


## SWEET SEVENTEEN.

 HE is but a child—  
 Seventeen to-day—  
 Has laughed and smiled  
 The years away,  
 Deeming all bright—  
 So sweet life's cup—  
 And now to-night  
 She is "grown-up."

Decked with fair flowers,  
 Their grace her own,  
 She reigns for hours  
 On queenly throne ;


And all the night  
 Is bright and fair,  
 For, swift as light,  
 Love flutters there.

Ah, sweet Seventeen !  
 'Tis ever so :  
 Love comes unseen,  
 But will not go !  
 Yet be Love true—  
 A faithful guest—  
 Then well for you,  
 For life is blest.

G. WEATHERLY.

## HOW COKE IS MADE.

BY J. W. STEEL.

 OKE-MAKING is one of the industries that are comparatively new, so far as an extensive production is concerned. For two centuries coke has been used in iron-works, but in limited quantities. The railway system first stimulated its use, and the growth of the iron trade in the past few decades has caused an enormous consumption of coke, and brought about a production that has been marked by "leaps and bounds" in its increase. Durham is the great centre of the trade, from which it has radiated into other parts that have been, and are in part still, supplied with coke from that greatest of our coal-yielding counties. The production of coke was at first on a most wasteful plan, and even now very valuable products are still generally wasted, though a most interesting attempt has of late been made to utilise those waste products, as we shall see. But the most ancient method of producing coke—by burning coal in open heaps—has been long departed from, and now it is produced in ovens.

In Durham, the "bee-hive" oven is that which is general. The external form of the oven is like the bee-hive, and in the centre of the dome-shaped roof there is a hole, through which the coal is introduced. In this oven, the sides being closed and sealed, the coal is allowed to burn, the time differing according to the kind of coal, but with the best practice two days are sufficient to "coke" the coal. The oven is then unsealed, and the coke withdrawn, and streams of water are played over it to cool it, and to give it that hardness that in some of the blast furnaces of the north is so essential to enable the coke to sustain the weight of the heavy mass of material that is put within the furnace.

There is no secret in the process ; but there is need for the teachings of experience to be followed, so that the coal may have the due proportion of time to be calcined, and that there may be that quality produced which is most fitting for its destined use. The

best coal for coking in Durham having shown signs that the heavy use would exhaust it, attempts were made to use other qualities than that from the famous seams of South Durham. These attempts have been successful, and mainly include the disintegration of coal, the use of it in the small state, and in some cases after "washing" away certain impurities. The coke manufacture of South Durham centres between Bishop Auckland and Durham, and between the former town and Crook, and its traces are speedily to be found. Near or far off the coke-ovens form a most striking sight. When they are full, they send out pencils and streaks of light from every aperture, whilst flames from the crest of the dome light up the weird scene ; and the spectacle of the opening of the oven, and the withdrawal of the coke in "prismatic concretions," like huge columns of burning basalt, the playing on these huge masses on the benches near the ovens, and the glow that diffuses itself in the air and lights up the valley—these form a picture that in every season is well worth seeing and preserving in the mind's eye.

From Durham the whole of the blast furnaces and foundries of Cleveland and Durham are fed with fuel, whilst there is a large quantity sent also to the Furness and West Cumberland and to the Yorkshire and Lincolnshire smelting districts ; but of late the high price of coke has lessened the railway use of this form of fuel.

In its production there have been wasted very large quantities of the products of the combustion. In coal there is a percentage of ammonia, and at many times there have been attempts to extract it during the course of the manufacture of coke, but these attempts have usually been discontinued, either because of the limited quantities of ammonia that could be obtained, or because the ammonia was obtained at the cost of a deterioration in the quality of the coke. But during the past two years two distinct and successful efforts have been made to obtain these valuable bye-products, and to make coke in ovens, or with added apparatus, that

would allow of the collection of the ammonia and of the tar oils, or other forms of what have been waste products. These two systems are those of Jameson, which has mainly been tried on the Tyne and in North Durham, and of Simon-Carves, which has been tried in England, near Crook, only. At Pease's West, Crook, are some of the coke ovens of the firm of Pease and Partners, who produce nearly three-quarters of a million tons of coke yearly by the old bee-hive oven, by the bee-hive oven with flues, and by the Simon-Carves system.

