

having planted more than twenty millions of olive and fig-trees, cotton-wood, oranges, acacias, planes, &c.) there now falls a good deal of rain, especially along the coast, in the months of November, December, and January, and even at Cairo it rains both oftener and more abundantly, so that real showers are no rarity.

Such are some of the effects of forests on the condition of the atmosphere. Their influence on the moisture of the soil and the flow of springs is equally well established. As the forests are destroyed, the springs which flowed from the woods, and consequently the greater watercourses fed by them, diminish both in number and volume. This fact is so familiar throughout the American States and the British Provinces, that there are few old residents of the interior of those districts who are not able to testify to its truth as a matter of personal observation.

The utility of woods in winter is also of vast importance, not only as a screen against the violence of storms, but as a mechanical means of retaining the snow, which is so effectual a protection for the soil against the excessive rigor of the winter temperature. The general effect of the forest in cold climates is to assimilate the winter state of the ground to that of wooded regions under softer skies, and it is a circumstance well worth noting, that in Southern Europe, where nature has denied to the earth a warm winter garment of flocculent snow, she has, by one of those compensations in which her empire is so rich, clothed the hill-sides with umbrella pines, ilexes, cork oaks, and other trees of persistent foliage, whose ever green leaves afford to the soil a protection analogous to that which it derives from snow in more northern climates.

To the general results which follow the destruction of forests there are some exceptions, even in countries of excessive climates. Some of these are due to favorable conditions of surface, of geological structure, and of the distribution of rain; in many others, the evil consequences of man's improvidence have not yet been experienced, only because a sufficient time has not elapsed since the felling of the forest to allow them to develop themselves. But the vengeance of nature for the disturbance of her harmonies, though slow, is sure, and the gradual deterioration of soil and climate in such exceptional regions, is as certain to result from the destruction of the woods as is any natural effect to follow its cause.

The Cultivation of Hops.

PICKING.—Hops usually ripen in Canada much about the same time they do in England, and taking the average of seasons, the beginning of September may be regarded as the commencement of the hop harvest. Both as regards weight and quality, much depends on the gathering of hops at the right time, that is, when they are in the fullest state of perfection. If gathered too soon they are light and weak, and if allowed to stand too long they also lose both in quantity and quality. Where a person has a considerable plantation, eight or ten acres, it would be found advantageous to cultivate an earlier and later variety, so as to secure the whole in the highest average condition. The *Goldings* and *Jones* will usually ripen several days earlier, under the same conditions, than the *Grapes* (white cluster) and *Colgates*.

As the gathering of hops at the time for securing the maximum amount of lupuline, or the bitter principle, is a matter of the highest importance, we may add a few words by way of aiding our readers in coming to a correct conclusion. Hops, when ripe, become changed from a light silvery-green colour to a deep primrose yellow, feel firmer in the hand, the petals adhering more closely together, have a stronger smell, and the seeds become changed from a green to a purple colour. A good practical test of

ripeness is when, by rubbing a hop in the hand, it emits a strong aroma, with an unctuous, clammy feeling and bitter taste; qualities which, though varying considerably in different varieties of hops, are readily appreciable in all, when fully matured. It is with difficulty that hops can be thoroughly dried before they are ripe, and much loss is incurred thereby. Nevertheless, it is important to observe that not a day should be lost in commencing picking at as early a date as possible, particularly when there is much to do, and the number of hands and means of curing are restricted. Hops, when allowed to get over ripe, and subjected to wet and boisterous weather, as is sometimes the case late in the season, lose greatly both in weight and quality, and may even become, for commercial purposes, almost or quite worthless. In our somewhat forcing climate the period for gathering should be included within two weeks, and in no case exceed three.

The work of harvesting involves matters of the utmost importance. However good and expensive may have been the cultivation, and promising the crop, if the gathering and curing be attended by serious defects, what otherwise might prove a handsome profit would be surely turned into a heavy loss. *Clean picking* is the great desideratum: by this term we mean freedom from bunches, and all but the very smallest leaves. The most valuable kinds of hops in England, such as the *Goldings* and *Canterburys*, are gathered singly, and those that are brown or damaged put into separate baskets; the result being an article of the highest practicable quality, commanding a corresponding price. Such refinements, it is true, cannot well be introduced here; but the higher we can raise our standard, both in cultivation, gathering, and curing the crop, the more profitable will hop growing become. We have not unfrequently seen hops in Canada, well grown and of good quality, so roughly picked and badly dried as to render them wholly unfit for exportation, worthless in the British market, and but of little value in our own.

