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THE BARBERRY IN IOWA AND ADJACENT STATES

L. H. PAMMEL

Of the 160 species of barberry generally recognized only the following have been commonly cultivated in Iowa; the common or European barberry (*Berberis vulgaris*), the Japanese barberry (*B. Thunbergii*), the *B. canadensis*, *B. amurensis*, *B. Sinensis*, *B. ilicifolia*, *B. Fischeri* and *B. macrocarpa*. The *B. Fischeri* and *B. macrocarpa* are regarded as synonyms of *B. canadensis*. The common European barberry, though commonly credited to western Europe, is Asiatic according to J. Lind's "The Barberry Bush and its Law," being a translation from *Berberisbusken* og *Berberisloven*. Through the kindness of Dr. Humphrey and Dr. Melhus I was furnished with the paper by J. Lind in which he makes the following statements: "The original home of the barberry bush is the middle and western Asiatic mountains, where it still grows wild in the Himalayas; its brightly colored berries attracted the attention of man and it is spoken of as a medicinal plant by the early Babylonian and Hindu writers. On the signs which composed King Sardanapal's library in Nineveh, B. C. 650, the berries are spoken of as a detersive agent. Later the plant has had the same destiny as so many other Asiatic medicinal plants; that of being carried from one country to another by man and cultivated as a useful plant until it has been replaced by other mediums. Many of the noxious herbs we have in our land, have, in earlier times been introduced as useful plants, sometimes as a kitchen garden plant, sometimes cultivated in the medicinal gardens of the monasteries and finally lost track of. The barberry bush is not mentioned by the Greek or Roman doctors who are noted for their knowledge of the medicinal quality of herbs from the time of Hippocrates, who lived in southwestern Asia from 459 to 377 B. C., to the time of Galen, who was the life doctor for the Roman Emperor Marcus Aurelius, 200 A. D. There is therefore cause to believe that the bush was not found north of the Mediterranean at that time. It came into use in the seventh century when the Arabians had spread their power over the neighboring states and established a kingdom whose well-organized conditions and blossoming culture was unequalled at that time. Medical art was considered very important among the Arabians, and we owe many of the physi-

cal remedies which we used during the middle ages and until the present day to the Arabians, besides the origin of the pharmacies. One of the Arabian doctors who used the berries from the barberry bush as medicine was Rhazes. He was born in Persia 850 and died 923. He was the life doctor for the Kaliff in Bagdad. Nikolaos Myrepaus, doctor in Alexandria from 1270 to 1290 was another. Their books were translated into Latin and became well known in Europe during the middle ages. Constantinus Africanus was the first man to bring the knowledge of the barberry plant to Europe. He was born in Carthage during the eleventh century and traveled for many years through Babylon, India, Egypt, and northern Africa for the purpose of studying the medical art of the Arabians. He was finally made manager of the medical school in Salerno. Because of his ability this was the most noted institution in Europe for doctors, during several centuries. Constantinus Africanus died in 1087. His books were translated into many languages. The first Danish botany was written by King Erik Plovpenning's doctor, Henrik Harpestraeng, who died 1244. This is a translation from Constantinus Africanus' works.

"Because Henrik Harpestraeng speaks of the barberry bush, several people considered it a proof that the plant existed in the north before the book was published. This is surely a false conclusion. But there is reason to believe that the knowledge of the bush and the recommendation it received in the books has led man to obtain samples of it and cultivate it just as the other plants that were used at that time, since each physician's or each monk's medical power lay in the herbs he cultivated in his garden. The transplanting of the bushes into the gardens surely took place a long time after the publication of the books concerning it, but there is reason to believe that the transplanting followed the same course as the knowledge of it; namely, from southern Asia across Egypt and Barbary to southern Europe; from there northward along two lines, one from Italy by those who visited the school of Salerno, the other by the Arabs to Spain and France.

"It is worth noticing that Constantinus Africanus used the name barberry which truly did not distinguish the bush but its berries, just as we use the names gooseberries, currants and strawberries for the eatable berries, and so name the bushes accordingly; as gooseberry bushes, etc. This name is found unchanged in many languages; for example, in Italian, berbero; in English barberry; in German, berbersbeere, berberitzen, etc.; in Danish, Norse, Sweden and Latin, berberis, in Polish, herywory; only in France has it a different name

"Epine-vinete." Later it was called sour-thorn, but this name has never been as common as barberry. This great similarity of names in the various languages proves that the plant was introduced proportionately. Wettstein writes concerning the origin of the name that it is derived from "the Arabian barberrys which signify the berries of this bush; or from Barberry in Africa where the Arabians first found the plant, and brought it to Spain." Professor Buhl, whose advice I have asked on this occasion, has willingly informed me that he believes it is quite possible that the name is derived from the Barbary States.

"This presentation of the introduction of the barberry bush, is confirmed by the fact, that remains of the barberry have never been found in antediluvian or other layers of earth, and it is not mentioned in the earliest books on herbs. According to botany, it has a characteristic common to most of the prominent medicinal plants, that is, that it is very difficult for the barberries to disperse by themselves, and they grow very firmly where they once take root. E. Henning has collected some information about the dispersement of the barberry bush. He says the berries are destroyed by only a very few birds and thus just when they can find no better food. Because of its original nature as a mountain plant, it is known to take root firmly in mountainous places. For this reason it is more common in Norway and Sweden than in Denmark. It is also allowed to grow undisturbed in the mountains. This encourages its growth there. Of the many minerals found in the mountains, this plant prefers limestone. For this reason it is found in great numbers on Moen's Hill.

"During the seventeenth century it was introduced into America from Europe, the result being that laws prohibiting its growth were passed in Connecticut, 1726, and in Massachusetts, 1755."

The genus is widely distributed. Of the 160 species, a dozen are credited to the United States; thirty-three to Chili, forty-two more to other parts of South America, of which Peru has twelve. Mexico has fourteen, China and Japan thirteen, and the Himalayan region of Europe and Siberia nine. The genus is therefore most largely represented in America from Chili to the southern Rockies, including Texas.

During the seventies the discussion on hedge plants in the agricultural and horticultural press as well as in the reports of the State Horticultural and Agricultural Societies is quite voluminous. The plants most frequently mentioned are the osage orange, white willow, honey locust and buckthorn. The barberry, buffalo berry and

Caragana (Professor Budd) were less frequently mentioned. It is, however, interesting to note the opinion of some nurserymen who were adverse to the use of the barb wire. For instance in the report of 1880 Mr. Dickey¹ said: "The repairing costs much more than the time required to cultivate and trim the hedge."

Professor J. L. Budd distributed several Asiatic species rather widely, among them the *B. amurensis* and *B. Thunbergii* but he was probably not the original introducer of the Japanese barberry in Iowa, as the letter from Mr. M. J. Wragg indicates that his father purchased his stock from the Arnold Arboretum in 1868. The *B. amurensis* and *B. Thunbergii* were on the college grounds at Ames when the author came here in 1889. The plants were then about ten years old, making the date of planting about 1879. In the report of the State Horticultural Society for 1881, there is this note by Professor Budd.²

"We have introduced from China two distinct species of barberry said to have nearly sweet fruit of which raisins are made in that country. We have not seen the fruit, but can say the plants are interesting on account of their freedom of fungus, while our common species this season are badly afflicted. The new species are richly worth trial." This note establishes the fact that one of the barberries introduced by Professor Budd was the *B. Thunbergii*, the other probably *B. amurensis*, and also that *B. vulgaris* was growing on the grounds. The bush of the common barberry referred to was still there in 1889, in front of what is now Morrill Hall.

As to the early planting of the common barberry in Iowa there is much uncertainty. It appears that there are three phases to its introduction: (1) the pioneer planting because of the old New England associations, (2) the "living fence" as hedge planting to turn stock, (3) the ornamental planting. The first period falls before 1868 and few plants were planted in this way. The second period falls between 1868 and 1878, the last being the year in which barb wire became quite general in use. Mr. M. W. Robinson mentions the use of the wire fence in 1871.³ The author states in this article that it may become the fence of the prairie. The zeal in planting and taking care of hedges was flagging in 1878, according to G. H. Little.⁴

¹Rep. Ia. State Hort. Soc. 1880; 582.

²Rep. Ia. State Hort. Soc. 1881; 378.

³Fencing in Iowa, Rep. Iowa State Agrl. Soc. 1871; 268.

⁴Ben. Ed. State Agr. Soc. 1878; 745.

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The third period overlaps the second because men like Professor Budd spoke of its culinary use and its value from an ornamental standpoint.

Most of the older bushes in the state go back to the time when farmers began to plant it to turn stock, during the day of hedge planting, which occurred in Iowa during the late sixties and seventies. A statement by Thomas J. Brooks of Indiana, used in the Iowa Homestead and Western Farm Journal, is of interest in this connection. He said⁵ "Seven years ago two barberry bushes were sent to me at my request, as I wanted my children to see them and taste the fruit. Three years ago I became interested in the plant as a hedge plant. These plants are now from six to seven feet high and each plant has sent up from its stool some thirty stalks." Mark Miller, who was then the editor of the Iowa Homestead and a horticulturist, said "We are interested in this new hedge plant and hope to make other experiments." Professor J. L. Budd mentions the use of the barberry as a hedge plant in his report on hedges.⁶ A year later, before the Southeastern Horticultural Society several hedge plants are mentioned,⁷ but not the barberry. Mr. D. W. Adams,⁸ in the report as secretary of the Iowa State Horticultural Society in 1870, mentions the use of the barberry as a living fence. He says the results are not satisfactory. Hon. J. R. Dodge in 1868⁹ recommended the purple leaved barberry to introduce variety. In the report on hedges Prof. J. L. Budd,¹⁰ chairman of the hedge committee, makes a lengthy report on the use of the Osage orange, buckthorn, honey locust, scarlet or white thorn, Norway spruce, arbor vitæ and barberry. On the barberry he makes the following comment: "The English barberry, now found wild in New England is the plant used for hedging. The American barberry (*Berberis canadensis*) is not strong enough in species or habit of growth. For a yard fence near the house in country and town, the barberry makes a very beautiful and useful hedge, though not strong enough for an outside fence until, at least, twelve years old, without wires drawn through it. After six years growth, with two wires, it can be relied upon. When loaded in the fall with a crop of its oblong scarlet berries, it is truly the ornamental of deciduous hedges. The fruit is also useful for culinary purposes. Many think the fruit equal to cranberries."

⁵Iowa Homestead and Western Farm Journal, March 20, 1867, copied from the Northwest Farmer.

⁶Meeting of Iowa State Horticultural Society, June 12, 1870, Iowa Home-
stead and Western Farm Journal, 1870, p. 196; No. 4.

⁷Rep. Ia. State Agrl. Soc. 1871; 330.

⁸Rep. Ia. State Hort. Soc. 1871; 111.

⁹Rep. II. S. Dept. of Agrl. 1868; 197.

Then a paragraph on starting a hedge from seed and a paragraph as follows: "The popular opinion has been that rust in grain emanated from the barberry. Late researches seem to confirm this popular notion. A peculiar fungus, called by scientists *Æcidium Berberidis* can be found on the leaves of all species and varieties of the barberry." A short description of the fungus follows. "Smut in wheat is declared only another form of this fungus. Admitting the idea to be well founded, no harm would result when used near dwellings for yard hedges." Mr. Suel Foster of Muscatine esteems the barberry for an ornamental hedge.

Professor Budd was a student of scientific horticultural literature of the time. What he wrote about the barberry may have been his experience in his nursery in Benton county, but he does not say so. I am inclined to think that some of the information was gleaned from published sources. He was familiar with the Darlington-Thurber *Agricultural Botany*¹¹ where the statement is made: "It was formerly a popular belief, and one which prevails yet to some extent, that the barberry possesses the power of blasting grain."

At the annual meeting of the Iowa State Horticultural Society held in 1869¹² various hedge plants were mentioned like the buckthorn, osage, honey locust, white willow, but no reference to the barberry was made. We infer from this that the plant was not generally used in Iowa.

In 1872 James Mathews, president of the Iowa State Horticultural Society, in his presidential address says: "I pass over the thorn, barberry, etc., because I have had no experience with them, nor has my observation enabled me to form any satisfactory conclusion on the subject." In other words these plants were not commonly used as hedge plants in Iowa. Mr. Mathews lived in Knoxville, Iowa, where he conducted a nursery and orchard. Hedges are further discussed in the report of this society for 1872, but no mention was made of the barberry by the persons who discussed the subject. It was evidently not such a common plant, otherwise some comments would have been made.

Samuel Lorton of Davenport is said to have extensively propagated the barberry in 1870. This is his recollection. Dr. I. E. Melhus, R. S. Kirby and L. W. Durrell in some unpublished manuscript make this statement, with reference to the early introduction of the common barberry. "The earliest reliable information regarding the

introduction of European barberry in Iowa dates back to 1851. At this time John Evans, according to his son, Oliver Evans, purchased from Ellwanger and Barry, of Rochester, New York, a shipment of European barberry. These plants were first planted at Davenport in a small garden. Six years later Mr. Evans purchased a farm at Pleasant Valley and transplanted some of his barberries into a hedge at this place. From this hedge in the early seventies, Mr. Samuel Lorton, of the Nichols and Lorton Nursery located at Davenport, secured seed for propagation. Later this hedge served as a source of seed for many people interested in securing barberries."

Mr. J. J. Wilson, in an interview in the Davenport Democrat,¹³ states that "John Evans is said to have imported his first stock from Rochester, New York, in 1850." I believe it is more likely that these plants were started from seed rather than from nursery stock.

