or flavour. It also applies to the method of curing, such as sun, air or flue curing. Grades represent the different qualities of a type, and vary much in the several types. The classification of American tobacco is threefold, viz. domestic cigar tobacco and "smokers," chewing-tobacco, export tobacco. The domestic tobacco trade comprises the various kinds of seed-leaf of Connecticut, New England, Pennsylvania, Wisconsin, Illinois, New York, Florida and Ohio, as well as the sorts known as White Burley "lugs," fine-fibred wrappers, Indiana kite foot, and American-grown Havana. In the chewing class are included the fine-cut and the plug fillers, principally of the White Burley type from Kentucky, while under the head of export tobacco are the Virginian bird's-eye cutting leaf, and the spinning fillers or shag. It is curious to notice how each market for export tobacco differs in its requirements. The "closed" markets, or those in which the tobacco trade is a monopoly of the Government, are France, Italy, Austria and Spain. The French "Régie" is supplied by wrappers, binders and fillers from Kentucky, Maryland and Ohio; the Italian Régie from Kentucky and Virginia; the Austrian Régie by "strips" from the same States, and the Spanish Régie by common "lugs." The open markets are Germany, to which are sent the tobaccos known as German saucer and spinners; Ohio and Maryland, spangled cigar-wrappers and "smokers" fat lugs; Switzerland, which is supplied with Virginian or Western wrappers and fillers; Holland, with Dutch saucer (a mottled Virginia, Kentucky or Tennessee leaf); Belgium, with Belgian cutter (a light, yellowish-brown leaf, well fired); Norway and Sweden, with heavy

types, mainly used for spinning and "saucing." Kentucky, which stands first of all the States for production, the annual produce being 171,120,784 lb., gains her chief profits from the white burley and yellow wrapper; Illinois, from the production of the seed-leaf; Missouri, from sweet fillers and white burley; Virginia, from yellow wrappers, bright "smokers," sun, air and flue-cured fillers. Decidedly the most prosperous tobacco States are those that grow types suitable for domestic consumption, while those that grow it mainly for exportation stand low in the scale, the margin of profit under this head being reduced very low. According to the researches of Dr. Gideon Moore, the largest amount of nicotine is contained in the Virginian heavily manured lots (5·81 per cent.), while the Virginian heavy English shipping has 4·72, the New York domestic Havana but 2·53, the Connecticut seed-leaf 1·14, while the smallest amount of all is found in the little Dutch tobacco of the Miami valley, 0·63. Profits in the culture of tobacco have been in direct proportion—first to its suitableness to domestic consumption; and, secondly, to the amount of fertilization practised by the growers in its cultivation. This is true in every case, except the yellow tobacco districts of North Carolina and Virginia, where poverty in the soil is a condition of success in the production of quality.

Professor J. T. Rothrock is of the opinion that the early natives of California smoked the leaves of *Nicotiana clevelandii*—a species only quite recently described by Professor Asa Gray. It is a small plant with small flowers, and it was found by Professor Rothrock only in association with the shell heaps which occur so abundantly

on the coasts of Southern and Central California. He states that perhaps of all the remains of extinct races so richly furnished by that region, none were so common as the pipes, usually made of stone resembling serpentine. The tobacco of *N. clevelandii* Professor Rothrock found by experience to be excessively strong.

A recent report of the Commissioner of Agriculture contains a few pages of sound advice to American planters on the management of this crop, which is worthy of reproduction here.

"The principal points to be attended to if the best results are to be attained may be stated in a few paragraphs—paragraphs which, while referring mainly to shipping, manufacturing, and smoking tobacco as constituting nine-tenths of the tobacco grown in the United States, embody principles and prescribe modes of management nearly identical with those to be considered in the treatment of other tobaccos.

"I. Select good land for the crop; plough and subsoil it *in autumn* to get the multiplied benefits of winter's freezes. This cannot be too strongly urged.

"II. Have early and vigorous plants and *plenty of them.* It were better to have 100,000 too many than 10,000 too few. They are the corner-stone of the building. To make sure of them give personal attention to the selection and preparation of the plant-bed and to the care of the young plants in the means necessary to hasten their growth, and to protect them from the dreaded fly.

