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"BROTHER JONATHAN" SERIES—No. 6

BOOK ABOUT BUSH FRUITS

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„Bro. Jonathan” Series of Fruit Books

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THE BUSH FRUITS

Arthur Thomas
By A. T. ERWIN

Associate Professor of Horticulture, Iowa
State College, Ames, Iowa

Also an appended chapter containing notes on
**Their Preparation as
Food Products**

BY

MISS GEORGETTA WITTER

Professor of Domestic Science,
Iowa State College

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Brother Jonathan Series

Booklet No. 6

Bush Fruits

The term "bush fruits" is used commonly to designate the small fruits that are borne on bushes, and includes the Currant, Gooseberry, Raspberry, Blackberry and Dewberry. All of them are native to the United States, and the garden varieties representing the different species are of comparatively recent origin. With many of them, their improvement and evolution has only begun, and the next few years will mark a very great difference between the native species and the forms grown within the garden.

As a class, the bush fruits have a very promising future because of their adaptability for small areas. No city lot is so small but that at least a corner can be found for a few of them, and they give fair returns, even where the conditions are not the best for plant growth. With the rapid increase of urban population, the acreage for bush fruits of all kinds would be greatly increased.

Varieties

Varieties are largely influenced by soil and climatic conditions, hence the selection of sorts for a given locality is primarily a local problem. There are certain varieties however, that have proven useful over a large territory in the Central West. Under the different classes of fruit the writer has endeavored to call attention to merely a few of the leading varieties for this section, without any effort at making the list complete. Such a list can scarcely be more than suggestive in giving the characters of a given variety and the final determination as to their adaption for a given locality must rest with the local planter.

The Currant

Probably no representative of the bush fruit group shows a stronger liking for northern latitudes than does the currant. The species from which practically all of our cultivated varieties of value have sprung is known botanically as *Ribes rubrum* and is native to the cooler portions of both Europe and America. In this country it is indigenous from New York to Minnesota and north.

Its native habitat is quite suggestive as to its cultural requirements with regard to climatic conditions. The currant loves a cool atmosphere and a retentive soil. It is perfectly hardy to the cold of winter, but does not thrive best in the lower altitudes and bright sunshine of the South. In southern sections this requirement can be met in a way by growing them in a shady situation, as between the rows of fruit trees in the orchard or on a north slope.

The currant delights in a rich, fertile garden soil, with a reasonable degree of moisture present. Like the gooseberry, it leaves out very early in the spring and for this reason, fall planting is an advantage. As you go north, however, fall planting in general is less certain, and frequently plants set in the fall suffer winter injury. This is not so likely to be the case, however, if the work is done sufficiently early in the fall to enable the plants to become re-established before winter sets in. Fall transplants should also be mulched at the opening of winter with a liberal coating of litter or manure.

Two-year-old plants are commonly used, and a distance of four feet apart in the row, with rows six feet apart, is very convenient distance for planting. For the first two years after planting, clean

culture should be practiced. After this the soil may be kept clean, or the plants may be permanently mulched. For this mulching, crushed corn stalks from the feed yard are excellent.

The currant may be trained to a tree form, but especially in the prairie states the bush form is much the better adapted to climatic conditions, and there is also much less loss from the cane borer. The best fruit is borne upon the two and three-year-old wood, and this fact should be remembered in pruning. After the canes reach an age of four or five years they become stunted in growth and the fruit dwarfed in size. Systematic pruning should be followed to encourage the formation of stout young canes. By cutting out a few of the old canes each year a balance may be maintained between the bearing and the old growth, and this keeps the plant in fruitful yet vigorous condition.

For shipping purposes the fruit should be gathered while still a little green, though for home use a better flavor is secured if the berries are permitted to fully ripen on the bush. The fruit is commonly marketed in the common strawberry crates. Ten to twelve cents per quart is a very common retail price, and a good bearing plant should average five pounds of fruit.

The most serious insect enemy of the currant in the Central West is the currant worm. This insect is an unwelcome guest of foreign birth, and in many localities strips the plants annually with the utmost regularity. The eggs are deposited in rows along the veins of the leaves on the under surface, especially on the leaves near the ground, early in the spring. The young begin to feed about the last of May and are frequently well established before being noticed. They reach the upper branches

Currant Worm.

