurely, symmetrical, sides elliptical, uniform in size and shape; stem short; cavity acute, deep, furrowed, often with thin golden-brown russet; calyx closed, small with short obtuse lobes; basin shallow, narrow, obtuse, corrugated, often with mammiform protuberances; skin tender, smooth, clear bright yellow covered with irregularly netted markings and dots; calyx-tube funnel-shape, wide limb; stamens median; core

axile, closed; core-lines clasping; carpels elliptic, emarginate; seeds large, long, acute; flesh yellow, firm, coarse, crisp, tender, juicy, sweet; very good in quality; October to January.

327. Lady Sweet.—The fruits are superior in size, color, flavor, and keeping qualities. The trees come in bearing young and bear regularly and heavily, though they are not vigorous, are short-lived, and often suffer from winter-injury. Lady Sweet originated near Newburgh, New York, and was brought to notice by Downing in 1845. It is a general favorite in the North Atlantic states and the Middle West.

Tree upright-spreading, vigorous. Fruit large, uniform in size and shape, round-conic, often approaching oblong-conic, irregularly elliptical, often ribbed, symmetrical; stem short; cavity acute, deep, narrow, sometimes wide, gently furrowed, often russeted, sometimes lipped; calyx small, closed, pubescent; basin small, narrow, shallow, abrupt, furrowed; skin thin, smooth, yellow overspread with bright red splashed with carmine, mottled and striped with white scarf-skin about the cavity; dots conspicuous, pale areolar with russet point or submerged; calyx-tube conical; stamens basal; core small, axile to abaxile; cells not uniformly developed, closed; core-lines meeting or clasping; carpels broad, round to round-ovate, mucronate, sometimes emarginate, tufted; flesh yellow, firm, fine, crisp, tender, juicy, sweet, with a distinct and pleasant aroma; very good to best; November to May.

328. Sweet Winesap (Fig. 52). *Hendrick Sweet.*—The fruits are a handsome red, large, well-turned, symmetrical, and uniform; excellent for dessert or culinary uses; and sufficiently firm of flesh and tough of skin to stand marketing and storage. The trees are lacking in vigor and hardiness, but are usually healthy, long-lived, and productive. It seems to have been described first in 1854.

Tree medium in size, vigorous, upright-spreading, dense. Fruit medium to large, round-conic, wide and flattened at the base, regular or elliptical, symmetrical; stem short, slender; cavity acuminate, shallow, wide, symmetrical or gently furrowed, sometimes partly russeted; calyx open; lobes long, acuminate; basin large, often oblique, round, deep, wide, abrupt; skin tough, smooth, pale yellow overspread with bright red, plainly marked with long narrow carmine stripes, covered with a thin bloom and often with thin light gray scarf-skin; dots small, scattering, white or russet; calyx-tube funnel-shape with broad yellow limb and narrow cylinder; stamens median; core small, axile or sometimes abaxile; cells closed or partly open; core-lines clasping; carpels flat, broadly elliptical, emarginate;

seeds small, plump, obtuse; flesh white, firm, fine, crisp, tender, juicy, sweet; good to very good; November to March.

329. Ramsdell Sweet. *Hurlbut.*—Ramsdell Sweet was once popular because of the handsome red color and good quality of the apples. The trees are not fruitful enough to give the variety value for commercial plantations. Ramsdell Sweet was brought to notice by Rev. H. S. Ramsdell, Thompson, Connecticut, about 1838. Its cultivation is confined to the East and North.

Tree vigorous, upright, open. Fruit medium or large, variable in size, round-conic, often faintly ribbed; stem short, slender, often red; cavity acuminate, deep, broad, symmetrical, often russeted; calyx small, closed or open; lobes narrow, abrupt, faintly furrowed and wrinkled; skin thin, tough, smooth, yellow, overspread with dark red, with obscure splashes and stripes of carmine, overspread with bloom; dots many, distinct, large, pale yellow or gray, often submerged; calyx-tube large, long, cylindrical; stamens median; core small, axile or abaxile; cells closed or open; core-lines clasping; carpels ovate; seeds small, narrow, plump, acute; flesh yellow, firm, fine, tender, juicy, sweet; good to very good; October to February.

DIVISION B. SOUR APPLES

Section IV. Early Apples

Group 6. Green Apples

330. Yellow Transparent (Fig. 53).—Earliness is the chief asset of the variety, though, if not over-ripe, the apples are very good culinary fruits, and at the proper stage of maturity are acceptable for dessert. The apples are above medium size, and have a clear yellow color. The chief faults are: the fruits on old trees run small and uneven in size and shape; the tender flesh shows bruises readily; and the fruits can never be kept long nor shipped far. The trees are small and lack health and productiveness, but come in bearing very early and are extremely hardy. The variety was imported from Russia in 1870, and is now grown from the Atlantic to the Pacific.

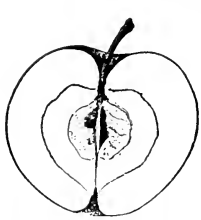

Fig. 53. Yellow Transparent.

Tree of medium size, vigorous, upright becoming spreading, dense, with short, stout, crooked branches filled with short spurs. Fruit sometimes large, uniform in shape and size, round-oval, round-conic or oblate-conic, ribbed, sides unequal; stem long, thick; cavity acute, deep, narrow, sometimes lipped, russeted; calyx closed; lobes broad; basin shallow, narrow, abrupt, furrowed and wrinkled; skin thin, tender, smooth, waxy, pale yellow changing to yellowish-white; dots numerous, light colored, often submerged; calyx-tube conical; stamens marginal; core medium in size; cells partly open to wide open; core-lines clasping; carpels broadly ovate; seeds wide, flat, obtuse; flesh white, firm, fine-grained, crisp, tender, juicy, sprightly subacid, with a pleasant but not high flavor; good, July and August.

331. Early Harvest (Fig. 54).—As the earliest summer apple, Early Harvest should hold a welcome place in every home collection. Much of the fruit is too small to be marketable, and the apples bruise badly in handling, so that the variety is suitable only for nearby markets. The trees are above the average in vigor, productiveness, hardiness, and healthfulness. Early Harvest was described as long ago as 1806, and is probably of American origin.

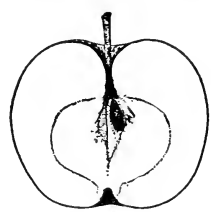

FIG. 54. Early Harvest.

Tree medium size, moderately vigorous, upright-spreading or roundish, open. Fruit medium, uniform in size and shape, nearly round, regular or slightly angular; sides unequal; stem thick; cavity acuminate, shallow, narrow to broad, russeted, with outspreading broken russet rays; calyx small, closed; lobes long, narrow; basin shallow, wide, obtuse, wrinkled; skin thin, tender, smooth, clear pale waxen-yellow, with deeper yellow on exposed cheek, sometimes slightly blushed; dots numerous, large and small, submerged or russet; calyx-tube short, funnel-shape; stamens median; core medium, abaxile; cells closed or slightly open; core-lines clasping; carpels obovate; seeds small to large, narrow, long, plump, acute; flesh white, fine, crisp, tender, juicy, at first briskly subacid but becoming mild; good to very good; late July and August.

332. Parry White.—The fruit of Parry White is unique in the coloring of both skin and flesh, the former being pale yellow or waxen and the latter pure white. The crop ripens early, following Yellow Transparent closely. It is supposed to have originated in Pennsylvania about the close of the Civil War, and its cultivation is confined to that state, New Jersey, and Delaware.

Tree of medium size and vigor, upright-spreading, somewhat drooping, dense. Fruit medium to large, globular, oblate or ovate, regular; stem short, slender; cavity acuminate, medium in depth and width, smooth, symmetrical; calyx small, closed; lobes narrow, acute; basin very shallow, narrow to broad, obtuse, smooth or wrinkled, symmetrical; skin thick, tough, pale waxen-yellow, occasionally blushed; dots small, pale, numerous, depressed; calyx-tube short, narrow, funnel-shape; stamens marginal; core small, abaxile; cells open; core-lines meeting or clasping; carpels round, emarginate; seeds acute, light brown; flesh white, firm, fine, tender, juicy, subacid; good; August through October.

333. Primate (Fig. 55).—This is considered about the best variety of its season, by reason of high quality of fruit and trees that grow vigorously and bear reliably and abundantly. The variety fails in commercial plantations because the crop ripens over a period of several weeks. Primate grew as a seedling on the farm of Calvin D. Bingham, Camillus, New York, about 1840.

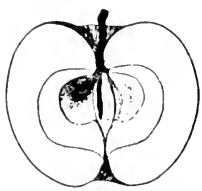

Fig. 55. Primate.

Tree large, vigorous, upright-spreading, dense. Fruit medium, round-conic, often ribbed; stem short, thick; cavity acute, deep, broad, furrowed; calyx closed; lobes long, narrow; basin shallow, abrupt, furrowed and wrinkled; skin thin, tender, smooth, light green or yellow, blushed; dots scattering, numerous, small, submerged or russet; calyx-tube large, long, broadly conical; stamens median; core large, axile or abaxile with hollow cylinder in the axis; cells open; core-lines clasping; carpels cordate; seeds large, wide, plump, acute; flesh white, fine, crisp, very tender, juicy, subacid, aromatic, sprightly; very good to best; August and September.

Group 7. Red Apples

334. Red June (Fig. 56). *Carolina Red June.*—Red June is characterized by its small deep red round apples of uniform size and shape. The flesh is white, rimmed and stained with red, juicy, sprightly, refreshing, rich, and very good. The variety is grown in full perfection only in the South and parts of the West. Red June is supposed to have originated in North Carolina, having been first described in 1848.

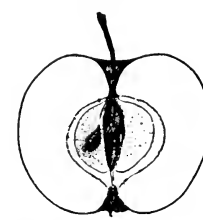

Fig. 56. Red June.

Tree vigorous, spreading, with short, stout, curved branches. Fruit small, round-ovate or oblong, sides usually unequal; stem commonly long, slender; cavity small, acuminate, shallow, narrow, symmetrical, sometimes compressed; calyx large, leafy, closed or open; lobes long, narrow, acuminate; basin small, shallow, narrow, obtuse, smooth or waxy; skin thin, tender, smooth, glossy, pale yellow, overspread with deep red, very dark red on the exposed cheek; dots numerous, very small, light; calyx-tube short, wide, conical; stamens median; core large, axile or somewhat abaxile; cells open or sometimes closed; core-lines clasping; carpels broadly ovate; seeds dark brown, numerous, small, plump, acute; flesh white, fine, tender, juicy, brisk subacid; good to very good; July to October.

335. Red Astrachan (Fig. 57).—The apples are beautiful in color and shape when well grown, but are often poorly colored and lack in uniformity of size and shape. The trees come into bearing young and bear regularly and abundantly, but are short-lived and subject to most of the ills that apple-trees are heir to. The apples cannot be handled or stored, and therefore, the variety has small place as a market fruit. Red Astrachan is a Russian apple introduced into America in 1835, and is now grown in all the apple regions of this continent.

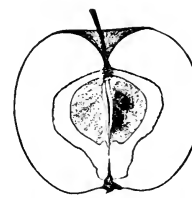

FIG. 57. Red Astrachan.

Tree large, vigorous, upright-spreading, dense. Fruit medium to large, round-oblate, conical, ribbed, sides unequal; stem slender, bracted; cavity acute, deep, broad, often russeted with greenish-russet, sometimes lipped; calyx large, open, or closed; lobes long, broad; basin shallow, narrow, obtuse, wrinkled; skin thin, tender, smooth, pale yellow often overspread with light and dark red, splashed and irregularly striped with deep crimson or carmine and covered with heavy bloom; dots numerous, white; calyx-tube long, funnelform; stamens median; core small, abaxile; cells closed or open; core-lines clasping; carpels broadly ovate, tufted; seeds small, wide, plump, obtuse; flesh white often tinged with red, fine, crisp, tender, juicy, brisk subacid, aromatic; good to very good; July to September.

336. Lowland Raspberry. *Liveland.*—Lowland Raspberry is an early Russian apple very popular in the Great Plains. The fruit is beautiful and of very good quality for an early apple, but the skin is so tender that the fruit is suitable only for home use and local market. The variety was introduced from Russia about 1880.

Tree vigorous, not large, upright, very hardy, productive. Fruit medium to large; color waxen-white, striped, shaded and marbled with light carmine; flesh white, often stained with red, fine, very tender, pleasant, mild subacid, almost sweet; August or with Yellow Transparent.

337. Early Strawberry is characterized by fruits with crisp, tender, sprightly, aromatic flesh; and hardy, healthy, early-bearing, fruitful trees. The apples are too delicate to ship, so that the variety is not a good general market sort. It was first known in the City of New York, where it probably originated about 1800 or a little later. It is now widely distributed in eastern America.

Tree medium in size, upright-spreading, hardy, healthy, productive biennially. Fruit medium, uniform in shape and size, oblong-conic or round, regular or somewhat ribbed, sides often unequal; stem long and slender, often clubbed; cavity acute, deep, broad, symmetrical, sometimes with faint radiating rays of russet; small, shallow, narrow, obtuse, furrowed; skin thick, tough, smooth, waxy, yellow, covered with rich dark red, mottled and irregularly striped and splashed with deeper red; dots minute, grayish; calyx-tube short, wide, conical with fleshy pistil point projecting into the base; stamens median; core large, axile or abaxile; cells open, sometimes partly closed; core-lines meeting; carpels elliptical, concave, emarginate; seeds wide, plump, obtuse, dark brown; flesh yellow often with streaks of red, coarse, crisp, tender, juicy, subacid, aromatic, sprightly; very good; August.

338. Williams. *Williams Early. Williams Red.*—Beautiful bright red color and rich agreeable flavor characterize the fruits of Williams, but they do not stand shipping well and cannot be kept long. Ordinarily, the apples are large, but with a heavy crop many of them may be small and uneven in size, and they ripen so unevenly that more than one picking is required. The trees are only moderately vigorous, but are healthful and fruitful. Williams originated in Roxbury, Massachusetts, about 1750 and for a century and a half has been a favorite in New England and the Middle Atlantic states but is losing in popularity now.

Tree small, upright-spreading, dense. Fruit medium or large, oblong-conic or round-conic, broadly ribbed, sides often unequal; stem medium to long, thick; cavity obtuse, shallow, broad, furrowed, sometimes russeted;

calyx closed; lobes long; basin shallow, narrow, abrupt, furrowed; skin thick, tender, smooth, pale yellow overlaid with bright deep red, striped with dark red; dots numerous, inconspicuous, gray or russet; calyx-tube long, narrow, funnel-shape; stamens marginal; core large, axile; cells closed; core-lines clasping; carpels ovate; seeds narrow, long, plump, acute, dark brown; flesh white sometimes tinged with red, firm, coarse, crisp, tender, juicy, becoming dry when over-ripe, pleasant mild subacid, aromatic; good; August and September.

339. Charlamoff is a Russian variety of the Oldenburg type, suitable for the cold climate of the northern parts of the Great Plains and Canada. It ripens a little earlier than Oldenburg, but is not so good in quality, and remains in condition for only a short time. To offset these faults of the fruit, the trees come in bearing young and yield large crops biennially. It was introduced about 1880.

Tree rather small, compact, very hardy, spreading, productive, bearing biennially. Fruit of medium size, sometimes large, oblong-conical; skin pale yellow, splashed and streaked with purplish-red; dots few, distinct; cavity deep, of medium width; stem medium long, stout; basin shallow, wrinkled; calyx open; flesh white, coarse, juicy, mildly subacid, pleasant; quality good; August or just before Oldenburg.

340. Early Joe.—The crisp, tender, juicy, aromatic, richly-flavored flesh of this apple is universally liked. Unfortunately the tree is slow of growth, attains only medium size, is seldom fruitful, and produces many undersized and otherwise unmarketable apples. It is not a market sort. Early Joe grew from a seed planted in 1800 by Heman Chapin, East Bloomfield, New York.

Tree vigorous, flat, spreading, dwarfish with short, stout, crooked branches. Fruit small, uniform in size and shape, oblate-conic to conic, ribbed, symmetrical; stem long, slender; cavity acute, shallow, broad, symmetrical, sometimes thinly russeted; calyx closed or slightly open; basin small, shallow, medium in width, abrupt, smooth or wrinkled; skin thin, tender, smooth, pale yellow, irregularly and obscurely striped and splashed with dull dark red; dots russet, white; calyx-tube wide, broadly conical; stamens median; core small, axile; cells open or closed; core-lines clasping; carpels broadly obcordate, concave; seeds small, wide, short, obtuse; flesh yellow, fine, crisp, very tender, very juicy, mild subacid; very good to best; August to September.

341. Benoni (Fig. 58) falls short of being an excellent market and home apple through the smallness of the fruits, and the unproductiveness and biennial bearing habit of the trees. When well grown it is a beautiful and delicious dessert apple. The variety originated at Dedham, Massachusetts, sometime before 1832. It is now chiefly grown in Illinois, Missouri, and neighboring states.

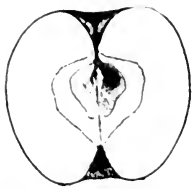

FIG. 58. Benoni.

Tree large, vigorous, erect or round-topped, dense. Fruit medium or small, round-conic, faintly ribbed toward the apex, sides unequal; stem short or very short, slender; cavity acute, narrow, deep, waxy, greenish-russet; calyx small, partly open, pubescent; basin medium in width and depth, abrupt, wrinkled; skin smooth, orange-yellow, partly covered with red striped with carmine; dots scattering, minute, white; stamens basal; core small, axile; cells closed; core-lines meeting; carpels round, elongated, emarginate; seeds few, dark brown, medium in size, plump, obtuse; flesh yellow, firm, crisp, fine-grained, tender, juicy, pleasant subacid; good to very good; August and early September.

342. Oldenburg (Fig. 59). *Duchess. Duchess of Oldenburg.* —The apples are handsome and well flavored, being especially suitable for culinary uses. The trees, while neither large nor long-lived and quite susceptible to disease, come in bearing early, are hard and productive, and are especially fitted for planting as fillers among permanent trees. The variety thrives north and south, east and west, on many soils. Oldenburg was imported to America from England in 1835.

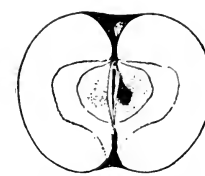

FIG. 59. Oldenburg.

Tree medium in size, upright-spreading. Fruit medium to large, round-oblate or oblate, regular, symmetrical; stem short, slender; cavity acute, deep, broad; calyx large, usually closed; lobes broad, acute; basin deep, wide, abrupt, smooth or with small mammiform protuberances; skin thick, tender, smooth, pale yellow, covered with irregular splashes and stripes of bright red, mottled and shaded with crimson; dots scattering, small, light-colored; calyx-tube long, wide, funnel-shape with broad truncate cylinder; stamens median; core large, axile; cells closed or open; core-lines clasping; carpels broad-ovate, emarginate; seeds large, wide, obtuse, plump, dark brown; flesh yellow, firm, fine, crisp, tender, juicy, sprightly subacid, aromatic; good to very good; August and September.

PLATE XII. A sweet cherry—The Schmidt.

343. Chenango (Fig. 60). *Chenango Strawberry.*—The fruits begin to mature in September and continue, in storage at least, until November. Chenango is too delicate to send to market, but no apple can give more pleasure to those who grow fruit for their own use. The trees are early and regular bearers, hardy, healthy, long-lived, fruitful, and annual in bearing. The history of this apple is not known, but it probably originated in Chenango County, New York. It was first described in 1854.

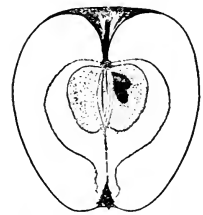

FIG. 60. Chenango.

Tree of medium size, vigorous, upright-spreading, dense, with short, stout, curved branches. Fruit medium to large, oblong-conic, ribbed; stem short, thick; cavity acuminate, deep, narrow, often furrowed and compressed; calyx large, partly open or closed; lobes often separated at the base, long, broad, obtuse; basin small, shallow, narrow, obtuse, furrowed, wrinkled; skin tough, smooth, glossy, yellowish-white, overspread and mottled with pinkish-red, conspicuously striped and splashed with carmine; dots few, inconspicuous, light-colored, often submerged; calyx-tube long, funnel-shape; stamens median; core large, abaxile; cells often unsymmetrical, wide, open or closed; core-lines clasping; carpels broadly ovate, smooth; seeds small, wide, plump, obtuse; flesh white, firm, tender, juicy, mild subacid, very aromatic; good to very good; latter part of August and through September.

344. Titovka is valuable in all regions where hardiness must be taken into account. The apples, which are large and handsome, are suitable for culinary use, but scarcely so for dessert. The trees are vigorous, healthy, and productive. The variety was imported from Russia in 1870 by the United States Department of Agriculture.

Tree dwarfish but vigorous, upright, dense, with stout twiggy branches. Fruit large, oblong symmetrical; stem short, not exserted; cavity acuminate, very deep, sometimes russeted; calyx of medium size, closed; segments small, convergent; basin shallow, very abrupt, wrinkled; skin smooth, yellow, shaded and striped with bright red and overspread with light bloom; calyx-tube elongated-cone-shape; stamens median; core large, abaxile; cells open; core-lines clasping; carpels broadly round or obovate, emarginate; seeds few, small, plump; flesh white, coarse, crisp, juicy, subacid; good to very good; August and September.

345. Tetofsky is the standard early apple in the northern limits of apple cultivation. The fruits are attractive in color

and pleasantly acidulous in flavor. The apples are small, however, and fall short of several other summer apples in the great fruit regions. Tetofsky is a pioneer Russian variety, having been imported in 1835 by the Massachusetts Horticultural Society.

Tree dwarfish, vigorous, very erect, dense, with stout branches, filled with small spurs. Fruit small, oblate or round, sometimes conic, regular; stem short or medium, slender; cavity obtuse, medium to deep, broad, usually symmetrical, gently furrowed; calyx large, closed; lobes long, broad; basin shallow, furrowed and wrinkled; skin thick, tough, smooth, waxy, greenish-yellow, more or less striped and splashed with bright red, overspread with faint bloom; dots inconspicuous, pale, submerged; calyx-tube long, wide, funnel-shape; stamens median; core large, axile; cells open; core-lines clasping; carpels broadly round, concave; seeds short, plump; flesh white, firm, coarse, tender, juicy, sprightly, aromatic, subacid; fair to good; late July to September.

Section VI. Midseason Apples

Group 8. Yellow Apples

346. Lowell. *Greasy Pippin.*—This is preëminently an apple for the home orchard, since it furnishes fruit for dessert or cooking from late summer to early winter. The flesh is pleasantly flavored, and the large bright-yellow apples, with a most perceptible coating of wax, are very attractive. It has been under cultivation for at least a century and is generally distributed throughout the East and North.

Tree large, vigorous, upright-spreading, open. Fruit large, round-oblong, conic, irregular; stem long, thick, deflected to one side; cavity acute, shallow, broad, often russeted; calyx large, closed or partly open; basin shallow, medium in width, abrupt, often furrowed and wrinkled; skin thin, tender, smooth or with occasional russet dots and flecks, waxy, rich yellow, greasy; dots numerous, brown, russet or submerged; calyx-tube long, wide, conical; stamens median; core large, axile to abaxile; cells closed; core-lines meeting or clasping; carpels obovate, emarginate; seeds dark brown, medium in size, obtuse; flesh yellow, firm, fine-grained, crisp, tender, very juicy, sprightly subacid; good to very good; August to October.

347. Gideon.—The clear waxen-yellow color, heightened by a bright pinkish blush, makes the fruits of Gideon beautiful; but the quality is not good, and the flesh passes rapidly from maturity to decay. The greatest assets of the variety are hardi-

ness, vigor, and fruitfulness. Gideon was grown by Peter Gideon, Excelsior, Minnesota, about 1880 from a seed of a crab-apple.

Tree vigorous, spreading and open. Fruit medium to large, round-conic or ovate, sometimes oblong, angular; stem long, slender; cavity acute, deep, broad, sometimes russeted; calyx small, closed; lobes narrow, acute, reflexed; basin small, shallow, narrow, obtuse; wrinkled, usually with narrow ridges; skin thin, glossy, waxen yellow, with pink blush on exposed cheek; dots light, submerged, inconspicuous, except where the skin is blushed; calyx-tube short, narrow, often funnel-shape with very short truncate cylinder; stamens marginal; core axile or abaxile; cells closed or open; core-lines meeting the limb or clasping the cylinder; carpels round, broadly ovate, or elliptical, emarginate, tufted; seeds large, irregular, long, acute, tufted, light brown; flesh yellow, soft, coarse, crisp, juicy, subacid; fair to good; October.

348. Dyer. *Pomme Royale.*—The fruit of Dyer is the quintessence of the apple-orchard. Unfortunately the trees bear only biennially, and are not fruitful, vigorous, healthy, or hardy. The variety was cultivated during the Revolutionary War, and is supposed by some to be the old French sort, Pomme Royale. Its culture is confined to the East and Middle West.

Tree vigorous in the nursery, dwarf in the orchard; comes in bearing young, but is short-lived; productive biennially. Fruit medium or sometimes large, round-oblate, regular or obscurely ribbed; stem long, slender; cavity small, acute, deep, sometimes lipped; calyx small, closed; lobes long, recurved; basin small, shallow to deep, furrowed; skin smooth, pale yellow, more or less flecked and marbled with a brownish blush on one cheek; dots dark or russet; core of medium size; cells open or closed; core-lines clasping; seeds numerous, plump, short, small, pale; flesh yellow, fine, very crisp, tender, aromatic, sprightly, mild subacid, highly flavored; very good to best; September and October.

349. Maiden Blush (Fig. 61).—This old favorite attained and holds its popularity chiefly by virtue of its very handsome crimson-cheeked lemon-yellow apples. The fruits are not high enough in quality to relish out of hand, but are very good for cooking, evaporating, and for the markets. The crop does not mature uniformly, is very susceptible to the scab-fungus, and does not keep well in either ordinary or cold storage. The trees are above the mark in most

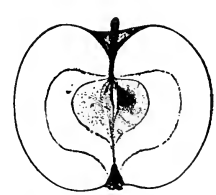

FIG. 61. Maiden Blush.

characters. The variety was very popular in Philadelphia as long ago as 1817. It is probably as widely disseminated in America as any other apple.

Tree vigorous, spreading, open. Fruit medium, sometimes large, oblate, sometimes conic, symmetrical; stem short, slender; cavity large, acute, medium to wide, shallow; sometimes russeted; calyx closed; lobes separated at base, broad, acute; basin shallow, medium to wide, obtuse, regular, smooth or furrowed, symmetrical; skin thin, tough, smooth, pale waxen-yellow with crimson blush; dots numerous, white, submerged or areolar; calyx-tube small, narrow, conical; stamens median; core of medium size, axile or somewhat abaxile, broad-elliptical; cells closed or slightly open; core-lines meeting or clasping; carpels broad-ovate; seeds brown, wide, long, plump, acute; flesh white or with yellow tinge, fine, crisp, tender, very juicy, subacid; good; September to December.

350. Holland Pippin is often confused with Holland Winter and Fall Pippin. The following differences distinguish it from these two: Holland Pippin is a fall apple, while Holland Winter is in season in winter. Holland Pippin is a culinary fruit, while Fall Pippin is a choice dessert apple. Holland Pippin is the earlier, going out of season soon after Fall Pippin begins to ripen. Holland Pippin is the greener fruit of the two, Fall Pippin being fit to use only when it is a golden-yellow in color. The stalk of Holland Pippin is short and set in a wide cavity, while that of Fall Pippin is long and in a narrow cavity. Holland Pippin has been grown in America over a century, its cultivation extending from the Atlantic westward to Michigan and Indiana.

Tree large, vigorous, spreading or round-topped. Fruit large or very large, oblate-conic, obscurely ribbed; stem short, slender; cavity acute, shallow, usually covered with thick outspreading russet; calyx pubescent, small, partly open; lobes long, acute; basin deep, narrow, obtuse, ridged and wrinkled; skin thin, tough, smooth, pale yellow with brownish-red blush which is marked with large irregular areolar dots; dots numerous, large and small, often submerged; calyx-tube wide, broadly conical; stamens median; core large, abaxile; cells unsymmetrical, open; core-lines meeting or clasping; carpels broad, narrowing toward base and apex, emarginate, tufted; seeds narrow, acute; flesh white, coarse-grained, crisp, tender, very juicy, brisk subacid; good to very good; September to October.

351. Hawley.—Few apples surpass Hawley. The fruits in quality become quite preëminent, being characterized by tenderness, crispness, juiciness and fineness of flesh, and richness of flavor. The apples cannot be kept long; are frequently water-

cored or rotten at the core; the trees are unproductive; and fruit and foliage are susceptible to the scab-fungus. Hawley originated from seeds planted by Mathew Hawley, New Canaan, New York, about 1750.

Tree large, vigorous, hardy, long-lived, comes in bearing late, moderately productive. Fruit large, uniform in size and shape, globular, oblate or conic, ribbed; stem slender; cavity acute, deep, wide and with outspreading russet rays; calyx large, partly closed; lobes reflexed, wide, acute; basin deep, very abrupt, often furrowed; skin smooth, waxy, thin, pale green deepening to yellow, sometimes showing a faint brown blush, with scattering russet dots and flecks toward the cavity; calyx-tube large, wide, cone-shape, yellow or brown; cells closed; core-lines meeting; carpels flat, tufted, round, emarginate; seeds few, obtuse, medium in size, often abortive; flesh yellow, soft, tender, fine-grained, juicy, rich, mild subacid; very good; September to November.

352. Porter.—If the fruits are judged by quality, the variety would rank as one of the best of its season, but the apples are too tender in flesh to ship, the season of ripening is long and variable, and the crop drops badly. Porter originated about 1800 with Rev. Samuel Porter, Sherburne, Massachusetts.

Tree large, vigorous, round or spreading. Fruit large, oblong-conic, truncate at base and with apex oblique and ribbed; stem short, thick, sometimes knobbed, curved; cavity acute, deep, narrow, compressed, usually faintly russeted; calyx large, closed or open; lobes separated at base, short, narrow, acute; basin deep, shallow, narrow, abrupt, broadly furrowed and wrinkled; skin thin, smooth, glossy, yellow with faint blush, marked with scattering red dots; dots small, submerged, green with white center, sometimes russet; calyx-tube short, wide, broadly conical; stamens median; core large, axile or abaxile; cells partly open or wide open; core-lines meeting; carpels broadly ovate, mucronate; seeds large, plump, rounded, acute; flesh yellow, fine, crisp, tender, juicy, subacid, aromatic, sprightly; good to very good; September to November.

Group 9. Red Apples

353. Constantine (Fig. 62). *Grand Duke Constantine.*—Constantine is very similar to the better-known Alexander, from which it differs in that the fruit ripens a week later, keeps longer, hangs later, cracks less, and is a little better in quality. The trees are not so large as those of Alexander and may

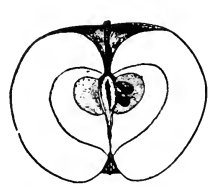

FIG. 62. Constantine.

be planted more closely. Constantine was first described in Europe in 1873, in America in 1880.

Tree small, spreading, open, with short, stout, curved branches. Fruit very large, round conic, symmetrical; stem long; cavity large, acuminate, very deep, broad, symmetrical, russeted and with outspreading rays of greenish russet; calyx open; lobes medium in width and length, acute; basin narrow, abrupt, wrinkled; skin thick, tough, smooth, waxy, greenish-yellow, mottled, marbled and blushed with bright red over nearly the whole surface, with wide broken stripes of carmine radiating from the cavity; overspread with thin bloom; dots white or pale russet; calyx-tube long, wide, funnel-shape; stamens median; core abaxile; cells open or closed; core-lines clasping; carpels cordate, emarginate; seeds wide, short, thick, plump, obtuse, dark brown; flesh white, firm, coarse, tender, juicy, sprightly subacid; fair to good; September to November.

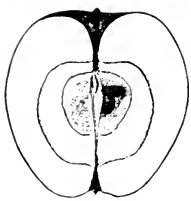

FIG. 63. Mother.

354. Mother (Fig. 63) is valued for its handsome appearance and its tender, rich, well-flavored flesh. The trees are seldom satisfactory and should be top-worked on a more vigorous stock to obtain vigor and thrift. Mother was described first in 1848 from Worcester County, Massachusetts.

Tree small, slow grower, upright-spreading, open. Fruit large, round, round-conic, obscurely and broadly ribbed; stem long, slender; cavity acute, shallow, broad, often russeted, sometimes furrowed, compressed or lipped; calyx small, closed or nearly so; lobes narrow, acute; basin shallow, narrow, abrupt, furrowed and wrinkled; skin thin, smooth, golden-yellow covered with bright deep red, marbled and striped with carmine; dots inconspicuous, yellow, submerged; calyx-tube long, funnel-form with wide limb and narrow cylinder; stamens marginal; core small, abaxile; cells open or partly so; core-lines clasping; carpels broad-ovate to round, emarginate, mucronate; seeds dark, plump, acute; flesh yellow, fine, tender, juicy, mild subacid, aromatic; very good to best; September to January.

355. Late Strawberry (Fig. 64). *Autumn Strawberry. Fall Strawberry.*—The true Late Strawberry is one of the best dessert apples of its season. Its reputation has suffered because of confusion in nomenclature, several distinct sorts being grown as Late Strawberry. The variety is debarred from commercial plantations because of the small size of the fruit and the long period of maturity, which makes

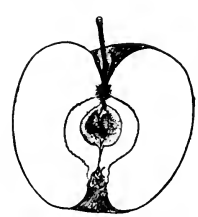

FIG. 64. Late Strawberry.

several pickings necessary. It originated at Aurora, Cayuga County, New York, and was first described in 1848.

Tree medium to large, vigorous, upright-spreading, hardy, healthy, long-lived, yielding regularly and heavily. Fruit small, round, or oblong-conic, sometimes strongly ribbed, irregular; stem long, slender, often curved; cavity acuminate, deep, broad, furrowed, sometimes with thin radiating streaks of light russet mingled with carmine; calyx large, open; lobes often separated at base, short, acute, erect or reflexed; basin deep, wide, abrupt, furrowed and wrinkled; skin pale yellow often almost entirely overspread with bright red, dotted and streaked with purplish-carmine; dots inconspicuous, light colored; calyx-tube wide, conical; stamens basal; core small, axile to abaxile; cells closed or open; core-lines meeting; carpels obovate; seeds large, flat, obtuse; flesh yellow, fine, crisp, tender, juicy, sprightly, aromatic, subacid; very good; September to December.

356. Bonum. *Magnum Bonum.*—Bonum is a standard variety in the South, valued for its productive trees and the rich flavor of its apples, qualities which it attains only when grown under favorable conditions. It originated in Davidson County, North Carolina, about 1840.

Tree vigorous, upright-spreading or round-topped, open. Fruit medium to large, oblate, regular; stem long, slender, green; cavity large, deep, regular, often with a little green-russet; calyx large, closed; basin shallow, wrinkled; skin smooth, yellow, mostly covered with crimson and dark red, striped; dots distinct, large, light with some having a dark center; calyx-tube funnelform; stamens marginal; core small; cells closed; core-lines meeting; carpels ovate; seeds numerous, large, plump; flesh white, often stained next to the skin, firm, fine, tender, juicy, aromatic, mild subacid; very good; September to November.

357. Wealthy (Fig 65).—This variety is indispensable in cold regions and valuable wherever apples are grown on this continent. The fruits are handsome in appearance, color, size, and shape; the quality is good, the flesh being especially crisp, juicy, and refreshing; the fruits stand handling and storage; the trees bear early and abundantly and at first are thrifty and healthy. Faults are: the trees are never of large size; the apples run small and uneven on old trees, and there is some loss from dropping. Wealthy is an ideal apple for planting as a filler among permanent trees.

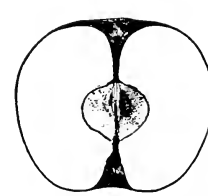

FIG. 65. Wealthy.

It originated from seed of the Cherry Crab planted by Peter M. Gideon, Excelsior, Minnesota, about 1860.

Peter differs from Wealthy in having yellowish flesh and in ripening a little later.

Tree dwarfish, vigorous, upright-spreading, open and drooping, with short, stout, curved branches. Fruit medium to large, round-conic, flattened at base, regular; stem short, slender; cavity acuminate, deep, narrow, russeted; calyx closed or partly open; lobes broad, obtuse; basin narrow, abrupt, smooth; skin thin, pale yellow, blushed and marked with narrow stripes and splashes of red; dots numerous; inconspicuous, pale or russet; calyx-tube conical; stamens median; core small, axile or sometimes abaxile; cells open; core-lines clasping; carpels small, round, narrowing toward base and apex, smooth, flat; seeds dark brown, acute; flesh white, sometimes stained with red, fine, crisp, tender, very juicy, agreeable subacid, sprightly, aromatic; good to very good; October to January.

358. Fameuse (Fig. 66). *Snow.*—Few apples are more beautiful and more refreshing than those of Fameuse. If the tender skin of light and shaded red is cut through, flesh of snowy whiteness rimmed and stained with crimson is exposed, beautiful to sight and delectable to smell and taste. Fameuse, commonly called Snow, belongs to high altitudes and northern latitudes, where, alone, the apples reach perfection, and the trees attain vigor, health, and longevity. The variety has several faults; the apples are small and keep only until Christmas; fruit and tree are inviting prey to apple-scab; and the trees are fastidious as to soils. Fameuse is of Canadian origin, with a history of at least two hundred years.

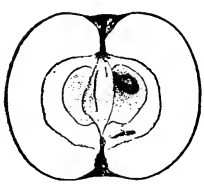

FIG. 66. Fameuse.

Tree vigorous, upright-spreading, dense, with long stout branches. Fruit medium size, round-conic, sometimes oblate, regular, uniform, symmetrical; stem short, slender; cavity acute, deep, wide, often gently furrowed, smooth and red or green; calyx small, closed; basin abrupt, obscurely furrowed or wrinkled, often having mammiform protuberances; skin thin, tender, smooth, bright red deepening to dark red, striped toward the apex; dots few, scattering, light; calyx-tube narrow, funnelform; stamens median; core small, axile; cells closed; core-lines clasping; carpels symmetrical, round or elliptical, emarginate, mucronate; seeds dark, long, narrow, acute; flesh white, streaked or stained with red, very tender, juicy, subacid becoming mild subacid, aromatic; very good; October to midwinter.

359. McIntosh (Fig. 67).—The fruits of McIntosh are uniquely beautiful, outwardly and inwardly, the flavor is hardly surpassed, and the whole apple is most agreeably perfumed. The bright deep-red color is made more attractive by a heavy and characteristic bloom. When the apples are cut, flesh of snowy whiteness rimmed and stained with red is exposed—firm, fine, crisp, tender, and juicy, with a rich, delicious, and very distinctive flavor. The trees are vigorous, hardy, and healthy. Tree faults detract from its value as a commercial fruit: apple-scab fungus seriously disfigures fruit and foliage; the crop ripens unevenly; and the apples seldom hang until sufficiently mature. The variety originated in Dundas County, Ontario, on the McIntosh homestead, from which its distribution was begun about 1870.

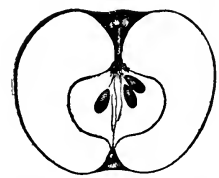

FIG. 67. McIntosh.

Tree vigorous, round or spreading, with numerous small slender laterals. Fruit large, uniform in shape and size, round-oblate, regular; stem short, stout, slender, often with irregular protuberances; cavity large, acuminate, wide, broadly furrowed, often partly russeted; calyx small, closed or partly open; lobes short, narrow, acute; basin pubescent, small, narrow, abrupt, smooth or obscurely furrowed; skin thin, tender, smooth, readily separating from the flesh, pale yellow washed and deeply blushed with bright red and striped with carmine; overspread with bloom; dots white or yellow, small; calyx-tube short, conical, with broad limb; stamens median; core abaxile; cells wide open; core-lines meeting, carpels elliptical, smooth, concave; seeds brown, large, acute; flesh white, sometimes veined with red, firm, fine, crisp, tender, very juicy, perfumed, sprightly subacid; very good to best; October to December or later.

360. Cortland.—The fruits of Cortland are so similar to those of McIntosh that the two varieties are certain to be confused, but each is distinct and the differences are all in favor of Cortland so that the apple is better than that of McIntosh, impossible as it may seem. The fruits of Cortland ripen later than those of McIntosh, hang on the tree much longer, keep longer, bruise less in handling, are larger, and brighter in color. The shape, taste, and flesh-characters of the two are almost identical. The trees are much the same. Cortland is an improved McIntosh and as such is sought for in New York and New England where McIntosh is chiefly grown. The variety is a cross between Ben

Davis and McIntosh made at the New York Agricultural Experiment Station in 1898. The variety was distributed in 1915 and now promises to be a close competitor or to take the place of McIntosh where the latter is grown.

361. Alexander (Fig. 68). *Aporta.*—Merits of the trees are vigor, hardiness, productiveness, earliness and regularity of bearing; of the fruits, large size and handsome appearance. The chief fault of the tree is susceptibility to blight. The apples are suitable only for culinary purposes; they ripen unevenly; drop prematurely; and do not keep well in either common or cold storage. The variety is much used as a filler in some apple regions, and as a permanent tree where hardiness is a determinant. Alexander was introduced into England in 1817; when into America is not known.

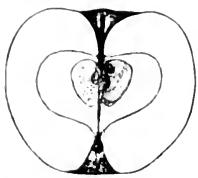

FIG. 68. Alexander.

Tree large, vigorous, with long stout branches, upright-spreading, open, drooping. Fruit large, round-conic to oblate-conic, broadly angular, symmetrical; stem short, thick; cavity acute, deep, broad, symmetrical, occasionally lipped, russeted, with broad conspicuous outspreading russet rays; calyx large, open; lobes short, narrow, acute; basin small, deep, narrow, abrupt, smooth, symmetrical; skin thick, tough, smooth, glossy, waxen, pale yellow deepening to orange-yellow in the sun, overspread with lively red or striped and splashed with carmine; dots inconspicuous, scattering; calyx-tube long, wide, conical; stamens median; core small, usually axile; cells closed or slightly open; core-lines clasping; carpels elliptical, emarginate; seeds wide, short, plump, obtuse; flesh faint yellow, firm, coarse, crisp, tender, juicy, mild subacid; fair to good; September to November.

362. Wolf River (Fig. 69) is of note chiefly for its very large apples. The fruits resemble those of the better-known Alexander in color, shape, and quality; but average larger and are rounder and less conical. The tree is very hardy and thrifty, but is only moderately productive. In the West, many prefer tree and fruit to the Alexander,—not so in the East. The variety originated on the farm of W. A. Springer, Wolf River, Wisconsin, and was first described in 1875.

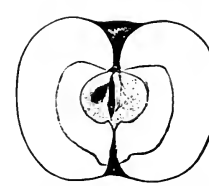

FIG. 69. Wolf River.

Tree large, vigorous, spreading, open, drooping. Fruit very large, broad and flat at the base, conic or round, often irregular; stem short, thick; cavity acuminate, deep, wide, heavily russeted; calyx large, open or closed; basin deep, narrow, abrupt, usually smooth, broadly furrowed; skin thick, pale yellow, mottled and blushed with bright, deep red and marked with conspicuous splashes and broad stripes of bright carmine; dots numerous, large, areolar, depressed, pale or russet; calyx-tube conical; stamens median; core large, abaxile; cells closed or partly open; core-lines clasping; carpels broadly cordate, emarginate, tufted; seeds dark brown, wide, short, plump, obtuse; flesh white tinged with yellow, firm, coarse, tender, juicy, subacid, aromatic; fair to good; September to December.

363. Grosh. *Large Rambo. Summer Rambo.*—While the apples are handsome when well-colored, they are not high in quality; and the trees, though good in most characters, have the fault of not being able to carry the crop, much of which drops prematurely. The variety is at its best in Ohio, where it is reputed to have originated about 1840.

Tree vigorous, upright-spreading, open. Fruit medium large, round-oblate to conical, regular or elliptical; stem short, thick; cavity acuminate, deep, wide, often compressed, smooth and green or russeted, symmetrical or gently furrowed, sometimes lipped; calyx large, open disclosing the yellow calyx-tube; lobes separated at the base, long, often leafy, acute; basin often oblique, large, abrupt, somewhat furrowed; skin thick, tough, waxy, greenish-yellow becoming bright yellow, washed and mottled with bright red and striped and splashed with carmine; dots numerous, large, gray or russet, often areolar or white and submerged; calyx-tube large, wide at the top, conical; stamens basal to median; core small, axile or abaxile with hollow cylinder in the axis; cells closed or partly open; core-lines clasping; carpels ovate, emarginate, often tufted; seeds numerous, dark brown, often abortive, wide, obtuse; flesh slightly tinged with yellow, firm, coarse, tender, juicy, sprightly subacid, aromatic; good to very good; September to January.

364. Fanny.—The fruits of Fanny are beautiful and most excellent in quality, and the trees are very satisfactory; but the apples are so deficient in size and ripen over so long a period that the variety is of value only for the home orchard. Fanny originated at Lancaster, Pennsylvania, with John K. Eshelman, previous to 1869, when Downing called attention to its merits.

Tree vigorous, flat, spreading, open, with long stout branches. Fruit medium size, uniform in size and shape, round-oblate, oblong or ovate, regular or slightly ribbed; stem short, slender; cavity acute, sometimes

russeted; calyx small, closed or partly open; lobes short, narrow, acute; basin shallow, wide, abrupt, furrowed; skin thin, tender, smooth, yellow overlaid with bright red indistinctly striped with carmine; dots small, yellow; calyx-tube wide, funnelform with pistil point projecting into the base; stamens median; core below medium, abaxile; cells open; core-lines clasping; carpels broadly ovate, emarginate; seeds large, wide, flat, plump, acute; flesh yellow, firm, fine, very tender, juicy, mild subacid; good to very good; September to November.

365. Jefferis is one of the best fall apples; the fruits are tender, pleasantly acidulous, rich, delicious. The trees also are satisfactory in all respects, but the apples ripen unevenly, are not attractive in color, and lack both size and uniformity. Jefferis originated with Isaac Jefferis, Chester County, Pennsylvania, and is first recorded in 1848. It is grown in all the eastern states.

Tree of medium size, vigorous, upright, open. Fruit small, uniform in size and shape, round-oblate, conic, regular or obscurely ribbed; stem short, thick; cavity acute, medium in depth, broad, symmetrical; calyx small, closed or open; lobes short, broad, acute; basin shallow to deep, wide, abrupt, smooth, symmetrical; skin thin, tough, pale yellow, blushed and mottled with dull red overlaid with narrow splashes and stripes of carmine; dots small, scattering, submerged or russet; calyx-tube narrow, conical; stamens marginal; core small, axile; cells open; core-lines clasping; carpels elliptical, emarginate, sometimes tufted; seeds numerous, large, wide, long, flat, very irregular, obtuse; flesh yellowish-white, firm, fine, crisp, tender, very juicy, mild, subacid; very good; September to January.

366. Twenty Ounce (Fig. 70).—The apples are large, handsomely colored with stripes and splashes of red on a rich yellow background, and while the quality is not good enough for a dessert apple, the fruits are scarcely surpassed for culinary uses. The trees bear early and abundantly, hold their crop well, but fall short in being susceptible to winter-injury and canker-fungi and in not attaining large size. Twenty Ounce was brought prominently to notice by Downing in 1845, but the origin of the variety remains a mystery.

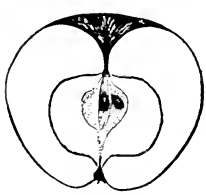

FIG. 70. Twenty Ounce.

Tree vigorous, upright becoming round-topped, dense, with branches long and stout. Fruit very large, round-conic, sometimes broadly ribbed; stem

deep set, short, thick or slender; cavity acuminate, very deep, sometimes lipped, sometimes russeted; calyx closed; basin often oblique, shallow, narrow, abrupt, broadly and deeply furrowed; skin thick, tough, green becoming yellow, washed, mottled and splashed with bright red or deepening to dark or purplish-red, with carmine stripes; dots gray or russet, small, often raised, sometimes submerged; calyx-tube large, long, wide, conical, extending to the core; stamens usually basal; core large, axile or abaxile; cells mostly closed, sometimes wide open; core-lines clasping the cylinder; carpels elongated-ovate, emarginate, tufted; seeds narrow, obtuse, variable; flesh yellow, coarse, tender, juicy, subacid; good; late September to early winter.

367. Collamer.—This variety is a sport of the well-known Twenty Ounce, from which it differs in bearing fruits more solidly covered with red, more regular in shape, and less ribbed. The brighter color of Collamer makes it a more valuable commercial apple than Twenty Ounce. The variety originated at Hilton, New York, in the orchard of J. B. Collamer, about 1895.

368. Ribston. *Ribston Pippin.*—The apples are not attractive in appearance, but have a fine rich flavor, a pleasant aroma, and firm, fine, crisp flesh that fit them admirably for dessert. The trees are hardy, vigorous, and long-lived, come in bearing young, and are annually fruitful, though not sufficiently productive to make a market variety. The Ribston originated in Yorkshire, England, over two centuries ago, and has been grown for at least a century in New York, New England, and Canada.

Tree large, vigorous, upright-spreading, with stout stocky branches. Fruit large, round, broad and flattened at the base, narrowing toward the basin, often broadly and obscurely ribbed; stem pubescent, short, thick, sometimes irregularly swollen or inserted under a lip; cavity large, acute, deep, wide, russeted and with outspreading russet rays; calyx small, closed or partly open; lobes separated at the base, erect, tips usually reflexed; basin small, shallow, narrow, abrupt, often furrowed and wrinkled; skin smooth or roughened with russet, yellow overspread with dull red which in highly-colored specimens deepens to bright red, with obscure carmine stripes and splashes; dots scattering, conspicuous, pale, often areolar with russet center; calyx-tube wide, cone-shape; stamens basal; core small, axile or with a narrow hollow cylinder at the axis; cells regular, closed; core-lines clasping; carpels emarginate, tufted; seeds light and dark brown, large, wide, long, obtuse, sometimes slightly tufted; flesh yellow, firm, very crisp, juicy, pleasantly aromatic, rich, sprightly subacid; very good; September to December.

369. Bietigheimer.—The fruits are of largest size, for which the variety is remarkable. On the other hand, the apples are coarse, poor in quality, and drop badly. The trees are hardy and healthy, and come into bearing early, but are among the unmanageables of orchard and nursery, and are seldom fruitful. The variety was introduced from Germany about 1870, and is now more or less grown in the colder parts of America.

Tree large, vigorous, upright-spreading, dense, with drooping laterals. Fruit very large, round-oblate, with broad flat base, somewhat irregular; stem short, thick; cavity large, acute, wide, shallow, occasionally lipped, often much russeted and with outspreading russet rays; calyx small, closed, with narrow acute lobes; basin shallow and obtuse to deep and abrupt, wrinkled, often marked with mammiform protuberances; skin thick, tough, smooth, pale yellow, washed with pinkish-red, obscurely splashed with deeper red; dots numerous, small, yellow or russet; calyx-tube broadly conical; stamens basal; core medium to large, axile; cells partly open; core-lines clasping; carpels cordate or broadly roundish, tufted; seeds numerous, large, wide, broadly acute, light brown; flesh white, firm, very coarse, crisp, tough, juicy, subacid; fair to good; September and October.

370. Haas (Fig. 71). *Fall Queen. Horse.*—Because of early bearing, thriftiness, hardiness, and productiveness in tree, Haas has been widely planted in America, and is still in favor in parts of the South. It might be a universal favorite, were it not for the poor quality of the fruit. Haas originated over half a century ago on the farm of Gabriel Cerre, St. Louis, Missouri, where it is chiefly grown.

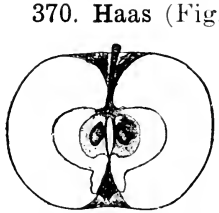

FIG. 71. Haas.

Tree large, very vigorous, tall and upright, becoming spreading, with long slender branches. Fruit medium to large, oblate-conic, ribbed, sides unequal; stem short, thick, often partly red; cavity acute, deep, broad, symmetrical, covered with thin greenish-russet; calyx small, closed; lobes separated at base, short, narrow, acuminate; basin narrow, deep, abrupt, smooth or furrowed and wrinkled; skin thin, tough, smooth, yellow, mottled, washed and covered with bright red or brownish-red, striped and splashed with carmine; dots large, inconspicuous, numerous, pale or russet; calyx-tube variable, long and wide, conical; stamens median; core medium, abaxile; cells symmetrical, open or closed; core-lines clasping; carpels round to elliptical; seeds dark brown, large, plump, acute; flesh white, often stained with red, firm, fine, a little tough, juicy, sprightly subacid, aromatic, a little astringent; poor in quality; October to early winter.

371. Hibernal. *Romna.*—Hibernal ranks among the best Russian apples in rigorous climates in the United States and Canada. The fruit is but mediocre but the tree is vigorous, healthy, and productive, making an excellent orchard plant either to produce its own fruit or upon which to graft less hardy or less vigorous varieties. The variety was imported from Russia between 1870 and 1880.

Tree vigorous, spreading, drooping. Fruit large, usually oblate-conic, often with sides unequal; stem short and stout, pubescent; cavity large, acute, deep, wide, furrowed, occasionally lipped, russeted; calyx large, open or partly closed; lobes broad, acute; basin large, often oblique, narrow, abrupt, furrowed and wrinkled; skin thick, tough, roughened with flecks of russet; color pale yellow, with thin bloom, blushed and striped with bright carmine; dots numerous, pale yellow or gray, conspicuous; calyx-tube long, wide, funnel-shape; stamens median; core small, axile; cells closed; core-lines meeting; carpels round-ovate, emarginate, tufted; seeds small, short, plump, obtuse, dark brown; flesh yellow, firm, coarse, juicy, brisk subacid; astringent; fair to good; September to January.

372. Gravenstein (Fig. 72).—All lovers of fruits value Gravenstein for its crisp, tender, sprightly, juicy, richly-flavored, aromatic apples. The trees are vigorous but subject to sun-scald and apple-canker, and do not hold their load well. Unfortunately, the variety is fastidious as to both soil and climate, and is grown in highest perfection in but few localities. Nova Scotia, where it becomes a winter apple, seems best suited to its needs. Gravenstein is an old German apple which has been in America probably a hundred years or more.

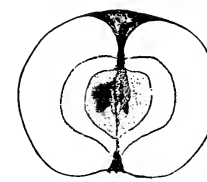

FIG. 72. Gravenstein.

Tree large, vigorous, upright-spreading, open. Fruit large, oblate or round, somewhat irregular, broad at the base, angular, narrow to broad, irregularly russeted; calyx large, open or closed; lobes large, long, very broad, acute; basin irregular, wide, obtuse to abrupt, wrinkled; skin thin, tender, rough, greenish-yellow or orange-yellow overlaid with broken stripes of light and dark red; dots few, small, light; calyx-tube large, conical; stamens median; core medium in size, strongly abaxile; cells open; core-lines clasping the funnel cylinder; carpels broad-ovate, emarginate; seeds large, long, plump, acute, brown; flesh yellow, firm, fine, crisp, tender, juicy, sprightly subacid, aromatic; very good to best; late September to November.

373. Banks. *Banks Gravenstein.*—Banks is a bright red Gravenstein, differing in no other important particular than color. Banks is a bud variation of Gravenstein, first propagated by C. E. Banks, Berwick, Kings County, Nova Scotia, about 1880.

Section VII. Late Apples

Group 10. Yellow Apples

374. Fall Pippin (Fig. 73).—Though one of the oldest American apples, it is doubtful whether Fall Pippin is properly appreciated. The name is inapt, as in the North the fruit keeps well into midwinter. The color is a beautiful golden-yellow, and the flesh is tender, rich, crisp, aromatic, and of delectable quality either for dessert or for culinary uses. The trees are hardy, healthy, long-lived, and very large. The habitat of the variety is New England, where it has been grown for at least a century and a half.

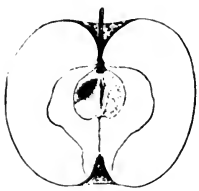

Fig. 73. Fall Pippin.

Tree large, very vigorous, spreading, with long branches which become drooping. Fruit large, round to round-oblate, sometimes oblong and truncate, obscurely ribbed; stem long, thick; cavity acute, wide, symmetrical or compressed, russeted; calyx large, open; lobes separated at the base, long, narrow, acuminate; basin wide, abrupt, wavy, wrinkled; skin thin, smooth, clear yellow, sometimes blushed; dots numerous, small, pale and submerged or russet; calyx-tube large, wide, long, conical; stamens median; core medium size, abaxile; cells symmetrical, closed or partly open; core-lines meeting or clasping; carpels round, emarginate, tufted; seeds dark brown, acute, plump; flesh yellow, firm, fine, tender, very juicy, agreeably subacid, aromatic; very good; late September to January.

375. Yellow Bellflower (Fig. 74). *Bellflower.*—Yellow Bellflower is distinguished by its unique fruits. The apples are oblong-conic with very prominent ridges at the apex, and with a smooth, delicate, pale, lemon-yellow, waxen skin beautifully blushed on the cheek to the sun. The fruits are not suitable for dessert, the flavor being a little too austere, but are unsurpassed for culinary purposes. Fruit and foliage are very susceptible

to injury by the apple-scab fungus. The trees are vigorous, healthy, hardy, long-lived, and productive in warm, well-drained, fertile soils. The most suitable regions for its cultivation are the coast valleys of California. In 1817, Coxe reported that the original tree was still standing near Crosswicks, New Jersey.

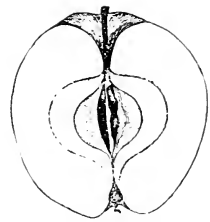

FIG. 74. Yellow Bellflower.

Tree large, vigorous, upright-spreading. Fruit large, oblong-conic, with prominent ridges at the apex, sides unequal; stem long, slender; cavity large, acute, deep, wide, furrowed, sometimes lipped, with broken rays of brownish-red in the sun which deepens to a blush; calyx closed or partly so; lobes narrow, acuminate, pubescent; basin small, oblique, abrupt, narrow, shallow, ridged and wrinkled; skin smooth, bright, pale lemon-yellow, with a shade of brownish-red in the sun; dots white or russet, small toward the basin, large, irregular toward the cavity; calyx-tube elongated funnel-shape; stamens median; core large, long, remarkably abaxile; cells open or partly closed; core-lines clasping; carpels round-obovate, much tufted; seeds large, long, obtuse; flesh yellow, firm, crisp, fine-grained, tender, juicy, aromatic; very good; October to March.

376. Ortley is probably a seedling of Yellow Bellflower. The essential differences between the two are: the fruits of Ortley are paler in color and have less acidity than those of Yellow Bellflower, and the trees are less productive. Ortley is an old variety first described in Coxe in 1817. It is a favorite on the Pacific slope.

Tree vigorous, medium in size or large, with long slender shoots, spreading. Fruit large, oblong-conic and flattened at the base or round-conic, regular or obscurely ribbed; stem long, slender; cavity large, acute, deep, narrow, partly russeted, furrowed; calyx small, closed or open; lobes long, acute, usually converging and reflexed; basin small, shallow, narrow, abrupt and wrinkled or furrowed; skin thin, tough, smooth, waxy, yellow, rarely with a faint blush; dots inconspicuous, white and submerged; calyx-tube funnelform, often elongated and extending to the core; stamens median; core large, widely abaxile; cells wide open; core-lines clasping the funnel-like cylinder; carpels round-ovate, elongated, emarginate; mucronate; seeds numerous, small and pointed, round, plump, light brown; flesh yellow, fine, crisp, tender, juicy, sprightly; very good; October to January.

377. Golden Delicious is now being introduced as a yellow dessert fruit, with the expectation that it will rank with the

best red apples. The expectations may be realized, for no other yellow apple is handsomer or of better quality. The trees are hardy, vigorous, healthy, and productive, with no marked faults that have appeared as yet. Golden Delicious originated as a chance seedling in West Virginia in the orchard of A. H. Mullins about thirty years ago.

Trees hardy, vigorous, healthy, productive. Fruit large, 3¼ inches broad, 3½ inches long, oblong-conic, uniform in size and shape, symmetrical, distinctly ribbed; stem 1½ inches long, slender, curved; cavity acuminate, broad, very deep, smooth, gently furrowed; calyx large, closed; basin narrow, abrupt, furrowed; skin golden-yellow, thin, smooth; dots numerous, small, conspicuous; russet and submerged at the apex; core large, open, abaxile; core-lines distinct, clasping; calyx-tube long, wide, funnel-shaped; carpels round-oval, tufted; seeds large, plump, acute; flesh firm, crisp, tender, juicy, mild subacid, rich, aromatic; quality very good to best for dessert and cooking; autumn to May.

378. Boiken.—This variety is remarkable for the vigor, health, productiveness, hardiness, and early bearing habit of the trees. The leaves are distinctive because of their great size, rich green color, and immunity to apple-scab. Unfortunately, the fruit is so austere as to be hardly fit to eat out of hand. The apples are in demand at evaporators, the cured product being remarkable for its light color. The variety is grown chiefly in cold regions, and where an early-bearing sort is wanted. Boiken came to America from Germany.

Tree vigorous, spreading, dense. Fruit medium to large, uneven in size, oblate, broad at the base, conical, often ribbed, symmetrical; stem long; cavity obtuse, very broad, furrowed, sometimes compressed, partly colored with thin brownish-russet; calyx large, closed or open acute lobes; basin oblique, wide, abrupt, deep, furrowed and wrinkled; skin tough, smooth, waxy, pale yellow, often with sharply contrasting brilliant red blush; dots numerous, small, often red-areolar, with white or russet center, often submerged; calyx-tube large, funnelform, often extending to the core; stamens median; core large, open, abaxile; cells usually symmetrical; core-lines clasping; carpels concave, very broad, elliptical, emarginate, tufted; seeds plump, obtuse to acute, dark; flesh white, firm, crisp, tender, fine-grained, very juicy, sprightly, brisk subacid; good; November to March.

379. Swaar is distinguished by greenish-yellow fruits, covered with dots and flecks of russet, which have heavy aromatic flesh of uncommonly rich flavor. The trees are neither long-

lived nor hardy, suffer much from apple-canker, lack vigor, are shy bearers, and lose a large part of the crop as drops or culls. Swaar was early produced by the Dutch settlers in the Hudson River valley, and has long been a favorite in that region.

Tree of medium size, vigorous, round to spreading, dense. Fruit medium to large, round-oblate, often ribbed, regular, symmetrical; stems long to medium in length, slender; cavity large, acute, deep, wide, often furrowed, usually russeted; calyx small, closed or open; lobes broad, obtuse, usually connivent; basin small, shallow, obtuse, wide, furrowed and wrinkled; skin tough, roughened with dots and flecks of russet, yellow, often shaded with a bronze blush; dots numerous, green or russet; calyx-tube cone-shape; stamens median; core small, axile, with hollow cylinder in the axis; cells closed or partly open; core-lines clasping; carpels thin, tender, broadly round, emarginate, mucronate, sometimes tufted; seeds numerous, broad, plump, obtuse, light brown; flesh yellow, firm, tender, fine-grained, juicy, mild or very mild subacid, aromatic, rich; very good to best; November to April.

380. Gloria Mundi. *Pound.*—Gloria Mundi is of interest because its fruits are the largest of cultivated apples, fit, however, only for culinary uses. All that is known of its history is that it was cultivated in the states of the Northeast very generally before 1804.

Tree large, vigorous, spreading, hardy, long-lived, but not very productive. Fruit large, round with truncate ends, conical, ribbed, sides unequal; stem short, thick; cavity large, acuminate, deep, broad, furrowed and compressed, sometimes russeted; calyx large, open or partly closed; lobes separated at base, short, narrow; basin large, deep, wide, abrupt; skin yellow, sometimes with faint bronze blush; dots small, often areolar with russet center, or light colored and submerged; calyx-tube very large, long, wide, broadly conical extending to core; stamens median; core large, usually abaxile; cells symmetrical, open; core-lines usually clasping; carpels broadly roundish to elliptical, tufted; seeds dark brown, small, narrow, short, plump, obtuse, sometimes tufted; flesh yellow, coarse, crisp, tender, juicy, mild subacid; fair or good in quality; October to January.

381. Northwestern Greening (Fig. 75).—Possessed of a constitution which enables it to endure as much cold as any other apple excepting a few Russian sorts, Northwestern Greening has found a niche in the apple flora of the cold Northwest. The tree grows with rapidity and vigor and eventually becomes a reliable and productive producer.

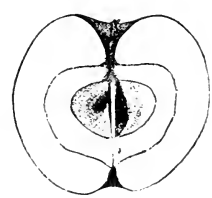

FIG. 75. Northwestern Greening.

The apples are mediocre in quality. Northwestern Greening originated in Waupaca County, Wisconsin, and was first described in 1895.

Tree vigorous, upright-spreading, dense, with long, stout, crooked branches. Fruit large or very large, round, oblong or oblate, often conic, more or less irregular, sometimes elliptical, sometimes ribbed; stem short; cavity small, acute, narrow, deep, often compressed or lipped, with outspreading russet; calyx variable, small, closed or open; basin small, narrow, abrupt, deep, furrowed and wrinkled; skin smooth, waxy, pale yellow, sometimes faintly blushed; dots small or large and irregular, usually white and submerged, sometimes gray with russet point; calyx-tube wide, conical or urn-shaped; stamens median; core large, axile; cells symmetrical, closed or open; core-lines meeting; carpels broadly round, mucronate; seeds small, often abortive; flesh yellow, crisp, firm, juicy, mild subacid; fair to good; November to April.

382. Holland Winter.—Several apples pass under the name Holland Winter. The one which is supposed to have received the name first, and which is here described, is very similar to Rhode Island Greening. The variety probably came from England, and has been long grown in eastern America.

Tree vigorous, spreading, open. Fruit large, round-conic, symmetrical, regular; stem short and thick; cavity acute, large, furrowed, occasionally with thin outspreading russet rays; calyx small, closed or open; basin shallow, occasionally deep and abrupt, furrowed, wrinkled; skin tough, waxy, smooth, pale green often with a faint dull blush; dots numerous, large, conspicuous, submerged, white, mingled with a few fine russet points; calyx-tube long, narrow, funnel-shape; stamens median; core of medium size, abaxile; cells symmetrical, open or partly closed; core-lines clasping; carpels round to elliptical, broad, tufted; seeds short, plump, obtuse; flesh white, firm, crisp, fine-grained, juicy, subacid, with mild pleasing aroma; good; December to May.

383. Winter Banana. *Banana.*—The fruits are large, shapely, clear pale waxen-yellow with a delicate blush which sometimes deepens into a bright red. The flavor is a mixture of sweet and sour, while the aroma has a suggestion of musk exclusively the property of this apple. The trees are hardy, fairly vigorous, bear young, almost annually, and are usually fruitful. The fruits are so easily bruised that they seldom reach the market in good condition. Winter Banana is said to have originated in Cass County, Indiana, but the writer has seen fruit brought

PLATE XIII. Two species of cherry—Mahaleb at left and Tomentosa at right.

from Holland, name unknown, which leads him to believe this to be an Old World apple that has somehow found its way to the New World.

Tree vigorous, spreading, open. Fruit large, round-conic, oblong-conic, or sometimes oblate, flat at the base; stem short to long; cavity large, acute, shallow, broad, gently furrowed, sometimes lipped, smooth or russeted; calyx small, partly open or closed; lobes short, obtuse; basin small, often oblique, shallow, narrow or wide, obtuse, furrowed and wrinkled; skin smooth, thick, tough, waxy, pale yellow, often with a blush; often a suture line extends from the basin to the cavity; dots numerous, white and submerged or with fine russet point; calyx-tube wide above, short, cone-shape; stamens median; core small, abaxile; cells open, sometimes closed; core-lines clasping; carpels elongated-ovate, narrow, emarginate, tufted; seeds small to large, obtuse, dull, dark brown, sometimes tufted; flesh pale yellow, firm, coarse, crisp, tender, juicy, mild subacid, aromatic; good to very good; October to March.

384. Rhode Island Greening (Fig. 76).—In color, the apples are a mellow shade of yellow with a dull blush or occasionally a pale red cheek. They are substantially large, never coarse, and very uniform in size and shape. The flesh is tender, very juicy, and has the mellow yellow tint of the skin. The flavor is rich, pleasantly acidulous, always refreshing, and as the apples ripen they develop a delightful aroma. The trees are of largest size, have wide-spreading drooping branches, rejoice in health and vigor, load themselves with fruit, and are long-lived. The faults of the fruits are that they bruise rather easily, are often disfigured by apple-scab, and scald badly in cold storage. The trees fail in not holding their load well, in susceptibility to apple-scab, and in tenderness to cold. The name commemorates the state of its nativity. Its cultivation dates back nearly two hundred years.

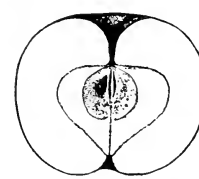

FIG. 76. Rhode Island Greening.