"III. Collect manure in season and out of season, and from every available source—from the fence corners, the ditch-banks, the urinal, the ash-pile. Distribute it with

a liberal hand; nothing short of princely liberality will answer. Plough it under (both the home-made and the commercial) in *February*, that it may become thoroughly incorporated in the soil and be ready to answer to the first and every call of the growing plant. Often (we believe generally) the greater part of manure applied to tobacco—and this is true of the 'bought' fertilizer as well as of that made on the farm—is lost to that crop from being applied too late. Don't wait to apply your dearly-purchased guano in the hill or the drill from fear that, if applied sooner, it will vanish into thin air before the plant needs it. This is an exploded fallacy. Experience, our best teacher, has demonstrated beyond cavil that stable and commercial manure are most efficacious when used in conjunction. In no other way can they be so intimately intermixed as by ploughing them under—the one broadcasted on the other—at an early period of the preparation of the tobacco lot. This second ploughing should not be so deep as the first; an average of three to four inches is about the right depth.

"IV. Early in May (in the main tobacco belt to which this article chiefly refers, that is to say, between the thirty-fifth and fortieth parallels of north latitude), re-plough the land to about the depth of the February ploughing, and drag and cross-drag, and, if need be, drag it again, until the soil is brought to the finest possible tilth. Thus you augment many fold the probabilities of a 'stand' on the first planting, and lessen materially the subsequent labour of cultivation. Plant on 'lists' (narrow beds made by throwing four furrows together with the mould-board plough) rather than in hills, if for no other reason

than that having now, if never before, to pay wages in some shape to labour, whenever and wherever possible horse-power should be substituted for man-power—the plough for the hoe.

"V. Plant as early as possible after a continuance of pleasant spring weather is assured. Seek to have a *forward* crop, as the benefits claimed for a late one from the fall dews do not compensate for the many advantages resulting from early maturity. Make it an inflexible rule to plant no tobacco after the 10th of July—we mean, of course, in the tobacco belt we have named. Where one good crop is made from later planting ninety-nine prove utter failures. Far better *rub out and start afresh the next year.* Take pains in transplanting, that little or no re-planting may be necessary. The cut-worm being a prime cause of most of the trouble in securing a stand, hunt it assiduously and particularly in the early morning when it can most readily be found.

"VI. Keep the grass and weeds down, and the soil loose and mellow by frequent stirring, avoiding as much as possible cutting and tearing the roots of the plant in all stages of its growth, and more especially after *topping.* When at all practicable—and, with the great improvement in cultivators, sweeps, and other farm implements, it is oftener practicable than generally supposed—substitute for hand-work in cultivation that of the horse. The difference in cost will tell in the balance-sheet at the close of the operation.

"VII. Attend closely to 'worming,' for on it hinges in no little degree the quality and quantity of tobacco you will have for sale. A worm-eaten crop brings no money.

So important is this operation that it may properly claim more than a passing notice. Not only is it the most tedious, the most unremitting, and the most expensive operation connected with the production of tobacco, but the necessity for it determines more than all other causes the limit of the crop which in general it has been found possible for a single hand to manage. Therefore bring to your aid every possible adjunct in diminishing the number of worms. Use poison for killing the moth in the manner so frequently described in treatises on tobacco, to wit, by injecting a solution of cobalt or other deadly drug into the flower of the Jamestown or 'jimson' weed (*Datura stramonium*), if necessary planting seeds of the weed for the purpose. Employ at night the flames of lamps, of torches, or of huge bonfires, in which the moth may find a quick and certain death.

"In worming, spare those worms found covered with a white film or net-like substance, this being the cocoon producing the ichneumon-fly, an enemy to the worm likely to prove a valuable ally to the planter in his war of extermination.

"Turn your flock of turkeys into the tobacco-field, that they, too, may prey upon the pest, and themselves grow fat in so doing.

"If these remedies should fail, sprinkle diluted spirits of turpentine over the plant through the rose of a watering-pot, a herculean task truly in a large crop, but mere child's play to the hand-picking process, for the one sprinkling suffices to keep off the worms for all time, whereas the hand-picking is a continual round of expensive labour from the appearance of the first worm

until the last plant has been carried to the barn. We have no idea that such sprinkling will at all affect the odour or flavour of the tobacco when cured.

