

2 TOBACCO.

—(1) Stalkless Maryland, of the following varieties: (a) *N. macrophylla ovata*—short-leaved Maryland, producing a good smoking-tobacco, (b) *N. macrophylla longifolia*—long-leaved Maryland, yielding a good smoking-tobacco, and excellent wrappers for cigars, (c) *N. macrophylla pandurata*—broad-leaved, or Amersfort, much cultivated in Germany and Holland, a heavy cropper, and especially adapted for the manufacture of good snuff; (2) Stalked Maryland, of the following varieties: (a) *N. macrophylla alata*, (b) *N. macrophylla cordata*—heart-shaped Maryland, producing a very fine leaf, from which probably the finest Turkish is obtained. Cuban and Manilla are now attributed to this group.

II. *N. Tabacum angustifolia* — Virginian tobacco. Of this, there are two sub-species—(1) Stalkless Virginian of the following varieties: (a) *N. angustifolia acuminata*, grown in Germany for snuff, seldom for smoking, (b) *N. angustifolia lanceolata*, affords snuff, (c) *N. angustifolia pendulifolia*, another snuff tobacco, (d) *N. angustifolia latifolia*—broad-leaved Virginian, used chiefly for snuff, (e) *N. angustifolia undulata*—wave-like Virginian, matures quickly, (f) *N. angustifolia pandurata*, furnishes good leaves for smoking, produces heavily, and is much grown in Germany, and said to be grown at the Pruth as “tempyki,” and highly esteemed there; (2) Stalked Virginian, of the following varieties: (a) *N. angustifolia alata*, (b) *N. angustifolia lanceolata* [*N. fructiosa*], growing to a height of 8 ft., (c) *N. angustifolia oblonga*, (d) *N. angustifolia cordata*—E. Indian, producing heavily in good soil, and well adapted for snuff, but not for smoking. Latakia and Turkish are now accredited to *N. Tabacum*.

III. *N. rustica*.—Common, Hungarian, or Turkish tobacco. Of this, there are two varieties: (a) *N. rustica cordata*—large-leaved Hungarian, Brazilian, Turkish, Asiatic, furnishing leaves for smoking; (b) *N. rustica ovata*—small-leaved Hungarian, affords fine aromatic leaves for smoking, but the yield is small. Until quite recently, Latakia, Turkish, and Manilla tobaccos were referred to this species; Latakia is now proved to belong to *N. Tabacum*, and Manilla is said to be absolutely identical with Cuban, which latter is now ascribed to *N. Tabacum macrophylla*.

IV. *N. crispa*.—This species is much grown in Syria, Calabria, and Central Asia, and furnishes leaves for the celebrated cigars of the Levant.

V. *N. persica*.—Hitherto supposed to be a distinct species, affording the Shiraz tobacco, but now proved to be only a form of *N. Tabacum*.

VI. *N. repanda*.—A Mexican plant, with small foliage. Long thought to be a distinct species peculiar to Cuba, but none such is now to be found in Cuba, whether wild or cultivated, and all the Cuban tobacco is now obtained from *N. Tabacum macrophyllum*.

Among the many other forms interesting only to the botanist or horticulturist, the principal are *N. paniculata*, *N. glutinosa*, *N. glauca*, attaining a height of 18 ft., and *N. clevelandii*, exceedingly strong, quite recently discovered in California, and supposed to have been used by the early natives of that country.

Thus the bulk of the best tobaccos of the world is afforded by the old well-known species *Nicotiana Tabacum*.

A good idea of the foliage and inflorescence of commonly cultivated tobaccos may be gained from a study of the accompanying illustrations.

Fig. 1 is a Cuban tobacco, and much grown on the continent of Europe, notably in Holland, Germany, and Switzerland, and there known as *goundie*, from the name

FIG. 1.



of an American consul who introduced the plant into Germany in 1848. It has a broad yet somewhat pointed leaf, with the ribs not arranged in pairs; it is fine, soft, thin, and esteemed for smoking in pipes and for wrappers of cigars.

One variety of the Maryland plant is shown in Fig. 2. The leaves spring from a tall stem at considerable intervals, and are broad and rounded at the end. This

FIG. 2.