Tree large, vigorous, wide-spreading, drooping. Fruit large or very large, round-oblate, sometimes obscurely ribbed, sides slightly unequal; stem green, pubescent; cavity acute, symmetrical or rarely lipped, smooth, sometimes russeted and with narrow outspreading russet rays; calyx large, closed, pubescent; lobes long, acute; basin small, shallow, obtuse, regular or furrowed; skin thick, tough, smooth, waxy, green or yellow, sometimes with brownish-red blush which rarely deepens to red; dots greenish-white

or russet, especially numerous toward the basin and often submerged; calyx-tube wide, cone shape with fleshy pistil point projecting into the base; stamens median; core small, abaxile; cells uniform, closed or partly open; core-lines meeting; carpels thin, flat, emarginate, round-cordate, sometimes tufted; seeds few, large, narrow, long, acute, sometimes tufted; flesh yellow, firm, fine-grained, crisp, tender, juicy, rich, sprightly subacid; very good in quality; November to March.

385. Yellow Newtown (Fig. 77). *Albemarle. Green Newtown. Newtown Pippin.*—This apple can be grown in perfection only in certain sections, as: Hood River, Oregon; the Albemarle region, Virginia; and along the Hudson River, New York. By virtue of high quality, long-keeping and beauty of fruit, together with good tree characters, Yellow Newtown has high standing in regions where it thrives. Yellow Newtown is an American apple. The original tree came into bearing early in the eighteenth century, and the variety was soon widely grown. Some pomologists maintain that there is a Green Newtown, a distinct variety from Yellow Newtown; but the differences in color are due to soil or climate—two varieties do not exist.

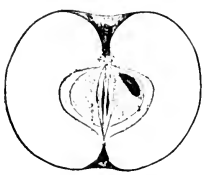

FIG. 77. Yellow Newtown.

Tree vigorous, roundish, dense. Fruit medium to large, uniform in size but variable in form and coloring, round-oblate and more or less angular, with an oblique axis; stem short; cavity deep, acuminate, broad or compressed, often with rays of russet; calyx small, closed or nearly so; lobes small, acute; basin furrowed and often wrinkled; skin tough, smooth or roughened with brownish-russet dots, grass-green at fruit harvest but yellow later, often showing brownish-pink especially near the base; dots submerged, numerous toward the eye, white scarf-skin over the base; calyx-tube long, funnel-shape; stamens median; core small, abaxile; cells symmetrical, closed; core-lines clasping; carpels broadly roundish or round-obcordate, emarginate, tufted; seeds tufted, dark, narrow, acuminate; flesh yellow, firm, crisp, tender, fine-grained, juicy, sprightly, with a fine aromatic subacid flavor; best; February to May.

386. White Pippin.—Because of similarity in color and in having an oblique axis, fruits of this variety are often confounded with those of Green Newtown Pippin, but here the similarities end; for, in flesh and flavor, the last-named apple is much superior, while in tree character White Pippin is usually the better. The fruits of White Pippin are larger, and the

blush is not so well marked, nor do they keep so long. The variety is gradually passing out of cultivation. Its origin is not known, but since the fruits were described from old trees in 1848, it must be more than a century old.

Tree large, vigorous, upright-spreading, dense. Fruit medium to large, round or round-oblate, irregular or angular; stem short; cavity large, acute, deep, narrow, often waxy, partly russeted; calyx small, closed or partly open; lobes long, narrow, acuminate; basin small, shallow, narrow, abrupt, furrowed and wrinkled; skin pale yellow, blushed, mottled and striped with thin brownish-red; dots small, characteristically white and submerged, or green with fine russet point, scattering, russeted toward the cavity; calyx-tube long, narrow, elongated conical; stamens median; core small, abaxile with hollow cylinder in the axis; cells closed or open; core-lines clasping; carpels round to ovate or elongated and narrow, sometimes emarginate, tufted; seeds small, plump, narrow, elongated, acuminate, brown to dark brown; flesh yellow, firm, fine-grained, tender, crisp, juicy, sprightly subacid; good or very good; November to April.

387. Peck Pleasant. *Peck.*—The tender-fleshed perfumed fruits are pleasantly flavored and beautiful and unique in color. The trees are subject to root-rot and canker and seldom bear large crops or a high percentage of first-class fruit. Peck Pleasant is distinctly for family use. The variety originated in Rhode Island early in the nineteenth century.

Tree medium in size, vigorous, upright-spreading or round, dense. Fruit medium to large, oblate or round, often ribbed, sometimes with furrow on one side; stem short, thick or fleshy; cavity obtuse, wide, shallow, often lipped or compressed, sometimes russeted; calyx pubescent, large; lobes long, open or closed, obtuse; basin broad, obtuse, symmetrical, furrowed or wrinkled; skin thick, tough, smooth, waxen yellow with orange-red blush; dots numerous, white and submerged or with russet point; core small, abaxile to axile; cells closed or slit; core-lines clasp the funnel cylinder; carpels tender, broadly round, often truncate, emarginate, mucronate; seeds numerous, dark, long, narrow, acute, sometimes tufted; flesh yellow, firm, tender, crisp, fine-grained, juicy, pleasant subacid, aromatic; very good to best; October to January.

388. Mann (Fig. 78).—The trees are vigorous, hardy, healthy, and productive, and the fruit keeps and ships well, but the apples, of the Rhode Island Greening type, are but mediocre in quality. The variety originated in the orchard of Judge Mooney, Granby,

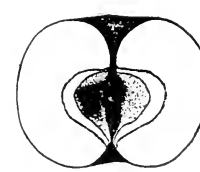

FIG. 78. Mann.

New York, about 1870, and later was introduced into Niagara County by Dr. Mann, who gave it his name. It is commonly grown in New York.

Tree medium to large, vigorous, spreading. Fruit medium to large, round-oblate, symmetrical, regular, faintly ribbed, uniform in size and shape; stem short; cavity acuminate, narrow, deep, russeted and often with outspreading broken russet, furrowed; calyx small, closed or partly open; lobes acute; basin abrupt, narrow, usually symmetrical, furrowed and wrinkled; skin thick, tough, green, often with a brownish-red blush tinged with olive-green but late in the season yellow; dots numerous, large, areolar, white with russet center; calyx-tube wide, cone-shape; stamens median; core small, usually axile; cells symmetrical, closed, sometimes open; core-lines meeting; carpels smooth, broad, narrowing towards the base and apex; seeds numerous, wide, obtuse, dark; flesh yellow, coarse, juicy, at first hard but becoming tender and crisp, subacid; fair to good; March to April.

389. Patten. *Patten Greening.*—Patten is a seedling of Oldenburg, which it resembles in shape and flavor of fruit and in tree characters. The color of the fruit, however, is green. The variety is much grown in cold regions. Patten originated from seed of Oldenburg planted by C. G. Patten, Charles City, Iowa, about 1885.

Tree vigorous, spreading, dense, flat, with long, stout, curved, drooping branches. Fruit medium to large, oblate or round-oblate, sometimes conic, symmetrical; stem short, thick; cavity acuminate, deep, broad or compressed, russeted and with outspreading russet rays; calyx large or very large, closed or open; basin deep, abrupt; skin thin, tough, smooth, pale greenish-yellow, sometimes blushed and occasionally faintly striped; dots small, numerous, pale and submerged; calyx-tube conical; stamens median; core small, axile or abaxile; cells closed or partly open; core-lines clasping; carpels round, irregular; seeds dark brown, plump, obtuse; flesh yellow, firm, coarse, tender, juicy, sprightly subacid; good; October to January.

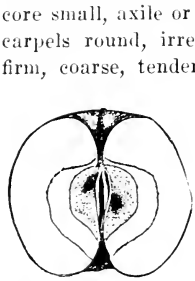

FIG. 79. Grimes Golden.

390. Grimes Golden (Fig. 79). *Grimes.*—This is a favorite wherever it can be grown. The outstanding merits of the fruits are: beautiful rich golden color, well-molded form, firm but crisp and tender flesh, pleasantly acidulous flavor, and most pleasant aroma. The variety has many faults. The apples do not develop size, color, or quality elsewhere than in a few regions, and, wherever grown, they scald badly in

storage. The trees, also are but moderately vigorous. Grimes Golden originated in West Virginia more than a century ago.

Tree vigorous, upright-spreading, drooping, dense. Fruit medium to large, round-oblong, often flattened at the ends, sometimes conic, regular, frequently obscurely ribbed; sometimes oblique, symmetrical, uniform, sides often unequal; stem short; cavity broad, deep, acute, often russeted; calyx large, closed; lobes long, reflexed, often separated at base; basin abrupt, deep, wide, furrowed; skin tough, deep yellow with scattering pale yellow or russet dots; calyx-tube yellow, very broad at the top, conical, deep; stamens basal; core small, abaxile; cells symmetrical, closed or open; core-lines meeting; cells roundish, emarginate, concave; seeds numerous, tufted, plump, acute; flesh yellow, very firm, tender, crisp, coarse, juicy, subacid, rich, aromatic, sprightly; very good to best; November to February.

Group 11. Red Apples

391. Lawver. *Delaware Winter.*—Lawver retains a place in pomology because of the attractive appearance and long-keeping quality of the fruit. The apples are, however, but mediocre in quality. The trees come in bearing early, and yield large crops biennially. The variety is at its best in southern latitudes. Fruit and foliage are subject to apple-scab. Lawver is said to have come from Parkville, Missouri, soon after the Civil War, and to have been reintroduced from Delaware under the name Delaware Winter.

Tree vigorous, round-spreading, dense. Fruit medium to large, round or oblate; stem long and slender; cavity acute or acuminate, deep, large and broad with outspreading russet rays; calyx small, closed or open, often leafy; lobes separated at the base; basin wide, flat and obtuse, deep and abrupt, gently furrowed, wrinkled; skin thin, tough, smooth, covered with bright red which deepens about the base and is often mottled and streaked with dull gray scarf-skin, toward the apex lighter red; dots white or russet, small and numerous about the basin, large and scattering toward the cavity; calyx-tube long, narrow at top, funnelform; stamens median; core abaxile, open; core-lines clasping; carpels concave, round to obcordate, tufted; seeds dark, large, wide, obtuse, tufted; flesh yellow, firm, breaking, fine, crisp, tender, juicy, brisk subacid, aromatic; fair to good; January to May or June.

392. Arkansas. *Mammoth Black Twig. Arkansas Black.*—Arkansas is a large, dull, deep red, striped, late-keeping winter-

apple of good quality, much grown in the South and Southwest. Arkansas was raised from a seed planted in 1833 near Rhea Mills, Arkansas. It resembles Winesap, of which it may be a seedling, and Paragon, to which it is similar.

Tree large, vigorous, upright-spreading; branches large, crooked, stout, open. Fruit large, uniform in size, round, sometimes oblate, broadly ribbed, uniform in shape; stem long, stout; cavity acute, wide, green, russeted, indistinctly furrowed; calyx small, closed; basin abrupt, wide, deep, waxy; skin smooth, dull green, often becoming deep yellow, overspread with a dull deep red, obscurely striped with darker red; dots small, russet; calyx-tube conical; stamens median; core axile, closed; core-lines clasping; carpels broadly ovate, deeply emarginate, tufted; seeds few, variable, long, narrow, acute, tufted; flesh yellow, very firm, fine-grained, tender, juicy, subacid, crisp; good; December to May.

393. Ralls. *Genet.*—The apples are not large, nor are they attractive in shape or color; but they are excellent in quality, and this has given the variety high place in the South. The young trees annually bear large crops of apples of fair size, but the old trees are biennial in bearing, and the apples are small. The variety is noted as one of the latest to bloom, so that it often escapes unfavorable weather at blooming time. Ralls came to the notice of fruit-growers about 1800 on the farm of Caleb Ralls, Amherst County, Virginia.

Tree of medium size, vigorous, upright-spreading, dense. Fruit medium in size, round-oblate or round-conic, symmetrical; stem long and slender; cavity obtuse, deep; calyx small, open; basin often oblique, wide, shallow, abrupt, wrinkled; skin smooth, yellow blushed and mottled with red, indistinctly striped with carmine, overspread with light bloom which with broken stripes of thin scarf-skin gives the fruit a dull appearance; dots numerous, small, white or russet; calyx-tube broad cone-shape; stamens marginal; core axile or abaxile; cells closed or partly open; core-lines meeting; carpels flat, broadly round, emarginate, tufted; seeds narrow, plump, acute, dark; flesh white, firm, fine-grained, crisp, tender, juicy, subacid, aromatic, pleasant; very good; November to April.

394. Salome is a very good apple in the southern Mississippi Valley. The characters commending the fruits are: ability to stand handling well, long-keeping qualities, and freedom from apple-scab. The outstanding characters of the tree are: hardiness, healthfulness, vigor, productiveness, early and nearly an-

nual bearing. Salome originated about 1853 in Ottawa, Illinois, in which state it is chiefly grown.

Tree vigorous, large, upright, dense. Fruit medium in size, round-oblate, obscurely ribbed, usually symmetrical; stem long, slender; cavity large, acute, deep, broad, often compressed or obscurely furrowed, thinly russeted; calyx small, closed; basin often depressed, narrow, furrowed and wrinkled; skin thin, tough, smooth, pale yellow mottled and blushed with red and obscurely striped with carmine, marked toward the cavity with gray scarf-skin and covered with bloom; dots conspicuous, pale gray, often areolar with russet point; calyx-tube small, cone-shape; stamens basal; core large, abaxile; cells open, sometimes closed; core-lines meeting; carpels thin, smooth, concave, broadly round, sometimes emarginate; seeds numerous, wide, obtuse, light and dark brown; flesh yellow, firm, fine-grained, crisp, tender, juicy, sprightly subacid; good to very good; November to March.

395. King David (Fig. 80).—The apples are about the size of those of Jonathan and even better colored, as beautiful as any in the orchard; for, added to the deep solid red color are rotundity in shape and uniformity in size. The apples hang long on the tree, but for late keeping should be picked as soon as overspread with red. The flesh is firm, crisp, tender, spicy, and juicy. The chief fault of the fruit is a tendency to decay at the core when over-ripe. King David was found in a fence-row in Washington County, Arkansas, in 1893.

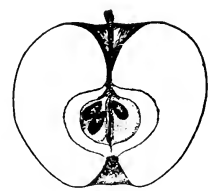

FIG. 80. King David.

Tree vigorous, healthy, hardy, productive. Fruit of medium size, round-conic, slightly ribbed; stem long to medium, slender; cavity moderately deep and broad, usually russeted; calyx small, closed; basin medium in depth, somewhat abrupt, furrowed; skin thin, tender, smooth; color pale greenish-yellow, almost entirely overspread with a very attractive deep dark red, changing to scarlet; core rather large, open, abaxile, with clasping core-lines; calyx-tube long, narrow, funnel-shaped; flesh distinctly yellow, firm, crisp, moderately tender, juicy, brisk subacid, spicy and aromatic; quality good to very good; November to February.

396. Rome Beauty (Fig. 81). *Rome.*—Rome Beauty is a desirable commercial apple in all apple regions except northern ones, where it is precariously hardy. The trees, while of but medium size, are vigorous, come in bearing early, load with

fruit annually, and in high winds the apples persist on the long stems and flexible branches better than those of almost any other variety. The apples are large, smooth, handsome, uniform in size and shape, thick-skinned, and therefore, ship and keep well, but are of only mediocre quality. Rome Beauty originated with H. N. Gillet, Lawrence County, Ohio, who brought it to the attention of fruit-growers in 1848.

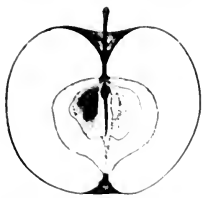

FIG. 81. Rome Beauty.

Tree vigorous, small, at first upright but later spreading and drooping, with slender lateral branches. Fruit large, round, round-conic, or oblong, regular or faintly ribbed; stem slender, often oblique; cavity large, obtuse and smooth, shallow, wide, often gently furrowed, green or red, never russeted; calyx small, closed or open; lobes converging above but separated toward the base; basin small, shallow, narrow, abrupt, furrowed or wrinkled; skin thick, tough, smooth, yellow mottled with bright red which in highly-colored specimens deepens to solid red on the exposed cheek, striped with bright carmine; dots numerous, white or brown, small; calyx-tube cone-shape, often with fleshy pistil point projecting into the base; stamens marginal; core medium to large, abaxile; cells open; core-lines meeting; carpels round, narrowing toward base and apex, mucronate seeds numerous, plump, acute, light and dark brown; flesh yellow, firm, fine-grained to coarse, crisp, juicy, aromatic, mild subacid; good; November to May.

397. Windsor (Fig. 82) has recently come to the notice of northern apple-growers as a good variety for rigorous climates. The trees come into bearing early, bear regularly and heavily, and hold their crop well. The apples are somewhat conspicuous by reason of the large areolar dots centered with russet, which mingled with flecks of russet, plentifully besprinkle the rather dull red skin. The flesh is somewhat coarse, but is juicy, aromatic, and well-flavored. The variety was first described in 1889.

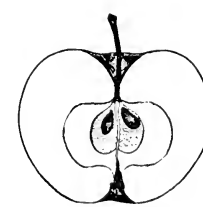

FIG. 82. Windsor.

Fruit above medium, round-conic, broad, flat at the base, often one-sided and faintly ribbed; stem long, slender; cavity large, obtuse to acute, wide, deep or shallow, russeted and with coarse russet rays; calyx small, closed or partly open; lobes small, connivent, acute, pubescent; basin abrupt, wide, furrowed, wrinkled; skin thick, smooth, waxy, pale yellow or greenish, blushed with thin dull red obscurely striped with dull carmine;

dots large, dull, pale, mingled with flecks of russet; calyx-tube funnel-form; stamens median; core small, axile; cells closed; core-lines clasping the funnel cylinder; carpels broad, narrowing toward base and apex, tufted; seeds narrow to wide, obtuse or approaching acute, tufted, light brown; flesh white, tinged with green or yellow, firm, fine-grained, juicy, aromatic, mild subacid becoming nearly sweet; good to very good; October to March.

398. Cooper Market.—For nearly a century Cooper Market was a standard commercial apple in northern regions. Its merits are capacity to keep, attractive color and form in the fruit, and vigor, hardiness, healthfulness, and productiveness in the trees. The variety is now passing from cultivation because the apples are small and their quality is poor. It was first described in 1904.

Tree vigorous, upright, lateral branches long, slender and drooping. Fruit medium or large, round-conic, flattened at the base and often narrowing sharply towards the apex, symmetrical; stem long, slender; cavity acuminate, deep, narrow, sometimes furrowed, russeted; calyx small, closed, pubescent; basin small, oblique, shallow, narrow, obtuse, furrowed, wrinkled; skin tough, smooth, glossy, greenish-yellow, mottled and blushed with red, conspicuously splashed and striped with bright carmine and covered with light bloom; dots white or with a russet point, numerous and small towards the cavity, scattering, large and irregular towards the basin; calyx-tube small, short, cone-shape; stamens median; core distant, truncate, abaxile; cells open, often unsymmetrical; core-lines clasping; carpels round, emarginate, tufted; seeds numerous, dark, short, plump, acute; flesh yellow, very firm, coarse, tender, juicy, brisk subacid; fair to good; January to June.

399. Missouri Pippin is one of the standard commercial apples in Missouri and neighboring states. The qualities which give it standing are: attractive appearance and long keeping quality in the fruit, and earliness, reliability, and heavy bearing in the trees. The apples are only second-rate in quality and the trees are usually short-lived. Missouri Pippin originated on the farm of Brinkley Hornsby, Kingsville, Missouri, from seed planted about 1840.

Tree vigorous, upright-spreading, with long, slender, curved branches, characteristic on account of its numerous slender twigs. Fruit medium in size, round-conic; stem slender; cavity acute, wide, deep, faintly russeted; calyx closed or nearly so; lobes long, narrow; basin medium to deep, wide, abrupt, wrinkled; skin thick, tough, smooth, glossy, thinly coated with bloom; color pale yellow overspread with bright red, striped with dark red; dots conspicuous, russet, or large, pale gray; calyx-tube funnel-

form with wide limb, sometimes broadly conical; stamens median; core small, axile, or nearly so; cells symmetrical, open; core-lines clasping; carpels smooth, round elliptical, sometimes emarginate; seeds small, obtuse, dark brown; flesh yellow, firm, fine-grained, brisk subacid; fair to good in quality; October to January.

400. Baldwin (Fig. 83).—This is the standard winter apple of eastern America. It takes its high rank from several characters, chief of which is adaptability to a great diversity of soils and climates. Other good qualities are: the fruits keep long; are uniformly large; when well grown, are attractive in color; the quality is good; and the apples stand handling and shipping well. The trees are vigorous, long-lived, healthy, and remarkably productive, and the crop is usually uniform. The trees are faulty in bearing biennially, in falling a little below the average in hardiness, and in being susceptible in fruit and foliage to the apple-scab fungus. Baldwin originated about 1740 on the farm of John Ball, Wilmington, Massachusetts.

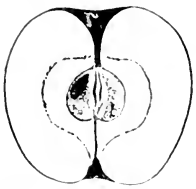

FIG. 83. Baldwin.

Tree large, very vigorous, upright-spreading; branches stout. Fruit large, round-conic to round-oblong, uniform in shape; stem medium to long; cavity acute, deep, broad, often furrowed, sometimes lipped, russeted with outspreading rays of russet or green; calyx small, closed or open, with long lobes, acuminate; basin abrupt, narrow to wide, often furrowed, corrugated; skin tough, smooth, light yellow, blushed and mottled with red, striped with deep carmine; dots gray, depressed, small and numerous toward the basin, conspicuous towards the cavity; calyx-tube conical, short and wide with projection of fleshy pistil point into its base; stamens basal; core medium, axile, closed or partly open; core-lines meeting; carpels round-ovate, emarginate, tufted; seeds variable, large, long, acute, dark brown; flesh yellow, firm, coarse, crisp, tender, juicy, agreeably subacid, sprightly, aromatic; good; November to April.

401. Westfield. *Seek-no-further.*—Westfield is distinguished by its dessert fruits of a full rich flavor and a pleasing aroma. The trees are exceptionally hardy, vigorous, and long-lived, but are productive only on warm, well-drained, fertile loams. The variety is said to have originated at Westfield, Massachusetts, and was under cultivation as early, at least, as the Revolutionary War. It is well known in New England, New York, Ohio, and Michigan.

Tree large, vigorous, spreading or roundish. Fruit medium, round-conical, obscurely ribbed; stem long, slender; cavity acuminate, deep, narrow, russeted with green- or yellow-russet; calyx small, partly open; lobes short, reflexed, obtuse; basin small, shallow, narrow, obtuse; skin tough, smooth, deep yellow, splashed with dull red, striped with carmine; bloom thin; dots large, pale yellow, gray or russet, often areolar with russet center; calyx-tube wide, cone-shape; stamens basal; core medium, axile; cells open; core-lines meeting; carpels elliptical, mucronate; seeds numerous, small, plump, acute; flesh pale yellow, firm, coarse, crisp, tender, breaking; juicy, mild subacid, rich, peculiarly aromatic, sprightly; very good to best; October to March.

402. Jonathan (Fig. 84).—These apples by general consent are placed among the very best in both appearance and quality. The brilliant red skin, indistinctly striped with carmine and underlaid with pale yellow, and the shapely, round-conic, smoothly and regularly turned form, make it one of the most attractive apples. The flesh is firm, crisp, tender, juicy, and not especially rich in flavor, but peculiarly sprightly and refreshing, and has a distinct and most pleasing aroma. Unfortunately, when kept long in either common or cold storage, dark spots develop in the skin which greatly mar the apples. The trees are hardy, vigorous and productive, and very accommodating as to soils and climates. Jonathan is grown best in parts of the Middle West and the Pacific Coast states. The variety originated on the farm of Philip Rick, Ulster County, New York, about 1800.

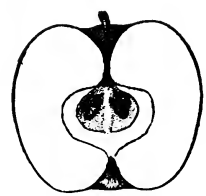

FIG. 84. Jonathan.

Tree medium in size, vigorous, round or spreading, drooping, dense. Fruit small, round-conic to round-ovate, often truncate, regular, uniform in shape and size; stem long, slender; cavity acute, deep to very deep, abrupt, narrow; skin thin, tough, smooth, pale yellow striped with carmine, covered with red which deepens on the sunny side, often showing contrasting bits of pale yellow about the cavity; dots inconspicuous; calyx-tube small, funnel-shape; stamens basal; core small, axile; cells symmetrical, usually closed; core-lines clasping the funnel cylinder; carpels concave, round to round-cordate, emarginate, smooth; seeds large, long, acute, dark, numerous; flesh yellow, sometimes with a tinge of red, firm, fine, crisp, tender, juicy, very aromatic, sprightly subacid; very good to best; November to January.

403. Wagener (Fig. 85) is most remarkable for precociousness in bearing. The trees bear annually and heavily and are hardy, but overload, are short-lived, subject to blight, and, vigorous at first, become very weak in growth with advancing age. The apples are attractive in appearance because of their bright red color. The quality is much above the average either for dessert or cookery. Wagener came from seed planted in 1791, near Penn Yan, New York. It has been widely planted in all northern apple regions.

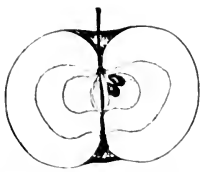

FIG. 85. Wagener.

Tree dwarf, at first vigorous but soon dwarfing, round to spreading, open. Fruit medium to large, oblate, broadly ribbed; sides often unequal; stem short to long, slender; cavity variable, acute, deep, often angular or furrowed, thinly russeted; calyx small, closed or partly open; lobes small, short, acute, connivent, reflexed; basin medium in width and depth, abrupt, furrowed; skin thin, tough, smooth, glossy, bright red striped with carmine and mottled and streaked with thin scarf-skin over a clear pale yellow background; dots numerous, white or russet; calyx-tube long, narrow, funnelform, often elongated and extending to the core; stamens median; core large, abaxile with hollow cylinder in the axis, or nearly axile; cells closed or open; core-lines clasping the cylinder; carpels broadly round, smooth, mucronate; seeds numerous, small, short, wide, obtuse, light brown, often abortive; flesh firm, fine-grained, crisp, tender, very juicy, subacid, aromatic, sprightly; very good to best; October to February.

404. Ontario (Fig. 86) is an intermediate between its parents, Northern Spy and Wagener. The apple has the oblate shape and the prominent ribbing of Wagener, but the deep cavity and the color of Northern Spy. Usually the fruits are larger than those of either parent, but inferior in both color and flavor. Ontario has been widely distributed, but is nowhere largely grown except in Ontario, where it was produced, in the town of Paris, by Charles Arnold. It was first described in 1874.

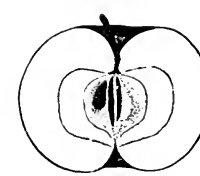

FIG. 86. Ontario.

Tree medium to large, vigorous, upright-spreading. Fruit large to very large, oblate or round-conic, distinctly ribbed or angular; stem medium in length and thickness; cavity large, acute, deep, wide, with rays of russet; calyx small, closed; lobes narrow, acute; basin small; deep, narrow, abrupt, often furrowed and wrinkled; skin thin, tough, smooth, pale yellow, bright

red striped with carmine, often coated with white bloom and mottled and streaked with scarf-skin; dots numerous, small, white; calyx-tube narrow, funnelform; stamens median; core small, abaxile with a large hollow cylinder at the axis; core-lines clasping the funnel cylinder; carpels smooth, round, narrowing toward the apex, often truncate at the base, emarginate; seeds wide, obtuse, dark; flesh yellow, firm, fine, crisp, tender, juicy, sprightly, brisk subacid, aromatic; good to very good; November to March.

405. Smokehouse (Fig. 87) is passing out because the apples lack high character in both flavor and appearance. The trees are vigorous, hardy, healthy, productive, come into bearing young, and hold their crop well. The variety originated on the farm of William Gibbons, Lancaster County, Pennsylvania, and was first brought to notice in 1848.

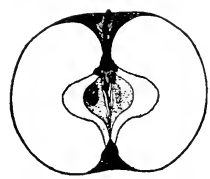

FIG. 87. Smokehouse.

Tree medium to large, vigorous, wide-spreading, dense; lateral branches willowy, slender. Fruit medium to large, oblate, regular, symmetrical; stem long, slender; cavity acute, deep, narrow, often thinly russeted; calyx large, open; lobes often flat, convergent, separated at the base; basin shallow, wide, abrupt, wrinkled; skin thin, tough, smooth, or roughened with capillary russet lines and russet dots; color yellow mottled with dull red, indistinctly mottled, striped and splashed with carmine; dots conspicuous, irregular, gray or russet; calyx-tube wide, short, obtusely cone-shape; stamens median; core small, axile; cells closed or open; core-lines meeting; carpels flat, broadly elliptical to round or cordate, usually smooth; seeds few, very dark, large, narrow; flesh yellow, firm, fine, crisp, tender, juicy, mild subacid, delicately aromatic; good; October to March.

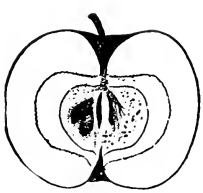

FIG. 88. Akin.

406. Akin (Fig. 88), *Akin Red.*—Akin is a handsome dark red late winter apple of medium size and very good quality, adapted to southern regions. It succeeds best on rich warm soils. The variety originated from seed planted near Lawrenceville, Illinois, in 1831, by W. J. Akin.

Tree upright-spreading, dense, vigorous; branches long, stout. Fruit medium, oblate; often irregular, slightly ribbed, sides sometimes unequal; stem long, slender; cavity obtuse, broad, shallow, often distinctly furrowed and corrugated; skin tough, smooth, yellow, blushed and striped with bright deep red, almost completely red; dots small, white; calyx-tube conical; stamens median; core abaxile, open or partly closed; core-lines meeting; carpels elliptical, emarginate; seeds dark brown, long, narrow,

acute, numerous; flesh yellow, crisp, coarse, tender, very juicy, subacid, aromatic; good to very good; January to June.

407. Ben Davis (Fig. 89) is least of all apples subject to local prejudices as to soils and climates, about the latest in season, and stands shipping and handling better than any other standard apple. Nurserymen like the variety because the young trees make a rapid and presentable growth. The trees are vigorous, thrifty, hardy, healthy, bear young, annually, and abundantly, blossom late, and are ideal in every respect except that they are short-lived and produce small apples as they grow old. The apples are large, uniform in size and shape, and are handsomely mottled, striped and splashed with bright red on a yellow background. The fruits are poor in quality, acceptable only for cooking. Ben Davis has been cultivated in parts of the South since about 1800.

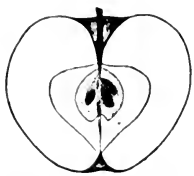

FIG. 89. Ben Davis.

Tree medium in size, very vigorous, upright-spreading. Fruit medium to large, conic to oblong, broad, rounded at the base, sides sometimes unequal; stem long, slender; cavity acute, deep, symmetrical, often with rays of thin greenish-russet; calyx closed, with short, acute lobes; basin abrupt, medium in width and depth, obtuse, oblique; skin tough, waxy, bright, smooth, glossy, yellow, mottled and washed with bright red, striped and splashed with carmine; dots inconspicuous, scattering; calyx-tube short, cone-shaped, with a long cylinder, frequently with a fleshy projection of pistil point into its base; stamens median; core axile, closed or partly open; core-lines clasping; carpels flat, obovate, emarginate, mucronate; seeds large, long, irregular, wide, plump, acute, dark brown; flesh yellow, firm, coarse, aromatic, juicy, mild subacid; good; January to June.

408. Black Ben Davis. *Gano.*—Black Ben Davis is either a seedling or a bud-mutation of Ben Davis, from which it differs in bearing dark red apples scarcely broken in color, whereas in Ben Davis the red fruits are striped, splashed, and mottled. Despite the fact that the evidence seems to show that they are of distinct origin, Black Ben Davis and Gano may be considered identical. The variety is said to have originated on the farm of M. Black, Washington County, Arkansas, about 1800. Its culture as an apple of commerce is restricted to its native and nearby states.

409. Black Gilliflower (Fig. 90). *Gilliflower.*—This variety, threatened with oblivion, is again being planted. The distinct form, color, flavor, and aroma of the apples mark it as an unusual and attractive fruit, fit for dessert, and excellent for cookery. The apples, eaten out of hand or cooked, have a most agreeable flavor and aroma. They are usually perfect, uniform in size and shape, and keep very well in either cold-storage or the cellar. The trees are vigorous, healthy, and fruitful. Black Gilliflower was known in New England as early as the Revolutionary War.

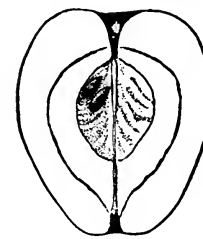

FIG. 90. Black Gilliflower.

Tree large, vigorous, upright-spreading. Fruit medium to large, oblong-conic, ribbed; stem long, thick; cavity acuminate, wide, lipped but usually symmetrical, with red-russet outspreading rays; calyx closed; basin shallow and furrowed and wrinkled; skin thick, tough, smooth, yellow, almost black, obscurely striped with darker crimson and with streaks of scarf-skin, giving the effect of dull bloom; dots numerous, gray, small, rough; calyx-tube large, wide, cone-shape; stamens median; core large, axile, closed; core-lines clasping; carpels long-ovate, tapering both ways, emarginate, tufted; seeds often abortive, acuminate, tufted; flesh yellow, firm, tender, coarse, juicy becoming dry, mild subacid, rich, peculiarly aromatic, good; October to February.

410. Delicious (Fig. 91). *Stark Delicious.*—No new apple of recent times has been more widely planted, or better received by consumers and growers. Introduced in 1895, its culture has spread throughout the apple district of the United States. In the orchards of the West and Northwest, it has been extensively planted and is proving a commercial success. The rich distinctive flavor of the apple is its chief asset, although it has size and beauty as well. The trees are nearly perfect orchard plants. The variety was found in 1881 by Jesse Hiatt, Peru, Iowa.

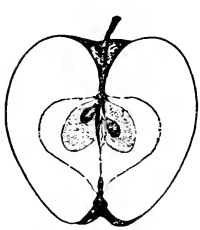

FIG. 91. Delicious.

Tree large, vigorous, spreading, hardy, productive. Fruit large, uniform, oblong-conic, ribbed; stem long, medium thick; cavity deep, broad, often furrowed, flaring, greenish; calyx medium, nearly closed, with long, nar-

row, acute lobes; basin deep, wide, abrupt, very strongly furrowed and corrugated; skin very thick, tough, smooth; color light yellow, overspread with dark red, splashed and mottled with carmine; dots numerous, small, yellow; core medium in size, axile, closed with clasping core-lines; calyx-tube long, wide funnel-shaped; seeds of medium size; flesh yellowish, firm, tender, juicy, aromatic, pleasant subacid; good to very good; December to last of February.

411. York Imperial (Fig. 92) is a popular southern apple, easily recognized by its bright red color, indistinctly striped with carmine, and by the shape of the fruit; both ends are distinctly truncate and the axis is very oblique. The flesh is coarse and the flavor not inviting. The apples keep and ship exceedingly well. These qualities give the variety its chief value, though the trees are very satisfactory in soils and climates to which they are adapted. In the North, the apples are deficient in size, color, and quality. The variety takes its name from York, Pennsylvania, where it originated soon after the Revolutionary War.

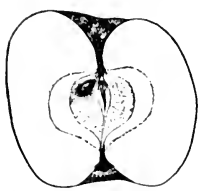

FIG. 92. York Imperial.

Tree vigorous, upright-spreading, dense. Fruit medium to large, round-oblate, with an oblique axis; stem short; cavity large, acuminate, deep, broad, smooth and green or partly russeted; calyx small, closed or partly open; basin large, abrupt, deep, wide, often furrowed; skin tough, bright, smooth, yellow blushed with light red and striped with carmine; dots pale or russet, conspicuous, numerous toward the eye, scattering, very large and elongated toward the cavity where they are often mingled with narrow broken streaks of gray scarf-skin; calyx-tube elongated-cone-shape; stamens median; core small, axile; cells closed or partly open; core-lines clasping; carpels broadly round, emarginate, sometimes tufted; seeds few, dark, wide, flat, obtuse, compactly filling the cells; flesh yellow, firm, crisp, coarse, tender, juicy, sprightly subacid, becoming mild subacid, aromatic; good; November to April.

412. Pewaukee.—The apples are distinguished by bluish bloom, characteristically rounded basal end, and a short stem inserted under a large lip. The flesh is coarse in texture and austere in flavor. The trees, however, have health, vigor, longevity, early bearing, great productiveness, and remarkable hardiness to commend them. Pewaukee is a cross between Northern Spy and Oldenburg made by George F. Peffer, Pewau-

kee, Wisconsin, about 1870. It is grown only where hardiness is a prime requisite.

Tree vigorous, large, upright-spreading or round, open, with stout curved branches. Fruit large, round-oblate, sometimes round-ovate, characteristically rounded toward the cavity, ribbed, more or less irregularly elliptical; stem short, often fleshy, inserted under a lip; cavity large, sometimes scarcely developed, narrow, very shallow, often furrowed and sometimes thinly russeted; calyx large, open or closed; basin usually abrupt, wrinkled; skin smooth, thin, tough, yellow washed and mottled with orange-red or red striped and splashed with carmine, covered with bloom; dots conspicuous, pale gray or white; calyx-tube funnelform; stamens median; core large, axile to abaxile; cells irregularly developed, usually closed or slit; core-lines clasping the funnel cylinder; carpels obcordate, tufted; seeds numerous, large, long, narrow, acute, plump, tufted, light brown; flesh white, firm, coarse, tender, very juicy, subacid, aromatic; fair to good; November to April.

413. Blue Pearmain (Fig. 93) is characterized by fruits with bluish bloom, purplish color, ribbed or sometimes furrowed surface, thick skin, and mild pleasant flavor, and the hardiness of the trees. The fruit does not keep well, and the quality is not sufficiently high to make the variety worthy except when hardiness is necessary. Blue Pearmain is known to be at least a hundred years old. The variety is widely grown only in New England.

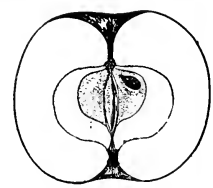

FIG. 93. Blue Pearmain.

Tree large, vigorous, spreading. Fruit large, round to oblate, irregular, often obscurely ribbed, sometimes furrowed from the cavity nearly to the basin; stem short, thick; cavity deep, obscurely furrowed, usually covered with greenish-russet; calyx partly open, acute lobes; basin medium in depth and width, with concentric gray or russet lines, obscurely furrowed; skin rough, yellow, washed and mottled with red, often deepening on one side to nearly solid red, splashed and striped with deep purplish-carmine and overspread with bloom; dots numerous, small, pale, mingled with others which are very large, gray with russet center; with irregular lines or flecks of dull green or russet; calyx-tube elongated-conical; stamens basal; core large, axile, closed or open; core-lines clasping; carpels broad, elongated or round, tufted; seeds long, acuminate, light brown; flesh yellow, firm, coarse, juicy, mild, subacid, agreeably aromatic; good; October till March.

414. Fallawater. *Tulpahocken.*—The fruits of Fallawater are unique, easily recognized by their large size, globular form, and

the unbroken pinkish-red color on a yellow background. The flesh is coarse, without distinctive flavor. The tree characters are usually satisfactory. Fallawater is at least a century old, having originated in Bucks County, Pennsylvania.

Tree large, vigorous, upright. Fruit large to very large, globular, sometimes oblate, symmetrical, often slightly irregular and faintly ribbed, uniform in size and shape; stem very short; cavity acuminate, deep, narrow, furrowed; calyx large, closed or open; lobes variable; basin shallow to deep, abrupt, sometimes furrowed, wrinkled; skin tough, smooth, waxy, blushed and striped with pinkish red, often streaked with thin grayish scarf-skin; dots conspicuous, white, areolar with russet point; calyx-tube wide, short, cone-shape; stamens basal; core abaxile to axile, large; cells unsymmetrical, open or closed; core-lines meeting or clasping; carpels tufted, long, narrowly ovate, mucronate; seeds few, long, narrow, acuminate, tufted; flesh yellow, firm, coarse, crisp, tender, juicy, subacid to mildly sweet; fair to good; November to April.

415. Tompkins King (Fig. 94) is one of the most widely planted apples in home orchards, and in either home or foreign market sells well. The fruits are red on a yellow background, uniformly large and symmetrical; while the flesh is rather coarse, it is crisp, tender, juicy, aromatic, and richly flavored. The trees lack in hardiness, healthiness, longevity and productiveness, suffer much from apple-canker, sun-scald, and collar-rot. The variety originated in Warren County, New Jersey, whence, about 1804, it was brought to Tompkins County, New York, and given its present name. It is most commonly grown in New York, where it ranks fourth in commercial importance.

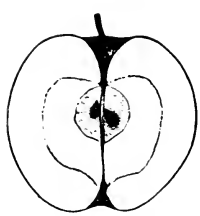

FIG. 94. Tompkins King.

Tree vigorous, spreading, open; lateral branches slender and drooping. Fruit large, round, sometimes conic, regular or obscurely ribbed; stem short to long, sometimes thick and swollen; cavity large, obtuse, deep, narrow, furrowed or wavy, often russeted, sometimes with fine outspreading russet; calyx large, closed or open; segments long, acuminate; basin small, narrow, shallow, deep, abrupt; skin smooth or roughened with russet dots, yellow, mottled and washed with orange-red, often shading to deep red, striped and splashed with bright carmine; dots numerous, conspicuous, white or russet; calyx-tube small, cone-shape; stamens median; core large, abaxile; cells symmetrical, closed or partly open; core-lines meeting; car-

pels ovate or obovate, tufted, mucronate, slightly emarginate if at all; seeds few, large, long, irregular, obtuse, often abortive, tufted; flesh yellow, coarse, crisp, tender, aromatic, juicy, subacid; very good to best; October to April.

416. Jewett Red (Fig. 95). *Nodhead.*—Jewett Red is an early winter apple of the Blue Pearmain type, highly esteemed in parts of New England. The apples are handsomely colored, and the quality is excellent, the flavor being a pleasing mingling of sweet and sour. The trees are precocious in bearing, but grow slowly and are seldom productive. The variety originated at Hollis, New Hampshire, early in the nineteenth century; by whom is not known.

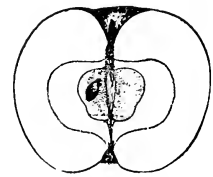

FIG. 95. Jewett Red.

Tree small, spreading, open. Fruit of medium size, uniform in size and shape, round-oblate, sides unequal, obscurely ribbed, often irregular; stem short; cavity variable, acute, shallow, wide, furrowed obscurely, green or russeted, sometimes lipped; calyx small, open or partly closed; lobes broad, short, obtuse; basin shallow, wide, obtuse, obscurely furrowed and wrinkled; skin thin, tough, smooth, dark red over yellow background, often deepening to purplish-red and obscurely marked with broken stripes and splashes of carmine; dots numerous, conspicuous, pale yellow with characteristic scarf-skin overspreading the base; calyx-tube narrow, funnelform; stamens median; core axile; cells closed or open; core-lines clasping; carpels oval, elongated, emarginate; seeds numerous, clear reddish-brown, small; flesh yellow, fine, tender, juicy, pleasantly aromatic, mild subacid; good to very good; October to February.

417. Paragon (Fig. 96) is probably a seedling of Winesap, which it greatly resembles in tree and fruit. It is not easily distinguished, either, from Arkansas, which is also thought to be an offspring of Winesap. The variety thrives only in regions where Winesap grows well, and is inferior to the older sort. Paragon originated on the farm of Major Rankin Toole, Fayetteville, Tennessee, about 1830.

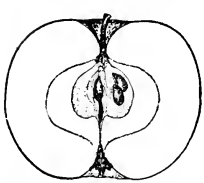

FIG. 96. Paragon.

Tree vigorous, round-spreading, inclined to droop, dense, with short, stout, twisted branches. Fruit medium or large, round or sometimes oblate, sides often unequal; stem medium in length and thickness; cavity obtuse, shallow to wide and deep, symmetrical, often furrowed or com-

pressed, occasionally lipped, with russet rays; calyx small, closed; basin shallow, obtuse, often furrowed and wrinkled; skin tough, smooth, yellow, covered with dull red and indistinctly striped with darker red; dots gray or white, small; calyx-tube small, conical; stamens median; core small; cells partly open; core-lines clasping; carpels concave, round varying to cordate, emarginate; seeds large, long, acute, dark, often abortive; flesh yellow, firm, coarse, tender, juicy, mild subacid, aromatic; good to very good; January to May.

418. Opalescent (Fig. 97).—The fruits are large, shapely, uniform in size, and covered with brilliant red on a yellow background. The quality, while not the best, is good. The trees are hardy, vigorous, productive, hold their load well, and are remarkably free from insect and fungous pests. Opalescent is a comparatively new variety introduced about 1899 from Xenia, Ohio.

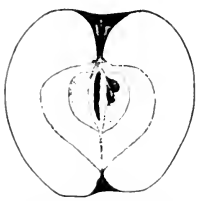

FIG. 97. Opalescent.

Tree vigorous, round-topped, open. Fruit large to very large, round-conic, obscurely ribbed; stem short, slender; cavity large, acuminate, very deep, sometimes russeted, compressed; calyx small, partly open; lobes small, obtuse, reflexed; basin small, often oblique, narrow, deep, abrupt, sometimes furrowed; skin thick, tough, glossy, pale yellow overspread with dark deep red with scarcely perceptible streaks of carmine; dots numerous, small, red, yellow or russet, often submerged; calyx-tube small, cone-shape; stamens median; core small, abaxile; cells closed; core-lines meeting; carpels smooth, round or broadly obcordate; seeds acute, medium in size, form and color; flesh yellow, firm, tender, coarse, juicy, mild subacid, aromatic; good to very good; November to March.

419. Stark.—The trees are vigorous, hardy, healthy, productive, and very accommodating as to soils. The fruits are large, smooth, well-turned in shape, uniform, and keep well, but are dull and unattractive in color and not good enough in quality for a dessert fruit, though they are well liked for culinary purposes and are prime favorites for drying. The flesh is firm and the skin thick and tough. The variety probably originated in Ohio, having been described first in 1867 as coming from that state.

Tree vigorous, upright-spreading, dense, with long ,strong branches. Fruit large, round-conic, sides sometimes unequal; stem short, stout; cavity acuminate, deep, wide, occasionally lipped, sometimes with outspreading russet; calyx large, closed or partly open; basin shallow, obtuse, wide,

PLATE XIV. A Rotundifolia grape—The James.

wrinkled; skin smooth or roughened with russet dots, pale yellow more or less blushed and mottled with red and indistinctly striped with darker red; calyx-tube wide, truncate cone-shape with fleshy pistil point projecting into the base; stamens median; core small, axile; cells closed or partly open; core-lines meeting; carpels thin, tender, flat, broadly round to obcordate, emarginate, mucronate, tufted; seeds few, long acute, tufted; flesh yellow, firm, fine, breaking, tender, juicy, sprightly, mild subacid; fair to good; November to April.

420. Winesap (Fig. 98) thrives on both the Atlantic and Pacific seaboards and in most of the apple regions that lie between. Its adaptability to various soils and climates is the chief asset of the variety, but it has excellent qualities of fruit and tree besides. The apples are bright deep red, striped and blotched with dark purple, with smooth glossy texture and soft bloom. The coarse yellow flesh, with veins tinged with red, is distinctive, as is, also, the sprightly subacid flavor. The apples keep and ship well, though they often scald in cold storage. The trees are vigorous, come in bearing early, and on light, rich, deep, well-drained soils are remarkably productive and regular bearers; they are precariously hardy and will grow only where the season is long. The origin of the variety is unknown, but it dates well back into the Colonial period.

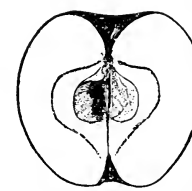

FIG. 98. Winesap.

Tree vigorous, round-spreading, straggling and open. Fruit medium to large, usually conical, sometimes round, truncate at base, regular or obscurely ribbed, symmetrical; stem short, slender; cavity small, acute, narrow, deep, furrowed, often lipped, russeted or with russet rays; calyx large, closed; lobes long, narrow, acuminate; basin small, often oblique, shallow, narrow, distinctly furrowed, wrinkled; skin tough, smooth, glossy, bright red indistinctly striped and blotched with dark red over a yellow ground-color, overspread with faint bloom; dots small, scattering, white; calyx-tube variable, conical; stamens marginal; core small, abaxile with a hollow cylinder in the axis, narrowing toward the apex; cells open or nearly closed; core-lines clasping; carpels broadly round, concave, mucronate; seeds wide, plump, obtuse; flesh yellow, veins sometimes red, firm, coarse, crisp, juicy, sprightly subacid; good to very good; October to March.

421. Stayman (Fig. 99). *Stayman Winesap.*—Stayman is a seedling of Winesap, which it resembles, but surpasses in several

essentials; thus, the fruits are larger and better-flavored; the trees are more productive and adapted to a wider range of soil and climate. The cultivation of Stayman is limited to regions having a long season, for in northern latitudes the apples fail to attain perfection in size, color, or flavor. The variety was grown from seed of Winesap planted in 1866 by Dr. J. Stayman, Leavenworth, Kansas.

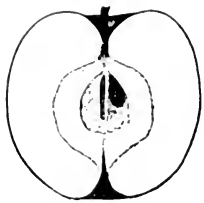

FIG. 99. Stayman.

Tree vigorous, spreading, open. Fruit medium to large, round-conic, flattened at the base and rounding toward the basin, sides sometimes unequal; stem short; cavity large, acuminate, deep, often gently furrowed, russeted, sometimes with outspreading, broken, russet rays; calyx small, closed; lobes long, acute; basin small, shallow, narrow and obtuse to deep and abrupt, furrowed, wrinkled; skin smooth, thick, tough, yellow, often covered with dull red and indistinctly striped with carmine; dots light gray and russet, large; calyx-tube cone-shape; stamens median; core small, abaxile; cells closed or open; core-lines clasping the cylinder; carpels thin, tender, concave, elliptical, emarginate; seeds long, obtuse, plump, often abortive; flesh yellow, firm, fine-grained, tender, crisp, breaking, juicy, aromatic, sprightly, pleasant subacid; good to very good; December to May.

422. Red Canada (Fig. 100). *Canada Red. Steele's Red.*— The apples are characterized by firm, crisp, fine-grained, juicy, aromatic, richly flavored flesh; they are medium to large, deep red, striped with deeper red on a background of yellow; the whole surface is conspicuously marked with large fawn-colored dots. The trees are precariously hardy, lack in vigor, fastidious as to soils, and are seldom sure or annual bearers. Red Canada originated in New England a hundred or more years ago, and has been most largely planted in New England, New York, and Michigan.

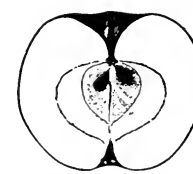

FIG. 100. Red Canada.

Tree medium to large, vigorous, upright. Fruit medium to large, round-conic, flattened at the base, sometimes obscurely ribbed and with sides a little unequal; stem slender, pubescent; cavity large, acuminate, deep, wide, often russeted and with radiating green or russet rays, sometimes furrowed; calyx small, closed or partly open, pubescent; basin small, narrow, shallow, abrupt, often oblique; skin tough, smooth toward the cavity, rough about the basin, light yellow overspread with a deep red blush, indistinctly

striped with deeper red; dots conspicuous, gray or fawn-colored; calyx-tube elongated-cone-shape; stamens marginal; core sessile, axile, small; cells symmetrical, closed or slit; core-lines clasping; carpels smooth, round, mucronate; seeds numerous, angular, long, wide, plump, obtuse; flesh yellow, firm, crisp, fine-grained, tender, juicy, aromatic, rich, agreeably subacid; good to best; October to March.

423. Hubbardston (Fig. 101).—The fruits are of large size, handsome color, good enough for dessert, smooth, uniform, and are produced abundantly on a vigorous tree. Unfortunately, the variety is so variable on different soils and climates in both tree and fruit characters as to be unsatisfactory. It takes its name from Hubbardston, Massachusetts, where it originated at least a century ago.

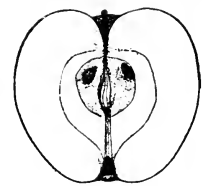

FIG. 101. Hubbardston.

Tree vigorous, large, erect, spreading, dense. Fruit medium to large, round-ovate to round-conic, symmetrical, often obscurely ribbed; stem short; cavity deep, acute, symmetrical, sometimes furrowed, russeted; calyx small, open or closed; basin narrow, shallow to deep, furrowed; skin smooth or roughened with dots, flecks and fine veins of russet, covered with faint bloom; color yellow, blushed and mottled with red which varies from dull brown to bright red, more or less marked with carmine; dots pale or russet, often large and irregular; calyx-tube broad, cone-shape; stamens median; core small, abaxile; cells symmetrical, closed or partly open; core-lines meeting or clasping; carpels broad, round, emarginate, tufted; seeds numerous, small, short, plump, acute, light brown; flesh yellow, firm, breaking, fine-grained, tender, crisp, juicy, aromatic, rich, at first sprightly but becoming mild subacid; very good to best; October to January.

424. Lady (Fig. 102).—This variety is known wherever apples are grown. Its popularity is due to its beautiful miniature fruits which are of highest quality, most suitable for dessert and for decorative purposes. The apples are in greatest demand during the holiday season. The trees are small, very dense in growth, unproductive, and come in bearing late. Lady has been in cultivation in France for over three hundred years, and was one of the first European apples to be brought to America.

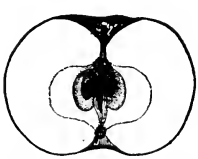

FIG. 102. Lady.

Tree vigorous, dwarf, dense, erect. Fruit very small, uniform in size and shape, oblate to round-conic, obscurely ribbed, symmetrical; stem

slender; cavity large and wide, obtuse, shallow, gently furrowed, sometimes thinly russeted; calyx small, closed; lobes small, acute; basin wide, shallow, obtuse, narrowly ridged and wrinkled; skin thick, tough, smooth, glossy with a deep red blush which is often irregularly and sharply outlined against the pale yellow ground-color; dots white or with russet points, inconspicuous; calyx-tube conical with short truncate cylinder; stamens marginal; core small, axile; cells symmetrical, closed; core-lines clasping; carpels smooth, round or elliptical, emarginate, mucronate; seeds plump, wide, obtuse, completely filling the cells; flesh white, firm, fine-grained, crisp, tender, juicy, aromatic, mild subacid; good to very good; December to May.

425. Bismarck is of the type of the better-known Alexander. The trees begin bearing as soon as established, often in the nursery row; they are also hardy, healthy, productive, and annual in bearing; and have a dwarf habit, scarcely attaining the dignity of a tree, a fact which fits them for fillers and for close plantings. The apples are large and handsome, but too poor in quality for even a good culinary fruit. Bismarck originated in New Zealand, and was introduced into America about 1895.

Tree dwarf, spreading, open with very short stout drooping branches. Fruit large, uniform in size and shape, round oblate, flattened at the base, regular, sides often unequal; stem short, thick; cavity large, acuminate, wide, deep, often compressed, green or russet with outspreading russet rays; calyx large, open, with short, broad, obtuse lobes; basin large, symmetrical, deep, wide, abrupt, sometimes broadly furrowed and wrinkled; skin thick, tough, smooth, yellow washed, mottled and striped with two shades of red becoming solid dark red on the exposed cheek, overspread with thin bloom and often marked with scarf-skin about the base; dots minute, russet or large and pale gray; calyx-tube wide, broadly conical; stamens basal; core small, axile to abaxile; cells closed or open; core-lines meeting; carpels flat, broadly ovate, tufted; seeds few, often abortive, wide, short, plump, obtuse, brown; flesh white, firm, coarse, tender, juicy, subacid; fair to good; October to early winter.

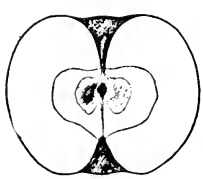

FIG. 103. Buckingham.

426. Buckingham (Fig. 103) is a southern apple, attaining on the Atlantic seaboard perfection in form and color, and having a rich pleasant flavor. In the North, the apples do not develop high color nor good quality, and the trees are unproductive and irregular in bearing. Buckingham has

been grown in Virginia and North Carolina for a century and a half.

Tree a moderate grower. Fruit large, oblate, irregular, obscurely ribbed, sides sometimes unequal; stem stout, short; cavity large, acuminate, wide, deep, with heavy outspreading russet; calyx large, closed or open; basin large, abrupt, wide, deep, furrowed, wrinkled; skin thick, tough, pale yellow or pale green washed and mottled with red, striped and blushed with bright carmine; dots numerous, small, light or russet, mingled with others which are large, gray and areolar; calyx-tube conical; stamens median; core small, axile; cells symmetrical and open or closed; core-lines clasping; carpels concave, round, emarginate, smooth; seeds dark, large, plump, wide, obtuse; flesh yellow, firm, coarse, tender, crisp, juicy, with distinct aroma, mild subacid; fair to good; November to April.

427. Deacon Jones.—The fruits of Deacon Jones are of large size and handsome; hang exceptionally well to the tree; there is almost no waste from windfalls and culls; and they are uniform in size and shape. The quality is much better than that of Ben Davis, but hardly as good as that of Baldwin. A tough skin and firm texture make the apples good shippers. The tree in nursery and in orchard is thrifty, comes into bearing young, is very productive, and is an annual bearer. The variety originated in Pennsylvania some time previous to 1890; it is chiefly grown in New York.

Tree vigorous, upright-spreading. Fruit very large, oblong-conic, ribbed, axis sometimes oblique; stem short; cavity obtuse, deep, smooth, often prominently lipped; calyx small, closed or partly open, often leafy; basin shallow to deep, narrow, distinctly furrowed and wrinkled; skin thick, tough, smooth, waxen yellow, mottled and blushed with red and with irregular dashes of carmine; in highly colored specimens deep red, with a bloom which gives the fruit a dull appearance; dots conspicuous, small and large, white, many areolar with russet point, numerous toward the eye; calyx-tube urn-shape; stamens median; core abaxile; cells symmetrical, wide open, very large; core-lines meeting; seeds numerous, small, dark brown, plump, obtuse, irregular; carpels much tufted, emarginate, mucronate, elongated and broadly ovate; flesh yellow, firm, coarse, crisp, tender, juicy, mild subacid, aromatic; fair to good; November to March.

428. Northern Spy (Fig. 104). *Spy.*—Delectable quality, great beauty in color and form, and the fair size of the fruit, with hardiness, healthfulness, reliability in bearing, vigor

and productiveness in the tree, make Northern Spy one of the leading American apples. Faults are: the skin is thin and tender, making careful handling necessary; when poorly grown, the flavor deteriorates; the trees are most capricious as to soils; come in bearing only after several years of care, and are an inviting prey to apple-scab. This apple was grown from seeds planted by Heman Chapin about the year 1800 in East Bloomfield, Ontario County, New York.

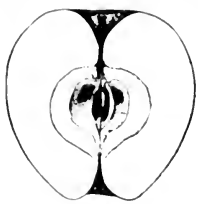

FIG. 104. Northern Spy.

Tree large, vigorous, upright, dense, becoming round-topped, with willowy, slender, drooping laterals. Fruit large, oblong-conic, flattened at the base, symmetrical, ribbed; stem thick; cavity large, acute, very wide and deep, broadly furrowed; calyx small, closed; lobes short, broad, obtuse; basin small, narrow, deep, abrupt, furrowed; skin thin, tender, smooth, glossy, the pale yellow ground-color nearly concealed with bright red, mottled and splashed with carmine and overspread with thin bloom; dots small, scattering, white, gray or russet; calyx-tube large, long, narrow funnelform with very narrow cylinder; stamens basal; core large, abaxile; cells open; core-lines clasping the funnel cylinder; carpels concave, broadly round, emarginate, tufted; seeds small, wide, plump, obtuse, dark, tufted; flesh yellow, firm, fine-grained, tender, crisp, juicy, sprightly, aromatic, subacid; very good to best; November to April.

429. Esopus Spitzenburg (Fig. 105) is one of the leading American apples. The fruits are unexcelled in quality, and are most pleasing in appearance. The apples are of the best to eat out of hand, and very good for all culinary purposes as well; they withstand the usages of marketing and keep in cold storage until June. Esopus Spitzenburg, however, falls below the mark through lack of vigor and health in the tree, and because of decided local prejudices to soil and climate which make it suitable only to favored localities. The variety originated in Esopus, New York, some years previous to 1800, and has long been grown from the Atlantic to the Pacific.

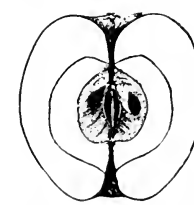

FIG. 105. Esopus Spitzenburg.

Tree open and spreading, upright, the lateral branches slender and drooping. Fruit medium to large, uniform in size and shape, broad and

flat at the base, varying from oblong to conic, obscurely ribbed; stem medium; cavity acuminate, deep, wide, red or yellow or with outspreading rays of thin yellowish-russet; calyx small, closed or open; basin often oblique, abrupt, narrow, shallow, sometimes compressed, furrowed and wrinkled; skin tough, waxy, roughened by the russet dots, deep rich yellow covered with bright red, inconspicuously striped with darker red, marked with pale yellow and russet dots numerous toward the basin, larger and much elongated toward the cavity; calyx-tube elongated, cone-shape; stamens median; core large, abaxile; cells often unsymmetrical and open but sometimes closed; core-lines clasping; carpels large, round-ovate, mucronate, tufted; seeds large, long, wide, acute, dark shaded with light brown; flesh yellow, firm, fine, crisp, tender, juicy, aromatic, sprightly subacid; very good to best; November to February.

Group 12.—Russet Apples

430. Pomme Grise.—The fruit of Pomme Grise is distinguished by small size, golden russet color, and crisp, tender, fine-grained, sprightly, aromatic flesh. The trees are hardy, healthy and annually produce fruit in great abundance. The variety had its origin and finds greatest favor among the French in the valley of the St. Lawrence.

Tree vigorous, dense, round or spreading. Fruit small, oblate, symmetrical; stem slender, pubescent, often streaked with reddish-brown; cavity large, obtuse, deep, wide; calyx small, closed; lobes long, narrow, acuminate, pubescent; basin pubescent, narrow, shallow, obtuse, furrowed; skin thick, tough, yellow covered with russet, the cheek often smooth and yellowish-brown, mottled and striped with red; dots gray or white, scattering and inconspicuous; calyx-tube cone-shaped; stamens basal; core abaxile; cells closed or partly so; core-lines clasping; carpels round, emarginate, mucronate, smooth or tufted; seeds plump, irregular, obtuse, tufted; flesh yellow, firm, crisp, fine-grained, juicy, rich, subacid, aromatic; very good to best; November to April.

431. Roxbury Russet (Fig. 106).—The rough, tough-skinned, yellowish-brown, russeted fruits are known by all. The flesh, also, is distinct in its yellow-green color, its tenderness, and its pleasing sprightly flavor. The variety does best in rich intervale soils, and is most popular in New England and Westward into Michigan. Roxbury is supposed to have originated in Roxbury, Massachusetts, nearly three hundred years ago.

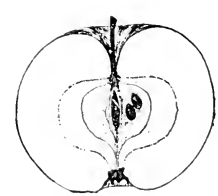

FIG. 106. Roxbury Russet.

Tree medium to large, vigorous, round-spreading. Fruit large, oblate or oblate-conic, often broadly and obscurely angular and sometimes remarkably elliptical, sides unequal; stem short, thick or swollen, pubescent, often red on one side; cavity acute, deep, wide, sometimes lipped; calyx large, pubescent, closed or partly open; lobes long, obtuse; basin narrow, obtuse, furrowed and often wrinkled; skin tough, covered with yellowish-brown russet, colored specimens developing a bronze blush which rarely deepens to red; dots russet or gray; calyx-tube large, wide, with fleshy pistil point projecting into the base, conical; stamens basal; core axile; cells closed; core-lines meeting; carpels flat, elongated and narrowing toward the apex, mucronate, tufted; seeds few, long, plump, acute, tufted; flesh yellow, firm, coarse, tender, breaking, juicy, sprightly subacid; good to very good; December to May.

432. Golden Russet.—The fruits of Golden Russet are smooth, uniform, suffer little from pests, and are most excellent for dessert, culinary uses, evaporating, and, of all varieties, best for cider. The trees are hardy, vigorous, and usually fruitful. Golden Russet is at least a century old in America, but when and from where it came is not known.

Tree large, vigorous, upright-spreading, dense. Fruit medium to large, round-oblate to conic, smooth, uniform in shape and size; stem short to very short, stout; cavity wide, acuminate, often deep green with numerous paler green or grayish dots; calyx large, closed or open; lobes long, acute, often reflexed, sometimes separated at the base; basin oblique, round, abrupt, shallow, sometimes plaited or ribbed; skin thick, tender, sometimes with patches and flecks of russet, becoming golden russet with bronze cheek; dots gray or russet, becoming golden russet with bronze cheek; dots gray or russet, inconspicuous; calyx-tube short, wide, conical; stamens basal; core medium, abaxile, or having a wide hollow cylinder for the axis; core-lines meeting; carpels broadly-ovate, elongated, sometimes tufted; seeds light brown, small, plump, obtuse, sometimes tufted; flesh yellow, fine-grained, crisp, tender, juicy, rich, subacid, aromatic; very good; December to April.

CHAPTER XX

VARIETIES OF CRAB-APPLES

THE introduction of new crab-apples in the cold Northwest, where the cultivation of hardy fruits becomes more and more prominent, increases the number of varieties of this fruit from year to year. Twenty-four crab-apples were listed in the nursery catalogues for 1923, but possibly three times as many are described in the pomological literature of North America. Descriptions of crab-apples in trade publications are so scant and fragmentary that they are of small use to the systematic pomologist, and the varieties in this chapter are, therefore, mostly those growing under the writer's observation on the grounds of the New York Agricultural Experiment Station at Geneva, New York. The descriptions are almost verbatim as published in the author's *Cyclopedia of Hardy Fruits*.[1]

INDEX TO VARIETIES OF CRAB-APPLES

KEY TO VARIETIES OF CRAB-APPLES

A. Apples sweet ..... 433 Van Wyck.
AA. Apples sour.
  B. Flesh salmon-yellow ..... 434. Orange.
  BB. Flesh white.
    C. Flavor mild subacid or nearly sweet: September and October ..... 435. Minnesota.
    CC. Flavor subacid; September; large..... 436. Excelsior.
  BBB. Flesh yellow.
    C. Fruit round-ovate or not oblate.
      D. Color golden-yellow ..... 437. Yellow Siberian.

[1] Hedrick, U. P. *Cyclopedia of Hardy Fruits*. 1922.

DD. Color red or striped with red.
E. Skin scarcely striped ..... 438. Hyslop.
EE. Skin striped with red.
F. Flavor mild subacid; August.... 439. Whitney.
FF. Flavor subacid and astringent; September ..... 440. Large Red Siberian.
CC. Fruit round-oblate or not ovate.
D. Skin scarcely striped with red.
E. Stem short; blushed with dull red; flesh very yellow ..... 441. Gibb.
EE. Stem long; fruit brilliant red; flesh yellowish.
F. With stem bracted, stout ..... 442. Transcendent.
FF. With stem not bracted, slender.
G. Season early—August ..... 443. Florence.
GG. Season late—October ..... 444. Martha.
DD. Skin striped with red.
E. Fruit small; stem very long bracted. 445. Cherry.
EE. Fruit large; stem medium ..... 446. September.

433. Van Wyck.—Although this sweet crab-apple originated in Duchess County, New York, it is now seldom found in eastern United States, but is advertised by western nurserymen. Its only value is that it is one of a few sweet crab-apples. It seems to have been first described by Downing in 1872.

Fruit large for a Siberian crab-apple, whitish shaded with bright red, covered with bloom; flesh white, tender, juicy, sweet, rich; core small, closed; quality good; August and September.

434. Orange.—This is an old eastern crab-apple, at one time a favorite, but now seldom grown east of the Mississippi. Nurserymen on the Great Plains list it and speak well of it. Its origin is not known, but it seems to have been first described by Downing in 1869.

Tree round-topped, spreading, dwarfish, rather slow in growth, hardy, long-lived, productive, bearing annually. Fruit of medium size, round or slightly oblate; stem very long, slender; cavity open, deep, acute, with a trace of russet; calyx closed; basin very shallow, wrinkled; skin orange-yellow, often netted with russet; dots white, obscure; core open; flesh light salmon-yellow, rather dry, mild subacid with a sweet aftertaste; quality good; September to November.

435. Minnesota.—In the northern part of the Great Plains, where the hardy crab-apple is a favorite fruit, Minnesota finds favor; elsewhere it is hardly known. The variety is an old one, having originated in Minnesota some time previous to 1872.

Tree small, compact, spreading, moderately vigorous and productive. Fruit very large, round; skin pale yellow, blushed or mottled on the sunny side and overspread with thin white bloom; flesh white, firm, crisp, juicy, fine-grained, mild subacid or nearly sweet, slightly astringent; quality good; September and October.

