

also secure more coöperation from universities, colleges, scientific societies, manufacturers, and all Government departments, than any other organization. Authority to make final decisions and to promulgate them is much needed in cases such as this and the Government certainly has this authority.

I am quite sure that none of the other organizations mentioned would care to shoulder the financial obligations without adequate returns. The American Medical Association has a well equipped laboratory and for a number of years has been doing just the kind of work that should be done in connection with pharmacopoeial revision. The American Pharmaceutical Association is just entering the field. Its available fund for research is insignificant, however, and it remains to be seen what position it will occupy in this domain.

None of the other agencies mentioned could be expected to shoulder the burden. There are then really only two available agencies for the work, namely, the Government and the United States Pharmacopoeial Convention. Might not these two agencies, working together, be utilized to good advantage? I have always held that the purely scientific portions of the Pharmacopoeia: the technical descriptions of the drugs and chemicals, assay methods and the like, should be published in one volume; the information required by pharmacists and physicians in their daily work in another. The former could be made far more useful to the chemist, manufacturer, Government administrator and the like than the present book. The latter, containing such information as doses, solubilities, formulas for pharmaceutical preparations, etc., could also be made more satisfactory to the physician and pharmacist, I am sure. Might not the Committee of Revision prepare the one, and the Government the other? One could be made the physicians' and pharmacists' guide, the other a book of standards for those requiring it. I believe that all scientific questions, involved in preparing the Pharmacopoeia, would be solved by adopting this or a related plan. Then declare in 1920 the present Pharmacopoeia, with any changes that may be suggested by experience up to that time, as the tenth revision; proceed at once to prepare the eleventh revision, spending the entire ten years, if necessary, but have it ready for adoption promptly in 1930. Any serious defects discovered in the meantime could be corrected by authoritative bulletins. By following this plan, in a few decades a book would be evolved that would be so nearly perfect that the periodical discussion of ways and means for Pharmacopoeial Revision would find no place in print.

UNIVERSITY OF ILLINOIS
SCHOOL OF PHARMACY.

BOTANICALS OF THE BLUE RIDGE.*

BY CLARE OLIN EWING AND ERNEST ELWOOD STANFORD.

The Bureau of Chemistry, in its activities in connection with the enforcement of the Food and Drugs Act, exercises supervision over crude drug products in general. While heretofore the greater volume and variety of foreign drug supplies has necessitated a more intensive study of these products, American medicinals have not been neglected. Owing to war conditions, American drug produc-

* A Contribution from the Pharmacognosy Laboratory, Bureau of Chemistry, Department of Agriculture, Washington, D. C.

tion has attained an added importance. For several decades the Southern Appalachian region has been the chief source of American botanical drug supplies. These materials have come chiefly from the Blue Ridge in North Carolina and its continuation into Virginia. Lesser supplies come also from Tennessee, Kentucky, and other states of the region. The increasing relative importance of the American industry rendered advisable a brief survey of the Blue Ridge region and its products. Some of the information acquired during this survey is believed to be of general interest.

North Carolina and Southern Virginia, whence come the larger proportion of botanical drugs, possess an extremely varied flora. Three physiographic zones may briefly be distinguished. The coastal plain of North Carolina, and its prolongation, tide-water Virginia, are low, frequently swampy in character, with sandy soil. The drier portions of the plain possess few plant species; a larger number are found in the swamps and along the streams. From the standpoint of drug production, the zone is of minor interest. It ends at the so-called fall-line, a generally abrupt height of land which in North Carolina runs in a devious line about 150 miles from the coast. Here begins the Piedmont. In topography the Piedmont is a rolling plain; its soil is predominantly of a clayey character, Indian-red in color, poor in humus, and much subject to erosion. Its flora is somewhat more varied than that of the plain; the greatest number of species is found in the alluvial soil of the river bottoms. In the western Piedmont considerable drug collection takes place, the chief centers being Statesville and North Wilkesboro, N. C., which also draw large supplies from the mountain region.