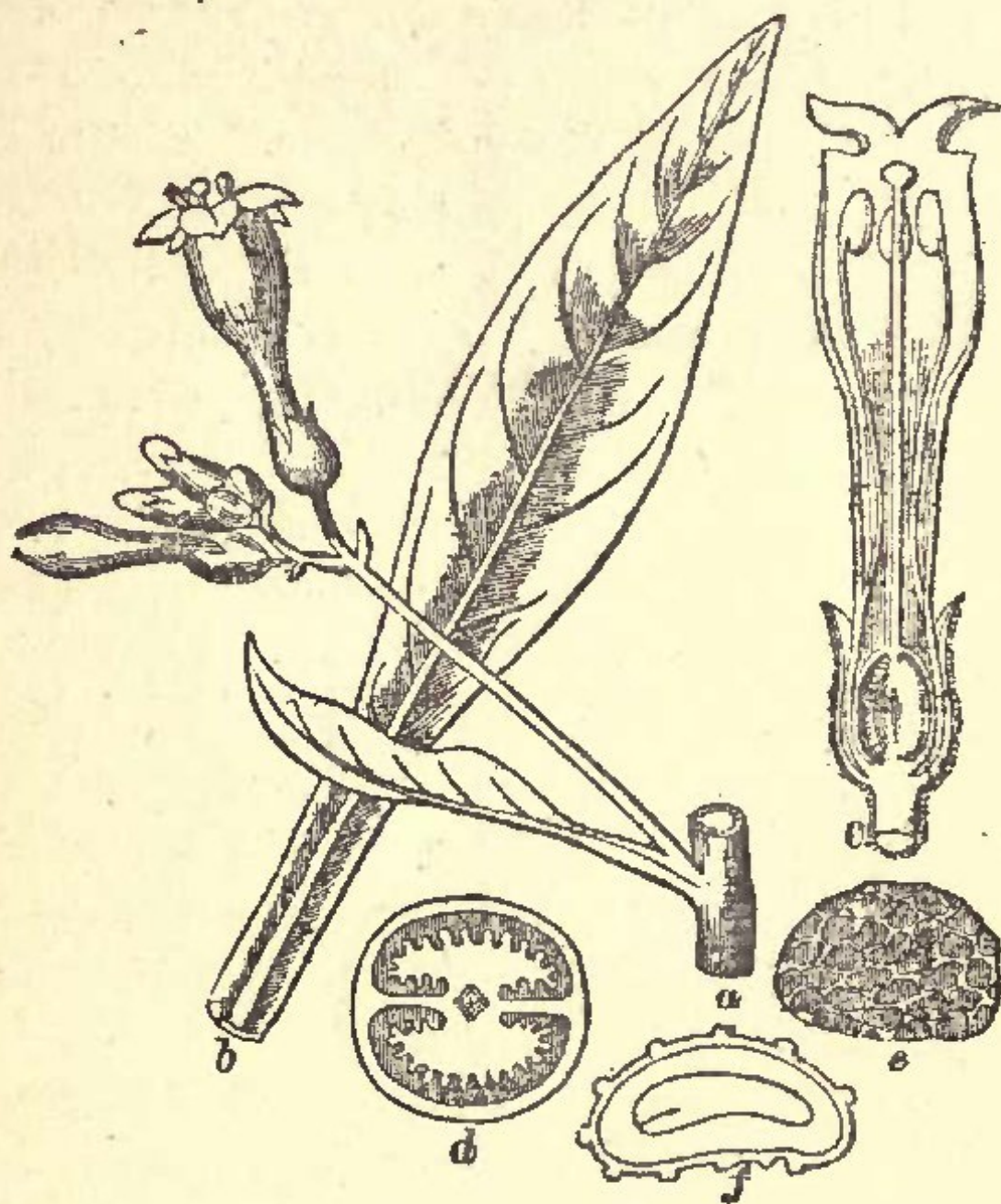


kind is valued for cigar-wrappers, and assumes a fine light brown colour when well cured.

A broad-leaved Cuban or Maryland growth long naturalized in Germany, and now familiar as Amersfort,

is represented in Fig. 3. It is distinguished by unusual length of leaf accompanied by a corresponding narrowness. A stem and flower are shown at *a*, a leaf at *b*, a flower in section at *c*, a capsule at *d*, a seed at *e*, and a cross-section of a leaflet at *f*.

FIG. 3.



These three examples represent the most successful kinds grown in Europe and at the same time some of the most marked diversities of form of leaf.

CHAPTER II.

CULTIVATION.