436. Excelsior (Fig. 107) is one of the few good dessert crabs, if, indeed, it should be called a crab, for its maternal parent was Wealthy and the other the Cherry crab. Besides being a good dessert fruit, it is excellent for culinary purposes. The trees are exceptionally vigorous, hardy, healthy, and come in bearing young, but are productive only in alternate seasons. The crop ripens earlier than that of any other crab. The variety originated with Peter Gideon, Excelsior, Minnesota, and was first described in 1880.

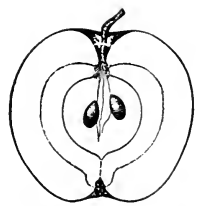

FIG. 107. Excelsior.

Tree large, spreading, dense, with long stout branches. Fruit very large, round-ovate to round-oblate, symmetrical; stem long and slender, sometimes bracted; cavity small, acute, narrow, shallow, often russeted; calyx large, closed; lobes reflexed; basin shallow, broad, obtuse, furrowed; skin smooth, yellow, shaded and splashed with red; dots numerous, russet; calyx-tube wide, cone-shape; stamens median; core large, abaxile; cells unsymmetrical, wide open; core-lines clasping; carpels elongated-ovate, sometimes tufted; seeds long, narrow, acute, tufted; flesh white, firm, coarse, crisp, juicy, subacid, with Siberian crab flavor; good to very good; early September.

437. Yellow Siberian is almost identical with Red Siberian, except in color and size of fruit. The fruits are larger than those of Red Siberian and of clear golden-yellow color. The trees come into bearing young and are reliable croppers, yielding very heavy crops annually. The trees are very hardy but sometimes suffer from blight. The season is September.

438. Hyslop has long been one of the standard American crab-apples, and is widely distributed and extensively cultivated. The apples are a brilliant dark red with heavy blue bloom, and are thickly borne in large clusters. The flesh is yellow with a tinge of red next the skin, firm, fine-grained, juicy, but eventuall becoming dry and mealy. The trees are vigorous, hardy, and fruitful. The origin of the variety is unknown; Warder first set forth its good qualities in 1869.

Tree vigorous, upright-spreading, open. Fruit medium to large, round-ovate or obovate, symmetrical; stem long, slender; cavity acuminate, small, shallow, narrow, often russeted; calyx closed; lobes long, narrow, acuminate, reflexed; basin shallow, wide, furrowed and wrinkled; skin pale yellow overspread with dark red and covered with thick bloom; dots small numerous, pale; calyx-tube short, narrow, cone-shape to urn-shape; stamens median; core axile; cells symmetrical, closed; core-lines meeting; carpels elongated-ovate, emarginate; seeds small, narrow, short, plump, obtuse, brown; flesh yellow, firm, fine, subacid, astringent; very good; late September and October.

439. Whitney ripens in late August, too early to meet the demand of housewives. For those who want a crab-apple for dessert early in the season, Whitney is about as good as any. The variety was grown from seed by A. E. Whitney, Franklin Grove, Illinois, and was first described in 1869.

Tree of medium size upright-spreading, with stout, long, curved branches. Fruit large, uniform in size and shape, round-ovate; stem slender; cavity narrow, deep, obtuse; calyx medium to large, closed or open; basin broad, shallow, wrinkled; skin light yellow shaded and striped with red; flesh yellow, crisp, juicy, mild subacid; good to very good; late August and early September.

440. Large Red Siberian.—This old sort, an improvement on Red Siberian, is, in its turn, being superseded by varieties having larger and handsomer fruits. Large Red Siberian differs from Red Siberian in being larger in tree and fruit, with coarser foliage and longer and more slender twigs. Both varieties are from the Old World, but when and by whom introduced does not appear.

Tree very hardy, healthy. Fruit of medium size, round to round-ovate, regular; stem long, slender; cavity acuminate, shallow, broad, often furrowed, russeted; calyx closed; lobes long, narrow, acuminate; basin shallow, obtuse, wrinkled, having mammiform protuberances; skin thin, tough, smooth, bright red and marked with obscure narrow stripes of dark red; dots small, light, inconspicuous; calyx-tube short, wide, urn-shape; stamens median; core medium size; axile; cells closed; core-lines meeting; carpels ovate, emarginate; seeds glossy, dark brown, small, short, wide, obtuse; flesh yellow, firm, subacid, astringent; good; September and Octobr.

441. Gibb is another cross between the common apple and the crab-apple, with characters that make it somewhat doubtful with which of its parents, Yellow Siberian and Fall Greening, it

should be placed. The fruits are large, yellow, blushed with dull red, with remarkably yellow flesh, which is juicy, pleasantly acidulous, and very good. The trees are slow-growing but eventually attain large growth, and are very hardy and fruitful. Gibb originated with George P. Peffer, Pewaukee, Wisconsin. The variety was first described in 1884.

Tree vigorous, upright-spreading, slow in growth, very hardy and very productive. Fruit large, round-oblate; stem short, thick; cavity wide, deep, regular; calyx of medium size, open; basin very wide, shallow, wrinkled; skin thin, yellow, blushed with dull red; dots white, minute; flesh remarkably yellow, firm, crisp, juicy, pleasant acid, astringent, sprightly; fair to good; early.

442. Transcendent (Fig. 108).—For many years Transcendent was the most popular crab-apple in America, its beautiful color and high quality commending it. The trees, also, are vigorous, hardy, and very productive. It is, however, a little too early in season for either home or market, and, with the advent of later and even handsomer and better flavored varieties, its popularity began to wane. It seems first to have been mentioned in 1844, but it was grown long before this. How long, or where it originated is not known.

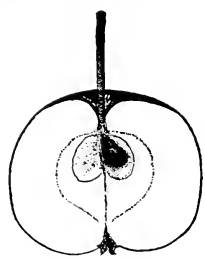

FIG. 108. Transcendent.

Tree large, very spreading, drooping, dense, with stout, curved and drooping branches. Fruit large, round or round-oblong, flattened at the ends, ribbed; stem long, stout, bracted; cavity narrow, shallow, obtuse; calyx large, closed; lobes long, leafy, reflexed; basin shallow, wrinkled; skin thin, yellow with bright red cheek, overspread with bloom, bright red; calyx-tube conical; stamens marginal; core medium size; cells closed; flesh yellow, crisp, juicy, fine, somewhat astringent, subacid; very good; late August to the middle of September.

443. Florence is remarkable for the beauty and high quality of its fruit and the fruitfulness of its trees and is desirable in every way for an early crab for either home or market plantations. Possibly the fruits fail somewhat in being more or less austere and astringent, but nevertheless they are rated by all as good in quality. This is another of Peter Gideon's crabs and was first described in 1886.

Tree vigorous, upright, drooping. Fruit medium in size, oblate, faintly ribbed; stem very long, slender; cavity acute, deep, symmetrical, russeted; calyx small, closed; basin very shallow, wide, obtuse, furrowed; skin thin, tough, smooth, yellowish white, overspread with brilliant red, covered with faint bloom; dots minute, white; calyx-tube long, wide, urn-shape or funnel-form; stamens marginal; core large; cells closed; core-lines clasping; carpels broadly obovate, emarginate; seeds small, wide, flat, obtuse; flesh yellow, coarse, crisp, tender, juicy, very brisk subacid, astringent; good; late August and early September.

444. Martha (Fig. 109).—The large fruits, handsomely colored with bright red on a yellow background, and the uniformity in size and shape, make Martha one of the most prepossessing of all crabs. The yellowish flesh is so crisp, juicy, and well-flavored that one is tempted to say that this is the very best crab for culinary purposes. The trees, while of but medium size and vigor, are hardy, come into bearing young, bear annually, and are usually fruitful. Furthermore, the season, late fall, makes this one of the most desirable crabs for home or market. This is another of Peter Gideon's crab-apples first described in 1839.

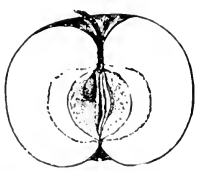

FIG. 109. Martha.

Tree medium in size, vigorous, spreading, open, drooping. Fruit large, round or oblate, sides sometimes unequal; stem long, slender; cavity acute, broad, often thinly russeted; calyx small, closed or partly open; basin shallow, wide, obtuse, smooth; skin thin, tough, smooth, pale yellow with bright light red overspread with bloom; dots numerous, light-colored, small; calyx-tube short, narrow, very small, conical; stamens median to marginal; core of medium size, axile; cells closed; carpels round or obovate, tufted; seeds narrow, acute; flesh yellow, firm, coarse, crisp, juicy, brisk subacid; good to very good; September to November.

445. Cherry.—This crab is remarkable for the large size, productiveness, and regularity in bearing of the trees, which may be further distinguished by their long, slender, curved branches. The fruits are small, red, and rather too coarse to be wholly acceptable. Cherry is an old variety of unknown origin.

Tree vigorous, upright-spreading, open, with long, slender, curved branches. Fruit small, oblate-round, ribbed; stem long to very long, slender, bracted; cavity broad, shallow, obtuse, russeted; calyx medium to large, usually closed, eventually deciduous; basin wide, shallow, obtuse,

wrinkled; skin pale yellow striped with carmine and overspread with thin bloom; dots distinct, numerous, large, white or russet; calyx-tube funnel-form; stamens marginal; core large, axile; cells closed; carpels broadly round or elliptical, emarginate, mucronate; flesh yellow, coarse, juicy, crisp, mild subacid, astringent; fair; August to October.

446. September.—This variety, also, comes from Peter Gideon, but is not as desirable as several other of his crab-apples, though the fruits are handsome and of good quality for either dessert or culinary uses. The trees, though vigorous, have short, stout, crooked, twisted branches,—serious defects which make the variety much more difficult to manage than several of its orchard associates. The variety is said to be a seedling from the Cherry crab.

Tree vigorous, open, with short, stout, crooked branches. Fruit medium to large, round-oblate to oblong, ribbed, sides usually unequal; stem long, slender; cavity obtuse, shallow, broad; sometimes russeted; calyx large, closed or partly open; basin mammillate, shallow, deep, obtuse; skin thin, tender, smooth, pale yellow, striped with red, overspread with bloom; dots small, scattering, gray or brown; calyx-tube short, broadly funnelform, pistil point persistent; stamens median; core medium size, axile or abaxile; cells closed or wide open; core-lines clasping, carpels round, elongated; seeds of medium size, wide, short, acute, light dull brown; flesh yellow, tender, juicy, subacid; good to very good; September.

CHAPTER XXI

VARIETIES OF PEARS

PEARS are well grown in but few parts of the United States, and nowhere thrive as they do in temperate Europe. Judged by the number of varieties offered by nurserymen, the pear is not now as popular as it once was in America. In 1872 the nurserymen of the country offered more than 300 sorts of this fruit; in 1925 it is doubtful whether seventy-five varieties can be purchased. American fruit-books have described more than 1000 varieties of pears, while the Europeans have listed upwards of 5000 sorts. In this text are described only the kinds common in the fruit regions of the country.

INDEX TO VARIETIES OF PEARS

Synonyms Are in Italics

KEY TO VARIETIES OF PEARS

A. Ripening in summer, with or before Bartlett.
  B. Shape oblong-pyriform.
    C. Stem-end obtuse, surface wavy; sides equal ..... 447. Bartlett.
    CC. Stem-end acute; surface smooth; sides unequal ..... 448. Souvenir du Congrés.
  BB. Shape obovate-obtuse-pyriform.
    C. Fruit large; stem long, curved, fleshy; blushed; flesh yellow, sweet; midsummer. 449. Clapp Favorite.
    CC. Fruit medium; stem medium; very thick; seldom blushed; flesh white, acid; late summer ..... 450. Doyenné Boussock.
    CCC. Fruit small; stem curved; brightly blushed; flesh yellow, sweet; early summer 451. Elizabeth.
  BBB. Shape round-acute-pyriform.
    C. Stem long; fruit slightly or not russeted ..... 452. Tyson.
    CC. Stem short; mottled with russet..... 453. Bloodgood.
AA. Ripening in autumn, after Barlett and before Beurré Clairgeau.
  B. Shape oblong-pyriform.
    C. Surface overspread with russet.
      D. Neck very long; stem long..... 454. Beurré Bosc.
      DD. Neck medium; stem short ..... 455. Beurré Hardy.
      DDD. Neck short or almost wanting; stem medium ..... 456. Mount Vernon.
    CC. Surface yellow or greenish-yellow or with little russet.
      D. Fruit large to very large; cheek not blushed.
        E. Stem-end obtuse; surface waxy; flesh white; mild ..... 457. Duchesse d'Angoulême.
        EE. Stem-end acute; surface smooth; flesh yellow; acid ..... 458. Pitmaston.
      DD. Fruit medium; blushed; sweet and aromatic ..... 459. Louis Bonne de Jersey.
  BB. Shape obovate, turbinate, or round-pyriform.
    C. Stem-end acute.
      D. Cheek solid bright red ..... 460. Worden Seckel.
      DD. Cheek mottled and dotted with pinkish-red ..... 461. Vermont Beauty.
    CC. Stem-end obtuse.
      D. Surface russeted more or less.
        E. Fruit obovate-pyriform; small to medium ..... 462. Seckel.

EE. Fruit round-obovate; medium to large.
F. Side unequal; patches and nettings of russet, greenish under ground.. 463. Doyenné du Comice.
FF. Sides equal; overspread with russet, yellow under ground ..... 464. Sheldon.
DD. Surface scarcely russeted or not at all.
E. Fruit obovate-pyriform; medium to large ..... 465. Howell.
EE. Fruit round-obovate; medium to large ..... 466. Flemish Beauty.
EEE. Fruit obovate-turbinate; small to medium ..... 467. White Doyenné.
EEEE. Fruit round-oval; yellow with bright blush ..... 468. Kieffer.
EEEEE. Fruit round-oblate; greenish-yellow without blush ..... 469. Sudduth.
AAA. Ripening in winter, with or after Beurré Clairgeau.
B. Stem-end acute.
C. Fruit medium to large in size; stem short.
D. Cheek heavily blushed; neck marked; early winter ..... 470. Beurré Clairgeau.
DD. Cheek scarcely or not blushed; neck hardly marked; mid-winter ..... 471. Beurré Anjou.
CC. Fruit enormous in size; stem long.
D. Color greenish-yellow with bright blush; seeds abortive ..... 472. Lincoln Coreless.
DD. Color golden-yellow with bronze blush; seeds normal ..... 473. Pound.
BB. Stem-end obtuse.
C. Flesh tinged with pink ..... 474. Joséphine de Malines.
CC. Flesh yellow.
D. Color golden-yellow with little russet; stem-end markedly truncate; early winter ..... 475. Lawrence.
DD. Color greenish-yellow with much russet; late winter ..... 476. Winter Nelis.

Section I. Summer Pears

Group 1. Oblong-pyriform Pears

447. Bartlett (Fig. 110) leads all other pears in number of trees in America, because of its great adaptability to different climates, soils and situations, and because, barring frosts or freezes, the trees bear full crops year after year. The trees are

vigorous, attain large size, bear young, live long, and are easily managed in the orchard. The pears are large, handsome, of good but not of the best quality, and keep and ship remarkably well. Bartlett is not without faults, however: the trees are not above the average in resistance to blight; they are not as hardy as those of some other varieties; and more than those of any other standard variety the blossoms require cross-fertilization. It is the most desired of all pears by the canning trade. This pear was found as a wilding at Aldermaston, Berkshire, England. It was first introduced to this country in 1797 or 1799 under the name of Williams' Bon Chrétien. In 1817 Enoch Bartlett, Dorchester, Massachusetts, allowed the pear to go out under his own name. Henceforth it became known in America exclusively as Bartlett.

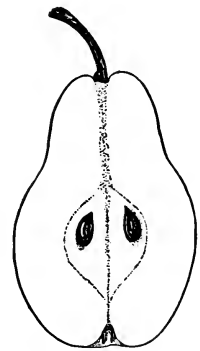

FIG. 110. Bartlett.

Tree medium in size, with age becoming tall and pyriform, upright. Fruit matures in September; large, 3⅜ inches long, 2⅜ inches wide, oblong-obtuse-pyriform, tapering slightly toward the apex, uniform; surface wavy; stem 1¼ inches long, often curved, thick; cavity small, usually lipped, with thin light streaks of russet, acute, shallow; calyx partly open; lobes separated at the base, narrow, acute; basin very shallow, narrow, obtuse, furrowed and wrinkled; skin thin, tender, smooth, often dull, the surface somewhat uneven; color clear yellow, with a faint blush on the exposed cheek, more or less dotted with russet and often thinly russeted around the basin; dots many, small, greenish-russet; flesh fine-grained, slightly granular at the center, melting, juicy, aromatic; quality very good; core large, closed, with clasping core-lines; calyx-tube long, wide, funnel-shaped; seeds wide, plump, acute.

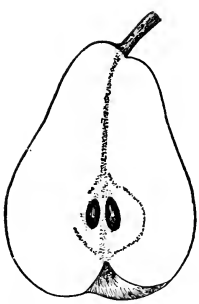

FIG. 111. Souvenir du Congrés.

448. Souvenir du Congrés (Fig. 111). *Congress. Souvenir.*—Souvenir du Congrés hardly merits a place in American pomology. Yet since the crop ripens between those of Clapp Favorite and Bartlett, and because the fruits are larger and often handsomer, the variety may be worthy a place in collections. The tree is remarkable for vigor, hardihood to cold,

and healthfulness, and bears so abundantly that the crop must be thinned to prevent breaking of branches. Souvenir du Congrés originated with François Morel, Lyons, France, about 1852.

Tree medium in size and vigor, upright-spreading, open-topped, very productive. Fruit ripe in September; large, 3 7/16 inches long, 2 11/16 inches wide, quite uniform in size and shape, oblong-acute-pyriform, symmetrical, with unequal sides; stem 1 inch long, short, thick, curved; cavity obtuse, almost lacking, shallow, narrow, russeted, furrowed, often with the stem inserted beneath a pronounced irregular lip; calyx open; lobes separated at the base, narrow, acute; basin wide, obtuse and flaring, furrowed, symmetrical, smooth except for the thick russet covering; color yellow, with a reddish blush on the exposed cheek, covered with nettings of russet and yellow patches; dots numerous, small, russet, conspicuous; flesh white, tinged with yellow, firm, granular, tender, very juicy, sweet, musky; quality good; core closed, with clasping core-lines; calyx-tube short, wide, conical; seeds long, wide, plump, acute.

Group 2. Obovate-obtuse-pyriform Pears

449. Clapp Favorite (Fig. 112) is the standard late summer pear to precede Bartlett, which it much resembles in size, shape, color, and flavor. The chief fault of the fruits is that they soon soften at the center after ripening, to obviate which they should be picked at least ten days before they would ripen on the tree. The trees are nearly perfect except that they go down quickly when blight is epidemic. Two good characters of the trees redeem the variety from failure because of blight. After those of Flemish Beauty and Tyson, the trees of this variety show greater hardihood to cold than those of any other standard sort; and of all pears in America the trees of Clapp Favorite are most fruitful. Clapp Favorite is one of the half-dozen leading sorts of the country. This variety originated with Thaddeus Clapp, Dorchester, Massachusetts. It was mentioned as a promising new fruit in 1860.

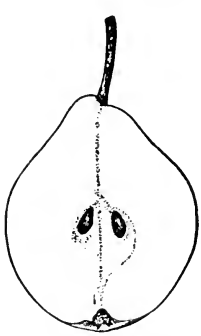

FIG. 112. Clapp Favorite.

Tree large, upright-spreading, round-topped, productive. Fruit ripe in early September; large, 4 inches long, 3¼ inches wide, obovate-obtuse-

PLATE XV. A Labrusca grape—The Concord.

pyriform, symmetrical; stem 1¼ inches long, thick, curved, fleshy; cavity shallow, narrow, lipped, with a fleshy ring around the stem; calyx large, open; lobes separated at the base, narrow, acuminate, erect and very stiff; basin shallow, wide, obtuse, wrinkled; skin thick, tough, smooth, glossy; color pale lemon-yellow, mottled and dotted with bright red, deepening in highly colored specimens to a crimson blush, with faint traces of russet; dots numerous, small, russet, conspicuous; flesh tinged with yellow, very granular and gritty at the center, tender and melting, buttery, juicy, sweet, rich, vinous, aromatic; quality very good; core large, closed, with clasping core-lines; calyx-tube long, narrow, funnel-shaped; seeds medium in size and width, plump.

450. Doyenné Boussock (Fig. 113). *Boussock.* If the fruits were better in quality and kept longer, this variety would take rank among the best commercial sorts, for the pears are handsome and the trees are nearly flawless. The pears are above medium in size and are sometimes large or very large. The trees are large and vigorous, as hardy to cold as those of any other pear, little susceptible to blight, and remarkable for their prominent buds and large, thick, glossy green leaves, which turn deep red in the autumn. This pear is supposed to have been raised by the Belgian, Van Mons, at the beginning of the nineteenth century.

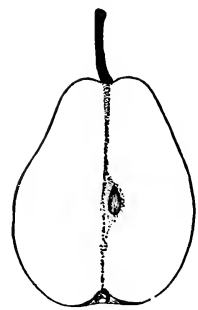

FIG. 113. Doyenné Boussock.

Tree large, vigorous, upright-spreading, tall, hardy, productive. Fruit matures in early September; large, 3 inches long, 2¾ inches wide, uniform, obtuse-obovate-pyriform; stem 1 inch long, very thick; cavity obtuse, shallow, broad, often russeted, furrowed, lipped; calyx large, open; lobes separated at the base, broad, acute; basin shallow, wide, obtuse, furrowed and wrinkled; skin thin, tender, smooth except for the russet nettings; color pale yellow, occasionally with a mottled pinkish-red blush, more or less netted with russet; dots numerous, small, russet, conspicuous; flesh white, tender and melting, very juicy, briskly acid; quality good; core large, closed, axile, with meeting core-lines; calyx-tube very short, wide, broadly conical; seeds black, narrow, long, flattened, often abortive.

451. Elizabeth. *Manning's Elizabeth.*—Elizabeth is among the best summer pears for eastern America. The characters which commend it are: handsome well-flavored fruits; and vigorous, hardy, productive trees, which are as resistant to blight as those

of any other European pear, and which come in bearing early and bear annually. Faults are: the fruits are small; a little coarse in texture of flesh, which is a little too gritty; and the flavor is not sweet and rich. The trees fail, if at all, in not attaining sufficient size. Elizabeth is a Belgian pear which originated with Van Mons early in the nineteenth century.

Tree small, upright, dense-topped, hardy, very productive. Fruit ripe in late August; 2⅜ inches long, 2½ inches wide, obovate-obtuse-pyriform, symmetrical, uniform; stem 1 inch long, thick, curved; cavity acuminate, shallow, narrow, symmetrical, often lipped; calyx large, almost closed; lobes separated at the base, short, narrow, acuminate; basin shallow, obtuse, gently furrowed and wrinkled; skin tough, characteristically rough, glossy; color bright yellow with a beautiful, lively, pinkish-red cheek, mottled, mingled with brownish minute specks; dots numerous, very small, conspicuous, russet or brown; flesh tinged with yellow, slightly granular under the skin, strongly granular at the center, tender and melting, very juicy, sweet, vinous, aromatic; quality very good; core large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds wide, plump, acute.

Group 3. Round-acute-pyriform Pears

452. Tyson.—In every character of fruit and tree excepting size and color of fruit, Tyson excels Clapp Favorite with which it competes. The flesh is melting and juicy with a spicy-scented sweetness that gives the fruits individuality. The pears keep longer and ship better than those of Clapp Favorite. Unfortunately, the fruits are but medium in size, and are often poorly colored. The tree is the most nearly perfect of that of any pear grown in America. It is as hardy as that of any other variety if not hardier, and resists better than that of any other sort the black scourge of blight. Add to these notable characters, large size, great vigor and fruitfulness, and it is seen that the trees are nearly flawless. Tyson is a seedling found about 1794 on the land of Jonathan Tyson, Jenkintown, Pennsylvania.

Tree very large, vigorous, upright-spreading, tall, dense-topped, hardy, productive. Fruit matures in late August; medium in size although somewhat variable, 2⅛ inches long, 1¾ inches wide, roundish-acute-pyriform; stem 1¾ inches long; cavity very shallow, obtuse, roughened, usually drawing up as a lip about the base of the stem; calyx open; small; lobes separated at the base, short, narrow, acute; basin shallow, narrow, flaring, slightly furrowed, compressed; skin tough, smooth, slightly russeted, dull;

color deep yellow, usually without blush; dots numerous, very small, obscure; flesh tinged with yellow, granular around the basin, otherwise rather fine-grained, tender and melting, very juicy, sweet, aromatic; quality very good; core small, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds medium in size and width, plump, acute.

453. Bloodgood.—The fruits are meritorious for flesh of fine texture, which is melting, juicy, and has a rich, sweet, perfumed flavor. The trees are resistant to blight, healthy, hardy, bear young and regularly, are long-lived, and attain large size. The variety has little value in commercial plantations, but is prized for home use. Bloodgood seems to have been brought to notice about 1835 by James Bloodgood, Flushing, Long Island.

Tree upright, dense, slow-growing, productive. Fruit matures in late August; 2 inches long, 2¼ inches wide, roundish-pyriform to acute-pyriform, with equal sides; stem ¾ inch long, thick; cavity russeted, lipped, drawn up in fleshy folds about the stem; calyx open, small; lobes separated at the base, short, broad, obtuse; basin narrow, obtuse, smooth; skin thick, roughish; color bright yellow, with patches and nettings of russet, producing a mottled russet effect; dots many, small, russet; flesh tinged yellow, granular, melting, rich, very juicy, sweet, aromatic; quality very good; core small, closed, with clasping core-lines; calyx-tube short, narrow, conical; seeds small, short, plump, acute.

Section II. Autumn Pears

Group 4. Oblong-pyriform Pears

454. Buerré Bosc (Fig. 114). *Bosc.*—The fruits of Buerré Bosc at once receive approbation from all who see them by virtue of their uniquely beautiful color and shape. The quality is very good or best, Seckel alone surpassing it as a dessert fruit. The flesh is tender and melting, very juicy, with a rich piquant flavor and a pleasing aroma. The characters of the trees fall far short of those of the fruits; they make a poor growth in the nursery and must be humored in soil and climate. While slow in coming in bearing, after fruiting begins the trees bear regularly and abundantly. Buerré Bosc may be recom-

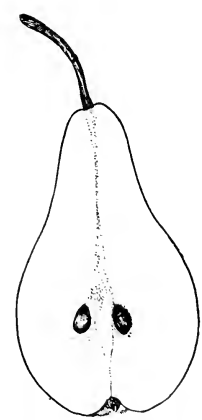

Fig. 114. Buerré Bosc.

mended for the home, for local and general markets and for exportation. This pear is a native of Belgium, having been raised from seed in 1897 by Dr. Van Mons.

Tree medium in size, not very vigorous, upright-spreading, hardy, productive. Fruit ripe in November; large 3⅜ inches long, 2¾ inches wide, uniform in size, acute-obovate-pyriform, with a very long tapering neck, uniform in shape and very symmetrical; stem 1½ inches long, curved; cavity very obtuse, wrinkled, russeted, with a fleshy ring folded up around the stem, slightly lipped; calyx open, small; lobes short, broad, obtuse; basin very shallow, narrow, obtuse, smooth, symmetrical; skin granular, tender, roughened by russet, dull; color dark yellow, overspread with thick dark russet, laid on in streaks and patches, with a cheek of solid russet; dots small, light russet, obscure; flesh yellowish-white, slightly granular, tender and melting, buttery, very juicy, with a rich aromatic flavor; quality very good to best; core large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds wide, short, plump, obtuse.

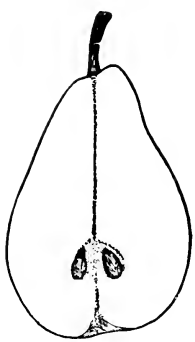

FIG. 115. Buerré Hardy.

455. Buerré Hardy (Fig. 115). *Hardy.*— The fruits are usually large, handsome, and the flesh and flavor are exceptionally fine. Unfortunately, the fruits do not keep well, having a tendency to soften at the core. When poorly grown the pears are quite astringent. The trees, while not large, are vigorous, hardy, productive and healthy except in being susceptible to blight. Buerré Hardy does especially well in eastern United States. This is a French pear raised about 1820 by M. Bonnet at Boulogne-sur-Mer.

Tree medium in size, vigorous, upright, dense-topped, rapid-growing, hardy, productive. Fruit in season late September and early October; large, 3 inches long, 2¼ inches wide, oblong-obtuse-pyriform, with a long neck; stem ⅞ inch long, thick, curved; cavity obtuse, shallow and narrow, russeted, often uneven and gently furrowed, lipped; calyx large, open; lobes broad, acute; basin shallow, narrow, obtuse, gently furrowed; skin granular, tender, russet; color dull greenish-yellow, overspread with thin brownish-russet, without blush; dots numerous, russet, small, very conspicuous; flesh granular, melting, buttery, very juicy, sweet, richly aromatic and somewhat vinous; quality very good to best; core large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds large, wide, long, plump, acute.

456. Mount Vernon (Fig. 116).— The top shape and reddish-russet color make this a unique pear in appearance, and the greenish-yellow, granular, spicy, piquant flesh constitute very distinct characters in the quality of the fruits. Lack of uniformity in shape and small size are the chief defects. The tree is vigorous but has a small dense head with numerous short stocky branches, many of which droop, the aspect given the top by these peculiarities being quite distinct. The variety is worthy when a winter pear is wanted whether for home or market. Mount Vernon originated from a chance seedling in the garden of Samuel Walker, Roxbury, Massachusetts, about 1847.

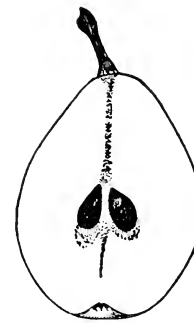

FIG. 116. Mount Vernon.

Tree large, vigorous, spreading, with many drooping branches, dense-topped, hardy, productive, long-lived. Fruit late October and November; medium in size, 2½ inches long, 2⅛ inches wide, uniform in size, oblong-pyriform, with unequal sides; stem 1 inch long, thick, usually curved; cavity obtuse, shallow and narrow, russeted, furrowed, often heavily lipped; calyx open; lobes short, narrow, acuminate; basin narrow, obtuse, smooth, symmetrical; skin granular, roughened by russet, dull; color light russet overspreading a greenish-yellow ground, with a brownish-red blush on the exposed cheek, dotted and netted with russet; dots numerous, small, russet, obscure; flesh with a faint tinge of yellow, granular, tender and melting, juicy, sweet, aromatic; quality good to very good; core large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds variable in size, wide, long, plump, acute, many abortive.

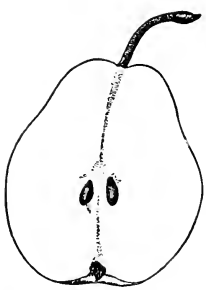

FIG. 117. Duchesse D'Angoulême.

457. Duchesse d'Angoulême (Fig. 117). *Angoulême.*—The fruits of Duchesse d'Angoulême excite admiration by their enormous size. They may be known by their size, squat pyriform shape, and uneven knobby surface. Well grown, the flesh is melting with a rich flavor; but poorly grown, and on unfavorable soils, the flesh is coarse-grained and nearly devoid of the richness that characterizes the fruits in happier situations. The trees are vigorous, hardy and healthy, bear abundantly under favorable conditions, and succeed either as standards or

dwarfs. On either stock, the tree makes a beautiful and symmetrical pyramid, and comes in bearing early and bears regularly. The original tree of Duchesse d'Angoulême was a wilding growing in a garden near Angers, France. It was introduced about 1812.

Tree vigorous, upright, becoming spreading, dense-topped, slow-growing, productive. Fruit ripe October-November; large, often very large, 3¾ inches long, 2¼ inches wide, oblong-pyriform with irregular and uneven surface and with sides often unequal; stem 1½ inches long, very thick, curved; cavity acute, deep, furrowed, irregular, often lipped; calyx partly open, small; lobes short, narrow, acute; basin medium to deep, abrupt, furrowed and uneven, often corrugated; skin thick, granular, roughened with russet; color dull yellow, streaked, spotted and netted with dull russet; dots numerous, russet, conspicuous; flesh white, firm, melting, tender, granular, juicy, sweet, rich; quality good to very good; core closed, with clasping core-lines; calyx-tube short, wide, conical; seeds small, narrow, flat, acute, often abortive.

458. Pitmaston (Fig. 118).—In appearance, the pears are unsurpassed. On warm soils or in warm seasons, the flavor is choicely good, but in cold soils and seasons, the flavor is often austere or even acid and astringent. The subacid flavor makes this one of the very best pears for culinary purposes. The fruits keep and ship well. The trees have fewer faults than those of most of the standard varieties. They are hardy, vigorous, fairly immune to blight, and while but moderately productive, bear annually, and the large size of the fruits make them high yielders. Pitmaston was raised by John Williams, Pitmaston, England, in 1841; it reached America about 1870.

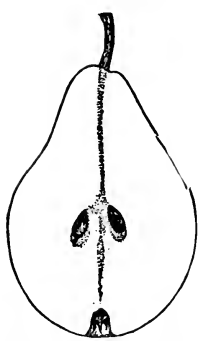

FIG. 118. Pitmaston.

Tree large, vigorous, spreading, dense-topped. Fruit ripe in October; large, 3¼ inches long, 2½ inches wide, oblong-pyriform, symmetrical; stem 1 inch long, thick, often curved; cavity very shallow and very narrow or lacking, the flesh drawn up in a wrinkled fold around the base of the stem, often lipped; calyx closed, large; lobes long, broad, acute; basin shallow, obtuse, furrowed and wrinkled; skin thin, granular, smooth, tender, dull; color pale lemon-yellow, dotted and patched with light russet, without blush; dots numerous, small, russet, conspicuous; flesh tinged with yellow, firm, somewhat granular, melting, buttery, very juicy, piquant and vinous;

quality good to very good; core large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds narrow, long, flat, acute, very often abortive.

459. Louise Bonne de Jersey. *Louise.*—The variety has many excellent qualities of fruit and tree. The fruits are medium to large, handsome, of excellent quality and keep and ship well. The trees are precariously hardy and somewhat subject to blight, but very vigorous, productive and long-lived. This pear is a standard for home collections, and finds favor in many commercial orchards. The parent tree of this pear was raised from seed about 1780 by M. de Longueval, Avranches, Normandy.

Tree large, vigorous, upright, very tall, dense-topped, hardy, productive, long-lived. Fruit matures in October; medium to large, often 2⅞ inches long, 2¼ inches wide, oblong-pyriform, irregular, stem 1 inch long, slender, usually curved; cavity obtuse, shallow, narrow, furrowed and wrinkled, often lipped, the flesh folded up around the stem; calyx open, large; lobes broad, acute; basin obtuse, furrowed and uneven; skin granular, smooth; color pale yellow, marked on the exposed cheek with a dull pinkish-red blush and with streaks of russet; dots numerous, small, grayish or russet, conspicuous; flesh yellowish-white, tender and melting, very juicy; sweet, aromatic, rich; quality very good; core closed, with clasping core-lines; calyx-tube short, wide, conical; seeds large, wide, long, plump, acute.

Group 5. Obovate-turbinate, or Round-pyriform Pears

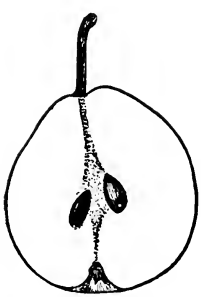

Fig. 119. Worden Seckel.

460. Worden Seckel (Fig. 119). *Worden.*—Well grown, the fruits of Worden Seckel are voluptuously handsome in form and color. They are smooth, glossy, trim of contour, commonly uniform, with a beautifully blushed cheek on a handsome yellow background. When the crop is thinned so that the fruits attain large size, no pear is handsomer or will bring a higher price on the fruit-stands. The crop comes in with Seckel, but keeps longer. The tree is very hardy and bears young. Worden Seckel was raised by Sylvester Worden, Minetto, New York, about 1881.

Tree large, vigorous, upright-spreading, rapid-growing, very productive. Fruit ripe in late September-October; medium in size, 2½ inches long, 2⅛

inches wide, obovate-obtuse-pyriform; stem ¾ inches long, thick; cavity very shallow and obtuse or lacking, the flesh folded up around the base of the stem and often lipped; calyx open, large; lobes narrow, acute; basin shallow, narrow, obtuse, smooth or gently furrowed; skin thin, tender, smooth, glossy; color pale golden-yellow, well blushed on the exposed cheek with solid bright red; dots numerous, small, russet, obscure; flesh yellowish; fine-grained near the skin, granular at the center, tender and melting, buttery, very juicy, spicy and aromatic; quality very good; core closed, axile, with meeting core-lines; calyx-tube conical; carpels ovate; seeds wide, plump, obtuse.

461. Vermont Beauty.—The bright-cheeked pears are as alluring to the eye as those of any other variety, and they are almost as delectable as the fruits of Seckel which they resemble in shape. The crop ripens a little later and keeps longer than that of Seckel. The trees are preëminent among their kind by virtue of large size, rapidity of growth, productivity, and hardiness. They rejoice in vigor and health as do those of almost no other variety, and while hardly as productive as those of Seckel, yet because of larger fruits fill the basket nearly as quickly. The variety is supposed to have originated in the nursery of Benjamin Macomber, Grand Isle, Vermont, more than forty years ago.

Tree vigorous, upright-spreading, dense-topped, hardy, productive. Fruit ripe in late October; medium in size, 2½ inches long, 2 inches wide, obovate-acute-pyriform; stem ¾ inch long, curved; cavity small or lacking, the flesh folded around the base of the stem, occasionally lipped; calyx small, open; lobes separated at the base, short, narrow, acute; basin shallow, narrow, obtuse, smooth; skin thick, tough, smooth, or with slight russet markings; color clear pale lemon-yellow, with a broad and brilliantly blushed cheek mottled and dotted with pinkish-red, fading at the sides into pinkish-red dots; dots numerous, very small, light russet, conspicuous; flesh tinged with yellow, fine-grained, tender and melting, very juicy, with a rich vinous flavor; quality very good; core closed, axile, with meeting core-lines; calyx-tube short, wide, conical; seeds large, wide, plump, acute.

462. Seckel (Fig. 120).—Among the several hundred pears that grow on this side of the Atlantic, Seckel stands almost alone in vigor of tree, productiveness, and immunity to blight, and is equalled by no other variety in high quality of fruit. The fruits are small, not highly colored, but are attractive because clean and trim in contour. The flesh is melting, juicy, perfumed, and most exquisitely and delicately flavored, with the

curious character of having much of its spicy aromatic flavor in the skin. The reddish-brown color of the fruit is another distinguishing character of Seckel. The trees are as hardy as those of any other pear, and are remarkable for their large, compact, broadly pyramidal tops. The tree is further distinguished by its short-jointed, stout, olive-colored wood, and its habit of bearing fruits in clusters on the ends of the branches. There are several faults of fruit and tree: fruit and foliage are susceptible to scab; the pears are too small for commercial canning; and the trees are late in coming in bearing. Seckel is supposed to have originated as a chance seedling soon after the Revolutionary War near Philadelphia, Pennsylvania.

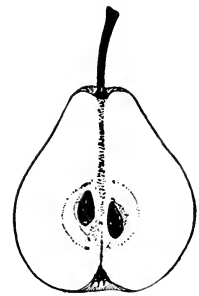

FIG. 120. Seckel.

Tree very large, very vigorous, upright-spreading, dense-topped, hardy, very productive, long-lived. Fruit ripe in October; small, 2 inches long, 1⅞ inches wide, uniform in size and shape, obovate-pyriform, symmetrical; stem ½ inch long, short, thick, often curved; cavity obtuse, with a shallow narrow depression, symmetrical; calyx small, partly open; lobes separated at the base, short, variable in width, acute; basin shallow, narrow, strongly obtuse, symmetrical; skin smooth, dull; color yellowish-brown, lightly marked with pale russet and often with a russet-red cheek; dots numerous, very small, russet or grayish; flesh white, with a faint tinge of yellow, slightly granular, melting, buttery, very juicy, sweet, with an exceedingly rich, aromatic, spicy flavor; quality very good to best; core small, closed, with clasping core-lines; calyx-tube short, conical; seeds small, short, not very plump, obtuse.

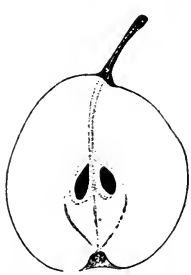

FIG. 121. Doyenné du Comice.

463. Doyenné du Comice (Fig. 121). *Comice.*—The fruits are very large, smooth, except for russet markings, clear handsome yellow, sometimes brightened by a delicate blush, with yellow fine-grained flesh, which is tender, melting; very juicy, sweet, piquant, perfumed. The trees make a poor growth in the nursery; must be humored in soil, climate, and care; they are subject to blight; while usually productive, they are not always so; lastly, they are below the average in hardihood to cold.

The variety thrives on the Pacific slope where it is a valuable commercial pear. The parent tree was taken from the fruit-garden of the Comice Horticole, Angers, France.

Tree vigorous, upright, dense, usually productive. Fruit ripe in November; large, 3 inches long, 2¾ inches wide, round-obovate, with unequal sides; stem 1¼ inches long, very thick, curved; cavity obtuse, shallow, narrow, russeted and wrinkled, often with a fleshy ring around the base of the stem; calyx open; lobes separated at the base, long, narrow, acuminate; basin wide, obtuse, furrowed; skin smooth except for the russet markings, dull; color clear yellow, often with a faint russet-red blush, the surface covered with patches and nettings of russet; dots many, small, dark brown; flesh yellow, fine-grained, melting, tender, very juicy, sweet and vinous, aromatic; quality very good to best; core closed, with clasping core-lines; calyx-tube short, wide, conical; seeds large, wide, long, rather plump, acute, often abortive.

464. Sheldon (Fig. 122).—The fruits of Sheldon, while not large, are of sufficient size to meet the demands of a good dessert fruit. The shape is a perfect turbinate, truncated at the base, and is usually symmetrical and uniform. In color, the pears are very distinctive, the whole fruit being more or less russeted, with a handsome ruddy cheek. The flesh is melting, juicy, sweet, vinous, and highly perfumed with a pleasant musky aroma. The fruits keep and ship well, and are esteemed both for dessert and culinary purposes. The trees, while large, vigorous, and hardy, are not productive, blight as badly as any pear in the orchard, are reluctant in coming in bearing, and seldom hold their crop well, so that in exposed positions the wind takes great toll. This pear is a native of Huron, Wayne County, New York, having sprung from seed planted about 1815.

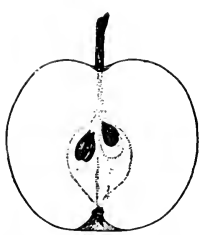

FIG. 122. Sheldon.

Tree large, vigorous, upright-spreading, rapid-growing, hardy, productive. Fruit matures in October; large, 2¾ inches long, 2½ inches wide, uniform in size and shape, round-obovate, symmetrical; stem ¾ inch long, thick, straight; cavity obtuse, deep, furrowed, occasionally lipped; calyx large, open; lobes very broad, obtuse; basin wide, obtuse, symmetrical; skin thick, granular, tender, roughish; color dull greenish-yellow with a faint brownish-red blush overspread with russet nettings and streaks; dots numerous, small, russet; flesh whitish, somewhat granular, tender and melt-

ing, very juicy, sweet and vinous, with a rich and pleasantly aromatic flavor; quality very good to best; core large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds acute.

465. Howell (Fig. 123).—The trees are not above the average in vigor, healthfulness, hardiness, and fruitfulness, but their spreading tops make them desirable orchard inhabitants and handsome dooryard ornamentals. The fruits cannot be praised for appearance or quality, but they are uniform and are freer from the ravages of the scab fungus than those of almost any other pears. Howell seems to be better suited to the middle western than to the eastern states. About 1830, Thomas Howell, New Haven, Connecticut, planted pear seeds; one of the trees resulting was named Howell.

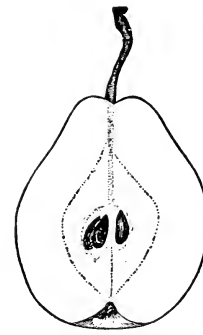

FIG. 123. Howell.

Tree large, vigorous, spreading, open-topped. Fruit ripe in late September; medium in size, 2⅜ inches long, 2¼ inches wide, obovate-pyriform, symmetrical; stem 1 inch long, thick, curved; cavity obtuse, very shallow and narrow, symmetrical; calyx open, small; lobes separated at the base, short, narrow, obtuse; basin obtuse, but slightly furrowed, nearly symmetrical; skin smooth, dull; color pale lemon-yellow with a trace of blush and with tracings of russet; dots many, small, russet, very conspicuous; flesh yellowish-white, firm but tender, granular, melting, very juicy, sweet, with a rich vinous flavor, aromatic; quality very good; core rather large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds long, plump, acute, frequently abortive.

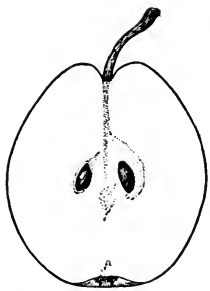

FIG. 124. Flemish Beauty.

466. Flemish Beauty (Fig. 124).—At one time Flemish Beauty was a leading commercial variety in eastern America, but it has been supplanted by other sorts because the toll of blighted trees is too great, and the fruits are too often disfigured by the scab-fungus. To offset these defects, the trees are unusually fruitful, and as hardy as those of any other variety. The fruits are nearly perfect if scab-free, and properly matured. The parent tree was a wilding in a wood near Alost, Belgium, about the beginning of the nineteenth century.

Tree medium in size, vigorous, spreading, drooping branches, rapid-growing, hardy, productive. Fruit ripe early October; large, nearly 2¾ inches long, 2½ inches wide, uniform in size and shape, obovate, with nearly equal sides; stem 1⅛ inches long, thick; cavity acute, shallow, narrow, russeted, a little furrowed; calyx open; lobes partly separated at the base, short, obtuse; basin shallow, narrow, abrupt; skin thick, roughish, dull; color clear yellow, overspread on the exposed cheek with a dotted and marbled reddish blush; dots numerous, russet, small, conspicuous; flesh yellowish-white, firm, becoming melting and tender, granular, juicy, sweet, aromatic, with a musky flavor; quality very good; core closed, with clasping core-lines; calyx-tube short, wide, conical; seeds rather long, plump, acute.

467. White Doyenné (Fig. 125) is being discarded because the small and unattractive fruits fail to satisfy commercial demands. A more serious fault is that the fruits and foliage are inviting prey to the scab-fungus which often cracks and scabs the pears and defoliates the trees. Except in susceptibility to scab, the trees are nearly flawless when grown in the soil which they prefer,—a rich clay which should be heavy rather than light. On such soil, tree and fruit attain perfection. The faults named have made the variety an outcast, but it should still receive attention for the superb quality of its fruits where scab can be controlled. This pear is one of the oldest of all varieties. It is impossible to say whether it originated in France or was brought to that country from Italy.

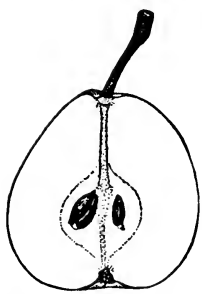

FIG. 125. White Doyenné.

Tree large, vigorous, upright, vasiform, hardy, very productive. Fruit matures in early October; medium in size, 2¼ inches long, 2⅛ inches wide, uniform, obovate; stem ¾ inch long, thick, slightly curved; cavity obtuse, shallow, narrow, russeted, usually symmetrical; calyx small, open or closed; lobes short, narrow, obtuse; basin shallow, obtuse, nearly smooth; skin thick, tough, smooth, dull; color clear pale yellow with a small amount of bright red blush; dots numerous, small, russet, conspicuous; flesh yellowish-white, granular, firm at first but becoming melting when fully ripe, juicy, sweet, with a rich aromatic flavor; quality very good; core closed, with clasping core-lines; calyx-tube short, wide, conical; seeds wide, plump, obtuse.

468. Kieffer (Fig. 126).—Although the most pretentious cheat in the orchard, Kieffer is grown more commonly than any other

pear in North America excepting Bartlett. Nurserymen like it because of all pears the trees of Kieffer are most easily grown; and in the orchard they are uniformly the most vigorous, fruitful, endure heat best, are least susceptible to blight, and withstand best the ravages of San José scale. On the other hand, the trees are tender to cold, in some soils refuse to set fruit, are often self-sterile, and sometimes with the best of care bear only pears of small size. Worthless for dessert, cooking removes the disagreeable natural taste of the raw pear, and leaves a good product. Canned, the pears retain their shape, color, and flavor well; therefore, and because of white and inviting flesh, Kieffers are preferred by commercial canners. Peter Kieffer, who lived near Philadelphia, grew the original Kieffer tree which fruited first in 1863.

FIG. 126. Kieffer.

Tree of medium size, vigorous, upright, dense-topped, hardy, very productive. Fruit matures in late October and November; above medium to large, 2¾ inches long, 2¼ inches wide, oval, narrowing at both ends; uniform; stem 1 inch long, thick; cavity very small, smooth; calyx open; lobes separated at the base, short, narrow, acute; basin shallow, narrow, obtuse, smooth; skin thick, tough, smooth; color yellow, occasionally blushed with dull pinkish-red; dots numerous, small, russet, conspicuous; flesh yellowish-white, very granular and coarse, crisp, juicy; not sweet, often astringent; quality poor; core large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds wide, plump, acute.

469. Sudduth is a standard sort in parts of the Mississippi Valley. The characters which give it a place are: remarkable freedom from blight; hardiness to cold and heat; capacity to withstand drought; early bearing; and great productiveness. The fruits are neither attractive in appearance nor high in quality, but they do very well for all culinary purposes. The pears do not keep well, as they soften at the center soon after becoming edible. The trees are nearly as hardy as those of the wild crab-apple. Sudduth originated from seed planted by Thomas Constant in 1820, in Sangamon County, Illinois.

Tree large, vigorous, upright-spreading, open-topped, hardy, productive. Fruit ripe in late September-October; medium or below in size, 2¼ inches

long, 2⅜ inches wide, roundish-oblate, slightly conical toward the apex; stem ⅞ inch long, slender; cavity acute, deep, narrow, smooth, sometimes lipped; apex large, open; lobes separated at the base, long, acute; basin very shallow, narrow, obtuse, occasionally wrinkled; skin thin, tough, smooth, dull; color light green, without blush; dots very small, russet or greenish, very obscure; flesh greenish-white, firm, crisp, rather dry, subacid; quality medium to poor; core large, closed, axile, with meeting core-lines; calyx wide, conical; carpels ovate; seeds variable in size, wide, flat, obtuse.

Section III. Winter Pears

Group 6. Pears with Stem-end Acute

470. Buerré Clairgeau (Fig. 127). *Clairgeau.*—Buerré Clairgeau is one of the mainstays in American pear-growing because of excellent tree characters. The fruits, while handsome, are of mediocre quality. The tree is second only to that of Buffum in vigor, health, and productiveness. They bear young and usually annually. The fruits are large, smooth, uniform in shape, with a handsome ground color of rich yellow at maturity and a bright crimson cheek. Here praises end, for the handsome coat covers rather coarse granular flesh which is sometimes good but more often commonplace. The core is very large, and the flesh surrounding it often softens prematurely. The pears are heavy and often drop before maturity; hence the trees should not be set in wind-swept situations. The original tree of Buerré Clairgeau appears to have grown by chance about 1828 at Nantes, France.

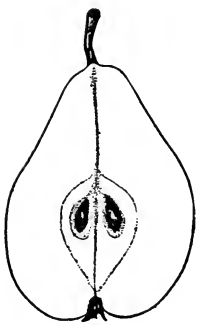

Fig. 127. Buerré Clairgeau.

Tree vigorous, unusually upright, dense, slow-growing, hardy, productive, a regular bearer. Fruit in season late October and November; large, 3⅝ inches long, 2⅝ inches wide, obovate-acute-pyriform, with a long tapering neck, uniform in shape; stem ½ inch long, short, very thick and fleshy; cavity obtuse, very shallow and narrow, with practically no depression, fleshy around the base of the stem, russeted, lipped; calyx open, large; lobes separated at the base, long, broad, acute or acuminate; basin shallow, narrow, obtuse, furrowed, often compressed; skin thick and granular, tough, smooth, glossy; color yellow, with bright pinkish-red blush, nearly crimson in highly colored specimens; dots many, small, russet, conspicuous; flesh white, quite granular, tender and melting, very juicy, sweet, aro-

matic, with a rich vinous flavor; quality very good to best; core large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds large, wide, long, plump, acute.

471. Buerré d'Anjou (Fig. 128). *Anjou.*—Buerré d'Angou is a standard market pear for late fall and early winter, its season lasting until well into January. The pear is of a distinct type, —large, very uniform, the sides slightly unequal, smooth of skin, yellow, marked and dotted with russet, with a faint blush, and borne on a very short thick stem. The yellowish-white flesh is firm but tender, slightly granular, very juicy, sweet and spicy, with a rich vinous flavor. The trees are vigorous, hardy, grow rapidly and come in bearing early, but have the serious fault of being uncertain croppers. It is an old French pear, the origin of which is obscure.

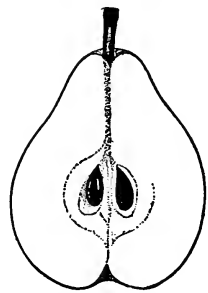

FIG. 128. Buerré d'Anjou.

Tree large, vigorous, spreading, hardy, an uncertain bearer. Fruit ripe November-December; large, 3½ inches long, 3 inches wide, oblong-obovate-pyriform, with surface irregular in outline, sides slightly unequal; stem ½ inch long, short, very thick and woody; cavity obtuse, shallow, slightly russeted and furrowed, usually lipped; calyx open; lobes separated at the base, long, narrow, acuminate; basin shallow, narrow, obtuse, smooth, symmetrical and regular; skin thin, tender, smooth, dull; color greenish becoming quite yellow, clouded with russet around the basin and occasionally with very fine russet lines and markings; dots many, small, russet, conspicuous; flesh white, firm but granular, tender, very juicy, sweet and spicy, with a rich aromatic flavor; quality very good; core large, closed; core-lines clasping; calyx-tube short, wide, conical; seeds large, wide, long, plump, acuminate, tufted at the tips.

472. Lincoln Coreless.—This variety receives attention only because it is a curiosity. The fruits are enormous in size, outweighing all other pears unless it be those of the Pound. They are unique in having a very small core and few or sometimes no seeds. They are further characterized by very late maturity; they ripen later than any other pear and keep until April. While usually rather dull greenish-yellow in color, the cheek is often enlivened by a bright blush which makes the fruits at-

tractive despite their grossness. Lincoln Coreless originated in Lincoln County, Tennessee, about 1830.

Tree medium to small, vigorous, upright, very dense, pyramidal, hardy, an uncertain bearer. Fruit ripe in February; very large, 5¼ inches long, 3 inches wide, uniform in size, obovate-acute-pyriform, somewhat ribbed, with unequal sides; stem 1⅜ inches long, thick, curved; cavity obtuse, shallow, narrow, russeted, furrowed, often lipped; calyx open, large; lobes separated at the base, narrow, acute; basin very shallow, narrow, obtuse, furrowed; skin very thick, tough, coarse and granular, smooth, dull; color greenish-yellow, with a handsome pinkish-red blush on the cheek exposed to the sun; dots many, brownish-russet, very conspicuous; flesh yellowish-white, very firm, granular at the core, crisp, tough, medium juicy, rather bitter and astringent; quality poor; core closed, with clasping core-lines; calyx-tube long, wide, conical; seeds few, narrow, often abortive, acute.

473. Pound is grown in collections for its monstrous fruits. The pears not infrequently weigh three pounds, and one is noted weighing four pounds, nine ounces. The pears are coarse in form, texture, and flavor. The pears keep well, and are fairly good for culinary purposes. The trees are unusually satisfactory, because of which the variety should make a good parent from which to breed. This is a very old pear, possibly dating back to Pliny, who wrote about eighty years after the beginning of the Christian era.

Tree upright, dense-topped, hardy, very productive. Fruit matures in February; large, 4 inches long, 2⅞ inches wide, obovate-acute-pyriform, with unequal sides; stem long, thick, curved; cavity obtuse, shallow, narrow, russeted, furrowed, drawn up in a fleshy ring about the stem; calyx large, open; lobes separated at the base, obtuse; basin shallow, narrow, obtuse, slightly furrowed, symmetrical; skin thick, tough, dull, roughened by the dots and by russet markings; color golden-yellow, often marked on the exposed cheek with a bronze or pinkish blush; dots numerous, russet, very conspicuous; flesh yellowish, firm, granular, very tough, subacid, inferior in flavor; quality very poor; core large, closed, axile, with meeting core-lines; calyx-tube short, wide, conical; carpels pear-shaped; seeds very large, brownish-black, wide, long, acuminate.

Group 7. Pears with Stem-end Obtuse

474. Joséphine de Malines (Fig. 129). *Malines.*—This is one of the few good winter pears. The fruits have a marked pe-

culiarity; cut through the shaded yellow-russet skin, flesh with a faint rosy tint is displayed. It is the quality of the fruits that commends the variety most. The flesh is buttery, juicy, sweet, and perfumed. In the orchard, the trees are satisfactory, but nurserymen find them difficult to grow; this, no doubt, is the chief reason for the neglect of this excellent pear. The trees thrive in almost any soil or situation suitable to pears, and are fruitful, hardy, and resistant to blight. This pear originated about 1830 in the seed-beds of Major Espéren, the well-known pomologist of Mechlin, Belgium.

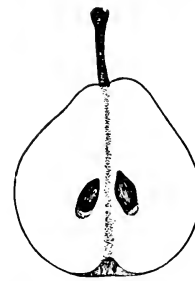

FIG. 129. Joséphine de Malines.

Tree large, vigorous, spreading, tall, dense-topped, rapid-growing, hardy, very productive. Fruit ripe December-February; medium in size, turbinate, inclined to truncate; stem long, very thick; cavity obtuse, shallow, narrow, slightly furrowed; calyx large, open; lobes short, broad, obtuse; basin narrow, obtuse, smooth; skin thick, tough, dull; color pale greenish-yellow, netted and patched more or less with russet; dots numerous, small, brown or russet, conspicuous; flesh pinkish-white, firm, granular, melting, very juicy, sweet, aromatic; quality good; core large, closed, axile, with clasping core-lines; calyx-tube short, wide; carpels pyriform; seeds large, wide, long, plump, acuminate.

475. Lawrence (Fig. 130).—The tree is hardy, moderately vigorous and fruitful, an early, annual, and uniform bearer, and has the reputation of being one of the longest lived of all pear-trees. The fruits are of medium size, but are trim in contour and distinctive in shape because of the rounded truncate stem-end, and in color are a bright clean lemon-yellow, marked with patches of russet and faintly blushed on the side to the sun. The fruits come in season in early winter and keep well under ordinary care for a full month or longer. The melting flesh bounds with a rich, sugary, perfumed juice, by virtue of which it is justly esteemed as the best flavored pear of its season. Lawrence is a chance seedling, a native of Flushing, Long Island, and was introduced in 1843.

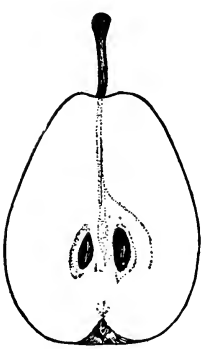

FIG. 130. Lawrence.

Tree vigorous, spreading, with drooping branches, very hardy, productive. Fruit ripe November-December; 2⅝ inches long, 2⅛ inches wide, obovate-obtuse-pyriform, often with sides unequal; stem 1 inch long, thick, curved; cavity small, obtuse, shallow, narrow, russeted, furrowed and irregular, often lipped; calyx large, partly open; lobes separated at the base, long, broad, acute; basin wide, obtuse, furrowed and sometimes corrugated; skin thick and granular, tough, roughish; color lemon-yellow, marked with occasional patches of russet and with a faint russet-red blush; dots numerous, small, russet, inconspicuous; flesh yellowish-white, firm, granular, tender and melting when fully mature, juicy, rich, sweet; quality very good; core large, closed, with clasping core-lines; calyx-tube short, wide, conical; seeds large, long, plump, acute.

476. Winter Nelis (Fig. 131) is the standard winter pear in the United States. The fruits are small, and are often so poorly colored as to be unattractive, but well grown they are sufficiently large for dessert fruits. The flesh is tender, melting, juicy, luscious, with a rich, sweet, aromatic flavor. The fruits keep, ship, and sell well. The trees are small with straggling wayward tops and habits of growth so self-assertive that no art nor skill of the pruner can bring the branches under control. Notwithstanding the poorly-shaped tops, the trees are often enormously productive. They bear almost annually; come in bearing young; are fairly hardy; and are adapted to almost any soil or situation, provided that the soil is fertile; and are as nearly immune to blight as those of any other European pear. Winter Nelis was raised from seed by Jean Charles Nelis, Mechlin, Belgium, early in the nineteenth century.

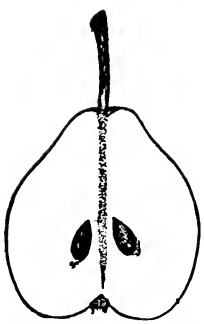

FIG. 131. Winter Nelis.

Tree medium in size and vigor, spreading, hardy, very productive. Fruit ripe November to January; medium in size, 2¼ inches long, 2¼ inches wide, uniform in size and shape, obtuse-obovate-pyriform; stem 1⅜ inches long, thick, curved; cavity obtuse, shallow, narrow, russeted, gently furrowed, occasionally lipped; calyx large, open; lobes separated at the base, short, broad, acute; basin shallow, obtuse, lightly furrowed; skin thick, tender, roughened with russet, dull; color yellow, with many russet streaks and patches, the exposed cheek blushed with light red; dots numerous, small, russet, conspicuous; flesh yellowish-white, granular, tender and melting, buttery, very juicy, sweet, aromatic; quality very good; core large, closed, axile; calyx-tube short, wide, conical; seeds large, wide, long, acute.

CHAPTER XXII

VARIETIES OF QUINCES

NEVER represented by a great number of named varieties, probably not more than a half-hundred in any country at one time, the quince is now discarded from many nurserymen's catalogues and appears under two, three, or at most, a half-dozen names in others. Eight varieties are listed in this text, but it is doubtful whether all could be purchased true to name from American nurserymen or be found in the quince plantations of the country.

INDEX TO VARIETIES OF QUINCES

KEY TO VARIETIES OF QUINCES

A. Fruits orange-shaped.
  B. Shape globular.
    C. Size medium; early midseason ..... 477. Orange.
    CC. Size large to very large; late midseason.
      D. Flavor of quince ..... 478. Rea.
      DD. Flavor of pineapple ..... 479. Pineapple.
  BB. Shape round-oblate; neck thick, short; very early ..... 480. Fuller.
  BBB. Shape round-oblong; lemon-yellow; surface furrowed ..... 481. Smyrna.
AA. Fruits pear-shaped.
  B. Shape obtuse-pyriform.
    C. Size medium to large; late ..... 482. Champion.
    CC. Size large to very large; midseason ..... 483. Meech.
  BB. Shape obovate-pyriform; very large ..... 484. Van Deman.

477. Orange (Fig. 132) is a group rather than a varietal name. The type seems to come nearly true from seed, which

accounts for the several strains. These Orange quinces belong to the North, where they ripen late in the season in cool weather. In the South, they ripen too early, and are inferior in size, quality, and color to several other varieties. When or where the name was first used is not known. Orange is the leading commercial quince in the United States.

FIG. 132. Orange.

Tree very vigorous, hardy, productive, and as free as any from blight. Fruit early midseason, nearly round with a very short thick neck, faintly ribbed; cavity broad, very shallow with indications of a small undeveloped neck, russeted; basin broad, abrupt, deep, furrowed; calyx medium in size; very pubescent; color golden yellow or sometimes greenish-yellow; flesh pale yellow, tender, fine, juicy, mild subacid, becoming a beautiful dark red when thoroughly cooked; core medium in size, wide open; quality very good.

478. Rea. *Rea's Mammoth.*—Rea is a strain of Orange characterized by very large quinces and a strong-growing productive tree, with foliage a little darker than that of the true Orange. The fruit ripens a little later and keeps well after maturity. The history of the variety goes back to Coxsackie, New York, whence it seems to have been disseminated by Joseph Rea. The trees are tender to cold in the North and, therefore, in disfavor in the quince-growing regions of New York and New England; they are also lacking in vigor, need high culture, and the crop should be thinned.

479. Pineapple is a comparatively new variety originated by Luther Burbank and sent out by him in 1899. The originator says that the variety is the result of an effort to secure a quince which on cooking would become tender as does the flesh of the apple. The flavor is suggestive of the pineapple, hence the name. In appearance the quince resembles the Orange, but is smoother and more globular, lighter in color, and a little larger. The tree is described as a strong grower and as productive as that of the Orange.

480. Fuller is probably the best of the early quinces. It is also characterized by the beauty of its fruits, which are rich golden-yellow. Unfortunately, the trees are a little more subject

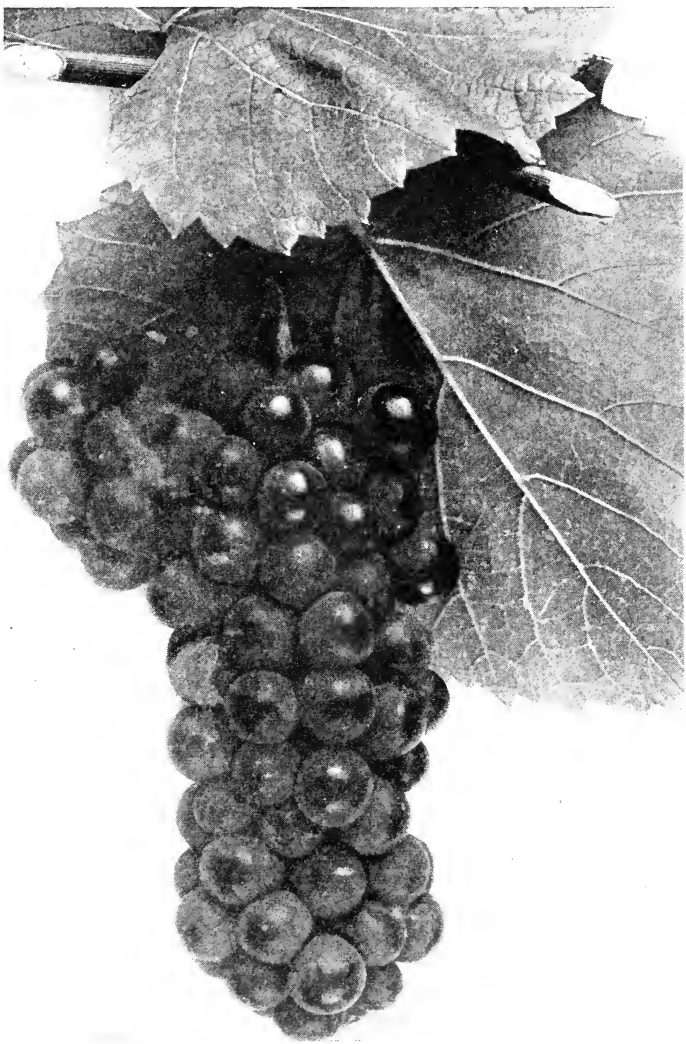

PLATE XVI. A Vulpina grape—The Clinton.

to blight than other varieties, and, since early quinces are not much in demand, are now seldom found in commercial plantations. Fuller was discovered about 1868 by A. S. Fuller, Ridgewood, New Jersey, and disseminated by him.

Tree of medium size, lacking in vigor, productive, subject to blight. Fruit very early, medium to large, apple-shaped but with a neck which gives some specimens the shape of a pear; surface ridged; heavily covered with pubescence; calyx set in a deep wide basin; stem set in a shallow cavity; flesh light yellow, juicy, tender, free from granules, very aromatic, mildly subacid; quality good to very good.

481. Smyrna is a new variety introduced from Smyrna in 1897 by G. C. Roeding, Fresno, California. It seems to have found a place in California, but as yet is hardly tested in the East. The plant is a handsome ornamental.

Tree a rapid and very vigorous grower with many large leaves. Fruit large, round-oblong; surface lightly furrowed, lemon-yellow; season about that of Orange, the fruit keeping well; flesh tender, very aromatic, mild subacid; quality good to very good.

482. Champion (Fig. 133) is one of the three or four standard varieties of American quinces. The fruits are very large and handsome, with flesh almost as tender as that of an apple, delicate in taste and odor, which are imparted to any other fruit with which the quinces are cooked. The trees are large and vigorous, bear young, and are very productive. The fruit ripens late and keeps long. Champion is of American origin, its history dating back to about 1870.

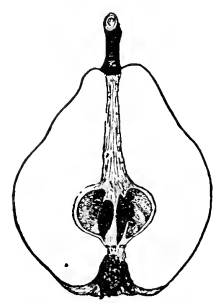

FIG. 133. Champion.

Tree vigorous, productive, early in bearing. Fruit large or very large, obtuse-pyriform, smooth or faintly ribbed; stem set obliquely in a slight depression; basin deep, narrow with deep narrow furrows; color greenish-yellow; pubescence very heavy; core large, open; flesh pale yellow, juicy, but firm, not spongy like that of Orange, slightly astringent, aromatic, mild subacid; quality good.

