

pervades it, and to love and worship its Creator. It is for science, as it leads to this contemplation of nature, and to a stronger sense of the beauties which God has spread around us, that I would claim your deeper reverence. Let us cultivate science for its own sake, as well as for the practical advantages which flow from it. Nor let it be feared lest this cultivation of what I may term contemplative science, if prosecuted in a really philosophic spirit, should inspire us with vain and presumptuous thoughts, or disqualify us for the due appreciation of moral evidence on the most sacred and important subjects which can occupy our minds. There is far more vanity and presumption in ignorance than in sound knowledge; and the spirit of true philosophy, be it ever remembered, is a patient, modest, and a humble spirit.

The Narcotics we indulge in.*

II. The Hop which may now be called the *English narcotic*, was brought from the Low Countries, and is not known to have been used in malt liquor in this country till after the year 1524, in the Reign of Henry VIII. In 1850 the quantity of hops grown in England was 21,668 tons, paying a duty of £270,000. This is supposed to be a larger quantity than is grown in all the world besides. Only 98 tons were exported in that year; while, on the other hand, 320 tons were imported, so that the home consumption amounted to 21,886 tons, or 49 millions of pounds; being two thirds more than the weight of the tobacco which we yearly consume. It is the narcotic substance, therefore, of which England not only grows more and consumes more than all the world besides, but of which Englishmen consume more than they do of any other substance of the same class.

And who that has visited the hop grounds of Kent and Surrey in the flowering season, will ever forget the beauty and grace of this charming plant? Climbing the tall poles and circling them with the clasping tendrils, it hides the formality and stiffness of the tree that supports it among the exuberant profusion of its clustering flowers. Waving and drooping in easy motion with every tiny breath that stirs them, and hanging in curved wreaths from pole to pole, the hopvines dance and glitter beneath the bright English vineyard, which neither the Rhine nor the Rhone can equal, and only Italy, where her vines climb the freest, can surpass.

The hop "joyeth in a fat and fruitful ground," as old Gerard hath it (1596). "It prospereth the better by manuring." And few spots surpass, either in natural fertility or in artificial richness, the hop lands of Surrey, which lie along the out-crop of the green sand measures in the neighbourhood of Farnham.—Naturally rich to an extraordinary degree in the mineral food of plants, the soils in this locality have been famed for centuries for the growth of hops; and with a view to this culture alone, at the present day, the best portions sell as high as £50 an acre. And the *highest* Scotch farmer—the most liberal of manure—will find himself outdone by the hop-growers of Kent and Surrey. An average of ten pounds an acre for manure over a hundred acres of hops, make this branch of farming the most liberal, the most remarkable, and the most expensive of any in England.

This mode of managing the hop, and the peculiar value and rarity of hop land, were known very early. They form parts of its history which were probably imported with the plant itself. Tusser, who lived in Henry VIII's time, and in the reign of his three children, in his *Points of Husbandry* thus speaks of the hop:—

"Choose soil for the hop of the rottenest mould,
Well dooned and wrought as a garden-plot should;
Not far from the water (but not overflume,)
This lesson well noted, is meet to be knowne.

The sun in the south, or else southlie and west,
Is joy to the hop as welcommed ghes;
But wind in the north, or elee northerly eas,
To hop is as ill as fray in a feast.

Meet plot for a hop-yard, once found as is told,
Make thereof account, as of jewel of gold;
Now dig it and leave it, the sun for to burne,
And afterwards fense it, to serve for that turne.

The hop for his profit, I thus do exalt;
It strengtheneth drink, and favoureth ale;
And being well brewed, long kep it will last,
And drawing abide, if ye draw not too fast."

The hops of commerce consist of the female flowers and seeds of the *humulus lupulus*, or common hop plant. Their principal consumption is in the manufacture of beer, to which they give a pleasant, bitter, aromatic flavour, and tonic properties. Part of the soporific quality of beer also is ascribed to the hops, and they are supposed by their chemical properties to check the tendency to become sour. The active principles in the hop consist of a volatile oil, and a peculiar bitter principle to which the name of *lupulin* is given.

When the hop flowers are distilled with water, they yield as much as eight per cent of their weight of volatile oil, which has a brownish yellow colour, a strong smell of hops, and a slightly bitter taste. In this "oil of hops" it has hitherto been supposed that a portion of the narcotic influence of the flowers resided, but recent experiments render this opinion doubtful. It is probable that in the case both of tobacco and of the hop, a volatile substance distils over in small quantity along with the oil, which has not hitherto been examined separately, and in which the narcotic virtue resides. This is rendered probable by the fact that the rectified hop oil is not possessed of narcotic properties.

The hop has long been celebrated for its sleep giving qualities. To the weary and wakeful, the hop-pillow has often given refreshing rest, when every other sleep-producer had failed. It is to the escape, in minute quantities, of the volatile narcotic substances we have spoken of, that this soporific effect of the flowers is most probably to be ascribed.

Besides the oil and other volatile matter which distil from them, the hop flowers, and especially the fine powdery grains or dust, which by rubbing, can be separated from them, yield to alcohol a bitter principle (*lupulin*) and a resinous substance, both in considerable proportions. In a common tincture of hops these substances are contained. They are aromatic and tonic, and impart their own qualities to our beer. They are also soothing, tranquilising, and in a slight degree sedative and soporific, in which properties well-hopped beer also resembles them. It is certain that hops possess narcotic virtue which beer derives from them;* but in what part of the female flower, or in what peculiar chemical compound this narcotic property chiefly resides, is still a matter of doubt.

* *Five Hundred Points of Good Husbandry*. London edition of 1812, p. 167.

* *Ale* was the name given to unhopped malt-liquor before the use of hops was introduced. When hops were added, it was called *beer*, by way of distinction, I suppose, because we imported the custom from the Low Countries, where the word beer was, and is still, in common use. Ground ivy (*Glechoma hederacea*.) called also alehoof and tunhoof, was generally employed for preserving ale before the use of hops was known. "Th manifold virtues in hops," says Gerard, in 1596, "do manifestly argue the holtsomeness of beere above ale, for the hops rather make it physcall drink to keep the body in health, than an ordinary drink for the quenching of a thirst."