

On discussing the matter with the manufacturer, we were informed that a change had been made in the vulcanization process. Instead of the golden antimony previously used, a mixture of aniline and crimson antimony had been substituted as an accelerator. The evidence, therefore, seems to indicate that the use of aniline as an accelerator was responsible for the development of the blue color and thus our suspicions were confirmed.

SUMMARY.

Under certain conditions rubber caps coming into contact with a solution containing 0.5% phenol may give rise to the development of a blue color. The evidence is very strong that the blue color is due to the chemical interaction of phenol with the organic accelerator, aniline, used in the vulcanization of the caps.

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THE STATUS OF DRUG-PLANT GROWING IN THE UNITED STATES
IN 1921.*

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The commercial production of drug plants under cultivation did not escape the general depression occasioned in almost every phase of agricultural activity by the sharp decline in prices which closely followed the ending of the World War. As was not unexpected the renewal of imported supplies brought about a competition that could not be met by domestic growers, many of whom discontinued entirely the cultivation of certain medicinals with which they had had considerable success during the war years.

With the year 1921 the effects of the artificial stimulus imparted to drug growing by the World War practically disappeared, leaving the general situation much the same as it was in pre-war years. Although this result might be taken as an indication that there is no further opportunity for drug growing in this country, there are on the contrary good reasons for regarding this apparently unfavorable outcome as actual progress toward the establishment of this industry on a sound economic basis. The situation in 1921 fully sustains the judgment of those who maintained a conservative attitude toward drug growing under war conditions and who realized that no permanency could be assured this industry except through its rational adjustment to approximately normal conditions of crop production and consumptive demand.

The experience of the past five years has greatly extended our knowledge in respect to localities in this country suitable for growing certain drug plants and concerning the labor and risks involved in the care and harvesting of drug crops. This experience has largely dispelled the illusions maintained for some years by a group of over-enthusiasts respecting the possibilities of deriving great monetary returns from drug growing and has brought about a general recognition of the fact that the demand for most of these crops is relatively small and that the suc-

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cessful marketing of drug crops is a more difficult and important problem than that of their production. It must be remembered that during what may be called the war period of drug cultivation popular interest was largely centered upon only a few of the drug plants for which there exist suitable locations among the varied conditions of soil and climate afforded by this country. The keenest demand in the emergency was for certain drugs that had been previously obtainable from abroad at prices so low that their cultivation in this country was not profitable, consequently the efforts of growers were largely directed to the production of such drugs as belladonna, henbane and stramonium to the exclusion of others for which the demand was less urgent.

From such data as it has been possible to obtain it appears that in 1921, in addition to the areas devoted to ginseng, hydrastis, cannabis, and insect flowers, were grown in this country two to three acres each of belladonna and digitalis, about ten of sage, and an indefinite number of small plantings of pinkroot, blood root, lovage, horehound, podophyllum, aletris, senega, cypripedium and other drug plants.

A large part of the ginseng produced under cultivation is grown in Wisconsin, Minnesota, Michigan, Iowa and Ohio, but there are extensive plantings of this crop in New York, Pennsylvania, Georgia, Kentucky, Tennessee, Washington and a number of other states. The gardens range in size from a few square rods to fourteen acres or more. There is no definite information respecting the annual production of cultivated ginseng. The exportation of both wild and cultivated root amount to 157,351 pounds in 1921 and it has been estimated that about 60 per cent. of this quantity came from gardens under cultivation. The value of the cultivated crop as calculated from the average export valuation was \$974,097, but the net return to the growers was of course considerably less.

The acreage devoted to the production of hydrastis has been gradually increasing for several years but the slump in the market in 1921 greatly restricted new plantings. Many ginseng growers whose crop had been largely or entirely destroyed by diseases replanted their gardens with hydrastis and many new plantings also were made in various parts of the country where climatic and soil conditions were not so favorable for ginseng. This expansion of acreage and consequent increase in production coupled with the lack of foreign demand resulted in a market situation in 1921 which was very disappointing to the growers. Unfortunately there are no available figures showing the acreage and production of hydrastis. It may be noted, however, that at the end of the year more of this drug was being offered than the market would absorb.

A decline in the cultivation of cannabis was evident in 1921 although small areas were grown in South Carolina, Virginia and Illinois, totaling approximately 25 acres. On account of the low prices obtainable for domestic cannabis several growers have stated their intention to discontinue the growing of this drug.

The production of sage except as a home and market garden crop nearly reached the vanishing point in 1921. Growers have found it practically impossible to produce sage which will fall within the standard limits for total and insoluble ash; consequently their product has been rejected on the market. Some have tried to overcome this difficulty by washing the sage as soon as it was harvested but this adds to the cost of production, interferes seriously with the process of drying,

and endangers the quality of the finished product. With satisfactory offers for their crop in hand some growers have left fields of fine sage unharvested on account of the anticipated difficulty in marketing.

In comparison with the quantity of insect flowers imported from Japan domestic production of these flowers in 1921 was entirely negligible. Small quantities produced experimentally in South Carolina and Wisconsin have been found the equal of Japanese flowers in effectiveness of action on certain insects. Upon analysis, however, the content of insoluble ash of these domestic flowers was found to run considerably above the standard limit of 2 per cent.; consequently dealers refused to purchase them. Should this high content of insoluble ash prove to be a constant characteristic of insect flowers grown in the eastern part of the United States it is unlikely that much interest will develop in their commercial cultivation.

Notwithstanding the unfavorable outlook for commercial drug growing occasioned in 1921 by the disparity between production costs and market returns, stocks of propagating material were maintained by many growers for the purpose of again extending their plantings as soon as conditions become favorable.

No statement regarding drug-plant growing in this country should omit some reference at least to the drug gardens maintained in connection with various schools of pharmacy. In 1921 the growing of drug plants was a feature of the educational work at twenty-six different institutions and at several others plans were being made to establish drug gardens as soon as facilities were available.

Insufficient funds and changes in personnel have restricted the work of some gardens but others have been more fortunate. One of these gardens has won the appreciation and support of the Pharmaceutical Association in the state where it is located and through a section devoted to poisonous plants has developed among the graduate veterinarians in the state a broader interest in the relation of these plants to animal health; at another garden plans are well developed for an important biochemical study of the mints which will involve research in the fields of both genetics and plant chemistry; still another garden has been materially extended through the generosity of a prominent manufacturer of pharmaceuticals who appreciates the increased opportunity which the garden affords for research work on drug plants.

The development of special fields of activity by different gardens is a gratifying sign of progress and clearly indicates the undesirability of a set formula of procedure to be followed by all. The specialization made necessary by the limitations peculiar to each garden will bring about not only an extension of the scope of the work on drug plants but also an increased appreciation of the aim and object of pharmaceutical education.

A REVIEW OF THE LITERATURE IN PHARMACEUTICAL BOTANY
AND PHARMACOGNOSY FOR 1921-1922 (AUGUST 1, 1921-
AUGUST 1, 1922).*

BY HEBER W. YOUNGKEN.

I am deeply gratified by the large number of excellent papers published during the last year in the field of pharmacognosy and pharmaceutical botany. Scien-

* Scientific Section, A. Ph. A., Cleveland meeting, 1922.