

In the foregoing it will be noticed that I have not included the new spray, Soluble Sulphur, or the powder forms of arsenate of lead. I think that Soluble Sulphur will prove satisfactory against San Jose Scale; it gave me good results on this pest last year, but even for this it would be better to test it further before strongly recommending it. As a summer wash I should advise every grower to be very careful in using it with arsenate of lead as a substitute for lime-sulphur and arsenate of lead. There were not many cases of burning last year from its use but I am not at all sure that under different weather conditions it may not cause serious injury. Therefore, my advice would be to use it only in an experimental way. I doubt very much whether it will prove to be nearly so safe as lime-sulphur or bordeaux mixture. It is a soda sulphur compound, not a lime-sulphur. Further study by chemists as to the reactions that take place when arsenate of lead is added to it may help us to supplement the knowledge we shall soon have obtained as to its safety and efficiency. I do not find that this wash

will kill aphids as claimed by many of its advocates.

As for the powdered forms of arsenate of lead, some experiments in the laboratory tend to show that it will be necessary to test these considerably before recommending them as a substitute for the paste form. The claim that they stay up in suspension much better than the paste form did not seem to be justified either when mixed alone in water or with lime-sulphur. Moreover the sticking qualities were seen to be not quite so good as those of the paste forms, though different makes differ in these respects. The particles are not quite so fine as in the paste. The greater convenience, however, in using, shipping and storing justifies their being used on a small scale by fruit growers.

In conclusion, I should mention that for grapes and potatoes bordeaux mixture should always be used instead of lime-sulphur. For potato beetles most men will get better results from paris green than arsenate of lead. Use from one to two pounds to every forty gallons of bordeaux.

## Better Fruits at Less Cost \*

Prof. H. A. Surface, Pennsylvania

The two points involved in this topic are, first, the production of fruits of higher quality, and second, the reduction of the cost of production.

Before proceeding far upon a discussion of quality, we should establish a definite basis by defining this much abused word. Perhaps we should go farther back and explain what quality is not. Therefore, we are prepared to say that quality does not mean huge size. Compare a Jonathan apple with a Wolf River, for example. Neither does this word mean the production of giants within any one variety. Let it be remembered that the scoring rules of the American Pomological Society properly provide for the scoring down of specimens of any variety if they are over size, or above a fair standard.

Quality is not red color. Compare Ben Davis and Grimes. Neither is it fine appearance alone. Compare a western boxed apple of any variety with a roughly-handled eastern grown Northern Spy, Baldwin, McIntosh, Tompkins, King, Grimes, Jonathan, or Stayman Winesap. Neither is quality produced by boxing what should be put into a barrel. Neither is it to be found in naturally low grade or mediocre varieties.

Quality in fruits is an epitome of those desirable features embraced in pleasing flavor; fair, uniform size for a certain variety; good, uniform color for the variety; freedom from injury by insects, or

by fungous diseases, and the absence of artificial injury, such as bruises.

Now comes the very important question: "Will one-tenth of our fruits measure up to this standard?" and the more important reply, that the average of the crop for America does not. Why not? Because there are more persons growing fruit trees who absolutely neglect them, producing nothing but culls and seconds, than there are who attempt to care for them and produce a first-grade product. We have shown in the demonstration orchards of the Bureau of Zoology of the Pennsylvania Department of Agriculture, trees bearing apples ninety-eight per cent. free from worms, which but two years ago produced fruit ninety-five per cent. wormy. The difference is due chiefly to negligence on the one hand, and care on the other.

With all orchardists the greatest problems involve the questions of how to improve quality, and how to reduce cost. To such men we venture to speak from personal experience in our own orchards which are, we believe, the largest in the Keystone State, and which produced, this year, carloads of fancy fruits that sold at record prices.

### ESSENTIALS TO SUCCESS

To produce fruit of better quality, first select "fruit soil." This must be deep, loose, and originally fertile. This produces good growth and large fruits. The "abandoned farm" proposition for successful fruit growing is generally a mis-

take. Starved trees usually produce poor crops of small size fruit.

Select land with elevation for air drainage. Dead or stagnating air is as sure to foster diseases of trees and fruits as of human beings or live stock. Low lands cannot produce fruits of highest color, free from fungous injury. Actual elevation above sea level is not nearly as important as relative elevation, above immediate surroundings.

Plant the orchard in soil with good water drainage. A tree cannot thrive with wet feet any more, than can a man. Wet soil means poor growth, diseased trees, and small, pale, insipid fruit. If your orchard has been planted in wet soil, nothing will pay better in the production of fruit of quality and quantity than to drain it well.

Plant good varieties, and top-work the older trees of poor varieties if they are vigorous enough. In an orchard there will be no figs from thistles, and no Rome Beauty or Stayman Winesap from Smith Cider or Ben Davis.

In any region plant only those varieties that do best there. It would be a mistake to reduce the quality of the ensuing product by planting the Spy in the Albemarle region, or the Rome Beauty in the Snow region, however excellent each of these may be when grown "at home."

Plant only healthy trees from reliable nurserymen, but pay no attention to the "old foggy" notion that hardy trees are to be obtained only from the north or young-bearing trees only from the south.

Plant at such distance between trees as to permit abundant growth without crowding, and also provide for the spreading of low broad tops, without that crowding and shading which must result in light-colored fungus-specked fruits.

Help to obtain color by so pruning as to grow low, open spreading tops. Top back old tall trees to spreading branches. Get sunshine and air to each fruit, if possible, to give color and flavor.

Obtain color by (a) growing in suitable soil, (b) at some elevation, (c) with potash and phosphoric acid fertilizers, (d) reducing the nitrogen so as to avoid too rank growth where greater color is wanted, (e) not cultivating too late in the season, and (f) not pushing too much leafy growth by severe dormant pruning, but (g) remove superfluous small growth by judicious midsummer pruning.

Strive for uniformity of color by adopting a definite, uniform system of pruning that will keep the tops open and spreading; avoid dense masses of foliage or such arrangement of branches as will close and become dense by weight of fruit; adopt a system of uniform feeding.

\*Extract from an address delivered before the Niagara District Fruit Growers' Association