Ellwanger & Barry in a letter to the writer, state: "Replying to yours of the eleventh, we find offered in our catalogue for 1867 the following barberries: *vulgaris*, *purpurea*, *canadensis*, white fruited, violet fruited and Nepal fruited."

A few large bushes of the common barberry were observed by me on the Lowry place near Montpelier in Muscatine county. Mr. Lowry stated that the bush was there as long as he could remember. Mr. Samuel Merry in 1839 purchased this land now owned by Mr. Lowry.¹⁴ His grandson, Samuel Hughes, who now lives at Muscatine at the age of 68 years, states that Dr. Merry moved from St. Louis to his farm at Montpelier in 1842 and gave much of his time in his old age to orcharding and to accumulating in his garden various kinds of shrubbery. On one of his visits to St. Louis, Dr. Merry brought back among his nursery stock a collection it is thought of the European barberry. The exact date of this introduction is not known, but the facts at hand suggest that it must have been in the forties. He said the barberry might have been there early in the last century. Walton,¹⁵ in *Scraps of Muscatine History*, states that one Nye landed at the mouth of Pine creek in 1834 and that the first post office and store in Muscatine county were located at Montpelier in 1838. One would hardly suppose that the barberry had been planted at that point in 1838 or for some years later. F. D. Lowry was born in Muscatine in 1868. His father, W. E. Lowry, moved to Muscatine in 1849 and to Montpelier later. The exact

¹³Davenport Democrat, Dec. 11, 1918.

¹⁴I am told that Mr. Merry (Lowry) was a brother of Mr. Lowry, Sr. He said he would not change his name for anyone.

¹⁵Scraps of Muscatine History, 17.

date is not given, but it must have been between 1868 and 1870, about the time the barberry began to be distributed as a hedge plant.¹⁶

It would appear to us that most of the older barberry bushes in the state go back to the seventies. Mrs. William Larrabee, Sr., of Clermont, a woman of unusually keen intellect, told me that the barberry bushes on their place were planted by Governor Larrabee in 1876, largely because of the reported value as a plant to "turn stock", and the governor's interest in the plant because of his boyhood recollection of Connecticut.

The barberry was occasionally planted in the prairie region for protection to stop the drifting snows in the winter, according to Mr. Ingram of Garner, who planted a hedge on his place in Hancock county many years ago. On the Hoag farm a hedge was also planted for this purpose about forty years ago (in 1878) according to Mr. Ingram.

The discussions on the barberry in the report of the Iowa State Horticultural Society are of interest to us, as giving us some of the history. Col. John Scott of Nevada wrote:¹⁷ "I have a few plants of this shrub that grow so thickly and so bristly with thorns, that only a small bird can penetrate them. I have not yet used it for a fence, but believe it would answer a good purpose. Unlike the willow, it is a shrub, and thorny. It grows in rich soils, and with pruning and cultivating attains a height of twenty to thirty feet, but in ordinary hedge row, may readily be kept at a height of five or six feet. Owing to a very general but erroneous impression, that the bushes cause rust in wheat, it has not been largely planted. It is subject to a species of rust, but this is entirely different from that of the wheat plant."

"It is propagated by layers, cutting, seeds, suckers of offshoots, and grows with little care. Left to itself it throws up numerous suckers from its base, making it very close at the foot, and as it bears the shears well, I see no reason why it would not make a very close hedge and occupy but little room." In 1876 C. L. Watrous reported to the Iowa State Horticultural Society as follows:¹⁸ "The Society has sometimes discussed the barberry as a hedge plant. I have to report one experiment with it. In 1874, A. Nighswander, of Dallas county, planted 100 yards or so of barberry hedge, using two year old plants. The same season, oats growing near it rusted badly, while the balance of the field escaped. In 1875 wheat near it was

¹⁶History of Muscatine county 672-673, 1911.

¹⁷Rep. Ia. State Hort. Soc. 1870: 152.

¹⁸Rep. Ia. State Hort. Soc. 1876: 152-153.

killed dead, the injury shading off one-half to three-fourths of a mile south and west. North and east was prairie. Wheat generally suffered from rust, but that near the hedge to a far greater extent. In 1876, oats near it were utterly killed and left on the ground, the injury gradually shading off as before and disappearing at from one-half to three-fourths of a mile, and the barberry was beheaded as a criminal, not fit to live, with what justice this Society may decide. I will only add that nothing appeared in soil or location to account for the phenomenon. I know of no other trial of barberry as a hedge plant."

In regard to the relation of rust Captain Watrous said: "Of the barberry as a hedge plant, I know but little. But the very habit of its growth convinces me that it will answer the purpose. I have one plant in my yard which is a special favorite; year after year this barberry bush is the favorite meeting place of the Brown Thrush. It stands not sixty feet from my door, and I believe, without this bush, I would not have the benefit of its morning song."

Mr. Briggs, of Wyoming, Iowa, in 1879, made the following interesting comment. "The barberry has astonished us in its results in growing into a good hedge. I have 20 rods of barberry hedge near my house, which is now eight years from the seed (this would make the date of introduction 1871) and as firm and strong as any farmer could desire, and a very thing of beauty, being well trimmed. On this hedge I have never known a twig injured by winter. But there is one great drawback to it in my opinion. Since the starting of this hedge, I have not known a square rod of wheat or oats within half a mile of it that was worth the harvesting. Invariably a black rust strikes the grain before ripening that prevents maturing of the grain. I think there is no question about this matter, as I have watched it for six or seven years at my own cost, and to some extent, my neighbors, and I have observed that in a field of grain growing near the hedge, the further I go from the hedge the less the damage from rust. On this account I do not dare recommend it for a farm fence."¹⁹ He did, however, recommend it for ornamental purposes. J. W. Whiting,²⁰ reflecting perhaps the opinion of Prof. J. L. Budd, in 1878 states that the buckthorn and barberry were good hedge plants. Mr. Samuel Bowers²¹ also gives testimony of the growing of the barberry on his place in 1878.

In a discussion on the subject of "Diseases of Plants"²² Dr. C. E. Bessey in 1881 comments as follows. "In the spring the leaves of

Published by the Iowa Hort. Soc. in 1874, p. 348, 9.
¹⁹Rep. Ia. State Hort. Soc. 1878; 326.
²⁰Rep. Ia. State Hort. Soc. 1878; 153.
²¹Rep. Ia. State Hort. Soc. 1882; 95, 96.

the barberry are attacked by a fungus which growing inside of the leaf-tissues soon breaks out through the epidermis and forms numerous very minute yellow cup-like cavities; hence this has been called the barberry cluster-cup or barberry rust.

“When these spores fall out and are blown away, those which alight upon leaves of wheat, oats or barley germinate and soon penetrate the leaf-tissues (the leaf rust was then considered identical with stem rust) growing there parasitically. This growth in the grain leaf is very rapid in hot damp weather, and in a short space of time it produces myriads of orange red spores just beneath the epidermis, which they soon break, thus forming the well known red rust patches too common on our small grain nearly every season.

“The peculiarity in this case of the first stage of the parasite occurring upon another plant has made many doubt the correctness of DeBary’s conclusion that the cluster-cup of the barberry was identical with the rust of grain. How soon the study of allied forms appears to indicate the truth of DeBary’s conclusion. I have little doubt that we shall find that not only the cluster-cups of the barberry, but that one or more native plants as well produce the rust of our grains.

“Two remedies or rather preventives will suggest themselves to every thinking person. The general destruction of the cluster-cup bearing plants would reduce greatly the disease. This, however, is not as yet possible. The destruction of the black spores by burning or otherwise would be an effective preventive if generally done. The thorough burning of the stubble soon after harvest, and the burning or thorough composting of all rusted straw would if done throughout wide acres of territory, prove effective.”

LETTERS FROM NURSERYMEN IN REGARD TO THE EARLY INTRODUCTION OF THE BARBERRY

During the fall I sent letters concerning the early planting of the barberry in Iowa to some of the older nurserymen in the state. Mr. M. J. Wragg wrote me as follows. “My father commenced growing the barberry *vulgaris* which was then called the Canadian barberry, about the year 1870.

“We grew a great many thousand of these because they were widely lauded as a plant for making a good hedge for guarding purposes. Along in later years, possibly about the early eighties, the

question of rust had commenced being discussed. Consequently, we stopped the growing of the plants in large quantities and merely grew them as ornamental shrubs from then on.

“Purple barberry, we did not commence growing to any great extent until along about 1890. I remember that we got our first stock from the late Robert Douglas of Waukeegan, Ill. There were many other kinds of barberry that we had growing on our place during these years, many of them are still old plants. I speak more especially of *Berberis ilicifolia*. There was a time that we considered this hardy, but during the last ten years it has almost all gone out.

“My father was the first man, as far as known, in Iowa to grow *Berberis Thunbergii*. Ours was imported from the Sargent Botanical Gardens about fifty years ago.”

The honorable Silas Wilson, formerly of Atlantic, Iowa, a large grower of grapes, apple trees and other trees and shrubs, wrote me that he had never sold barberry.

Mr. D. C. Snyder of the Linn county nursery informs me that a common barberry in their fruit yard in Center Point, must have been planted in 1878. They started to sell the common barberry in 1892, but there was not much demand for it. He says: “You might be interested to know that the writer’s first recollection of shrubbery was of a large barberry bush near our house. From the size of the bush at the time and the writer’s age, it must have been planted at least forty years ago, as it was a very large specimen and bore great quantities of fruit. Very likely this bush was received from Patten at Charles City, as Father secured most of his nursery stock there.”

The Iowa Seed Company also began to distribute them, with other ornamental plants, along in the nineties. Captain Watrous of Des Moines probably sold the barberry in the eighties or late seventies. Mr. Markel of the Watrous Nursery Company says they were in stock in 1898 and had been sold for some years previous to that. The Earl Ferris Nursery Company of Hampton say they never sold many, except a few locally. Mr. D. S. Lake of the Shenandoah Nursery Company writes that they sold the purple leaved barberry for forty-nine years and in early years never sold large amounts.

Mr. H. A. Johns of the Sioux City Seed Company began to sell the purple leaved barberry in 1884 and the *B. Thunbergii* in 1900. Mr. E. S. Welch of the Mount Arbor Nurseries of Shenandoah says

they bought their nursery in 1891 and that they sold the common and purple leaved barberry from that time up to the spring of 1918.

Mr. C. F. Gardner of Osage, Iowa, writes to me under date of December 16th as follows. "The first common barberry that I planted in Iowa was long before I issued a catalogue. I think it was in the spring of 1866. I grew a few thousand each year from the seed and sold the plants generally in small lots to parties who wanted to grow berries for the sake of mixing them with apples to make a kind of sauce which was in great favor with people from the New England states. It was generally planted in hills of single plant or in a short hedge-row. About 1880, as near as I can figure, we raised probably about twenty thousand plants, which were sold to our customers. The greater number of plants that we sold were for hedges. Finally about the year 1895 the sales of the plants ran so low that we discontinued planting them entirely. And we, thereafter, might have bought a few plants to fill a few orders. This was also about the time we commenced growing the Japanese (*Thunbergii*).

CAN THE AGE OF THE BARBERRY BE DETERMINED BY THE ANNUAL RINGS?

I thought it might be possible to determine the age of the barberry by making cross sections of the stem.

| LOCALITY | DIAMETER OF BRANCH IN INCHES | ANNUAL RINGS |
|-------------------------------|------------------------------|--------------|
| Humboldt, Warner | $\frac{3}{4}$ | 8 |
| Humboldt, Warner | $\frac{1}{2}$ | 3 |
| Humboldt, Warner | 1- $\frac{1}{2}$ | 15 |
| Humboldt, Warner | $\frac{1}{2}$ | 8 |
| Humboldt, Warner | 1 | 14 |
| Humboldt, Warner | 1- $\frac{1}{4}$ | 12 |
| Garner, Hedden | 2- $\frac{1}{2}$ | 15 |
| McGregor, Chapin | 2- $\frac{1}{2}$ | 17 |
| McGregor, Chapin | 3- $\frac{3}{4}$ | 20 |
| McGregor, Chapin | 1- $\frac{3}{4}$ | 25 |
| McGregor, Gutthell | 1- $\frac{3}{4}$ | 16 |
| LeClaire, Johnson | $\frac{3}{4}$ | 6 |
| LeClaire, Johnson | $\frac{1}{2}$ | 5 |
| Des Moines, State House | $\frac{3}{4}$ | 9 |
| Des Moines, State House | 1- $\frac{1}{8}$ | 15 |
| Des Moines, State House | 1- $\frac{1}{4}$ | 10 |
| Des Moines, State House | 1- $\frac{5}{8}$ | 13 |
| Des Moines, State House | 1- $\frac{1}{4}$ | 13 |

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WIDTH OF RINGS DIFFERENT YEARS, WILD BARBERRY FROM CHAPIN PLACE,
MCGREGOR, IOWA.

| | | | |
|------------|----------------|------------|--------|
| 1901 | wide | 1910 | medium |
| 1902 | narrow | 1911 | medium |
| 1903 | narrow | 1912 | medium |
| 1904 | narrow | 1913 | medium |
| 1905 | narrow | 1914 | wide |
| 1906 | narrow | 1915 | medium |
| 1907 | wide | 1916 | medium |
| 1908 | wide to medium | 1917 | wide |
| 1909 | widest | 1918 | medium |

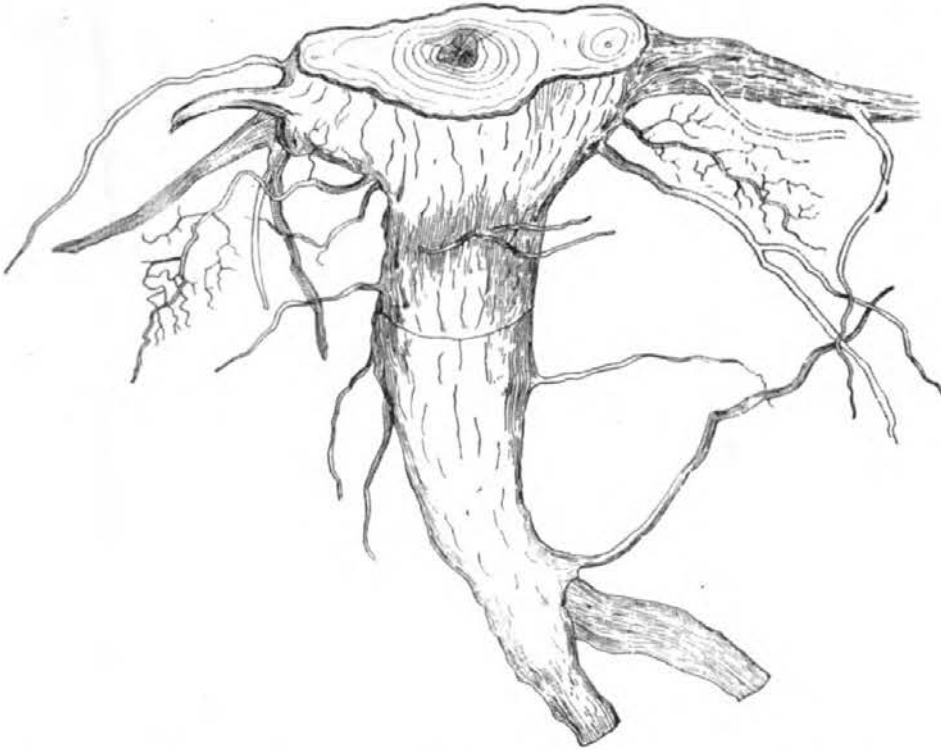


FIG. 52.—Old stem and root of common Barberry showing the older portion in center and two lateral stalks. (C. M. King.)