This mountain region, which, after its principal chain, may be called the Blue Ridge region, rises abruptly in western North Carolina and Virginia. It is an area of precipitous hillsides, of sharp and narrow valleys. Close to the eastern foot of the ridge in North Carolina, and somewhat more distant in Virginia, runs the thousand-foot level, which may be said to be the limit of the Piedmont. The average elevation of the mountain region of North Carolina is 2700 feet;¹ Mount Mitchell, the highest point east of the Rockies, reaches 6711 feet, and a number of other peaks pass 6000 feet. The soils of this zone vary somewhat in character. Clay soils and loams predominate. Wheat, corn, rye, and other cereals are important crops, and cattle feeding and cheese-making are considerable industries. The steepness of the hillsides, the comparative lack of railroad facilities, and the general lack of good roads have prevented the Blue Ridge region from attaining any great agricultural importance. Most promising, perhaps, from the farmer's viewpoint, is the extreme northwestern portion of North Carolina. Grass and clover, which take but a precarious hold on the eastern slope and Piedmont; thrive on the more loamy soil of the western slope. The greater portion of the region, however, is covered by dense forests.

In the mountain zone the plant growth exhibits wonderful variety. In the valleys and lower slopes chestnuts, oaks, and hickories predominate. Higher up, white pine, spruce, hemlock, and balsam are found. The higher peaks extend above the timber-line. The shrubs and herbaceous plants of the higher altitudes are characteristic; alpine, but hardly northern, consisting chiefly of *Ericaceous*

¹ Joseph Hyde Pratt, North Carolina Geological and Economic Survey Bulletin 17, 13 (1908).



Gathering "Yarbs"



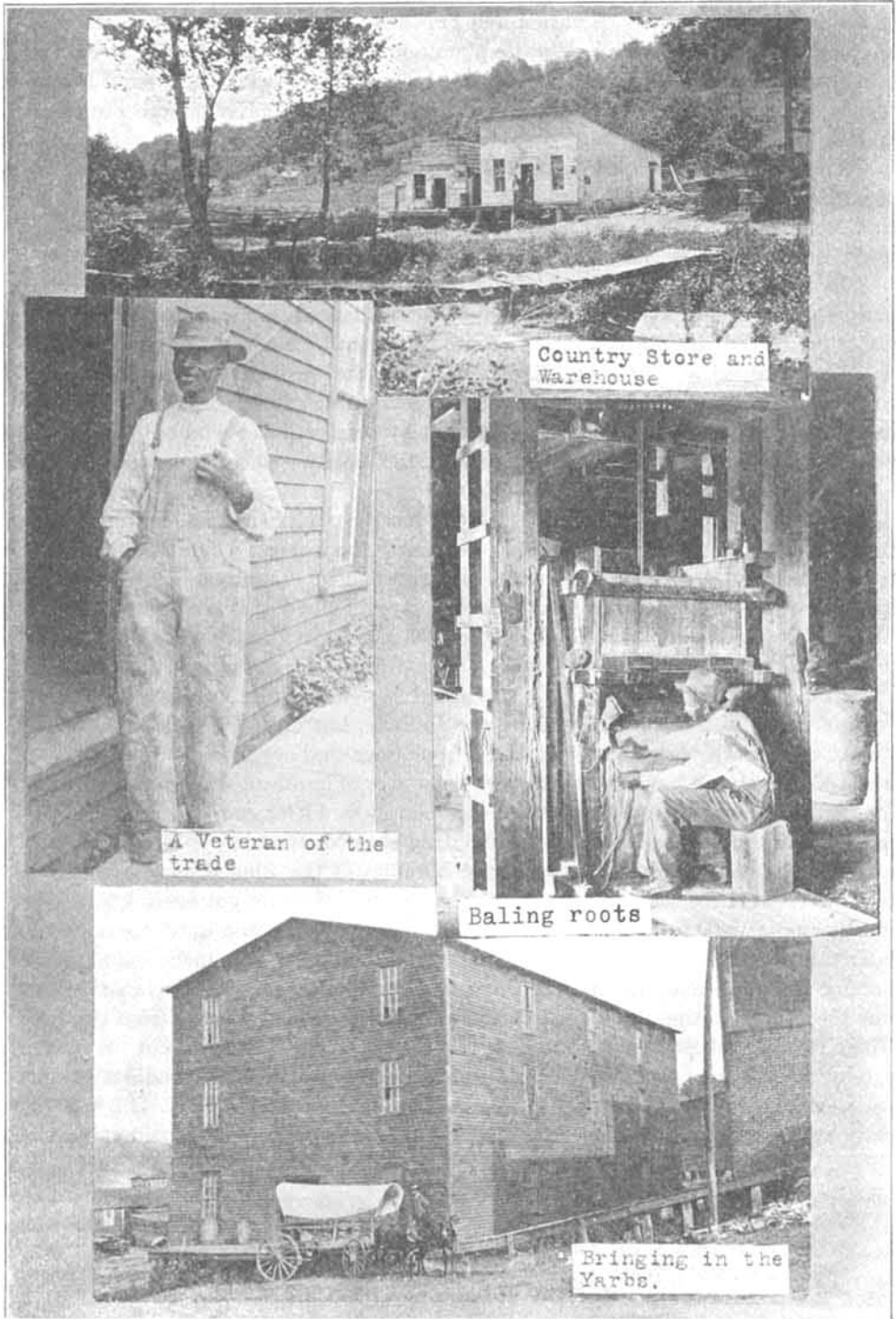
Telling them by the rattle.