483. Meech (Fig. 134).—Many pomologists believe Meech to be a strain of the better-known Champion. A review of the history and characters of the two varieties shows that Meech is

the older of the two quinces; ripens its crop two weeks earlier; is much less subject to blight; the trees are hardier, more vigorous, and more productive; and, all in all, the true Meech is a better variety than the true Champion. Meech seems to have been in cultivation in Vineland, New Jersey, about the middle of the nineteenth century. Coming into the hands of Rev. W. W. Meech, it was disseminated in 1883.

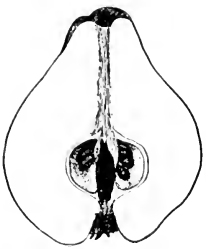

FIG. 134. Meech.

Tree very vigorous, hardy, productive and comparatively free from blight; comes in bearing early. Leaves large, broad in proportion to their length and luxuriantly green. Flowers very large and attractive. Fruit midseason, very large, obtuse-pyriform, smooth or occasionally slightly ribbed; stem set obliquely in a slight depression; basin rather narrow, smooth or somewhat furrowed; color bright golden-yellow; very pubescent but becoming smooth at maturity; flesh yellowish-white, juicy, fine-grained, highly aromatic, tart; quality good.

484. Van Deman (Fig. 135) is a comparatively new quince from Luther Burbank, Santa Rosa, California. Its value remains to be determined, although it has already found favor in some regions.

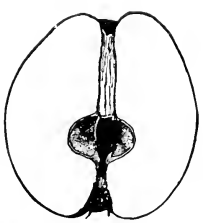

FIG. 135. Van Deman.

Tree vigorous, hardy, prolific, coming in bearing early. Fruit ripens just before Orange; very large, pear-shaped, with a short obtuse neck, making the shape obovate-pyriform; surface smooth; basin of medium width and depth; stem set obliquely in a shallow calyx, sometimes surrounded by a short neck-like protuberance; calyx open, with leaf-like lobes; color pale orange; without much pubescence; flesh pale yellow, rather coarse, slightly astringent, aromatic, pleasant, subacid, juicy, becomes deep red when cooked; quality very good; core large, wide open.

CHAPTER XXIII

VARIETIES OF APRICOTS

California has a monopoly of the apricot industry, furnishing America with fresh fruits and the whole world with the cured and canned product. Elsewhere in the United States the apricot is grown for the occasional crop the trees may produce, but chiefly as an ornamental. Apricot cultivation is confined to California on this continent because the blossoms appear so early—first of all tree-fruits—that elsewhere they are usually caught by spring frosts. The Russian apricots are not so often injured by frosts at blooming time, but the fruits are hardly worth having after they are in hand. Only twelve varieties of this fruit are described, and these less satisfactorily to the author than the varieties of any other fruit.

INDEX TO VARIETIES OF APRICOTS

KEY TO VARIETIES OF APRICOTS

A. Fruits borne in clusters. (Russian apricots)
  B. Size large; round, compressed; flesh yellow ..... 485. Shense.
  BB. Size small; oval, sides unequal; flesh orange ..... 486. Budd.
AA. Fruits borne singly. (Common apricots)
  B. Shape round or nearly so.
    C. Kernel sweet; skin pale yellow; flesh yellow ..... 487. Smyrna.
    CC. Kernel bitter.
      D. Color deep yellow with crimson blush and dots; flesh yellow; season early... 488. Luizet.
      DD. Color orange; flesh orange.

E. Season early; size small ..... 489. Early Moorpark.
EE. Midseason or late; size large.
F. Apricots deep orange with brown dots; flesh deep orange.
G. Fruit usually more than 2 inches in diameter; sides often ripen unevenly ..... 490. Moorpark.
GG. Fruits usually under 2 inches in diameter; sides ripen evenly. 491. Hemskirke.
FF. Apricots light orange, almost yellow, usually with red dots; flesh light orange.
G. Size medium to large; stone always free ..... 492. Royal.
GG. Size large; stone often clinging; deeper orange in skin and flesh than Royal ..... 493. Blenheim.
BB. Shape oblong or longer than wide; season early.
C. Kernel sweet; stone large, very broad, thick, and rough ..... 494. Large Early Montgamet.
CC. Kernel bitter.
D. Apricots oblong-oval, often oblique; skin and flesh orange ..... 495. Large Early.
DD. Apricots oblong-elliptical; skin and flesh rich yellow ..... 496. St. Ambroise.

485. Shense (Fig. 136). *Acme.*—Shense is the hardiest Russian apricot; the tree is vigorous, handsome, productive, and the fruit large and of good quality in Iowa and Nebraska. In the last-named state, the variety is grown under the name Acme. Shense originated from a stone brought from China about 1883.

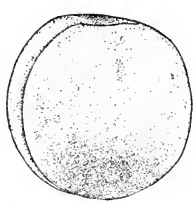

FIG. 136. Shense.

Fruit early; large, 2 inches in diameter, round, compressed; suture distinct; color pale yellow, the half exposed to the sun overspread with intense red deepening to purple; flesh deep yellow, juicy, mild subacid, pleasant; good in quality; stone large, free, ovate.

486. Budd has the doubtful recommendation of producing the best fruits of all the Russian apricots. The crop ripens very early, and the fruits have a sweet peach-like flavor that recommends them to those looking for variety. Budd is grown only in the Middle West, where it was introduced a generation ago by J. L. Budd, the noted authority on Russian fruits.

Tree vigorous, upright, hardy, productive. Leaves glandular. Fruit very early; small, oval, flattened; suture deep; halves unequal; skin golden-yellow, tinged with red on exposed sides; flesh bright orange, coarse, stringy, juicy, firm, sweet, peach-like in flavor; good; stone cling or half-cling, rather large.

487. Smyrna is grown on the grounds of the Experiment Station, Davis, California. The following description of the fruit is sent by Lloyd Austin, a specialist in apricots:

Fruit midseason; large, round-oval, slightly conical, sides compressed; cavity shallow; suture medium to deep; color yellow; flesh pale yellow; flavor distinctive and very pleasing; stone free, medium in size, oval, plump; kernel sweet.

488. Luizet (Fig. 137) is an old French sort little grown in America, but offered by several American nurserymen. Wickson stated that it was approved in the upper San Joaquin Valley, California.

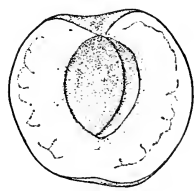

FIG. 137. Luizet.

Fruit early; very large, round-ovate, sides a little compressed toward the apex; suture prominent, dividing a swollen ridge; halves of the fruit unequal; cavity broad, deep; color a deep rich yellow with a crimson blush and dots of crimson; flesh deep yellow, firm, juicy, aromatic, sweet, rich; very good in quality; stone large, round-ovate, free, rough, variable in thickness; kernel bitter.

489. Early Moorpark (Fig. 138) is one of the standard early apricots East and West, and is very popular with the apricot-growers in southern California. The fruits resemble those of Moorpark, best known of all apricots, in shape, color, and quality, but are smaller and appear three weeks earlier; they are choicely good in quality but are a little too small for the market. The trees are very productive, but are tender to cold, and the crop ripens unevenly in some situations. This is a good variety to try in the East because of extreme earliness. Early Moorpark is an old English variety.

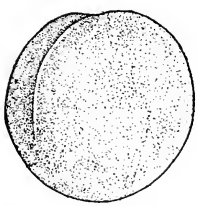

FIG. 138. Early Moorpark.

Tree vigorous, hardy, healthy, productive, with strong luxuriant shoots. Fruit very early; small, round-oval, with a well-marked or deep suture ex-

tending from base to apex; skin lemon-yellow, flushed and dotted with bright reddish-orange; very juicy, sweet and rich; of best quality; stone free from the flesh, round-oblong, rough; kernel bitter.

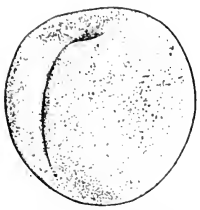

FIG. 139. Moorpark.

490. Moorpark (Fig. 139) is probably the most widely grown of all apricots. The merits of the variety are chiefly in the fruits, which are large, handsome, and of best quality. The trees have several faults: they are tender to cold; uncertain and irregular bearers; and the crop ripens unevenly. Moorpark is an old English variety, but is said to have been introduced from France to England at an early date.

Tree very large, with long strong shoots, tender to cold, sometimes very productive, but often shy and uncertain and not always healthy. Fruit large, more than 2 inches in diameter, round with truncate base and compressed sides; cavity small; suture shallow, dividing the fruit into unequal halves; color deep orange with brown dots; flesh deep orange, firm, juicy, sweet, rich; best in quality; stone free, large, rough, thick, kernel slightly bitter.

491. Hemskirke (Fig. 140).—This variety is a strain of Moorpark, which it surpasses in hardiness of tree. The tree resembles that of Moorpark in wood and foliage, but is a more regular bearer; unfortunately it does not hold the crop well. The fruit, also, resembles that of Moorpark, but ripens evenly on both sides, as Moorpark often does not. The variety is widely grown in California. It is an old English sort.

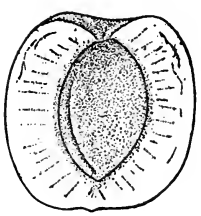

FIG. 140. Hemskirke.

Tree large, spreading, very hardy and healthy, regular and productive bearer. Flowers large, nearly pure white. Fruits midseason; large, nearly 2 inches in diameter, round or round-oblate, sides compressed, bulged on one side of suture near the apex; suture distinct; apex mucronate; color orange with brown spots, blushed toward the sun; skin thick, adhering; flesh golden-orange, tender, juicy, rich; very good in quality; stone oval, small, free; with a pervious channel; kernel bitter.

492. Royal (Fig. 141) is now the leading apricot in the great apricot-growing regions of California. In quality of fruit, it is somewhat inferior to Moorpark, but the trees do

not have the several serious faults of Moorpark. In addition to the variety, there seem to be two quite distinct strains of Royal in California. The Derby Royal is like the type variety, but is two weeks earlier. White Royal is lighter in color and flesh; this strain is not liked by canners. Royal and Blenheim are almost indistinguishable, though the latter is larger. The variety is an old European sort.

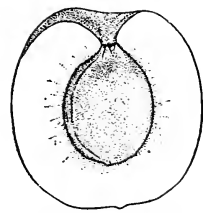

FIG. 141. Royal.

Tree large, vigorous, regular in bearing large crops which ripen uniformly. Fruit midseason; large, oval, sides compressed; suture shallow but distinct; color yellow or orange with orange cheek tinged with red with a few red dots; flesh rich, dull, yellow, firm, juicy, vinous; very good in quality; stone large, free, round-oblong, thick, rough; kernel bitter.

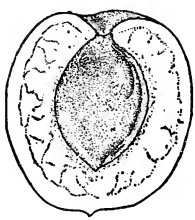

FIG. 142. Blenheim.

493. Blenheim (Fig. 142). *Shipley.*—Blenheim is one of the popular apricots in California for canning, standing in popularity next to Royal, which it closely resembles. It is grown in every apricot section of the state. This is an old sort raised by a Miss Shipley, Blenheim, England. Loose and Knobel are selected strains growing in Santa Clara Valley, California.

Tree vigorous, a regular and productive bearer, hardy. Fruit midseason; 2 inches in diameter, round-oblong or round-oblate, sides compressed; suture well marked, deep at cavity; apex rounded; color golden-orange with a deep red blush; pubescence short, fine, obscure; stem very short; skin thin, tender, free; flesh deep yellow or orange, juicy, mild, sweet but not rich; stone of medium size, flat, ovate, free or clinging somewhat; pervious channel; kernel bitter.

494. Large Early Montgamet.—This is probably a European sort renamed. It is offered for sale by California nurserymen and is to be found occasionally in eastern America.

Fruit early; large, 2 inches or more in diameter, round-oval, sides compressed, irregular, ribbed, truncate; cavity large and deep; suture distinct, dividing a prominent swollen ridge; color rich yellow or orange, mottled or blushed with red; flesh deep yellow, juicy, firm, sweet, rich; quality very good; stone large, free, nearly as broad as long, thick, rough, very dark in color; kernel sweet.

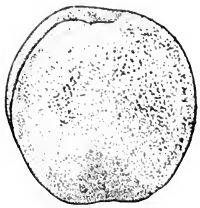

FIG. 143. Large Early.

495. Large Early (Fig. 143).—This is an especially valuable variety because of the earliness, large size, attractive appearance, and high quality of its fruits. The variety is a favorite in nearly all apricot-growing regions. A fault is that the tree is sometimes an uncertain bearer. Large Early is an old French variety.

Tree vigorous, spreading, hardy, productive but sometimes uncertain in bearing. Leaf large, broader than long; margin coarsely serrate; petiole ¾ inch long, with 1 to several globose glands. Flowers white, often with 6 petals. Fruit very early; nearly 2 inches in diameter, oblong-oval, compressed, often oblique; suture well marked; apex terminating in a sharp point; color light orange, darker orange next to the sun with some red; fine obscure pubescence; flesh orange, firm, juicy, sweet, rich; very good to best; stone free, oval, flat with sharp point; kernel bitter.

496. St. Ambroise (Fig. 144).—The tree of St. Ambroise is accredited as being most productive and very good in other characters as well, but the fruits are a little coarse, lacking in richness of flavor, and not well adapted for either canning or drying, although they ship well in the fresh state. St. Ambroise is an old European variety.

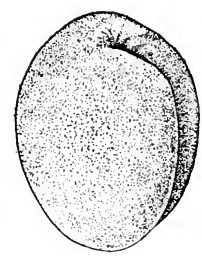

FIG. 144. St. Ambroise.

Tree vigorous, hardy, healthy, very productive. Fruit early; large, more than 2 inches in diameter, oblong-elliptical, sides compressed, suture side swollen, ribbed at base; suture distinct; color deep rich yellow, blushed next the sun; a few reddish dots; flesh rich yellow, firm, a little stringy, melting, juicy, perfumed; very good in quality; stone free, very large, rough, elliptical, flat, winged.

CHAPTER XXIV

VARIETIES OF CHERRIES

THE cherry, of all hardy fruits, excepting, perhaps, the Insititia plums, is most fixed in its characters: as a consequence, the differences between tree and fruit in the varieties are less marked, and sorts come more nearly true to seed. In spite of these facts, there are a great number of varieties,—the author described 1145 in *The Cherries of New York*. The cherries included in this chapter are now under common cultivation.

INDEX TO VARIETIES OF CHERRIES

KEY TO VARIETIES OF CHERRIES

A. Cherries sweet.
  B. Flesh firm (Bigarreaus)
    C. Skin and flesh light-colored (Light Bigarreaus)
      D. Shape long-cordate, longer than wide; reddish at pit ..... 497. Napoleon.
      DD. Shape short-cordate, shorter than wide; flesh not red at the pit ..... 498. Yellow Spanish.
    CC. Skin and flesh dark-colored (Dark Bigarreaus)

D. Shape long-cordate.
E. Fruit midseason; stone oblique..... 499. Schmidt.
EE. Fruit late; stone symmetrical..... 500. Windsor.
DD. Shape round-cordate.
E. Stem short and stout.
F. Suture a groove; late; stone small, ovate ..... 501. Republican.
FF. Suture a line; midseason; stone large, oval ..... 502. Bing.
EE. Stem long and slender; stone large, oblique ..... 503. Lambert.
BB. Flesh soft (Hearts, Geans, or Guignes)
C. Skin and flesh light-colored (Light Hearts)
D. Fruit long-cordate, pointed; bright red tinged with amber ..... 504. Elton.
DD. Fruit round-cordate, blunt; light red; not tinged with amber.
E. Stem long, slender.
F. Size of fruit medium; early..... 505. Ida.
FF. Size of fruit large; midseason.. 506. Wood.
EE. Stem medium, stout; early..... 507. Coe.
CC. Skin and flesh dark in color. (Dark Hearts)
D. Fruit round-cordate.
E. Ventral suture of stone flat with central groove ..... 508. Knight Early Black.
EE. Ventral suture of stone raised with central ridge ..... 509. Black Eagle.
DD. Fruit long-cordate.
E. Stem very long; stone broadly oval, symmetrical ..... 510. Early Purple Guigne.
EE. Stem medium; stone ovate, oblique. 511. Black Tartarian.
AA. Cherries sour.
B. Flesh and juice light-colored. (Amarelles)
C. Skin dark red, fruit small, early..... 512. Early Richmond.
CC. Skin light red; fruit medium to large, midseason.
D. Fruit medium in size, borne in pairs, globose ..... 513. Montmorency.
DD. Fruit large, borne singly, round oblate ..... 514. Large Montmorency.
BB. Flesh and juice dark-colored (Morellos or Griottes)
C. Stem short; suture a well-marked groove. 515. English Morello.
CC. Stem very long; suture scarcely distinct ..... 516. Brusseler Braune.
AAA. Cherries mildly acid (Duke or Hybrid cherries)
B. Flesh red with colored juice.
C. Fruit small, ¾ inch in diameter.

D. Flesh dark red; stone free, round; early ..... 517. May Duke.
DD. Flesh pale red; stone clinging, ovate, oblique ..... 518. Empress Eugenie.
CC. Fruit large, 1 inch in diameter; flesh light red; stone free, ovate; midseason... 519. Louis Philippe.
BB. Flesh yellowish or amber.
C. Fruit small, early; flesh and juice tinged with red ..... 520. Royal Duke.
CC. Fruit large, midseason or late; flesh not tinged red.
D. Shape oblong-conic, amber red, midseason; flesh pale yellow ..... 521. Reine Hortense.
DD. Shape round-cordate, dark red, very late; flesh amber ..... 522. Late Duke.

DIVISION A. SWEET CHERRIES

SECTION I. FIRM-FLESHED CHERRIES (BIGARREAUS)

Group 1. Light-colored Bigarreaus

497. Napoleon (Fig. 145). *Royal Ann.*—Napoleon is the leading firm-fleshed sweet cherry, by virtue of the large size, handsome appearance, and high quality of the fruit, and the phenomenal productiveness of the trees. The rich sweet flavor, with abundant juice and firm crackling flesh, makes this a most delicious cherry for dessert, and, with the great size and attractive color, give it preference over all other sweet cherries for canning. The trees come in bearing early, and are vigorous, hardy, and healthy. They may be known by their upright growth and large sturdy limbs. Napoleon is not, however, without its faults. The cherries crack badly in wet weather and the tree is fastidious as to soils. Early in the eighteenth century Napoleon was grown by Germans, French, Dutch and English,—proof that it is a very old variety. It has been in America for at least a century.

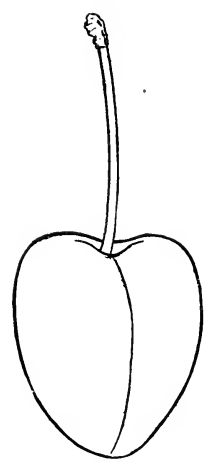

FIG. 145. Napoleon.

Tree large, vigorous, upright-spreading, open-topped, very productive. Fruit midseason; over one inch in diameter, long-cordate, compressed; cavity deep, wide, flaring; suture a distinct line; apex much pointed; color varying shades of bright red over a yellowish background, mottled; dots obscure; stem slender, more than one inch long, adherent to the fruit; skin thin, adherent; flesh white with a faint yellow tinge, with colorless juice, tender, meaty, crisp, mild, sweet; good to very good in quality; stone semi-clinging, small, ovate, flattened, pointed, with smooth surfaces.

498. Yellow Spanish (Fig. 146).—For centuries Yellow Spanish was the best of all the Bigarreaus, and it is only in recent years that it has had rivals. The trees are the largest of all the varieties of sweet cherries, and have an upright-spreading top, which gives a large bearing surface and forms a canopy of excellent foliage; they are vigorous, bear abundantly and regularly, and come in bearing young, with the crop well distributed. The cherries do not come up to the trees in points of superiority; they are smaller than those of Napoleon, and are more subject to attacks of brown-rot. In fruit Yellow Spanish is rather the handsomer of the two cherries; in quality it is the better of the two, having tenderer flesh and a sweeter and richer flavor. Yellow Spanish is so old and so widely disseminated that its origin can only be conjectured. The variety was imported to America from London by the Princes, Flushing, Long Island, in the year 1802.

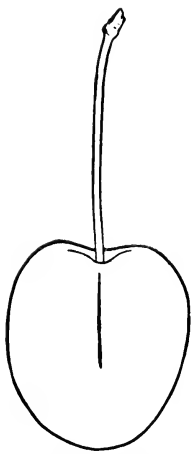

FIG. 146. Yellow Spanish.

Tree very large and vigorous, upright-spreading, open-topped, productive. Fruit midseason; 1 inch or over in diameter, cordate, compressed; cavity deep, wide, flaring; suture a mere line, apex rounded; color bright amber-yellow with a reddish blush, slightly mottled; dots numerous, small, light russet, obscure; stem 1½ inches long, adherent to the fruit; skin thin, tough, separating from the pulp; flesh white, with colorless juice, tender, meaty, crisp, aromatic, sprightly, sweet; very good to best in quality; stone free, ovate, flattened, oblique, with smooth surfaces.

Group 2. Dark-colored Bigarreaus

499. Schmidt (Fig. 147). *Schmidt's Bigarreau.* — The characters which entitle Schmidt to a high place in the cherry list are: the fruits are large, being unsurpassed in size by any other black cherry; they are glossy black in color; the flesh is dark ruby-red under the skin, which makes the cherry as pleasing inwardly as outwardly; and they are free from brown-rot, in this respect excelling any other market sort. The trees are vigorous, healthy, productive, and characterized by abundant large leaves of dark luxuriant green. Schmidt originated with Herr Schmidt, Casekow, Prussia, about 1841. It eventually found its way to America, but when and how is not known.

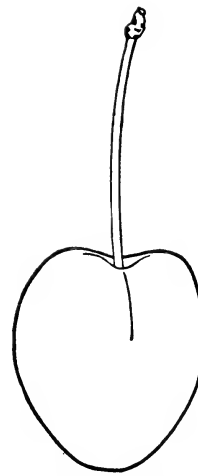

FIG. 147. Schmidt.

Tree large, vigorous, upright-spreading, open-topped and productive. Leaves obovate; margin serrate, glandular. Fruit midseason, one inch in diameter, long-cordate, compressed, often oblique; cavity deep, wide, flaring; suture indistinct; apex bluntly pointed; color purplish-black; dots numerous, small, dark russet, obscure; stem slender, 1½ inches long; strongly adherent to the fruit; skin tough, separating from the pulp; flesh purplish-red, with dark colored juice, crisp, firm, mild, sweet; of good quality; stone semi-clinging, ovate, oblique, with smooth surfaces.

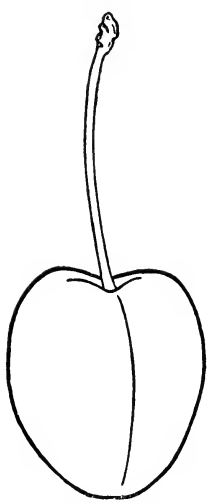

FIG. 148. Windsor.

500. Windsor (Fig. 148) is the standard late Bigarreau. The fruits are firm and stand harvesting and shipping well; and at a season of the year when brown-rot is usually rife, Windsor is fairly free from this scourge of the sweet cherry. The quality is good, equalled but not surpassed by others of its class. The trees have the reputation of being the hardiest of the Bigarreaus, of thriving in many soils and of being fruitful, but to offset these merits, they do not come

into bearing early; are tall and upright in growth, being almost fastigiate, so that it is difficult to harvest the crop; and the load of fruit is not well distributed. Windsor originated on the farm of James Dougall, Windsor, Ontario, and was introduced to fruit-growers in 1881.

Tree large, vigorous, upright-spreading, open-topped, very productive. Fruit late midseason; one inch in diameter, oblong to conical, compressed; cavity deep, wide, flaring; suture a line; apex rounded; color very dark red becoming almost black; dots numerous, small, russet, obscure; stem slender, 1¼ inches long, adherent to the fruit; skin thin, adhering to the pulp; flesh light red, with reddish juice, tender, crisp, mild, sweet; good to very good in quality; stone semi-free, ovate, flattened, blunt pointed, with smooth surfaces.

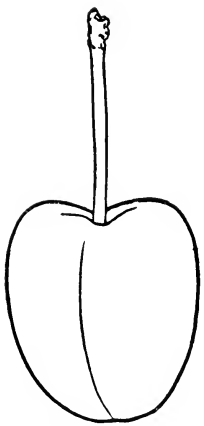

FIG. 149. Republican.

501. Republican (Fig. 149). *Black Republican.*—The cherries are rich in flavor, firm of flesh, and have an abundance of refreshing juice, a pleasing rotundity of shape, and a beautiful dark red, almost black, glossy color. In size of fruit, the variety often falls short. The trees are large, spreading, and vigorous, but are susceptible to the shot-hole fungus and exceedingly capricious as to soils. The cherry is, at most, of only local value. This variety originated about the middle of the nineteenth century in the orchard of Seth Lewelling, Milwaukee, Oregon.

Tree large, vigorous, open-topped, very productive. Fruit late; one inch in diameter, wide, variable in shape, cordate or round-cordate, compressed, with angular and uneven surfaces; cavity deep, wide, flaring; suture a shallow groove, often extending around the fruit; apex with a depression at the center; color purplish-black; dots numerous, small, dark russet; stem thick, 1⅛ inches long, adherent to the fruit; skin thin; flesh purplish-red, with dark colored juice, tender, crisp, mild, sweet or with slight astringency; of good quality; stone semi-free, small, ovate, flattened, blunt, with smooth surfaces.

502. Bing (Fig. 150).—The fruits are almost unequalled in size, attractiveness, and quality. Other characters commending the variety are that the crop hangs well on the trees and ripens

at one time, so that the harvest consists of one picking. The trees are not so vigorous, healthy, or productive as they should be in a commercial variety of first rank. Seth Lewelling, Milwaukee, Oregon, grew Bing from the seed of Republican in 1875.

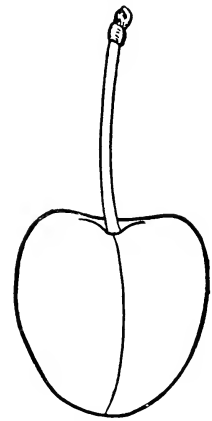

FIG. 150. Bing.

Tree large, vigorous, erect, upright-spreading, open, productive. Fruit midseason or later; 1 inch in diameter, round-cordate, somewhat compressed, slightly angular; cavity deep, of medium width, abrupt, regular; suture a dark line; apex rounded or slightly depressed; color very dark red, almost black; dots small, russet, inconspicuous; stem 1¼ inches long; skin tough, adherent to the pulp; flesh purplish-red with dark purple juice, rather coarse, firm, brittle, sweet; of very good quality; stone semi-free, large, oval, blunt, with smooth surfaces.

503. Lambert (Fig. 151).—In appearance, the fruits of Lambert are like those of Black Heart, having much the same shape and color, but are larger, more rotund, smoother, and brighter. The flesh is purplish-red marbled with lighter red, firm, meaty, and juicy, with a sweet rich flavor. The tree is strong, vigorous, healthy, and usually fruitful and regular in bearing. The fruit sets in large loose clusters, often a dozen to the fruit-spur. Lambert originated as a seedling under a Napoleon tree, about 1848, in the orchard of J. H. Lambert, Milwaukee, Oregon.

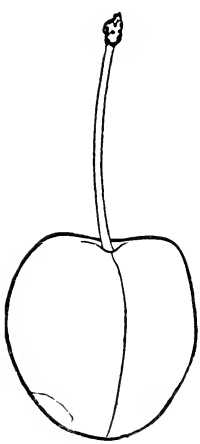

FIG. 151. Lambert.

Tree medium to large in size and vigor, upright-spreading, very productive. Fruit midseason; 1 inch in diameter, round-cordate, compressed; cavity deep, flaring; suture shallow, often a mere line; apex rounded, depressed at the center; color very dark red changing to reddish-black; dots numerous, small, russet, obscure; stem tinged with red, slender, 1¼ inches long, adherent to the fruit; skin thin, adhering to the pulp; flesh dark red, with scant dark red juice, firm, pleasantly flavored, sweet, rich, and refreshing; of very good quality; stone clinging, large, wide, ovate, flattened, blunt, oblique, with smooth surfaces.

Section II. Flesh Soft (Hearts)

Group 3. Light-colored Hearts

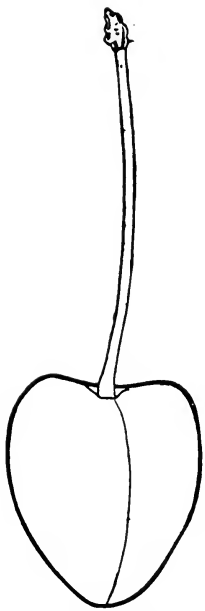

Fig. 152. Elton.

504. Elton (Fig. 152) is distinguished by the form, color, flesh, and flavor of its fruit. The cherries are oblong-heart-shaped; the color is dark red, mottled with amber, very bright, clear, and glossy; the flavor is peculiarly rich and luscious. The trees may be recognized readily by the unusually dark red color of the petioles of the leaves. Brown-rot, the scourge of the sweet cherry, attacks this variety more aggressively than almost any other sort and for this reason Elton must remain a variety for the home orchard. This is a cherry from Thomas Andrew Knight, who fruited it first about 1806. It was brought to America in 1823.

Tree large, vigorous, upright-spreading, open-topped, very productive. Fruit early; about 1 inch long, ¾ inch wide, cordate, conical, somewhat compressed and oblique; cavity abrupt, regular; suture indistinct; apex distinctly pointed; color dark red with an amber tinge, faintly mottled; dots numerous, small, light yellow, obscure; stem slender, 1¾ inches long, skin thin, tender, separating from the pulp, flesh white with a tinge of yellow, with colorless juice, slightly stringy, tender, very mild, sweet; of good quality; stone free, long-ovate, flattened, with smooth surfaces.

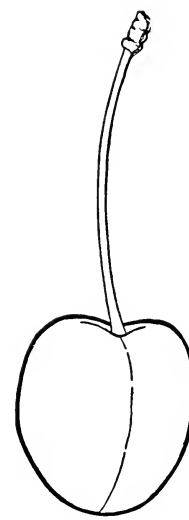

Fig. 153. Ida.

505. Ida (Fig. 153) is a general favorite in home orchards. It can never take a high place among commercial kinds, because the cherries are too soft to handle well, show bruises plainly, are susceptible to brown-rot, and come when good cherries are plentiful. The trees are vigorous and hardy, and bear

full crops regularly and in various environments. The variety is readily recognized by the upright habit of growth and by the large lenticels on the trunk and branches. E. H. Cocklin, Shepherdstown, Pennsylvania, grew this variety about 1870.

Tree large, vigorous, upright, open-topped, vasiform, very productive. Leaves obovate, thin; margin doubly crenate. Fruit early; ¾ inch in diameter, cordate, slightly compressed, cavity deep, flaring, regular; suture a distinct line; color amber overspread with light red, mottled; dots numerous, large, yellowish, conspicuous; stem 1½ inches long; skin thin, separating readily from the pulp; flesh white, with colorless juice, tender and melting, mild, sweet; of good quality; stone free or semi-free, round, flattened, blunt, with smooth surfaces.

506. Wood (Fig. 154). *Governor Wood.*—Wood is preeminently a sweet cherry for the amateur. The trees are tender to cold, are not quite productive enough to make the variety profitable and are somewhat fastidious as to soils, but to offset these defects, they are vigorous and healthy and bear early. The cherries will not stand handling in harvesting and shipping, and are very susceptible to brown-rot. The flesh separates readily from the skin, is tender, juicy, with an abundance of colorless juice, and a flavor that has given it the reputation of being one of the best in quality. Wood was raised by J. P. Kirkland in 1842, at Cleveland.

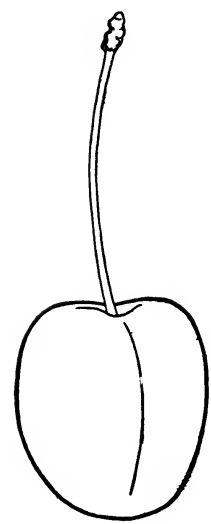

FIG. 154. Wood.

Tree vigorous, upright-spreading, open, productive. Fruit early midseason, 1 inch in diameter, roundish-cordate, compressed; cavity wide, flaring; suture distinct, wide; apex roundish; color crimson on a yellowish-white background; dots numerous, small, light russet, conspicuous; stem slender, 1½ inches long, adhering well to the fruit; skin thin, tender, separating from the pulp, flesh whitish, juice colorless, tender, mild, sweet; very good; stone clinging, large, roundish, blunt, with smooth surfaces, with a broad ventral suture.

507. Coe (Fig. 155). *Coe's Transparent.*—Coe is the first of the light-colored cherries to ripen, and is an excellent fruit in quality and appearance. The tree characters are in the

main very good. The variety can be distinguished by the large spreading tree; by hardiness, vigor, healthfulness, and fruitfulness. Curtis Coe, Middletown, Connecticut, grew this variety early in the nineteenth century from a pit of Ox Heart.

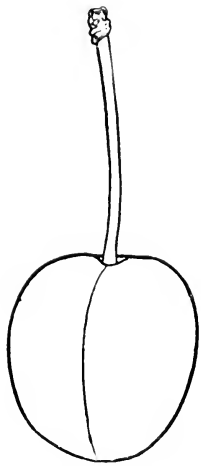

Fig. 155. Coe.

Tree large, vigorous, upright-spreading, open, very productive. Leaves numerous, 4¼ inches long, 2¼ inches wide; margin coarsely serrate, with small black glands; petiole 1¾ inches long, grooved, hairy, with 2-3 large, reniform, greenish-yellow or reddish glands. Flowers midseason, 1¼ inches across, white; borne in dense clusters, in twos and threes. Fruit early; 1 inch in diameter, round cordate, compressed; cavity regular, abrupt; suture indistinct; apex blunt-pointed or slightly depressed; color pale amber faintly mottled with red; dots small, light yellow, inconspicuous; stem slender, 1¼ inches long, adherent to the pulp; flesh pale yellow, with colorless juice, tender, meaty, mild, sweet; good to very good in quality; stone semi-free or free, flattened, blunt, with smooth surfaces.

Group 4. Dark-colored Hearts

508. Knight Early Black (Fig. 156).— Possibly Knight Early Black is found in home gardens in eastern United States as often as any other sweet cherry. The characters which give it popularity are chiefly those of its fruits, which are excellent in quality and handsome in appearance. The cherries are of a glossy dark purple color, and are uniform in color, shape, and size. Knight, in size, color and flavor of fruit is much like Black Tartarian, but the cherries are smaller and ripen earlier. The trees are about all that could be desired in a sweet cherry; these are characteristically marked by smooth bark dotted with large lenticels. Knight came from T. A. Knight, Downton Castle, Wiltshire, England, about 1810.

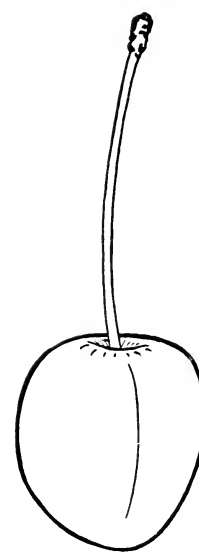

Fig. 156. Knight Early Black.

Tree of medium size, upright-spreading, open-topped, very productive. Fruit early; ¾ inch in diameter; cavity wide, rather abrupt; suture indistinct, apex flattened, with a small depression at the center; color dark reddish-black, obscurely mottled; dots numerous, small, russet, obscure; stem slender, 1½ inches long, adhering well to the fruit; skin thin, tender, separating from the pulp; flesh dark red, with dark-colored juice, tender, meaty, mild, sweet; of good quality; stone free, small, round-ovate, with smooth surfaces.

509. Black Eagle.—In many respects Black Eagle is one of the best varieties of its species. The trees are usually fruitful; ripen their fruit at a good time in the cherry season, and are as hardy, healthy, and vigorous as those of any sweet cherry. It is high quality of fruit that gives Black Eagle such merit that it ought not to be forgotten. The fruit-stems of this variety are characteristically long. Black Eagle was grown about 1806 by Thomas Andrew Knight, Downton Castle, Wiltshire, England.

Tree large, vigorous, upright-spreading, dense, unproductive at first, but improving with age. Fruit midseason; 1 inch in diameter, oblate, round-cordate, compressed; cavity regular, flaring; suture a faint groove; apex pointed or slightly depressed; color dark red almost black; dots small, russet, medium in number, obscure; stem slender, 2 inches long; skin thin, tender; flesh dark red, with wine-colored juice, meaty, tender, crisp, pleasantly flavored, mild sweet; very good to best in quality; stone free except along the ventral suture, small, ovate, slightly flattened, blunt, with smooth surfaces.

510. Early Purple Guigne (Fig. 157) is a valuable cherry on account of the earliness, attractiveness, and high quality of its fruits. The trees bear well and regularly after having become established in the orchard, but are poor growers in the nursery. Early Purple Guigne is the Early Purple of Ray in 1688. The variety was brought to America over a hundred years ago.

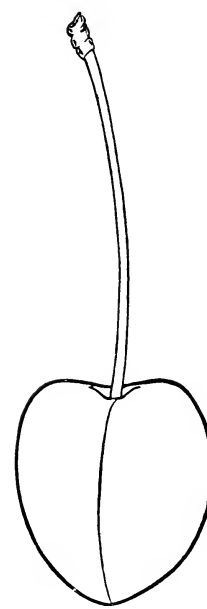

FIG. 157. Early Purple Guigne.

Tree large, vigorous, upright-spreading, open-topped, very productive. Fruit very early; 1 inch in diameter, long-cordate, compressed; cavity regular; suture a faint line; apex pointed; color purplish-black; dots num-

erous, small, grayish, obscure; stem tinged with red, slender, 2 inches long, adhering to the fruit; skin thin, tender, separating readily from the pulp; flesh dark reddish-purple, with dark colored juice, tender, melting, mild, sweet; of very good quality; stone free, large, broadly oval, compressed near the apex, with smooth surfaces.

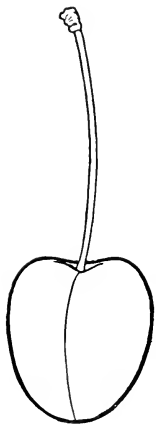

FIG. 158. Black Tartarian.

511. Black Tartarian (Fig. 158) is a favorite dooryard and roadside sweet cherry. The meritorious characters which give it high place in cherry culture are: the elasticity of its constitution, whereby it adapts itself to widely different soils and climates; the fruitfulness, healthfulness, and robustness of the trees, which also bear regularly, live to an old age, and grow to a prodigious size; comparative freedom from brown-rot; lastly, the cherries though not large, are tempting to the eye, and are a delight to the palate, the handsome purplish-red flesh being firm and crisp, yet juicy, with a sweet rich flavor. Black Tartarian was introduced into England in 1794 from Circassia.

Tree characteristically large, vigorous, upright, vasiform, productive. Fruit early; 1 inch in diameter, long-cordate, compressed; cavity intermediate in depth and width, flaring; suture indistinct; apex pointed and slightly depressed; color purplish-black; dots numerous, small, russet, obscure; stem slender, 1½ inches long, adherent to the fruit; skin thin, separating readily from the pulp; flesh purplish-red with dark colored juice, firm, meaty, crisp, pleasant flavored, mild, sweet; of very good quality; stone free, ovate, slightly flattened and oblique, with smooth surfaces.

DIVISION B. SOUR CHERRIES

SECTION III. FLESH LIGHT COLORED (AMARELLES)

Group 5. Dark-skinned Amarelles

512. Early Richmond (Fig. 159) has long been the leading sour cherry of its season. It is not a remarkable variety in its fruit characters, for the cherries are only medium in size, mediocre in quality, and not handsomer than those of other

PLATE XVII. An Æstivalis grape—Delaware.

Amarelles with which it belongs. The tree thrives in varied soils and climates from the St. Lawrence to the Carolinas and from the Atlantic to the Pacific—everywhere vigorous, healthy, and fruitful. This variety was early brought to America, where it became known as Early Richmond, as the first trees were grown at Richmond, Virginia.

Tree of moderate size, vigorous, upright-spreading, dense, round-topped. Fruit early; ¾ inch in diameter, round-oblate, compressed; cavity abrupt, regular; suture indistinct; apex flattened; color dark red; dots numerous, small, russet; stem slender, 1 inch long, adherent to the fruit; skin thin, tough, separating from the pulp; flesh pale yellow, with light pink juice, stringy, tender and melting, sprightly; good to very good in quality; stone free, small, round-ovate, pointed, with smooth surfaces.

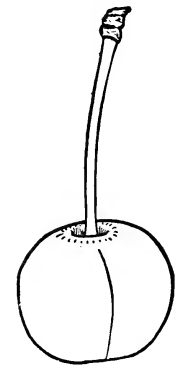

FIG. 159. Early Richmond.

Group 6. Light-skinned Amarelles

513. Montmorency (Fig. 160) is the most popular sour cherry grown in America. It is surpassed by no other in vigor, health, and productiveness of tree. No other sour cherry is adapted to a greater diversity of soils than Montmorency, which fact, with its capacity to stand heat and cold, makes it suitable to wide variations in environment. The fruit has the advantage of being presentable in appearance and fit for culinary purposes several days before it is fully ripe, and this adds to the value of the variety for market. Montmorency falls short in the size of the tree, which is seldom more than medium, but the head is spreading and much branched, and the fruit is borne in clusters thickly, so that the total yield from a tree is greater than would be thought. The variety originated in Montmorency Valley, France, several centuries ago. It has been cultivated in America under various names for at least a century.

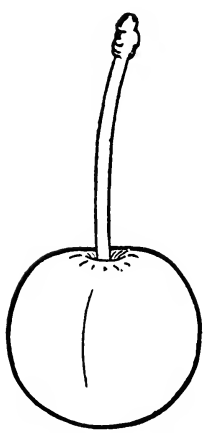

FIG. 160. Montmorency.

Tree large, vigorous, upright-spreading, round-topped, productive. Fruit midseason; ¾ inch in diameter, round-oblate, slightly compressed; cavity abrupt; suture very shallow; apex rounded; color light to rather dark red; dots numerous, small, russet, inconspicuous; stem thick, usually with a faint tinge of red, 1 inch long, adhering well to the fruit; skin thin, tender, separating from the pulp; flesh pale yellow, with a reddish tinge, with abundant light pink juice, tender and melting, sprightly, tart; of very good quality; stone free, small, round-ovate, flattened, pointed, with smooth surfaces which are tinged with red.

514. Large Montmorency (Fig. 161) is easily distinguished by several marked characters from the common Montmorency, with which it is often confused. Its fruits are more often borne singly, are larger, have a shorter, thicker stem, are more oblate, and ripen a little earlier. The trees are more upright, with stouter branches, and are far less fruitful. The flesh characters of the two kinds are much the same; the flavor in both is particularly refreshing to those who like the acidity of the sour cherry. Large Montmorency came to America from England early in the nineteenth century.

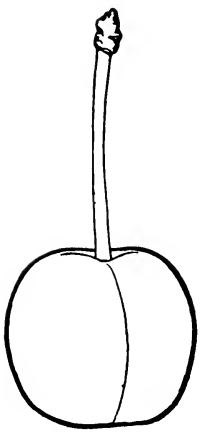

FIG. 161. Large Montmorency.

Tree large, vigorous, upright, vasiform, unproductive. Fruit midseason; ¾ inch in diameter, oblate, compressed; cavity wide, flaring; suture shallow; apex flattened or depressed; color dark red; dots numerous, small, conspicuous; stem thick, 1 inch long, adhering to the fruit; skin thick, separating from the pulp; flesh white, showing distinctly the fibers in the pulp, with abundant colorless juice, tender and melting, sprightly, pleasantly flavored, tart; of very good quality; stone free, round, plump, with smooth surfaces, tinged with red.

SECTION IV. FLESH DARK COLORED (MORELLOS)

Group 7. Short-stemmed Morellos

515. English Morello (Fig. 162) is the standard late sour cherry in North America. The cherries are handsome in appearance, bear harvesting and shipping well, are resistant to brown-rot, and hang long on the trees. The trees are hardy

but not always healthy, and are not adapted to a great diversity of soils. The variety probably originated in Holland or Germany, whence it was introduced into England and later into America. Wragg is thought by some to be identical with this cherry, and if not, it differs but little.

Tree small, upright-spreading, with drooping branches, dense-topped. Fruit very late; about ¾ inch in diameter, round-cordate, compressed; cavity shallow, narrow, flaring, regular, suture a shallow groove; apex rounded, with a small depression at the center; color dark red becoming almost black; dots numerous, small, dark russet, conspicuous; stem slender, 1 inch long, adhering well to the fruit; skin thin, tender, separating from the pulp; flesh dark red, with dark colored juice, tender and melting, sprightly, tart; of good quality; stone free, small, ovate, flattened and pointed, with smooth surfaces, tinged with red.

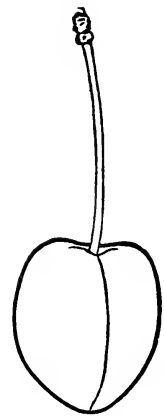

FIG. 162. English Morello.

Group 8. Long-stemmed Morellos

516. Brusseler Braune (Fig. 163) has little value for commercial planting. The trees are uncertain in bearing; the cherries are small, sour, and astringent; and the crop ripens very unevenly. It is of the English Morello type but is far inferior to this well-known sort. The variety has two marked peculiarities: the leaves on the two-year-old wood are very small, and the fruit stems bear a small leaflet at their bases. No doubt Brusseler Braune originated more than a hundred years ago in Holland.

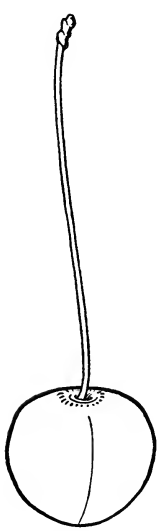

FIG. 163. Brusseler Braune.

Tree of medium size, vigorous, upright-spreading, but with drooping branchlets, dense, round-topped, unproductive. Fruit very late, 1 inch in diameter, variable in size, round-cordate, compressed; cavity of medium depth, narrow, abrupt; suture very shallow, indistinct; apex rounded, with a small depression at the center; color dark red; dots numerous, small, dark russet, inconspicuous; stem 2½ inches long, with small leaflet at the base, strongly adherent to the fruit; skin thin, tender, separates readily from the pulp; flesh dark red,

with dark-colored juice, tender and melting, somewhat astringent; sour; of fair quality; stone free, round oval, plump, blunt-pointed; surfaces smooth.

DIVISION C. MILDLY ACID CHERRIES (DUKES)

SECTION IV. RED-FLECKED CHERRIES

Group 9. Small Dukes

517. May Duke (Fig. 164) is one of the oldest and most popular cherries; the fruit is finely flavored, especially when prepared for the table, and even before ripe; it is also delicious to eat out of hand if the cherries are dead ripe; and it may be left to hang for a month or six weeks, becoming daily sweeter and more aromatic. Despite tender flesh, the fruits ship well, although grown only for local markets, since the long period of ripening makes necessary several pickings. The trees are as fruitful as any; are hardy, vigorous, and healthy; and few cherries thrive in greater variations of soil and climate. The fruit is well distributed in dense clusters on trees characteristically upright and vasiform, which bear a dense canopy of dark-green luxuriant foliage. May Duke is supposed to have originated in a district in France known as Médoc, and the name to have been derived by the English from the place.

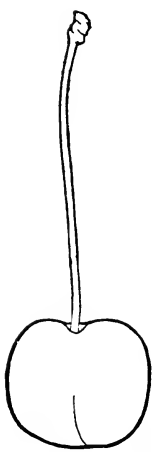

FIG. 164. May Duke.

Tree large, upright, vasiform, very productive. Fruit early; ¾ inch in diameter, cordate to conical, compressed; cavity abrupt, regular; suture indistinct; apex rounded with a small depression at the center; color dark red; dots numerous, russet, obscure; stem slender, 1½ inches long, adhering strongly to the fruit; skin thin, tender, separating from the pulp; flesh dark red with pinkish juice, tender and melting, sprightly, subacid, pleasantly flavored; of very good quality; stone nearly free, small, round, with smooth surfaces.

518. Empress Eugenie (Fig. 165).—This old French cherry does not thrive in the new world as well as could be wished,

yet is worth planting. The two faults that condemn it are: the cherries ripen very unevenly, and the trees are so small that, though loaded with fruit, the total yield is not large. The short stem also prevents easy picking. The cherries are of the best. This variety appeared in 1845 as a chance seedling near Paris, France.

Tree small, not very vigorous, upright, becoming round-topped, very productive. Flowers midseason, 1¼ inches across, white; borne in very dense clusters in threes and fours. Fruit midseason; ¾ inch in diameter, round-conic to oblate-conic; compressed; cavity narrow; suture very shallow, indistinct; apex flattened or depressed; color dark red; dots numerous, small, dark russet, obscure; stem 1¼ inches long, adherent to the fruit; skin tough, separating from the pulp, flesh pale red with pink juice, tender, meaty, sprightly, pleasantly flavored, tart; of good quality; with smooth surfaces.

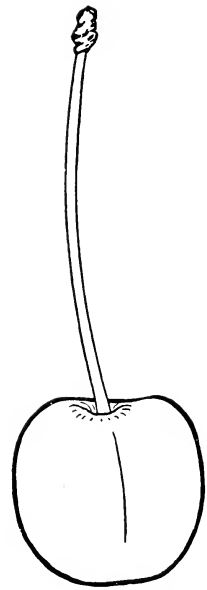

FIG. 165. Empress Eugenie.

Group 10. Large Dukes

519. Louis Philippe (Fig. 166).—Some writers call Louis Philippe a Duke, while others place it with the Morellos. The fruit shows many characteristics of the Morellos, but the tree appears to be a Duke, so that it is probably a hybrid between the two groups. The fruit is large, globular, deep red, glossy, with a rich, vinous, subacid flavor; eaten out of hand it would be rated as a very good Morello or a somewhat mediocre Duke. It is one of the earliest of the Morello-like cherries, and this advantage may give it a place in the cherry flora of the country. The trees are large and vigorous, and their much-branched round tops would seem to give the maximum amount of bearing surface, but the cherries do not set abun-

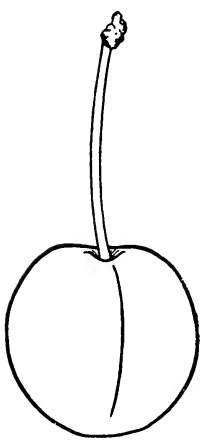

FIG. 166. Louis Philippe.

dantly. Elliott, the American pomologist, imported Louis Philippe from France in 1846.

Tree vigorous, upright-spreading, open-topped. Fruit midseason or later, 1 inch in diameter, round-ovate; cavity abrupt; suture very shallow to a mere line; apex flattened, depressed; color very dark red; dots numerous, unusually small, obscure; stem 1¼-1½ inches long, adhering to the fruit; flesh light red, with much wine-colored juice, fine-grained, tender and melting, sour at first, becoming pleasantly tart at full maturity; good in quality; stone separates readily from the flesh, small, round-ovate, plump.

Section V. Yellow-fleshed Dukes

Group 11. Small Dukes

520. Royal Duke (Fig. 167) has a place in the cherry orchard to follow May Duke, and to precede Late Duke. It is so nearly like these two sorts, except in season, that there is much difficulty in getting the variety true to name. Royal Duke differs from May Duke in being a little later in season, while the cherries are larger, lighter in color, and do not hang so thickly, but are scattered along the branches, often singly, and are more oblate. The trees are markedly upright and the foliage is dense. The origin of this variety is unknown, but it dates back at least a century and a half in Europe; it was brought to America in the first half of the nineteenth century.

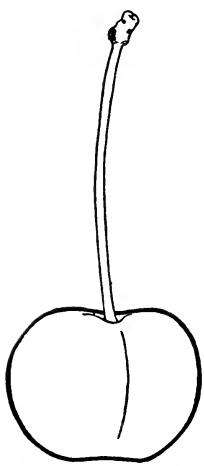

Fig. 167. Royal Duke.

Tree of medium size, vigorous, upright, vasiform, unproductive. Fruit early; ¾ inch in diameter, oblate, compressed; color bright red becoming darker at maturity; dots few, small, obscure; stem 1½ inches long, adhering to the fruit; skin thin, tough, separating from the pulp; flesh pale yellowish-white with tinge of red, pink juice, tender, sprightly, pleasantly acid; good to very good in quality; stone semi-free, small, ovate, slightly flattened, with smooth surfaces.

Group 12. Large Dukes

521. Reine Hortense (Fig. 168) takes high rank among hybrid cherries. The fruit is excellent in quality, its flavor being a commingling of the refreshing acidity of the sour cherry and the richness of the sweet cherry. The fruits are also handsome, being large, round, bright glossy red, with a shade of amber, and very uniform in size, color, and shape. The chief faults of the variety are in the trees, which are of medium size, not productive, and at their best only in choice cherry soils. M. Larose of Neuilly-sur-Seine, France, grew the original tree early in the nineteenth century. It was brought to America about 1850.

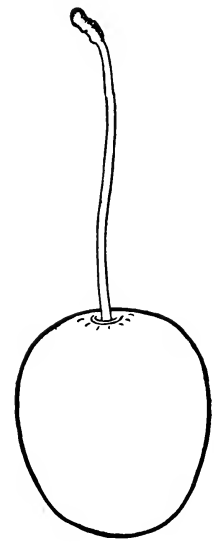

FIG. 168. Reine Hortense.

Tree of medium size, upright-spreading, unproductive. Fruit midseason, 1 inch in diameter, oblong-conic, compressed; cavity shallow, narrow, abrupt, often lipped; suture indistinct; apex rounded with a small depression at the center; color amber-red; dots numerous, light russet, conspicuous; stem tortuous, slender, 1½ inches long, adherent to the fruit; skin tender, separating from the pulp; flesh pale yellow, with colorless juice, tender and melting, sprightly subacid; of very good quality; stone free, large, oval, flattened, blunt, with smooth surfaces.

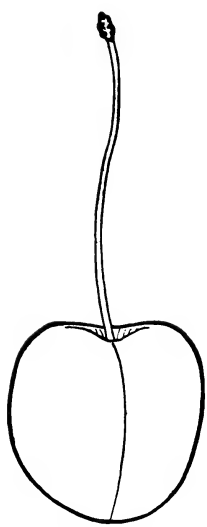

FIG. 169. Late Duke.

522. Late Duke (Fig. 169) is a variant of the well-known May Duke, ripening from two weeks to a month later. The cherries are not quite so sweet as those of May Duke, a little more marbled in color or skin, and ripen through a longer season. The trees are readily distinguished from those of the earlier Duke, being more open and spreading, scanter of foliage, with more slender branches and fruit more thickly clustered

along the branchlets. The tree is hardy and its blossoming-time is late, so the variety is well adapted to northern latitudes. Late Duke has been cultivated in Europe for more than a century, and has been in America nearly that length of time.

Tree vigorous, upright-spreading, open-topped, productive. Fruit very late; 1 inch in diameter, blunt-cordate, compressed; cavity wide; suture shallow; color dark red; stem slender, 1½ to 2 inches long, deeply inserted; flesh amber-colored, with abundant juice, tender, rich, sprightly subacid; stone semi-clinging, medium to large, round-ovate, compressed.

CHAPTER XXV

VARIETIES OF NECTARINES

THE nectarine is not an orchard fruit of importance in any part of North America excepting California, and in that state is of minor consequence. The lack of cultivation is due not to inferiority in the product, but to the fact that nectarines are not profitable because the fruits are too delicate to meet the demands of commerce, bruising and decaying before the crop can be put in the hands of consumers. It is, however, an excellent fruit for the home orchard in any climate on any soil where the peach thrives. For these reasons, there has been small demand for new varieties of nectarines; scarcely a score are under cultivation in the United States, of which ten are described in this chapter.

INDEX TO VARIETIES OF NECTARINES

KEY TO VARIETIES OF NECTARINES

A. Color of flesh greenish-white.
  B. Stone clinging, large, ovate; very early..... 523. Cardinal.
  BB. Stone free.
    C. Kernel sweet or scarcely bitter ..... 524. Victoria.
    CC. Kernel very bitter.
      D. Flesh white to the stone ..... 525. Lord Napier.
      DD. Flesh with more or less red at the stone.
        E. Skin dark purplish-red, especially on the cheek ..... 526. Hardwicke.
        EE. Skin greenish-white with a bright red cheek ..... 527. Downton.
        EEE. Skin creamy-white with a crimson cheek; sunfreckled with red ..... 528. Elruge.
        EEEE. Skin greenish-yellow, marbled with brownish-red; cheek sometimes crimson..... 529. Newton.

AA. Color of flesh yellow or orange.
B. Fruit oblong-oval; season late ..... 530. Humbolt.
BB. Fruit round-oval; midseason.
C. Suture distinct; flesh orange yellow ..... 531. Pineapple.
CC. Suture a line; flesh yellow ..... 532. Boston.

523. Cardinal (Fig. 170).—This new nectarine seems to have been tested only in greenhouses in America. It is considered one of the best both here and abroad for forcing and for pot-culture. The variety might well be tried as an extra early nectarine out-of-doors, for, although it is a clingstone, its trim contour, delicately marked coloring, and piquant refreshing flavor make it a most inviting dessert fruit. Cardinal is an English nectarine first mentioned about 1890, and brought to America a few years later.

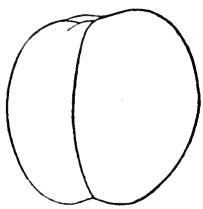

FIG. 170. Cardinal.

Tree rather small, round-headed, compact, hardy, productive. Fruit extra early, medium to small in size, oval; suture shallow but distinct; apex depressed with a well-marked abrupt tip; color greenish-yellow, marbled with a distinctive salmon-red, with white spots covered with net-like lines; flesh greenish-white, juicy, melting, piquant, refreshing; quality good; stone clinging rather tenaciously, large, ovate.

524. Victoria.—On the grounds of the New York Agricultural Experiment Station, Geneva, New York, Victoria is one of the most satisfactory of all nectarines. The trees are as hardy as those of any other varieties and the fruits are very good,—as luscious as those of any other fruit grown. The variety seems to have originated in England about 1860.

Tree medium in size, vigorous, compact, tender to cold, productive. Fruit large, round-oval, heart-shaped at the base; color pale green, purplish-red or almost violet in the sun; flesh white, melting, sweet, rich, aromatic, delicious; quality very good; stone rather large with a kernel similar in taste to that of the sweet almond.

525. Lord Napier (Fig. 171) is the mainstay in commercial orchards as the earliest nectarine. The tree in California is reported to be a heavy and regular bearer,

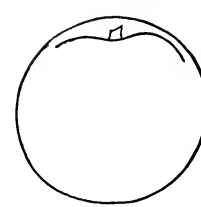

FIG. 171. Lord Napier.

and the fruit is pronounced about the best. The variety is grown as commonly as any other in eastern America either in the greenhouse or in the garden. This variety came from Thomas Rivers, Sawbridgeworth, England.

Tree rather large, vigorous, as hardy as any, regular and productive in bearing. Fruit early, large 2½ inches in diameter, ovate, regular; cavity wide and rather deep; suture wide and shallow; apex depressed with a nipple in the depression; color pale cream, mottled and streaked with blood-red, with a dark crimson cheek on the side to the sun; flesh white, very tender, melting, juicy, without red at the stone, piquant; quality good; stone free, rather large, ovate, pointed, corrugated, slightly pitted.

526. Hardwicke.—In southern California, Hardwicke is the favorite nectarine, being the heaviest and most dependable bearer. The fruits are said to make a most excellent dried product, as the cured nectarines have a rich flavor, and the flesh becomes almost translucent and of a beautiful amber tint. Eastern nurserymen do not offer the variety, and it is doubtful whether trees can be found in the East. It is an old English nectarine introduced into the United States sometime previous to 1850.

Tree vigorous, hardy, spreading, productive. Fruit midseason, very large, round or sometimes round-oval; color pale green almost covered with dark purplish-red which becomes a solid color on the sunny side; flesh greenish, stained with red at the stone, tender and melting, juicy, rich and sweet; quality good; stone of medium size, free, ovate.

527. Downton is a staunch commercial variety wherever this fruit is widely grown, vigor of tree and great productiveness recommending it. It is a second early sort, ripening at Geneva, New York, early in September. The original plant was raised by the famous pomologist, T. A. Knight, Downton Castle, Herefordshire, England.

Tree of medium size, upright-spreading, hardy, very productive. Fruit midseason, 2 inches in diameter, round-oval; cavity medium in width and depth; suture shallow; apex a sharp tip; color greenish-white, with a clean lively red cheek next to the sun; flesh pale green, red at the stone, juicy, tender, fine-grained, sweet mingled with some piquancy, rich, aromatic; quality very good; stone free, ovate medium in size, corrugated.

528. Elruge (Fig. 172) is a time-honored landmark in the evolution of nectarines, and at the same time one of the best of its species. The fruit is voluptuously inviting in appearance, by reason of its trim contour, smooth flesh-colored skin, and crimson cheek, which, with its rich flavor, make it an alluring dessert fruit. Elruge is said to have originated with a nurseryman in England named Gourle in the time of Charles the Second.

FIG. 172. Elruge.

Tree of medium size, compact, hardy, very productive. Fruit midseason, 1¾ inches in diameter, round-oval, regular; cavity of medium width and depth; apex a swollen point; color creamy-white with a crimson cheek, sometimes sun-freckled with red; skin thin, adherent; flesh white, red at the pit, juicy, tender, piquant, aromatic; quality very good; stone free, small.

529. Newton (Fig. 173).—The fruits are large, handsome, richly flavored, with flesh of almost jelly-like transparency, almost flawless, the consummate product of the peach family. Newton originated in England, with Rivers of Sawbridgeworth, about the middle of the last century.

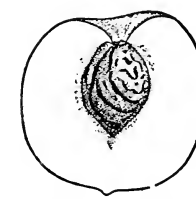

FIG. 173. Newton.

Tree large, vigorous, upright-spreading, open, hardy, productive; branches and branchlets reddish, short-jointed, with rather inconspicuous lenticels. Fruit late, large, 2½ inches in diameter, oval; cavity medium in width and depth; suture shallow; apex depressed with an abrupt tip; color greenish-yellow, marbled with brownish-red and crimson with some pale spots; flesh pale green with faint red radiating from the stone, almost transparent, with a rich almond-like flavor; quality very good; stone free, ovate, reddish.

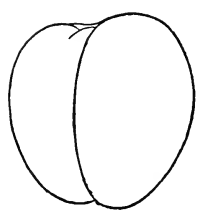

FIG. 174. Humbolt.

530. Humbolt (Fig. 174).—Pomologists in California speak of Humbolt as one of the best nectarines for some locations in that state. The large deep-rose flowers are so beautiful that the variety is well worth cultivating as an ornamental. This is one of

the many nectarines which originated with Rivers, the famous nurseryman, Sawbridgeworth, England.

Tree large, vigorous, hardy, usually productive, often bearing the second year out. Fruit late, large, 2½ inches in diameter, oblong-oval; cavity rather shallow; apex a swollen point, slightly depressed; suture shallow or a hair-line; color yellow-orange, stained, streaked, mottled with dull red and sometimes sun-flecked on the cheek to the sun; flesh yellow, almost orange, tender, juicy, red at the pit, sweet, rich and aromatic; quality very good; stone free, obovate to ovate, pointed, corrugated, pitted, brown.

531. Pineapple (Fig. 175) is probably fit only for forcing; it is a favorite for this purpose in England, and is occasionally found under glass in America. English pomologists say that it is too tender for out-of-doors, and it seems not to have been tried in orchards in America. The variety has individuality in its orange-yellow flesh and its rich pineapple flavor. Pineapple seems to have been cultivated for a half-century at least. The description is compiled from English catalogues.

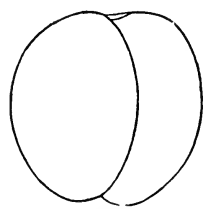

FIG. 175. Pineapple.

Tree rather small, tender, free in bearing. Fruit midseason, large, round-ovate; suture distinct; color deep orange with a bright crimson blush; flesh orange-yellow marbled with red next the stone, firm, aromatic, with a rich pineapple flavor; quality very good; stone free, small, with deep corrugations.

532. Boston.—The fruits are large and handsome, but, while they have a pleasant distinctive flavor, are not quite so acceptable for dessert as those of several other varieties. A peculiarity is that the stone is small and pointed. Boston was raised from a peach-stone planted by T. Lewis, Boston, Massachusetts, early in the last century.

Tree small but vigorous, upright-spreading, hardy, productive; branches smooth, slender, dark red, with numerous conspicuous lenticels. Fruit late midseason, 1¾ inches in diameter, round-oval, irregular, halves unequal; cavity rather deep, wide; suture shallow or but a line; apex depressed, mucronate; color yellow blushed with crimson, sometimes mottled and sun-flecked; skin nearly free; flesh yellow, moderately coarse, sweet, aromatic, pleasant and distinctive; stone small, ovate, free, pointed, brown, corrugated; quality good.

CHAPTER XXVI

VARIETIES OF PEACHES

THE great number of varieties, not less than 500 having been cultivated in America, attests the variability of the peach. The kinds can be distinguished through differences in size, shape, skin, flesh, flavor, aroma, stone, and season; and, if fruit is lacking or insufficient for identification, the leaf, flower, and tree offer nearly as many distinguishing characters. A hundred or more kinds of peaches can be purchased from nurserymen, and about 300 sorts are now in fruit in the hands of the author at the New York Agricultural Experiment Station. Of these many varieties twenty-nine are selected for this text as being most representative and most commonly grown.

INDEX TO VARIETIES OF PEACHES

KEY TO VARIETIES OF PEACHES

A. Flesh mildly acid, not honey sweet; fruits globose.
  B. Color of flesh white.
    C. Stone clinging; early.
      D. Fruit round; suture shallow; very early... 533. Alexander.

DD. Fruit round-oblate; suture rather deep; very early ..... 534. Canada.
DDD. Fruit oblong-oval; oblique; early; suture deep at the cavity ..... 535. Greensboro.
CC. Stone free or nearly so.
D. Ripening early; brilliant red on a white background ..... 536. Carman.
DD. Ripening midseason, after Greensboro and with or before Champion.
E. Shape of fruit oblong-conic, bulged at the apex ..... 537. Hiley.
EE. Shape of fruit round-oval.
F. Fruit truncate; halves equal; late midseason; quality very good ..... 538. Champion.
FF. Fruit compressed.
G. Halves equal; midseason; quality poor ..... 539. Belle.
GG. Halves unequal; early midseason; quality good ..... 540. Waddell.
DDD. Ripening late, after Champion or Elberta.
E. Fruit round-oval; sides equal; late..... 541. Stevens.
EE. Fruit oblong-oval; sides unequal; very late ..... 542. Iron Mountain.
BB. Color of flesh yellow.
C. Stone clinging.
D. Fruit round-oval; early ..... 543. Tuskena.
DD. Fruit round-oblong; midseason or late.
E. Ripening midseason; striped and blushed with red more or less ..... 544. Phillips Cling.
EE. Ripening late; without stripes and scarcely blushed ..... 545. Sellers Cling.
CC. Stone free.
D. Ripening early, with or before Greensboro.
E. Fruit pale yellow overlaid with dark red; very early; quality poor..... 546. Triumph.
EE. Fruit golden-yellow blushed with bright red; early; quality very good ..... 547. St. John.
DD. Ripening midseason, after Greensboro and before Crosby.
E. Fruit lemon-yellow and little or not at all blushed; late midseason ..... 548. Muir.
EE. Fruit yellow, more or less blushed.
F. Shape round-oblong; compressed; late midseason; suture well marked ..... 549. Elberta.
FF. Shape sphere-like; suture a line; earlier than Elberta ..... 550. J. H. Hale.
FFF. Shape round-oblate; early midseason; pubescence heavy ..... 551. Rochester.
FFFF. Shape round-oval; compressed; sides unequal; midseason .... 552. Early Crawford.

DDD. Ripening late, with or after Crosby.
E. Flesh golden-yellow to the pit; scarcely blushed ..... 553. Gold Drop.
EE. Flesh tinged red at the pit; cheek blushed with red.
D. Fruit round-oblate, compressed, small, halves unequal ..... 554. Crosby.
DD. Fruit round-oval, compressed, halves unequal ..... 555. Late Crawford.
DDD. Fruit oblong-conic, angular, compressed, halves unequal, very pubescent..... 556. Chili.
DDDD. Fruit round cordate, compressed; greenish yellow with a brownish-red blush; very late ..... 557. Salwey.
BBB. Color of flesh red ..... 558. Blood Cling.
AA. Flesh honey sweet; fruits oblate or globose and beaked.
B. Fruit and stone markedly oblate ..... 559. Peento.
BB. Fruit round-oval; more or less beaked.
C. Shape oval; sides unequal; beak curved..... 560. Climax.
CC. Shape oblong-oval; sides equal; beak straight ..... 561. Pallas.