"If, as stated by a writer in a California paper, the well-known 'yellow-jacket' be useful in destroying tobacco-worms, by all means win it as an ally. As proving its usefulness, the writer asserts that one of his neighbours, a Mr. Culp, during fifteen years growing tobacco, has never expended a dollar for labour to destroy the worm, trusting all to this little workman, who, he says, carefully searches the plants for the worms, and never allows one to escape its vigilance.

"We cannot speak from our own experience as to many of these suggested means for overcoming the horn-worm, but we have no hesitation in saying to the farmer, try any, try all of them rather than have your crop eaten to shreds, and the labour of more than half the year brought to naught in a few days, it may be, by a single 'glut' of worms.

"VIII. 'Prime high and top low.' While open to objection in particular cases, even with the character of tobacco chiefly under consideration, and altogether inadmissible, it may be, in the management of other varieties of tobacco, this is a safe rule, we think, to follow in general practice.

"We favour 'priming' by all means; for when no priming is done the lower leaves (made worthless by constant whipping on the ground) serve only as a harbour for worms, which are the more difficult to find because of the increased burden of stooping. Moreover, if the bottom leaves be saved on the cut stalk, as most likely they will

be, there is always the temptation to put them on the market; and against a *sacrilege* like this we are firmly set, let others say and think what they may.

"Yet another advantage to be gained by the removal of these bottom leaves, which is what the planter terms 'priming,' is the increased circulation of air and distribution of light thereby afforded, both essential factors, the merest tyro knows, to the full development of plant life.

"'Topping' (the pinching off with the finger-nail the bud at the top of the plant) is an operation requiring considerable skill and judgment. Let it be performed only by hands having these prerequisites.

"That as many plants as possible may ripen at the same time (a desideratum not to be undervalued in aiming, as all should, at a *uniform* crop) wait until a large number of plants begin to button before commencing to top. Going about through the crop, topping a plant here and there because it may chance to have buttoned before its fellows, is a damaging process not to be tolerated.

"No inflexible rule can be given for the number of leaves that should be left on a plant. All depends upon the variety of tobacco, the strength of the soil, the promise of the particular plant, the probable seasons and time left for ripening, &c.

"One of the most successful growers of heavy dark tobacco we have ever known, once stated to us his conviction, after years of observation and practice, that one year with another, taking the seasons as they come, eight leaves would give a better result than any other number.

Our own experience has tended to confirm this judgment.

"IX. See to it that the suckers are promptly removed. It is work quickly done, and with worming may constitute a single operation.

"X. We come now to consider the last operation in the field, 'cutting' the crop. In this, as in topping, a man of judgment, experience, and fidelity is needed. An inexperienced hand, one without judgment, and particularly one who is indifferent to the interests of his employer, will slash away, right and left, not knowing or not caring whether the tobacco he cuts be ripe or green, doing more damage in a few hours than his whole year's wages would compensate for, even could they be garnished.

"Therefore, be on hand to see for yourself, and do not delegate the duty to any less interested party, that a crop managed well, it may be, so far, from the initial plant-bed, should not be spoiled in the closing work by an incompetent or unfaithful cutter.

"Be there, too, to see, in this supreme hour, that injury from sunburn is warded off by the timely removal, to the shade, of the plants that have been cut, or by a proper covering, where they lie, against the scorching rays of the sun. The neglect of this precaution has played havoc with many a crop when brought under the auctioneer's hammer.

"XI. We should have no space to describe the different methods of 'curing' tobacco, as, for instance, 'sun-curing,' 'air-curing,' 'flue-curing,' 'open-fire-curing,' &c., even though the whole subject had not been gone over again and again in previous reports of this Department.

We can only say of this operation, as of all others connected with the production of tobacco, that much depends on its proper doing, and that, as much as possible, it should have the personal superintendence of the owner.

"But the crop may have been brought along successfully even to the completion of this operation and 'lack one thing yet,' if it be not now properly manipulated.

"Therefore, go yourself, brother planter, into your barns, see with your own eyes, and not through the medium of others; handle with your own hands, and *know of a surety* that the tobacco hanging on the tier-poles is in proper order for 'striking' and 'bulking,' and act accordingly.