- (a) Eggs deposited on under surface of leaves.
 (b) Young larvae.
 (c) Full grown larvae. (d) Adult insect.

and become conspicuous about the time the fruit is ready to gather in June, a time when it is more difficult to combat them. If taken in its early stages this insect is easily destroyed with arsenate of lead or Paris green. These insecticides, however, should

not be applied after the fruit begins to color. At this stage the best material to apply is hellebore, as it is harmless to man.

The currant is occasionally subject to leaf spot and other fungus diseases, and for this reason it is

advisable to add Bordeaux mixture to the insecticide when spraying for the currant worm.

Some ten years ago Professor J. L. Budd, of the Iowa Experiment Station, introduced from eastern Europe and disseminated throughout the North-

west, a number of new varieties of the large fruited black currant. These have proven hardy and reasonably fruitful, but owing to a special tang in their flavor and also to the odor of the fruit, they have never become popular, though they are re-

garded as being very superior abroad, and those who have cultivated a taste for them are partial to them in this country.

VERSAILLES—This variety is a strong grower; canes moderately large, long and upright, and quite vigorous and hardy. The fruit is medium in size, roundish, and of a light red color; flavor slightly sub-acid; quality good; bunches compact; one of the most productive and widely grown varieties in the middle West.

VICTORIA—Fruit of a bright red color, medium or above in size, and mildly sub-acid. The fruit will remain on the bush in good condition for some time; an old, reliable variety.

RED DUTCH—A well-known and standard commercial sort.

WHITE GRAPE—One of the best white varieties now offered on the market. The canes are vigorous and hardy, though not as productive as some of the red sorts. Fruit large, clusters long, skin transparent, and slightly sub-acid. An excellent dessert sort.

The Gooseberry

The American varieties of gooseberries are among our hardiest fruit-bearing plants. The early attempts at gooseberry growing in America were confined to the English sorts, and resulted in a general failure on account of their weak foliage and susceptibility to mildew and other diseases. All of the standard varieties of the present day are cultivated forms of a species of the native gooseberry, known botanically as *Ribes oxycanthoides*, which is indigenous to the upper Mississippi Valley, and in this region the cultivated varieties seem to reach their highest development.

The gooseberry is one of the very first plants to leaf out in the spring, and like the currant, is partial to the cool regions of the North. The climatic conditions and the black fertile soil of the prairie states have proven peculiarly well adapted to its requirements.

Two-year-old plants are commonly used for transplanting, and on account of its early leafing habit, fall setting is advisable. The rows may be placed five feet apart, with plants four feet apart in the row.

The best fruit is borne on the two and three-year-old wood, and a thinning out of the weaker growth to secure strong, vigorous canes and a renewal of the bearing wood is the only pruning required.

The gooseberry is largely free from insect enemies, though the currant worm occasionally defoliates the plants. For this insect, an arsenite or hellebore may be used, as recommended for the currant.

The foliage is sometimes affected with the downy mildew. This disease appears as a dirty white web-like structure on the young stems, leaves and fruit. The growth of the fruit is arrested, causing it to fall prematurely. The affected leaves are also apt to drop, leaving the plant at midsummer in a badly defoliated condition. An application of Bordeaux mixture just as the buds are opening is excellent. Bordeaux mixture should not be used, however, after the berries are half grown, as it is apt to stain the fruit, and at this stage of growth potassium sulphide is recommended.

Clean culture should be given until the plants are well established, which would mean for at least the first two or three years. After this period the plants may be permanently mulched, though an occasional stirring of the soil and an application of manure is highly advantageous.

In America the gooseberry is consumed entirely in its cooked state, while in England it is consumed largely as a fresh fruit from the hand. In the middle West it is a general favorite for winter pies and is especially relished for its acidity in the early months of spring. For this purpose the fruit is preferred when gathered when about three-fourths mature, or just before it begins to color. However, the mistake is frequently made of gathering gooseberries for the market when not more than half grown. At this stage they are insipid in flavor and soon wilt and become discolored. For shipping purposes the twenty-four quart berry crate makes an excellent package.

VARIETIES.