The annual rings are somewhat unequal, but the largest annual ring of the Chapin barberry occurred in 1901.

Mr. L. E. Foglesong, the associate landscape architect of Des Moines, sent to me a large barberry bush from the state house grounds, Des Moines, set out by Mr. Jackson in 1896. As near as I can determine these branches had rings as follows:

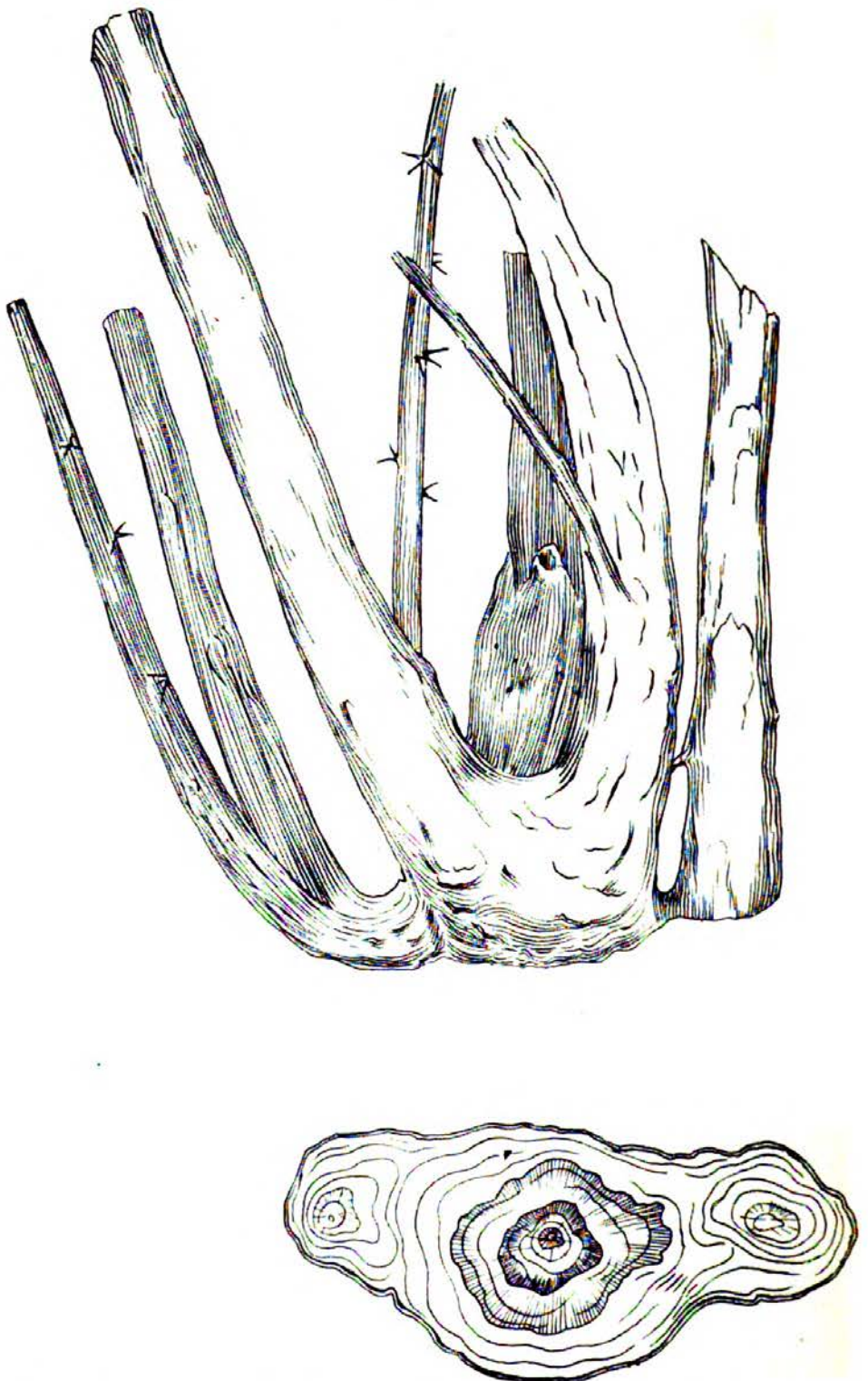
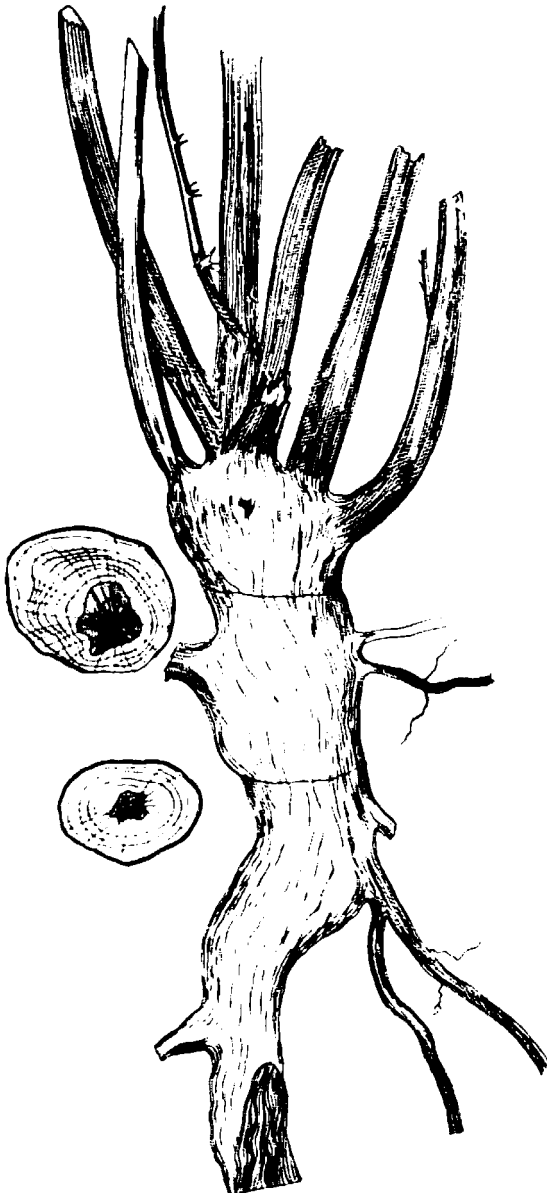


FIG. 53.—Another portion of the same stem showing eight stalks. The central part has five stalks, the right hand lateral has one stalk and the left hand lateral has two. The section of this stem is shown in the upper part of the figure. (Drawn by C. M. King.)

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WIDTH OF ANNUAL RINGS IN DIFFERENT YEARS FOR PLANTS, STATE HOUSE GROUNDS, DES MOINES.

| WIDTH RING. | | WIDTH RING. | |
|------------------------|-------------------------|-------------|-------------------------|
| YEAR | (WIDE RING EARLY STAGE) | YEAR | (WIDE RING EARLY STAGE) |
| <i>Thirteen Years.</i> | | | |
| 1905 |wide | 1911 |narrow |
| 1906 |wide | 1912 |narrow |
| 1907 |medium | 1913 |medium |
| 1908 |medium | 1914 |narrow |
| 1909 |medium | 1915 |medium |
| 1909 |medium | 1916 |medium |
| 1909 |wide | 1917 |medium |
| 1910 |narrow | 1918 |medium |



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 FIG. 54.—Another root and stem on an old Barberry. (Drawn by C. M. King.)



FIG. 55.—Roots of Barberry planted on the State House grounds in 1894. Photographed by J. J. Wilson, 1919.

| YEAR | WIDTH RING. (WIDE RING EARLY STAGE) | YEAR | WIDTH RING. (WIDE RING EARLY STAGE) |
|-----------------------|--|------|--|
| <i>Nine Years.</i> | | | |
| 1909 |medium | 1914 |narrow |
| 1910 |medium | 1915 |narrow |
| 1911 |medium | 1916 |narrow |
| 1912 |wide | 1917 |narrow |
| 1913 |narrow | | |
| <i>Fifteen Years.</i> | | | |
| 1903 |wide | 1917 |medium |
| 1904 |medium | 1918 |medium |
| 1905 |medium | | |
| 1906 |medium | 1908 |medium |
| 1907 |medium | 1909 |medium |
| 1908 |narrow | 1910 |medium |
| 1909 |wide | 1911 |medium |
| 1910 |medium | 1912 |medium |
| 1911 |medium | 1913 |medium |
| 1912 |wide | 1914 |medium |
| 1913 |medium | 1915 |medium |
| 1914 |medium | 1916 |medium |
| 1915 |medium | 1917 |medium |
| 1916 |medium | 1918 |medium |

These tables show clearly that widths of rings from the same clump vary greatly, and that no conclusion can be drawn as to a wet or dry year, from the data at hand.

Owing to the varied life of different stems it is impossible for one to determine the age of the common barberry from the annual rings. As the bush becomes older stalks are constantly dying

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sometimes the center of the clump contains numerous decayed remnants of old stalks and new shoots are formed every year from the old roots. The diameter of a bush therefore increases every year so that the old bushes found near Montpelier on the Lowry place which measured twelve feet across must be of long standing.

THE WILD BARBERRY.

It is not surprising that the barberry should have escaped from cultivation since many other shrubs and some trees have escaped from cultivation like *Lonicera tatarica*, *Juniperus virginiana*. As the studies of barberry have continued the number of places where the barberry has escaped from cultivation is increasing. Wild plants were noted at the following points by me: Garner, Postville, Clermont, Montpelier, McGregor, LeClaire, Kelley, Carroll county, Monmouth, Clear Lake, Iowa Lake, Iowa; Galena and Port Byron, Illinois.