"When, later on, it is being 'stripped,' 'sorted,' and tied into bundles, or 'hands,' as they are often called, be there again, *propria persona*, to see that it is properly classed, both as to colour and to length, the 'lugs' going with lugs, the 'short' with short, the 'long' with long, &c. Instruct those sorting that when in doubt as to where a particular leaf should be put, to put it at least one grade lower than they had thought of doing. Thus any error will be on the safe side.

"Prize in hogsheads to weigh what is usually called for in the market in which you sell, and, above all, 'let the tobacco in each hogshead be as near alike as possible, uniform throughout, so that the 'sample,' from whatever point it may be taken, can be relied on as representing the whole hogshead,' and that there be left no shadow of suspicion that 'nesting' has been attempted, or any dishonest practice even so much as winked at.

"We sum up the whole matter by repeating:

"1. That overproduction, the production at all, of *low* grade tobacco is the chief cause of the present extremely low price of the entire commodity.

"2. That the planters of the United States have the remedy in their own hands; that remedy being the reduction of area, this reduction to result, from the employment of the means here suggested, in increased crops; and, paradoxical as it may seem, these increased crops to bring greatly enhanced values.

"The whole world wants good tobacco, and will pay well for it. Scarcely a people on earth seeks poor tobacco or will buy it at any price.

"In a word, then, one acre must be made to yield what it has hitherto taken two or three acres to produce; and this double or treble quantity must be made (as, indeed, under good management it could not fail to be) immeasurably superior in quality to that now grown on the greater number of acres. Either this or the abandonment of the crop altogether—one or the other."

The exports from Baltimore were 46,239 hogsheads in 1882, 43,620 in 1883, 43,192 in 1884. The State of New York, in 1883, had 5440 acres under tobacco, producing 9,068,789 lb., value 1,178,943 dollars; and Connecticut, 8145 acres, 9,576,824 lb., 1,292,871 dollars. The production of Minnesota was 65,089 lb. in 1879, 48,437 lb. in 1880, 79,631 lb. in 1881, 62,859 lb. in 1882, 14,744 lb. in 1883.

Venezuela.—The exports from Ciudad Bolivar were, in 1884, 1318 *kilo.*, value 1037 *bolivares*, to the British West Indies; 9618 *kilo.*, 6691 *bolivares*, to the United States; 275,329 *kilo.*, 192,188 *bolivares*, to Germany. The exports of tobacco from this port in decades have been:—

7,650,656 lb. in 1850–59; 2,134,711 in 1860–69; 3,170,812 in 1870–79.

West Indies.—The Spanish possessions in the West Indies are well known for their tobacco. The best is produced on the *vuelta abajo*, or low-lying districts of Cuba, near Havana, which are yearly flooded during the autumn, just before the tobacco is transplanted. To this fact, and the peculiar suitability of the seasons, the excellence of this particular product is attributed. The exports from Havana in 1878 were:—93,603 bales tobacco, 75,212,268 cigars, 203,581 bundles cigarettes, to the United States; 6169 bales tobacco, 66,795,330 cigars, 5,034,774 bundles cigarettes, to England; 32,582 bales tobacco, 9,541,498 cigars, 133,008 bundles cigarettes, to Spain; 582 bales tobacco, 3,861,700 cigars, 8206 bundles cigarettes, to N. Europe; 5671 bales tobacco, 18,327,025 cigars, 797,513 bundles cigarettes, to France; 41 bales tobacco, 900,850 cigars 5,709,442 bundles cigarettes, to other countries. The totals for 1878 were 7,078,904 *kilo.* of tobacco, 182,356 thousand cigars, and 12,816,903 packets of cigarettes; in 1879, 6,371,014 *kilo.* of tobacco, 145,885 thousand cigars, and 14,098,693 packets of cigarettes. The tobacco exports in 1879 from St. Jago de Cuba were 9653 bales to Bremen, 4015 to the United States (chiefly for Bremen), and 1809 coastwise, total 15,477, against 10,249 in 1878. In the island of Puerto Rico, the tobacco-plant thrives well, and the quality, especially in the Rio de la Plata district, is very good. In 1878, the island exported 8 *quintals* (of 101½ lb.) to the United States, 32,109 to Spain, 4198 to Germany, and 18,123 to other countries.