On this side the Atlantic wooden boxes are mostly used for picking hops in, and when made sufficiently large answer the purpose very well. Two compartments, instead, as is usual, four, would, in our opinion, be much better, allowing more room to both the picker and the hops. Two bins having four pickers could manage a square containing 144 hills, the poles of which should be afterwards put into one stack for preservation after being stripped of the bines. In this way the stacks will be placed in straight rows at a uniform distance throughout the garden. Both cattle and sheep will readily eat the hop bine, either in a green or dried state. If labour can be afforded, it is best and more economical to strip the poles as they are picked, and when the bines are sufficiently dried, they can be bound into bundles and stacked, securing the roof against wet; some valuable winter provender will be thereby provided. In fine seasons this can readily be done; but a few showers in the course of haying would spoil the bines for the purpose of cattle food, and in that case they should either be burnt in the field, or, which is better, taken to the cattle yards and trodden down with straw for manure.

The number of pickers must be regulated by the size of the plantation and the facilities for drying. The sooner the crop can be gathered after becoming ripe the better; a sufficient number of hands should be procured to keep the drying process in operation both day and night. As green hops, when gathered, especially if wet, soon become discoloured, and ferment when kept in large quantities only a few hours, it is best to put them lightly into their bags, with large interstices, to prevent heating, and get them spread as soon as possible on the drying kiln. As several hours must generally elapse before this can be done, care should be taken that the bags are not placed on each other, and that they be kept loose and perfectly free from any kind of pressure.

DRYING.—This is a most important process, demanding the greatest attention and care. From the careless and imperfect manner in which this indispensable operation is sometimes performed, the hopes of a season become blasted, and serious losses are incurred. Great improvements have been made of late years in curing hops, especially in England, where the subject in all its bearings has received more attention from scientific and practical men than in any other country. By improved structures more hops can be better dried in the same space, with less fuel, and with almost certain results. We cannot in this country, at present, afford the outlay necessary for such erections as may now be seen on most of the great plantations in England, nor indeed is this necessary, since if we understand and carry into practice the *true principle*, on a humbler scale, similar results may be obtained.

The object of drying hops is to evaporate the water they contain, so as to prevent them when cracked from running into fermentation, and thus impart to them keeping qualities. A hop house should be so constructed as to admit of the vapour, caused by the artificial heat applied, to get off the hops into the outer air as quickly as possible. It is this vapour or "reek," not finding a quick exit, remaining too long in and on the hops, that retards the work of drying, and causes more or less discoloration. Hops should be dried not by coming in contact with heat directly from radiated surfaces, but by currents of heated air passing rapidly through them. The ground floor therefore, where the stoves are placed, should be well supplied with cold air, and the distance between it and the floor above, where the hops are spread, should be not less than fourteen or sixteen feet, thus affording a large space for hot air. The space above the hops to the roof should also be capacious, surmounted by a large moveable cowl, for allowing a ready exit to the vapour or "reek." Hops are dried in a manner similar to the making of malt, and the same kiln is sometimes used for both purposes. A coarse cloth (such as is used in England is made of horse hair) is generally preferred to perforated tiles. Great care should be taken, when wood or bituminous coal is used, that no smoke or other exhalations escape and reach the hops, thereby injuring both their colour and flavor. The precautions chiefly to be observed in drying are,—not to have the hops spread too thickly on the cloth, especially when in a wet state; to begin with a slow fire, gradually increasing, but somewhat diminishing during the latter portion of the process, and allowing as much time as is practicable, say eleven or twelve hours. In this manner hops picked in the fore part of the day are put on the kiln at noon; those of the afternoon at midnight. If sulphur is used, it is best to apply it at first in small quantity, and a little more may after an hour or two be given;—it imparts a bright yellowish colour to the hops, facilitates their drying; but on the whole, perhaps its utility is questionable, and with bright, sound hops, its application is, to say the least, doubtful. If used in large quantities, there is some ground to fear that it may interfere with the fermentation of the brewer's wort, though some of the representations made to that effect are evidently exaggerated. It is important to observe that, as soon as the "reek" is off the hops, they should be turned and thoroughly intermixed before drying them off, which should be done by a slow fire. When they are done enough can readily be determined by experienced observation; but few tough hops are to be found, and the strig, when rubbed by the fingers, has lost its softness. Good care should be observed in this matter. If hops are underdried they will not keep, but become mouldy and useless; if overdried their quality is injuriously affected, as regards flavour and their influence in preserving the quality of beer.

Persons intending to raise a hop plantation, but having no experience in the modes of picking, drying, &c., we would strongly recommend to visit and inspect a few of the best hop-houses within their reach, and spend a season in observing the practice of drying, before they commence operations themselves.

PACKING.—A large room is required for putting hops in after they are dried, to cool, preparatory to packing. The old system of sifting and breaking the hops is now all but universally exploded in all countries; and so is the equally old practice of treading the hops into bags by men. Mechanical science has come to the help of the hop grower with great advantage, and machines of different construction are now generally employed for this purpose. A useful machine, similar to some we have seen in the State of New York, is now made by Jacob Brickem, of Waterloo, C. W.; it has the double lever action, and packs rapidly and uniformly with the assistance of two men.