The American varieties of gooseberries have not advanced a great deal from their wild state, and

some of the best varieties today, such as the Houghton and Downing, were produced more than a half century ago. That we have not reached a limit in the improvement of this fruit is evidenced by the history of the English sorts. The native English gooseberry is said to be in no way superior to our own varieties in its possibilities; yet from this English parent varieties have been created which produce single fruits measuring over four inches in circumference. It seems probable, however, that the English sorts have been improved with a sole eye to mere size and bigness regardless of quality. In Lindley's "British Fruits," Volume I, page 22, which is a recognized authority among fruit-growers, he says:

"No garden is complete without a selection of small fruited gooseberries, which, in general, are as superior to the large ones in richness of flavor as they are inferior in magnitude."

Many of these large fruited varieties have been tried in this country, but with general failure. In the corn belt region they are especially subject to mildew and are also apt to winter kill.

Some of the best American varieties are the Champion, Houghton, Downing and Pearl.

Recently there has been introduced a new type of gooseberry representing a cross between the English and American sorts, of which the Industry is a good example. While this type possesses some superior points, it is to be regretted that it has not proven hardy as far north as Iowa.

Raspberries

As viewed from an economic standpoint, Raspberries may be divided into two groups; namely, the Red Caps and the Black Caps.

The Black Caps, on account of their firm texture of fruit and good shipping qualities, are distinctly the commercial type for large plantations and long distance shipments. The Reds, on the other hand, bear a fruit which is rather soft and of a delicate texture, which necessitates the disposal of the fruit on the home market. It also possesses a delicacy of flavor unknown to the black sorts, and for this reason it is especially prized by the amateur, and also usually commands a price of from two to three cents more per quart on the market than the black varieties.

These two types also differ as to their method of propagation, the blacks being increased by stolens or rooted tips, while the reds multiply by suckers. To secure young plants of the black sorts, the soil in the middles should be cultivated and kept in good tilth during August and September to encourage the rooting of the tips. The work may be facilitated by partially burying the tips with a spadeful of earth or weighting them down with a peg or clod. Roots are readily emitted at the points coming in contact with the moist soil, and by late fall these tips should be well established and able to shift for themselves. The transplanting may be done either in the fall or spring, though in the colder regions it is best not to sever the tips from the parent plant or in any way disturb them until the following spring. They may be dug and stored, however, with safety.

The Red Caps sucker very freely, and young plants may be set deeper than with the Blacks, and for this reason are less liable to winter injury. They also begin growing very early in the spring, and many growers prefer to transplant them in the fall.

The Raspberry is commonly planted in rows about seven feet apart and the plants three feet apart in the row. However, on the city lot, where space is limited, this may be reduced to three by five feet. The first year after setting, no fruit should be allowed to form, and the young shoots should be cut back when they reach a height of fifteen inches, and with the Black Caps the side branches should be cut back one-half the spring following. The second year the canes should be headed in when they reach a height of two feet and a similar cutting back of the side branches the

Red Raspberry Cane
with well developed side
branches due to summer
pruning.

spring following should be made. This nipping back of the terminal branches during the summer season is very important, as it induces the development of side branches. These laterals or side branches form the fruit bearing wood for the succeeding crop, hence it is highly desirable to induce their development. It is well to go over the plantation at frequent intervals, in order to tip the canes as they reach the height mentioned. If the work is delayed for a single operation, many of them will become too large and the side buds do not develop so well. A light hand sickle is a very convenient tool for this work. This heading in tends to produce a short, bushy cane which is able to support itself, and in a prairie region the fruit is less injured by the wind through the whipping of the branches. Short canes also assume a more erect form of growth, making the berries more convenient to gather, and by this method of pruning the bearing area is more concentrated, which facilitates the work of gathering the fruit.

As the new growth comes on, a number of the strongest and most vigorous canes should be reserved for the succeeding crop and the weaker ones cut out. The Red Caps are prolific sprouters, and special care must be exercised in this regard to keep them under control, otherwise in a very short period of time the plantation will be one solid mass of small canes which are so dense as to shade the fruit heavily and produce an inferior crop of berries. This tendency to become weedy is one of the most serious objections to the red type of raspberries. In growing this kind the rows must be carefully defined and all plants coming up through the middles treated as weeds and cut out.

At the close of the fruiting season the old canes

should be cut out and burned. This work may be done any time during the summer or fall, but the best time is immediately following the fruiting period. If delayed until after the new canes are formed they are more difficult to remove.