THE following observations on the methods of cultivating tobacco have reference more particularly to the processes as conducted in Cuba, India, and the United States; this branch of agriculture has been brought to great perfection in the last-named country, and the supervision of the operations in India is mostly entrusted to skilled Americans.

Climate.—Of the many conditions affecting the quality of tobacco, the most important is climate. The other conditions that must be fulfilled in order to succeed in the cultivation of this crop may be modified, or even sometimes created, to suit the purpose; but cultivators can do little with reference to climate: the utmost they can do is to change the cultivating season, and this only in places where tobacco can be grown nearly throughout the year. The aromatic principles, on the presence of which the value of a tobacco chiefly depends, can only be properly developed in the plant by the agency of high temperature and moisture. The fame that Cuban and Manilla tobaccos enjoy is mostly due to the climate. The article produced in Cuba is most highly esteemed; up to this time, no other country has been able to compete successfully with it. However it cannot be doubted that there are many places whose climate justifies the assumption that a tobacco could be grown there, not

inferior to that produced in the West Indies. The more closely the climate of a place corresponds with that of Cuba, the greater chance is there that a Havanna variety will preserve its peculiar aroma. In such places, a fine and valuable tobacco may be grown with less expenditure on labour, &c., than it is necessary to bestow in raising an inferior article in less suitable climes. In countries where a low temperature rules, the plants must be raised in hot-beds, and there is also a great risk that the young plants may be destroyed by frost, or afterwards by hail-stones. When damp weather prevails during the tobacco harvest, it is often injured; and to give the required flavour, &c., to make the article marketable, macerating has often to be resorted to, thus involving great risk and expenditure. But in spite of these drawbacks, tobacco cultivation is often very remuneratively carried out in countries possessing an unfavourable climate. The deficient climatic conditions are here partly compensated for by making the other conditions affecting the quality of tobacco, and which can be controlled by the cultivator, the most favourable possible.

Soil.—The soil affects to a great extent the quality of a tobacco. The plant thrives best in a soil rich in vegetable mould; this, however, is not so much required to supply the necessary plant food, as to keep the soil in a good physical condition. No other plant requires the soil in such a friable state. A light soil, sand or sandy loam, containing an average amount of organic matter, and well drained, is considered best adapted for raising smoking-tobacco; such a soil produces the finest leaves. The more organic matter a soil contains, the heavier is

the outturn ; but the leaves grow thicker, and the aroma becomes less. As, in tropical climates, the physical properties of the soil play a prominent part in its productive capabilities generally, and the presence of organic matter in the soil tends to improve these properties, it will rarely occur that in such places a soil will contain too much humus. The more clay in a soil, the less is it adapted to the production of fine smoking-tobacco, on account of its physical properties being less favourable to the development of the aromatic principles ; the leaf becomes also generally thick and coarse, but the outturn on such soils is commonly heavier than on a more sandy one. A clay soil possessing a great amount of humus may, if properly tilled, produce an ordinary smoking-tobacco, and may even, if great attention be paid to the selection of the variety, &c., produce leaves for cigar-wrappers.

Of less importance than the physical properties of the soil is its chemical composition. By proper tillage and heavy manuring, tobacco is sometimes grown on comparatively poor soils. From analysis of the plant, it is clear that it contains a large amount of ash constituents, which it extracts from the soil ; the most important of these are potash and lime. A soil destitute of these constituents would require a great quantity of manure to supply the wants of tobacco.

An experienced Ohio planter, Judson Popenoe, speaking of soil, says "A rich, sandy, second bottom, I believe to be the best for raising tobacco, although our chocolate-coloured uplands, when very rich and highly manured, will grow an excellent quality of tobacco, but will not

yield as much to the acre. Black river-bottoms will yield more to the acre than any other kind of land, but the tobacco is not of so fine a quality; it grows larger, has coarser stems, and heavier body, and consequently, in my opinion, is not so good for wrappers or fine cut as the second bottom or upland tobacco."

On the same subject, an Illinois grower observes, "for us in the West, and for all the localities that have not an over-amount of heat, experience has proved, that a dry, warm soil (loam or sandy loam), rich, deep, and containing lime, is most suitable for tobacco. The more sandy, to a certain degree, the soil is, the better will be the quality of the tobacco; the nearer the soil is to clay, the poorer will be the crop under similar circumstances, although the yield may yet be satisfactory. Clayey soil will hardly produce tobacco suitable for cigars. Wet and tough clay soils are under no circumstances suitable to tobacco."