Washing roots in a Mountain Stream.



A "Yarb" gatherers home.



Native Botanic Drug Industry of U. S.

species—Rhododendron, Kalmia, Azalea, and their relatives. The undergrowth of the mountainsides is both varied and luxuriant. Here, beneath characteristically northern chestnuts, birches, white pines, and elms, are found shrubs as characteristically southern—the ever-present rhododendron, wahoo, black haw, honey-suckle, trumpet-creeper, hydrangea, and hosts of others. Even more numerous are the herbaceous plants.

This mountain zone, the region of the Blue Ridge, is America's chief source of native botanic drugs. It furnishes, perhaps, 75 percent of such supplies. The chief commercial centers of the drug production of this region, besides those already mentioned, are Asheville, North Carolina, and Marion, Virginia.

In the luxuriant flora of the Blue Ridge are found perhaps six hundred or more species which, at some time, have had medicinal application. Some—the majority, indeed, are obsolete, cast off and forgotten by the wayside of experience or of medical science. Others, lightly held by the medical profession, survive, commercially at least. A few—a very few—rank high in the materia medica of to-day. It may be that science, stimulated by war, will yet winnow trophies of value from the discards of yesterday, perhaps too hastily cast aside on scanty trial.

The early history of the crude drug industry of this region is rather obscure. A considerable number of the drugs bear, locally, Indian names, and tradition states that the settlers learned their use from the red men. Undoubtedly this is true in part, but a survey of the early literature indicates that the Indian medical lore was rather more scanty than is popularly supposed. Peter Smith, "of the Miami Country," whose *Indian Doctor's Dispensatory*² treats of a number of botanics of this region and of the plains northward, remarks:

"I call myself an *Indian Doctor*, because I have incidentally obtained a knowledge of many of the simples used by the Indians; but chiefly because I have obtained my knowledge generally in the like manner that the Indians do."

Quite likely we have to thank other pale faces of inquiring or commercial mind for many of our "Indian simples," as we certainly do for most of the "Indian" panaceas and cure-alls which adorn our drug-store shelves.