The Wild Barberries at Garner—During the month of September, 1918, Miss Winifred Gilbert called my attention to some escaped barberries near Concord in Hancock county. The place was visited and the following facts learned about the escaped plants. The present owner of the wood lot is Mr. Hedden. The editor of the Garner Signal, Mr. Clark, informed the writer that a Mr. Bailey ran a nursery on this farm about 1878, and later the nursery was operated by a Mr. Doolittle for a few years. The place was then purchased, according to Mrs. Hedden, by Mr. C. Cramer in 1881, Mr. Hedden operating the place since 1891. The Heddens and Cramers never sold any nursery stock. The place was allowed to take care of itself, either as a pasture or as a hog lot. The plants had escaped on both sides of the road, but the barberry was originally on the south side. Some of the old plants are still standing in the nursery row. These plants have scattered in every direction where there were groves. Most of the wild plants are found within a quarter of a mile from the original nursery stock, but few were found one-half mile from the original plants. The plants to the west in a white willow grove, were mostly small, two to four years old, although there were a few somewhat older and a few seedlings. Most of the wild barberry plants to the west of the original nursery next to the fence were small. The larger wild plants occurred to the north along the highway fence and in a hog lot. Some were found in a willow hedge east and north from the hog pasture and a few isolated plants along the line fence to the east, separated

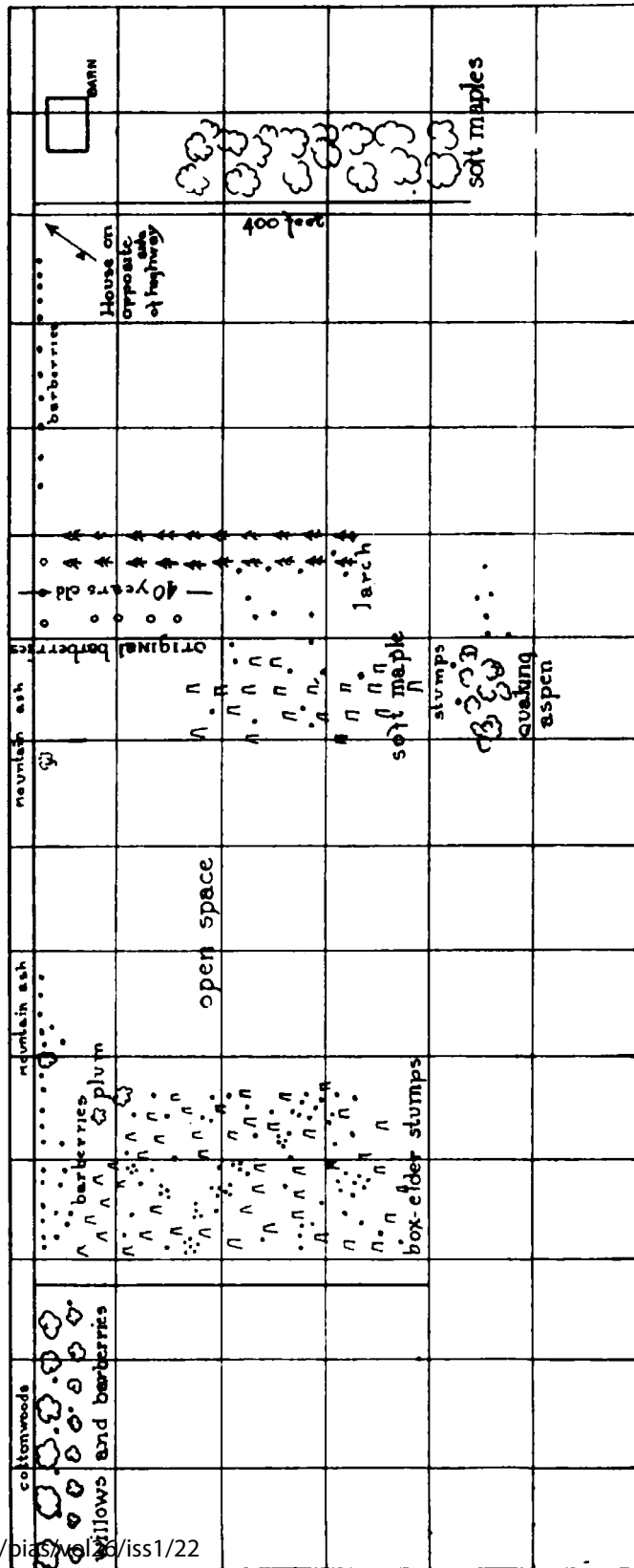


FIG. 56.—Wild (escaped) common Barberry (*Berberis vulgaris*) south of highway, Hedden farm, Garner, Barberry marked (•).

THE BARBERRY IN IOWA

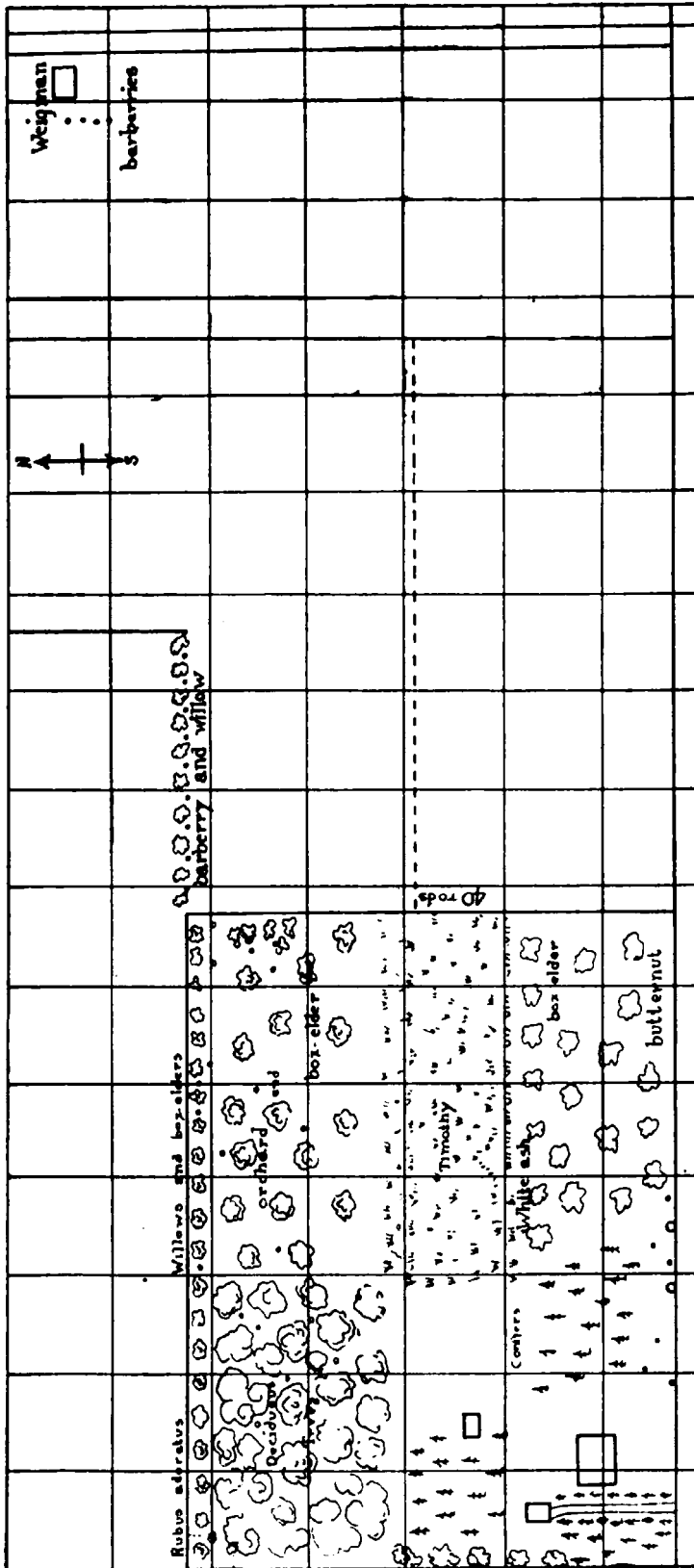


FIG. 57.—Wild (escaped) common Barberry (*Berberis vulgaris*) north of highway. Hedden farm, Garner. Barberry marked (.), original plants marked (o).

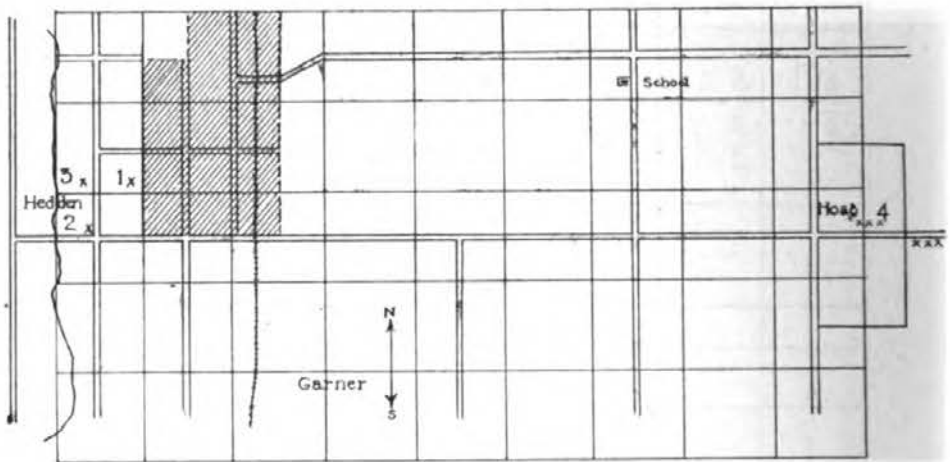


FIG. 58.—Wild Barberry (escaped) near Garner. 1, 2, 3, location of Barberry marked X. 4, Barberry hedge, next to grain field on the Hoag farm. (C. M. King.)

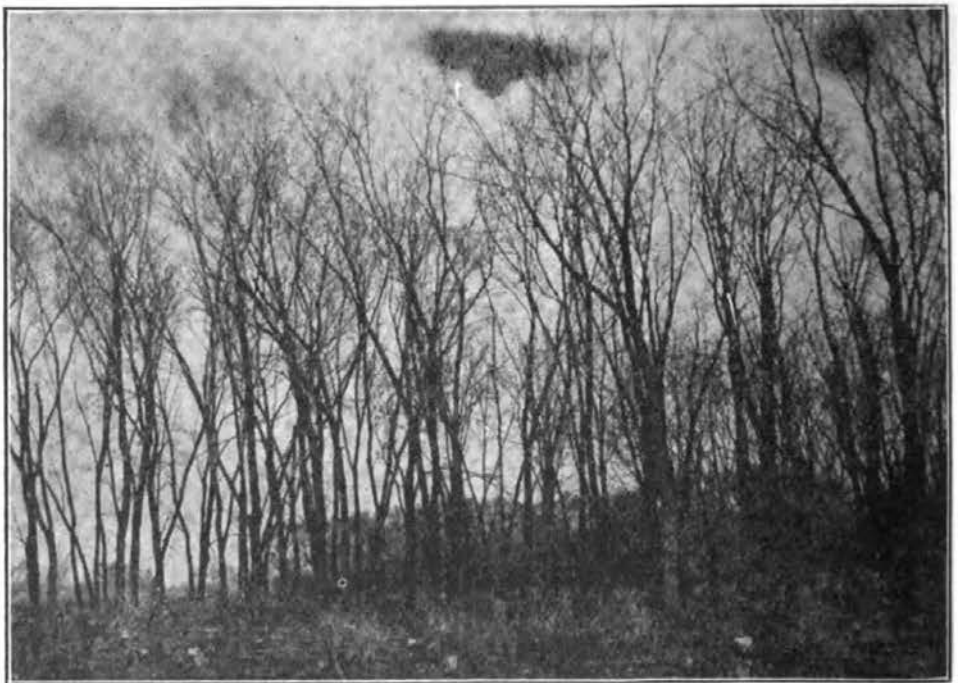


FIG. 59.—Young wild (escaped) Barberry (*Berberis vulgaris*) in front of grove, Hedden farm, Garner. Photographed by F. Fritsch, 1918.

entirely from trees and bushes of all kinds, showing that trees are not always necessary to scatter the seeds. I should judge that most of these older wild plants have not been in these groves for more than twenty-five years. Many of the plants were loaded with fruit this year



FIG. 60.—Old original common Barberry from which the seed came, near larch grove, Hedden farm, Garner. Photographed by F. Fritsch, 1918.

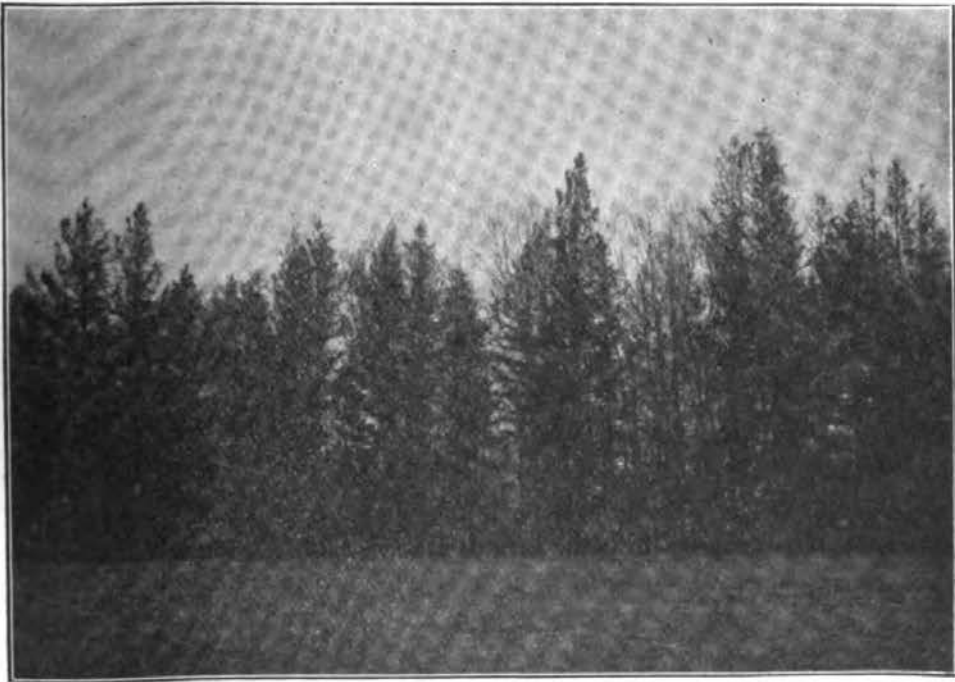


FIG. 61.—Wild (escaped) Barberry (*Berberis vulgaris*) distributed in larch grove, Garner. Photographed by F. Fritsch.