DIVISION A. FLESH MILDLY ACID; FRUITS GLOBOSE

Section I. Flesh White

Group 1. Stone Clinging

533. Alexander is one of the notable early peaches, hardiness and vigor of tree contributing with earliness to make the variety popular. Unfortunately, the peaches run small, the flesh clings to the stone so that the two can be separated only with difficulty, and the quality is poor. The trees are unproductive. The fruits are very susceptible to brown-rot, but to offset this weakness, the trees are resistant to leaf-curl. Alexander originated soon after the Civil War, on the farm of O. A. Alexander, Mount Pulaski, Illinois.

Tree large, vigorous, upright-spreading, hardy, unproductive. Fruit very early; 2¼ inches in diameter, round, compressed, with sides nearly equal; cavity deep, flaring; suture shallow; apex depressed ending in a mucronate or small mamelon, recurved tip; color greenish-white becoming creamy white, blushed and blotched with dark red, mottled; pubescence short; skin separates readily from the pulp; flesh greenish-white, juicy, stringy, sweet, very mild; fair to good in quality; stone clinging, oval, plump, faintly ringed,

abruptly pointed at the apex, with slightly pitted surfaces, and with a few grooves.

534. Canada.—A standard early peach in the northern states, the variety has few characters to commend it, except earliness and hardiness, though the trees are often loaded with fruit. The peaches are small but are attractive in color, which is bright red on a light background. The fruits are about the poorest of all peaches in flavor, but are firm and ship well for a white-fleshed sort. The variety originated more than a quarter century ago with A. H. High, Jordan, Ontario.

Tree large, upright-spreading, open-topped, hardy, productive. Fruit very early; 2¼ inches in diameter, round-oblate, compressed, with unequal sides; cavity wide, flaring; suture deep; apex ending in a mucronate recurved tip, color creamy-white blushed with red and mottled and splashed with darker red; pubescence short, thick; skin thin, tender, separates from the pulp; flesh white, juicy, fine-grained, tender, sweet yet sprightly; fair in quality; stone clinging, round-oval, plump, abruptly pointed, with small grooves in the surfaces.

535. Greensboro (Fig. 176) takes high place among peaches because of its showy fruits and its large, vigorous, healthy, early-bearing, and prolific trees. The peaches, while handsome, are in no way remarkable, the quality being rather inferior, so that it is the tree that gives Greensboro its standing. The peaches are less susceptible to brown-rot than most other varieties of Greensboro's season, but to offset this advantage there are many cracked pits and accompanying malformations. Greensboro was grown by W. G. Balsey, Greensboro, North Carolina, about 1891.

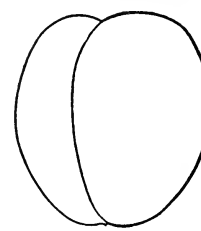

FIG. 176. Greensboro.

Tree very large, spreading, hardy, very productive. Fruit early; 2½ inches in diameter, oblong-oval, often oblique, bulged at one side, compressed, with unequal sides; cavity deep, narrow, abrupt; suture shallow, deepening toward the cavity; apex rounded, with a small mucronate tip; color creamy-white, blushed with red, with a few stripes of darker red intermingling; pubescence heavy, nearly tomentose; skin tough, separates from the pulp; flesh white, very juicy, tender, mild, sprightly; fair in quality; stone semi-clinging, ovate, strongly bulged along one side, with short grooves on the surfaces.

Group 2. Stone Free or Nearly so

536. Carman (Fig. 177).—The chief asset of Carman is a constitution which enables it to withstand trying climates and to accommodate itself to a great variety of soils. While of only medium size, the peaches are pleasing in appearance; the color is brilliant red splashed with darker red on creamy-white background; the shape is nearly round, and its trimness and symmetry make the peach, especially when packed in box or basket, one scarcely surpassed in attractiveness. The habit of growth is excellent; peaches are borne abundantly; brown-rot takes comparatively little toll; and in tree or bud the variety is remarkably hardy. Carman grew from a seed planted in 1889 by J. W. Stubenrauch, Mexia, Texas.

Fig. 177. Carman.

Tree large, vigorous, upright, open-topped, hardy, very productive. Fruit early; 2¼ inches in diameter; round-oval, compressed, with unequal sides, bulged near the apex; cavity flaring, tinged with pink, and with tender skin; suture shallow, becoming deeper at the cavity; apex round or depressed, with a somewhat pointed mucronate tip; color creamy-white more or less overspread with light red, with splashes of darker red; pubescence very thick, short; skin thin, tough, adherent to the pulp; flesh white, red at the pit, juicy, tender, sweet, mild, pleasant; very good in quality; stone free, plump, with thickly pitted surfaces.

537. Hiley (Fig. 178).—Two characters make Hiley notable in its class; it is the earliest commercial free-stone white-fleshed peach; and it is better in quality than most of its competitors. The peaches are large in size and handsomely colored, but they are not quite so uniform in either size or color as could be desired. The trees are neither large nor sufficiently hardy and vigorous to make an ideal commercial sort. The fruits are easy prey to brown-rot. Hiley originated with Eugene Hiley, Marshallville, Georgia, about 1886.

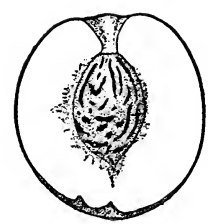

Fig. 178. Hiley.

Tree medium in size, upright-spreading, very productive. Fruit midseason; 2½ inches in diameter, oblong-conic, bulged near the apex, with unequal halves; cavity abrupt, the skin tender and tearing easily; suture shallow, deepening toward the apex; apex pointed; color greenish-yellow with a dull blush over one-half the surface, more or less mottled; pubescence thick, fine, short; skin thin, tough, separates from the pulp when fully ripe; flesh creamy-white stained red at the pit, stringy, firm but tender, with a distinct pleasant flavor, sprightly; good in quality; stone free, pointed at both ends, with nearly smooth surfaces.

538. Champion (Fig. 179) is rightly used to gauge the quality of all other white-fleshed peaches. The fruits are nearly as attractive to the eye as to the palate; but, unfortunately, run small and off-color in all but choicely good soils. The tree is almost perfect, few others surpassing it in height and girth, and none equalling it in quantity and the luxuriant green of its foliage. The variety surpasses most of its orchard associates in productiveness, but the peaches are inviting prey to brown-rot, and the trees are defoliated with leaf-curl. The original seed was planted about 1880 by I. G. Hubbard, Nokomis, Illinois.

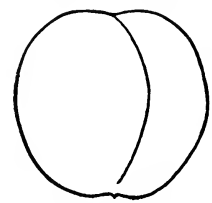

FIG. 179. Champion.

Tree large, vigorous, spreading, open-topped, very productive. Fruit midseason; 2¼ inches in diameter, round-oval, truncate, with halves usually equal; cavity shallow, narrow, flaring, contracted; suture shallow; apex rounded, with a recurved tip; color pale creamy-white, with splashes of carmine, mingled with a blush of darker red; pubescence short, thick; skin tough, adherent to the pulp; flesh white, red at the pit, very juicy, tender, sweet, pleasantly flavored; very good; stone free, oval, long-pointed, with deeply grooved surfaces.

539. Belle (Fig. 180). *Belle of Georgia.*—Belle elicits praise because of the great beauty of its fruits, which are large, trim in contour, creamy-white, with a beautiful crimson cheek. The fruits are as enticing to the eye inwardly as outwardly, for the white flesh is delicately marbled, tinted with red at the pit, and flesh and pit part cleanly. Appearance misrepresents quality; for the variety, while good, falls short in flavor and the

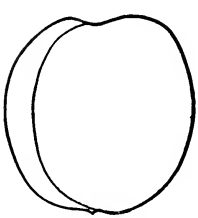

FIG. 180. Belle.

flesh is stringy. The trees are large, open-headed, a little straggling, fast-growing, and hardy, though like most of their type easy prey to leaf-curl. Belle came from a seed of Chinese Cling planted in 1870 by L. A. Rumph, Marshallville, Georgia.

Tree large, vigorous, spreading, open-topped, hardy, very productive. Fruit midseason; 2 inches in diameter, round-oval, bulging near the apex, compressed, with halves nearly equal; cavity abruptly flaring, red, with tender skin; suture shallow, deepening toward the apex; apex round with mucronate tip; color greenish-white changing to creamy-white, blushed with red, with faint stripes and splashes of darker red, mottled; pubescence short, fine, thick; skin thin, tender, adherent to the pulp; flesh white, tinged with red at the pit, and with radiating rays of red, juicy, stringy, tender, sweet, mild; good in quality; stone free, oval, bulged near the apex, blunt at the base with a short sharp point at the apex, and with pitted surfaces.

540. Waddell (Fig. 181) is an early midseason white-fleshed semi-cling peach from Georgia, now widely esteemed as a commercial sort. Its chief competitor is Carman, compared with which the fruit ripens a few days earlier; is handsomer, of rather finer texture of flesh, better flavored; and is a better shipper. It is a particularly pleasing peach and ought to be considered for every commercial plantation where a variety of its season is desired. Waddell is a chance seedling found by William Waddell, Griffin, Georgia, about 1890.

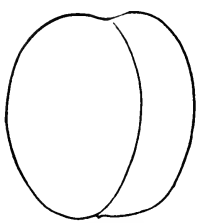

FIG. 181. Waddell.

Tree medium in size, vigorous, spreading, hardy, productive. Fruit early midseason; 2¼ inches in diameter, round-oval, compressed, with unequal halves; cavity deep, abrupt, with tender skin, tinged with pink; suture shallow, deepening toward the apex, and extending beyond; apex rounded, with a small mucronate tip; color creamy-white blushed with red and with dull splashes of darker red; pubescence thick; skin tough, separates from the pulp; flesh white, stained with pink near the tip, juicy, stringy, firm, sweet but sprightly, aromatic; good in quality; stone semi-free to free, ovate; ventral suture deeply grooved along the sides, faintly winged.

541. Stevens (Fig. 182). *Stevens Rareripe.*—Stevens is a large, white and red, white-fleshed, freestone peach. In quality, the fruits are extra good, the flesh characters pleasing in every respect. The flavor is a pleasant mingling of sweet and sour

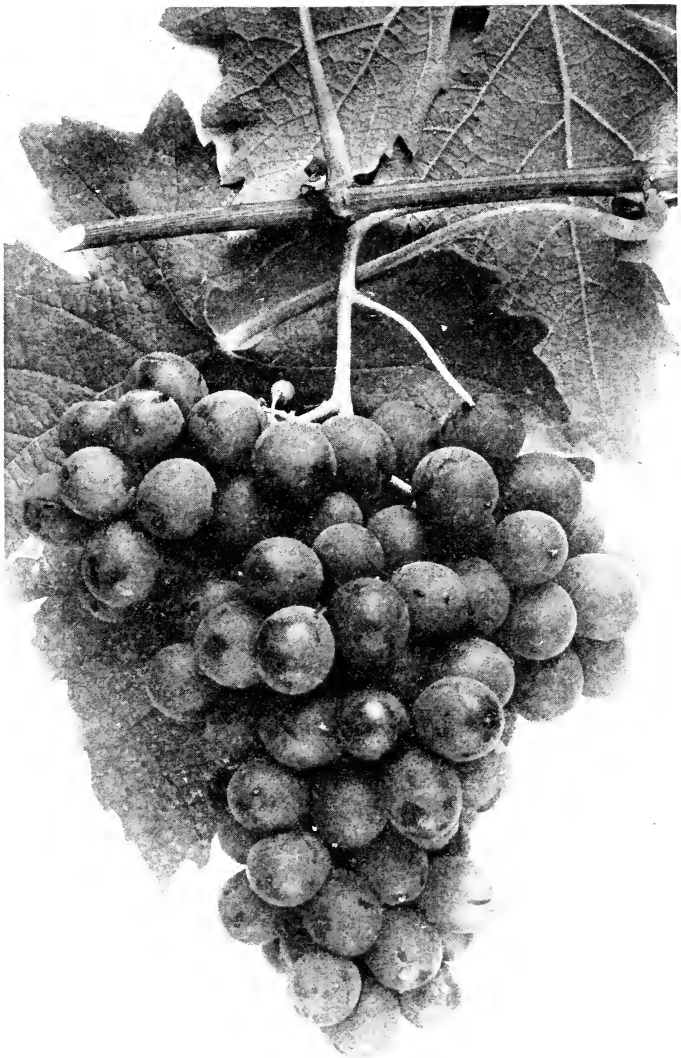

PLATE XVIII. A Vinifera grape—Muscat Hamburg.

not found in many other peaches so late in the season. The appearance is as alluring as the taste, the fruits being almost perfect in color and shape. The variety has the reputation of being hardy in both wood and buds. Stevens originated about 1858 on the farm of B. Stevens, Morristown, New Jersey.

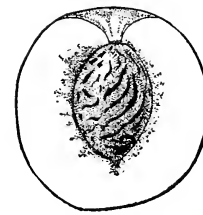

FIG. 182. Stevens.

Tree vigorous, upright-spreading, productive. Fruit late; 2¾ inches in diameter, round-oval, with nearly equal sides; cavity deep, wide, abrupt; suture deep, often extending beyond the tip; apex rounded, with a strongly mucromate and recurved tip; color greenish-white overlaid with purplish-red, often mottled or splashed with darker red; pubescence short, fine; skin thick, tough, adherent to the pulp; flesh white, tinted with red near the pit and red underneath, the deepest surface blush, juicy, coarse, sweet, sprightly; good in quality; stone nearly free, obovate, flattened at the base, plump, with grooved surfaces.

542. Iron Mountain (Fig. 183).—Hardiness is the outstanding character which has brought Iron Mountain into prominence. It is a very late, white-fleshed, freestone peach, well adapted for extending the commercial limits in regions where fall frosts hold off sufficiently long for the fruit to ripen. The tree characters are very satisfactory, and the peaches serve very well for culinary purposes, but are not sufficiently attractive for a dessert fruit. There seem to be two varieties passing under this name, much alike in fruit; one is large-flowered, the other small-flowered. Iron Mountain originated in New Jersey about 1890, but nothing is known of its parentage or its originator.

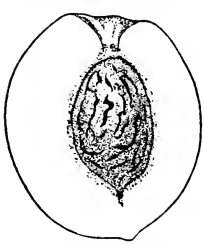

FIG. 183. Iron Mountain.

Tree large, vigorous, upright-spreading, not always productive. Fruit very late; 2¾ inches long, 2½ inches thick, oblong-oval, often bulged on one side, compressed; cavity contracted, below medium in depth, flaring; suture shallow, extending only to the tip; apex distinctly mucronate or rounded; sometimes tapering; color creamy-white, occasionally with a light blush; pubescence heavy; skin medium to thin, tender, adherent to the pulp; flesh white, stained brown next to the pit, juicy, tender, sweet, mild; quality good; stone semi-free, wedge-like at base, obovate, plump, long-pointed at the apex, winged, with large, wide and deep grooves in the surfaces.

Section II. Flesh Yellow

Group 3. Stone Clinging

543. Tuskena. *Tuscan Cling.*—By common consent, Tuskena is one of the best early clingstone varieties for canning and shipping in California, where it is usually known as Tuscan Cling. The trees are exceptionally vigorous and produce heavily. The variety originated in Mississippi sometime previous to 1873.

Tree large, open, vigorous, healthy, productive. Fruit early, large, round-oval; suture distinct; apex round, depressed; cavity deep, abrupt; skin yellow with a dark red cheek; flesh yellow, red at the pit, firm, sweet but vinous, rich; quality very good to best; stone large, clinging.

544. Phillips Cling is the most popular yellow-fleshed clingstone grown in California for canning. The fruits ripen progressively, so that picking covers from two to three weeks. Canners like the product because the peaches are of even size, of the same color from skin to stone, have a small pit, and the flesh is exceedingly rich in flavor and very highly colored. The trees are large, vigorous, and heavy producers. The variety originated with Joseph Phillips, Sutter County, California, sometime previous to 1889.

Tree very large, upright, vigorous, healthy, very productive. Fruits 3 inches in diameter, round-oblong; cavity deep, wide, abrupt; apex rounded, usually with an erect tip; skin golden-yellow with faint stripes of red and blushed on the sunny side; pubescence short, fine; skin thin, tender, adherent; flesh yellow, juicy, fine-grained, firm, sweet and rich; quality fair to good; stone bulged at apex, flattened at the base, ovate, rather large, clinging tenaciously.

545. Sellers Cling.—Canners in California recommend Sellers Cling as one of the best midsummer varieties for their trade. The variety finds favor with the growers because of the great productiveness of the trees. The peaches are handsome in color, uniform in size, and ripen at a favorable period of the canning season. The variety originated on the ranch of S. A. Sellers, Contra Costa County, California, sometime previous to 1889.

Tree large, very vigorous, upright-spreading, one of the most productive of all peaches in California. Fruit late, very large, round-oblong, somewhat flattened; suture distinct; apex rounded with well-marked tip; skin rich golden, sometimes with a faint tinge of red; flesh deep golden from skin to stone, very firm, moderately juicy, sweet and rich; quality good to very good; pit of medium size, plump at the point, flattened at the base, clinging tenaciously.

Group 4. Stone Free

Sub-group 1. Early Peaches

546. Triumph is an extra early yellow-fleshed peach so inferior in appearance and quality of fruit, and so subject to brown-rot, that it is not worth growing in any but the most northern peach regions, where, because of great hardiness in wood and bud, it becomes valuable. It is grown more or less, however, North and South, because it is one of the earliest yellow-fleshed sorts, and because the trees bear regularly and abundantly. Small pits somewhat offset the small size of the fruit. Triumph is one of several seedlings grown by J. D. Husted, Vineyard, Georgia, about 1895.

Tree of medium size, vigorous, upright-spreading, hardy, very productive. Fruit early; 2 inches in diameter, round-oval, compressed, with unequal sides; cavity deep, abrupt, with tender skin; suture shallow; apex rounded, with a mamelon and recurved tip; color pale yellow overlaid with dark red; pubescence thick and long; skin thin, adherent to the pulp; flesh yellow, stained with red near the pit, juicy, firm, sprightly; fair in quality; stone free, obovate, flattened, wedge-like at the base, bulged at one side near the apex, plump, with deeply grooved surfaces.

547. St. John. *Yellow St. John.*—Unproductiveness and uncertainty in bearing keep this yellow-fleshed dessert fruit from being one of the most popular early peaches. The peach is one of the earlist of the Crawford group, a perfect freestone, handsome in appearance, sweet, rich and delicious in flavor. The fruits resemble those of Early Crawford in size and shape, but are a little more rotund, somewhat smaller, not quite so high in quality, and ripen several days earlier. The trees are all that could be asked in size, vigor, and hardiness. The place and time of origin of St. John are unknown; it is more than a century old.

Tree medium to large, vigorous, upright-spreading, unproductive. Fruit early; 2¾ inches in diameter, round-oval, depressed, with oblique sides; cavity wide, abrupt or flaring, often tinged with red; suture deep near the tip; apex round or depressed, with a pointed tip; color deep yellow, blushed and splashed with carmine; pubescence thick and long; skin thick, tough; flesh light yellow, tinged with red near the pit, juicy, tender, pleasantly sprightly, highly flavored; very good in quality; stone free, ovate, plump, tapering to a long point, with rough surfaces marked by large and small pits.

Sub-group 2. Midseason Peaches

548. Muir (Fig. 184) is a late midseason yellow-fleshed, freestone peach much used by canners on the Pacific slope. It should be more generally grown for the same purpose in the East; for, as a canned product, it is hardly surpassed in appearance or quality. The trees are vigorous, productive, and little subject to leaf-curl, but the fruits are often marred by peach-scab. The variety was found about 1880 on the farm of John Muir, Silveyville, California.

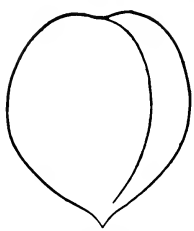

FIG. 184. Muir.

Tree vigorous, upright or somewhat spreading, hardy, productive. Fruit midseason; 2¾ inches long, 2½ inches wide, round-cordate or oval, angular, compressed, with unequal halves; cavity shallow, contracted about the sides, flaring; suture medium in depth; apex pointed, with a large recurved mamelon tip; color lemon-yellow; pubescence heavy, long; skin thin, tough; flesh yellow, faintly tinged near the pit, dry, coarse, tender, sweet, mild; good in quality; stone free, ovate, flattened, wedge-shaped toward the base, tapering to a long apex, with large pits and a few small grooves in the surfaces.

549. Elberta (Fig. 185) leads all other peaches in America in number of trees. The preëminently meritorious character of Elberta is its freedom from local prejudices of either soil or climate. Thus Elberta is grown with profit in every peach-growing state in the Union, and in nearly all is produced in greater quantities than any other market peach. The second character which commends Elberta is fruitfulness: barring frosts or freezes, the trees load themselves with fruit year in and year out. Added to these two great points of superiority are ability

to withstand the ravages of both insects and fungi, large size, vigor, early bearing, and longevity in tree; and large handsome fruits which ship and keep remarkably well. Elberta, however, is not without faults. The trees are not hardy in either wood or blossoms. The peaches lack the richness of the Crawfords and the sweetness of the white-fleshed Champion type. The stone is large but usually wholly free from the flesh. Elberta was grown by Samuel Rumph, Marshallville, Georgia, from a seed of Chinese Cling planted in the fall of 1870.

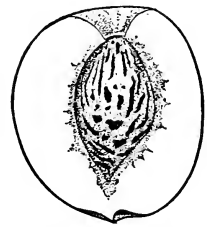

FIG. 185. Elberta.

Tree large, vigorous, upright spreading, very productive. Fruit midseason; 2¾ inches long, 2½ inches wide, round-oblong or cordate, compressed, usually with a slight bulge at one side; cavity deep, flaring, often mottled with red; suture shallow, deepening toward the apex; apex rounded, with a mamelon or pointed tip; color greenish-yellow changing to orange-yellow, from one-quarter to three-fourths overspread with red and with much mottling extending sometimes over nearly the entire surface; pubescence thick and coarse; skin thick, tough, separates from the pulp; flesh yellow stained with red near the pit, juicy, stringy, firm but tender, sweet to subacid, mild; good in quality; stone free, broadly ovate, sharp-pointed, bulged on one side, with pitted surfaces.

550. J. H. Hale (Fig. 186).—The characters of J. H. Hale can be set forth best by comparing it with Elberta. In size, the fruit of J. H. Hale averages larger; the flesh is firmer and heavier. In shape, the fruit is almost a sphere, so that it is more shapely than the oblong Elberta, and can be packed to better advantage. In color there is no choice; both peaches are voluptuously handsome. The skin of the J. H. Hale is less pubescent and a little firmer and tighter. There is but little difference in flavor, aroma, texture and juiciness. J. H. Hale ripens its fruits a few days earlier than Elberta, and its trees and buds are hardier. Which is the more productive is not certain. This variety is a chance seedling found by J. H. Hale, South Glastonbury, Connecticut. The distribution of the variety was begun by Stark Brothers, Louisiana, Missouri, in 1912.

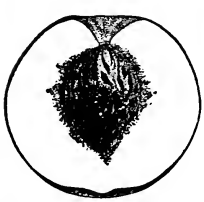

FIG. 186. J. H. Hale.

Tree vigorous, upright-spreading, productive. Fruit midseason; 3 inches in diameter, regular, round, with equal halves; cavity deep, wide, regular; suture a mere line, very shallow, or with almost no depression; apex rounded, with a small tip set in a depression; color lemon-yellow overspread with dark red and with mottlings and splashes of carmine; pubescence light; skin thick, tough, separates but poorly from the pulp; flesh yellow, red around the pit, juicy, fine-grained, sweet or somewhat sprightly; good in quality; stone free, oval, plump, flattened at the base, pointed at the apex, with grooved and pitted surfaces.

551. Rochester (Fig. 187) precedes Early Crawford by several days, ripening soon after the middle of August. The peaches are large, yellow, with a handsome over-color of mottled red, more round than either of the two Crawfords,—qualities which make a strikingly beautiful peach; the flesh is thick and firm, marbled yellow, stained with red at the pit, juicy, rich, sweet. The variety came from a seed planted about 1900 on a farm owned by a Mr. Wallen, Rochester, New York.

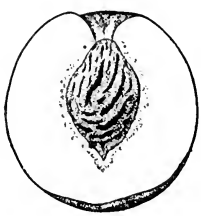

FIG. 187. Rochester.

Tree large, vigorous, upright-spreading, productive. Fruit early midseason; 3-3½ inches in diameter, round-oblate, compressed; cavity wide, deep, flaring; suture shallow, becoming deeper near the tip; color orange-yellow, blushed with deep, dark red, mottled; pubescence heavy; skin thick, tough; flesh yellow, stained with red near the pit, very juicy, tender and melting, sweet, highly flavored, sprightly; very good in quality; stone free, oval, plump, flattened near the base, with rough surfaces marked by large deep pits and short grooves.

552. Early Crawford (Fig. 188).—In its season the fruit is unapproachable in quality by that of any other variety. The peach has richness of flavor, pleasant aroma, tender flesh, and abundant juice. It is large, round oblong, slightly compressed; distinguished by its broad deep cavity; color rich red, splashed and mottled with darker red in the sun, golden-yellow in the shade. The flesh is marbled yellow, rayed with red at the pit, and perfectly free from the stone. The trees are all that could be desired in health, vigor, size, and shape, but are unproductive, uncertain and

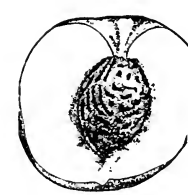

FIG. 188. Early Crawford.

tardy in bearing. Early Crawford came into bearing in the orchard of William Crawford, Middletown, New Jersey, early in the nineteenth century.

Tree large, vigorous, upright-spreading, unproductive. Fruit early mid-season; 2½ inches in diameter, round-oval, bulged near the apex, compressed, with unequal halves; cavity deep, wide, abrupt; suture shallow; apex often with a swollen elongated tip; color golden-yellow, blushed with dark red, splashed and mottled with deeper red; pubescence thick; skin separates from the pulp; flesh deep yellow, rayed with red near the pit, juicy, tender, pleasantly sprightly, highly flavored; very good in quality; stone free, oval or ovate, bulged along one side, medium plump, with small shallow pits in the surfaces.

Sub-group 3. Late Peaches

553. Gold Drop (Fig. 189) has several distinctive peculiarities which make it a pleasing variation. Thus, its transparent golden skin and flesh make it one of the handsomest of all peaches, and it has a distinctive vinous, rich, refreshing flavor. Gold Drop is further characterized by trees of great hardiness and remarkable productiveness. The variety is also about the least susceptible to brown-rot and leaf-curl. The trees are small, dainty in habit, with clean fresh foliage, making them attractive ornamentals. Gold Drop is an ideal variety for the home garden. It is an old sort believed to be another variety renamed.

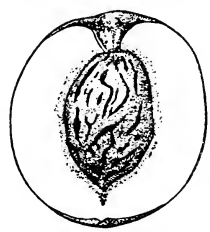

FIG. 189. Gold Drop.

Tree of medium size and vigor, spreading, open-topped, hardy, very productive. Fruit late; 2½ inches in diameter, round-oval, bulged at one side, with unequal halves; cavity deep, abrupt, twig-marked; suture very shallow; apex rounded, with a mamelon tip; color golden-yellow, with a dull blush on one side; pubescence thick, coarse; skin adhering to the pulp; flesh pale yellow to the pit, pleasantly sprightly; good in quality; stone free, broadly ovate, bulged at one side, with a pointed apex and deeply grooved surfaces.

554. Crosby (Fig. 190).—Of the several virtues which entitle Crosby to the esteem of fruit-growers, the most notable is hardiness in tree and bud. Besides hardiness, the trees have to recommend them vigor, health, and productiveness. The rich yellow

freestone peach is delicious to the taste either as a dessert or as a culinary fruit. However, Crosby falls far short in appearance, as the peaches run small, are somewhat irregular, and are covered with dense tomentum. The tree is distinguished by its willowy growth, small leaves, and small flowers. Crosby was sent out about 1876 by a Mr. Crosby, Billerica, Massachusetts.

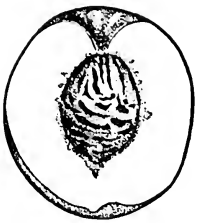

FIG. 190. Crosby.

Tree small, vigorous, spreading, unusually hardy, very productive. Fruit late; 2¾ inches in diameter, round-oblate, compressed, with unequal sides; cavity deep, flaring, sometimes splashed with red; suture shallow; apex rounded, with a sunken mucronate tip; color orange-yellow, often blushed over much of the surface with dull red, splashed and striped with darker red; pubescence long, thick, coarse; skin thick, tough, adherent to the pulp; flesh deep yellow, stained with red near the pit, juicy, stringy, firm but tender, sweet, mild; very good in quality; stone free, oval, plump, bulged near the apex, with pitted and grooved surfaces.

555. Late Crawford (Fig. 191), a quarter-century ago, began to give way to Elberta because of the greater productiveness of the tree and the showier fruits, and now, though widely distributed, is nowhere largely planted. Unproductiveness and tardiness in coming in bearing are the faults of Late Crawford. The variety is possibly the best of all peaches in fruit characters. The fruits are more shapely than those of other peaches, being more uniform, rounder, trimmer in contour, and having a suture that scarcely mars the symmetry. In color, it runs the whole gamut of the soft tints of red and yellow that make the Crawfords the most beautiful of all peaches. The trees are as vigorous, hardy, healthy and as little susceptible to disease as any of the varieties of kin. This excellent peach was raised by William Crawford, Middletown, New Jersey, at least a hundred years ago.

FIG. 191. Late Crawford.

Tree large, vigorous, upright-spreading, not very productive. Fruit late; 2¾ inches in diameter, round-oval, compressed, with unequal halves; cavity

deep, medium to narrow, flaring; suture shallow, deepening toward the apex; apex rounded with a slightly pointed and swollen beak-like tip; color deep yellow, dully or brightly blushed, with the red cheek splashed with darker red; pubescence short, fine; skin thick, tough; flesh yellow, stained with red at the pit, juicy, firm, sweet, richly flavored; very good in quality; stone free, ovate, flattened, bulged on one side, blunt-pointed, with surfaces deeply pitted and grooved.

556. Chili. *Hill's Chili.*—Chili is now waning in popularity, after having been for nearly a century one of the mainstays of commercial orchards the country over. The peaches are not attractive in size, color or shape; are too dry of flesh to eat with pleasure out of hand; and are made less agreeable to sight and taste by pubescence so heavy as to be woolly. The trees are vigorous, very hardy, long-lived, and annually fruitful. Chili came into cultivation early in the nineteenth century in the orchard of Pitman Wilcox, Chili, New York.

Tree medium in size, compact, vigorous, upright-spreading, hardy, productive. Fruit late; 2½ inches in diameter, oblong-conic, angular, compressed, with unequal halves; cavity uneven, shallow, contracted, flaring, the skin tender and tearing easily; suture shallow, extending beyond the apex; apex pointed; color orange-yellow, with a dark red blush, splashed and mottled with red; pubescence long, thick, coarse; skin thin, tough, separates from the pulp; flesh red at the pit, yellow, dry, stringy, firm but tender, mild, sprightly; good; stone free, flattened at the base, obovate, winged, usually without bulge, long-pointed at the apex with pitted surfaces.

557. Salwey is a yellow-fleshed freestone peach, one of the best for canning, preserving, and evaporating. The trees are vigorous, hardy, healthy, and very productive, but their crop is so late in northern peach regions that the variety cannot be depended on. Salwey is a standard sort in France, England, and in America from the Atlantic to the Pacific and from Canada to the Gulf. It was raised in 1844 by Colonel Salwey, Egham Park, Surrey, England.

Tree of medium size, vigorous, becoming drooping, very productive. Fruit very late; 2½ inches in diameter, round-cordate, compressed; cavity deep, abrupt, often splashed with red; suture shallow, often extending beyond the tip; apex usually a small elongated point; color greenish-yellow, mostly with a brownish-red blush, splashed with dark red; pubescence short, thick, fine; skin thin, tough, adherent to the pulp; flesh golden-yellow, faintly tinged with red near the pit, juicy, tender, sweet, pleasantly flavored, aro-

matic; very good in quality; stone free, oval, very plump, pointed at the base, with large pits and short grooves in the surfaces.

Section III. Flesh Red

558. Blood Cling is the favorite curiosity of the peach orchard. The fruit is pleasant to eat out of hand and is much used for pickling and preserving, for which purpose it has much merit. This is an American seedling raised many years ago from the Blood Clingstone of the French. The fruit is much larger than that of the parent, but otherwise is much the same.

Tree large, vigorous, round, compact, hardy, unproductive. Fruit very late; 1¾ inches in diameter, compressed, with unequal halves; cavity narrow, abrupt, usually white; suture shallow; apex round, with a mucronate tip; color dull greenish-white, entirely overspread with dingy pink with splashes and stripes of darker clouded red, mottled; pubescence long, coarse; skin tough, adherent to the pulp; flesh red, becoming lighter colored at the stone, juicy, stringy, tough and meaty, brisk, pleasantly flavored; fair in quality; stone clinging, obovate, short-pointed, strongly bulged near the apex, with grooved and pitted surfaces.

DIVISION B. FLESH HONEY SWEET; FRUITS OBLATE OR GLOBOSE AND BEAKED

Section IV. Fruit Oblate

559. Peento. *Chinese Flat.*—Peento was the first variety of a group of peaches to which it gives its name, now common in the Gulf regions. The peach is flattened endwise, with a flat stone, so different from the fruits of other members of Prunus as to make this about the most unique of all drupe-fruits. Besides being remarkable for shape, the fruits are distinguished by a rich sweet flavor with a savor of the almond. Peento came from Java to England, whence it was imported to America in 1828 by William Prince.

Tree vigorous, tender in the North, productive. Fruit early; 1½ inches thick, 2½ inches wide, strongly oblate; cavity shallow, very wide, flaring; suture deep, wide, extending two-thirds around the fruit; apex depressed, set in a large, wide, flaring basin; color creamy-yellow, mottled and delicately pencilled with red, often blushed toward the apex; pubescence short, thick; skin thick, tough, nearly free; flesh white, stained red at the stone, juicy, stringy, tender and melting, sweet, mild, with an almond-like

flavor; very good in quality; stone clings, red, strongly oblate, with corrugated surfaces; ventral suture very deep at the edges, narrow at the base, becoming wide at the apex; dorsal suture a wide deep groove, merging into a line at the apex.

Section V. Fruit Globose and Beaked

560. Climax (Fig. 192) is a honey-sweet freestone peach adapted only to the far South, where the fruits are large and attractive. In the North, the peaches are small, unattractive in color, drop badly, are disfigured by peach-scab, and have only honeyed sweetness to recommend them. The variety was introduced by G. L. Taber, Glen St. Mary, Florida, in 1896.

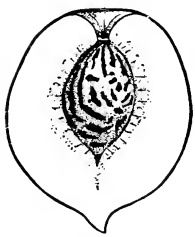

Fig. 192. Climax.

Tree small, vigorous, upright-spreading, round-topped, dense, productive. Fruit midseason; 2⅜ inches in diameter, oval, slightly compressed, with unequal sides; cavity shallow, flaring, splashed with red; suture shallow; apex conic, with a long swollen often recurved tip; color creamy white, occasionally with a blush or faint mottlings of red toward the base; pubescence short, thick; skin thin, adherent to the pulp; flesh white stained with red near the pit, juicy, stringy, melting, very sweet, mild; very good in quality; stone semi-free to free, oval, plump, bulged on one side, long-pointed at the apex, with pitted and grooved reddish-brown surfaces.

561. Pallas (Fig. 193) is one of the best of the several honey-flavored beaked peaches. It is supposed to thrive only in warm climates, but in New York the trees are vigorous, appear to be hardy, and differ from northern varieties, so far as life events are concerned, only in holding their leaves longer. The fruits run small and lack uniformity in size, the peaches are not attractive in appearance, suffer terribly from brown-rot, and do not ship well. In quality Pallas is almost unapproachable,—so rich, sweet, aromatic, and delicious as well to justify the sobriquet, "Honeydew," bestowed on it. Pallas is one of the many seedlings of Honey and originated in 1878 with L. E. Berckmans, Augusta, Georgia.

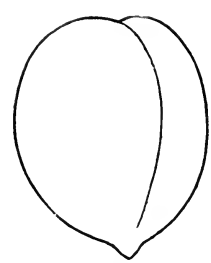

Fig. 193. Pallas.

Tree medium in vigor, upright-spreading, productive. Fruit early mid-season; 2 inches in diameter, pointed-oval, compressed, with halves equal; cavity shallow, flaring, with tender skin; suture shallow; apex a long straight beak; color pale white, with a bright red blush with dull mottlings; skin thick, tough; flesh white, scarcely stained at the pit, very juicy, sweet, tender and melting, high-flavored; very good in quality; stone free, ovate, slightly wedged-shaped at the base, plump, winged, long-pointed, with pitted and grooved surfaces.

CHAPTER XXVII

VARIETIES OF PLUMS

FIFTEEN species of plums and varieties to the number of more than 2,000 are now under cultivation. Of all drupe-fruits plums furnish the greatest diversity of kinds. Species and varieties give a greater range of colors, forms, sizes, flavors, aromas, and textures than any other hardy fruit. The plants are quite as diverse as the fruits: some plums are true trees with stout trunks and sturdy branches, while others are shrubs with slender branches. In geographical distribution, wild and cultivated plums encircle the globe in the north temperate zone, the species and varieties being adapted to great diversities of soil and climate. Varieties to the number of thirty-four from twelve species are described in this text, all of which have come under the author's observation as grown at the Experiment Station, Geneva, New York.

INDEX TO VARIETIES OF PLUMS

KEY TO VARIETIES OF PLUMS

A. Plums green, yellow, or purple but not cherry-red.
  B. Size of fruits large, 1½ inches or more in diameter. (Domesticas)
    C. Color of fruits green or yellow.
      D. Fruit large to very large; long-oval; late or very late.
        E. Stem long, with a fleshy collar; apex round; late ..... 562. Yellow Egg.
        EE. Stem short; apex depressed; very late ..... 563. Golden Drop.
      DD. Fruit of medium size; round-oval.
        E. Surface more or less mottled and blushed with red.
          F. Skin greenish-yellow, with green splashes; blush faint ..... 564. Washington.
          FF. Skin bronze-yellow; blush distinct. 565. Jefferson.
        E. Surface not mottled or blushed with red.
          F. Skin yellow streaked and splashed with green; midseason ..... 566. Reine Claude.
          FF. Skin straw-yellow, scarcely streaked or splashed; late ..... 567. Bavay.
    CC. Color of fruits black- or blue-purple.
      D. Stone free.
        E. Fruits markedly compressed and swollen on the suture side.
          F. Medium to large; dots conspicuous; stem 1 inch long, inserted on side of base ..... 568. Italian Prune.
          FF. Medium in size; dots inconspicuous; stem ¾ inch long ..... 569. German Prune.
        EE. Fruits scarcely compressed and swollen on suture side.
          F. Suture shallow and indistinct.
            G. Shape round-oval; stem ¾ inch long; dots inconspicuous; late.... 570. Quackenboss.
            GG. Shape ovate; stem ½ inch long; dots conspicuous; midseason..... 571. Pacific.
          FF. Suture broad, prominent; stone necked ..... 572. Arch Duke.
      DD. Stone clinging.
        E. Suture shallow and indistinct.
          F. Shape ovate, halves equal; flesh greenish-yellow; midseason ..... 573. Gueii.
          FF. Shape round-oval, halves unequal; flesh golden-yellow; late ..... 574. Monarch.
        EE. Suture wide and prominent; stone not necked ..... 575. Grand Duke.

CCC. Color of fruits reddish-purple or reddish; sometimes mottled.
D. Stone free.
E. Shape of fruit markedly obovate.
F. Fruit large to very large; flesh golden-yellow ..... 576. Pond.
FF. Fruit small to medium; flesh greenish-yellow ..... 577. Agen.
EE. Shape of fruit oval or round-oval.
F. Fruit mottled light purple-red; round-oval; stem slender, ¾ inch long ..... 578. Lombard.
FF. Fruit dark purple-red; oval; stem stout, 1 inch long ..... 579. Bradshaw.
DD. Stone clinging; fruit obovate.
E. Fruit large, midseason; flesh golden-yellow ..... 580. Giant.
EE. Fruit medium to large, late; flesh greenish-yellow ..... 581. Imperial Epineuse.
BB. Size of fruits small, less than 1½ inches in diameter. (Insititias)
C. Fruits purple; tart.
D. Shape ovate; dull black; stem ¾ inch long; stone semi-free; flesh greenish-yellow ..... 582. French.
DD. Shape oval; purple-black; stem ½ inch long; stone clinging; flesh golden-yellow ..... 583. Shropshire.
CC. Fruits yellow; sweet; round-oval; stone free ..... 584. Mirabelle.
AA. Plums cherry-red or yellow, never purple.
B. Fruits more or less cordate; more than 1½ inches in diameter. (Japanese plums)
C. Color yellow; stone free ..... 585. Ogon.
CC. Color red; stone clinging.
D. Flesh dark red; round-cordate; suture prominent ..... 586. Satsuma.
DD. Flesh yellow.
E. Size of fruit very large; obliquely cordate; apex prolonged; suture prominent ..... 587. Wickson.
F. Season very early; cavity very deep; apex pointed ..... 588. Red June.
FF. Season very late; cavity wide; apex rounded ..... 589. October.
FFF. Season early.
G. Shape of fruit round-ovate; cavity shallow; apex pointed; flesh yellow 590. Abundance.
GG. Shape of fruit round-conic; cavity deep; apex rounded, flesh deep yellow ..... 591. Burbank.

BB. Fruits globular; not cordate; less than 1½ inches in diameter. (Native plums)
C. Season late or very late. (Hortulana plums)
D. Stem short; flesh golden-yellow ..... 592. Forest Garden.
DD. Stem long; flesh amber-yellow ..... 593. Miner.
CC. Season early or midseason.
D. Shape of fruit round-oval; currant-red; bloom thin; stem jointed (Munsoniana plums) ..... 594. Wild Goose.
DD. Shape of fruit round, truncate at the base; dark crimson; dots very numerous. (Americana plums) ..... 595. De Soto.

DIVISION A. FRUITS GREEN, YELLOW, OR PURPLE, BUT NOT CHERRY RED

SECTION I. FRUITS LARGE, 1½ INCHES IN DIAMETER OR MORE (DOMESTICAS)

Group 1. Fruits Green or Yellow

562. Yellow Egg (Fig. 194).—Producing the largest and handsomest plums, Yellow Egg is worth consideration by either the amateur or the commercial fruit-grower. At best, however, the fruit is fit only for cooking, and is none too good for culinary purposes. The trees are very satisfactory on all but very light soils. It is an old European variety.

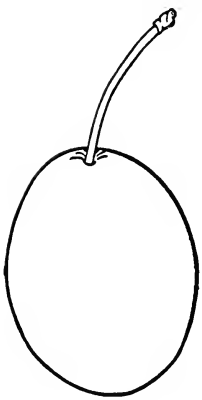

FIG. 194. Yellow Egg.

Tree large, vigorous, round-topped, open, hardy, very productive. Fruit late, season short; 2 by 1⅝ inches in size, long-oval, compressed, halves nearly equal; cavity narrow, abrupt; suture shallow, often a line; apex roundish; color golden-yellow, with thick bloom; dots numerous, white, inconspicuous; stem slender, 1¼ inches long, pubescent, adhering well to the fruit, surrounded at the cavity by a fleshy collar; skin thin, astringent, separating readily; flesh golden-yellow, juicy, coarse, firm, mild; good; stone semi-free or free, oval, flat, acute at the base and apex, with roughened and pitted surfaces.

563. Golden Drop. *Coe's Golden Drop. Silver Prune.*—Well grown, this variety produces large, handsome, and the best of the yellow plums; but in eastern America, trees of Golden Drop

lack vigor; and, while hardy, the fruit-buds are often caught by cold; they are slow in growth; and have a precarious existence because of insects and diseases. The fruits need a long season to reach perfect maturity, often failing to ripen where other plums mature well; they are used for all purposes to which plums are put,—for dessert, cooking, canning, preserving, and prune-making. Jervaise Coe, St. Edmunds, Suffolk, England, raised Golden Drop from a seed about 1809.

Tree medium to large, vigorous, spreading or roundish, open-topped, hardy, productive. Fruit very late; 2 by 1½ inches in size, long-oval, tapering at the base to a short neck, compressed, halves equal; cavity shallow, narrow, abrupt; suture shallow and wide; apex depressed; color golden-yellow with thin bloom; dots numerous, small, russet, conspicuous; stem ¾ inch long; skin tough, adherent; flesh light golden-yellow, juicy, sweet, mild; good to very good; stone free, oval or ovate.

564. Washington (Fig. 195).—The fruits of Washington are large; handsome in form and color; abundant in juice, yet firm and meaty enough to keep and ship well; and very good in flavor. The trees are large, hardy, vigorous, and healthy; remarkable for their broad, glossy, abundant leaves; and bear bountiful crops annually at a favorable period of maturity. Defects are: the fruits are subject to brown-rot; the quality varies greatly in different locations and years; the trees are slow in coming in bearing; and the crops are small for some years after fruiting begins. About 1790, the pits of twenty-five quarts of Green Gage plums were planted by the Princes at Flushing, Long Island. From one of these came Washington.

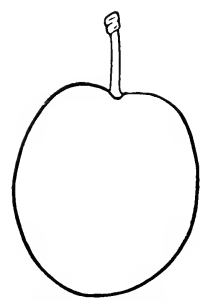

FIG. 195. Washington.

Tree large, vigorous, round and open-topped, hardy, very productive. Fruit midseason; 1¾ by 1⅝ inches in size, round-oval, compressed, halves equal; cavity shallow, narrow, flaring; suture shallow; apex roundish; color greenish-yellow, with green stripes and splashes, occasionally with a faint blush on the sunny side, with thin bloom; dots numerous, white, inconspicuous; stem ½ inch long, with thick pubescence, adhering strongly to the fruit; skin thin, sour, separating readily; flesh greenish-yellow, juicy, firm, tender, sweet, mild, pleasant flavor; good to very good; stone free, oval, turgid, roughened, somewhat blunt at the base and apex.

565. Jefferson (Fig. 196) is one of the best of all dessert plums. Grown under favorable conditions and when fully ripe, the fruit is golden-yellow with a delicate blush and bloom, and is large for the Reine Claude group. It fails as a market variety because the trees are late in coming in bearing, a little particular as to soils, and not quite hardy. Jefferson was raised by Judge Buel, Albany, New York, about 1825.

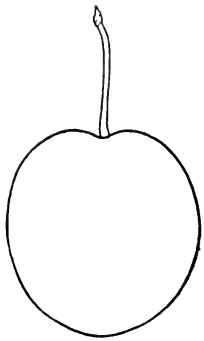

FIG. 196. Jefferson.

Tree medium to large, vigorous, spreading, open-topped, hardy, productive. Fruit midseason; 1½ inches in diameter, round-oval, halves equal; cavity shallow, narrow, abrupt; suture very shallow, indistinct; apex round; color bronze-yellow, sometimes with faint pink blush on the exposed cheek; dots numerous, very small, gray or reddish; stem 1 inch long, thinly pubescent; skin thin, tough, adhering; flesh deep yellow, juicy, firm but tender, sweet, pleasant; very good; stone semi-free, flattened, broadly oval, abruptly tipped, with a short neck at the base, blunt at the apex, with rough and pitted surfaces.

566. Reine Claude. *Green Gage.*—For the qualities that gratify the sense of taste,—richness of flavor, consistency and texture of flesh, abundance of juice, and pleasant aroma, the fruits of Reine Claude are unsurpassed. When grown on thrifty trees, the crop thinned, foliage and fruit kept free from pests, and the fruit sufficiently exposed to the sun to color well, the plums are beautiful. The trees are only of moderate size in the orchard; although small, they are productive and bear regularly, the chief defect being suseeptibility to sun-scald. Reine Claude is still one of the most profitable plums grown, and, whether for the commercial or home plantation, deserves a place in the orchard. The variety is an old one from Europe.

Tree of medium size and vigor, round-topped, hardy, productive. Fruit midseason; 1¾ by 1⅝ inches in size, round-oval, halves equal; cavity narrow, regular, abrupt; suture shallow, broad; apex pubescent, slightly depressed; color yellowish-green, indistinctly streaked with green, becoming golden-yellow at full maturity, overspread with thin bloom; dots very numerous, small, grayish, conspicuous, clustered about the apex; stem thick, ¾ inch long, pubescent; skin tough, adhering to the pulp; flesh greenish-yellow or golden-yellow, juicy, firm, sweet, mild; very good;

stone semi-clinging, oval, turgid, tapering at the base, blunt at the apex, with thickly pitted surfaces.

567. Bavay (Fig. 197). *Bavay's Green Gage.*—Bavay is one of the best green plums. The fruit is unexcelled for dessert, and its delicious flavor is retained in cooking, making the somewhat rare combination of a first-rate dessert and culinary plum. It is also a good market sort, keeping and shipping well. The trees bear young, annually, and heavily, sometimes too heavily, and while not so hardy, large, robust, or long-lived as could be wished, yet in these respects they are superior to most varieties of Reine Claude plums. This is a seedling of Reine Claude produced by Major Espéren, Mechlin, Belgium, about 1832.

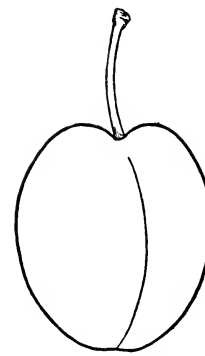

FIG. 197. Bavay.

Tree of medium size and vigor, upright-spreading, open-topped, hardy, very productive. Fruit late; of medium size, round-oval, halves equal; cavity abrupt; suture a line; apex roundish; color straw-yellow, obscurely streaked and splashed; bloom light; dots numerous, small, gray, obscure, clustered about the apex; stem thick, short, pubescent, adhering to the fruit; flesh rich golden-yellow, juicy, fibrous, tender, sweet, pleasant; very good; stone free, oval, necked, blunt at the apex, with pitted surfaces.

Group 2. Fruits Black- or Blue-purple

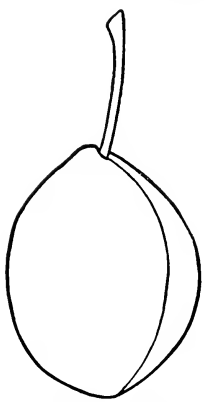

FIG. 198. Italian Prune.

568. Italian Prune (Fig. 198). *Fellenberg.*—The fruit is finely flavored, whether eaten out of hand, prepared for the table or cured as a prune. In cooking, the yellow flesh changes to a dark wine color, very attractive in appearance, with a most pleasant sprightly flavor; as a cured prune, the flesh is firm and meaty, yet elastic, of good color and a perfect freestone. The prunes from this variety are noted for long-keeping. In the uncured state, the product keeps and ships well. The trees are large, hardy, productive, well-formed, and bear regularly; yet

they are often capricious to soil and climate, do not always bear well, seem to be susceptible to diseases, are preyed upon by insects, and suffer from dry or hot weather. Italian Prune originated in Italy at least a century ago.

Tree vigorous, upright, low-topped, hardy, productive. Fruit late; 2 by 1½ inches in size, long-oval, enlarged on the suture side, compressed, halves unequal; cavity very shallow and narrow, abrupt; suture shallow; apex bluntly pointed; color purplish-black, with very thick bloom; dots numerous, small, light brown, conspicuous; stem inserted at one side of the base, 1 inch in length, pubescent; skin thin, tough; flesh yellow, juicy, firm, subacid, aromatic; very good to best; stone free, irregular-oval, flattened, roughened and pitted, neck at the base, abruptly tipped at the apex.

569. German Prune (Fig. 199) is one of the oldest plums under cultivation. The variety comes almost true to seed, and is often propagated by planting pits, a practice which has produced many strains. The most commonly grown German Prune in the United States is the Rochester strain, from trees of which the following description was made. All German Prunes are characterized by large, hardy, vigorous, healthy, productive trees, characters giving the variety its great value. The fruit is excellent for all culinary purposes. This variety is likely to remain a standard for some time, but will eventually be superseded by one having a larger fruit. German writers state that this variety originated in Asia, whence it was brought during the Crusades to Europe.

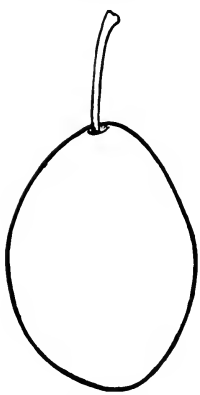

FIG. 199. German Prune.

Tree large, vigorous, round, hardy, very productive. Fruit late, ripening period very long; 1⅝ by 1 inch, oval, swollen on the ventral side, halves unequal; cavity very shallow, narrow, flaring; suture a faint line; apex pointed; color purplish-black; bloom thick; dots numerous, small, brown, inconspicuous, clustered about the base; stem ⅝ inch long, adhering well to the fruit; flesh yellowish-green, juicy, firm, sweet, mild, with pleasant flavor; good to very good; stone free, flattened, obliquely long-oval, pointed at the apex and base, with rough and pitted surfaces.

570. Quackenboss (Fig. 200).—The fruits of Quackenboss possess to a high degree the characters which make a good mar-

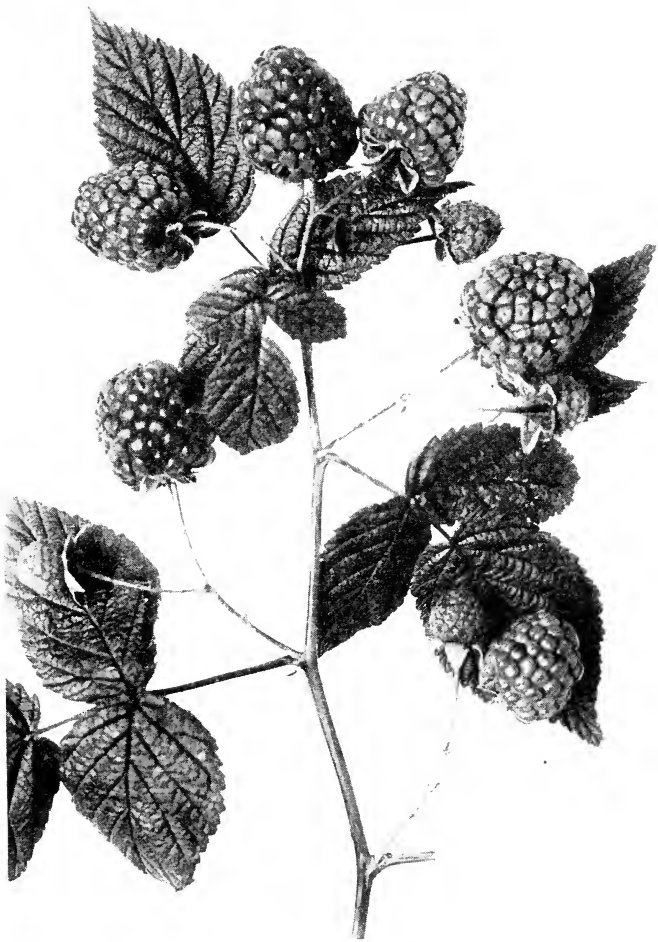

PLATE XIX. An American red raspberry—The Cuthbert.

ket plum: they are of large size; round-oval, better for the markets than the prune shapes; very prepossessing in color,—a handsome, dark purple with heavy bloom; and the flesh is tender, juicy and sweet. The tree is large, vigorous, hardy, with a round and spreading top, but is unfruitful and fails as a commercial sort for this reason. The variety has two peculiarities; the petals are comparatively distinct from each other, giving the flower, or a tree in flower, an odd appearance; and the leaves are remarkably variable in size. Quackenboss originated at Schenectady, New York, about 1828.

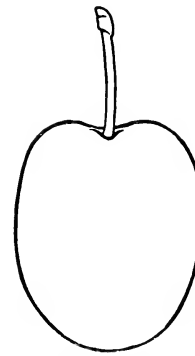

FIG. 200. Quackenboss.

Tree very large and vigorous, hardy, productive. Fruit late, season short; 1⅝ by 1⅜ inches in size, round-oval, slightly compressed, halves equal; cavity narrow, abrupt; suture shallow, often lacking; apex depressed; color bluish-black, with thick bloom; dots numerous, yellowish-brown, inconspicuous; stem ¾ inch long, pubescent, adhering well to the fruit; skin tender, astringent; flesh deep yellow, juicy, tender, sweet, mild; good; stone free, flattened, irregular-oval, tapering to a long narrow neck at the base, bluntly acute at the apex, with rough and pitted surfaces.

571. Pacific (Fig. 201). *Willamette.*—The purple plums of Pacific are beautiful in color and shape, very large, and few varieties of this color excel them in quality. The trees are unusually robust, hardy, and productive. It is well worth general trial for home and market plantations. This plum is badly confused with the Willamette, the two sorts having originated in Oregon about 1875.

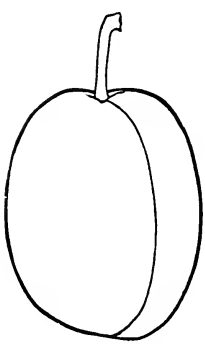

FIG. 201. Pacific.

Tree large, upright-spreading, open-topped, hardy, productive. Fruit midseason; 2 inches by 1⅝ inches in size, ovate, halves equal; cavity shallow, narrow, flaring; suture shallow, indistinct; apex bluntly pointed; color bluish, overspread with thick bloom; dots small, brown, conspicuous; stem thick, ½ inch long, pubescent, adhering well to the fruit; skin thin, tough, separating readily; flesh pale golden-yellow, juicy, firm, sweet, spicy; good; stone free, flattened, irregularly broad-oval, obliquely contracted at the base, blunt at the apex, with rough and pitted surfaces.

572. Arch Duke (Fig. 202).—The qualities which give Arch Duke high place among commercial varieties are: large size; handsome color,—a rich dark purple with thick bloom; and firmness of flesh and skin, so that it keeps and ships well. The plum of Arch Duke compared with that of Grand Duke is nearly as large, with neck thicker, the same color, bloom heavier, quality higher, flesh firmer, stone free, and season earlier. All the tree characters, like those of the fruit, are good. Arch Duke was raised by Thomas Rivers, Sawbridgeworth, England, and was sent out in 1883.

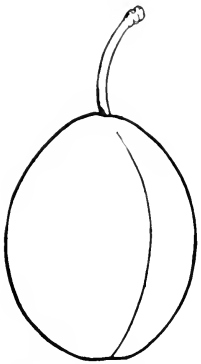

FIG. 202. Arch Duke.

Tree of medium size, upright-spreading, hardy, very productive. Fruit late; 1¾ to 1¼ inches, long-oval, compressed, necked; cavity shallow, narrow, compressed, abrupt; suture shallow, broad, prominent; apex elongated; color dark blue; bloom heavy; dots numerous, small, brownish-russet, inconspicuous; stem often inserted at one side of the base, ⅝ inch long, glabrous, adhering well to the fruit; flesh deep golden-yellow, often reddish, juicy, coarse, firm, tender, sweet, pleasant; good; stone free, the cavity larger than the pit, long-oval, necked, abruptly tipped at the apex, reddish, rough.

573. Gueii (Fig. 203) ranks among the first six plums in eastern America. Its popularity is due to its being a money-maker, as few would care to grow it in a home orchard. The quality of the fruit is poor, but the trees bear early and abundantly; are large, vigorous, healthy, and hardy; and the plums are hardly surpassed for shipping. The stone sometimes clings rather tightly, and under other conditions is wholly free. Gueii originated with a Mr. Hagaman, Lansingburgh, New York, about 1830.

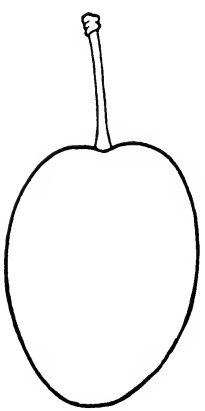

FIG. 203. Gueii.

Tree large, vigorous, open-topped, hardy, very productive. Fruit midseason; medium in size, ovate, halves equal; cavity abrupt, rarely sutured; apex bluntly pointed; color dark purplish-black, with thick bloom; dots numerous, small, russet, clustered about the apex; skin thin, tender, separating readily; flesh greenish-yellow,

changing to light golden-yellow, dry, firm, tender, sweet, mild, astringent at the center; fair in quality; stone unusually clinging, large, ovate or oval, blunt at the base and apex, roughened and pitted.

574. Monarch (Fig. 204). — The nicely turned form and the rich purple color make the fruits of Monarch handsome; while the quality is not of the best, it is good as compared with other purple varieties. Monarch is not remarkable for its tree characters, yet these average well with those of other plums, and, with those of the fruit, make a variety quite above the average, giving it a place among the best commercial sorts. Monarch was grown by Thomas Rivers, Sawbridgeworth, England, and was introduced by the originator in 1885.

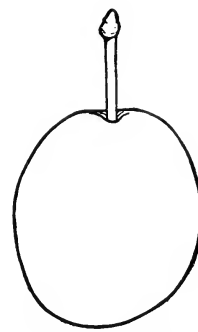

FIG. 204. Monarch.

Tree of medium size and vigor, upright-spreading, open-topped, hardy, productive. Fruit late; 2 inches by 1¾ inches in size, round-oval, halves unequal; cavity deep, narrow, abrupt; suture shallow; apex flattened; color dark purplish-red, with russet flecks scattered over the surface, with thick bloom; dots numerous, small, reddish-brown, conspicuous; stem thick, ¾ inch long, pubescent; skin thin, tender, astringent, separating readily; flesh golden-yellow, juicy, fibrous, tender, aromatic; good; stone clinging, long-oval, turgid, roughened and pitted, pointed at the base, blunt at the apex.

575. Grand Duke (Fig. 205) is the favorite late-shipping plum in eastern America. Its popularity is due to large size, handsome color, and firm meaty flesh, which fits the fruits excellently for shipping. The plum is not more than a second-rate dessert fruit, although it is very good in whatever way cooked. The trees grow poorly in the nursery and in the orchard are seldom large and vigorous enough to be called first class; they come in bearing slowly, but bear regularly and abundantly and hold the crop well, the plums being unusually free from rot and hanging in good condition a long time. Grand Duke is another of the many valuable plums produced by Thomas Rivers, Sawbridgeworth, England.

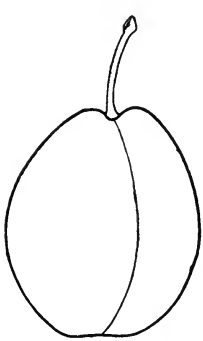

FIG. 205. Grand Duke.

Tree medium in size, vigorous, upright-spreading, hardy, productive. Fruit late; 2½ by 2 inches in size, elongated-oval or slightly obovate, halves unequal; cavity shallow, narrow, abrupt; suture wide; apex flattened, depressed or with a short blunt tip; color purplish-black, with thick bloom; dots numerous, small, brown; stem ¾ inch long; skin separating readily; flesh golden-yellow, juicy, firm, sweet, mild; good; stone clinging, sometimes tinged red, irregularly oval, slightly flattened, rough.

Group 3. Fruits Reddish-purple or Reddish

576. Pond (Fig. 206). *Hungarian.*—Pond is preëminent among plums for its large fruits, which are distinguished also by their form and color, both being pleasing as well as distinctive. The eye is pleased with the plum, but the palate is sadly disappointed, for at best it is not even second-rate. The fruits, however, ship and keep well. The trees are satisfactory in most regions, though small and not always productive. This variety was obtained from seed by a Mr. Pond, an English grower of fruits, as long ago as 1831.

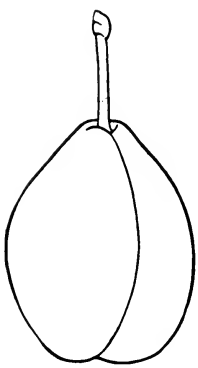

FIG. 206. Pond.

Tree of medium size, vigorous, upright, hardy, variable in productiveness. Fruit late, season short; 2 inches by 1¾ inches in size, obovate, frequently with a neck, halves equal; cavity shallow, narrow, abrupt; suture shallow, often a line; apex roundish; color reddish-purple to purplish-red, overspread with thick bloom; dots numerous, small, reddish-brown, obscure; stem thick, ⅞ inch long, heavily pubescent, adhering well to the fruit; skin tough, separating readily; flesh golden-yellow, dry, fibrous, firm, mild, not highly flavored; fair in quality; stone semi-free to free, long-oval, flattened, the surfaces roughened and deeply pitted, tapering towards the base and apex.

577. Agen (Fig. 207). *French Prune. Petite Prune.*—Agen is largely grown for prune-making, several qualities admirably fitting the fruits for curing. The plum has a high percentage of sugar and solids, so that it cures readily into a firm, sweet, long-keeping prune, which, in cooking, needs little sugar; the plums are uniform in size; the trees bear regularly and abundantly; and the crop hangs well on the tree. Besides making

excellent prunes, Agen is a very good dessert plum and ought to be in every home orchard. Lack of size in the fruit has kept it from being more largely grown outside of prune-making regions. The name is derived from Agen, a region in France where the variety is extensively cultivated.

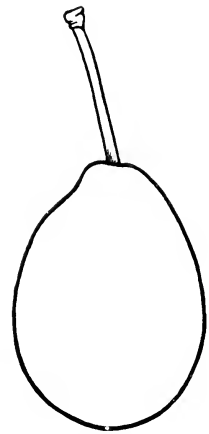

FIG. 207. Agen.

Tree of medium size, upright-spreading, dense-topped, hardy, very productive. Fruit late; 1½ by 1 inch, obovate, the base necked, halves equal; cavity shallow, narrow, flaring; suture very shallow, indistinct; apex roundish or flattened; color violet-purple; bloom light, dots numerous, small, brown, obscure; stem thick, 1 inch long, glabrous, adhering to the fruit; flesh greenish-yellow, tender, sweet, aromatic; very good to best; stone semi-free or free, oval, flattened, with pitted surfaces, abrupt at the base and apex.

578. Lombard (Fig. 208) is probably more widely grown in America than any other plum. The meritorious characters are: it adapts itself to widely different soils and climates; the robustness, hardiness, healthiness, productiveness, and regularity in bearing of its trees; the fact that the fruits are comparatively free from plum-curculio; lastly, its showy fruits tempting to the eye and readily salable. Canned, cooked, preserved, or spiced, the product does very well, but as a dessert fruit, Lombard falls in a category with the Ben Davis apple and Kieffer pear, "good-looking but poor." Lombard was raised by Judge Platt, Whitesboro, New York, about 1830.

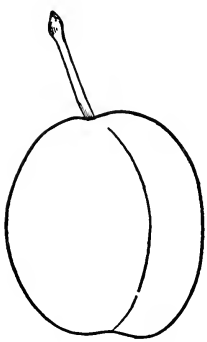

FIG. 208. Lombard.

Tree of medium size, round-topped, very hardy, productive. Fruit mid-season; 1¾ by 1½ inches in size, round-oval, compressed, halves unequal; cavity narrow, abrupt, round; suture a line, apex flattened; color light to dark purplish-red, overspread with thick bloom; dots numerous, small, light russet; stem slender, ¾ inch long; skin thin, tender, separating readily; flesh yellow, juicy, fibrous, firm and sweet, mild; inferior in quality; stone semi-free to free, dark colored, oval, flattened, roughened.

579. Bradshaw (Fig. 209).—A study of this variety does not justify its great popularity. The trees grow slowly and are tardy in coming into bearing, the fruit is not especially high in quality, and in many regions is attacked by brown-rot too freely for profitable orchard culture. To offset these faults, the trees are large, well formed, bear regularly and heavily, are robust and healthy; and the plums are large, attractive in appearance, and keep and ship well, especially if picked a little green. The origin of this plum is not known; it was named by C. M. Hovey in 1846.

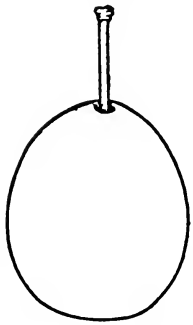

FIG. 209. Bradshaw.

Tree large, vigorous, broad-vasiform, hardy, very productive. Fruit midseason; 2 by 1¾ inches, oval, compressed, halves equal; cavity shallow, narrow, abrupt, with a fleshy ring around the stem; suture very shallow; apex flattened; color dark reddish-purple; bloom heavy; dots numerous, small, russet, inconspicuous, clustered about the apex; stem thick, 1 inch long, pubescent, adhering strongly to the fruit; flesh dull yellow, often with a trace of red, juicy, fibrous, tender, sweet, pleasant; good; stone semi-free, flattened, irregularly oval, necked at the base, blunt at the apex, strongly roughened and pitted.

580. Giant (Fig. 210). *Giant Prune.*—The fruit of Giant is distinguished by large size and attractive color. The flesh is coarse, fibrous, lacking in juice, clings more or less to the stone, and rots quickly. The trees lack somewhat in both vigor and productiveness. Introduced as a prune, it was supposed that this variety would prove a great boon, but it does not cure well and is now hardly used for drying. It is unfortunate that a plum so attractive cannot be recommended, but the quality is too poor. Giant was grown by Luther Burbank, Santa Rosa, California. Stock was first offered for sale in 1893.