Clean culture should be given throughout the growing season. The raspberry is especially sensitive to a lack of moisture, and the presence of a dust mulch to retain the water supply of the soil, is very important. For soils that are open in texture and lacking in water holding capacity, a mulch of straw, crushed corn stalks, or newly cut clover, applied about the base of the plants and for a distance of two feet on each side, as the berries begin to form is excellent and does not interfere with the cultivation of the aisles.

In sections where the crop is liable to be cut short by drouth, planting on a north slope is a decided advantage. Any fertile garden soil will produce good raspberries. An application of well rotted manure, applied at the rate of fifteen tons per acre, every second or third year, is also advisable for most soils. This will not only add plant food to the soil, but will also increase the water holding capacity of the soil through the humus supplied—a point of importance with the raspberry crop.

As a rule, the best results are secured by putting out a new plantation every few years. The plants in an old plantation tend to become diseased and weakened in vigor, and under these conditions it is advisable to grub them out and start in with a new plantation on clean soil, and thus rotate the crop.

In the more severe sections of the Northwest the canes are apt to winter kill unless protection during the winter is furnished. To avoid this, they are laid down in the fall and covered with earth. In

some cases the canes are merely bent over in the direction of the prevailing winds and the tips weighted down. In this way they are better able to gather and hold the snow, which is a great protection. Where the plants are laid down for the winter, some kind of a support is necessary to hold the canes upright the following spring. However, in most parts of the middle West, winter protection is unnecessary and if the plants are properly pruned in the summer to secure a stocky growth, no support will be required.

The Black Caps are commonly marketed in the one-quart strawberry boxes. On account of the fruit of the Reds being very soft and tender, the pint boxes are advisable. For either kind the flat-bottomed boxes are not satisfactory, as the lower layers of fruit are bruised too much. In this respect the raised bottom is of material advantage. A box holder facilitates the picking, as both hands are left free for work.

VARIETIES OF RED AND PURPLE RASPBERRIES.

RED VARIETIES.

CUTHBERT—An old standard variety which has been widely grown; plants are strong, vigorous, productive. Fruit large, red, moderately firm, and of high flavor; good quality; a fair shipping sort.

MILLER—This variety has been grown to a considerable extent in the East and to some extent in the West. It is a strong, moderate grower; hardy and productive; fruit holds to stem and does not drop; large, bright red, juicy, firm and good quality; a very good market variety, and would stand shipping better than most varieties.

TURNER—An old variety which is still considered a very good variety. Canes are moderate growers and very productive. Fruit is medium size, red, very juicy and of high quality; too soft for shipping.

PURPLE VARIETIES.

HAYMAKER—This variety was originated in Ohio and is now grown in some parts of the upper Mississippi Valley. Canes are vigorous, thrifty, moderately hardy and productive; fruit large, firm, dark purple; very juicy, and of good quality. Season late; a good shipping variety.

COLUMBIAN—A seedling of Cuthbert; one of the most hardy varieties of this class; productive; fruit is of good size; good quality, and firm for shipping.

BLACK RASPBERRIES.

The **OLDER** is a variety that is widely grown and makes a good variety for a distant market. It originated in Iowa about 1872. The canes are low growing, spreading, and moderately vigorous, hardy, and the fruit is large, black, firm, good quality, and productive.

GREGG (Western Triumph)—This is one of the oldest varieties and will be found in almost every commercial plantation. It originated in Indiana about 1866. Plant is upright, and vigorous, with strong canes. Fruit is large, roundish oblate, with a dull white bloom, and firm. A good bearer; season late.

EUREKA—This is a vigorous grower, hardy, and productive. Fruit of good size, firm and very juicy; a very good sort,

KANSAS—Originated in Kansas in 1884. Plant is a vigorous grower, hardy, and can be easily propagated by tipping. Fruit resembles the Gregg; fully as large, some earlier; flavor better. A good shipper on account of its firmness.

The Blackberry

The cultivated blackberry is distinctively an American product. Its limit of successful cultivation does not extend as far north as that of the raspberry. On the other hand it thrives over a larger area of the south, and in sections where the currant and other bush fruits are unprofitable.

As a commercial fruit it is most profitably grown for the local market. The berries begin to color before they are ripe, and if gathered at this stage, and while still firm, they are low in quality. On the other hand the ripe fruit is very tender, even more so than the red raspberry. The ripe berries bleed readily, and the fruit sours very quickly. For this reason it is a difficult fruit to handle for long shipments, and is most profitable for the local market. For the home grower it is frequently a very profitable crop.