The cedar waxwing probably was responsible for scattering the barberry. The grove of Mr. Hedden was used by Miss Elder to study the bird population of the region because of the interesting species found there. It was not the only grove in that vicinity, since Mr. Elder, who ran a nursery in Concord, had planted a fine lot of trees around his home. The soil of the region is a black prairie soil and fifty years ago was a virgin prairie. It may be of interest to note here the establishment of other shrubs and trees in the Hedden grove. I note first of all the *Rubus odoratus* which is

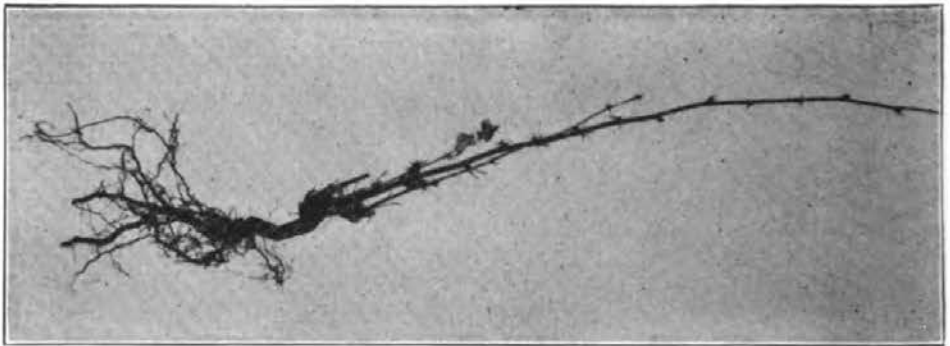


FIG. 62.—A single young Barberry (escaped) root, Garner. Photographed by F. E. Colburn, 1918.

scattered over a rod in the south grove, the elderberry (*Sambucus canadensis*) in both groves, the snowberry (*Symphoricarpos occidentalis*), the chokecherry (*Prunus virginiana*), the black cherry (*P. serotina*) and the poison ivy (*Rhus Toxicodendron*). The following trees were found in the grove: *Acer saccharinum*, *Populus deltoides*, *Acer negundo*, *Salix alba*, *Fraxinus viridis lanceolata*, *Pyrus aucuparia*, *Juglans nigra*, *J. cinerea*, *Larix decidua*, *Pinus strobus*, *Picea alba*, *P. excelsa*, and *P. austriaca*.

The Wild Barberries at McGregor, Postville and Clermont.—I will only consider these found on the Chapin and Guttheil places in McGregor. In the former place the plants occurred in the rocky limestone area, 150 feet from an old cellar where once stood a house. There was no evidence here of any barberry ever having been cultivated. It is certain, therefore, that the wild plants must have been brought from some wild plants up further in the hills. The plants were seventeen to twenty-five years old. There were a number of young plants around the old bush which was loaded with fruit.

The Guttheil barberry in McGregor is also of interest. A family by the name of Reynolds lived on the place and when the Guttheils



FIG. 63.—Old roots of Barberry, Garner. Photographed by F. E. Colburn, 1918.

took possession in 1897 there were two hedges about 160 feet long. Mr. Gutheil started to remove the hedge. At this time it probably had escaped to the nearby woods. Mr. C. Bickel furnished me the following information. "I was disappointed in finding the original hedge had been cut down twelve years ago. What stands now has come up from the old roots. I thought that the one large bush which stood in the field by itself was a part of the original planting, but it also had grown from a root of the original bush which had been cut down about 15 years ago. I grubbed up several of these bushes

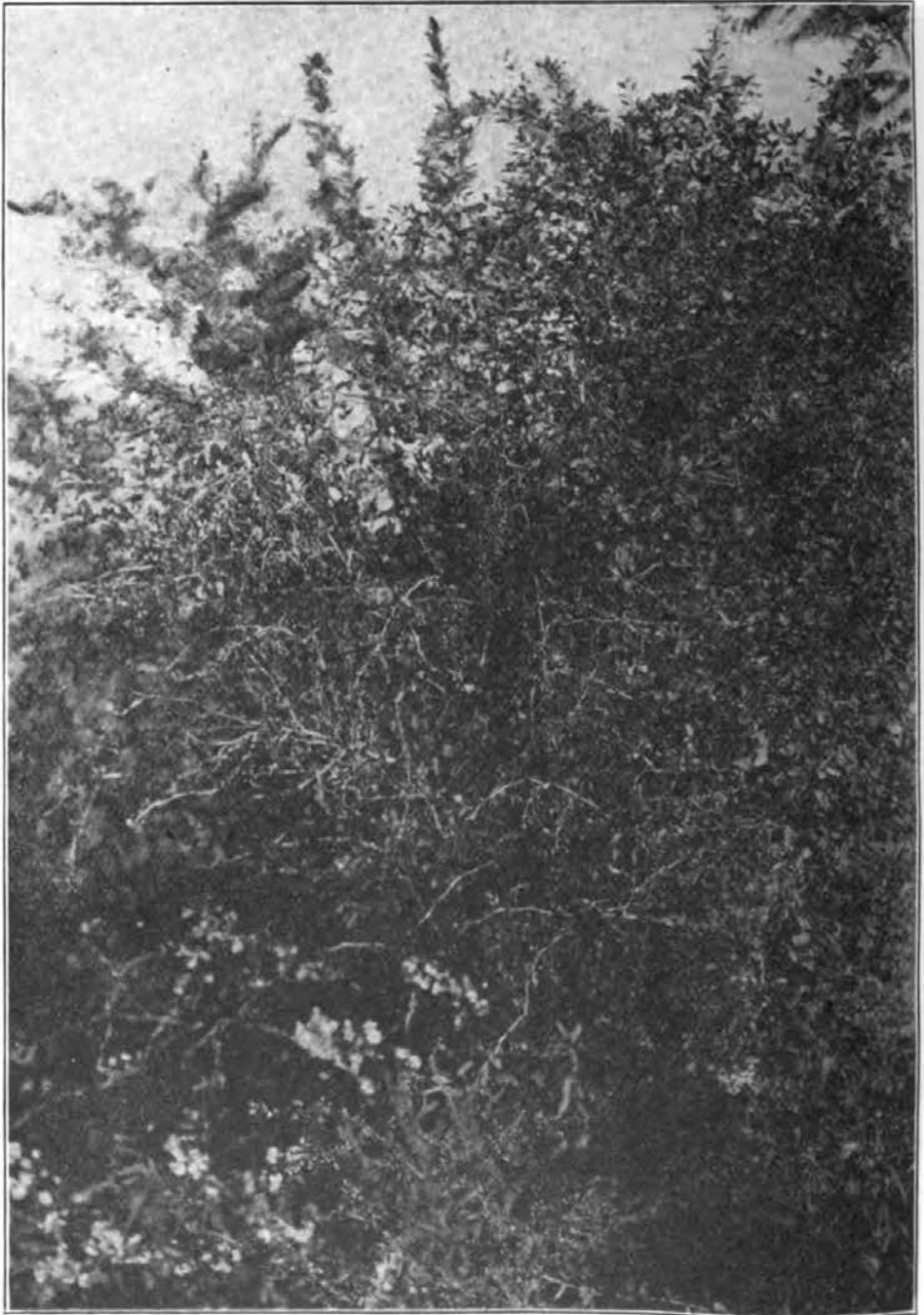


FIG. 64.—Wild (escaped) Barberry (*Berberis vulgaris*), McGregor, branches loaded with fruit, goldenrod and asters growing with it. Photographed by Fryklund, McGregor, 1918.

which had sprung up from the original hedge in the hopes of finding an old root which might aid us some in determining the age of the hedge, but all the original is decayed. I find that this hedge was planted between 1869 and 1872, and that the plants came from New

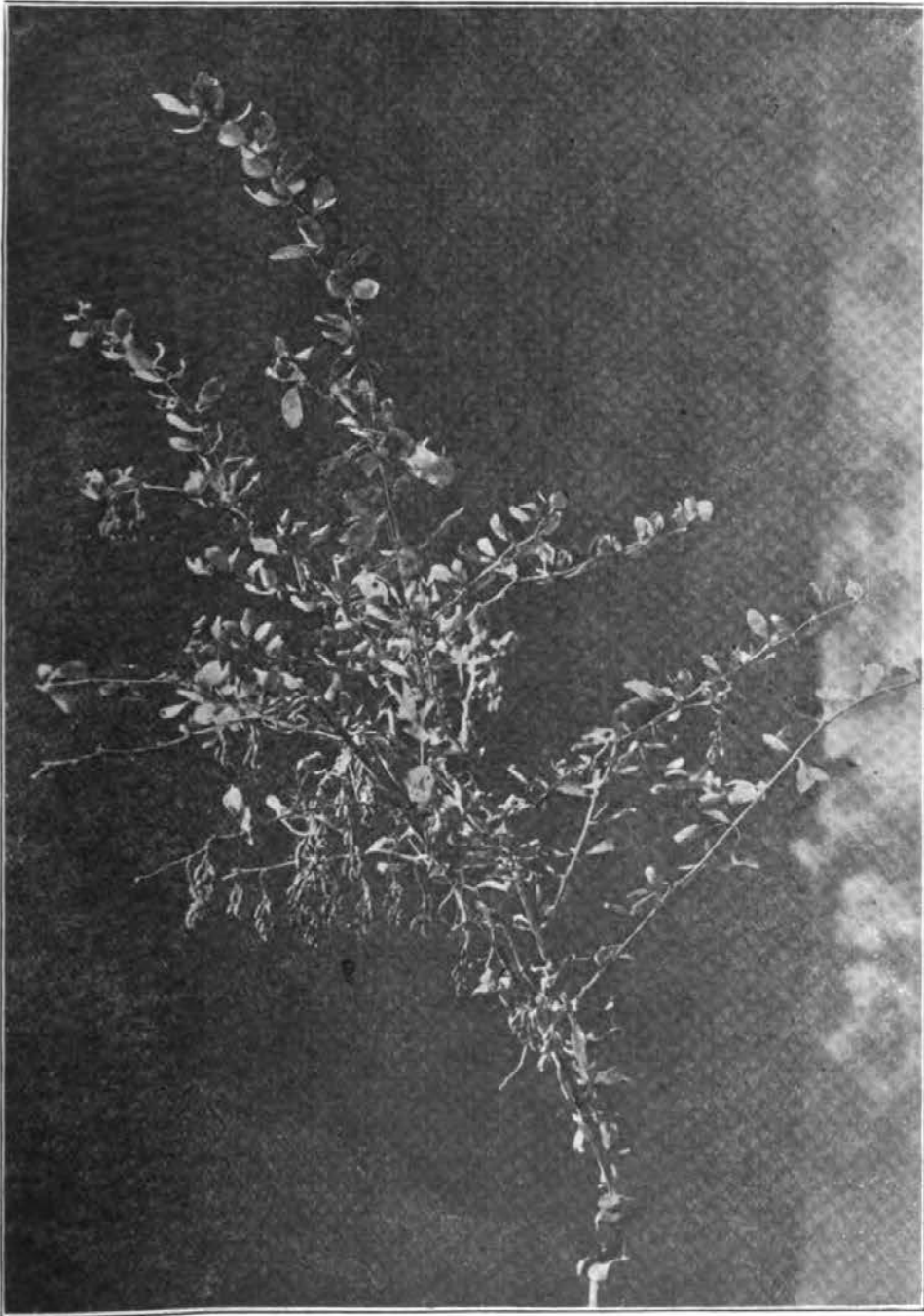


FIG. 65.—Two branches of wild (escaped) Barberry (*Berberis vulgaris*), McGregor, showing the fruit in racemes. Photographed by Fryklund, 1918.

York or New England. I do not think the hedge was raised from seed, as the party I learned the above from said he thought the hedge had been set out from plants.”

It appears that much of the wild barberry in the region came from the original plants on the Reynolds (now Guttheil) property and

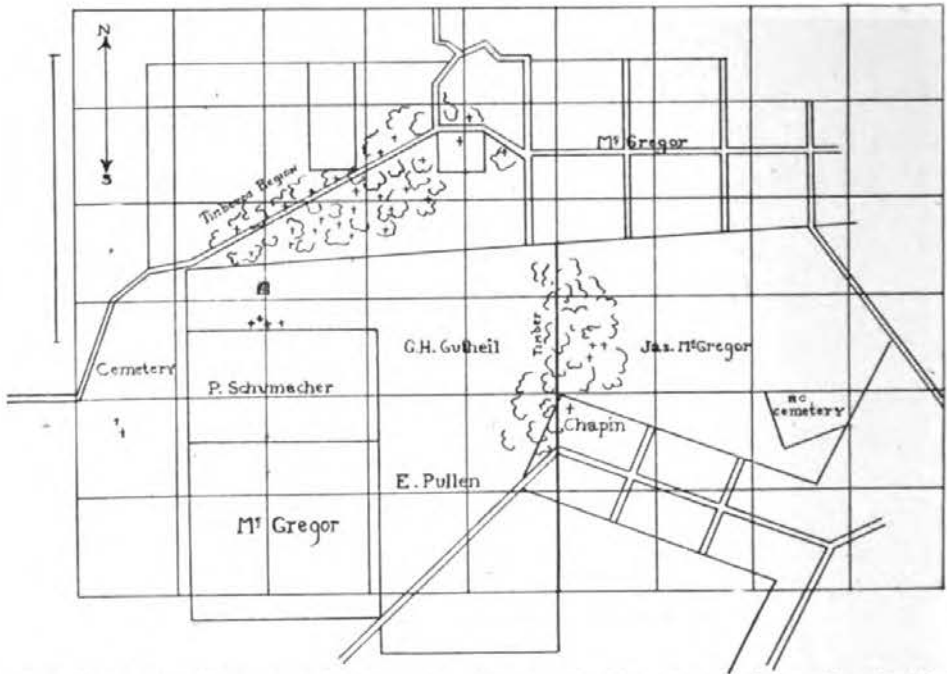


FIG. 66—Wild Barberry, McGregor. This probably started from the Gutheil place. (C. M. King.)