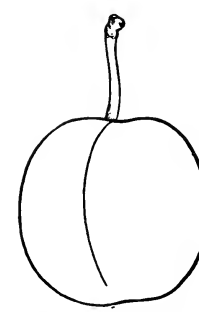

FIG. 210. Giant.

Tree medium in size and vigor, round, dense-topped, hardy, productive. Fruit midseason; 2 by 1½ inches, obovate, slightly necked, compressed, halves unequal; cavity shallow, narrow, abrupt; suture shallow; apex

roundish or depressed; color purplish-red; bloom thin; dots numerous, small, russet, inconspicuous; stem 1 inch long, thinly pubescent, adhering to the fruit; flesh light golden-yellow, coarse, fibrous, firm, sweet, mild; fair in quality; stone semi-clinging, long-oval, flattened, with rough and pitted surfaces.

581. Imperial Epineuse.—The fruits of Imperial Epineuse are not surpassed in quality by those of any other plum; moreover, they are most pleasing in appearance, being large, beautiful in shape, and made further attractive by a handsome reddish-purple color which is lighter or darker according to the exposure to the sun. The tree is particularly large and vigorous, its strong growth being a striking characteristic of the variety. Wherever tried, fruit and tree are liked and the variety is certain to grow in popularity in eastern orchards for both home and market plantations. Imperial Epineuse was found about 1870 near Clairac, France. It was brought to the United States by Felix Gillett, Nevada City, California, in 1883.

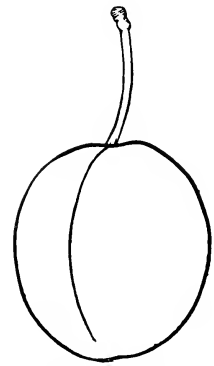

FIG. 211. French.

Tree large, vigorous, spreading, productive. Fruit late; large, obovate, purplish-red, darker on the sunny side, mottled, overspread with thick bloom; flesh greenish-yellow, fibrous, tender, sweet, agreeable in flavor; very good; stone clinging, irregular-oval, flattened, obliquely but bluntly contracted at the base, with pitted surfaces.

SECTION II. FRUITS SMALL, LESS THAN 1½ INCHES IN DIAMETER. (INSITITIAS)

Group 4. Purple Insititias

582. French (Fig. 211). This excellent Damson is largely grown for the market, for good quality as well as size and appearance of the fruit aid in selling the product. The fruits have but one defect, the pit is large for the amount of flesh. The trees are large, hardy, bear abundantly and annually, and carry their foliage so well that fruit and wood usually ripen perfectly.

The season is a little after that of the more commonly grown Shropshire, in most years an advantage. The origin is unknown, but it is probably an old variety renamed.

Tree large, vigorous, spreading, dense-topped, hardy, productive. Fruit late; 1½ by 1⅛ inches in diameter, ovate, halves equal; cavity very shallow, flaring; suture a line; apex roundish; color dull black; bloom thick; dots numerous, small, inconspicuous; stem slender, ¾ inch long, pubescent, adhering well to the fruit; flesh greenish, juicy, fibrous, tender, sweet, pleasant, sprightly; good; stone variable in adhesion, oval, roughened, acute at the base, blunt at the apex.

583. Shropshire (Fig. 212) is the best known of the Damsons. The qualities which make it a favorite are for the most part those of the tree, which is not surpassed by any other Insititia in size, vigor, hardiness, and health. The tree is enormously productive and has but one defect,—unless sprayed the foliage falls prey to fungi and drops early. The fruit is of medium size, and, while in no sense a dessert plum, may be eaten out of hand with relish when fully ripe or after a light frost. Shropshire originated in England sometime in the seventeenth century.

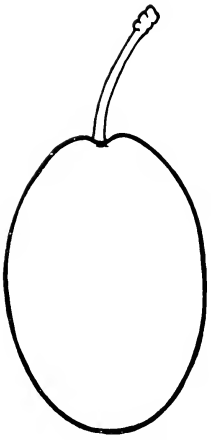

FIG. 212. Shropshire.

Tree vigorous, vasiform, hardy, productive. Fruit late, season long; 1½ inches by 1 inch in size, oval, compressed, halves equal; cavity shallow, narrow, flaring; suture an indistinct line; apex roundish; color purplish-black, overspread with thick bloom; dots numerous, small, russet; stem slender, ½ inch long, glabrous, adhering to the fruit; skin thin, tender, adhering; flesh golden-yellow, juicy, firm but tender, agreeably tart, pleasant; stone clinging, oval, acute at the base, blunt at the apex, with nearly smooth surfaces.

Group 5. Yellow Insititias

584. Mirabelle.—In Europe, Mirabelle is one of the favorite varieties, and its fruits are in great demand for canning, preserves, compotes, tarts, and prunes. The trees grow very well, producing fine crops of fruit wherever the Damsons can be raised. The small, round, yellow fruits are attractive in appear-

ance and sweet and pleasant in flavor. The trees are small but vigorous and healthy. Mirabelle was first noted by pomological writers of the seventeenth century.

Tree small, round, open-topped, hardy. Fruit midseason; 1 inch in diameter, round-oval, necked, compressed, halves equal; cavity shallow, abrupt; suture indistinct; apex depressed, color light golden-yellow, with thick bloom; dots numerous, small, white; stem slender, ¾ inch long, pubescent, parting readily from the fruit; skin thin, tough; flesh light yellow, firm, tender, sweet, mild; good to very good; stone free, oval, blunt, broadly ridged along one edge, rough.

DIVISION B. FRUITS CHERRY RED OR YELLOW, NOT PURPLE

Section III. Fruits More or Less Cordate. (Japanese Plums)

Group 6. Fruits Yellow

585. Ogon is one of the few varieties of *P. salicina* bearing yellow fruits. It is further distinguished by being the only freestone sort of its species under cultivation in America, and by fruits having a flavor quite distinct, resembling that of the apricot. The plums are not of high quality, crack badly on the tree, and are unusually susceptible to the attacks of curculio. The trees are small and unproductive. These faults preclude the growing of Ogon in commercial plantations. Ogon was imported from Japan about 1885.

Tree medium, vigorous, vasiform, dense-topped, unproductive. Fruit early; 1¼ by 1¾ inches in size, round-oblate, oblique, halves equal; cavity narrow, regular, flaring; suture variable in depth, prominent; apex roundish or slightly flattened; color lemon-yellow, with thin bloom; dots numerous, small, white, inconspicuous; stem slender, ½ inch long, glabrous, separating readily; skin thin, rough, astringent, inclined to crack, adhering; flesh pale or amber-yellow, firm, sweet, mild; of fair quality; stone free, round-oval, turgid, blunt but with a small short tip, oblique, slightly pitted.

Group 7. Fruits Red

Sub-group 4. Flesh Red

586. Satsuma.—There is a group of several varieties of Japanese plums unique in having deep red flesh. While the fruit is

not so large nor so handsome in color as some of its offspring, Satsuma is still one of the best of these red-fleshed varieties for quality of fruit. The plums keep and ship well, and if of sufficient size and allowed to color properly, make a good showing on the markets. The trees are above the average for the species in size, habit, health, hardiness, and productiveness, though they bear sparingly when young. Satsuma was raised from seeds sent to Luther Burbank by a Japanese agent in 1883; it was introduced in 1889.

Tree medium to large, vigorous, upright-spreading, usually hardy, productive, bearing heavier crops as the tree becomes older. Fruit midseason or later; 2 inches in diameter; round-cordate, flattened at the base, compressed, halves unequal; cavity deep, narrow, abrupt, compressed; suture prominent; apex pointed; color dark dull red, with thin bloom; dots numerous, russet, conspicuous, clustered about the apex; stem slender, ⅜ inch long, glabrous; skin of medium thickness and toughness, bitter, semi-adherent; flesh dark purplish-red, juicy, tender at the skin, tough at the center, sweet, with an almond-like flavor; of good quality; stone clinging, oval, strongly pointed, rough, red.

Sub-group 5. Flesh Yellow

587. Wickson (Fig. 213).—The fruit of Wickson is the largest of the Oriental plums, if not the largest of all plums; it is of handsome color and distinct form; the flesh is firm and of a peculiar flavor, generally considered pleasant. These characters and the narrow upright tree, with its long lanceolate leaves, mark the variety as a new and a valuable addition to pomology. In the East, Wickson is a little tender in tree and bud, hardy only where the peach can be grown; it blossoms too early to be safe from frost; it is susceptible to brown-rot; the trees are late in coming in bearing and are not reliable in fruiting; the fruits ripen unevenly; and the trees are not of good form for heavy crops. In California, Wickson is one of the leading Japanese sorts. It is the best known of Burbank's many plums. It was first described in 1892.

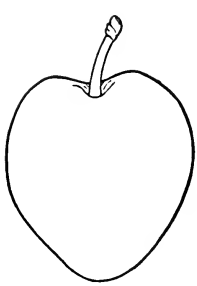

Fig. 213. Wickson.

Tree medium to large, vigorous, with narrow upright head, dense-topped, tender to cold, an uncertain bearer. Fruit early midseason; 2⅛ inches in diameter, obliquely cordate, halves unequal; cavity deep, abrupt, with concentric rings; suture prominent and deep, with a prolonged tip at the apex; color dark red over a yellow ground, indistinctly splashed with darker red, mottled with thin bloom; dots numerous, small, yellow, densely clustered about the apex; stem thick, 11/16 inch long, glabrous; skin thin, tender, separating easily; flesh amber-yellow, juicy, coarse, fibrous, firm, sweet, pleasant but not high in flavor; good; stone clinging, oval or ovate, pointed, with pitted surfaces.

588. Red June is distinguished from all other plums by its fruit characters; the fruits are distinctly cordate in shape with a deep cavity and a pointed apex; the color is a mottled garnet-red overlaid with delicate bloom; the flesh is a light yellow, peculiarly aromatic, sweet, and not wholly agreeable in flavor; the stone adheres tightly to the flesh. The trees are large, vigorous, spreading, hardy, healthy, and productive. Other good qualities of the variety are that it blooms late; the fruits are very early, comparatively immune to curculio and brown-rot and hang to the trees exceptionally well. The variety was imported from Japan by H. H. Berger and Company, San Francisco, California, about 1887.

Tree large, vigorous, upright-spreading, hardy, productive, healthy. Fruit early, 1½ by 1⅜ inches in size, round-cordate, sides unequal; cavity large, deep, narrow, regular, abrupt; suture deep, distinct; apex very pointed; color garnet-red, mottled; bloom thin; dots numerous, small, russet; stem ½ inch long, adhering to the fruit; skin tender, astringent, separating easily; flesh light yellow, fibrous, meaty, sweet except near the center; good; stone clinging, irregular-oval; flattened, pointed at both ends, with pitted surfaces.

589. October is the nearest approach to a good late plum in its species, but because of several faults falls considerably short of filling the need. The fruits are large, attractive, suitable for dessert, good for culinary purposes, hang well to the tree, and keep and ship much better than those of the average Japanese variety. The trees are well shaped, usually robust and healthy, and the fruit is well borne on lateral spurs distributed over the old wood; but they are tardy in coming in bearing, and cannot be depended on to bear satisfactory crops regularly. October was first fruited by Luther Burbank in 1892.

Tree variable in size and vigor, upright-spreading, open-topped. Fruit midseason, ripening period long; 1⅞ inches in diameter, round-cordate, halves unequal; cavity deep, wide, flaring, with streaks radiating from the cavity; suture a line; apex round to pointed; color dark red over a yellow-green ground, with bloom of medium thickness; dots numerous, large, russet, conspicuous, clustered about the apex; stem slender, ⅝ inch long, glabrous; skin thin, tough, sour, separating readily; flesh light yellow tinged with red, very juicy, fibrous, sweet, mild; good; stone clinging, round-oval, blunt but with a small tip, somewhat rough.

590. Abundance (Fig. 214) is the best known of the Japanese plums. The two assets which have given the variety great popularity are adaptability to a wide diversity of soils and climates, and, as its name implies, abundance of fruit. As a market plum, Abundance has several faults; the fruits ship and keep poorly, are subject to brown-rot, mature unevenly, and drop rather too readily as they ripen. The crop should be harvested before quite ripe, as the plums develop in flavor best when picked early, and the dropping and rot are thus avoided. The variety is exceedingly variable, and undoubtedly several well marked strains could be selected. Abundance was imported from Japan by Luther Burbank in 1884.

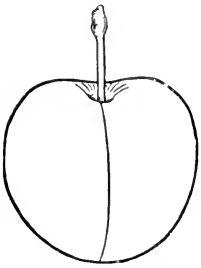

Fig. 214. Abundance.

Tree large, vigorous, vasiform, hardy, very productive. Fruit early; 1½ inches in diameter, round-ovate, slightly compressed; cavity medium in depth and width, abrupt, regular; suture shallow, distinct; apex pointed; color dark red, mottled; bloom light; dots numerous, russet, conspicuous; stem ½ inch long, glabrous, parting easily from the fruit; flesh yellow, very juicy, melting, sweet, pleasantly aromatic; good; stone clinging, oval, compressed, pointed, rough.

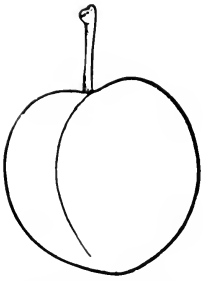

Fig. 215. Burbank.

591. Burbank (Fig. 215). — Abundance holds first place among Japanese plums, but Burbank is a close second, and in many localities has preference. Abundance is in the lead because its trees are larger, better formed, and bear more fruit than those of Burbank. To offset

the advantages of Abundance, the fruit of Burbank is of better quality, more handsomely colored, keeps and ships better, is less susceptible to brown-rot; and ripens a week or more later, which in most seasons is a slight advantage. The trees are distinguished from those of all other plums by their low spreading habit, flat top, and drooping branches. Burbank was produced from a plum pit sent to Luther Burbank by a Japanese agent in 1883.

Tree large, vigorous, distinguished by its low sprawling habit and flat open top, very productive, healthy. Fruit early; variable in size, large, 1¾ inches in diameter, round-conic, halves equal; cavity deep, abrupt, regular; suture shallow, apex roundish; color dark red over a yellow ground, mottled; bloom heavy; dots numerous, large, russet, conspicuous; stem ⅝ inch long, glabrous, parting readily from the fruit; flesh deep yellow, juicy, tender, firm, sweet, aromatic; good; stone clinging, round-oval, turgid, blunt but sharp-tipped, rough.

SECTION IV. FRUITS GLOBULAR, NOT CORDATE (NATIVE PLUMS)

Group 8. Fruits Very Late

592. Forest Garden. *P. hortulana Mineri.*—Forest Garden is widely distributed in the Central West, where both in tree and fruit characters it seems adapted to the needs of climate and soil. The fruit is late, maturing at a good time for shipping, for which it is further adapted by tough skin and firm flesh; and, while not preëminently well fitted for dessert, it has a spicy flavor that makes it pleasant eating and admirably adapted for culinary purposes. This variety is from a wild plum found in the woods near Cedar Rapids, Iowa, by Thomas Hare, about 1862.

Tree large, very vigorous, spreading, flat-topped, hardy, bearing young. Fruit late; 1⅛ inches in diameter, large, round-ovate, compressed, halves equal; cavity shallow, wide, flaring; suture a line; apex roundish or pointed; color dark red; bloom light; dots numerous, russet, conspicuous; stem slender, ⅝ inch long, glabrous; flesh dark golden-yellow, juicy, coarse, fibrous, melting, sweet next the skin, sour toward the center, with a strong and peculiar flavor, aromatic; good; stone clinging, oval, turgid, blunt, flattened at the base, ending in an abrupt but sharp point at the apex, smooth.

593. Miner. *P. hortulana Mineri.*—Miner is particularly adapted to the northern limits of the cultivation of its species. The tree is robust, healthy, better in habit of growth for orchard management than any other of the native plums, and usually productive. The fruits are good in quality, attractive in appearance, comparatively curculio-proof, and are especially suited for culinary uses. In 1813, William Dodd found this plum in a Chicasaw Indian plantation on the Tallapoosa River, Alabama.

Tree large, vigorous, spreading, hardy, unproductive unless cross-pollinated. Fruit late; medium in size, round-ovate; cavity shallow, narrow, regular; suture indistinct; apex pointed; color dull dark red, with thin bloom; dots numerous, minute, yellowish; stem slender, long, astringent; flesh pale amber-yellow, juicy, tender, mild, aromatic; good; stone adhering, small, round-oval, flattened, with nearly smooth surfaces.

Group 9. Fruits Early or Midseason

594. Wild Goose. *P. Munsoniana.*—Wild Goose was the first native plum to be generally grown as a distinct variety. Good qualities of the plum are: bright attractive color; tender and melting flesh with a sprightly and refreshing flavor; a tough skin which fits it well for shipment and long-keeping; comparative freedom from brown-rot and curculio. The trees are large, hardy, healthy, and, when cross-pollinated, very productive. About 1820 M. E. McCrance, Nashville, Tennessee, shot a wild goose; his wife, in dressing the goose, found a plum seed in its craw, which, planted, produced the Wild Goose tree.

Tree very large and vigorous, wide-spreading, flat-topped, hardy. Fruit very early; 1⅜ by 1 3/16 inches in size, oval, halves equal; cavity small, narrow, shallow, abrupt; suture an indistinct line; apex round or pointed; color bright red, with thin bloom; dots few, light russet, conspicuous, clustered about the apex; the stem attached to a stem-like growth from the fruit-spurs gives the appearance on the tree of a jointed stem, very slender, ¾ inch long, glabrous, not adhering to the fruit; skin tough, astringent, separating readily; flesh yellowish, juicy and fibrous, tender and melting, sweet next the skin but sour at the center, sprightly; fair to good; stone adhering, long and narrow-oval, flattened, slightly necked at the base, acute at the apex, roughened.

595. De Soto (Fig. 216). *P. americana.*—De Soto is better suited to the orchard than other Americanas, having little of the

waywardness in tree of most sorts of its species. The trees, also, are enormously productive. The fruits of De Soto, while not so large nor so brilliantly colored as those of some of the Americanas, are not surpassed in quality by the product of any, and keep and ship well. De Soto was found on the bank of the Mississippi River near De Soto, Wisconsin, by a Mr. Tupper, in 1853.

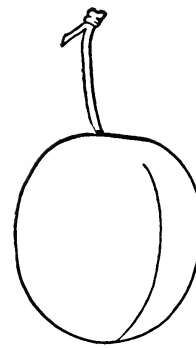

FIG. 216. De Soto.

Tree small, spreading, hardy, produces heavy crops annually, bears young. Fruit midseason; 1½ inches in diameter, round, compressed, often strongly truncate at the base; cavity shallow, abrupt; suture very shallow or a line; apex round or somewhat pointed; color dark crimson over orange-yellow ground; bloom light; dots very numerous, small, light russet, inconspicuous; stem slender, ¾ inch long, sparingly pubescent; flesh golden-yellow, very juicy, fibrous, tender, melting, mild; fair to good; stone nearly free, oval, turgid, blunt-pointed, smooth.

CHAPTER XXVIII

VARIETIES OF GRAPES

TEN species of native grapes have furnished about 2,000 varieties to American viticulture. Possibly twice as many more are described in European viticultural literature from *V. vinifera* alone, more than 300 of which have been tried in America. Few other fruits offer so great a number of combinations of sizes, color, flavors, aromas, and uses as the grape. The vineyard, to fulfil its potentialities, should have a well selected assortment of the kinds described.

INDEX TO VARIETIES OF GRAPES

KEY TO VARIETIES OF GRAPES

A. Skin of mature grapes separating from the pulp. (Native grapes)
  B. Berries in clusters not exceeding 10 to 20; parting readily from the pedicels. (Rotundifolia grapes)
    C. Color of berries greenish with an amber tinge ..... 596. Scuppernong.
    CC. Color of berries red or purple.
      D. Shape of berries round, 4 to 12 in a cluster, blue-black ..... 597. James.
      DD. Shape of berries round-oblong.
        E. Number of berries 4 to 12 in a cluster, almost jet-black ..... 598. Memory.
        EE. Number of berries 10 to 20 in a cluster, purplish-black ..... 599. Flowers.
  BB. Berries in bunches of 20 to many; adhering strongly to the pedicels.
    C. Size of berries about as large as those of Concord or larger. (Labrusca-like grapes)
      D. Color of berries green or greenish-yellow.
        E. Grapes green, rather small, round; season very early ..... 600. Winchell.
        EE. Grapes yellowish, large, oval.
          F. Clusters short, rather small; season early; pure flavor ..... 601. Diamond.
          FF. Clusters long, large; midseason; flavor foxy ..... 602. Niagara.
      DD. Color of berries red or reddish.
        E. Ripening early; round; dark red.
          F. Clusters short, broad; flavor scarcely foxy ..... 603. Salem.
          FF. Clusters long, narrow; pulpy and very foxy ..... 604. Lucile.
        EE. Ripening midseason; berries oval; light or dark red.
          F. Grapes light red; cluster large, long, broad, loose ..... 605. Brighton.
          FF. Grapes dark red.
            G. Cluster short, broad, tapering; stem medium long ..... 606. Agawam.
            GG. Cluster long, cylindrical; stem long ..... 607. Lindley.
        EEE. Ripening late; berries oval; light and dark red.
          F. Berries amethyst-red; clusters shouldered, slender, tapering, loose. 608. Iona.

FF. Berries dull purplish-red; clusters broad, tapering ..... 609. Catawba.
FFF. Berries mottled light and dark red; clusters broad, cylindrical.... 610. Vergennes.
DDD. Color of berries purple-black.
E. Ripening early.
F. Shape of berries oval.
G. Clusters very large; berries very large; brush reddish ..... 611. Campbell Early.
GG. Clusters medium; berries medium; brush green ..... 612. Eclipse.
FF. Shape of berries round.
G. Brush green or greenish.
H. Clusters large, long, broad, tapering, compact; medium early ..... 613. Worden.
HH. Clusters medium, cylindrical, loose; very early ..... 614. Moore Early.
GG. Brush red; cluster small, short, cylindrical ..... 615. Janesville.
GGG. Brush bronze; cluster medium, blunt, compact, cylindrical. 616. Champion.
EE. Ripening midseason; brush greenish.
F. Shape of berries round, glossy-black; clusters large, long, broad, tapering ..... 617. Concord.
FF. Shape of berries oval; clusters short, very broad.
G. Berries more or less flattened, dull black; season with Concord. 618. Herbert.
GG. Berries not flattened, purplish-black; later than Concord..... 619. Barry.
EEE. Ripening late; brush red; berries rather small, jet-black ..... 620. Ives.
CC. Size of berries as small as those of Delaware or smaller.
D. Color of berries green.
E. Cluster large, long, slender, cylindrical; flavor without foxiness.... 621. Empire State.
EE. Cluster medium, short, broad, cylindrical; flavor foxy ..... 622. Elvira.
DD. Color of berries red.
E. Season early; clusters small; berries light red ..... 623. Delaware.
EE. Season very late; clusters large; berries reddish black ..... 624. Herbemont.
DDD. Color of berries purple-black.
E. Cluster medium to large, short, broad, tapering; berries small, round-oblate, jet-black; very late ..... 625. Norton.

EE. Cluster small, slender, cylindrical; berries round, purplish-black; midseason ..... 626. Clinton.

AA. Skin of mature grapes adhering to the flesh. (European grapes)

B. Color of berries green.

C. Grapes seedless, small, oblong-oval, golden-yellow; early ..... 627. Sultanina.

CC. Grapes seeded.

D. Shape of berries round, golden-yellow, depressed at blossom-end; cluster medium, cylindrical; very early ..... 628. Chasselas Golden.

DD. Shape of berries oval, large.

E. Berries yellowish-green to amber; very large; midseason ..... 629. Malaga.

EE. Berries light green, oblong-oval, with distinct Muscat flavor; midseason ..... 630. Muscat of Alexandria.

BB. Color of berries red.

C. Berries oblong-oval; clusters large; very compact; midseason ..... 631. Flame Tokay.

CC. Berries oval, variable in size; clusters large, berries hanging free; late ..... 632. Emperor.

BBB. Color of berries black.

C. Berries characteristically long and curved; late ..... 633. Purple Cornichon.

CC. Berries round or oval.

D. Shape of berries round.

E. Size small or medium; cluster divided into small clusters; late..... 634. Mission.

EE. Size large or very large; cluster not divided.

F. Cluster broad, almost round, very compact; late ..... 635. Black Morocco.

FF. Cluster very large, long, irregular; late midseason ..... 636. Black Hamburg.

FFF. Cluster very large with shoulder often as large as main cluster, short, broad; berry very large; midseason ..... 637. Gros Colmar.

DD. Shape of berries oval, small to large; cluster very large, long, broad, tapering, loose; early midseason, with distinct Muscat flavor ..... 638. Muscat Hamburg.

DIVISION A. SKINS SEPARATING FROM THE PULP (NATIVE GRAPES)

SECTION I. BERRIES IN CLUSTERS NOT EXCEEDING 10 TO 20 (ROTUNDIFOLIA GRAPES)

Group 1. Berries Greenish

596. Scuppernong is the chief representative of *Vitis rotundifolia*, which runs riot in natural luxuriance from Delaware and Maryland to the Gulf, and westward from the Atlantic to Arkansas and Texas. The vines are almost immune to mildew, rot, phylloxera, or other fungal or insect pests; they give not only an abundance of fruit, but on arbors and trellises are much prized for their shade and beauty. The fruit, to a palate accustomed to other grapes, is not very acceptable, having a musky flavor and a somewhat repugnant odor, which, however, with familiarity becomes agreeable. The pulp is sweet and juicy but is lacking in sprightliness. The grapes are not suitable for the market because the berries drop from the bunch in ripening and become more or less smeared with juice, so that their appearance is not appetizing.

Vine vigorous, not hardy in the North, very productive. Leaves small, thin. Flowers very late; stamens reflexed. Fruit late. Clusters small, round, unshouldered, loose. Berries few in a cluster, large, round, dull green, often with brown tinge, firm; skin thick, tough with many small russet dots; flesh pale green, juicy, tender, soft, fine-grained, foxy, sweet to agreeably tart; fair to good. Seeds adherent, large, short, broad, unnotched, blunt, plump, surface smooth, brown.

Group 2. Berries Red or Purple

597. James is probably the best general-purpose variety of its species. The vine is noted for vigor and productiveness, and the fruits are large, well flavored, hang on the vines long after ripening, and keep well after harvesting. The variety was found by B. W. M. James, Pitt County, North Carolina.

Vine vigorous, healthy, productive. Canes slender, numerous, long, slightly trailing. Leaves of medium size, thick, smooth, leathery, cordate,

PLATE XX. An American blackcap—Gregg.

as broad as long, with a serrate margin. Flowers open late; stamens reflexed. Fruit ripens late, hangs on the vine for three weeks. Clusters small, containing from 4 to 12 berries, irregular, loose. Berries large, ¾ to ¼ inch in diameter, round, blue-black, marked with specks; skin thick, tough; pulp juicy; sweet; good in quality.

598. Memory is one of the best of the Rotundifolia grapes for the garden and local markets, and its fruits are especially good for dessert. The variety is given credit for being the most productive of the grapes of its species. Memory is probably a seedling of Thomas, which it much resembles, and was found by T. S. Memory, Whiteville, North Carolina, about 1868.

Vine very vigorous, healthy, productive. Leaves large, longer than broad, thick, smooth with coarsely serrate margins. Flowers perfect. Fruit ripens in September in North Carolina. Clusters large, with 4 to 12 berries which hang unusually well for a variety of *V. rotundifolia*. Berries very large, round-oblong, deep brownish-black, almost jet-black; skin thick; flesh tender, juicy, sweet; good to best.

599. Flowers is noted for its vigorous and productive vines, its large fruit-clusters, and dark-colored grapes that cling in the cluster unusually well for a variety of this species. The crop is late, ripening in North Carolina in October and November. The fruit is valuable only for wine and grape-juice, and has little to recommend it for dessert purposes. Flowers was found in a swamp near Lamberton, North Carolina, more than a hundred years ago, by William Flowers.

Improved Flowers, probably a seedling of Flowers, was found near Whiteville, North Carolina, about 1869. It differs from its supposed parent in having a more vigorous and productive vine and larger clusters, the berries of which cling even more tenaciously.

Vine vigorous, healthy, upright, open, very productive. Leaves variable but average medium in size, longer than broad, pointed, cordate, thick, dark green, smooth, leathery; margins sharply serrate; flowers perfect. Fruit very late. Clusters large, consisting of 10 to 20 berries. Berries large, round-oblong, purple or purplish-black, clinging well to the cluster-stem; skin thick, tough, faintly marked with dots; pulp white, lacking in juice, hard, sweetish, austere in flavor; poor for a table-grape but excellent for grape-juice.

Section II. Berries in Bunches, 20 to Many

Group 3. Berries About as Large as Those of Concord or Larger

Sub-group 1. Berries Greenish-yellow

600. Winchell (Fig. 217). *Green Mountain.*—The vines of Winchell are vigorous, hardy, healthy, productive, and the fruit is early, of high quality, and ships well. There are some minor faults. The berries, and under some conditions the bunches, are small, and the bunch is loose, with a large shoulder. The grapes shell when fully ripe. Again, while the crop usually ripens evenly, there are seasons when two pickings are needed because of unevenness in ripening. Lastly, the skin is thin and there is danger in unfavorable seasons of the berries cracking. The original vine was raised by James Milton Clough, Stamford, Vermont, about 1850.

Fig. 217. Winchell.

Vine vigorous, hardy, healthy, very productive. Leaves large; lobes 3-5, with terminal lobe acute; petiolar sinus deep; basal sinus shallow; teeth shallow, wide. Flowers fertile, midseason; stamens upright. Fruit early. Clusters long, slender, cylindrical, often with a long shoulder, compact; pedicel short, slender, with few inconspicuous warts; brush greenish-white. Berries small, round, light green, persistent, soft; skin marked with small reddish-brown spots, thin, tender, slightly astringent; flesh green, translucent, juicy, tender, fine-grained, sweet; very good to best. Seeds free, 1-4, small, plump, wide and long, blunt, brown.

601. Diamond.—Few other grapes surpass Diamond in quality and beauty of fruit. To its desirable fruit characters must be added hardiness, productiveness, and vigor of vines, but the latter are often unhealthy. The plant resembles closely that of its American parent, Concord. Jacob Moore, Brighton, New York, grew Diamond about 1870 from Concord seed fertilized by Iona.

Vine vigorous, hardy, productive. Leaves thick; lobes 3, indistinct; petiolar sinus very shallow; teeth shallow. Flowers self-fertile, open early; stamens upright. Fruit early. Clusters medium to short, broad, blunt, cylindrical, often single-shouldered, compact; pedicel short, thick with a few

inconspicuous warts; brush slender, pale green. Berries large, ovate, green with a tinge of yellow, glossy, covered with thin bloom, persistent, firm; skin thin, tough, adherent, astringent; flesh pale green, transparent, juicy, tender, melting, fine-grained, aromatic, sprightly; very good. Seeds free, 1-4, broad and long, sharp-pointed, yellowish-brown.

602. Niagara (Fig. 218) is the leading American green grape. It is less valuable than Concord, and it is doubtful whether it should be ranked much higher than several other green grapes. In vigor and productiveness, Niagara and Concord rank the same. In hardiness of root and vine, Niagara falls short of Concord; it cannot be grown without winter protection where the thermometer goes much below zero. Both bunches and berries of Niagara are larger than those of Concord and are better formed, making a handsomer fruit. The fruit shells as badly as that of Concord and does not keep longer. Both vine and fruit of Niagara are more susceptible to fungal diseases than those of Concord. Niagara was produced by C. L. Hoag and B. W. Clark, Lockport, New York, from seed of Concord fertilized by Cassady, planted in 1868.

FIG. 218. Niagara.

Vine vigorous, lacking in hardiness, very productive. Leaves large, thick; lobes 3-5 with terminus acute; petiolar sinus of medium depth and width; basal sinus shallow, wide, often toothed; lateral sinus wide, frequently toothed; teeth shallow, variable in width. Flowers self-fertile, open in midseason; stamens upright. Fruit midseason. Clusters large, long, broad, tapering, frequently single-shouldered, compact; pedicel thick with a few small inconspicuous warts; brush pale green, long. Berries large, oval, pale yellowish-green with thin bloom, persistent, firm; skin thin, tender, adherent, astringent; flesh light green, translucent, juicy, fine-grained, tender, foxy; good. Seeds free, 1-6, deeply notched, brown.

Sub-group 2. Berries Reddish

603. Salem (Fig. 219) is the one of Rogers' hybrids of which the originator is said to have thought most, and to which he gave the name of his place of residence. The two chief faults, unproductiveness and susceptibility to mildew, are not found in all localities, and in favorable places, near good markets, Salem

ought to rank high as a commercial fruit. The vine is hardy, vigorous, and productive, and bears handsome fruit of high quality. This variety was christened Salem by Rogers in 1867.

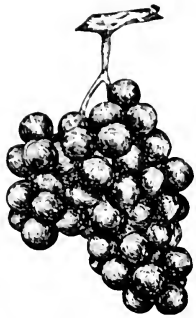

FIG. 219. Salem.

Vine vigorous, hardy, variable in productiveness. Leaves variable in size; lobes 1-3 with terminus acute; petiolar sinus deep, narrow, often overlapping; basal sinus lacking; lateral sinus shallow, narrow, notched. Flowers sterile, midseason; stamens reflexed. Fruit early. Clusters large, short, broad, tapering, heavily shouldered, compact; pedicel short, thick, with small warts, enlarged at point of attachment to berry; brush short, pale green. Berries large, round, dark red, dull, persistent, soft; skin thick, adherent, without pigment, astringent; flesh translucent, juicy, tender, stringy, fine-grained, vinous, sprightly; good to very good. Seeds 1-6, large, long and broad, blunt, brown.

604. Lucile (Fig. 220).—In vigor, health, hardiness, and productiveness, Lucile is not surpassed by any native grape. The size, form, and color of bunches and berries are good, making a very attractive fruit, but the grapes have an obnoxious foxy taste and odor and are pulpy and seedy. Lucile is earlier than Concord, the crop ripening with that of Worden. Lucile may be recommended when a hardy grape is desired, and for localities in which the season is short. J. A. Putnam, Fredonia, New York, grew Lucile. The vine fruited first in 1890.

FIG. 220. Lucile.

Vine vigorous, hardy, very productive. Leaves large, firm; leaf with terminus acute; petiolar sinus shallow, narrow, sometimes closed and overlapping; basal sinus usually absent; lateral sinus a notch when present; teeth shallow. Flowers self-fertile, open early; stamens upright. Fruit early. Clusters large, long, slender, cylindrical, usually single-shouldered, very compact; pedicel short, thick, with few inconspicuous warts; brush light brown. Berries large, round, dark red with thin bloom, persistent, firm; skin thin, tender, astringent; flesh pale green, translucent, juicy, tough, stringy, foxy; fair in quality. Seeds adherent, 1-4, small, broad, short, blunt, dark brown.

605. Brighton (Fig. 221) ranks as one of the leading amateur grapes in eastern America. Its good points are: for the fruit,

high quality; for the vine, vigorous growth, productiveness, adaptability to various soils, and ability to withstand fungi. Brighton has two serious defects which keep it from taking high rank as a commercial variety: the fruits deteriorate in quality very quickly after maturity; and the flowers are self-sterile to a more marked degree than in any other commonly grown grape. Brighton is a seedling of Diana Hamburg pollinated by Concord, raised by Jacob Moore, Brighton, New York. The original vine fruited first in 1870.

FIG. 221. Brighton.

Vine vigorous, hardy, productive, subject to mildew. Leaves large, thick; lobes 3 when present, terminal one acute; petiolar sinus intermediate in depth and width; lateral sinus shallow; teeth narrow. Flowers open late, self-sterile; stamens reflexed. Fruit midseason. Clusters large, long, broad, tapering, heavily shouldered, loose; pedicel thick; brush pale green with brown tinge, thick, short. Berries irregular, large, oval, light red, glossy with heavy bloom, persistent, soft; skin thick, tender, adherent, astringent; flesh green, transparent, tender, stringy, melting, aromatic, vinous, sweet; very good. Seeds free, 1-5, broad, light brown.

606. Agawam (Fig. 222).—The qualities commending Agawam are large size and attractive appearance of bunch and berry; grapes of rich sweet aromatic flavor; vigor of vine; and capacity for self-fertilization. The vine is vigorous, hardy, and productive. The chief defects of the fruit are a thick and tough skin, coarse solid texture of pulp, and foxy flavor. The vine is susceptible to the mildews, and in many localities does not yield well. The vines prefer heavy soils, and do better on clay than on sand or gravel. This is one of the grapes grown by E. S. Rogers, Salem, Massachusetts.

FIG. 222. Agawam.

Vine vigorous, hardy, productive. Leaves thick; lobes lacking; terminus acute; petiolar sinus deep, narrow; lateral sinus very shallow; teeth shallow, wide. Flowers on plan of 6, nearly self-fertile, open late; stamens upright. Fruit midseason. Clusters medium to large, short, broad, tapering, loose;

pedicel short; brush very short, pale green. Berries large, oval, dark purplish red with thin bloom, very persistent; skin thick, tough, adherent, astringent; flesh pale green, translucent, tough, stringy, solid, foxy; good. Seeds adherent, 2-5, large, long, brown.

607. **Lindley** (Fig. 223).—The bunches are of only medium size and are loose, but the berries are well-formed, of uniform size, and of an attractive dark-red color. The flesh is firm, fine-grained, juicy, tender, with a peculiarly rich aromatic flavor. The skin is thick and tough but is not objectionable in fruit fully ripe. The fruit keeps and ships well, and the berries neither crack nor shatter. The vine is vigorous, hardy, healthy, but susceptible to mildew. The chief defects of Lindley are self-sterility, precariousness in bearing, and lack of adaptation to many soils. In 1869, Rogers gave this grape its name in honor of John Lindley, the English botanist.

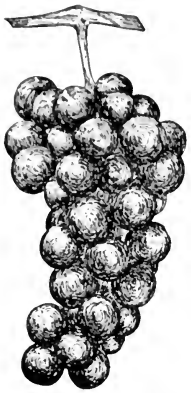

FIG. 223. Lindley.

Vine vigorous, usually hardy, susceptible to mildew. Leaves obscurely 3-lobed with terminus acute; petiolar sinus deep, narrow, often closed and overlapping; teeth shallow. Flowers self-sterile, open in midseason; stamens reflexed. Fruit midseason. Clusters long, broad, cylindrical, frequently single-shouldered, the shoulder being connected to the bunch by a long stem, loose; pedicel short, slender, smooth; brush short, pale green. Berries large, round-oval, dark-red with faint bloom; skin tough, adherent, unpigmented, strongly astringent; flesh pale green, translucent, juicy, fine-grained, tender, vinous; good to best. Seeds adherent, 2-5, notched, brown.

608. **Iona** (Fig. 224).—In flavor, the fruit of Iona has a rare combination of sweetness and acidity,—pure, delicate, and vinous. The flesh is transparent, melting, tender, juicy, and of uniform consistency quite to the center. The color is dark-red wine with a tint of amethyst. The bunch is large but loose, with berries varying in size and ripening unevenly. The fruit may be kept until late winter. The vines are doubtfully hardy, and in many parts of the North must have win-

FIG. 224. Iona.

ter protection; they are not vigorous and are inclined to overbear, to remedy which they must have close pruning. Iona originated with C. W. Grant, Iona Island, New York, from seed planted in 1885.

Vine weak, doubtfully hardy, unproductive. Leaves thick; lobes 3-5 with terminal one acute; petiolar sinus of medium depth and width; basal sinus shallow; lateral sinus shallow, wide; teeth shallow. Flowers self-fertile, open late; stamens upright. Fruit late. Clusters medium in size, sometimes double-shouldered, slender, tapering, loose; brush pale green. Berries uniform, oval, round, dull, light and dark red with thin bloom, persistent, firm; skin tough, adherent, slightly astringent; flesh green, translucent, juicy, fine-grained, tender, melting, vinous; very good. Seeds free, 1-4, small, broad, plump, brown.

609. Catawba (Fig. 225) has long been the standard red grape in the markets of eastern America, chiefly because the fruit keeps well and is of high quality. The vine is vigorous, hardy, and productive, but the foliage and fruit are susceptible to fungi. Catawba was introduced by John Adlum, District of Columbia, about 1823. Adlum secured cuttings from a Mrs. Scholl, Clarksburgh, Montgomery County, Maryland, in the spring of 1819. Its further history is not known.

FIG. 225. Catawba.

Vine vigorous, hardy, productive. Leaves large; lobes sometimes 3, terminal one acute; petiolar sinus often lacking; lateral sinus narrow; teeth shallow, narrow. Flowers self-sterile, open late; stamens upright. Fruit late. Clusters large, long, broad, tapering, single- or sometimes double-shouldered, loose; pedicel with a few inconspicuous warts; brush short, pale green. Berries of medium size, oval, dull purplish-red with thick bloom, firm; skin thick, adherent, astringent; flesh green, translucent, juicy, fine-grained, vinous, sprightly, sweet and rich; very good. Seeds free, frequently abortive, 2, broad-necked, distinctly notched, blunt, brown.

610. Vergennes (Fig. 226).—The most valuable attribute of Vergennes is certainly in bearing. Vergennes is unpopular with vineyardists because of the sprawling habit of the vines, which makes them untractable for vineyard operations; this fault is obviated by grafting on other vines. The grapes are attractive,

the quality is good, flavor agreeable, flesh tender, and seeds and skin are not objectionable. The original vine was a chance seedling in the garden of William E. Greene, Vergennes, Vermont, in 1874.

FIG. 226. Vergennes.

Vine variable in vigor, doubtfully hardy, productive, healthy. Leaves large, thin; leaf usually not lobed with terminus broadly acute; petiolar sinus wide; teeth shallow. Flowers semi-sterile, midseason; stamens upright. Fruit late. Clusters of medium size, broad, cylindrical, sometimes single-shouldered, loose; pedicel with numerous small warts; brush slender, short, pale green. Berries large, oval, light and dark red with thin bloom, persistent; skin thick, tough, adherent, astringent; flesh pale green, juicy, fine-grained, somewhat stringy, tender, vinous; good to very good. Seeds free, 1-5, blunt, brown.

Sub-group 3. Berries Purple-black

611. Campbell Early (Fig. 227).—The meritorious qualities of Campbell Early are: the grapes are high in quality; free from foxiness and from acidity about the seeds; have small seeds which easily part from the flesh; are early, ripening nearly a fortnight before Concord; bunch and berry are large and handsome; and the vines are exceptionally hardy. Campbell Early falls short in not being adapted to many soils; the variety lacks productiveness; the grapes attain full color before they are ripe, and are, therefore, often marketed in an unripe condition; the bunch is variable in size; and the color of the berry is not attractive. George W. Campbell, Delaware, Ohio, grew this variety from a seed of Moore Early. It bore first in 1892.

FIG. 227. Campbell Early.

Vine vigorous, hardy, productive. Leaves large, thick; lobes 3, usually entire, terminal one acute; petiolar sinus shallow, wide, basal sinus pubescent; lateral sinus wide or a notch; teeth shallow, narrow. Flowers self-fertile, open in midseason; stamens upright. Fruit early. Clusters usually large, long, broad, tapering, single-shouldered; pedicel short, slender, with

small warts; brush long, light wine-color. Berries usually large, oval, dark purplish-black, dull with heavy bloom, persistent, firm; skin tough, thin, adherent with dark red pigment, astringent; flesh green, translucent, juicy; coarse, vinous, sweet from skin to center; good. Seeds free, 1-4, light brown, often with yellow tips.

612. Eclipse (Fig. 228) is a seedling of Niagara, and, therefore, a descendant of Concord, which it resembles, differing chiefly in earlier fruit which is of better quality. Unfortunately, the bunches and berries are small. The vines are hardly surpassed by those of any other variety, being hardy, healthy, and productive. The ripe grapes hang on the vines for some time without deterioration, and do not crack in wet weather. The crop ripens several days earlier than that of Concord. Eclipse originated with E. A. Riehl, Alton, Illinois, from seed planted about 1890; introduced in 1906.

FIG. 228. Eclipse.

Vine vigorous, hardy, productive. Leaves large; lobes wanting or 3 with terminal one acute; petiolar sinus narrow, often notched; teeth shallow, narrow. Flowers self-sterile, open in midseason; stamens reflexed. Fruit early. Clusters of medium size, broad, tapering, frequently single-shouldered, compact; pedicel short, thick, covered with small warts; brush long, pale green. Berries large, oval, dull black with abundant bloom, persistent, firm; skin tender, fine-grained, foxy, sweet; good. Seeds free, 1-4, short, broad, distinctly notched, blunt, brown.

613. Worden (Fig. 229).—Of the many offspring of Concord, Worden is most meritorious. The grapes differ from those of Concord in having better quality and in being a week to ten days earlier. The vine is equally hardy, healthy, vigorous, and productive, but is more fastidious in its adaptations to soil. The chief fault of the variety is that the fruit cracks badly. The fruit-pulp of Worden is softer than that of Concord, there is more juice, and the keeping qualities are not so good. Early season is against Worden, for a commercial variety, and, with the defects mentioned, prevents it

FIG. 229. Worden.

taking the place of Concord. Worden was originated by Schuyler Worden, Minetto, New York, from seed planted about 1863.

Vine vigorous, hardy, healthy, productive. Leaves large, thick; leaf usually not lobed; petiolar sinus wide, often urn-shaped; teeth shallow. Flowers fertile, midseason; stamens upright. Fruit early. Clusters large, long, broad, tapering, usually single-shouldered, compact; pedicel slender with a few small warts; brush long, light green. Berries large, round, dark purplish-black, glossy with heavy bloom, firm; skin tender, cracks badly, adheres slightly, contains dark red pigment, astringent; flesh green, translucent, juicy, fine-grained, tough, foxy, sweet, mild; good to very good. Seeds adherent, 1-5, large, broad, short, blunt, brown.

614. Moore Early (Fig. 230) is the standard grape of its season. Its fruits cannot be described better than by saying that they are almost identical with those of Concord. The vines, however, are readily distinguishable from those of Concord, and differ chiefly in being less productive. The bunches of Moore Early are not so large as those of Concord, and are less compact: the berries shell rather more easily, and the skin cracks more readily. The flesh characters and the flavor are essentially those of Concord, although the quality is not so high as in the older variety. Captain John B. Moore, Concord, Massachusetts, originated this variety from seed of Concord planted about 1868.

FIG. 230. Moore Early.

Vine vigorous, hardy, unproductive. Leaves large, thick; leaf usually not lobed, terminus acute; petiolar sinus wide; basal sinus lacking; lateral sinus a notch when present; teeth shallow, narrow. Flowers fertile, open in midseason; stamens upright. Fruit early. Clusters medium in size, length, and breadth, cylindrical; sometimes single-shouldered, loose; pedicel short, thick, smooth; brush short, pale green. Berries large, round, purplish-black, firm; skin tender, adherent; flesh green, translucent, juicy, fine-grained, tough with slight foxiness; fair to good. Seeds 1-4, large, broad, plump, blunt, brown with yellow tinge at tips.

615. Janesville (Fig. 231).—Endowed with a constitution enabling it to withstand cold to which most other grapes succumb, Janesville has made a place for itself in far northern

localities. Moreover, the grapes ripen early, being about the first to color, although they are not ripe until some time after coloring. The vine also is healthy, vigorous, and productive. The fruit, however, is worthless where better sorts can be grown. The clusters and berries are small, the grapes are pulpy, tough, seedy, have a thick skin and a disagreeable acid taste. Janesville was grown by F. W. Loudon, Janesville, Wisconsin, from chance seed planted in 1858.

FIG. 231. Janesville.

Vine vigorous, hardy, healthy, productive. Leaves small, thin; leaf usually not lobed, with terminus acute; petiolar sinus narrow, often closed and overlapping; basal and lateral sinuses lacking; teeth shallow. Flowers self-fertile, open very early; stamens upright. Fruit early. Clusters small, short, cylindrical, usually single-shouldered, compact; pedicel short, slender, covered with small scattering warts; brush dark wine color. Berries round, dull black with heavy bloom, persistent, firm; skin thick, tough, adherent, with dark wine-colored pigment, astringent; flesh pale reddish-green, translucent, juicy, tough, coarse, vinous, acid; fair in quality. Seeds adherent, 1-6, large, broad, angular, blunt, dark brown.

616. Champion is a favorite early grape, although the poor quality of the fruit should have driven it from cultivation long ago. The characters which have kept it in the market are earliness, good shipping qualities, attractive appearance of fruit, and a vigorous, productive, hardy vine. The hardiness of the vine and the short season of fruit development make it a good variety for northern climates. The origin of Champion is unknown. It was first grown about 1870 in New York.

Vine very vigorous, hardy and productive. Leaves large; lobes usually 3, often obscurely 5, terminal one acute; petiolar sinus deep; teeth shallow. Flowers self-fertile, early; stamens upright. Fruit early. Clusters medium in size, blunt, cylindrical, usually not shouldered, compact; pedicel short with inconspicuous warts; brush white tinged with bronze. Berries medium in size, round, dull black covered with heavy bloom, soft; skin thick, tender, adherent, astringent; flesh light green, translucent, juicy, fine-grained, tender, foxy; poor in quality. Seeds adherent, 1-5, broad, long, blunt, light brown.

617. Concord (Fig. 232) is the most widely known of the grapes of this continent. The preëminently meritorious character of Concord is that it adapts itself to varying conditions. A

second character which commends Concord is fruitfulness; the vine bears large crops year in and year out. Added to these points of superiority are hardiness, ability to withstand the ravages of diseases and insects, comparative earliness, certainty of maturity in northern regions, and fair size and handsome appearance of bunch and berry. The variety is not, however, without faults: the quality is not high, as the grapes lack richness, delicacy of flavor and aroma, and have a foxy taste disagreeable to many; the seeds and skin are objectionable, as the seeds are large and abundant and difficult to separate from the flesh, and the skin is tough and unpleasantly astringent; the grapes do not keep nor ship well, and rapidly lose flavor after ripening; and the skin cracks and the berries shell from the stems after picking. Seeds of a wild grape were planted by E. W. Bull, Concord, Massachusetts, from which plants fruited in 1849. One of these seedlings was named Concord.

FIG. 232. Concord.

Vine vigorous, hardy, healthy, productive. Leaves large, thick; lobes 3 when present, terminal one acute; petiolar sinus variable; basal sinus usually lacking; lateral sinus obscure and frequently notched; teeth shallow, narrow. Flowers self-sterile, open in midseason; stamens upright. Fruit midseason. Clusters uniform, large, wide, broadly tapering, usually single-shouldered, sometimes double-shouldered, compact; pedicel thick, smooth; brush pale green. Berries large, round, glossy, black, with heavy bloom, firm; skin tough, adherent with a small amount of wine-colored pigment, astringent; flesh pale green, translucent, juicy, fine-grained, tough, solid, foxy; good. Seeds adherent, 1-4, large, broad, distinctly notched, plump, blunt, brownish.

FIG. 233. Herbert.

618. Herbert (Fig. 233).—In all that constitutes a fine table-grape, the fruits of Herbert are as near perfection as those of any other American variety. The vine is vigorous, hardy, and fruitful. While the fruit ripens with that of Concord, it keeps much later and packs and ships better. The variety is self-sterile and must be set

near other varieties. Herbert is deserving attention from commercial growers who supply a discriminating market, and its many good qualities give it high place as a garden grape. The variety is one of Rogers' hybrids, named Herbert in 1869.

Vine very vigorous, productive. Leaves large, round; leaf entire, terminus obtuse; petiolar sinus deep, narrow, closed, overlapping; basal and lateral sinuses lacking; teeth shallow. Flowers self-sterile, open in midseason; stamens reflexed. Fruit midseason. Clusters large, broad, tapering, 2-3 clusters to a shoot, heavily single-shouldered, loose; pedicel thick with small russet warts; brush yellowish-green. Berries large, oval, flattened, dull black, covered with thick bloom, persistent, firm; skin thick, tough, adherent, astringent; flesh light green, translucent, juicy, tender, fine-grained; very good. Seeds adherent, 3-6, large, broad, notched, long with swollen neck, blunt, brown with yellow tips.

619. Barry (Fig. 234) is one of the best American black grapes, resembling in berry and in flavor and keeping quality of fruit its European parent, Black Hamburg. The appearance of berry and bunch is attractive. The vine is vigorous, hardy, and productive, but susceptible to mildew. The ripening season is just after that of Concord. For the table, for winter keeping, and for the amateur, the fruits of Barry may be recommended highly. Barry was dedicated in 1869, by E. S. Rogers, who originated it, to Patrick Barry, distinguished nurseryman and pomologist.

FIG. 234. Barry.

Vine vigorous, hardy, productive, susceptible to mildew. Leaves large; lobes 1-3, terminus acute; petiolar sinus deep, narrow, sometimes closed and overlapping; basal sinus usually lacking; lateral sinus shallow, narrow; teeth shallow. Flowers open in midseason, self-sterile; stamens reflexed. Fruit midseason. Clusters short, very broad, tapering, often subdividing into several parts, compact; pedicel with small warts. Berries large, oval, dark purplish-black, glossy, covered with heavy bloom, adherent; skin thin, tough, adherent; flesh pale green, translucent, tender, stringy, vinous, pleasant-flavored; good. Seeds adherent, 1-5, large, deeply notched, with enlarged neck, brown.

620. Ives has a high reputation as a grape for making red wine and grape-juice, being surpassed only by Norton for this purpose. The vine is hardy, healthy, vigorous, and fruitful.

The fruit is poor in quality, colors long before ripe, has a foxy odor, and the flesh is tough and pulpy. The bunches are compact, with well-formed jet-black grapes, which make them attractive. Ives was grown by Henry Ives from seed planted in 1840 in Cincinnati, Ohio.

Vine vigorous, hardy, healthy, productive. Leaves large; lobes 3-5 when present with terminal one acute; petiolar sinus shallow; lateral sinus narrow; teeth shallow. Fruit late midseason. Clusters large, tapering, frequently single-shouldered, compact, often with numerous abortive berries; pedicel, slender with numerous small warts; brush short, slender, pale with a reddish-brown tinge. Berries oval, jet-black, with heavy bloom, very persistent, firm; skin tough, adherent, wine-colored pigment, astringent; flesh pale green, translucent, juicy, fine-grained, tough, foxy; good. Seeds adherent, 1-4, small, often abortive, broad, short, blunt, plump, brown.

Group 4. Berries as Small as Those of Delaware or Smaller

Sub-group 4. Berries Green

621. Empire State (Fig. 235) competes with Niagara and Diamond for supremacy among green grapes. The variety is as vigorous in growth, as free from parasites, and on vines of the same age as productive as those of the other sorts named, but the vines are less hardy, and the grapes are not so attractive in appearance. The fruits are very good, approaching in flavor the Old World grapes; the slight wild taste suggests one of the Muscats. The grapes ripen early, hang long on the vine, and keep well after picking without losing flavor. Empire State originated with James H. Ricketts, Newburgh, New York, and bore fruit first in 1879.

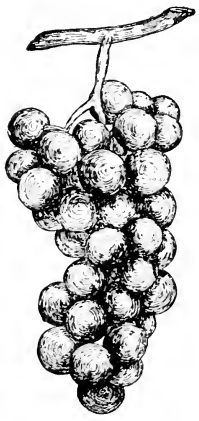

FIG. 235. Empire State.

Vine vigorous, somewhat tender. Leaves small; lobes 3-5 when present, terminal one acuminate; petiolar sinus deep, narrow, often closed and overlapping; basal sinus variable in depth and width; lateral sinus deep, narrow, often enlarged at base; teeth deep, wide. Flowers self-sterile, open late; stamens upright. Fruit midseason. Clusters large, long, slender, cylindrical, frequently single-shouldered, compact; pedicel slender with small warts; brush short, light green. Berries medium or small, round pale

yellowish-green, covered with thin bloom, persistent, firm; skin thick, adherent to the pulp, slightly astringent; flesh pale yellowish-green, translucent, juicy, fine-grained, tender, agreeably flavored; good to very good. Seeds adherent, 1-4 small, broad, notched, short, blunt, plump, brown.

622. Elvira.—The qualities which commend Elvira are: great productiveness; earliness; exceedingly good health and great vigor; and almost perfect hardiness even as far north as Canada. Its good qualities are offset by two defects: the grapes have thin skins which burst easily and thus wholly debar them from distant markets; and their flavor and appearance are not sufficiently good to make the variety a table-grape. Elvira originated with Jacob Rommel, Morrison, Missouri, from seed of Taylor.

Vine vigorous, hardy, healthy, productive. Leaves large, thin; lobes wanting or 1-3 with terminus acute; petiolar sinus deep, narrow, sometimes closed and overlapping; basal sinus usually lacking; lateral sinus shallow, often notched; teeth deep, wide. Flowers self-fertile, open early; stamens upright. Fruit midseason. Clusters short, cylindrical, usually single-shouldered, compact; pedicel smooth; brush short, greenish-yellow with brown tinge. Berries medium in size, round, green with yellow tinge, dull with thin bloom, firm; skin very thin, foxy, sweet; fair in quality. Seeds free, 1-4, medium to large, blunt, plump, dark brown.

Sub-group 5. Berries Red

623. Delaware (Fig. 236) is used wherever American grapes are grown as the standard to gauge the quality. In addition to high quality in fruit, the variety withstands climatic conditions to which all but the most hardy varieties succumb, is adapted to many soils and conditions, and bears in most situations an abundant crop. These qualities make it, next to Concord, the most popular grape for garden and vineyard now grown in the United States. Besides the qualities named, the grapes mature sufficiently early to make the crop certain, are attractive in appearance, keep and ship well, and are immune to black-rot. Faults of the variety are: small vine, slow growth, susceptibility to mildew, capriciousness in certain soils, and small

FIG. 236. Delaware.

berries. Delaware is an especially desirable grape to cultivate in small gardens because of its delicious handsome fruit, its compact habit of growth, and its ample and lustrous green leaves, which make it most ornamental. Delaware can be traced to the garden of Paul H. Provost, Frenchtown, New Jersey, where it was growing early in the nineteenth century, whence it was taken to Delaware, Ohio, in 1849.

Vine weak, hardy, productive. Leaves small; lobes 3-5 in number, terminal one acute; petiolar sinus narrow; basal sinus narrow and shallow when present; lateral sinus deep, narrow; teeth shallow. Flowers self-fertile, open late; stamens upright. Fruit early. Clusters small, slender, blunt, cylindrical, regular, shouldered, compact; pedicel short, slender, smooth; brush light brown. Berries uniform in size and shape, small, round, light red, covered with thin bloom, persistent, firm; skin thin, tough, adherent, unpigmented, astringent; flesh light green, translucent, juicy, tender, aromatic, vinous, refreshing, sweet; best in quality. Seeds free, 1-4, broad, notched, short, blunt, light brown.

624. Herbemont is grown in an immense territory, extending from Virginia and Tennessee to the Gulf and westward through Texas. The vine is remarkably vigorous, being hardly surpassed in this character by any of the native grapes. The fruits are attractive because of the large bunch and the glossy black of the small berries, and are borne abundantly and with certainty in suitable localities. The flesh characters of the fruit are good for a small grape, neither flesh, skin, nor seeds being objectionable in eating; the pulp is tender, juicy, rich, sweet, and highly flavored. The ample lustrous green foliage makes this variety one of the attractive ornamental plants of the South. Herbemont was in cultivation in Georgia before the Revolutionary War.

Vine very vigorous. Leaves large, round, entire or 3-7 lobed, nearly glabrous above and below. Flowers self-fertile. Fruit very late. Clusters large, long, tapering, prominently shouldered, compact; pedicels short with a few large warts; brush pink. Berries round, small, uniform, reddish-black or brown with abundant bloom; skin thin, tough; flesh tender, juicy; juice colorless or slightly pink, sweet, sprightly. Seeds 2-4, small, reddish-brown, glossy.

Sub-group 6. Berries Purple-black

625. Norton is one of the leading wine-grapes in eastern America. The vine is hardy but requires a long warm season

to reach maturity, so that it is seldom grown successfully north of the Potomac. The vines are robust, very productive, especially on fertile soils; as free, or more so, from fungal diseases as any other native grape; and very resistant to phylloxera. The bunches are of only medium size and the berries are small. The grapes are pleasant eating when ripe—rich, spicy, and pure-flavored—but tart if not quite ripe. The variety is difficult to propagate from cuttings and to transplant, and the vines do not bear grafts well. Norton has been under cultivation since before 1830, when it was first described.

Vine very vigorous, healthy, half-hardy, productive. Leaves large, irregularly round; leaf usually not lobed, with terminus acute; petiolar sinus deep, narrow, sometimes closed and overlapping; basal sinus usually absent; lateral sinus shallow or a mere notch. Flowers self-fertile, late; stamens upright. Fruit late. Clusters medium in size, short, broad, tapering, single-shouldered, compact; pedicel slender with a few warts; brush dull, wine-colored. Berries small, round-oblate, black, glossy with heavy bloom, persistent, soft; skin thin, free with much dark red pigment; flesh green, translucent, juicy, tender, spicy, tart. Seeds free, 2-6, small, brown.

626. Clinton came into prominence because of vigor, hardiness, fruitfulness, and immunity to phylloxera. A serious defect is that the vines bloom early and in northern climates the blossoms are often caught by late frosts. Other defects are: the fruit is small and sour, and the seeds and skins are prominent. The fruit colors early in the season, but does not ripen until late, a slight touch of frost improving the flavor. Clinton is an old sort, the Worthington, known as early as 1815, renamed; it began to attract attention about 1840. It is now more or less grown in all parts of northeastern United States.

Vine vigorous, hardy, healthy, productive. Leaves hang until late in the season, small, thin; petiolar sinus deep, narrow, urn-shaped; basal and lateral sinuses shallow; teeth wide. Flowers self-fertile, open early; stamens upright. Fruit midseason. Clusters small, slender, cylindrical, uniform, single-shouldered, compact; pedicel short, very slender, smooth; brush tinged with red. Berries small, round, oval, purplish-black, glossy, covered with thick bloom, adherent, firm; skin very thin, tough, free from pulp with much wine-colored pigment, astringent; flesh dark green, juicy, fine-grained, tough, solid, spicy, sour, vinous. Seeds adherent, 2, short, blunt, brownish.

DIVISION B. SKIN ADHERING TO THE PULP (EUROPEAN GRAPES)

Section II. Berries Seedless

627. Sultanina is one of the standard seedless grapes of the Pacific slope, grown both to eat out of hand and for raisins. Probably it can be raised in home plantations in favored parts of eastern America where the season is long and warm. The following description is compiled.

Vine very vigorous, very productive; trunk large with very long canes. Leaves glabrous on both sides, dark yellow-green above, light below; generally 3-lobed, with shallow sinuses; teeth short and obtuse. Bunch large, conic-cylindrical, well filled, with herbaceous peduncles. Berries oval, beautiful golden-yellow color; skin moderately thick; flesh of rather neutral flavor; very good.

Section III. Berries Seeded

Group 5. Berries Greenish

628. Chasselas Golden. *Chasselas Dore. Fontainebleau. Sweetwater.*—Several qualities have made Chasselas Golden a favorite grape wherever it can be grown. The variety is adapted to widely differing environments; the season of ripening is early; while not choicely high, the quality of the grapes is good, and they are beautiful in color which is clear green tinged with golden-bronze where exposed to the sun. Chasselas Golden is a popular variety on the Pacific slope, and should be one of the first Viniferas to be tried in the East.

Vine medium in vigor, very productive; buds open in midseason. Leaves medium to above in size, slightly cordate; lobes 5, terminal lobe acuminate; basal sinus broad and rather deep; lower lateral sinus variable, usually broad and sometimes deep; upper lateral sinus broad and frequently deep; teeth large, obtuse to rounded. Flowers late; stamens upright. Fruit early. Clusters large, long, broad, tapering, sometimes with a single shoulder, compactness medium. Berries medium to above, round, pale green to clear yellow, with thin bloom; skin thin, tough, adherent, slightly astringent; flesh greenish, translucent, firm, juicy, tender, sweet; good.

629. Malaga.—The fruit of Malaga is one of the favorite table-grapes in California, and is also much grown to ship to

eastern markets. In some parts of southern California, where the Muscats do not thrive, Malaga is much grown, and in the San Joaquin Valley its fruits are rather largely used in making raisins. It requires a long season to mature its crop and probably could not be grown in eastern regions except in the most favored localities. The description is compiled.

Vine very vigorous, healthy and productive; wood reddish-brown, short-jointed. Leaves of medium size, smooth, leathery; light glossy green above, lighter below; deeply lobed. Bunches very large, long, loose, shouldered, sometimes scraggly; stem long and flexible. Berries very large, oval, yellowish-green, covered with light bloom; skin thick; flesh firm, crisp, sweet and rich; quality good. Season late.

630. Muscat of Alexandria.—This is possibly the leading table- and raisin-grape of the Pacific slope. From the literature or from a visit to vineyards, one cannot make out whether one or several varieties are grown under the name. Probably there are several strains under the distinctive name "Muscat" which is applied to these sweet, light yellow, musky grapes. This is one of the standard sorts to force indoors, but requires too long a season for out-of-doors in the East. The following description is compiled:

Vine short, straggling, bushy, sometimes forming a bush rather than a vine, very productive; wood gray with dark spots, short-jointed. Leaf round, 5-lobed; bright green above, lighter green below. Bunches long and loose, shouldered. Berries oblong, light yellow and transparent when fully mature, covered with white bloom; flesh firm, crisp; flavor sweet and very musky; quality good. Season late, the laterals producing a second, sometimes even a third, crop.

Group 6. Berries Reddish

631. Flame Tokay.—This is the leading shipping grape of the Pacific slope, where it is everywhere grown under the name "Tokay" with several modifying terms, as "Flame," "Flame-colored," and "Flaming." The fruit is not especially high in quality nor attractive in appearance, but it ships and keeps well, qualities making the variety popular in commercial vineyards. The description is compiled.

Vine very vigorous, luxuriant in growth of canes, shoots and leaves dark green with a brown tinge; lightly lobed. Bunches very large, sometimes

weighing eight or nine pounds, moderately compact; shouldered. Berries large, oblong, red when mature, covered with lilac bloom; flesh firm, crisp, sweet; quality good. Season late.

632. Emperor is one of the standard shipping grapes of the Pacific slope, and one of the mainstays of the interior valleys. On the coast and in southern California, the vine is irregular in bearing, and on the coast the fruits often fail to ripen. It is chiefly grown in the San Joaquin Valley. It could hardly be expected to ripen even in the most favored grape regions in the East. The following brief description is compiled:

Vine strong, healthy and productive. Leaves very large, with 5 shallow lobes; teeth short and obtuse; light green in color, glabrous above, woolly beneath. Bunches very large, loose, sometimes inclined to be straggling, long-conical. Berries large, dull reddish-purple, oval; flesh firm and crisp; skin thick; flavor and quality good. Ripens late.

Group 7. Berries Purple-black

633. Purple Cornichon. *Black Cornichon.*—By virtue of attractive appearance and excellent shipping qualities of the fruit, this variety takes high place among the commercial grapes of California. Late ripening is another quality making it desirable, while its curious long curved berries add novelty to its attractions. The fruit does not take high rank in quality. The description is compiled.

Vine very vigorous, healthy and productive; wood light brown striped with darker brown, short-jointed. Leaves large, longer than wide, deeply 5-lobed; dark green above, lighter and very hairy below; coarsely toothed; with short thick petiole. Bunches very large, loose or sometimes scraggly, borne on long peduncles; berries large, long, more or less curved, dark purple, spotted, thick-skinned, borne on long pedicels; flesh firm, crisp, sweet but not rich in flavor; quality good but not high. Season late.

634. Mission.—Of all grapes, Mission has probably played the most important part in the vineyards of California. Its viticultural value for table and wine-press was early appreciated by Californian grape-growers, and its cultivation rapidly spread to every county in the state adapted to grape-growing. With vines vigorous, healthy, and productive, bearing grapes of delicious quality, Mission is a mainstay on the Pacific slope, surpassed by

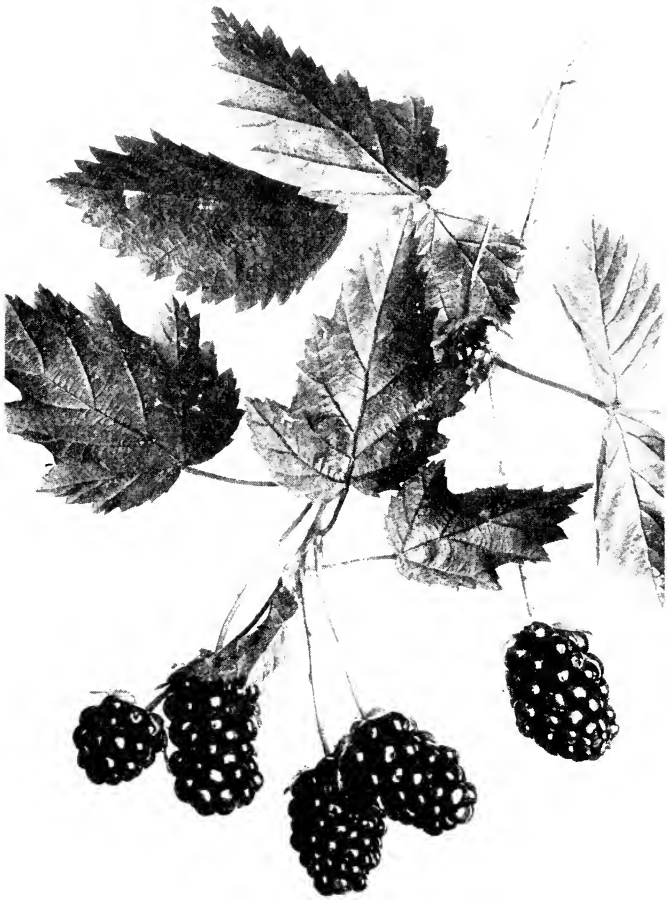

PLATE XXI. A dewberry—Lucretia.

few vineyard varieties for general usefulness. The description is compiled.