While a considerable number of the botanics of the Blue Ridge were known to Cutler,³ Schoepf,⁴ and Barton,⁵ these early investigators got their knowledge for the most part from plants grown elsewhere. It was not until considerably later that the products of this thinly settled and comparatively inaccessible region became of commercial importance. Previous to the Civil War, Cincinnati, Ohio, was the principal American drug market, and such supplies as came from the Blue Ridge region probably traveled thence from the western slope. About fifty years ago, according to statements of various dealers, the drug-shipping industry began to be of commercial importance in North Carolina. Statesville, N. C., was the early center of this industry. In later years, buying firms of considerable size

² Peter Smith, "The Indian Doctor's Dispensatory," Cincinnati, Reprint, Bul. Lloyd Library 2, 1901 (1813).

³ Manasseh Cutler, "An Account of Some of the Vegetable Productions Naturally Growing in This Part of America, Philadelphia, 1785," Reprint Bul. Lloyd Library No. 7, 1903.

⁴ J. D. Schoepf, "Materia Medica Americana potissimum regnii vegetabilis, Erlanger, 1787," Reprint, Bul. Lloyd Library No. 6, 1903.

⁵ B. S. Barton, "Collections for an Essay toward a Materia Medica of the United States, Philadelphia, 1798-1804," Reprint, Bul. Lloyd Library No. 1, 1900.

have developed also at Asheville and North Wilkesboro, N. C., and Marion, Va. Lesser centers are found at West Jefferson, N. C., Elizabethtown, Tenn., Bristol, Tenn., Pikeville, Ky., and other places, but in general they are tributary to the larger centers mentioned.

Crude drugs are collected in small amounts by a large proportion of the people of the mountains. Few, or none, gather drugs as a chief occupation. The mountaineers, in general, make their principal living on tiny hillside clearings. Because of the rugged character of the land, which unfits it for machine farming, large plantations are rarely found. Marketing of farm crops in large amounts is also difficult, owing to the steep grades and poor repair of the mountain roads, which in many places are little more than bridle paths. Work away from the farms is normally scarce and wages extremely low. Drug collection is carried on largely when no other work offers, chiefly by the women and children, and is a rather haphazard process. The men, in general, consider such occupations beneath them, and collect, ostensibly, only heavy and bulky products, such as barks of the larger trees, and bring in the other products with an apologetic "Here's some yarbs the women got." The principal collecting seasons are spring, when most barks and some roots are gathered, and late summer, when the crops no longer need cultivating, and herbs, leaves, and flowers abound, and roots may be distinguished by the herbage. Some products, of course, are necessarily collected at other times, but convenience rather than the Pharmacopoeia governs the season.

The collectors usually barter their wares in small quantities for necessities from the local store. The country storekeeper, in his turn, generally has a contract arrangement with the wholesale dealer in crude drugs, and turns over his receipts in exchange for stocks of dry-goods or groceries. Some wholesalers, however, buy for cash. Those dealers who conduct both a cash and exchange business give slightly higher rates in goods.

After inspection of the drugs, the wholesalers condition such as they deem advisable, by garbling, drying, or otherwise. For storage they are usually placed in gunny sacks, but may also be baled. Baling presses are usually run by hand, but mechanical presses of a simple type are used in some establishments. As a rule, the drugs are shipped in bales, varying greatly in weight according to the commodity.

While a call for *Sanguinaria*, *Veratrum*, or *Podophyllum* would mean little to the mountaineer or his wife, they collect bloodroot, hellebore, mayapple, etc., with considerable precision. Occasional instances of substitution, usually, it appears, unintentional, take place. *Cimicifuga*,—black cohosh or black snake-root—is frequently admixed with red cohosh (*Actaea rubra*), whose foliage and roots are very similar to those of the official drug. The same is true of American angelica (*Angelica atropurpurea*) and spikenard (*Aralia racemosa*). Star grass root (*Aletris farinosa*) and false unicorn root (*Chamaelirium luteum*) are still occasionally confused. Beth root (*Trillium erectum*) is also mixed with Helonia, although there is no similarity in the above-ground parts. Prickly-ash bark (*Xanthoxylum carolinianum*) may be mixed with that of prickly elder (*Aralia spinosa*). The mints, spearmint (*Mentha spicata*) and peppermint (*Mentha piperita*) are also frequently confused. Hoarhound (*Marrubium vulgare*) and catnip (*Nepeta cataria*) are sometimes confused. The rootbark of dogwood

(*Cornus florida*) is said to be mixed with that of black haw (*Viburnum prunifolium*). Gross adulteration or substitution is said to be rare, though a good sized rock or other material of more weight than value occasionally turns up. Such things, however, are easily traced to their origin, which tends to discourage the practice.