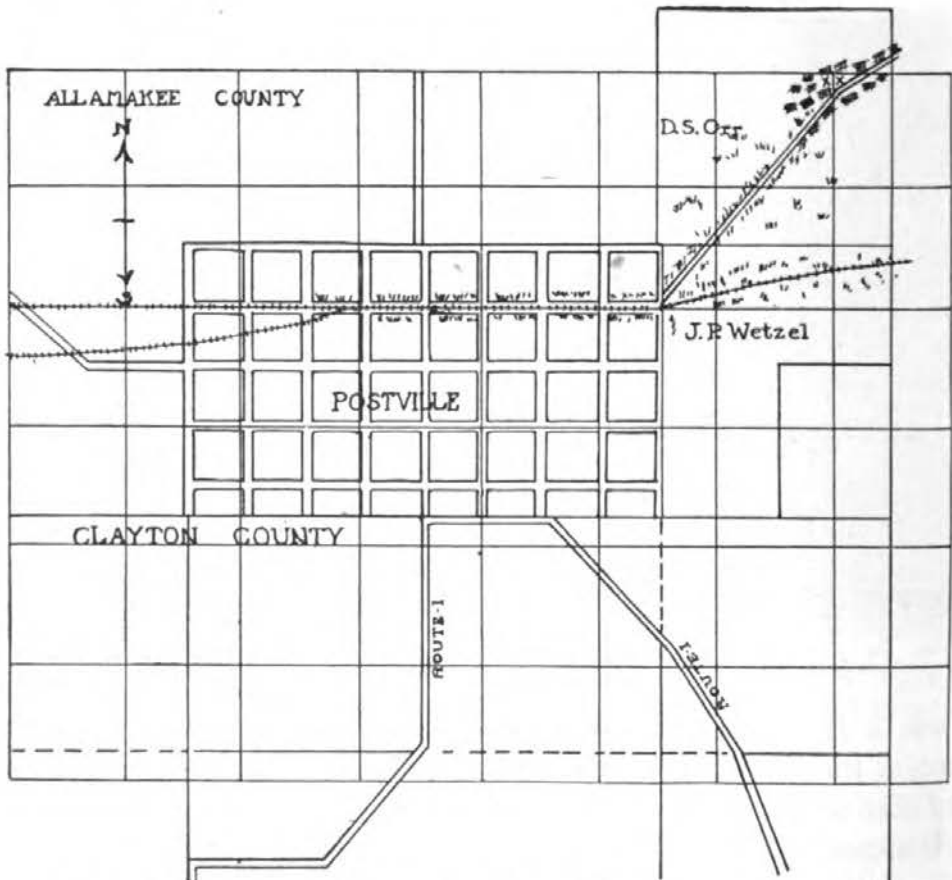


FIG. 67—Wild Barberry, and rust near Postville. (C. M. King.)

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the cemetery. A Mr. Kenyon was in the nursery business in McGregor for many years. His daughter, Mrs. Jesse K. Nagel of Seattle, Washington, writes me as follows: "I cannot tell you what variety of barberry my father grew, but remember that it was about

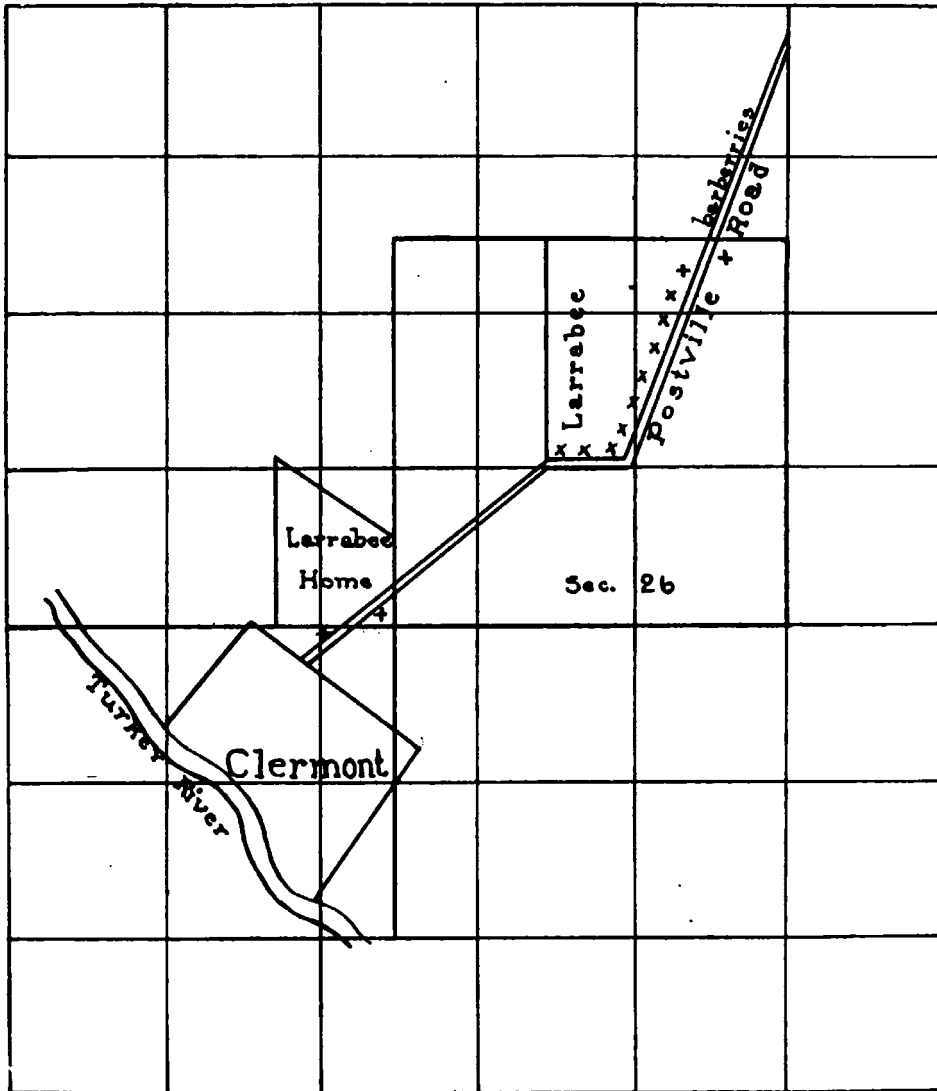
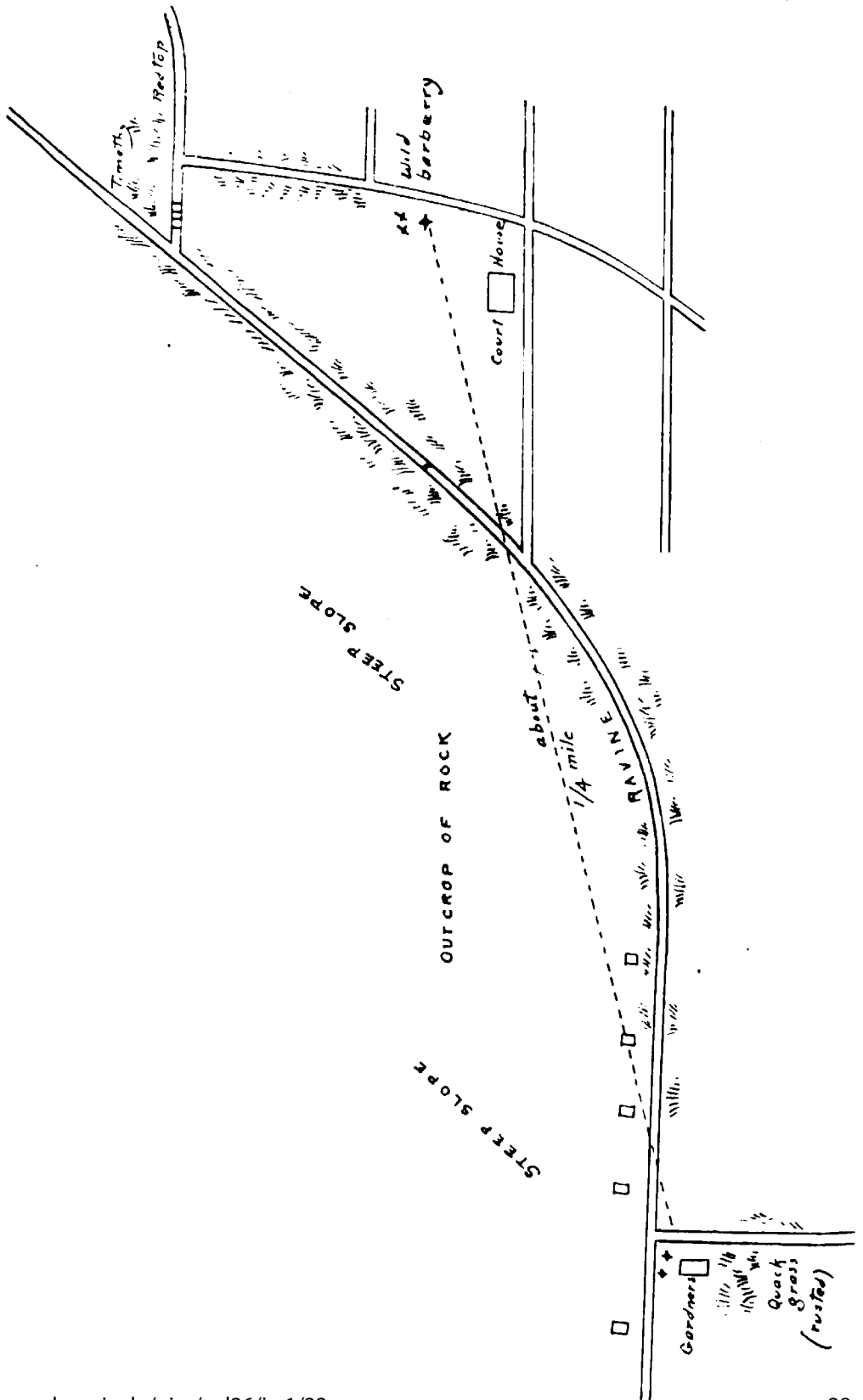


FIG. 68.—Barberry hedge, Clermont, showing wild plants along the highway. (C. M. King.)

as tall as the fence in front of the yard, that it had a leaf with a rough edge; that the berries hung in clusters similar to currants; that they were a very bright red, with a flat seed, and that they hung on the bushes after the leaves had dropped. We had a hedge of these bushes about thirty-five years ago. I do not know of his having distributed them."



THE BARBERRY IN IOWA

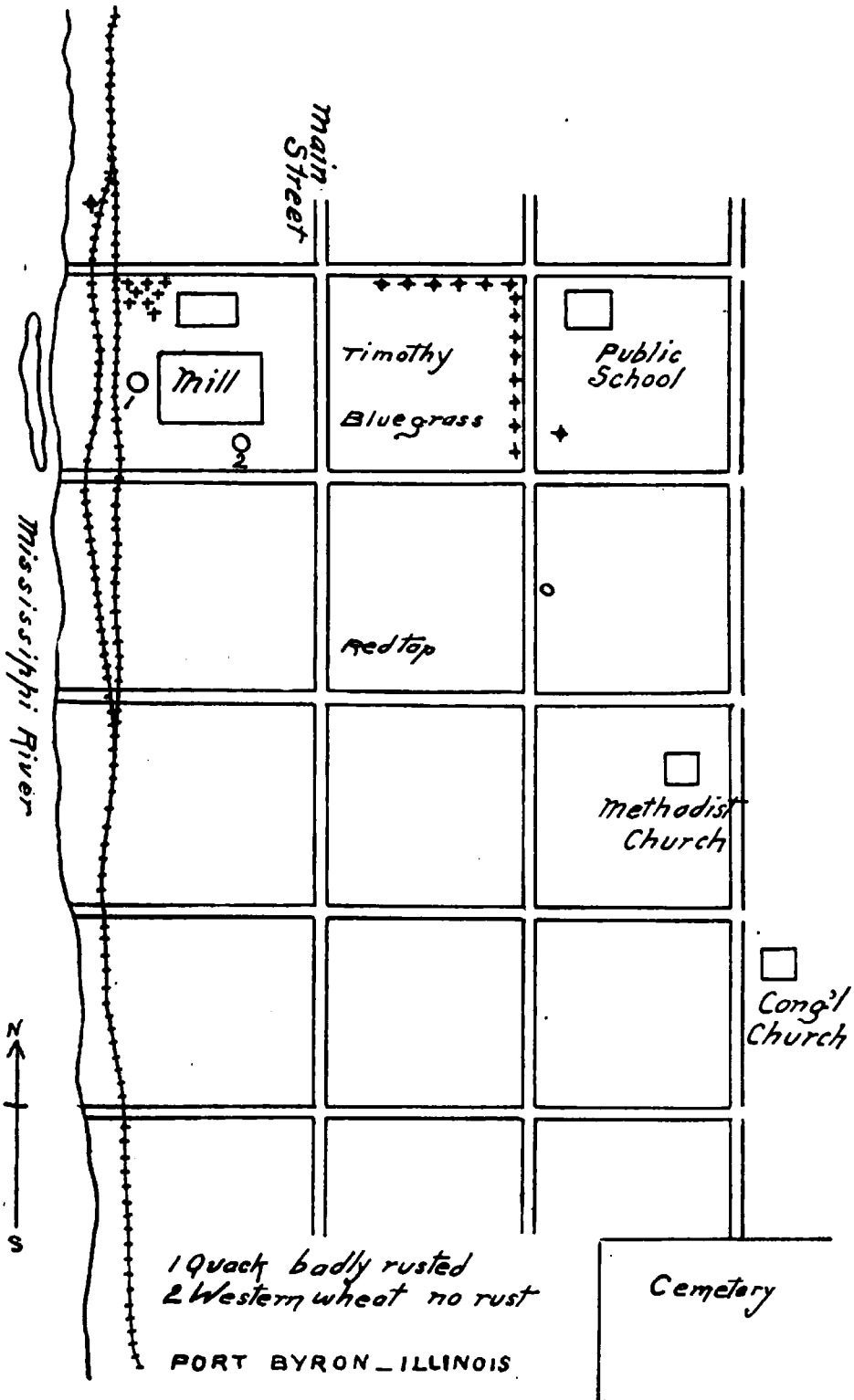


FIG. 70.—Wild Barberry on Chicago, Milwaukee and Saint Paul Railway and
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The wild barberry on the Jeremiah Orr place, Postville, was undoubtedly carried to the place by birds. Mr. Orr never planted it and he has lived on the place for sixty years. There was a wild apple approaching the Hyslop crab near it. The wild plants carried

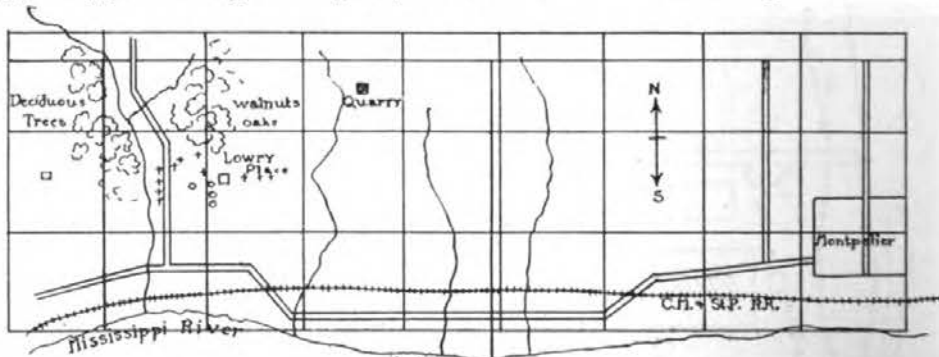


FIG. 71.—Lowry place, Montpelier, wild Barberry. The Barberry near the house is the original hedge, the Barberry next to the highway and woods is escaped. Individual oaks and walnuts near the house marked by circle.