Situation.—Land intended for tobacco-culture should have good drainage, and be sheltered from high winds. In Holland, where tobacco-cultivation is carried out to great perfection, each field is surrounded by a hedge about 7 ft. high; the fields are divided into small plots, which are again bordered by rows of plants that are able to break the force of the wind, which would injure the leaves, and render them of comparatively little value. To this circumstance must chiefly be attributed the fact that Dutch growers succeed in getting as much as 50 per cent. of leaves of the first quality, whereas in most other countries 25 per cent. is considered to be a very good outturn.

In the United States, several rows of pole beans, i. e. scarlet runners, a few steps apart, are sometimes planted as a wind-screen.

Manure.—In its natural state, the soil will rarely possess the elements of plant food in such a form as is most conducive to the production of a fine tobacco-leaf. Any deficiency must be supplied in the shape of suitable manure. Schlösing found that a bad burning tobacco was produced on a soil containing little potash, on unmanured soil, on soil manured with flesh, humus, calcium chloride, magnesium chloride, and potassium chloride. A good burning tobacco was produced on a soil manured with potassium carbonate, saltpetre, and potassium sulphate. More recent experiments carried out by other investigators tend to corroborate these conclusions. It is generally assumed that a soil rich in nitrogenous organic matter produces a strong tobacco that burns badly.

The results of Nessler's experiments clearly show that it is not sufficient to apply the element most needed by the plant—potash—in any form, but that, to produce a good tobacco, it is necessary to apply it in a particular combination. It was found that potash carbonate applied as manure produced the best tobacco: it burned for the longest time, and its ash contained most potash carbonate; whereas potash chloride produced a much inferior tobacco. The assertion of other experimenters that chlorides produce a bad tobacco is thus confirmed. Potash sulphate and lime sulphate produced a good tobacco. It may be noticed here that tobacco which was manured with gypsum contained a great amount of potash carbonate in the ash, probably due to the fact that gypsum is a solvent for the

inert potash salts. From the foregoing, it may be concluded that in tobacco cultivation, the elements potassium and calcium should be restored to the soil in the form of carbonate, sulphate, or nitrate, but not as chlorides. Poudrette, or prepared night-soil, generally contains a considerable amount of chlorides, and is not well suited as manure for fine tobacco. It has been found that fields manured with chlorides produced heavily; a small proportion of chlorides may therefore be applied in this form, whenever quality is of less importance than quantity. Farmyard manure may suffice when tobacco is cultivated in proper rotation, but here also, unless the soil be very rich in potassium and calcium, the application of some special manure will greatly enhance the value of the outturn. Wood-ashes are a valuable supplement to stable dung. Gypsum is an excellent dressing for soils in a good manurial condition: it supplies the lime needed by the tobacco, and acts as a solvent on the inert potash salts. Gypsum applied on poor land, however, hastens the exhaustion of the soil. It is said that crops manured with gypsum suffer less from the effects of drought, and require less irrigation, than when manured otherwise: the leaves of plants that had been manured with gypsum exhaling less water than when manured with other substances. If this assertion be correct, gypsum would be invaluable to the Indian cultivator.

With regard to the amount of manure to be employed, it may be observed that, with farmyard manure properly rotted, there is no theoretical limit, especially when the tobacco is intended for snuff, and is grown in a hot climate, where the physical properties of the soil are of the utmost

importance. It is said that some Rhenish-Bavarian soils contain as much as 15 per cent. of organic matter, yet the cultivator considers it necessary to heavily manure each tobacco crop. Dutch growers apply to the rich alluvial soil as much as 25 tons an acre of well-rotted cattle-manure. In America, it is reported that the heaviest crops are obtained on soil newly taken up, and very rich in vegetable mould. It is considered nearly everywhere that tobacco will pay best when heavily manured. The first care of even the poorest peasant in the tobacco districts of Germany, Holland, &c., as soon as he sells his tobacco, is to purchase the manure which he considers essential to his success.