Vine vigorous, healthy, productive; wood short-jointed, grayish-brown, dull, dark. Leaf, medium to large, slightly oblong, with large deeply-cut compound teeth; basal widely opened, primary sinuses narrow and shallow; smooth on both sides with scattered tomentum below, bright green above, lighter below. Bunch divided into many small distinct lateral clusters, shouldered, loose, sometimes very loose. Berries of medium size, round, purple or almost black with heavy bloom; skin thin, flesh firm, crisp, juicy, sweet, rich and delicious. Seeds rather large and prominent; season late.

635. Black Morocco very generally meets the approval of grape-growers on the Pacific slope, without being a prime favorite for either home use or commerce. The grapes are not high enough in quality for a home vineyard, and, while they ship well, are hard to handle because of the large size and rigidity of the bunches. The chief asset of the variety is handsome appearance of fruit. Black Morocco is remarkable for the number of second-crop bunches which it produces on the laterals. The following description is compiled:

Vine very vigorous, productive. Leaves medium to small, very deeply 5-lobed; the younger leaves truncate at base, giving them a semi-circular outline, with long sharp teeth alternating with very small ones; glabrous, or nearly so, on both sides. Bunches very large, short, shouldered, compact and rigid. Berries very large, round, often misshapen from compression; dull purple, lacking color in the center of the bunch; flesh firm, crisp, neutral in flavor, lacking in richness; quality rather low. Season late.

636. Black Hamburg is an old European sort, long the mainstay in forcing-houses in Belgium, England, and America, and now popular out-of-doors in California. The grapes are excellent for the table and keep well, but the tender skin does not permit their being shipped far, especially when grown out-of-doors. Bunch and berry are as beautiful as in any grape. The vine is subject to disease. The following description of the fruit is made from grapes grown in the greenhouse:

Bunches very large, often a foot in length and weighing several pounds; very broad at the shoulder and gradually tapering to a point; compact, oftentimes too compact; berries very large, round or slightly round-oval; skin rather thick; dark purple becoming black at full maturity; flesh firm, juicy, sweet and rich; quality very good or best. Season late.

637. Gros Colmar has the reputation of producing the handsomest black table-grape grown. It is one of the favorite hothouse varieties in England and eastern America, and is commonly cultivated out-of-doors in California. The variety is remarkable for large berries, borne in immense bunches, and for the long-keeping qualities of the fruits, although the tender skins sometimes crack. The following description is compiled:

Vine vigorous, healthy and productive; wood dark brown. Leaves very large, round, thick, but slightly lobed; teeth short and blunt; glabrous above, wooly below. Bunches very large, short, well filled but rather loose. Berries very large, round, dark blue; skin thick but tender; flesh firm, crisp, sweet and good; quality not of the highest. Season late.

638. Muscat Hamburg is an old European grape well known in some parts of America in greenhouse graperies, since it is one of the best for forcing. The fruits are delectable, containing the quintessence of the flavors and aromas which make the grape a favorite fruit. The grapes keep long and retain almost to the end their form, size, and color, and their rich delicate flavor. This variety is a treasure to the amateur; and the professional who wants another grape for local markets should try grafting over a few vines of some native to this sort.

Vines vigorous, tender, need protection during the winter. Leaves medium to large. Fruit ripens in October, ships and keeps well. Clusters very large, long, broad, tapering, single- or double-shouldered. Berries large, firm, oval, very dark purple, covered with lilac bloom, very persistent; skin thick, adheres strongly to the pulp; flesh pale green, translucent, meaty, very juicy, tender, vinous, musky, sweet, rich; very good to best. Seeds separating easily from the pulp, large.

CHAPTER XXIX

VARIETIES OF RASPBERRIES

VARIETIES of raspberries run into the hundreds, but the number now in the nurseries is surprisingly small. About fifty red, five purple, and thirty black sorts are offered in the catalogues. In this text the varieties are arranged in two groups, the red and hybrid kinds in one, and the black raspberries in another group. It is now impossible to separate the red and hybrid, or purple varieties, the types having become hopelessly confused. Neither is it necessary to put the varieties of Old World and New World red raspberries in separate groups. It is impossible to make a key whereby varieties of the several species of raspberries may be separated.

INDEX TO VARIETIES OF RASPBERRIES

RED AND HYBRID RASPBERRIES

639. Antwerp. *R. idæus.*—Antwerp is one of the oldest European varieties, supposed to have come from the Island of Malta to Antwerp, Belgium. Nevertheless, it is still one of the

best of its kind, and is more or less grown in various parts of America. Antwerp is a favorite on the Pacific slope, where it is often planted as a companion of Cuthbert, than which it is more productive. It is tender to cold and susceptible to crown-gall.

Plants vigorous with long yellowish-green canes, glaucous, tinged with purple; beset with dark brown bristles; bearing wood nearly smooth. Fruit early, large, conical, dark red, firm, rich and rather sweet; quality good.

640. Brilliant. *R. strigosus.*—This variety is comparatively new, and is grown commercially only in New Jersey and Delaware, where it has the reputation of being one of the most profitable red raspberries. It is a heavy yielder and is adapted to a variety of soils, which, however, must be rich. Brilliant originated at Bridgeville, Delaware, and was introduced in 1901.

Plants medium to tall, of medium vigor, upright or slightly drooping, much branched, very productive, with many suckers, lacking in hardiness. Leaflets rather small, yellowish-green, with characteristic tendency to lobe. Fruit early midseason, just before Cuthbert, rather small, hemispherical, downy, light bright glossy red; drupelets of medium size, rather dry, mild and not particularly well flavored; quality not above good; seeds of medium size.

641. Cardinal. *R. strigosus* × *R. occidentalis.*—Cardinal can be grown farther north and south than any other purple sort, and farther south than any other raspberry. The plants are very productive, vigorous, and healthy. It is a valuable sort for the Central West. The variety originated with A. H. Griesa, Lawrence, Kansas, in 1895.

Plants vigorous, very hardy to heat and cold, productive. Fruits large, uniform in size, broadly-hemispherical, rather dark purple, dull; drupelets large, round, numerous; torus large, smooth, releasing the berry readily; flesh juicy, firm but tender, sweet, rich, aromatic, resembling in flavor the red raspberry; quality good to very good; seeds rather large.

642. Columbian. *R. strigosus* × *R. occidentalis.*—Columbian is the most prized of the purple raspberries by virtue of the large size, firm flesh, handsome appearance, and high quality of the fruit; and the hardiness, healthfulness, and phenomenal productiveness of the plants. It is now more largely grown for commercial canning than any other raspberry, red, black, or purple.

The fruit of Columbian is smaller, firmer, and hangs on the plant longer than that of Shaffer with which it is often confused; the plants are more vigorous and more productive, and the fruiting season is later. Shaffer excels Columbian only in greater hardiness of plant. Columbian originated from seed of Cuthbert, a red, growing next to Gregg, a blackcap; the seed was sown in the spring of 1885 by J. T. Thompson, Oneida, New York.

Plants very tall, very vigorous, very productive, lacking in hardiness, upright-spreading; canes numerous, tall and stout, round, dull reddish-brown, with numerous straggling straight prickles. Leaflets 3, large, oval, rugose, glabrous, yellow-green above, greenish-gray and pubescent beneath. Flowers 12-16 in a long, open, leafy, prickly cluster. Fruit midseason, season long, large, broadly-round, dull purple; torus small, releasing berry easily; drupelets large, round, numerous; flesh firm, juicy, mild and sprightly, very aromatic; quality good; seeds rather large.

643. Cuthbert (Fig. 237). *R. strigosus.*—Cuthbert is the most commonly grown red raspberry in America. The pre-eminent character which justifies its popularity is its freedom from local prejudices of either soil or climate. While best adapted to somewhat sandy land, Cuthbert thrives on a wide range of soils, and is as hardy to cold and endures heat as well as any other red raspberry. The plants are healthy and productive, and the crop ripens evenly over a long season. The berries are of good red color, firm of flesh, and fine in flavor. Cuthbert originated as a chance seedling on the grounds of a Mr. Cuthbert, Riverdale-on-Hudson, New York, and was introduced in 1865.

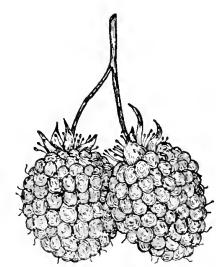

FIG. 237. Cuthbert.

Plants tall, vigorous, upright, medium number of suckers, hardy, not very productive; canes long, numerous, round, yellowish-brown, with a few straight prickles. Leaflets 3-5, of medium size, dull dark green, rugose, glabrous above, pubescent beneath. Fruit midseason, large, uniform, retains size well through the season, conical; color dull dark red, with light bloom; drupelets small, numerous, juicy, firm, sweet, rich; quality very good; seeds rather small.

644. Eaton. *R. strigosus.*—Eaton is largely grown in New England because of unusual productiveness and hardiness.

Faults are: the berries crumble badly and do not separate easily from the torus; the flavor is too acid to be pleasant; the plants droop almost to the ground, making them hard to manage; and, except in New England, there are not enough canes to make the variety productive. Eaton originated as a chance seedling with Ulysses Eaton, Cambridge City, Indiana, in 1885.

Plants medium tall, of moderate vigor, drooping, with a distinct tendency to branch, making few suckers, very hardy, productive only in New England. Fruit midseason, clings to torus and crumbles when picked, round-conical, the surface irregular and undulating, clear bright durable crimson; pedicel slender, beset with prickles; drupelets very large, broadly grooved; flesh red, juicy, firm; flavor rather acid with an agreeable aroma; quality good for culinary purposes only; seeds small.

645. Empire (Fig. 238). *R. strigosus.*—Empire is one of the most promising new red raspberries, having as its chief assets hardiness, productiveness, vigor of bush, healthiness, and large, handsome, firm, well-flavored fruits. The plants need no winter-protection in New York; equal any other variety in productiveness; and are unusually vigorous. The berries average larger than those of the well-known Cuthbert, and are about the same color, ripen a little earlier, and have a longer picking season. The fruits are mild, rich and sweet. The texture is firm and the berries stand shipment well and may be kept long. Empire originated in 1904 with L. E. Wardell, Marlboro, New York.

FIG. 238. Empire.

Plants tall, vigorous, upright, with medium number of suckers, hardy, very productive; canes smooth except for the few scattering short prickles, stocky, long; prickles short, few, becoming more numerous towards the base. Leaflets large, wide, thick, dark green, rugose. Fruit early midseason, clings well to the torus yet picks easily; large, uniform, retains its size well to the close of the season, regular in outline, round-conical; bloom slight; drupelets small, numerous, with strong coherence; color medium to dark red, glossy; flesh juicy, firm, mild, high-flavored; very good in quality; seeds medium in size.

646. Hailsham. *R. idæus.*—A few red raspberries fruit on the first year's wood in the late summer. These are the ever-

bearing or autumn-fruiting varieties of the catalogues. Among the best of these is Hailsham, an English variety which is being grown somewhat in California. It is described as very distinct in plant and berry. The plants are vigorous, with remarkably large leaves, producing enormous, hemispherical, dark red berries of excellent quality, and bearing the main crop in autumn. Picking must not be hurried, if color and taste are to reach the condition where nothing requisite is wanting.

647. Herbert (Fig. 239). *R. strigosus.*—Herbert is one of the best berries of its kind. The preëminent merits are: great vigor and hardiness; comparatively few suckers; and great productivity, being nearly twice as productive as the old standard, Cuthbert. The season is about that of Cuthbert, but usually continues a few days longer. The berries are similar to those of Cuthbert, but are more sprightly in flavor, a little larger, rounder, and a little softer. The berries are firm enough to carry to nearby markets with ordinary care. Herbert is a chance seedling found in the garden of R. B. Whyte, Ottawa, Ontario, about 1891.

FIG. 239. Herbert.

Plants vigorous, upright, hardy, healthy, very productive; canes intermediate in size and smoothness, numerous, dull red; prickles medium in length and number. Leaflets oblong-oval, dark green, rugose. Flowers large; petals rather large, oval, tapering to short abrupt claws. Fruit matures late, about with Cuthbert; large to very large, broadly ovate, with medium to large coherent drupes, dark red, juicy, soft under unfavorable conditions, pleasant flavored, sprightly; good in quality.

648. June (Fig. 240). *R. strigosus.*—Several remarkable characteristics of plant and fruit make June worthy of extensive cultivation. The plants are as hardy and as healthy as those of its two well-known parents, Loudon and Marlboro, and are more vigorous. The yield is heavy and is well distributed over a long season, which begins the earliest of all. The fruits resemble those of Loudon in color, but are a brighter handsomer red; they average larger and are more spherical. The product ships unusually well

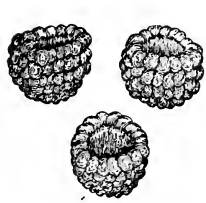

FIG. 240. June.

throughout the season, and is high in quality. June is the result of a cross made on the New York Station grounds in 1897 between Loudon and Marlboro.

Plants vigorous, upright, few suckers, hardy, very productive, healthy; canes stocky, nearly smooth, roundish, often with considerable bloom; spines straight, short, few in number and distributed near the base. Fruit matures very early, keeps and ships well, adheres well to the bushes, easily picked; berries very large, and holding their size unusually well until the close of the fruiting season, firm, with large drupelets, bright, handsome red resembling Loudon, mild subacid; quality very good.

649. King. *R. strigosus.*—In the Northeast, King is not so satisfactory as other standard sorts, but in West Virginia and westward through the Central West it is considered one of the best early red raspberries. It is most productive on clay loams. King was grown from seed by T. Thompson, Richmond, Virginia, and was introduced in 1892.

Plants tall, vigorous, upright-spreading, productive, hardy; suckers numerous. Leaflets rather small, somewhat lanceolate, more or less pubescent on both surfaces. Flower-cluster long, loose, leafy, with 8-12 flowers. Fruit early, of medium size, light red; receptacle small, releasing the berry easily; drupelets rather small, cohering poorly, the berries crumbling rather badly; flesh soft, tender, with rather insipid flavor; quality rather poor; seeds of medium size.

650. Loudon (Fig. 241). *R. strigosus.*—Loudon is one of the best red raspberries for the northern limits of this fruit, being hardier than Cuthbert or Marlboro, with which it must compete in raspberry regions. The product is liked by canners, because it holds its color well. The fruits are not so good in quality as those of Cuthbert, and the plant is very subject to crown-gall. Loudon originated about 1890 with F. W. Loudon, Janesville, Wisconsin.

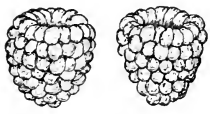

FIG. 241. Loudon.

Plants of medium height and vigor, stocky, upright, very hardy; with numerous canes. Fruit midseason, bright red, medium to large, somewhat larger than Cuthbert, conic; drupelets large with a well-marked suture, adhering so that berries do not crumble; receptacle of medium size, releasing the berry easily; flesh firm, tender, juicy, moderately sweet, pleasantly aromatic; quality good; seeds relatively small.

651. Marlboro (Fig. 242). *R. strigosus.*—Marlboro is the standard early red raspberry in many parts of the East, along the shores of Lake Erie, and in Colorado. In these regions the variety is prized for hardiness; productiveness; its very large berries; its handsome crimson fruits; and because the crop hangs on the bushes three or four days after maturity and is still marketable. Marlboro originated with A. J. Caywood, Marlboro, New York, in 1882.

FIG. 242. Marlboro.

Plants of medium height and vigor, upright, hardy, very productive, with numerous canes. Fruit early, large, regular, dark but bright red, conical, downy; drupelets irregular, numerous, adhering well so that berries do not crumble; receptacle smooth, releasing the berry easily; flesh firm, tender, juicy, mild and rather poor in flavor; quality not above good; seeds small.

652. Ontario. *R. strigosus.*—Ontario has much to recommend it for commercial plantations to precede Cuthbert and to follow Marlboro, Perfection, and June. It is one of the most productive varieties ever grown on the grounds of the New York Agricultural Experiment Station, and the berries are so large, handsome, and well-flavored, and keep and ship so well, that it is certain to be a good commercial fruit. It was grown from seed at the New York Station, Geneva, New York, first fruiting in 1911, and was introduced in 1919.

Plants medium to tall, very vigorous, upright-spreading, very productive; canes numerous, stocky, reddish-brown, almost devoid of prickles. Fruit early midseason, very large, uniform and retaining size throughout the season, broad-conic, medium red; torus small, smooth, releasing berries readily; drupelets large, adhering so that there is no crumbling; flesh firm, juicy, mild subacid, pleasantly aromatic; quality very good; seeds small.

653. Perfection. *R. strigosus.*—There are two Perfection red raspberries; one from Wisconsin, which is now grown little or not at all; the other, a comparatively new variety from the great small-fruit district of the Hudson River Valley. The latter is the subject of this sketch. This variety, for the last few years, has been the best-liked sort in eastern New York because of great vigor, productiveness, and hardiness. Some find the fruit a little soft and inclined to crumble. Perfection originated

with A. H. Grefe, Marlboro, New York, in 1900 and was distributed in 1910.

Plants tall, vigorous, upright, very hardy and productive; canes numerous, stocky, prickly, dull greenish-brown. Fruit early midseason, large, regular, hemispherical, dull, rather dark red; torus large, rather rough, clinging a little too tenaciously to the fruit; drupelets large, irregular, cohering weakly so that the berries crumble; flesh a little soft, tender, sprightly, fair to good; quality not above mediocre; seeds small.

654. Ranere (Fig. 243). *R. strigosus. St. Regis.*—Introduced as an everbearing red raspberry, Ranere is chiefly valuable for spring-bearing, five-sixths of the crop being borne in early summer and the remainder in the autumn. Aside from its being a double-cropper, there is not much to recommend the variety. The berries, while handsomely colored, are variable in size, running rather small, and are mediocre in quality. The plants are hardy, but only moderately vigorous, and are very susceptible to crown-gall. The variety was long grown in New Jersey by a colony of Italians, and was generally distributed about 1912.

FIG. 243. Ranere.

Plants of medium size, vigor and productiveness, hardy; canes numerous, slender, brownish-gray. Leaves rugose, glabrous above, pubescent beneath with a spiny midrib which is glandular at its base. Flowers 5-6 in a long, open, leafy cluster. Fruit early summer and autumn, rather small and variable in size, light red, hemispherical; drupelets of medium size, round, cohering poorly, the berries often crumbling; flesh rather soft, mild and insipid; quality poor; seeds small.

655. Royal Purple. *R. strigosus* × *R. occidentalis.*—While the berries are not so inviting in either appearance or taste as those of the standard Columbian, Royal Purple may have a place in commercial berry-growing because of the great hardiness of the plants and the lateness of the ripening period. The crop ripens one to two weeks later than that of Columbian, and has a remarkably long season, lasting until early blackberries are ripe. The variety originated with G. H. Giston about 1898, at Bristol, Indiana.

Plants vigorous, upright-spreading, very productive, very hardy; canes of medium length, numerous, dark reddish-brown, with few thorns mostly at

the base. Fruit late, medium in size, broad-ovate, dull purple; drupelets small, numerous, round; flesh rather dry, firm, subacid, insipid; quality rather poor; seeds small.

656. Shaffer. *R. strigosus* × *R. occidentalis.*—Shaffer is the oldest standard purple raspberry, and was for many years the most prized. It is now being superseded by Columbian, which resembles but surpasses it, as noted in the discussion of that variety. It is still grown for canning. The propagation of Shaffer is mostly by tips, as it does not sucker well. The plants lack hardiness. The variety originated with George Shaffer, Scottsville, New York, about 1871.

Plants tall, very vigorous, very productive, lacking in hardiness; canes long, numerous, reddish-brown, with numerous stray prickles. Leaflets 3, rugose, glabrous and dark green above, gray-green and pubescent beneath. Flowers 12-14 in long, open, leafy, prickly clusters. Fruit late, large, dull purple, broadly hemispherical; drupelets large, numerous, round; flesh juicy, rather soft, sprightly, aromatic; quality good; seeds small.

657. Sunbeam. *R. strigosus* ×.—Sunbeam is a new and very hardy red raspberry which originated with N. E. Hansen of the South Dakota Experiment Station, Brookings, South Dakota. It is considered very promising for the northern Great Plains region, where great hardiness and capacity to withstand summer drought are required. The variety was introduced in 1913.

Plants tall, vigorous, upright-spreading, productive; canes very numerous, dull reddish-brown, with many sharp slender prickles. Leaflets glabrous above, pubescent beneath, terminal one lobed. Flowers 5-8 in short open clusters with slender red prickles. Fruit late midseason, below the average in size, variable, hemispherical, dark red; drupelets of medium size, cohering well; flesh soft, too acid except for culinary purposes; quality fair; seeds small.

658. Superlative. *R. idæus.*—Superlative is an old English variety, now grown wherever the red raspberry is cultivated, and regarded as a standard. Unfortunately the canes are not sufficiently hardy, vigorous, or productive for the eastern United States, but the variety is highly prized on the Pacific slope, especially near San Francisco. It was introduced in England in 1888, and was soon after brought to America.

Plants rather dwarf, not very vigorous, productive only in certain localities, tender to cold; canes slender, numerous; typical of *R. idæus* in leaf

and flower. Fruit medium early, large to very large, conical, dark red, too dull to be attractive; drupelets large, round, cohering so that the berry does not crumble; torus small, rough and adhering too tenaciously to the berry; flesh soft, juicy, rich, sprightly, pleasantly aromatic; quality good to best; seeds relatively small.

659. Surprise. *R. idæus. Early Surprise. California Surprise.*—This seems to be the most remarkable red raspberry, which so far as yet tested, thrives only in California, where it is becoming the most popular variety of this fruit. On the grounds of the New York Agricultural Experiment Station, Geneva, New York, the plants are so tender to cold and suffer so much from dry and hot weather that the variety is worthless. In California, the fruit is described as being very like that of Superlative, but the plant is very different. Thus, the plant has the remarkable quality of bearing fruit every month in the year in southern California; bears the first season set; is bushy and almost weeping; and is reported to be much more productive than that of Superlative. Surprise originated with D. W. Coolidge, Pasadena, California, about 1898, and was introduced in 1904.

BLACK RASPBERRIES

660. Black Pearl (Fig. 244).—Although a new variety, Black Pearl stands at the front of black raspberries. The plants are about all that could be desired in hardiness, healthfulness, and productiveness; while the berries are large and glossy black, very inviting in appearance, and of good quality, falling short only in being a little too variable in size. The season is early but somewhat short, the crop maturing a week or more before the well-known Gregg. Black Pearl is in favor with evaporators, especially in cold climates, and where summer droughts parch the land. The variety was found as a chance seedling by Herman Krumris, St. Joseph, Missouri, in 1905, and was introduced in 1907.

FIG. 244. Black Pearl.

Plants vigorous, upright, very productive; canes numerous, stocky, dull brownish-red, with heavy bloom; spines numerous, slender. Leaflets small,

dark green, rugose, heavily pubescent beneath. Flowers early, 10-12, in short, close, leafy clusters. Fruits early, large, hemispherical, glossy black; drupelets numerous, small, cohering strongly; flesh firm, rather dry, sprightly, rich; quality very good; seeds small.

661. Cumberland.—Until a few years ago, Cumberland was the most widely and commonly grown black raspberry. Hardiness and productiveness of plant and large size and high quality of fruit were the assets which gave it supremacy. It is now hardly more popular than several other sorts, falling from former popularity chiefly because of susceptibility to anthracnose. Cumberland originated with David Miller, Camp Hill, Pennsylvania, and was introduced about 1898.

Plants tall, vigorous, upright, very hardy, very productive, susceptible to anthracnose; canes medium in number, light reddish-brown, with straight stray prickles. Foliage typical of the species. Flowers 12-14, in short, close, leafy, compact, prickly clusters. Fruit midseason, large, conical, glossy black; torus small, releasing the berry readily; drupelets large, round; flesh firm, juicy, sweet, rich; quality very good; seeds small.

662. Gregg (Fig. 245).—At one time the leading black raspberry, Gregg is gradually passing out. The plants are too tender for northern climates; too susceptible to the ills of the species; are not adapted to many soils, and do not mature in a short season. Three meritorious qualities may be named: the berries are large, handsome, and of very good quality; the plants are very productive where they thrive; the raspberry is one of the best for evaporating, a smaller quantity of fresh fruit being required for a pound of dried fruit than of almost any other variety. The original plant was found wild on the Gregg farm, Ohio County, Indiana, in 1866.

FIG. 245. Gregg.

Plants of medium vigor, tender to cold, productive, spreading in growth; canes rather few, brown, glaucous with a few strong straight prickles. Leaflets 3-5, dark green above, greenish-gray and pubescent beneath. Flowers 8-14, in short, close, leafy clusters on tips of the branches. Fruit late, large, broadly hemispherical, black with tinge of purple and heavy bloom; drupelets large, numerous, round, cohering strongly; flesh firm, juicy, rich and highly flavored; quality good; seeds small.

663. Hoosier is a promising black raspberry for the Middle West. It is a selection from a large number of seedlings grown to secure a hardy and disease-resistant variety, but, on the grounds of the New York Agricultural Experiment Station, Geneva, New York, it is neither hardier nor more resistant to diseases than the average variety of its species; in fact, it is marked as susceptible to anthracnose. Notwithstanding the experiences noted, it is well spoken of by many. Hoosier originated on the farm of John Dunn, Pekin, Indiana, about 1895.

Plants medium in size and vigor, productive, upright; canes medium in number, rather stocky, dull reddish-brown with strong straight spines. Leaflets usually 3, large, dark green above, greenish-gray beneath. Flowers 10-12, in very short, compact, leafy clusters. Fruit midseason, large, hemispherical, glossy black; torus small, releasing the berry readily; drupelets large, numerous, round; flesh dark red, firm, juicy, subacid, rich, with pleasant aroma; quality good; seeds large, hard.

664. Kansas (Fig. 246).—Long a prominent commercial black raspberry, Kansas is more often and better characterized by its faults than by its virtues. Chief of the faults is susceptibility to winter-killing, although defective fruits, the berries being often imperfect and variable in size and shape, stand against the variety as markedly as the defect in the plant. Nevertheless, the variety finds favor and is largely grown, although it is being replaced by Plum Farmer. The original plant was a chance seedling on the farm of A. H. Griesa, Lawrence, Kansas, found in 1884.

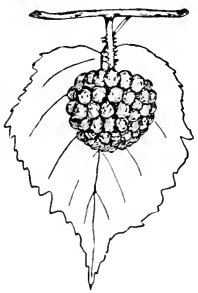

FIG. 246. Kansas.

Plants medium in size and vigor, upright-spreading, very productive, tender to cold; canes numerous, stocky, reddish-brown, with many strong prickles. Leaflets usually 3, rather small, typical of the species. Flowers 10-12, in short, compact, leafy clusters at the tips of branches. Fruit midseason, medium to large, broadly hemispherical, variable in size and shape, with many imperfect berries, glossy black; drupelets rather small, numerous, round; flesh firm, rather dry, subacid; quality good; seeds large, hard.

665. Ohio.—Before the coming of canning and quick transportation of fruit, black raspberries were grown in great quanti-

ties to evaporate, and Ohio was the variety best suited for this purpose, yielding more pounds to a bushel of fresh fruit than any other black raspberry, as the seeds are large and heavy and the flesh is firm and dry. With the decline of the evaporation of berries, Ohio is passing out. The variety originated about 1865 with Hiram Van Dusen, Palmyra, New York.

Plants of medium size and vigor, productive, upright-spreading, hardy; canes stocky, reddish-brown, numerous, with slender spines mostly at the base. Leaflets 3, small on the old canes, rather light green. Flowers 9-11, in short leafy clusters. Fruit midseason, hemispherical, dull black; drupelets of medium size, oval, numerous, cohering weakly; flesh firm, dry, mild subacid; quality rather poor; seeds large, hard.

666. Plum Farmer.—It is difficult to judge the merits of Plum Farmer, but the indications are that it is to become one of the leading commercial black raspberries for eastern America. While the plants are preëminently vigorous, hardy, healthy, and productive, the chief merits are in the fruits, which ripen early, are large, beautiful, of high quality, and ship well. The first plant was found by L. J. Farmer, Pulaski, New York, in a shipment of raspberries from Ohio, about 1892.

Plants vigorous, upright, dense, hardy, very productive, healthy; canes stocky, long, numerous, round, bright red, heavily overspread with dense bloom; prickles large and long, thick, strong, straight, sharp, medium in number; branches thick, long, numerous, reddish, densely coated with bloom, with internodes of medium length. Fruit early, easily picked, ships well, one of the best to withstand severe drought; berries large, very black, covered with bloom, firm, uniform, sprightly at first, becoming mild at full maturity, juicy; quality good; seeds small, hard.

CHAPTER XXX

VARIETIES OF BLACKBERRIES AND DEWBERRIES

NURSERYMEN offer about a hundred sorts of blackberries and dewberries, but each year sees new introductions of both groups, so that, even with the inevitable discarding of old varieties, there is likely to be an increase from year to year in named sorts. The progeny of at least twelve species are to be found in the cultivated blackberries and dewberries of this continent. These have been crossed and recrossed until it is now quite impossible to classify varieties with reference to the species from which they came. About all that can be done is to group blackberries in one division and dewberries in another, not an easy task, for the characters of the two fruits in the wild forms intermingle, and by crossing have been further confused under cultivation. It is impossible to separate the varieties sufficiently well from their fruit characters to make a workable key to varieties, as has been attempted for the tree-fruits.

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BLACKBERRIES

667. Agawam (Fig. 247).—For many years Agawam was the most prized of early blackberries, and it is still widely grown, but not so commonly in commercial plantations as formerly. Productiveness of plant and high quality and earliness of fruit are the chief assets. The faults are: the plants suffer from winter-killing and the berries run too small to make the variety wholly satisfactory. The variety originated with John Perkins, Ipswich, Massachusetts, between 1865 and 1870.

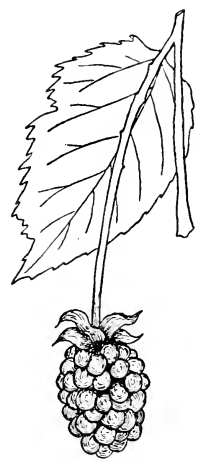

FIG. 247. Agawam.

Plants of medium size and vigor, productive, upright-spreading; canes numerous, tender to cold, furrowed, dark reddish-brown, covered with strong straight prickles. Leaflets 3-5, long, with a tapering apex, very pubescent beneath; margin finely, sometimes doubly serrate. Flowers 1 inch across, 12-16, in long open prickly clusters. Fruit early, small, ¾ inch in length, broad-oblong, glossy black; drupelets few, large, round; core white, soft; flesh rather soft, sweet and pleasant; quality very good; seeds of medium size, soft.

668. Ancient Briton is a prime favorite in northern regions, Wisconsin and Minnesota particularly. The plants are very vigorous, very productive, and the berries are of the best quality. It is an old sort and a well-established standard for commercial plantations. The origin of the variety is uncertain, but it came into prominence in Wisconsin in the sixties of last century.

Plants medium in size and vigor, very hardy, very productive; canes moderately numerous, roundish, brown, with numerous thick straight prickles. Leaflets 5, palmate, oblong-oval, heavily pubescent above and below; margin serrate and hairy. Flowers 1¼ inches in diameter, 16-18, in a long, open, prickly raceme. Fruit medium to late, medium to large, long, rather narrow, tapering, glossy black; core white, conical, soft; drupelets large, numerous, elliptical; flesh tender, juicy, sweet but sprightly; quality good.

669. Black Diamond. *Atlantic. Ewings Wonder. Star. Wonder.* This variety is listed as a dewberry by some, but it properly belongs with the Evergreen blackberry, with which it is so nearly identical that it needs no separate description. It is but half-hardy, and therefore of little value in the East, although it is rather commonly grown in southern New Jersey, but even there every cold winter takes its toll. The variety is said to have originated with G. H. Liepe, Cologne, New York, early in this century.

670. Blowers.—The plants of Blowers are so capricious, responding to every diversity in season, soil, and climate, and so many of the berries are imperfect, even in locations suitable for the plants, that it is worthless as a commercial variety. Nevertheless, many nurserymen offer it and report it successful in parts of North America. It originated with H. W. Blowers, Westfield, New York, about 1888.

Plants tall, very vigorous, not hardy, productive; canes moderately numerous, stocky, furrowed, reddish-brown, with numerous strong straight prickles. Flowers 1½ inches in diameter, 8-10 in open, short, leafy clusters. Fruit midseason, ripening over a very long period, 1 inch long, rather narrow, tapering, variable in size, glossy black; core soft, conical; drupelets large, variable in size, round; flesh soft, sweet, mild; quality good; seeds rather large.

671. Dallas is supposed to be a blackberry-dewberry hybrid, although at Geneva, New York, it shows little if any dewberry parentage. The variety has little to recommend it for the North, but seems to find favor in Texas and Oklahoma. It is a native of Texas, but where or when it originated cannot be learned.

Plants very vigorous, drooping half-hardy, productive; canes long, with numerous sharp spines. Leaflets 5, palmate, coarsely and deeply serrate. Flowers very large, 2 inches in diameter, 5-7, in long, open, leafy, prickly corymbs. Fruit early midseason, large, almost hemispherical; flesh firm, juicy, sweet; quality very good.

672. Early Harvest (Fig. 248).—One of the earliest blackberries to ripen its crop, Early Harvest is valuable only for this

reason. In the North, the plants are often winter-killed, and in the South, where they are very productive and ripen the crop extra early, they are susceptible to rust. The variety is prized in parts of California. The original plant was growing wild in Illinois some time previous to 1880.

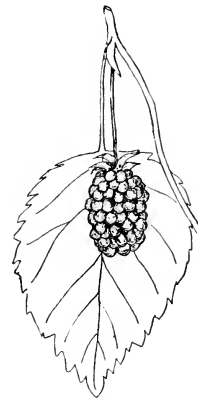

FIG. 248. Early Harvest.

Plants moderately vigorous and productive, winter-kill in the North; canes long, numerous, deeply furrowed, with strong straight prickles. Leaflets 3-5, palmate, ovate-lanceolate, deeply and sometimes doubly serrate. Flowers 1½ inches in diameter, 8-10, in long open racemes. Fruit early, ripening over a long season, medium in size, conical, glossy black; drupelets round, numerous, rather small; flesh tender, sweet; quality good; core soft, white; seeds small, hard.

673. Early King ripens a week later than Early Harvest, being the second earliest blackberry. The plants lack in hardiness, and, like all early blackberries, are not very productive; to which may be added a third fault, susceptibility to blackberry-rust. The variety is worth growing only in mild eastern climates.

Plants low, vigorous, half-hardy, moderately productive, prickles long and numerous, susceptible to rust. Fruit early, with a short season, medium size, glossy black, oblong-hemispherical, irregular, ripe as soon as black; flesh soft, very sweet; quality good.

674. Eldorado.—For many years Eldorado was the first main-crop variety to ripen; it has, with other notable virtues, great hardiness and freedom from the blackberry-rust in the plant, handsome appearance, and exceptionally high quality in the fruit. The variety originated as an accidental seedling in Preble County, Ohio, about 1880.

Plants tall, vigorous, very hardy, productive, healthy; canes numerous, with many large prickles. Flowers 1½ inches in diameter, 10-12, in long, open, very spiny racemes. Fruit early midseason, ripening period very long, elongated hemispherical, jet-black; drupelets large, round, few; core soft, white, conical; flesh firm, juicy, sweet, rich; quality very good; seeds small.

675. Erie.—With several characters to recommend it, Erie has long been under general cultivation. The plants are very vigorous, hardy, productive, and free from the dreaded blackberry-rust. The berries are extraordinarily large, and the quality is good when the fruit is mature. The original plant of Erie was found near Tallmadge, Ohio, about 1876.

Plants of moderate height, very vigorous, hardy, productive, upright-spreading; canes numerous, stocky, deeply furrowed, with straight slender prickles. Leaflets palmate, large, ovate-lanceolate, pubescent on both surfaces. Flowers very large, 1¾ inches in diameter, 8-12, borne in long, open, leafy racemes. Fruit midseason, large, cylindrical, tapering irregularly, glossy black; core cylindrical, rather soft; drupelets numerous, rather small, round; flesh soft, juicy, sweet when fully ripe, rich; quality good; seeds of medium size, hard.

676. Giant Himalaya (Fig. 249).—This much talked about berry is probably an inhabitant of central Europe, which has found its way to various parts of the Old World, being rechristened as it was taken from place to place. As advertised in the United States it is the most pretentious cheat in the berry garden, yet in some respects it is a remarkable addition to edible brambles, and therefore needs consideration. The name is misleading. The story of its origin is that an English traveler brought seed from the Himalayas to Luther Burbank about 1898, from which the variety came. However, the variety or its counterpart has been known in Germany under the name Theodore Reimers.

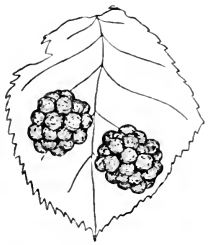

FIG. 249. Giant Himalaya.

The plants are too tender to cold for northern regions. In the Pacific states, Himalaya is remarkable for vigor and productiveness, but in mild climates in the East, regions south of Pennsylvania, the plants are very vigorous but almost barren. In all regions, the plants need cross-pollination, and even so, produce many imperfect fruits. The berries at best are poor in quality and uninviting in appearance. The long, trailing, thorny, evergreen canes are almost unmanageable on trellis or stake. The value of the variety seems to lie in the possibilities it furnishes for hybridization. The several hybrids now known,

PLATE XXII. A standard white currant—White Grape.

of which it is one parent, promise much. Vigor and productiveness of plant are the characters for which it should be used in hybridization.

677. Iceberg.—One of the few white blackberries worth trying, Iceberg is little more than a curiosity in the East, but has some value in California as a fruit for home use. At Geneva, New York, the plants must be protected against winter-killing. The variety originated with Luther Burbank about 1895. The plant is described as much like that of Lawton, while the berries in California are said to be large, amber-white, soft, and of very good quality.

678. Kittatinny has an unbroken record of more than a half century as a standard commercial blackberry in the United States from the Atlantic to the Pacific. Possibly no variety has been or is more widely and largely grown. It equals the best representatives of its kind in quality of fruit. Two faults mar an otherwise excellent variety; the plants are not hardy in cold climates, and are very susceptible to rust where that disease is rife. Kittatinny comes from the mountains of the same name in New Jersey, and was introduced by E. Williams about 1865.

Plants tall, vigorous, upright-spreading, productive, half-hardy; canes numerous, stocky; furrowed, reddish-brown, with long, strong, straight prickles. Leaflets large, oblong-lanceolate, pubescent above and beneath. Flowers 1¼ inches in diameter, 6-8, in rather short, open, leafy racemes. Fruit early midseason, medium size, oblong, variable in size and shape, jet black; core cylindrical, soft; drupelets large, round; flesh sweet, rich; quality very good; seeds small, soft.

679. Lawton. *New Rochelle.*—Lawton was the second variety of this fruit introduced. It is still grown widely on the Pacific slope and somewhat in the East, being especially well liked for canning. It has lost commercial importance in the East, however, because the plants do not withstand cold well and are susceptible to rust. The fruit is not ripe until jet-black, when the quality is of the best. Lawton was introduced by William Lawton, New Rochelle, New York, about 1848.

Plants stocky, vigorous, productive, tender to cold, susceptible to rust, with numerous large prickles. Fruit late midseason, large, jet-black, be-

coming bronzed when over ripe; core large and rather hard; flesh soft, sweet, rich; quality very good.

680. McDonald (Fig. 250) is a blackberry-dewberry hybrid much grown in the southwest. The plants are very vigorous, remarkably productive, immune to rust, better able to withstand drought than most other brambles, and ripen their crop two weeks before the earliest blackberry. The canes trail the first season, but send up strong drooping canes in succeeding years. The variety is self-sterile and must be inter-planted with another blackberry for a pollenizer. The berries are large, oblong, very good in quality, and hang in good condition on the vines for three or four days after ripening. The variety came into prominence in the southwest about 1912.

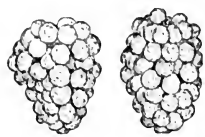

FIG. 250. McDonald.

681. Mammoth. *Lowberry. Black Loganberry.*—This is another blackberry-dewberry hybrid usually listed with blackberries. Mammoth thrives only on the Pacific slope, being too tender to cold for the East. The variety is remarkable for its enormous berries and its long trailing vines, which sometimes attain a length of twenty-five or thirty feet. The canes are stout and covered with small short spines; they grow upright several feet and then begin to trail. Eventually the tips take root; tipping is the method of propagation. The leaves are semi-evergreen in California. The berries, while soft for distant shipment, are excellent for local markets and home use. The blossoms are self-sterile and the loganberry makes a good pollenizer.

682. Mersereau has long been a dependable variety for both market and home in the northern and eastern states. It fails in the South because of susceptibility to rust. Mersereau is a seedling of Snyder which it surpasses in vigor of plant and in size and quality of berry. The variety originated with J. M. Mersereau, Cayuga, New York, about 1890.

Plant tall, vigorous, upright, hardy, productive, susceptible to **rust**; canes numerous, light red, furrowed, with long strong straight **prickles**. Leaflets 3-5, palmate, oval-lanceolate, pale hoary pubescence beneath, with

sharp narrow serrations in a double series. Flowers 1½ inches in diameter, 8-10, in short, compact, leafy racemes. Fruit late midseason, season short, large, oblong-conical, black, retaining color well after picking; drupelets large, round; core soft, conical, white; flesh firm, but tender, juicy, sweet, rich; quality very good; seeds small, soft.

683. Rathbun (Fig. 251).—The berries of Rathbun are flawless but the plants leave much to be desired. They are only moderate in vigor and productiveness, sucker too sparingly, are susceptible to rust, winter-kill, and bear flowers which must be cross-pollenized. Rathbun is a blackberry-dewberry hybrid having the peculiarity of rooting at the tips. It is well liked in mild climates east of the Rocky Mountains. The variety originated with Alvin Rathbun, Silver Creek, new York, about 1885.

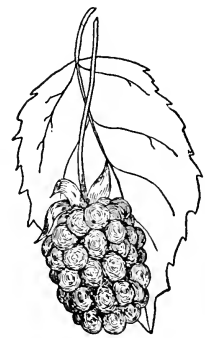

FIG. 251. Rathbun.

Plants of medium size and vigor, half-hardy, moderately productive; canes few, angular, greenish, with straight slender spines. Flowers 1¾ inches in diameter, 3-7, in short, open, leafy racemes with a few prickles, sterile or nearly so. Fruit early, very large, somewhat variable, cylindrical, jet-black; core cylindrical, soft, white; drupelets large, round, numerous; flesh firm, juicy, sweet, rich; quality very good; seeds large, soft.

684. Snyder (Fig. 252).—The fruit is not inviting in appearance and taste and turns red after picking, faults that condemn Snyder; but the plants rejoice in such vigor, health, productiveness, and hardiness that for seventy years the variety has been a standard. It originated with Henry Snyder, La Porte, Indiana, about 1851.

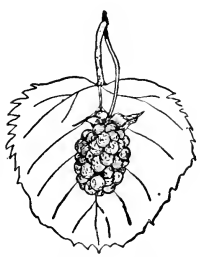

FIG. 252. Snyder.

Plants tall, upright, very vigorous, hardy and productive; canes numerous, stocky, rough, furrowed, reddish-brown, with many very large, thick, straight thorns. Leaflets mostly 5, palmate, ovate-lanceolate, narrow, pubescent above and beneath, apex acute, sharply serrate in a double series. Flowers 1½ inches in diameter, 15-20, in long leafy racemes. Fruit midseason, season short, of medium size, glossy black; core elongated, soft, white; drupelets large, round; flesh firm, sweet, poorly flavored; quality poor; seeds large, soft.

685. Taylor (Fig. 253) has long been the favorite late blackberry, and is prized also because of its hardiness of bush, immunity to rust, and high quality of fruit. It is only moderately productive in many localities. The plants are characterized by greenish-yellow canes, sometimes tinted with red. It is an old variety, having originated with a Mr. Taylor, Spiceland, Indiana, in 1867.

FIG. 253. Taylor.

Plants tall, vigorous, very hardy, moderately productive, immune to rust; canes numerous, slender, angular or nearly round, greenish-yellow, sometimes reddish, with numerous straight prickles. Leaflets 3-5, oblong-lanceolate, pubescent on both surfaces. Flowers 9-15, in long, compact, leafy, prickly racemes. Fruit late, medium in size, thimble-shaped, glossy black; core soft, white; flesh rather soft, juicy, sweet, rich; quality very good; seeds of medium size, hard.

686. Texas Early. *Crandall.*—This variety is held in high esteem in California, where the fruit matures early and ripens during a long period. The high quality of the fruit also commends it. Crandall originated in Texas, but when, where, and by whom is not known. It was introduced in California about 1875 by J. R. Crandall, whose name it sometimes bears.

Plants vigorous, upright, productive, hardy at Geneva, New York; canes numerous, resembling those of Lawton very closely, as do the leaves. Flowers 6-8, in long, open, leafy, prickly racemes. Fruit very early, ripening period long, large; flesh firm, sweet, rich; quality very good.

687. Wilson Early.—Although not generally grown now, the variety is still found in parts of the East. The plants are precariously hardy, not always productive, and bear many imperfect flowers, most of which are more or less doubled. Wilson Early is probably a blackberry-dewberry hybrid. The variety originated with John Wilson, Burlington, New Jersey, about 1854.

Plants upright or often semi-trailing, the trailing shoots rooting at the tips, medium in vigor, half-hardy, variable in productiveness. Leaflets 3 to 5, broad-lanceolate. Flowers 1½ inches in diameter, often double and imperfect, 4-6, in long, open, leafy racemes. Fruit very large, often irregu-

lar and imperfect, tapering toward the apex; drupelets few, very large, round, variable in size; flesh firm, sweet, rich; quality very good.

DEWBERRIES

688. Aughinbaugh.—This variety is the chief representative of the wild western dewberry, *R. vitifolius,* and probably is the parent of the loganberry. Its cultivation is confined to California, where, before the advent of the loganberry, it was much grown. The flowers are pistillate, requiring pollen from another variety to set fruit. The plant is lacking in vigor and productiveness. It has been in cultivation since 1875.

689. Laxtonberry. *Laxton.*—Crosses between brambles are destined to play an important part in the berry-growing of the future; a dozen or more already have enriched pomology both as market crops and for the fruit-fancier. One of these of lesser importance, which has attained some prominence in England, and is grown somewhat on the Pacific slope, is the laxtonberry, a cross between the loganberry and the Superlative red raspberry. This interesting hybrid, having much the habit of growth of the loganberry, is listed with dewberries. The berry is much like that of the loganberry in color and flavor, but separates from the receptacle somewhat like a raspberry. Its blossoms are not wholly self-fertile, and the variety must be planted in proximity to the loganberry or a red raspberry.

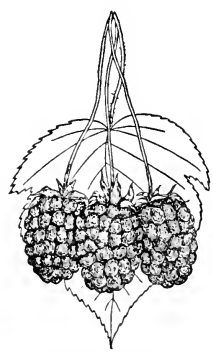

FIG. 254. Loganberry.

690. Loganberry (Fig. 254). *Logan Blackberry.*—The loganberry has a permanent place in American pomology as a distinct type of fruit. There are remarkable features in the plant which appeal to berry-growers, but it is the product that makes the loganberry one of the most valuable pomological introductions of the generation. The fruit is prized for the fresh-fruit market; it is handsome and delectable as processed in the canneries; well ripened, the crop gives a large proportion of the dried product to the fresh fruit; lastly, the fruit makes a de-

licious nonalcoholic beverage, for which purpose it is now more used than for the other products. So far, the loganberry is successfully grown only in parts of California, Oregon and Washington. The plants do not yield to the climates and soils of the regions east of the states named, succumbing to cold in the North and proving almost barren in the South.

Variously called a blackberry, a dewberry and a hybrid between the western dewberry and a red raspberry, the loganberry, by reason of its trailing canes, and habit of rooting at the tips, is probably best classified with the dewberries, it being, as most authorities now agree, a red-fruited variety of the western dewberry, *R. vitifolius*. The original plant was discovered by Judge J. H. Logan, Santa Cruz, California, in 1881, and was considered a hybrid between the Aughinbaugh dewberry and a red raspberry, a theory untenable in light of recent investigations. Plant and fruit are sufficiently well described in the description of *R. vitifolius*, page 186.

691. Lucretia (Fig. 255) has attained high place because endowed with a constitution fitting it for a great diversity of soils, and for a range in latitude from the coldest to the warmest in which dewberries can be grown. The plants have the faults of being susceptible to anthracnose, and of producing many double blossoms with resultant sterility. The quality of the fruit, while not the best, is good, but the large jet-black berries are more inviting in appearance than in taste. The variety was introduced from Ohio about 1876.

FIG. 255. Lucretia. Plants vigorous, trailing, productive, half-hardy, requiring winter protection; canes slender, long, numerous, round, greenish-brown, with strong rather blunt prickles. Leaflets 3-5, sometimes 7, oval, variable in shape, pubescent above and beneath, coarsely serrate. Flowers nearly 2 inches in diameter, 3-5, in short, open, leafy, prickly corymbs. Fruit early midseason, large, cylindrical, tapering slightly, jet-black; core long, conical, soft; drupelets large, round; flesh firm, juicy, sweet, rich; quality good; seeds large, soft.

692. Mayes (Fig. 256). *Austin Improved.*—Of the many dewberries and dewberry like brambles in Texas, Mayes is the lead-

ing variety. It seems to be comparatively rare elsewhere, although earliness and productiveness commend it. The berries are handsome and of excellent quality, but fail as commercial fruits because too soft to ship well. The canes are vigorous and productive, but subject to anthracnose and double-blossom. The fruit ripens about a week before that of Lucretia. The original plant was found wild in Texas by John Mayes about 1880.

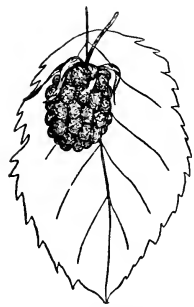

FIG. 256. Mayes.

Plants vigorous, productive, subject to anthracnose and double-blossom; canes trailing, long, slender, numerous. Leaflets 3-5, mostly sessile, variable in size, coarsely serrate in a double series. Flowers 1½ inches in diameter, 4-6 in axils of leaves and terminal. Fruit early, large, conical, broad at the base, jet-black; core medium to soft; drupelets very large, round; flesh firm, juicy, sprightly; quality very good; seeds rather large, soft.

693. Phenomenal.—This is a new fruit of the loganberry type, introduced by Luther Burbank as a cross between a variety of the western dewberry and Cuthbert red raspberry. It is so similar to the loganberry that it is usually classed with it. The essential difference in normal plants of the two varieties are: the canes of Phenomenal are a little hardier; the blossoms open a few days later; the berries are a little larger; and, while the flavor of the fruits of the two is similar, the juice of the loganberry makes the better beverage, the fruit of both being used most largely for their juice. The variety was introduced in 1912.

694. Premo.—Except for a few trivial differences, Premo might be said to be an early Lucretia, and is either a sport or a seedling from that variety. The plants are very like those of Lucretia, but ripen their crop a week or ten days earlier, are not so productive, and bear more imperfect flowers. The berries are smaller than those of Lucretia, but are just as firm in flesh and as good in quality. This variety, a comparatively new acquisition, is becoming a favorite early fruit in many dewberry sections in the United States, especially in the South, and in North

Carolina particularly. Data regarding the origin of the variety are lacking, but it has been under cultivation at least since 1905.

695. **Primus.**—Another variety of the loganberry type is Primus, introduced about 1890 by Luther Burbank as a cross between the western dewberry, *R. vitifolius* and *R. cratægifolius*. Its chief claim for recognition by berry-growers is that the crop ripens before that of loganberry. The variety fails and is being discarded because of several serious faults; the blossoms appear early and are caught by frosts; the berries cling and are bruised in picking, and are dull and unattractive in appearance; and the plants are rather more unmanageable in the plantation than those of other varieties of its type, all of which give trouble in staking or trellising. In foliage and canes, Primus is very similar to the loganberry. The variety was introduced by Burbank in 1893.

CHAPTER XXXI

VARIETIES OF CURRANTS

THE currant plays an important part in the pomology of northern climates; no less than seventy red, fourteen black and five golden currants have been grown at one time or another in the United States and Canada. Compared with other fruits, these numbers seem small, but currants are relatively stable, and improved varieties are obtained only with difficulty, so that the several species are represented by only few varieties. The botanical classification of currants is based on distinctions so fine that pomologists will find it difficult to place cultivated varieties of red currants in the several species. Thus it is impossible to make sure whether some varieties belong to *R. sativum* or *R. rubrum*. Nor can a satisfactory key to varieties be made. The author is forced to be content with putting all red currants in one group, black sorts in another, and the golden currants in a third.

INDEX TO VARIETIES OF CURRANTS

RED CURRANTS

696. Cherry (Fig. 257).—Bunches and berries are large, and, as they are borne on vigorous plants, the variety becomes one

of the most productive of the large-fruited currants. The berries are a beautiful bright red, very large, and well flavored. Defects are that the plants do not sucker freely, so that the bushes sometimes have too few stalks; there is a tendency in the canes to "go blind," that is, to lack the terminal shoot; and the short-stemmed bunches are borne so close to the wood that the crop is difficult to pick. The variety was introduced into America by W. W. Falk, Flushing, Long Island, in 1846.

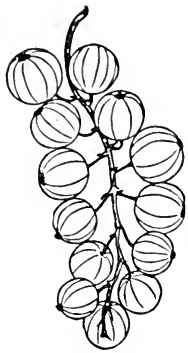

FIG. 257. Cherry.

Plants large, vigorous, upright-spreading, dense, productive; suckers few. Leaves cordate, lobes ovate, rugose, pubescent, margin crenate; petiole 2 inches long. Flowers early, *R. sativum* type. Fruit early; clusters short, thick, loose, 10-14 berries; stem short, making fruit difficult to pick; berries very large, cling well, round, dark red; skin smooth, tough, transparent; flesh red, medium juicy, firm, mild subacid; quality good; seeds large, rather numerous.

697. Diploma (Fig. 258) is a new currant widely grown in New York, but still on trial in other currant-growing regions. The variety is easily distinguished by its light red fruits, which are more transparent than those of any other currant, the seeds and segments showing distinctly through the thin skin. The fruits are juicier than those of most other currants, therefore especially desirable for jellies; for the same reason the crop must be picked and handled with care. The flavor is mild almost sweet. Diploma originated with Jacob Moore, Brighton, New York, in 1885.

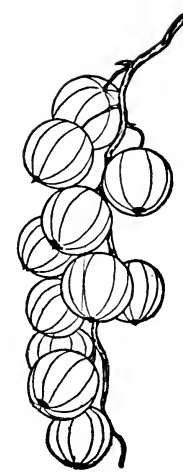

FIG. 258. Diploma.

Plants large, vigorous, upright-spreading, dense, hardy, productive, healthy; canes numerous, stocky, long, somewhat angular, reddish-brown; blooms in midseason. Fruit midseason, period of ripening short; pedicels of average length and thickness; berries large, round, adhere tenaciously to the pedicels, bright light red which changes but slowly after picking; skin very thin, very transparent, the segments, veins and seeds unusually distinct; flesh semi-transparent, tinged

with red, tender, very juicy, sprightly subacid becoming mild; quality good to very good; seeds numerous, large.

698. Giant Red.—This is a new currant with a reputation yet to make in commercial plantations. On the grounds of the Experiment Station, Geneva, New York, it is surpassed by several older varieties of its type, that of Versailles, of which it is a seedling. Giant Red was grown by E. P. Powell, Clinton, New York, from seed planted in 1895.

Plants very tall, upright, productive, healthy; canes stout. Leaves large, milky-green, thick, held nearly flat. Flowers midseason, slightly tinged with red. Fruit midseason; clusters of medium length, compact, well filled to the end; stems long, making picking easy; berries medium to large, bright red; flesh firm, medium juicy, sour, too acid for pleasant eating; seeds large, numerous.

699. Fay (Fig. 259) is one of the best of the large-fruited red currants. Clusters and berries are large and very uniform in size, making a most attractive product. The cluster-stems are long, therefore harvesting is easy. The berries are dark-red, sprightly, juicy, and thin-skinned, qualities that make the fruit one of the best for canning and jellies. The bushes are not large, and the yield is not so heavy as with some other varieties, unproductiveness being the chief defect. Fay originated in 1868 with Lincoln Fay, Portland, New York.

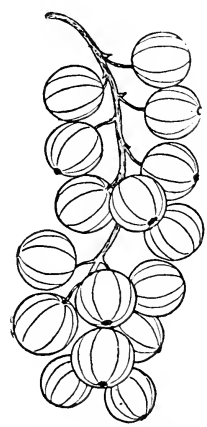

FIG. 259. Fay.

Plants of medium size and productiveness, healthy, sprawling in habit. Leaves large, very rugose, pointing downward, olive-green. Flowers early, green tinged with red. Fruit early midseason; clusters large, 12-15 berries, loose, with long stem, uniform; berries cling well, large, round, rather dark red; flesh reddish, firm, juicy, subacid, mild and pleasant; quality very good; seeds small, rather numerous.

700. London Market is considered the best red currant in many parts of the Middle West. Its chief commendatory characters are ability to withstand hot dry weather, and resistance to currant-borers, and diseases. It is said to be also the most

resistant of all red currants to the pine-blister rust. The history of the variety is obscure.

Plants tall, upright, vigorous, fairly productive. Leaves small, thin, light green, late in opening, very abundant. Flowers open in midseason. Fruit late; clusters long, medium compact, tips well filled, 12-20 berries; berries of medium size, variable, round-oblate, dark red; flesh red, firm, juicy, sprightly; quality good; seeds medium in number, large.

FIG. 260. Perfection.

701. Perfection (Fig. 260).—The outstanding characters of the plants are vigor, hardiness, healthfulness, and productiveness; of the fruit, large clusters of uniformly large berries borne on a long stem, so that picking is easy. The berries are bright clear red, and in flavor superior to those of most other currants. The fruit is borne on the old wood in a manner peculiar to the variety. Perfection originated with Charles G. Hooker, Rochester, New York, in 1887.

Plants large, vigorous, upright-spreading, hardy, productive, healthy; branches stocky, smooth, long, straight, numerous, brownish, dull and with little red; foliage deep green, healthy; season of bloom early. Fruit midseason; very easily picked, ships well; clusters long, compact, cylindrical, slightly tapering; stems long, of medium thickness; pedicels short, thick; berries roundish, uniformly large, cling well to the pedicels, bright handsome red; skin thin but tough; flesh juicy, tender, sprightly subacid; quality good; seeds intermediate in size and number.

702. Prince Albert is an old European currant, valued for its very late fruits, which are of large size, have thin skins and a most pleasing piquancy of flavor. The bushes are vigorous and upright, but only moderately productive. The fruit is well liked by canners and in the home for preserves and jellies. The variety is one of the latest to flower as well as to ripen its fruits.

Plants large, vigorous, upright-spreading, very dense, medium productive; suckers of medium number; canes tall, rather slender; young shoots tinged red. Leaves cordate, taper-pointed, dull green, very rugose; held stiffly upright; petiole 3 inches long, pubescent; flowers late. Fruit very late; clusters long, well-filled; stems and pedicels short; berries cling well, of medium size, round-oblate, bright red; skin thin, smooth, tough, translu-

cent; texture firm, juicy; flavor sour, highly flavored; quality good for dessert purposes; seeds of medium size, numerous.

703. Red Cross.—This variety is hardly above the ordinary, and is excelled by several others of the large-fruited currants. Moreover, in the Hudson River Valley, where it was at one time rather largely planted, the berries crack badly. Red Cross originated with Jacob Moore, Attica, New York, in 1894.

Plants large, vigorous, spreading, dense, fairly productive. Leaves large, milky-green, held nearly flat. Flowers midseason; type of *R. sativum*. Fruit midseason; cluster of medium length, tips filled poorly; berries large, round, bright red; flesh red, juicy flavor mild subacid; quality good; seeds large, numerous.

704. Red Dutch (Fig. 261) is now generally discarded in eastern commercial plantations, but is grown in the Middle West. The variety is passing from cultivation by reason of the small berries, which, however, are excellent in quality. It is an old European sort.

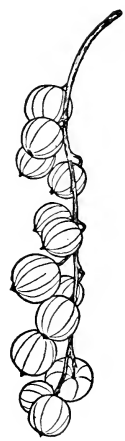

FIG. 261. Red Dutch.

Plants large, vigorous, upright, very productive; canes and shoots slender. Leaves rather large, dull green, soft, hairy beneath. Flowers midseason, of *R. rubrum* type. Fruit early; cluster long, slender, 10-18 berries, cling well, small, round, bright red; flesh red, juicy, firm, sprightly; quality of the best; seeds medium in size and number.

705. Ruby.—Two currants are sold under this name, one an early and the other a late sort. Plants on the grounds of the New York Agricultural Experiment Station, Geneva, New York, secured from the originator, Jacob Moore, Attica, New York, show the early sort to be the true Ruby. Neither fruit nor plant recommends the variety very highly. It was introduced about 1895.

Plants dwarfish, upright, medium in vigor and productiveness. Leaves rather large; upper surface yellow-green; lower surface milky-green, pubescent. Fruits early; clusters short, tips well filled, 10-12 berries; berries of medium size, uniform, round, dark red; flesh firm, medium juicy, rich, sprightly; quality very good; seeds numerous, medium in size.

706. Versailles is now giving way to newer and better currants. There are other large-fruited sorts with larger and more

uniform clusters and berries of better quality. It is almost impossible to distinguish Versailles from Cherry. As grown at the Geneva Experiment Station, Geneva, New York, Versailles has a longer bunch, darker fruit, and less tendency to "go blind," that is, to lack the terminal bud. Versailles is an old European sort brought to America more than a half century ago.

FIG. 262. Victoria.

Plants large, vigorous, upright, not very productive; shoots stout, easily broken, many "blind." Leaves large, milky-green, held nearly flat. Flowers early, *R. sativum* type. Fruit midseason; clusters short length, 8-12 berries, well filled to tip; berries medium to large, round, dark red; flesh firm, juicy, red, mild subacid; quality good; seeds rather numerous, large.

707. Victoria (Fig. 262).—This variety is rather widely grown in Canada and the United States. Its small berries condemn it for commercial plantations. The plants are very vigorous and productive; the fruit is of exeellent quality, and keeps longer on the bushes than that of any other variety.

Plants very large, upright, vigorous, healthy and productive. Leaves large, yellowish-green, thick, soft, under surface very pubescent. Flowers midseason, sepals tinged with red, *R. rubrum* type. Fruit late midseason; clusters short to medium, filled to the tip, 10-20 berries; stem yellow, downy; berries cling well, held on stem to one side, small to medium, round-oblate, bright red; flesh red, firm, juicy, rather too sour for dessert; quality fair; seeds large, rather numerous.

FIG. 263. Wilder.

708. Wilder (Fig. 263).—In the great currant regions of New York, Wilder is now the favorite variety, and in the race for commercial supremacy, continues to increase its lead. The fruits are handsomer, higher in quality, and hang longer after ripening than those of any other commercial sort. They are not always uniform in size. Wilder is said to have originated with E. G. Teas, Irvington, Indiana, about 1878.

Plants large, upright-spreading, vigorous, healthy, productive. Leaves large, nearly flat, milky-green, thick. Flowers early, *R. sativum* type. Fruit

late; clusters long, compact, tips filled rather poorly; fruit-stems long; 8-10 berries which are large, variable in size, round-oblate, dark red; flesh red, firm, juicy, mild subacid; quality good; seeds large, numerous.

WHITE CURRANTS

709. White Dutch (Fig. 264).—The fruits of White Dutch are the earliest and sweetest white currants, characters which help to distinguish the variety; they are a little darker in color than those of White Grape. Unfortunately, the berries are not very large and are not uniform, to offset which fault they are most excellent in quality. White Dutch is an old European currant.

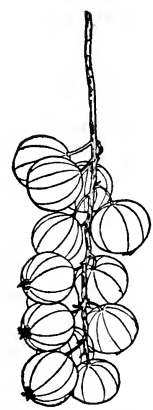

FIG. 264. White Dutch.

Plants vigorous, upright-spreading, very productive; suckers numerous. Leaves cordate, taper-pointed, rugose, pubescent, with margins nearly serrate; petiole 2½ inches long; flowers midseason. Fruit early; clusters short, medium compact, tips poorly filled, with berries small to medium, cling well, round-oblate, yellowish-white; skin thin, smooth, tender; flesh white, rather dry, fine-grained, mild subacid, almost sweet; quality excellent; seeds small, rather numerous.

710. White Grape is distinguished by having the largest cluster and berry of all white-fruited currants. The quality of the fruit is not so good as that of White Dutch, being sourer and not so rich. Because of its handsome fruits and fill-basket qualities, it is the best commercial white currant. Its history is unknown, except that it came from Europe and has long been grown in America.

Plants of medium size and vigor, spreading, sometimes sprawling, productive; canes and branches rather slender. Leaves of medium size, thick, soft, pubescent on lower surface, yellowish-green. Flowers midseason, *R. rubrum* type. Fruit midseason; clusters long, tips filled poorly, loose, berries 8-16; berries large, round-ovate, clear translucent white, not creamy as is White Dutch; flesh firm, juicy, subacid; quality good; seeds large, numerous.

711. White Imperial.—The fruits of White Imperial are rated as best in quality of all currants. The rich, almost sweet flavor, makes it a choice dessert fruit. The plant characters are not

so good as those of several other white varieties, and the currants are not so attractive in appearance. The variety was sold and strongly recommended by the late S. D. Willard, Geneva, New York, beginning about 1890.

Plants rather small, spreading, medium in vigor and productiveness. Leaves and flowers of the *R. rubrum* type; flowers midseason. Fruit midseason; clusters medium to long, well filled to the tips; fruit-stems long, making easy work in picking; berries medium to large, creamy-white, roundish; flesh firm, juicy, sweet, rich; quality excellent; seeds medium in size and number.

BLACK CURRANTS

712. Boskoop Giant (Fig. 265) is rated as quite the best all-round black currant. The characters which recommend it are very large, sweet, richly-flavored berries, and vigorous productive bushes. The plants flower late, but the fruit ripens early. The crop can be gathered at one picking, and the berries hang long on the bushes after ripening. The variety was imported into England from Holland in 1896, and was soon after brought to America by several nurserymen.

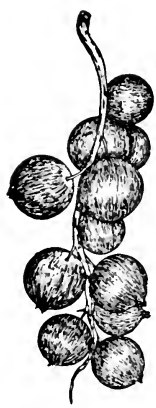

FIG. 265. Boskoop Giant.

Plants large, vigorous, upright, productive; canes numerous, rather slender. Leaves large, dull green, with numerous aromatic glands on the under surface; margin coarsely serrate; petiole short. Flowers late. Fruit midseason; clusters large, loose, not well filled; stem long, glandular; berries 8-14, large, cling well, round, black; skin glandular, thin, opaque; flesh greenish, tinged red at skin, fine-grained; juicy, rich and sweet, aromatic; quality excellent; seeds small, numerous.

713. Champion.—This black currant has long been grown in this country, where it is liked for its vigorous productive bushes and large mild-flavored currants. It seems to have been brought to the United States from England about 1880, but how long it has been cultivated in the Old World does not appear.

Bushes large, vigorous, spreading, productive; canes numerous, rather slender. Leaves large, dull green, pubescent, resinous on the under side; margins hairy, coarsely serrate. Flowers late. Fruit late; clusters rather short, loose, tips well filled; berries 6-10, cling well, medium to large, round,

black; skin opaque, glandular, thin; flesh firm, rather dry, yellowish, tinged red at the skin, sprightly, rich, aromatic; quality very good; seeds small, numerous.

714. Naples (Fig. 266).—An old variety, long a standard in Europe, Naples is being discarded abroad, but is still one of the commonest black currants in America. It should give way to better sorts on this side of the Atlantic, as the fruits are exceedingly variable in size, the clusters small, and the flavor rather too strong to be pleasant. It is mentioned by Kenrick as a new importation to America in 1832.