The best soil for the blackberry is a clay loam. This type of soil retains the moisture well, and produces an excellent quality of fruit. On soils that are inclined to be sandy the fruit is likely to suffer for moisture. If it is necessary to plant in a soil of this character it is highly advantageous to plant on a northern slope if possible. On account of its late ripening period, which is after all the other bush fruits are gone, it is especially subject to injury from drought. On the black soil of the prairie region, which is usually very rich in nitrogen, the plants are inclined to make an excessive wood growth, and often at the expense of fruit production. The wood is also more succulent in character, and hence more subject to winter killing.

After the soil has been thoroughly prepared, the

rows may be laid out with a diamond plow, placing them eight feet apart, and the plants four feet apart

Crate of Blackberries.

in the row. The Planter Junior or Iron Age cultivator are convenient tools for summer work.

Clean cultivation should be practiced for the first two years to secure deep rooting. After this period the cultivation may be continued, or the plants may be mulched if desired.

One of the most important points in blackberry culture is the pruning. Unless this is attended to

the patch is very apt to become one mass of thorns, and an impenetrable brush heap. The first year after planting the canes should be pinched back at a height of two feet. After the first year they are headed back at a height of three and a half feet. This heading back promotes the formation of lateral

or side branches, and is highly advantageous. The spring following it is often advisable to cut the side branches back if the set of fruit is excessive. A compact branchy plant is also of great advantage in the gathering, as the fruit is more concentrated in area, and the plants can be gotten over much more quickly. If the pruning is properly done no supports are necessary as a rule, though some growers use a single No. 12 wire to tie the canes up to in the spring.

In regions of severe winters, such as northern Iowa and Minnesota, winter protection is necessary. To grow the plants successfully in these regions, the canes must be covered. To do this the plants are laid to the north or west, as the tops hold the snow better when placed in this direction. The workman begins at the far end of the row and weights the tips down with earth. The next hill is placed over this shingle fashion, and so on. After the canes are all bent over and weighted down, a final covering of straw may be added. Hill culture is necessary where winter protection is practiced.

In some regions the cane-borer and orange rust are destructive. The most feasible method of combating these foes is by mowing off the patch and burning the vines immediately after the fruiting period. Where the plantation is badly infested the best plan is to burn everything and start over on new land, taking special pains to secure clean, healthy plants.

The following are among the most profitable varieties for the Middle West:

SNYDER—This is perhaps more largely grown than any other commercial sort, and is very productive, and the berries large and of good quality. For

the south the Early Harvest is a profitable berry on account of its earliness, but in the north is one of the most tender sorts. For northern regions the Ancient Briton, Snyder and Stones' Hardy are highly regarded.

Dewberries

The dewberry is a close relative of the blackberry and differs from it in that it is a trailing form of growth and roots from the tips instead of from suckers. In hardiness it ranks with the blackberry. Its fruit ripens before that of the blackberry, which renders it less subject to drouth, and for this reason frequently produces a fruit of more uniform size. Its deep rooting habit also assists materially in this regard. In fact, it is perhaps less affected by drouth than any other member of the bramble family.

The best soil for the dewberry is a clay loam, and in the black prairie soil region it usually succeeds best on the very thinnest soil procurable. On the black soil the vines tend strongly to form excessive wood growth at the expense of fruit. Also in point of hardiness the plants grown on the clay soil are firmer in texture and less subject to winter injury.

In the Middle West and north of the forty-first degree, the dewberry is small, tender, and requires protection to make it a profitable commercial crop. One of the most successful growers in this northern region is Mr. W. S. Fultz, of Muscatine, Iowa. For the Northern grower, Mr. Fultz recommends the following method:

"To grow the dewberry successfully in Iowa or further north, special care is necessary. The plant is rather tender and requires winter protection, and without this it is not a profitable berry to grow. The first four or five years in our experience we made a failure of it, notwithstanding the fact that we tried various methods of treatment. Four years ago this fall we hit upon a method of treatment that we have since followed with decided success.