Not many grades are made of these products. Herbs, including stems, usually bring considerably less than the leaves alone. This is in line with official specifications of most standardized drugs, which usually discriminate against stems. Many roots are quoted "with fibers" and "without fibers," the fibers being the smaller rootlets. The fibers are said to be difficult to grind, and roots without them usually bring a higher price, though the difference is, one would think, hardly sufficient to pay for the tedious task of getting them off. Small roots and root-hairs, moreover, would probably have a tendency to raise the ash content. Color of root alone is not necessarily indicative of quality, as it is influenced greatly by the type of soil in which the plant has grown. Particularly noticeable, oftentimes, is the red color due to the tenacious, finely divided clay to which reference has previously been made. Barks of roots usually cost more than barks of trees or shrubs; this, also, is usually due to official specifications or to supposedly superior therapeutic value as well as to the greater expense of digging. Barks of the larger sorts are usually rossed, *i. e.*, deprived of their outer rough layers with a draw-knife before peeling. They are graded in some instances according to age of tree. Wild cherry, which is in particular demand at present, runs through five grades, which, at the time of our survey, were quoted and priced as follows: Young, thin, free from wood and green skin, 7 c.; medium, 6 c.; young, thin, unrossed, 5 c.; thick rossed, 5 c.; thick unrossed, 3 c.

On the whole, curing is said to be rather carefully carried out. Leaves and herbs are usually dried as rapidly as possible, preferably in the shade. Strong sunlight tends to destroy the chlorophyll, and buyers prefer bright green products. Different flowers require different treatment; elder flowers are dried in a day in the sun, while red clover requires shade, and a curing period of a month or more. This is usually completed in the wholesale warehouse, as heating may follow premature baling. Berries—poke, horse-nettle and the like—cure with difficulty, and may heat or ferment in the warehouse. Roots are usually split to facilitate drying. Ginseng is an exception. Split ginseng does not appeal to the psychology of the Chinaman, who takes the entire output. Roots, perhaps, are more subject to improper curing than any other product of the region. Many, especially of the fleshy roots, are quite hygroscopic, and fall an easy prey to molds. Others, as bamboo briar and skunk cabbage roots, are quite liable to insect attack in storage. Podophyllum, on the contrary, has the reputation of never becoming wormy. Barks receive no specially careful curing. Some of these, too, are very liable to insect attack; white pine bark is not usually kept over a year on this account.

Many dealers issue instructions for drug collection and drying on their regular buying lists. Most firms claim to refuse improperly prepared or low grade material, or to cut its buying price severely. Some deduct 10 percent from the price for undried or improperly dried commodities.

These buying lists are issued at short intervals by the wholesale buyers, and usually quote prices on 100 to 200 different articles. Of these, perhaps, fifty may be considered as staples, and include three-fourths or more of the annual trade.

Among these may be mentioned the barks of wild cherry, white pine, wahoo, cotton-root, sassafras root, and several viburnum species, the roots of angelica, black cohosh, bloodroot, burdock, calamus, goldenseal, hellebore, senega, poke, may-apple, lady's slipper, spikenard, American sarsaparilla, aletris, helonias, and yellow dock; the leaves of herbs of boneset, catnip, hoarhound, stramonium, lobelia, liverwort, pennyroyal, peppermint, spearmint, and squaw vine; flowers of red clover and elder; buds of balm of gilead or balsam-poplar; seeds of lobelia and chenopodium; cornsilk.