FIG. 266. Naples.

Plants large, very dense, vigorous, rather unproductive. Leaves rather large, light green, appearing very early. Flowers very late, strong disagreeable odor. Fruit latest of all black currants; clusters short, 4-10 berries, tips well filled; berries small to large, variable, round, black; pedicel with one or two bracts where attached to berry; skin glandular, thick, tough; flesh greenish, juicy, tart, strongly flavored, aromatic; quality fair; seeds small, numerous.

GOLDEN CURRANTS

715. Crandall is the sole representative of *R. odoratum* widely distributed throughout the country, being a familiar inhabitant of dooryards and parks as an ornamental. The tough skin and unpleasant flavor condemn it as a garden plant. The variety is often sold under the name Flowering Currant. There is said to be a productive strain on the market.

Plant 8 feet in height, very vigorous, hardy, unproductive. Leaves roundish-cordate, 3 inches broad, thin, pubescent on both surfaces; margins coarsely serrate; petiole short, slender. Flowers late, yellow, few; pedicels short, pubescent, green. Fruits borne in clusters of 1-5, drop when ripe, ½ inch in diameter, round-oblate, black, glossy, smooth; flesh greenish-yellow, rather dry, sprightly, very aromatic; quality fair; seeds many.

716. Deseret.—Deseret, Golden, and Jelly are other named sorts of the golden currant which occasionally appear in catalogues from the Middle West and Rocky Mountain regions, where the Europeans grow but poorly or not at all. No one of the three is as worthy of cultivation as Crandall.

CHAPTER XXXII

VARIETIES OF GOOSEBERRIES

THE gooseberry is a much neglected fruit in America. Two kinds, Houghton and Downing, are cultivated almost to the exclusion of other sorts, many of which are as easily grown and nearly all of which produce larger, handsomer, and better-flavored fruits. The gooseberry also suffers from another species of neglect in this country. Americans seldom use the ripe fruits and, therefore, do not know how refreshing and delectable a well-ripened gooseberry is. Were any of the several good sorts described in this text grown, and the product allowed to ripen, this fruit might receive the attention and attain the esteem it merits and holds in all European countries. Cultivated gooseberries are derived from two species, *Ribes hirtellum* and *R. Grossularia*, all American sorts excepting Pale Red, pure-bred from *R. hirtellum*, being hybrids between the two, while all of the European kinds are varieties of *R. Grossularia*.

INDEX TO VARIETIES OF GOOSEBERRIES

717. Carrie. *R. hirtellum* × *R. Grossularia*.—In Minnesota, Wisconsin, and neighboring states, where only the hardiest fruits can be grown, Carrie is becoming the most popular gooseberry. It is much like Houghton but distinct, although some maintain that it is identical. The variety originated with Wyman Elliott, Minneapolis, Minnesota, from seed planted in 1892.

Plants very large, spreading, dense, productive; canes long, slender, willowy; spines slender, short, few. Leaves large, thick, dull green, glossy, free from mildew. Flowers midseason, singly or in clusters of 2, 3, or 5.

Berries small, round-oval, purplish-red, conspicuously veined, grayish bloom; pedicel slender; flesh green, firm, juicy, translucent, pleasantly subacid; quality good to very good; seeds small, rather few.

718. Chautauqua (Fig. 267). *R. Glossularia.*—Chautauqua is a fine gooseberry of the European type, almost free from mildew, and easily grown wherever the comparatively worthless Houghton and Downing will thrive. The original plant was found by Lewis Roesch, Fredonia, New York, in 1876. It is probably a pure-bred European and possibly an old English sort renamed. Freedom, Columbus, Portage, Triumph, Duplication, Wellington, Glory, and Careless are all very similar, and no doubt some of them are identical.

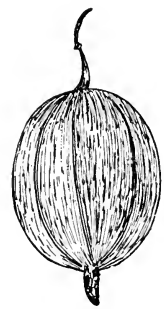

FIG. 267. Chautauqua.

Plants medium large, vigorous, stocky, upright-spreading, rather dense, very productive, with but little mildew; suckers few, smooth, straight, rather long, with short internodes, dull light gray; spines thick, strong, numerous, long, very sharp, in ones, twos and threes. Leaves obovate, taper-pointed, thick; upper surface glossy, light green, smooth, glabrous; lower surface olive-green; margin blunt-crenate; petiole about ¾ inch long, slender, pubescent. Flowers midseason. Fruit midseason; large in diameter, round-oval, silvery green; pedicels ⅜ inch long, pubescent; skin smooth, covered with bloom, thick, tough, translucent; flesh pale green, juicy, firm, sweet; quality good; seeds large, numerous.

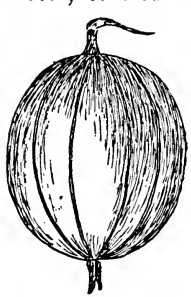

FIG. 268. Columbus.

719. Columbus (Fig. 268). *R. Grossularia.*—Very similar to Chautauqua, or identical with it, Columbus is offered by several nurserymen as distinct. If it differs from Chautauqua, it is in the fruits, which seem to some authorities to be larger and yellower. On the assumption that it does differ in fruit, it is well to let the variety stand, as it is one of the best of the English gooseberries for American conditions. It was introduced by Ellwanger & Barry, Rochester, New York, sometime previous to 1890.

720. Crown Bob (Fig. 269). *R. Grossularia.*—Crown Bob is one of the best gooseberries in quality of fruit, its rich vinous

flavor making it particularly delectable. To have the fruit at its best, picking must not be hurried. Industry, to which Crown Bob is similar, is much freer from mildew and should be planted in preference to this variety for markets. Crown Bob is an old English sort long grown in America.

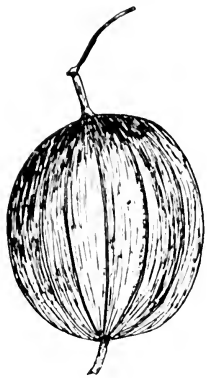

FIG. 269. Crown Bob.

Plants dwarfish, spreading, vigorous, very productive. Fruit early, dark red, medium to large, nearly round; skin thin, somewhat hairy; flesh firm, juicy, rich, sweet; quality good.

721. Downing (Fig. 270). *R. hirtellum* × *R. Grossularia.*—Downing is the standard gooseberry derived from a native species, although it is now agreed by all that it is a hybrid with the European gooseberry. The vines are remarkably vigorous, healthy and productive, and the fruits, although small, are smooth, thin-skinned, attractive in appearance, and of very good quality. It is grown more widely in America than any other gooseberry. The fruit must be picked as soon as full size, since decay sets in soon after maturity. Downing originated from seed of Houghton sown by Charles Downing, Newburgh, New York, about 1860.

FIG. 270. Downing.

Plants medium in size, very vigorous, very productive, upright, dense-topped; canes stout, somewhat resembling those of European gooseberries. Leaves large, glabrous; margin crenate, somewhat hairy. Flowers midseason, American type, green tinged with red. Fruit midseason, small, round-oval, pale green with light bloom; skin thin and smooth; flesh soft, juicy, rich, sweetish but sprightly; quality very good; seeds small, numerous.

722. Houghton (Fig. 271) *R. hirtellum* × *R. Grossularia.*—After Downing, Houghton is the most widely and commonly planted gooseberry in America. However, the variety has several faults and does not deserve its popularity. Faults are: the fruits are very small and uninviting in appearance and taste; the foliage is susceptible to mildew and aphis; and canners, to

PLATE XXIII. European and American gooseberries—Crown Bob and Downing.

whom gooseberries are mostly sold, do not like the fruit. Good characters are: the plants are very hardy, vigorous, and productive; the variety thrives under a great diversity of conditions; the berries are rich, sweet, and of excellent quality. This is the oldest American gooseberry of note, having originated with Abel Houghton, Lynn, Massachusetts, in 1833. It is probably a hybrid between a European and an American gooseberry.

FIG. 271. Houghton.

Plants medium in size, spreading, very vigorous, very productive; canes rather slender, drooping. Leaves large, dark green, glabrous or nearly so; margin crenate, hairy. Flowers midseason, American type. Fruit midseason, very small, round-oval, dark red with light bloom; skin thin, smooth; flesh firm, juicy, sweet and rich; quality very good; seeds small, numerous.

723. Industry (Fig. 272). *R. Grossularia.*—Industry is given the place of honor as the best of the European gooseberries in America. It is one of the most vigorous varieties of its class; rather more productive than any other European; and it often passes through a season without mildew. The large claret-red berries, rich, sweet, and piquant, are the most inviting of all gooseberries to eye and palate. Picking must not be hurried, if color and taste are to reach the condition where nothing requisite is wanting. It is an old English sort.

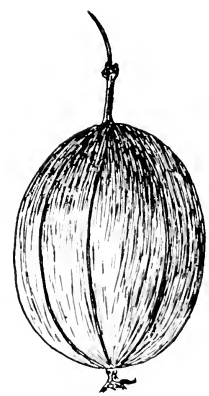

FIG. 272. Industry.

Plants of medium size, vigorous, upright, productive; canes rather straight and stout. Leaves of medium size, thick, dark green, glabrous except on ribs and veins. Flowers midseason, large, borne singly. Fruit early, large, 1¼ inches in diameter, round-oblong, sometimes pear-shaped, smooth or nearly so, deep claret-red with lines of light flecks; flesh yellowish-green, firm, juicy, mild subacid, nearly sweet; quality good; seeds medium in size, numerous.

724. Lancashire Lad. *R. Grossularia.*—This variety must be named among the half-dozen best European gooseberries for

American cultivation. The fruits stand shipment well and are pleasing in flavor, but must be permitted to mature completely. The most important consideration is that the plants are comparatively little infected by mildew. Lancashire Lad is an old English sort long grown in America.

Plants small, erect, compact, a little lacking in vigor, fairly productive. Fruit midseason, medium to large, round or round-oblong, dark red, with lines of light flecks, skin hairy; flesh firm, juicy, mild subacid; quality good; seeds rather small.

725. Oregon. *R. hirtellum* × *R. Grossularia.*—Resembling Downing, this variety appears to have merits not possessed by its parent. Thus, it is strongly recommended in the Pacific Northwest and in Indiana. It is similar in plant and fruit to Downing, differing in the plants being slightly more productive, while the fruits are yellower at maturity and later in season. The description of Downing answers for this variety, except in the characters named. The variety originated with O. D. Dickinson, Salem, Oregon, sometime previous to 1880.

726. Pale Red (Fig. 273). *R. hirtellum.*—Pale Red is worthy of notice only because it is the sole pure-bred representative of *R. hirtellum.* The vigorous productive plants and the tender sweet berries commend the variety. The berries, however, are quite too small for present demands, and if Pale Red has any value, it is as a parent to cross with some large-fruited sort to produce a variety of high quality. Pale Red has been grown for at least a century.

FIG. 273. Pale Red.

727. Poorman (Fig. 274). *R. hirtellum* × *R. Grossularia.*—At once attracting attention on account of the vigor and productiveness of the bushes and the handsome appearance and high quality of the fruit, plants and berries of Poorman give it a place as the leader among gooseberries grown in America. The vigor of the variety is so great that the plants must be set farther apart than with most kinds. The berries are larger than those of Downing, more oval, and red

FIG. 274. Poorman.

instead of green; their quality is excellent. The variety originated about 1890, with W. H. Craighead, Brigham City, Utah.

Plants large, vigorous, upright-spreading, dense, hardy, very productive, not susceptible to mildew; branches stocky, rough, long, usually straight, resembling those of Downing; spines thick, strong, long, less numerous and thicker than those of Houghton, variable in number; foliage healthy. Fruit matures early, period of ripening long, readily picked, ships well; berries over 1 inch long, nearly 1 inch through, oval to slightly obovate, semi-transparent, silvery-green changing at full maturity to pinkish-red; quality good; seeds numerous, small.

728. Red Jacket (Fig. 275). *R. hirtellum* × *R. Grossularia.* —Red Jacket has excellent plant characters, but the berries are quite too small for the variety to have value for commercial plantations. The berries are of especially high quality, being juicy, rich and fragrant. Red Jacket is a hybrid between Houghton and Red Warrington, a European sort; the cross was made by William Saunders, London, Ontario, about 1876.

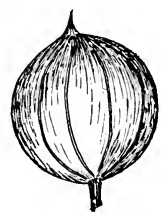

FIG. 275. Red Jacket.

Plant vigorous, productive, healthy, being practically free from mildew. Fruit small to medium, round-oblong, reddish-green, becoming pale red; skin smooth; flesh firm, juicy, transparent, sweet, rich; quality very good; seeds small, numerous.

CHAPTER XXXIII

VARIETIES OF CRANBERRIES

SOME thirty odd varieties of cranberries are grown in the United States and Canada. Most of the product is sold by the American Cranberry Exchange under eighty or more brands. These brands are established in accordance with variety, color, and size. Thus, Early Black, a leading variety, is sold under six brands in New England and three in New Jersey. Varietal names are as lasting and stable as those of other fruits, but the names of brands may change from season to season. The following are the leading varieties:

INDEX TO VARIETIES OF CRANBERRIES

729. Bell and Bugle.—This so-called variety is a mixture of two types which has been under cultivation in Wisconsin for the past thirty years. The Bell type in this mixture is much the same as in the better-known Bell and Cherry variety to be described next. The bell-like berry is a longer fruit than that in the Bell and Cherry group; the bugle-like berry is still further prolonged with much less bulge than that in the bell type. The Bell and Bugle berries are a little larger than those of the Bell and Cherry. The berries are of a uniform bright red color, ready for shipment about October 10, and keep and ship well. Bell and Bugle is becoming unpopular in Wisconsin owing to its susceptibility to "false blossom," a condition in which fruits apparently set but fail to develop.

730. Bell and Cherry. *Natives (of Wisconsin).*—The standard cranberry in Wisconsin is a mixture of the bell and cherry types, giving the trade name of Bell and Cherry, though growers usually call the mixture "Natives." In acreage, this is the principal variety, if the mixture can be called a variety, grown in Wisconsin. It is the original cranberry found on the marshes of central Wisconsin, and has been the commonest group under cultivation for the last thirty years.

Vines vigorous, productive, without the dense matting of McFarlin, which is a standard named variety of this type. Leaves averaging smaller than those of McFarlin. Fruit of the bell type, tapering at the stem-end and larger at the blossom-end which is flat; fruit of the cherry type, round with both stem- and blossom-ends flattened with slight indentations; color of both types uniformly red without distinct markings; size 7/16-½ inch in diameter; usually ready for shipment soon after October 5.

731. Bennett Jumbo (Fig. 276).—This variety is characterized by late long-keeping cranberries, of the jumbo type, which are olive-shaped and of large size. The plants are very vigorous, productive, and blossom late, thereby escaping late spring frosts; the blossoming season is from June 20 to July 15th. Bennett Jumbo is considered one of the best late varieties in Wisconsin. This was found by A. C. Bennet, Grand Rapids, Wisconsin, about 1890.

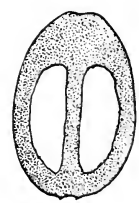

FIG. 276. Bennett Jumbo.

Vines very vigorous and productive, more so than those of the Bell and Cherry. Leaves larger and of the same dark olive-green color as those of Bell and Cherry. Flowers late. Fruit large, 7/16 of an inch in diameter, ¾-1 inch long, olive-shaped; red-ribbed on green or light gray, approaching white at maturity, but when very ripe bright red with ribs of darker red; ready for shipment after October 20.

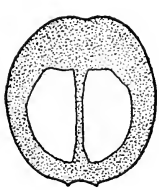

FIG. 277. Centennial.

732. Centennial (Fig. 277).—All agree that the fruits of this variety are unsurpassed in appearance and in table qualities. Centennial is not grown largely in Massachusetts; is hardly known in Wisconsin; but is highly prized and much grown in New Jersey. The variety originated with George Batchelder, Hollister, Massachusetts, about 1876.

Vines coarse, with many runners and poorly suited for scoop-picking; foliage rather dark green; about as productive as Early Black, averaging 55 barrels to the acre. Fruit late, ripening about October 5, on Cape Cod; large, 59-90 berries to the half-pint, uniform round; uniformly red, becoming dark red when very ripe; with four rather prominent ridges forming a rough cross; flesh rather thin but extra fine in table quality; seeds 14-26.

733. Centreville.—This variety is described by all as producing fruit that is particularly handsome, of extra fine flavor, and as very desirable for the fancy trade of eastern and central markets. Notwithstanding its fine fruit, Centreville is grown only in a limited way in Massachusetts and New Jersey, and scarcely at all in Wisconsin. Chipman and Matthews are very similar in vine and fruit but hardly as desirable. The variety originated with T. Fuller, Centreville, Massachusetts, about 1882.

Vines coarse with many runners; yielding about 55 barrels to the acre; poorly suited for scoop-picking. Leaves dark green in the summer; very similar to those of Howes. Fruit late, ripening in Massachusetts about October 5; berries very large, 60-90 to the half-pint cup; elongated with both ends conical; uniform in size and shape; medium red, becoming dark red; fruits coloring poorly in storage; not easy to clean, and do not keep or ship well; table quality superior; seeds 9-13.

734. Chipman (Fig. 278).—The fruits of Chipman are of bugle shape, similar to those of Centreville. The berries are of extra fine flavor, and ready for shipment after October 20. The quantity grown is small, and the variety is comparatively unimportant. The origin of Chipman seems not to be known.

Fig. 278. Chipman.

735. Early Black (Fig. 279) is the standard early cranberry in Massachusetts and New Jersey. Early in the season the crop is sold as Early Black; but the berries keep so well that cranberry dealers find it profitable to call it Late Red during the last of the season. The fruit is very suitable for long-distance shipment. The variety is rather susceptible to the fruit-worm. It seems to have originated about 1835 with Capt. Cyrus Cahoon, a Cape Cod cranberry-grower.

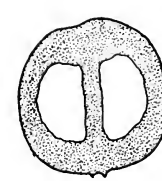

Fig. 279. Early Black.

Vines comparatively slender, producing uprights rather than runners; productive, averaging 55 barrels to the acre. Leaves comparatively small, light green in the summer, reddish in the winter. Flowers white, but little marked with pink. Fruit very early, Black Veil alone ripening earlier; berries small, 89-150 to the half-pint; when full seeded the berries are round with the stem-end slightly conical, but oblong when seeds are few; pinkish-white, then red and when very ripe almost black; colors well in storage when picked green; flesh firm, good for keeping, shipping and the table; easily cleaned; seeds 7-17.

736. Howes (Fig. 280) is the standard late cranberry in Massachusetts and New Jersey, attaining popularity chiefly because of the excellent keeping quality of the fruit. Unfortunately, the variety is not always productive. The fruit is especially prized for long-distance shipments. Pointed Howes seems to be a strain grown in New Jersey. The variety originated with James P. Howes, East Dennis, Massachusetts, sometime prior to 1880.

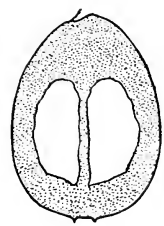

FIG. 280. Howes.

Vines rather coarse, with many uprights and comparatively few runners; not as productive as Early Black, averaging 40 barrels to the acre in Massachusetts; rather susceptible to the rose-bloom and to the blackhead wire-worm. Leaves large, dark green in the summer, very dark red in the winter. Flowers white, much marked with pink. Fruit late, ripening in Massachusetts about October 5; berries a little under medium size, 80-140 to the half-pint cup; round when well seeded, oblong when poorly seeded, symmetrical; red and indistinctly striped, becoming dark red; colors exceptionally well in storage; flesh very firm, excellent for keeping and shipping, fair for the table; easily cleaned; seeds 7-15 as an average.

737. Jersey.—Under this name the wild cranberry of New Jersey is offered by the American Cranberry Exchange. It is said that more of these "natives" are grown in the cultivated bogs of the state than of any distinct named variety. The berries are variable in size, shape, and color. They are usually ready for market after October 15. The fruit is of long-keeping and good-shipping qualities and very desirable for distant shipment. A large percentage of the crop of this variety is shipped uncleaned, the product keeping better when packed and stored in this manner.

738. McFarlin (Fig. 281) is one of the few cranberries grown in both the East and the West. It is rather more highly prized

in Wisconsin and in the Pacific states than on the Atlantic seaboard, although at one time it was one of the three leading varieties in the eastern states. The variety originated with T. H McFarlin, South Carver, Massachusetts, about 1874.

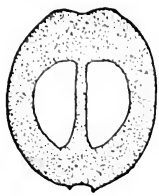

Fig. 281. McFarlin.

Vines coarse with many runners, poorly suited for scoop-picking; about as productive as Early Black, bearing 55 barrels to the acre. Leaves medium green, rather large. Flowers distinctly marked with pink. Fruit midseason, usually ripening about September 20; berries large, 65-95, in half-pint cup; round-oblong, flower-end conical; lacking in uniformity, size and shape; red becoming dark red when very ripe; flesh tender, extra fine in flavor; variable in keeping and shipping quality; seeds 9-23.

739. Plum (Fig. 282).—This cranberry is grown only in New Jersey, and is named Plum because of the size and shape of the berries. There has never been a large acreage of Plum planted, nor is it increasing. The crop is ready for market about October 15, and is especially desirable for the extra fancy trade in eastern markets. The berries are extra large, handsomely colored, and excellent in flavor.

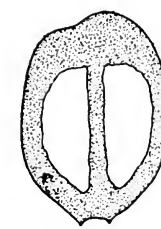

Fig. 282. Plum.

740. Pride (Fig. 283) is a new sort, strongly recommended because of the great productiveness of the vines, which are said to be half again as productive as those of Early Black, a variety long regarded as the standard. At present Pride is grown only on a few bogs in Massachusetts. It originated with Benjamin F. Vose, Rochester, Massachusetts, about 1890.

Fig. 283. Pride.

Vines coarse with many runners, enlarged at the juncture of branches, the fruiting uprights producing one or more branchlets the season they fruit; very productive, about 80 barrels to the acre; poorly adapted to scoop-picking; susceptible to the cranberry fruit-worm. Leaves light green. Fruit midseason, ripening about September 15 in Massachusetts; berries of medium size, varying greatly; bell-shaped, the calyx-end being rounded and the stem-end conical, variable; white with pink blush when partly ripe, becoming solid red and then dark red when very ripe; flesh fairly

firm, keeping and shipping well and of a good flavor; not easily cleaned; seeds 7-15.

741. Prolific (Fig. 284).—This variety is finding favor in the cranberry region of central Wisconsin, and in the Michigan districts where cranberries are grown. The berry is large, cherry-shaped, ripens early and is of excellent flavor. Because of handsome appearance, early season and good flavor of berries, the American Cranberry Exchange offers the crop as a fancy and an extra fancy fruit. The variety is said to have originated with C. D. Leach, Walton, Michigan, in the late eighties of the last century.

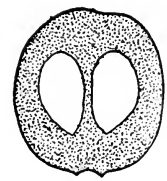

FIG. 284. Prolific.

Vines vigorous, approximately the same as those of Bennett Jumbo, fairly productive. Flowering season early, usually from June 10-July 4. Fruit ⅝-¾ inches in diameter, sometimes larger, cherry-shaped; color a uniform red becoming dark red; finely flavored and less tart than later varieties; one of the earliest berries grown in Wisconsin, being ready for shipment about October 1.

742. Searles Jumbo (Fig. 285).—This is a cranberry of the Jumbo type similar to Bennett Jumbo. The fruit is about the same size as that of the latter, is of the same shape, but in color is more uniformly red. The vine is more vigorous and slightly more productive than that of Bennett Jumbo. It is a medium season variety, the crop ripening just a little later than that of the Bell and Cherry and Early Black. Searles Jumbo was propagated by A. Searles, Grand Rapids, Wisconsin, toward the close of last century.

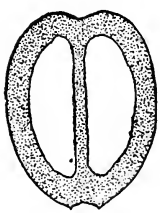

FIG. 285. Searles Jumbo.

743. Smalley (Fig. 286).—This variety seems to be described only by the American Cranberry Exchange. The fruits are round or bell-shaped; ready for shipment about October 15. The quantity grown is said to be small, and is sold under the Chipmunk brand, in which the berries are of medium red color and medium to large size; and the Pocahontas brand, the berries of which are well colored, of average size and of good quality.

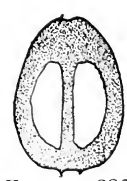

FIG. 286. Smalley.

744. Wales Henry (Fig. 287).—This variety is described as a most promising cranberry, now grown on only a few bogs in Massachusetts. Productiveness of vines, and berries that may be cleaned easily, keep and ship exceptionally well, and of excellent flavor, are the qualities that recommend Wales Henry. The variety originated with W. A. Andrews, North Carver, Massachusetts, about 1885.

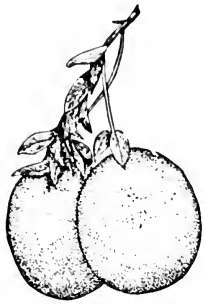

FIG. 287. Wales Henry.

Vines rather coarse, with many uprights and few runners; very productive, bearing 60 barrels to the acre; well adapted to scoop-picking. Leaves dark green. Fruit midseason, usually ripe about September 20, medium in size, round; uniform in size and shape; indistinctly striped with varying shades of red, coloring well in storage; flesh firm, keeping and shipping well; excellent in flavor; easily cleaned; seeds 12-18.

CHAPTER XXXIV

VARIETIES OF STRAWBERRIES

THE strawberry has been under cultivation in America only a short time, the commercial industry having begun with the introduction of the Wilson in 1854, but progress has been so rapid that the number of sorts introduced in America exceeds 2000. Few of these are now under cultivation, for the list of varieties changes every ten or fifteen years. In 1923 more than 300 varieties were listed for the United States and Canada. In every part of the continent in which agriculture is practiced, strawberries are grown; no other fruit is more widely distributed. The growing of strawberries is a great commercial industry of the country, and each region in which growers specialize in this fruit has a list of varieties suited to its needs.

INDEX TO VARIETIES OF STRAWBERRIES

745. Aroma.—This variety is grown in the Middle West from Missouri and Kentucky to Wisconsin and Michigan and also in Ohio, West Virginia, and as far east as Delaware. The

plants are resistant to disease, very productive; and are adapted to a variety of soils. The berries keep and ship well, are attractive in appearance and of high dessert quality. Aroma originated with E. W. Cruse, Leavenworth, Kansas, about 1889.

Perfect. Plants vigorous, healthy; make runners freely; calyx medium, adherent. Fruit midseason to late, large, globose-conic or short wedge-shaped, firm; bright crimson with light red flesh; mild subacid, core white, solid; quality good; seeds prominent.

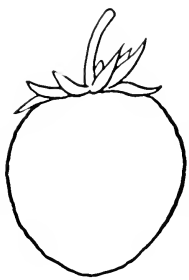

FIG. 288. Campbell.

746. Campbell (Fig. 288).—Prized for its great productiveness, Campbell is largely grown in New Jersey. The fruits are large, inviting in appearance and taste, very uniform in shape, and ship particularly well. Campbell was introduced by W. B. Kille, Swedesboro, New Jersey, in 1916.

Perfect. Plants very vigorous, healthy, making many runners. Fruit early, medium to large, retain size throughout season; globose to globose-conic; rich crimson color; flesh firm; subacid; quality very good; seeds large, yellow.

747. Chesapeake (Fig. 289) has several distinctive characters, chief of which are vigor and healthfulness of plants, and beauty and attractiveness of fruit. The plants do not multiply so rapidly as those of most varieties, and therefore should be set thickly. The surface of the berries is characteristic of the variety, being unbroken by furrows or irregularities and unusually plump and glossy. The dark red flesh is aromatic, mildly acid, and very good in quality. This variety originated with J. W. Parks, Nanticoke, Maryland, about 1904.

FIG. 289. Chesapeake.

Perfect. Plants few, vigorous, usually healthy but with a tendency to mildew, productive; leaves above medium in size, wide, thick, usually branched, semi-erect; season of bloom late; calyx large, leafy, attractive green, slightly depressed. Fruit midseason or later, easily picked, ships well; berries large, dropping in size as the season advances, round-conic to wedge-shaped, the surface plump, unbroken by furrows or by irregularities, with conical apex which becomes seedy in appearance in the smallest berries, beautiful glossy scarlet; flesh

very firm, variable in color, mildly acid, juicy, pleasant flavor; very good to best in quality; seeds conspicuous, often markedly raised, numerous.

748. Chipman.—This new variety is now the leading strawberry in the Virginian part of the Chesapeake Peninsula. Earliness and productiveness are the two characters that make it valuable. It was introduced in 1907 by W. S. Todd, Greenwood, Delaware.

Perfect. Plants very numerous, vigorous, healthy, productive; leaves of fair size, dark green; leaf-stems medium to long, slender; fruit-stems long, thick, often branched, prostrate; blooms early; calyx large, sometimes leafy, light green, flat. Fruit large, early, wedge-shaped or round-conic, sometimes elongated, surface irregular, light and dark scarlet, becoming duller as the season advances; flesh light in color, medium in firmness and juiciness, mild acid, pleasant but not high flavor; fair to good; seeds sunken.

749. Clark (Fig. 290) is a standard variety in the Pacific Northwest. It has little value in other regions. The plants require much moisture, and except under irrigation are seldom productive. The berries have the reputation of standing shipment better than those of any other variety, and are liked by canners because of their firm red flesh. The variety originated in Portland, Oregon, with F. E. Clark, about 1880.

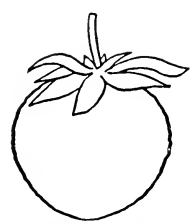

FIG. 290. Clark.

Perfect. Plants vigorous, healthy, erect, make runners freely; leaf- and fruit-stems short. Fruit midseason, of medium size, globose or globose-conic, very firm; color dark crimson with dark red flesh; brisk subacid or acid; core solid; quality good; seeds bright yellow, raised.

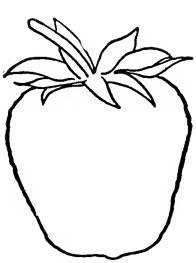

FIG. 291. Crescent.

750. Crescent (Fig. 291).—Long one of the standard strawberries, Crescent is still found in the eastern states. Its great merits are productiveness, and strong vigorous plants which make many runners. The plants rust badly, however, and the berries are deficient in color, firmness, and quality. The variety originated in 1870 with William Parmalee, New Haven, Connecticut.

Imperfect. Plants tall, vigorous, productive; runners very numerous; fruit-stalks erect, branching. Fruit early midseason, of medium size, round-conic usually with a depression in the apex, bright scarlet; calyx recurved, easily detached; flesh light red, medium in firmness; core solid pink; flavor subacid, mild, aromatic; quality fair; seeds numerous, slightly raised.

751. Dr. Burrill (Fig. 292) is most promising in its plants, but rather disappointing in the quality of its berries, which, however, are large and well colored. Berry-growers in southern Illinois find it a very acceptable new sort. Dr. Burrill originated with J. R. Reasoner, Urbana, Illinois, and was introduced in 1916.

FIG. 292. Dr. Burrill.

Perfect. Plants numerous, intermediate in vigor, healthy, productive; leaves rugose, glossy; flowers early midseason; fruit-stems raised, with reflexed sepals, attractive green. Fruit late midseason; large, regular, conical, strongly necked, medium to dark red, glossy; apex pointed; flesh medium red throughout, variable in juiciness and flavor, firm, subacid; quality fair to good; seeds sunken.

752. Dunlap (Fig. 293). *Senator Dunlap.*—The high quality and handsome appearance of the berries make Dunlap a great favorite for the garden and local markets in the northern states east of the Rocky Mountains. In the northern Mississippi Valley, it is grown almost exclusively. Besides the characters named for the fruits, the variety has to its credit hardy, healthy, productive plants. Dunlap originated with J. R. Reasoner, Urbana, Illinois, about 1890.

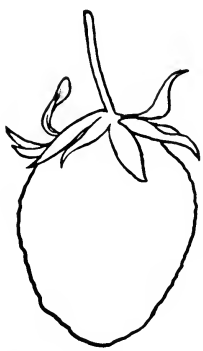

FIG. 293. Dunlap.

Perfect. Plants very numerous, vigorous, healthy, very productive; leaves of medium size and color; leaf-stems long, slender; fruit-stems long, slender, usually single; blooms in midseason; calyx large, reflexed, usually on a slight neck. Fruit very large, midseason, drops in size as the season advances, round-conic or elongated, often with a neck, glossy, light and dark scarlet; flesh well colored, firm, mild, pleasant flavor; quality good; seeds large, sunken.

753. Ford.—This is a new strawberry which gives promise of being one of the best late varieties. The berries are very large,

attractive dark red, and of most excellent quality. Another valuable asset is lateness in blooming, whereby spring frosts are escaped. Ford is a chance seedling found by Granvill Brewington, about 1913, in Winomico County, Maryland.

Perfect or semi-perfect. Plants numerous, extremely vigorous, healthy, very productive; leaves of largest size, very thick, markedly dark green, rugose; flowers very late; fruit-stems very long, thick, erect, branching into many long pedicels; calyx unusually large, flat, very leafy, attractive green. Fruit very late, of largest size, regular, blunt-wedge to blunt-conic, attractive, glossy, medium to dark red, coloring somewhat unevenly; apex obtuse; flesh red throughout, unusually juicy, firm, mild, sweet; quality good.

754. Gandy (Fig. 294) has long been a standard sort in parts of Maryland, Delaware, and New Jersey, and is more or less grown throughout northern United States. Its outstanding qualities are: handsome, deep red, firm fruit of very good quality; and late season, reaching the market at the very close of the strawberry season. The plants require moist heavy clay soils to produce sufficiently well; they should be fruited only one season. Gandy originated with W. G. Gandy, Newport, New Jersey, in 1885.

FIG. 294. Gandy.

Perfect. Plants vigorous, low, spreading, somewhat susceptible to disease, productive, make runners freely; fruit-stems long and prostrate; calyx large, easily detached. Fruit late, large, globose-conic, irregular; color deep crimson; flesh firm, juicy, brisk subacid; quality good; core hollow; seeds numerous, raised.

755. Glen Mary.—Once widely grown, Glen Mary is still prized in New York and New England for its productive vines and its handsome well-flavored fruits. Several faults mar the variety: the fruit-stems are too slender to hold the fruit off the ground; the foliage is susceptible to leaf-spot; the plants thrive only on very heavy and enriched soils; and the blossoms are not self-fertile. The variety originated with J. A. Ingram, East Bradford, Pennsylvania, in 1896.

Partially perfect. Plants rather small, spreading, fairly vigorous, somewhat susceptible to rust; runners moderate; leaves small, leaf-stalks slender; fruit-stems slender, long, prostrate; calyx of medium size, flat, often discolored. Fruit midseason, medium to large, conic, sometimes necked, irregu-

lar; color dull crimson often with white tips; flesh red, rather soft, subacid; core solid; quality good; seeds large, raised.

756. Good Luck (Fig. 295).—Growers agree that Good Luck ranks among the best new late strawberries. Its fruits are distinguished by flesh so firm that they are hardly surpassed in standing transportation. Another outstanding character is that the plants are not susceptible to leaf-spot. The fruits are large, handsome, and very good in quality, having sprightliness and a most distinctive flavor. A little too acid for dessert, canned or cooked, the berries are hardly surpassed in flavor. The calyx is large, leafy, and a beautiful green. Good luck originated with Elwood Pedrick, Cumberland County, Maryland, in 1904.

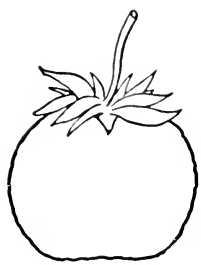

FIG. 295. Good Luck.

Perfect. Plants numerous, large, vigorous, healthy, very productive; leaves medium in size and thickness, with crenate margins; leaf-stalks long; flowers medium in season of bloom; fruit-stems long, thick, semi-erect, branching. Fruit late; large, retains size well to close of season, distinctly wedge-shape, with some cockscombs in the first picking; calyx large, attractive green, often surrounded at the base by small fleshy protuberances; apex a pointed wedge, inclined to green tips unless picked with care; color attractive, medium red; flesh well colored to the center, juicy, firm, sprightly; good in quality; seeds both raised and sunken.

757. Haverland (Fig. 296).—For many years Haverland was considered one of the best strawberries, and is still in gardens in the northeastern states. The berries are too soft and light in color for distant markets, but are often grown for near markets where the variety proves profitable because of great productiveness. The crop ripens over a long season. The variety has the reputation of being very hardy, and its blossoms are said seldom to be injured by frost. Haverland originated in 1882 with B. H. Haverland, Cincinnati, Ohio.

FIG. 296. Haverland.

Imperfect. Plants large, upright, vigorous, healthy, very productive; leaves abundant, light green; run-

ners few; fruit-stalks rather short, often too weak to hold up the fruit. Fruit midseason, medium to large, long-conic, sometimes necked, light scarlet; flesh light red, medium firm; core pink, solid; flavor mild subacid; quality good; seeds numerous, large, raised.

758. Joe (Fig. 297). *Big Joe.*—This variety is a favorite in Maryland, New Jersey and Delaware, and is grown more or less in all parts of the United States. Its outstanding merits are large, handsome, well-flavored berries, suitable for either home use or the markets. It is a desirable kind for intensive culture. Joe originated with Black, Son & Co., Hightstown, New Jersey.

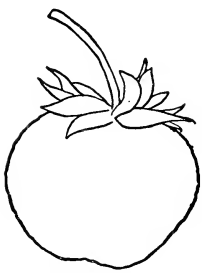

FIG. 297. Joe.

Perfect. Plants few, vigorous, healthy, productive when planted close; leaves medium to very large, dark green; leaf-stems long, thick; fruit-stems long, thick, usually double, semi-erect; blooms late; calyx often large, leafy, usually flat. Fruit large to very large, midseason, blunt, round-conic or irregular wedge, surface furrowed, glossy dark scarlet; flesh dark red, firm, sprightly, good in quality; seeds numerous, raised.

759. Kellogg Prize (Fig. 298).—The plant habits of this new variety seem to be exceptionally good, and the berries make a fine showing in size and color, and ship very well. It is worth trying as a late strawberry. The variety is a chance seedling found by R. M. Sears, La Grange, Illinois; it was introduced in 1913.

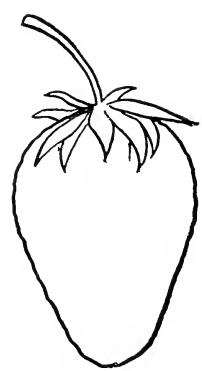

FIG. 298. Kellogg Prize.

Imperfect. Plants medium or below in number, intermediate in vigor, healthy, productive; leaves of medium size and color, thick, dull, rugose; flowers early midseason; fruit-stems thick, prostrate, branching; calyx large, raised, leafy. Fruit matures late; above medium to large, blunt-conic to blunt-wedge, necked, medium to light red; apex slightly pointed; flesh light red throughout, juicy, firm, sprightly; quality fair to good; seeds raised.

760. Klondike (Fig. 299).—A general favorite in a large part of the United States, Klondike is grown almost exclusively in the South Atlantic and Gulf states for distant shipment. Its

popularity is due to its healthy foliage and the firm flesh and deep red color of the berries. The quality is not of the best, and the hulls do not part readily from the berries. Klondike originated with R. S. Cloud, Independence, Louisiana.

FIG. 299. Klondike.

Perfect. Plants vigorous, healthy, productive; leaves large, dark green; leaf-stems long; fruit-stems long and thick, often single, erect; blooms in midseason; calyx large, reflexed, strongly tinged with dull red, flat or sunken. Fruit large, midseason, retains size as the season advances, blunt, round-conic, dark, dull, scarlet; flesh dark red, very firm, acid; rather poor in quality.

761. Lupton.—Grown in southern New Jersey for the Philadelphia market, Lupton has to recommend it remarkably handsome fruits which ship well. The berries are so coarse and dry in flesh and so uninteresting in flavor that the variety is one of the poorest in quality of all strawberries. The foliage is susceptible to leaf-spot. This is a comparatively new kind introduced by M. D. Lupton, Newport, New Jersey, in 1915.

Perfect. Plants large, vigorous, productive, susceptible to leaf-spot; make runners freely. Fruit midseason, very large, often double; color bright red, glossy, seldom turning dark after picking; flesh firm, dry, mild; quality poor.

762. Marshall.—Long a commercial variety of high standing in the northeastern states, Marshall fails south of Delaware and Pennsylvania. Wherever grown, the berries are a standard of excellence in quality. The plants require heavy rich soils and intensive culture to force the foliage sufficiently to withstand leaf-spot. The plants produce large crops of handsome well-flavored berries. Marshall originated with M. F. Ewell, Marshfield Hills, Massachusetts.

Perfect. Plants medium in number, productive; leaves large, light to dark green; stout, usually double, prostrate; blooms in midseason; calyx of medium size, discolored, depressed. Fruit very large, midseason, round-conic, surface often irregularly furrowed, dark scarlet; flesh well colored, firm, juicy, pleasant acid, of high flavor; very good; seeds large, raised.

763. Missionary.—This new variety is the leading commercial sort in central Florida, and is more or less grown in eastern

North Carolina, the Norfolk region of Virginia, and in eastern Maryland. Earliness is its chief commercial asset, although the berries stand shipping well, and the plants are free from disease. Missionary was sent out by E. W. Townsend & Company, Salisbury, Maryland, in 1906.

Perfect. Plants numerous, vigorous, healthy; leaves light green, smooth; season of bloom early; fruit-stems long, prostrate, branching; calyx small, raised. Fruit early; above medium in size, blunt-conic, often necked, very dark dull red, colors evenly, apex somewhat pointed; flesh well colored to center, juicy, very firm, tart, not pleasant in flavor; fair in quality; seeds small, sunken.

764. Nich Ohmer is considered desirable because of productive plants and very large, firm, attractive berries. The berries run small after the first picking, however, and are not always good in quality; but in spite of these faults the popularity of the variety is increasing. Nich Ohmer originated with J. F. Beaver, Dayton, Ohio, about 1895.

Perfect. Plants large, vigorous, productive, somewhat susceptible to leaf-spot, make runners freely. Fruit midseason, large, round-conic, dark crimson, glossy; flesh red, mild subacid, insipid in some localities and in others well flavored; quality ranging from poor to very good.

765. Pan American (Fig. 300) is a claimant for recognition as the first of the everbearing strawberries, and as one of the parents of many later ones. The vines are not productive, make few plants, and the fruit is none too good, for which reasons the variety is being discarded. Pan American originated with Samuel Cooper, Delevan, New York, in 1898.

FIG. 300. Pan American.

Perfect. Plants vigorous, variable in productiveness; leaves small, dark green; leaf-stems short, slender; flower-stems short, stout, erect, double; calyx small, deeply set. Fruit of medium size, round-conic, obtuse, dull scarlet; flesh pale red, firm, aromatic, subacid; quality good; seeds very numerous, raised, but not very conspicuous.

766. Peerless.—Of the several everbearing strawberries on probation, one of the most meritorious is Peerless, a recent in-

troduction from Samuel Cooper, Delevan, New York. It is very similar in plant and fruit to the well-known Superb, but the berries are larger in size, of better quality, and the plants are more productive. The variety is adapted to conditions under which the older variety thrives. Under most conditions Peerless is a better strawberry than Superb and should replace it in most strawberry regions.

767. Progressive.—Of the score or more everbearing strawberries introduced in recent years, Progressive is the most widely known. Its outstanding characters are hardiness, freedom from disease, and handsome well-flavored fruits. The plants produce in the spring as well as the fall. The variety is adapted only to northern climates. Progressive originated with Harlow Rockhill, Conrad, Iowa, in 1908.

Perfect. Plants few, vigorous, productive, healthy; leaves dark green, smooth; season of bloom early; fruit-stems variable in length, thick, much branched; calyx flat, reflexed, attractive green and often with pink tinge. Fruit matures early; varies considerably in size ranging from large to small, blunt-wedge to blunt-conic, glossy, medium to dark red, colors evenly; apex obtuse; flesh well colored to center, firm, subacid, mild; good in quality; seeds prominent, raised.

768. Prolific (Fig. 301).—This variety originated on the grounds of the New York Agricultural Experiment Station and was distributed in 1908. Because of the vigor and productiveness of its plants, and the attractiveness of its large, handsome, well-flavored berries, the variety gives promise of taking high rank as a commercial sort. Unfortunately, the plants are somewhat susceptible to leaf-spot.

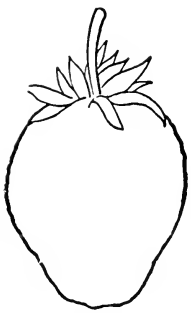

FIG. 301. Prolific.

Perfect. Plants very numerous, vigorous, unusually productive, yielding on the Station grounds as high as 14,502 quarts to the acre; foliage somewhat susceptible to leaf-blight in unfavorable seasons; leaf-stems long, thick; fruit-stems stout and usually single, semi-erect; blooms and ripens in midseason; calyx depressed. Fruit very large, retains size well as the season advances, round-conic to blunt wedge, attractive bright scarlet; flesh firm, good color, agreeably acid; quality good; seeds numerous, raised.

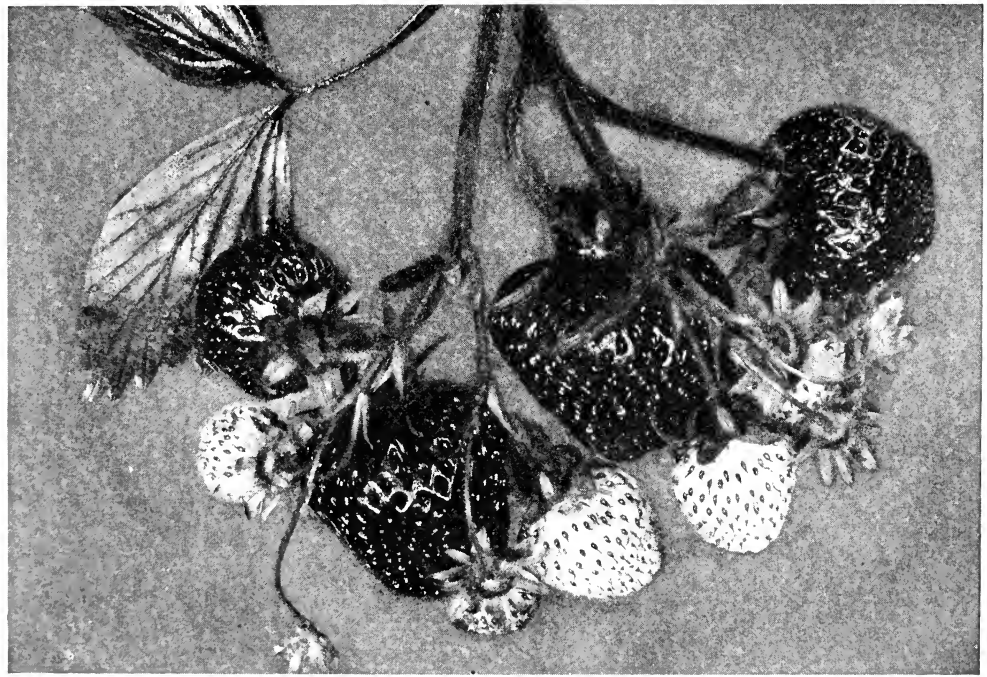

PLATE XXIV. A popular strawberry—Dunlap.

769. Rough Rider.—With only few characters of the plant to recommend it, Rough Rider is nevertheless a desirable late strawberry on account of the large size, bright color, and high quality of the fruit. The variety is grown only in New York and New England. It was introduced by L. J. Farmer, Pulaski, New York, in 1900.

Perfect. Plants vigorous, productive, making numerous runners; leaves of medium size, dark green; leaf-stems long, slender; fruit-stems slender, stout, double; calyx small, leafy, reflexed. Fruit late, large, retaining its size throughout the season, round-conic, dark scarlet; flesh firm, light red, well-flavored; good in quality; seeds depressed.

770. Superb (Fig. 302).—After Progressive, Superb is probably the most generally grown of the everbearing strawberries. It has to recommend it hardy and healthy plants and handsome richly-flavored berries. It needs an abundant supply of moisture, hence is well adapted to the irrigated regions of the Northwest, although it is grown in the Northeast as well. It originated in New York about 1908.

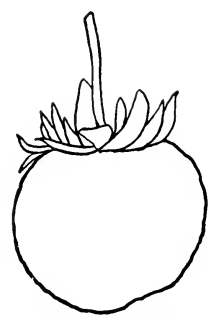

FIG. 302. Superb.

Perfect. Plants large, productive, healthy, make runners freely. Fruit midseason, large, round or round-conic, dark crimson when fully ripe; flesh light crimson, soft to firm, mild subacid; quality good except late in the season in cool weather.

771. Uncle Jim. *Dornan.*—Despite unattractive color of berries, which, besides, are often too coarse to be inviting, this variety is rather commonly grown in some parts of Michigan and neighboring states. It originated with J. F. Dornan, Glenn, Michigan, in 1898.

Perfect. Plants of medium number, vigorous, healthy, productive; leaves very large, dark green; leaf-stems long, slender; fruit-stems long, thick, double, prostrate, blooms midseason; calyx large, sometimes leafy, often discolored, variable in position. Fruit large to medium, retains size well in late pickings, wedge-shaped or round-conic, surface furrowed, dull, unattractive light and dark scarlet; flesh medium red, firm, mild; quality fair to good; seeds sunken.

Fig. 303. Warfield.

772. Warfield (Fig. 303). — For many years a standard sort, Warfield is now discarded except in the northern part of the Middle West, where it is still grown, being prized for its hardy, healthy, and productive plants. The fruits are especially well liked by canners, as they retain their color, shape, and flavor very well. The variety originated in Illinois in 1882.

Imperfect. Plants large, vigorous, healthy, productive and make runners very freely. Fruit early to midseason, medium in size, round or round-conic, dark crimson, glossy; flesh soft or fairly firm, dark red, acid, well flavored; quality very good.

773. William Belt (Fig. 304). *Belt.*—William Belt has long been a favorite in New England and New York because of the productiveness of its vines and its handsome dark-red, well-flavored fruits. The berries are not firm enough for the market. The variety originated with William Belt, Mechanicsburg, Ohio, about 1888.

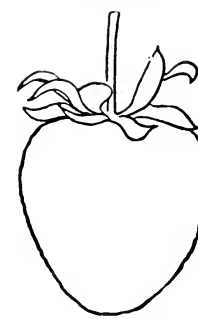

Fig. 304. William Belt.

Perfect. Plants vigorous, fairly healthy; runners numerous. Fruits medium to late, large, irregular, globose-conic or wedge-shaped; flesh rather soft, outer color dark crimson with dark red flesh; core pink, hollow; mild subacid; quality very good to best; seeds prominent.

GLOSSARY

Abaxile. Said of the core of a pome when the walls of the carpel are distant from the axis.
Abrupt. Suddenly narrowed.
Acaulescent. Stemless or apparently so.
Achene. A hard dry, one-seeded indehiscent fruit, especially one in which the pericarp very closely envelops the seed.
Acuminate. Tapering at the end.
Acute. Terminating with a sharp angle.
Adaptation. The fitness or fitting of any organ or organism to perform certain functions or to live in certain conditions.
Adventitious. Said of buds, or of shoots, which appear in abnormal or unaccustomed places or numbers, rather than at nodes and in definite number.
Æstivation. The arrangement of the parts of the perianth in the bud.
Alternate (of leaves, etc.). Not opposite on the axis, but arranged singly at different heights.
Annual. Of only one year's duration.
Annular. In the form of a ring.
Anther. The pollen-bearing part of a stamen.
Apetalous. Having no petals.
Apex. The end of a fruit most distant from the stem.
Appressed. Lying close and flat against.
Areole. A small space marked out upon a surface.
Articulate. Having a node or joint.
Ascending. Rising somewhat obliquely, or curving upward.
Attenuate. Slenderly tapering; becoming very narrow.
Axil. Angle above the junction of a leaf-blade, petiole, peduncle, or pedicel, with the branch or stalk from which it springs.
Axis. The central line of any organ or support of a group of organs.

Base. The point of attachment of a fruit.
Basin. In pomological writings, the depression in the apex of a pome.
Beaked. Ending in a prolonged tip.
Berry. A fruit, the whole pericarp of which is fleshy or pulpy.
Biennial. Of two years' duration.
Bifid. Two-cleft.
Biscxual. Having both stamens and pistils.
Blade. The expanded portion of a leaf, etc.
Bloom. The delicate, white substance on the surface of some fruits; or on the canes of vine and bramble-fruits.
Blush. An unbroken red tint on the surface of a fruit.
Bract. A modified leaf subtending a flower or belonging to an inflorescence.
Bractlet. A secondary bract, as one upon the pedicel of a flower.

Brush. The bundle of fibers connecting the pedicel with the berry of the grape.
Bud. The rudimentary state of a stem or branch; an unexpanded flower.
Bullate. Blistered or puckered.

Callus. A hard protuberance or callosity.
Calyx. The outer series of the perianth of the flower; the sepals considered together.
Campanulate. Bell-shaped; cup-shaped with a broad base.
Cane. A shoot which bears but once, particularly one which arises from the crown or root.
Capillary. Hair-like.
Carpel. One of the separable or integral parts of a compound pistil.
Cavity. The depression in the stem-end of a pome.
Cell. One of the minute vesicles of which plants are formed. Any structure containing a cavity, as the cells of an anther, ovary, etc.
Cellular. Composed of short, transparent, thin-walled cells.
Chalaza. The place where seed-coat and kernel of a seed connect.
Ciliate. Marginally fringed with hairs.
Cion (Scion). A cutting set into a plant rather than in soil; graft.
Close-fertilization. Self-fertilization.
Compound. Composed of two or more similar parts united into one whole; example, a compound ovary.
Compound leaf. One divided into separate leaflets.
Compressed. Flattened, especially laterally.
Conduplicate. Folded together lengthwise.
Confluent. Running into each other.
Connivent. Coming into contact.
Convolute. Rolled up longitudinally.
Cordate. Heart-shaped, with the point upward.
Core. The ovary of a pome-fruit; the central part of a fruit.
Coriaceous. Leathery in texture.
Corolla. The inner perianth, of distinct or connate petals.
Corrugate. Wrinkled or in folds.
Corymb. A flat-topped or convex open flower-cluster.
Corymbose. In corymbs or corymb-like.
Cotyledons. The foliar portion or first leaves (one, two, or more) of the embryo as found in the seed.
Crenate. Dentate, with the teeth much rounded.
Crenulate. Finely crenate.
Cross. The offspring of any two flowers which have been cross-fertilized.
Cross-breed. A cross between varieties of the same species.
Crossing. The operation or practice of cross-pollinating.
Cross-pollination. Transfer of pollen to pistil of another flower.
Crown. An outgrowth from the throat of the perianth; corona; also the top of a bulb or corm, or of an upright rootstock; also that portion of a plant at the surface of the ground.
Cuneate. Wedge-shaped; triangular, with the acute angle downward.
Cyme. A usually broad and flattish determinate inflorescence, i.e., with its central or terminal flowers blooming earliest.
Cymose. Bearing cymes or cyme-like.

Deciduous. Not persistent; not evergreen.
Decurrent (leaf). Extending down the stem below the insertion.
Definite. Of a constant number, not exceeding twenty.
Dehiscence. The mode of opening; applied especially to fruits and anthers.
Dehiscent. Opening regularly by valves, slits, etc., as a capsule or anther.
Dentate. Toothed, usually with the teeth directed outward.
Denticulate. Minutely dentate.
Depressed. Somewhat flattened from above.
Diaphragm. The woody tissue which interrupts the pith at the node in a grape-vine.
Diffuse. Widely or loosely spreading.
Digitate. Compound, with the members arising together at the apex of the support.
Diœcious. Unisexual, with two kinds of flowers on separate plants.
Dissected. Cut or divided into numerous segments.
Distinct. Separate; not united; evident.
Divaricate. Widely divergent.
Divided. Lobed to the base.
Domestication. The state or condition of being adapted or inured to cultivation, or the act of adapting or inuring to cultivation.
Dorsal. The back or outer surface of an organ.
Drupaceous. Resembling a drupe.
Drupe. A fleshy or pulpy fruit with the inner portion of the pericarp (1-celled and 1-seeded, or sometimes several-celled) hard or stony.
Drupelet. A diminutive drupe.

Echinate. Beset with prickles.
Elliptical. Applied to oblong leaves which gradually taper both ways from the middle.
Emarginate. Having a shallow notch at top.
Embryo. The rudimentary plantlet within the seed.
Endocarp. The inner layer of a pericarp.
Entire. Without toothing or division.
Environment. The sum of the physical conditions in which an organism lives.
Epicarp. The outer layer of the pericarp or matured ovary.
Epidermis. The superficial layer of cells.
Exfoliating. Cleaving off in thin layers.
Exocarp. Outer layer of a pericarp.
Exserted. Projecting beyond an envelope, as stamens from a corolla.
Extrorse. Facing downward.
Eye. The calyx of a pome-fruit; a compound bud of a grape.

Family. A natural assemblage of plants placed together because of resemblances.
Farinaceous. Containing starch; starch-like.
Farinose. Covered with a meal-like powder.
Fascicle. A close bundle or cluster.
Fasciculate. In close bundles or clusters.
Fastigiate (branches). Erect and near together.
Female. Fertile; pistillate.

Fertile. Capable of producing fruit; or productive, as a flower having a pistil, or an anther with pollen.
Fertilization. Action of the pollen on the egg-cell of the embryo-sac, resulting in the formation of the embryo; impregnation; fecundation.
Fibrous. Composed of or resembling fibers.
Fibrous tissue. A tissue formed of elongated thick-walled cells.
Filament. The part of a stamen which supports the anther; any thread-like body.
Filamentous. Composed of threads.
Filiform. Thread-shaped.
Flaccid. Without rigidity.
Flexuous. Zigzag; bending alternately in opposite directions.
Flora. The plants of a region; also a book treating of the plants of a region.
Floret. A small flower, usually one of a dense cluster.
Floriferous. Flower-bearing.
Foliaceous. Leaf-like in texture or appearance.
Forked. Divided into nearly equal branches.
Foxiness. The peculiar smell and taste in some grapes, particularly the Native Labruscas.
Free. Not adnate to other organs.
Fructification. The act or organs of fruiting.
Fruit. The seed-bearing product of a plant.
Fusiform. Spindle-shaped; swollen in the middle and narrowing toward each end.

Genus. A group comprising a greater or less number of closely related species; plural *genera.*
Glabrous. Smooth; not rough, pubescent or hairy.
Gland. A secreting surface or structure.
Glandular. Bearing glands or of the nature of a gland.
Glaucous. Covered with a bloom.
Graft. A cutting set into a plant; cion.

Habit. The general appearance of a plant.
Habitat. The place in which an organism lives.
Heart-shaped. Ovate with two rounded lobes and a sinus at the base.
Herb. A plant with no persistent woody stem above ground.
Herbaceous. Having the character of an herb.
Hermaphrodite. Bisexual.
Hilum. The scar or point of attachment of the seed.
Hirsute. Pubescent with rather coarse or stiff hairs.
Hoary. Grayish-white with a fine close pubescence.
Hybrid. A cross-breed of two species.
Hybridization. The state or condition of being hybridized, or the process or act of hybridizing.
Hybridizing. The operation or practice of crossing between species.
Hypogynous. Situated on the receptacle beneath the ovary and free from it and from the calyx; having the petals and stamens so situated.

Imbricate. Overlapping.
Imperfect. Lacking either gynœcium or andrœcium.

Incised. Cut sharply and irregularly and more or less deeply.
Included. Not at all protruded from the surrounding envelope.
Incomplete flower. One from which any of the four series is missing.
Indefinite. Inconstant in number or very numerous.
Indehiscent. Not opening by halves.
Indigenous. Original to the region.
Inferior. Lower or below; outer or anterior.
Inflorescence. The flowering part of a plant, flower-cluster; more accurately the mode of flowering.
Inserted. Attached to or growing out of.
Insertion. Method of attachment.
Internode. The portion of a stem between two nodes.
Introduced. Brought intentionally from another region for purposes of cultivation.
Introse. Turned inward or toward the axis.
Involucre. A circle or collection of bracts surrounding a flower-cluster or head.
Involute. Rolled inward.
Irregular. Showing inequality in the size, form or union of its similar parts.

Laciniate. Slashed; cut into narrow pointed lobes.
Lanceolate. Shaped like a lance-head, several times longer than wide, broadest above the base and narrowed to the apex.
Latent. Said of a bud which remains dormant.
Leaflet. A single division of a compound leaf.
Lenticular. Of the shape of a double-convex lens.
Linear. Long and very narrow, with parallel margins.
Lobe. Any segment of an organ, especially if rounded.
Lobed. Divided into or bearing lobes.

Male. Sterile; staminate.
Mammiform. Said of fleshy nipple-like protuberances.
Median. Said of stamens in the middle of the calyx-tube.
Midrib. The central or main rib of a leaf.
Monœcious. With stamens and pistils in separate flowers on the same plant.
Mucro. A short and small abrupt tip.
Mucronate. Tipped with a mucro.

Nectary. Any place or organ which nectar secretes.
Nerve. An unbranched vein or slender rib.
Node. The place upon a stem which normally bears a leaf or whorl of leaves.
Nut. A hard indehiscent 1-celled and 1-seeded fruit, though usually resulting from a compound ovary.
Nutlet. A diminutive nut, but not necessarily of the same morphology.

Oblique. Unequal sided or slanting.
Oblong. Longer than broad and with nearly parallel sides.
Obovate. Inverted ovate.
Obsolete. Not evident: rudimentary.

Obtuse. Blunt or rounded at the end.
Opaque. Dull; neither shining nor translucent.
Orbicular. Circular.
Organ. A part of a living body directly associated with the vital functioning.
Oval. Broadly elliptical.
Ovary. The part of the pistil that contains the ovules.
Ovate. Egg-shaped; having an outline like that of an egg, with the broader end downward.
Ovoid. A solid with an oval outline.
Ovule. The body which after fertilization becomes the seed.

Palmate (leaf). Radiately lobed or divided.
Palmately. In a palmate manner.
Panicle. A loose irregularly compound inflorescence with pedicellate flowers.
Panicled, paniculate. Borne in a panicle; resembling a panicle.
Papillose. Bearing minute nipple-shaped projections.
Parted. Cleft nearly but not quite to the base.
Pedicel. The support of a single flower in a cluster.
Pedicellate. Borne on a pedicel.
Peduncle. A primary flower-stalk, supporting either a cluster or a solitary flower.
Pedunculate. Borne upon a peduncle.
Pellucid. Clear, transparent.
Pendulous. More or less hanging.
Perennial. Lasting year after year.
Perfect (flower). Having both pistil and stamens.
Perianth. The floral envelope, consisting of the calyx and corolla (when present), whatever their form.
Pericarp. The matured ovary.
Perigynous. Adnate to the perianth, and therefore around the ovary and not at its base.
Peripheral. On or near the margin.
Persistent. Long-continuous, as a calyx upon the fruit, leaves through winter, etc.
Petal. A division of the corolla.
Petaloid. Colored and resembling a petal.
Petiolate. Having a petiole.
Petiole. The footstalk of a leaf.
Pigment. The coloring matter in the skin of a fruit.
Pilose. Hairy, especially with soft hairs.
Pinnate (leaf). Compound, with the leaflets arranged on each side of a common petiole.
Pinnatifid. Pinnately cleft.
Pistil. The seed-bearing organ of the flower, consisting of the ovary, stigma, and style when present.
Pistillate. Provided with pistils, and, in its more proper sense, without stamens.
Pitted. Marked with small depressions or pits.
Plicate. Folded into plaits, usually lengthwise.
Plumule. The bud or growing point of the embryo.

Pollen. The fecundating grains contained in the anther.
Pollination. The act or fact of conveying pollen from anther to stigma.
Polliniferous. Bearing pollen.
Polygamous. Hermaphrodite and unisexual flowers variously mixed upon the plant.
Polypetalous. Having separate petals.
Pome. A fleshy fruit of which the apple is a type.
Posterior. In an axillary flower, on the side nearest to the axis of inflorescence.
Prickle. A small spine from the bark or rind.
Procumbent. Lying on the ground or trailing but without rooting at the nodes.
Prostrate. Lying flat upon the ground.
Pubescent. Covered with hairs, especially if short, soft and down-like.
Punctate. Dotted with depressions or with translucent internal glands or colored dots.
Pyriform. Pear-shaped.

Quality. The combination of characters in a fruit which makes it pleasant to the palate.

Raceme. A simple inflorescence of pediceled flowers upon a more or less elongated axis, opening from the base.
Racemose. In racemes; or resembling a raceme.
Radiate. Spreading from or arranged around a common center.
Radical. Belonging to or proceeding from the root or base of the stem near the ground.
Ramification. Branching.
Raphe. The ridge which runs from the hilum to the chalaza in a seed.
Receptacle. The more or less expanded portion of an axis which bears the organs of a flower or the collected flowers of a head.
Recurved. Curved downward or backward.
Reflexed. Abruptly bent or turned downward.
Regular. Parts all uniform in shape or structure.
Reniform. Kidney-shaped.
Reticulate. In the form of network; net-veined.
Retrorse. Directed back or downward.
Retuse. With a shallow notch at a rounded apex.
Revolute. Rolled backward from the margins or apex.
Rib. A primary or prominent vein of a leaf; a ridge on a pome-fruit.
Root. The underground part of a plant which supplies it with nourishment.
Rosette. A much-shortened stem bearing a dense cluster of leaves.
Rostrate. Having a beak.
Rotate. Wheel-shaped; flat and circular in outline.
Rugose. Wrinkled.
Runner. A filiform or very slender stolon.

Salver-shaped. Having a slender tube abruptly expanded into a flat limb.
Scabrous. Rough to the touch.
Scape. A peduncle which arises from the ground, is simple, or nearly so, not jointed, and destitute of foliage.

Scarf-skin. The roughened outer skin of a pome-fruit.
Scarious. Thin, dry, and membranaceous, not green.
Seed. The ripened ovule, consisting of the embryo and its coats.
Seedling. A plant growing directly from seed, without the intervention of grafts, layers or cuttings.
Segment. One of the parts of a leaf or other like organ that is cleft or divided.
Self-colored. Of one color; not striped or particolored.
Self-fertilization. Action of pollen upon a pistil of the same flower; close-fertilization.
Sepal. A division of a calyx.
Serrate. Having sharp teeth pointing forward.
Sessile. Without footstalk of any kind.
Shrub. A woody perennial, smaller than a tree, usually with several stems.
Silky. Covered with close-pressed soft pubescence.
Simple. Of one piece; not compound.
Sinuate. With the outline of the margin strongly wavy.
Sinus. The cleft or recess between two lobes.
Smooth. Without roughness or pubescence.
Spatulate. Gradually narrowed downward from a rounded summit.
Species. The unit in classification; used either as singular or plural.
Spine. A sharp woody or rigid outgrowth from the stem.
Spinose. Spine-like.
Stamen. One of the pollen-bearing organs of the flower.
Stellate, stelliform. Star-shaped; said of star-like dots on the apple.
Stem. The main ascending axis of a plant.
Sterile. Unproductive, as a flower without pistil, or stamen without an anther.
Stigma. That part of a pistil through which fertilization by the pollen is effected; the part (usually apex) on which pollen is deposited.
Stigmatic. Belonging to or characteristic of the stigma.
Stipule. An appendage at the base of a petiole or on each side of its insertion.
Stolon. A runner, or any basal branch that is disposed to root.
Stoloniferous. Producing stolons.
Striate. Marked with fine longitudinal lines or ridges.
Style. The usually attenuated portion of the pistil connecting the stigma and ovary.
Succulent. Juicy; fleshy.
Sucker. A sprout or shoot arising from an underground root or stem; also, an adventitious shoot in the top of a plant, especially a vigorous shoot.
Suffrutescent. Slightly or obscurely shrubby.
Sulcate. Grooved or furrowed.
Superior. Said of the ovary when it is free; above, in position.
Suture. A line of dehiscence.
Symmetrical (flower). Regular as to number of its parts: having the same number of parts in each circle.

Tendril. The coiled thread-like organ by which some vines clasp an object.
Testa. The outer, commonly hard and brittle seed-coat.

Tomentose. Densely pubescent with matted wool.
Torus. The receptacle of a flower.
Trifid. Three-cleft.
Trifoliate. Having three leaves.
Trifoliolate. Having three leaflets.
Truncate. Ending abruptly, as if cut off transversely.
Turbinate. Top-shaped; inversely conical.

Umbel. An inflorescence in which the peduncles or pedicels of a cluster spring from the same point and are of approximately equal length.
Umbellate. In or like an umbel.
Undulate. With a wavy surface.
Unisexual. Of one sex, either staminate or pistillate only.

Valvate. Opening by valves, as a capsule; in æstivation, meeting by the edges without overlapping.
Variety. A form which, in the judgment of any writer, is considered to be subordinate to the species in classificatory importance.
Veins. Threads of fibrovascular tissue in a leaf or other organ, especially those with branch.
Venation. Veining.
Ventral. Belonging to the inner face of an organ; the opposite of dorsal.

INDEX

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