"We plant in rows seven feet apart, and set the plants five feet apart in the rows. The first year we planted potatoes with the dewberries as a nurse crop, and in the fall after the potatoes were dug, the dewberries were covered with a mulch to protect them during the winter. The following spring the vines were raised above the mulch and clean culture given during the summer. The following fall after the leaves had fallen the vines were all cut away from each hill except six, three on each side. These six vines were cut back to three and one-half to four feet long, and were then drawn down lengthwise of the row, three each way from the hill and fastened down with a couple of small stakes. This drawing down of the vines is done to bring down or straighten the bow that grows in each vines at the hill, so as to reduce the amount of mulch needed for covering and to give better protection by having the vine close to the ground. This small, slender row of vines is then covered over with earth or with mulch of some kind. We have covered with earth by throwing it over the vines with a plow, which is the most rapid way of doing the work. We have also tried various kinds of mulch and now cover entirely with forest leaves, which are held in place with a little earth thrown on the edges of the row of leaves by a small seven-inch plow. The leaves should be about three inches deep over the vines and just wide enough to properly cover them. When trimmed and drawn down close to the ground it requires but a small amount of leaves to properly cover the vines. Care should be taken that there is no frost in the vines when staking down, as then they are very brittle and apt to break.

"The second spring after planting, good strong posts are set at each end of the rows, the posts to

extend two feet above the ground, and well braced. Stakes are driven in the ground every fifteen feet along the row, the stakes to be as high above the ground as the posts. A No. 12 wire is then strung

Dewberry Vines, Supported by Wire Trellis.

over the rows and fastened to the posts and stakes. The wire should be at least twenty inches above the ground. In the spring the little stakes that hold the vines to the ground are pulled up and the vines

are raised and tied to the wire. The leaves are allowed to remain on the ground, as they save hoeing by keeping down the weeds in the row. A horse and plow or cultivator is used to keep the spaces between the rows clear of weeds.

"The object of tying up the vines to a wire is two-fold. First, to keep the berries off the ground and keep them clean, and second, to keep the bearing vines high enough from the ground so that the new growth will not overrun and smother them. We find that it is very detrimental to their bearing qualities to allow the new or current year's growth to overrun the old or bearing vines. The treatment for each succeeding year is the same as for the second year.

"It must not be supposed that this treatment of the dewberry can be given without labor. It requires a large amount of care and labor to raise any kind of fruit, and the dewberry is no exception."

In the season of 1904 Mr. Fultz secured gross returns of \$225.00 from an acre, and paid out for harvesting and cultivation, \$50.00. The dewberry commonly retails on the Northern market at \$2.50 per 24-quart crate.

Whatever form of winter protection is adopted, summer pruning is necessary, and is of material advantage even where no winter protection is required. As the new canes reach a length of about two feet the terminal buds should be nipped out. This checking of the growth causes the formation of fruit buds near the base of the plant. This is highly advantageous, as the tips are more subject to injury. Particularly in the North this is one of the most important points in the culture of the dewberry.

The dewberry may be propagated by either tips or root cuttings. Many growers prefer the former, believing that a plant with a heavier crown and a better root system is thereby secured. This transplanting should be done at the opening of spring.

Lucretia Dewberry

Unless the vines are trained to a wire, it is a decided advantage to have the ground mulched at fruiting time, as with the strawberry. The mulch is of great assistance in keeping the fruit clean and in attractive condition for the market.

The Bartell, Lucretia, and Austin are some of the most important varieties. The latter is tender and unsatisfactory in the North, and the Bartell and Lucretia are quite successful over a large territory. The Bartell is preferred by some growers on account of its vines being less spiny.

Notes on the Bush Fruits and their Preparation as Food Products

Compiled by

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A great variety of fruits, both in the fresh and dried states, are consumed as articles of food or as flavoring agents and luxuries. In studying their value as food products, it may be of interest to consider first their chemical composition. The currant and gooseberry may serve as examples in this respect, especially of those that contain considerable acid. The following table indicates their chemical composition.

CURRENT.

Water	Nitrogen	Free Acids	Sugar	Other Non-Nitro- genous	Cellulose	Ash
84.77	.51	2.15	6.38	.90	4.57	.72

GOOSEBERRY.

Water	Nitrogen	Free Acids	Sugar	Other Non-Nitro- genous	Cellulose	Ash
86.	.40	1.5	7.00	1.9	2.7	.5

It will be seen from the above table that these fruits possess but a low nutritive value, as they contain a very large proportion of water, and of their

solids only a very small proportion consists of nitrogenous matter. Their chief food value is in the sugar which they contain.