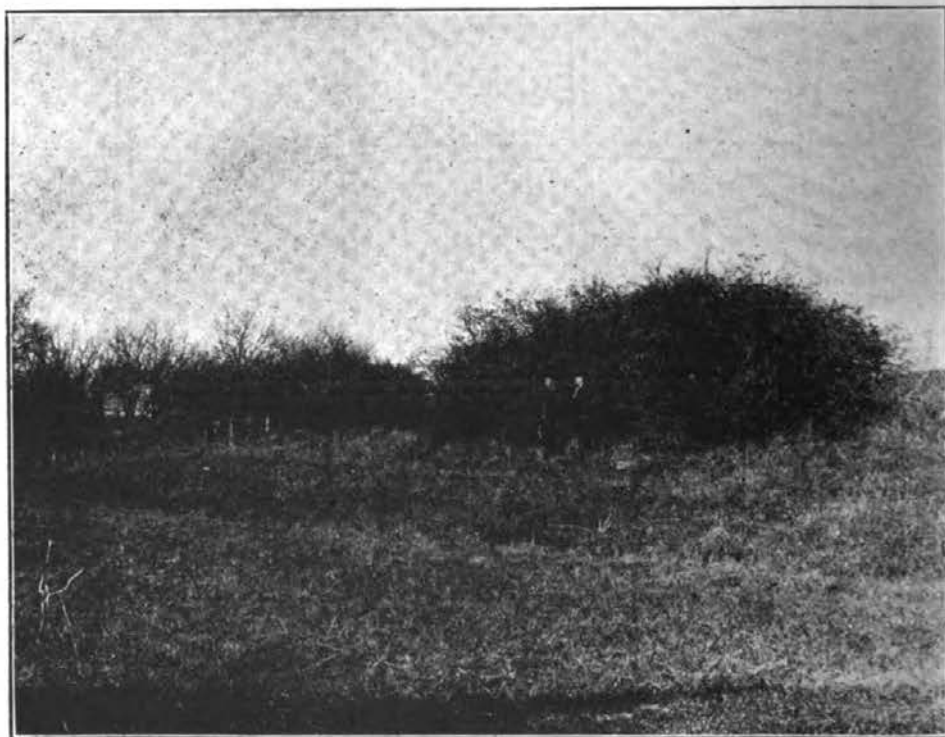


FIG. 72.—The original hedge planting of Barberry (*Berberis vulgaris*) on the Lowry place near Montpelier. The height may be judged by the men standing alongside of the hedge. Photographed by A. L. Parrman, 1918.

by birds at McGregor and Postville were *Rubus villosus*, *Rhus glabra*, *Prunus virginiana*, *P. serotina* and *Rhus Toxicodendron*. The soil at Postville was yellow clay, at McGregor clay and limestone rock.

The wild barberry at Clermont is of interest. Elsewhere we have given the date of the introduction of the bush by Governor William Larrabee. The wild plants occurred on both sides of the highway and in the woods on a sloping hill, before reaching the valley of the Turkey river. In some cases the older plants appeared to be about

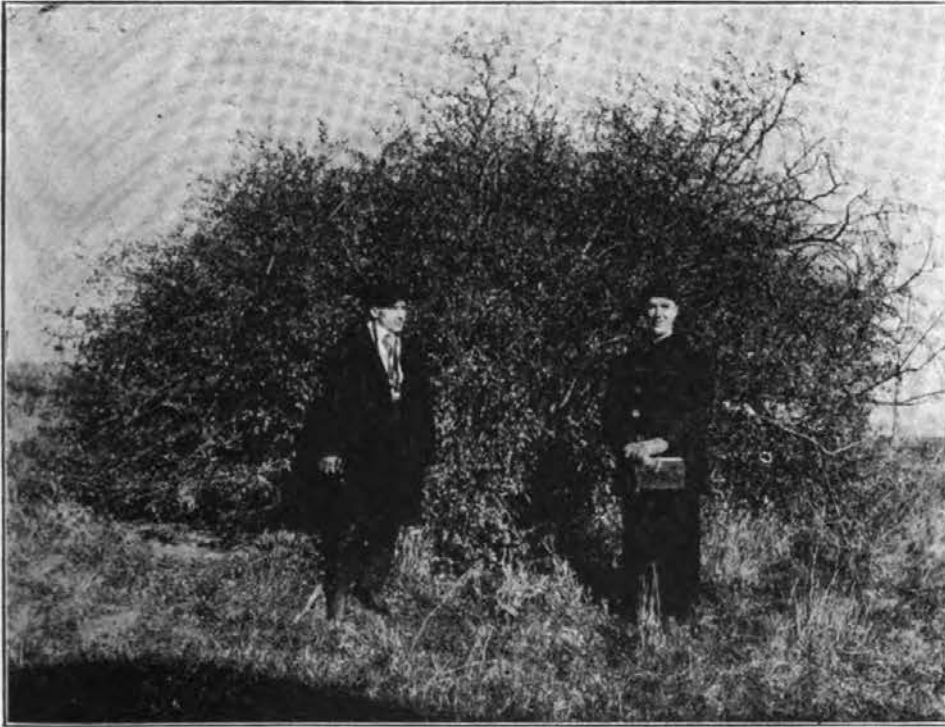


FIG. 73.—A single large Barberry on the Lowry place, Montpelier. Photographed by A. L. Parrman, 1918.

twenty years old. Many of the plants were, however, only four or five years old.

The Wild Barberries at Galena, Freeport and Port Byron, Illinois.
—The limestone rock of the Galena region is highly favorable for the development of wild barberry. Some very large cultivated bushes with thousands of shoots occurred at several points in Galena and Port Byron. How long the barberry has been cultivated in Galena is not known, probably twenty or thirty years. The courthouse was built in 1839. It is probable that the barberries were introduced much later. The large plants may have been thirty-five years old, or perhaps forty. Up in the limestone bluffs about one-quarter of a mile distant from the cultivated barberry plants were barberry plants which had been carried there by birds. Wild bar-

Luther of Dubuque and Mr. Reintz of Freeport. Both men were quite familiar with the plant. The town of Port Byron, Illinois, is opposite LeClaire, Iowa. There were many hedges of the common barberry at this point. Wild plants were found along the right of way of the Chicago, Milwaukee & St. Paul Railway, on both sides of the track, on the bank of Mississippi river. The plants undoubtedly came from larger bushes about 800 feet away.

Wild Barberry Plants at Montpelier and Le Claire.—The city of Montpelier is one of the oldest places in Muscatine county. An old



FIG. 74.—A clump of escaped Barberry (*Berberis vulgaris*) near Montpelier. The original clump was to the right of the house and back of the evergreens. Photographed by A. L. Parrman, 1918.

hedge was observed on the F. D. Lowry place, one and a half miles from Montpelier. The old hedge might have been between forty and fifty years old. Mr. Lowry stated that the plants had been there for fifty years, as long as he can remember, and he thought they might have been eighty years old. We doubt this, since that would carry it back to the time of the earliest settlement in the county. The plants were large and many of the old stalks died many years ago. Some had spread across the road some 1500 feet away from the older clumps. The trees in the Lowry pasture con-

pasture and near it were red cedars (*Juniperus virginiana*). The black walnuts had evidently been planted there many years ago. Other trees noted in the pasture were bur oak (*Quercus macrocarpa*), American elm (*Ulmus Americana*), slippery elm (*U. fulva*), red haw, white ash, black cherry, and across the road were basswood (*Tilia Americana*), swamp white oak (*Quercus platanooides*), and

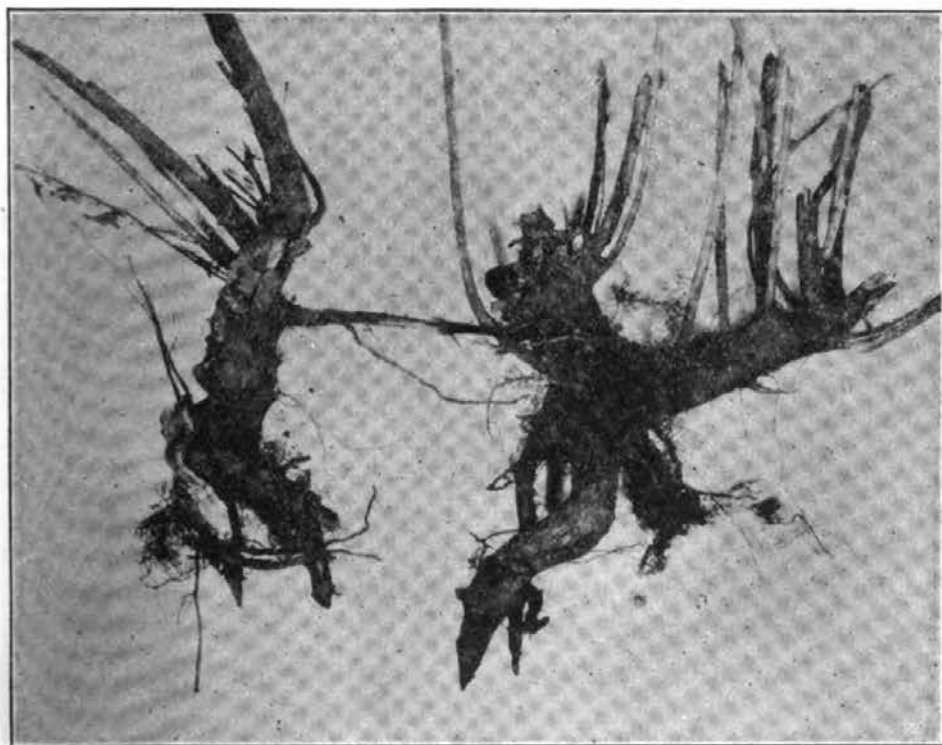


FIG. 75.—Old (escaped) Barberry roots, Montpelier. Photographed by F. E. Colburn, 1918.

honey locust (*Gleditsia triacanthos*). Of the shrubs I observed the Missouri gooseberry (*Ribes gracile*), wild grape (*Vitis vulpina*), sumach (*Rhus glabra*), dogwood (*Cornus asperifolia*), blackberry (*Rubus nigrobaccus*) and black currant (*Ribes floridum*). The herbaceous plants observed were sweet William (*Phlox divaricata*), blue grass (*Poa pratensis*), *P. compressa*, timothy, *Phleum pratense*.

The timothy was common near the barberry bushes. On every one of the clumps of wild barberry aërial infection was observed on May 19, 1919, but there were no cups. It would appear that the infection might have come from timothy. The writer observed in Muscatine and Louisa counties *Hordeum pusillum*, *Bromus tectorum*, *Secale cereale* heading out. Winter wheat and squirrel tail grass also were observed, but in no case did the writer observe uredo stage on these grasses. In this connection attention may be called to stations established in Manchester in the fall of 1918 containing an abundant infection of *Puccinia graminis* on *Hordeum jubatum*, *Agrostis alba*, *Agropyron repens*, *Phleum pratense* and *Dactylis glomerata* and rye. In no case did the writer find any indication of *P. graminis* on

the grasses on May 12, 1919. In this connection it may be said that *P. coronata* was common on orchard grass in Manchester in October, 1918, and yet there was no indication of uredo spores of this rust on orchard grass on May 12, 1919. The writer also made observations on *Hordeum jubatum*, *Agrostis alba*, *Agropyron repens* and winter rye at LaMont in Butler county, but there were no indications of uredo spores of *P. graminis* on these grasses. *Hordeum jubatum*, squirrel tail grass, was observed at Ames with a heavy infection of *P. graminis* last fall, but up to the writing of this paragraph on May 22d has shown no indication of uredo spores. On May 18th there was no indication of *P. graminis* on winter rye.