Among products more or less commonly listed, which have at least occasional sale for medicinal purposes, but which receive scanty consideration or no mention at all from the regular dispensaries and modern therapeutic authorities, mention may be made of arbor vitae leaves (*Chamaecyparis thyoides*), burdock leaves and seed (*Arctium lappa*), comfrey root (*Symphytum officinale*), elder berries (*Sambucus canadensis*), hive vine or squaw vine (*Mitchella repens*), ground ivy vine (*Nepeta hederacea*), Indian turnip or jack-in-the-pulpit root (*Arisaema triphyllum*), milkweed or silkweed root (*Asclepias syriaca*), poison oak leaves (*Rhus toxicodendron*), Queen of the Meadow root, and leaves (*Eupatorium purpureum*), tag-alder bark (*Alnus incana*), Turkey corn (*Dicentra canadensis*), white clover flowers (*Trifolium repens*), wild potato root (*Ipomoea pandurata*), yellow root (*Xanthorrhiza apiifolia*), wild and garden lettuce leaves (*Lactuca* spp.), strawberry leaves (*Fragaria* spp.), balmony leaves (*Chelone glabra*), cleavers herb (*Galium* spp.), gravel plant (*Epigaea repens*), dogwood flowers and leaves (*Cornus florida*), dittany bark (*Cunila origanoides*), green osier bark (*Cornus circinata*), ox-eye daisy flowers (*Chrysanthemum leucanthemum*), raspberry leaves (*Rubus idaeus*), skunk cabbage root (*Symplocarpus foetidus*), bamboo briar root (*Smilax* spp.), mould bean leaves (*Rhynchospora communis*), and others far beyond space to mention. These products, as well as large quantities of the better-known products of the region, presumably are used chiefly in the manufacture of patent medicines.

Prices, of course, vary widely. They run, usually, from 30 to 60 percent of the New York wholesale price. Wild ginseng may reach \$11.00 and the cultivated root \$4.00, but this commodity is very unstable. Goldenseal is priced at from \$4.25 to \$4.50. Other roots bring from 2 c. to 65 c., being as a class the highest priced commodity, with the exception of flowers, of which, however, very few species are quoted. Herbs and leaves do not usually exceed twelve cents, and are the lowest priced of any class. Barks run from 3 c. in low, unrossed grades, to 25 c. for some root barks. A general average of several lists, excluding ginseng and goldenseal, gave a mean of about 8 c. per pound. While it is difficult to say what an average day's work would yield a drug collector, it may readily be seen that poor roads are not the only reason why the mountaineer markets his product by mule-wagon or ox-cart rather than by automobile. Probably a dollar or two per day would approximate the average receipts, although much more, with good luck, may be cleared on certain products. Products in large demand, of course, bear prices calculated to stimulate collection, and in addition are generally noted in large type. In case of continued shortage, dealers seek supplies from their own number more frequently than they order specially from collectors. Exceptions to this rule sometimes occur, especially in the case of fresh, un cured drugs, which are not quoted in regular lists. Relatively small quantities

of these are bought; they are shipped by express or else packed in an alcoholic menstruum in specially constructed barrels, and sent by freight. Commonly collected fresh drugs are passion-flower, horse-nettle, yarrow herbs, and elder flowers. Fresh corn silk (N. F. IV) is generally a by-product of canning factories, and is not obtained in the Blue Ridge. Considerable quantities of dry corn silk, however, originate there. Pollen, too, is occasionally collected on order, and brings a price commensurate with the difficulties of its collection. Pollens most in demand are those of ragweed and goldenrod, for use in the preparation of hay-fever serums.

The firms of the Blue Ridge region, with one exception, grind no drugs.