They also contain important salts of vegetable acids as well as some free acids. They therefore possess valuable anticorbutic properties. As their salts are chiefly combinations of vegetable acids with alkalies, and as they become converted into carbonates in the system, they impart alkalinity to the urine, and they are, on that account, valuable in gouty states with a tendency to the disposition of acid urates. Their agreeable aroma is due to the presence of essential oils and compound ethers. They all contain varying amounts of indigestible cellulose and pectin. Malic acid is found in gooseberries and currants.

OTHER ACIDS.

When taken in moderate amounts, these fruits are useful additions to the dietary; they are cooling and refreshing, of agreeable flavor and tend to promote intestinal action, and to correct tendencies to constipation. Taken in excess, or when immature or over-ripe, they are apt to set up gastro-intestinal irritation, often of a severe form.

Currants, gooseberries and raspberries are remarkable for the amount of free acid which they contain which makes them very refreshing and their juices form an agreeable addition to effervescing water, such as apollinaris or carbonic acid water and may sometimes be used in fevers, although lemon juice is usually preferable. Currants are prepared in various ways, the chief one being in the form of jelly. Prepared in this manner, they constitute an appetizing and wholesome flavoring material which may be

taken with meats and other foods to stimulate the appetite.

"Currants, raspberries and blackberries are frequently made into jams. These, on account of the large quantity of sugar which is added in their preparation, are quite nutritious and their numerous seeds have a laxative action. For this reason, they are sometimes beneficially given to children to be eaten with bread and butter. They aid in satisfying the natural craving of children for sweets, and if taken in moderation, they are very wholesome, and their taste may encourage the eating of more nutritious but less agreeably flavored food, such as rice, cornstarch or farina."

CURRENTS—These include those popularly designated as the white, red and the black currants. The first is a favorite table fruit, while the red currant is more generally esteemed for the purpose of jelly, jam and acid flavoring for summer beverages.

CURRENT JELLY—Currants are in the best condition for making jelly between the middle of June and the middle of July and should not be picked directly after a rain. Cherry currants make the best jelly. Equal proportions of red and white currants are considered desirable and make a light colored jelly.

Pick over currants, but do not remove stems; wash and drain. Mash a few in the bottom of a preserving kettle, using a wooden potato masher; so continue until berries are used. Cook slowly until currants look white; strain through a coarse strainer, then allow juice to drop through a double thickness of cheese cloth or a jelly bag. Measure, bring to boiling point, and boil for five minutes; add an equal measure of sugar, boil five minutes, skim and pour

into glasses. Let stand twenty-four hours—cover and keep in a cool, dry place.

CURRENT AND RASPBERRY PRESERVES.

6 lbs. Currants; 6 lbs. Sugar; 8 qts. of Raspberries.

Pick over, wash and drain currants. Put into a preserving kettle, adding a few at a time, and mash. Cook for one hour, strain through a double thickness of cheese cloth. Return to kettle, add sugar, heat to boiling point, and cook slowly for twenty minutes. Add one quart of raspberries when syrup again reaches the boiling point, skim out raspberries, put in a jar, and repeat until raspberries are used. Fill jars to overflowing with syrup and screw on tops.

RED CURRENT JAM.

Wash the currants, put them into a porcelain lined kettle, stand them over a very moderate fire until thoroughly heated, then press them through a sieve. Measure the liquid, and to every pint allow three-quarters of a pound of sugar. Put the sugar and liquid back into the kettle and boil rapidly for twenty minutes, stirring occasionally to prevent scorching. Pour into tumblers or jars, and seal the same as fruit jelly.

Black and White Currant jam may be made the same.

CURRENT SYRUP—(Mrs. Rorer.)

Mash the currants and stand aside in a warm place for four days—cover to keep out dust and insects. Then turn into a jelly bag and let drip slowly. If you wish it very clear, filter through filter paper.