The amount of any special manure which can be applied without injury to the plants depends very much on the solubility of the stuff, and the manner of applying it. Highly soluble salts, such as soda or potash nitrate, should be applied in smaller quantities than salts which dissolve slowly. With regard to the manner of applying concentrated manures, it is evident that, when a salt is applied in close proximity to the plant, less will be required than when strewn over the whole field. When applied in solution, not more than 300 lb. of nitrate per acre should be used at one time. The amount to be applied varies also with the soil; a sandy soil, which has little absorptive power, should receive less than a clay. Salts easily disintegrating should not be applied before tobacco has been planted, especially not before heavy rains which would carry off the salt. To supply the potash required by the tobacco plant, 200 lb. of good salt-petre per acre would be sufficient in most cases. Lime,

although removed from the soil in large quantities, is rarely applied to tobacco as a special manure. Where wood-ashes can be had at a moderate price, lime may be applied in this form. Some ashes are very rich in lime. It has been found that ashes obtained from beech-wood contain 52 per cent. of lime, and those from oak-wood as much as 75.

Whilst most growers are agreed that tobacco is a crop demanding a rich soil, there is a want of uniformity of opinion as to the best method of manuring. On this point, C. Schneider, a successful Illinois planter, says "manuring cannot be done too early, or too heavily. The manures are very different, and equally useful for the different kinds of tobacco. We may classify them as follows:—

"To be applied shortly before planting, and in equal quantities, for all kinds of tobacco: 1. Guano, 200 to 300 pounds on the acre; 2. Poultry-droppings, 400 to 500 pounds; 3. Green manure in any quantity; 4. Sheep-dung, 6 two-horse loads; 5. Cattle manure, 10 two-horse loads.

"For chewing-tobacco and snuff: 1. Sheep-dung, 10 to 12 loads per acre; 2. Cattle manure, 20 to 30 loads; 3. Horse-dung, 15 to 25 loads; 4. Hog manure, 20 to 30 loads. The last two are useless for smoking-tobacco, or for that to be used for cigars.

"The first three manures (guano, poultry-droppings, and green manure) must be followed after the tobacco-crop, by a plentiful supply of stable-manure. The tobacco-stalks themselves, rotted or burned to ashes, sown over the field before the transplanting, or in the planting-

furrows, will act as a good manure, but are not sufficient. In highly-worked farms, that is, where the soil is valuable, and cannot remain idle, it will pay every way, to sow rye for fodder on the tobacco-land in the fall; this may be made into hay, or turned under as manure at the beginning of July, just as may seem most profitable. Deep ploughing for the rye, and afterward for the tobacco, must not be forgotten."

R. E. Burton, in the *Sugar Cane*, translating from Mitjen's essay on tobacco growing in the most renowned district of Cuba, has the following sensible remarks on the all-important subject of manuring:—

"Each veguero or farmer should make a hole or rotting-bin in which he should deposit as much muck and leaves as he may be able to accumulate, and, before giving the last ploughing to prepare his field for planting the tobacco, he should spread over it all the prepared rotten manure he can procure. Manure that is not thoroughly rotten injures the plants more than benefits them. A piece of land, well manured and thoroughly worked up, will produce four times more tobacco than one badly prepared would. Consequently no expense or labour is so remunerative as that which is applied to the soil. This is a very important point which should fix the attention of every agriculturist who desires to prosper.

"Agriculturists acknowledge the advantage of manuring. In tobacco cultivation it produces the most brilliant results, but in Vuelta-Abajo it is very difficult to procure sufficient country manure. Yagues (i.e. strips of palm bark used as screens, and for baling) and all the refuse from palm trees are excellent; grass from the savannahs

and all kinds of vegetables in a thoroughly putrid state are very good, but it requires a great quantity, and the immense labour to collect and prepare these, frightens the greater number of vegueros, and few have sufficient constancy to enable them to collect enough properly prepared manure for their fields.

“The most which some manage to do is to spread refuse over some portions of land, where it rots and fertilizes the soil; but this system is inefficacious, because the vegetable substances being very light, the heavy rains wash away the greater portion of the decomposed matter, and fully nine-tenths are lost. If the system was adopted of depositing this manure in holes or trenches, from which it can be removed when thoroughly rotted and fit for the fields, it would produce much more with much less labour; for although at first sight the labour appears to be doubled; by having to carry it twice, it must be remembered that one load of well-prepared manure is better than ten or twenty of grass or bush that is not rotten.

“But in every way there is great difficulty in collecting vegetable manure in sufficient quantities; recently, guano has been tried with the most brilliant success.

“Peruvian guano is the most compact fertilizer known, and a very small quantity suffices to manure a tobacco field; its cost is not excessive, and is very frequently less than the carriage of other manures to the spot where they are to be used. Its most active results are shown on light and sandy soil; it quickens vegetation, and experience has shown that it increases prodigiously the quantity and value of crops; we therefore recommend the use of