Incoming stocks are, in some cases, inspected by the dealer in person. A number of firms employ comparatively young men as inspectors; in other cases, veterans grown old in the trade pass on the drugs. These inspectors, apparently without exception, are without scholastic training in science and in some cases are quite illiterate. Scientific names of drugs are almost unknown. Microscopic and chemical tests are not resorted to. Even a hand-lens is rarely or never used. Appearance, odor, taste and "feel" are the chief criteria. With long experience, these inspectors attain a remarkable proficiency. Some even claim sound as definitive. One veteran, in search of certain material, went through a pile of unmarked bags, announcing the contents of each after a thrust or shake. Interrogation brought forth the modest response "I reckon I tell 'em by the rattle."

Colored help is frequently employed in the warehouses, but the inspectors are almost invariably white. One colored veteran, however, boasted an experience of forty-two years; while unable to read or write, he has a wide reputation as a "doctor" among his own race, and even claims to "send medicines North." The knowledge of these inspectors as to the various properties of the products they handle, and of other locally used "medicinals," is an interesting blend of hearsay, superstition, tradition, and folk-lore, some of which, indeed, is hardly peculiar to this region alone. Beech-drops (*Epiphegus virginiana*) "drop from the beech limbs and take root." "Mould" bean is so called in the erratic local orthography because it "keeps moles out of the gardens." As castor bean, this plant has attained rather a wider celebrity. Spice wood leaves, dittany tea, and a tea made from the excrement of sheep, are sovereign remedies to "bust out measles." Buck-eyes are carried in the pocket as a cure for piles. Black willow buds and bark are "a great friend to man" for their anaphrodisiac qualities. Pennyroyal leaves and cotton-root bark are said to be in common use as domestic ecbolics, although observations in the region would lead one to doubt their universal efficacy.

In character the wholesale warehouses are quite variable. Few appear to have been especially constructed for the purpose. Wooden buildings predominate, and are claimed to facilitate drying. Brick warehouses are occasionally seen. Special devices for ventilation are not often seen, and, in case of the older wooden buildings, are hardly required. No special precautions to render the warehouses rat-proof appear to be taken, and occasional evidence of the depredations of rodents were seen. Cats are sometimes kept, but appear to prefer to sleep on the bales of catnip rather than pursue the elusive rat. Worms may be guarded against by keeping only small, rapidly moving warehouse stocks of specially susceptible items. Fumigation, apparently, is never resorted to. In general, the

stocks of drugs appeared to be in good condition, moldiness being seen only in a few instances. Stocks of the principal staples move quite rapidly, but small quantities of the less-known medicinals are apt to be more than in one sense, drugs on the market. The presence of worms appears to be the main criterion of deterioration.

Stocks sometimes are sold by sample. More frequently, however, material is sold on the dealers' guarantee, but the larger manufacturing firms employ experts whose province it is to pass on identity and quality of crude drug purchases. Manufacturers' buyers also occasionally visit the warehouses, and rather rarely the dealer makes a selling trip to the chief manufacturing centers.

The drug trade of the Blue Ridge has, of course, been profoundly affected by war conditions. In the earlier years of the war only a few items were affected, as competition with foreign products was indirect rather than direct. About 1917, however, buying prices, which had been quite staple for a number of years, were generally increased. Collections increased likewise; the output in 1917, in most localities, is said to have been unprecedented. This year prices have again been increased but results have been widely different. The young men have been drafted. The remaining men, who formerly found it difficult to obtain work away from home, and when work did offer could collect a daily wage of but a dollar or two, now find ready employment in the cities, sometimes nearer home, at three to five dollars a day. This is particularly true around Asheville, near which city several training camps and army hospitals are located. The younger women, in many instances, find positions in the stores and factories of the larger towns and cities. Wheat, corn, beef, and other agricultural products have risen in price, and women and children who formerly collected drug products have taken the place of the men in the fields. In spite of the increased prices of botanicals, dealers generally estimate that collections have fallen off from 25 to 50 percent, with few exceptions. Red clover blooms, formerly supplied by Germany, have quadrupled in price, and are largely collected. One dealer stated that they were "picked by an apparatus with fingers." Probably this referred to something of the berry-stripper type. No other reports of anything of this nature were heard; pickers were frequently observed collecting the flowers by hand. White pine and wild cherry barks and balm of gilead buds are largely collected, owing, no doubt, to their extensive use in preparations for pulmonary and bronchial complaints. Cotton-root bark is in large demand, owing, quite likely, to the shortage of ergot. American sarsaparilla (*Aralia nudicaulis*) is in considerable request as a substitute for the imported *Smilax* species. The trade in corn silk (dried), and elder flowers, has increased since the virtual cessation of foreign supplies. American angelica is in great demand for chewing tobacco manufacture. Deertongue leaves, used in smoking tobacco as a source of coumarin, are not being largely collected at present, in spite of the shortage of tonka beans. One prominent tobacco manufacturer stated that they are unsatisfactory on account of their comparatively large bulk and low coumarin content.