In the autumn of 1882 the firm began to make coke by the new system, having had twenty-five ovens erected, each oven being capable of holding  $4\frac{1}{2}$  tons of coal. The cost of the erection of the ovens was over £5,600, but this includes some machinery that would also serve additional ovens. During over 200 days the results of the working were proved. They made out of the coal put into them 77 per cent. of coke—which is a much larger per-centage than that of ordinary ovens—and six gallons of tar, and 27 gallons of ammoniacal liquor per ton of coal, but there was a greater cost of labour in working these ovens. The coke, too, that was made was less columnar in structure, more in large circular blocks, and though it was very "dense" coke, it lacked the silvery brightness that was supposed to be requisite in the best quality. But in the opinion of the experienced manager it was "all that could be desired" for blast furnace or foundry work, and the firm are extending the production of coke by this plan.

The second system—that of Jameson—is on trial at several places. It uses the old form of oven, and it is claimed that it increases the yield of coke, improves the quality, and yields large quantities of oils and ammoniacal liquors.

These two systems are now fairly proved successful, and continued success would lead to a revolution in the coke manufacture of the kingdom. When it is stated that in one branch of metallurgy alone—the crude iron manufacture—there is consumed 6,000,000 tons of coke annually, the value is apparent of any process that would save the bye-products that have long been wasted. Dr. Angus Smith has said that the present method of making coke in England "has all the appearance of roughness and savagery which extravagance always produces." The old bee-hive ovens are picturesque, but they send forth clouds of smoke and gases that destroy vegetation, and waste products of which science has of late shown the value. The attempts of which we have spoken would turn to profit these waste products, and one of them would substitute a newer and more enduring form of oven, and a more scientific and ready method of manufacture than the old, and would largely alter one of the conditions under which coke-making has been carried on—that of destroying vegetation. Coke has been often as detrimental to vegetable life as chemicals, and not the least of the benefits of the revolution that seems to have begun in the coke trade would be a stoppage of the killing of tree and plant life near the coke ovens.

---

## OUR GARDEN IN MARCH.



**E**NTERING as we are once again upon the great spring-sowing month of the year, and upon almost the first month of it, too, in which it may be said we begin to see flowers reappearing around us in the open flower-beds, it is difficult to make at once a happy selection of some one particular flower to which to give prominent attention, so great is the delightful choice now before us.

Before giving, however, a few general hints for the routine management of the garden in this most busy and all-important month, on which so much depends, we will say a few words about a very popular and very modest spring friend, the polyanthus. Now, this being the very month in which they are beginning to bloom, we may well open our remarks by noticing one of the main causes of the occasional poverty of their flowering, and this is the carelessly allowing more than one truss or bunch of flowers to develop itself. Unhappily, the tendency of the plant is to throw out

side shoots, which take very much from the strength of the principal one, as well as from each other. Great pains must, then, be taken to plant out what are called single hearts when the roots are parted after blowing, and also all little side shoots must be pinched off always, and on their first appearance, just as we pinch off those small shoots that begin now to persist in making their appearance all along the stocks of our roses. This practice throws the strength into the head of whatever flower we are growing. Yet any one must have noticed polyanthuses in the spring, whether in the open borders or under glass, with a few straggling heads of flowers round the principal one, which they have more than half spoiled by their presence.

In the month of March established plants can be planted out, and, indeed, their general cultivation may be said to be almost entirely the same as that of the auricula. By the end of the month your polyanthuses in the open border—and this, by the way, is by far the best plan for growing them—should have the soil well stirred between them, and a dressing of leaf-mould given to them. All dead leaves should be removed; and as slugs are particularly partial to the polyanthus, a complete circle of fresh lime had better be put all round your plant; but bear in mind