Measure the juice, and to every pint allow two pounds of sugar. Mix the juice and sugar together until only a small portion settles to the bottom, then

pour it into a double boiler, place over the fire—when the sugar is all dissolved, take it from the fire and stand aside to cool. When cold, put into small bottles, fill to the top, cork lightly, seal, and keep in a dark, cool, dry place. Be very careful that you use only porcelain or granite utensils in the making of the syrup, as the acids of the fruit will act upon metal and change the bright red color to a purple. Use a wooden spoon in stirring. Strong heat or boiling also destroys the color and flavor of the syrups.

GOOSEBERRIES.

GREEN—Top and stem the gooseberries, wash in cold water and drain. To every pound of gooseberries, allow one and a quarter pounds of sugar and one and a half pints of water. Put the berries into a granite kettle, cover with boiling water and stand aside a few minutes, to scald. Put sugar and water in another kettle to boil. As soon as it boils, skim and set aside to cool. When the gooseberries feel tender, take them out carefully and slide them into a pan of cold water. Let stand a few minutes, then carefully put them into the syrup. Stand over a gentle fire and let simmer slowly for about twenty minutes or until they are clear. When done, put carefully into jars or tumblers and stand aside to cool. Cover and keep in cool place.

FOR PIES—They are better sealed without sugar. It may be added at time of using. Stem, wash and drain gooseberries, put them in a porcelain lined kettle, bring quickly to the boiling point and put into cans.

SPICED—Cut off the blossom end of the fruit and to every six pounds allow two quarts of sugar and one-half cups of vinegar. Put the vinegar over

the fire, and when scalding hot, pour in the berries with one teaspoonful of whole all-spice and cloves mixed, a few pieces of stick cinnamon and a small piece of ginger root cut into bits, the whole of these tied in a thin muslin bag. Cover closely and let gooseberries simmer till they are tender. Put fruit into jars, cover with syrup and seal.

RED RASPBERRIES.

Select the large red berries, pick carefully and put into small glass jars, a layer of berries and a sprinkling of sugar, allowing to each pint of berries, two heaping tablespoons of sugar. Place jars in a sterilizer and steam for six minutes. If fruit settles, leaving space unfilled, fill up from another jar as need require. Seal without delay and stand aside to cool.

PRESERVED RASPBERRIES.

Put three quarts of large red raspberries into a preserving kettle, mash them and stand over a moderate fire to heat. At the first boil, remove them from the fire and press through a jelly bag. Measure and to every pint, allow one pound of sugar. Put sugar and juice into a porcelain lined kettle and bring quickly to the boil. Boil rapidly for ten minutes, and skim until the scum ceases to rise. Then put in three quarts of whole berries. Boil rapidly for five minutes and stand aside to cool. When cool, bring again to the boiling point, lift carefully by the spoonfuls, put into jars—cover with liquid, seal.

RASPBERRY JELLY.

Put the berries into a stone jar—stand it in a kettle of cold water—cover the top of the jar and heat slowly until berries are soft. Put a small quantity

into the jelly bag and squeeze out all the juice. Measure juice, and to each pint, allow one pound of sugar. Boil juice twenty minutes—turn in sugar and stir until dissolved. As soon as juice comes to boil, remove from fire and fill tumblers.

Raspberry jelly is the most critical jelly to make, and should not be attempted if fruit is thoroughly ripe, or if it has been long cooked.

RASPBERRY SYRUP.

Mash the berries and stand in a warm place for two or three days or until fermentation has commenced. If this is omitted, the syrup will jell instead of remaining liquid. To every pint of juice, allow one and three-quarters pound of sugar. Finish same as Currant Syrup.

Blackberry Syrup may be made in the same manner.

RASPBERRY VINEGAR.

Put two quarts of berries into a stone jar and pour over them one quart of good cider vinegar. Cover and stand aside for two days, then drain off the liquid without mashing the berries, pour it over a quart of fresh fruit and let stand as before. Do this once more, the last time straining through a muslin bag. Now add one pound of sugar to every pint of fruit juice. Boil slowly for five minutes, skim, let stand fifteen minutes, bottle and seal. Blackberry vinegar is made in the same manner.

BLACKBERRY JELLY.

Blackberry jelly may be made the same as currant jelly.

CONTENTS

Bush Fruits	5
Varieties	5
Currants	6
Varieties	11
The Gooseberry	12
Varieties	13
Raspberries	15
Varieties—Red, Purple and Black	19-22
The Blackberry	23
Dewberries	28
Notes on Bush Fruits and Their Preparation as Food Products	35-41

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