Dealers of the Blue Ridge region carry on but a relatively small export trade, and have, apparently, not been seriously inconvenienced by export regulations save in case of ginseng and in some exports to Canada. Domestic shipping difficulties have contributed, however, to the uncertainty of the situation. On ac-

count of labor supply, and shipping troubles, dealers at present are somewhat reluctant to accept large contracts, or orders for future delivery.

The future of the Blue Ridge drug industry is therefore somewhat uncertain. It is quite true that many of the products of this region could well be spared, but others would be sadly missed. Apparently no marked increase in output is to be looked for, at anything like present prices. The recent widespread interest in drug cultivation will hardly affect most of these products. The very few which are produced by cultivation, like red clover flowers and corn silk, are only incidental by-products of commercially more important crops. Natural supplies of the majority of important items are, no doubt, sufficient for many years to come. It is not unreasonable to suppose that increasing prices will result in sufficient collections of indispensables, while many of the useless species which have heretofore competed with them for the herb-gatherer's attention will, it is to be hoped, fall by the wayside.

COUCH GRASS *versus* BERMUDA GRASS.*

BY E. N. GATHERCOAL.

The drug couch grass, *Triticum* U. S. P., has been recently reported as adulterated or substituted with the dry rhizome of Bermuda grass.¹ *Triticum* is defined in the U. S. Pharmacopoeia as the dried rhizome and roots of *Agropyron repens* (Fam. Gramineae) gathered in the spring. Other English synonyms for *Triticum* are quack grass, dog grass, twitch grass, quickens, quitch, etc. Bermuda grass is the dried rhizome and roots of *Capriola dactylon*. It is also called Scotch grass, dog-tooth grass, wire grass, cane grass, Bahama grass, etc.

Bermuda grass is native to the Mediterranean basin and couch grass is common a little further north and throughout Europe. Both grasses are also found in North America, South America and Asia, the couch grass extending the further north and the Bermuda grass more into the tropics.

In the days of Dioscorides, 2000 years ago, perhaps the discussion as to the relative medicinal value of these two grass roots was a live issue. At least we know from the writings of this great teacher that the underground part of one or more grasses was used in his time as a diuretic and for vesical calculus.

The early writers on medicine generally include mention of grass root under the Greek name *Agrostis* and the Latin name *Gramen*.

Galen² speaks of the grass-root native to Parnassus as of greater power than that growing elsewhere and ascribes to it not only refrigerent and demulcent properties but also diuretic and lithontriptic powers. He refers also to the more slender form of the Parnassus kind of grass root and of its sweet yet very slightly sharp and bitter taste. Perhaps Galen and his disciples recognized a distinction between the grass roots we now name couch grass and Bermuda grass.

The German, French and English herbals of the 15th to 17th centuries usually

* Read before Scientific Section, A. Ph. A., Chicago meeting, 1918.

¹ U. S. Department of Agriculture.

² Galen, *De simplicium medicamentorum facultatibus*, lib. VI. *Agrostis—sed interdum tamen lapides frangere assolet, siquis eam decoctam ebibat. At semen alterius quidem imbecillum estieius vero quae in Parnaso nascitur, urinam ciet—tenuium partium et subacerba.*