The British West Indies have only recently appreciated the importance of tobacco cultivation. Many portions of Jamaica seem as well fitted for it as the *vuelta abajo* of Cuba, and already Jamaica tobacco in the Hamburg market ranks next to the best Havana, and is considered superior to such Cuban growths as St. Jago, Manzanillo, Yara, &c. Tobacco cultivation may now be said to have a place in the industries of Jamaica, a fact mainly due to Cuban refugees. Tho most extensive plantations in the island are Potosi in St. Thomas Parish, and Morgan's Valley in Clarendon. Much of the produce goes to the German market, the remainder being made into cigars for local consumption, and said to be quite equal to some of the best Cuban brands. Some experiments made with Bhilsa tobacco have given great satisfaction, on account of the robust habit and immense yield of the plant. It is especially adapted for very wet districts, and its cultivation will be widely extended, if justified by its market value. Tobacco is, and for very many years has been, grown by the peasantry in small patches; from this, they manufacture a smoke-dried leaf, which, twisted together in rope form, sells readily in the home market. The acreage occupied by the crop was 297 in 1874–5, 442 in 1875–6, 331 in 1876–7, and 380 in 1877–8. The slopes of valleys in many parts of Dominica, too, are eminently suited to this crop, particularly the district between Roseau and Grand Bay. The experiment of tobacco culture in New Providence on a large scale has not proved satisfactory, owing to the difficulties encountered in curing and preparing the leaf; the cigars made are fit only for local consumption.

The exports from San Domingo in 1884 were 10,513,940 lb., value 669,500 dollars.

According to a recent Consular Report, it would seem that "Cuban tobacco has lost its prestige through forcing and artificial manures, and has to sustain sharp competition from abroad where it formerly commanded the market; and probably some years must elapse before the soil can recover from the excessive and indiscriminate use of artificial fertilizers.

"A few years ago the leaf harvested in the Vuelta Abajo was not sufficient to meet the large demand, and in order to increase the yield, growers made use of guanos of all sorts, and with such bad results that they find it now difficult to place on reasonable terms more than half, and sometimes less, of their crops, at very low prices; in few localities only the soil has not been spoilt by spurious manures, and the leaf grown there commands very high prices and is warmly competed for by local manufacturers and buyers for the United States.

"Notwithstanding the last crop has been of a better quality than heretofore, growers were compelled to abandon the tobacco cultivation for a certain time, and devote the ground to other purposes.

"It appears that this change of cultivation is absorbing the fertilizers, and restoring to the soil its former good qualities, and, if one can judge from the splendid appearance of the leaf and the ready sale it now meets with, it would seem that the Vuelta Abajo fields are regaining their former renown.

"This has been a hard but healthy lesson the Vegueros are not likely to forget. The soil cannot and should

not be taxed beyond a reasonable and natural yield; any attempt to the contrary would only be a repetition of the fable of the golden eggs, as the tobacco growers in the Vuelta Abajo have had occasion to learn to their cost.

"Towards the end of the year buyers, influenced by the pending negotiations of the Spanish-American Treaty, entered the market and operated extensively in the expectation of a great reduction of duties in the United States, paying prices above the established one, and which, a few weeks later, they were utterly unable to obtain.

"Cuban growers complain much of heavy purchases made in the United States for account of the Spanish Government for Peninsular consumption; they say that however low the class of the Cuban leaf may be, it must necessarily be superior to that of the Virginia and Kentucky tobacco, and that they might easily cultivate here the quality required, and place it in the markets at as low a price as any other country.

"Growers are unanimous in denouncing the action of some local merchants and cigar manufacturers in forwarding at the opening of the last season samples of leaf tobacco and cigars in condition that by no means gave a true idea of the quality of the crop, and which necessarily gave a result contrary to the interests of all parties engaged in the trade; and they earnestly protest against a repetition of this injudicious haste.

"The total tobacco production is estimated at between 400,000 and 500,000 *quintals* (one *quintal* about 100 lb.), chiefly from the following districts:—