The large wild barberry plants here were perhaps twenty-five years old. Several clumps were scattered through the woods and along the roadside.

The barberry had escaped near Montpelier before 1900 according to Mr. W. D. Barnes, Ferd Reppert and A. A. Miller. On page 202 of the Flora of Scott and Muscatine counties²³ published in 1900 they state: "In woods west of Montpelier." This is the only locality given by these authors. If other had been known they would have been mentioned by Mr. Reppert who was a keen observer.

Warren Upham in his Catalogue of the Flora of Minnesota²⁴ published in 1884 reports that Leiberg found barberry spontaneous in old fields at Mankato, Minnesota. It is likely that Leiberg found the plant several years previously, making barberry spontaneous in the late seventies or early eighties.

At Le Claire we visited the J. B. Johnson hedge two and one-half miles from Le Claire. According to Mr. Johnson the hedge is forty-six years old, and is seventy rods long. Formerly it was trimmed back, but now little is done. It was not dug out or removed because his mother said the father planted it, and there was much sentiment connected with it. The house stands on a hill, a private road leads from the highway west and then curves slightly to the north, leaving a bank to the south. On the bank I found some black oak (*Q. velutina*) and some red cedar, a single red cedar on the top of the hill south side and several red cedars on the north side of the road on the slope; between the hill and the highway on the north side are several wild bushes and on the bank below the oaks I found between fifty and sixty wild plants, one to five years old. The man who originally planted this hedge must have had considerable horticultural interest. He set out some *Rhamnus cathartica*, *Syringa vulgaris*, *Spiraea Thunbergii* and back of it is an orchard overrun with *Rhus occidentalis*, *R. villosus* and weeds. I did not, however, find any

²³Proc. Davenport Acad. Sci. 1900: 202.

²⁴Flora of Minnesota and Natural History Survey of Minn., Pt. VI. Annual Report of Progress.

wild barberry. The wild plants are some 400 feet from the original hedge. A few are only twenty feet away. There is no question that the plants on the hill were scattered by birds. Professor Paar-

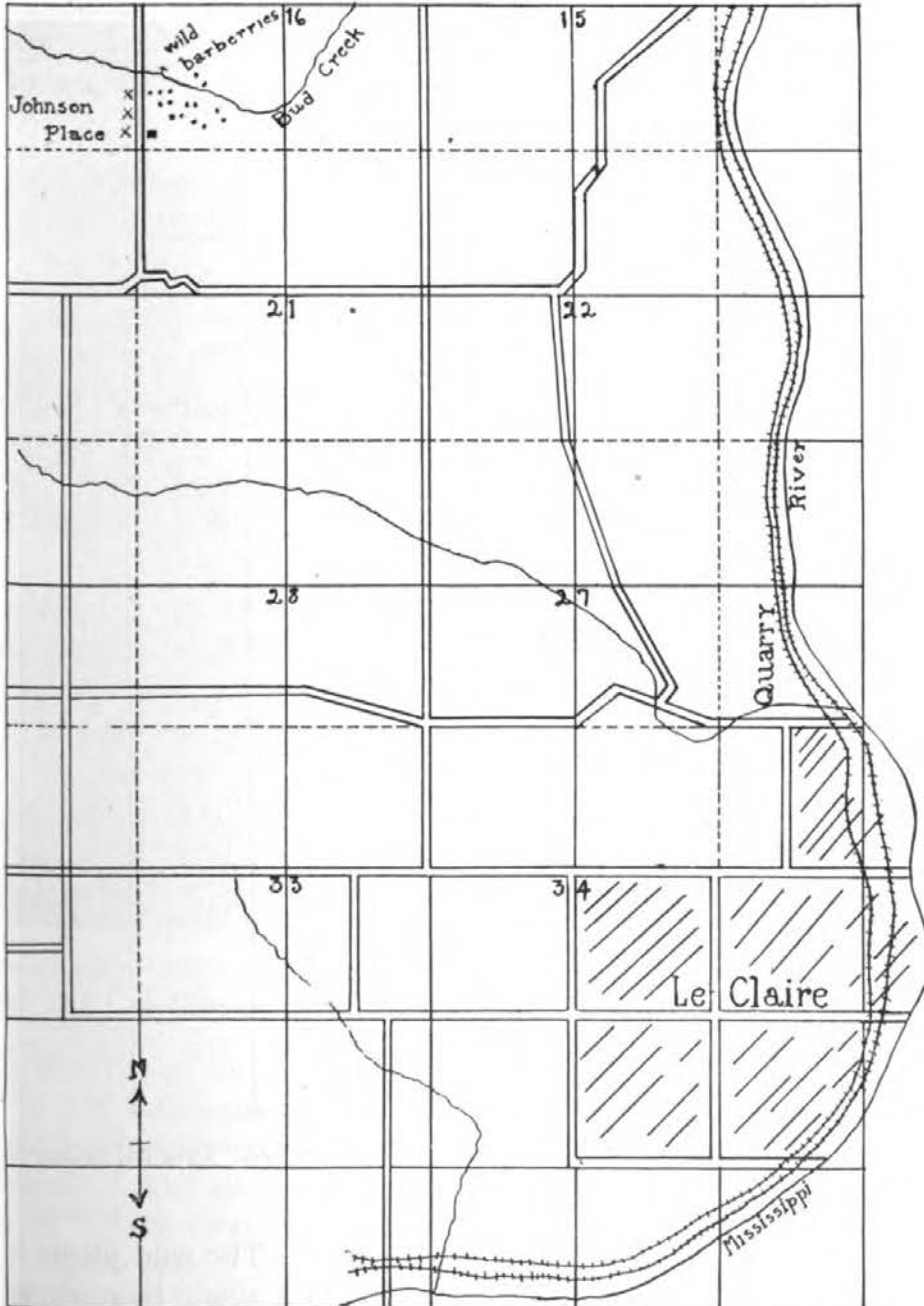


FIG. 76.—General map of LeClaire and the Johnson place. (C. M. King.)

man says that the Cedar wax wing is the important scatterer of the seeds, and in Iowa this occurs from February to April. We next visited the timber where the wild plants are scattered over an area

of some eighty acres. In all cases the wild plants were observed on the slope of the hills from seventy-five to ninety rods from the hedge. In some cases these wild plants were loaded with fruit. Mr. Johnson states that there was one large plant on the river

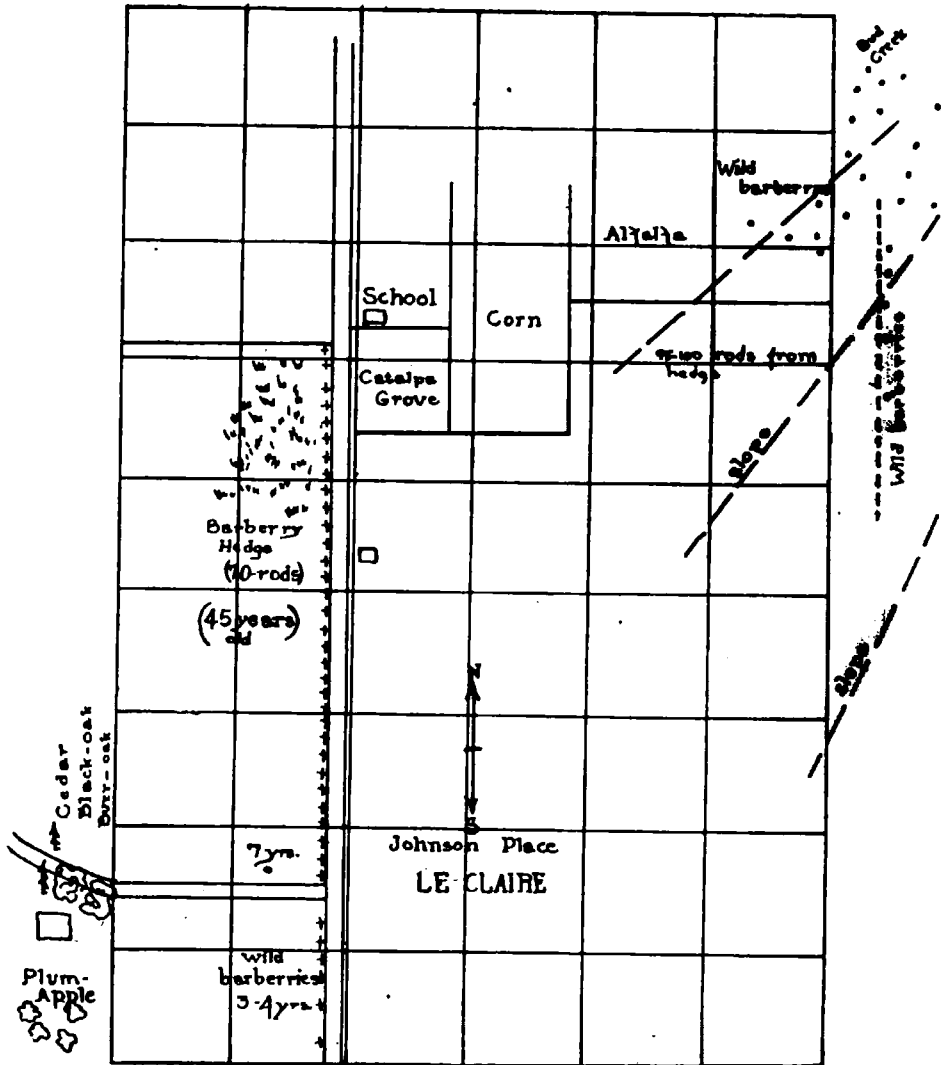


FIG. 77.—Wild Barberry on Johnson place near LeClaire. Original hedge on highway. Oats not fit to harvest.

bottom, a little over a quarter of a mile away. The wild plants in the pasture are perhaps thirty years old. On a single large clump in the hedge, I estimated 30,000 seeds. In some cases there are even as high as 40,000. Red top and timothy in the vicinity were badly rusted. According to Professor Bliss, wheat in the vicinity was also badly rusted. However, Mr. Johnson does not think the barberry is responsible for the rust on grain.

Wild Barberry in Manchester.—The history of the wild barberry on the Cook farm, four miles west of Manchester and one-fourth of a mile from the Hawkeye trail in Delaware county, is as follows: Mr. Edward Cook bought the place twenty years ago. He found on it several bushes of the common barberry. These were cut off a few years later. From the cut-off bushes new clumps began to come

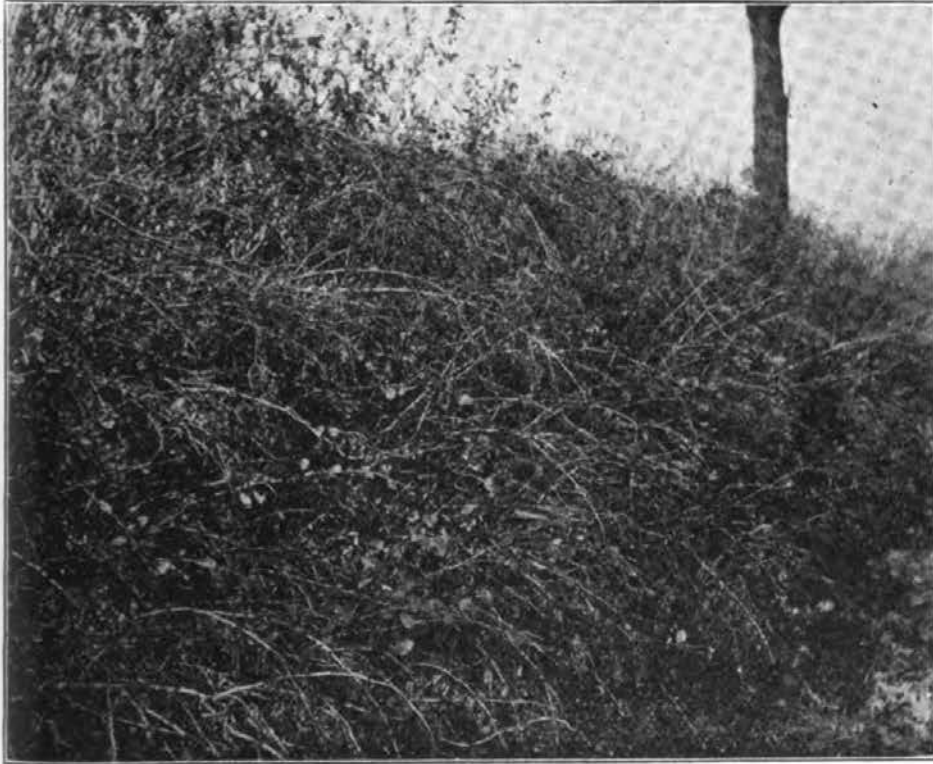


FIG. 78.—The Johnson Barberry hedge near LeClaire, from which the wild Barberry in that vicinity originated. Photographed by A. L. Parrman, 1918.

up. The Cooks found that birds carried the seed to the orchard and to the native timber beyond. The timber has since been removed, leaving numerous old stumps of trees remaining. The timber consisted of bur oak, black oak, black cherry and haw (*Crataegus mollis*). There were also clumps of choke cherry (*Prunus virginiana*), *Ribes gracile* and in low places *Spiraea salicifolia*. The old grove is now pretty closely grazed so that few shrubs remain. However, the large clumps of barberry are conspicuous in the wood lot. It would appear that the larger clump may have been there for twenty or thirty-five years. Only a few planted hedges were reported to Doctor Melhus in the county, and one of these was in Manchester.

Wild Barberry at Clinton, Iowa.—Mr. R. S. Kirby reported a considerable number of wild barberries in Clinton early in the season of 1918. The plants occurred on the E. E. Pearce place, Mount Pleasant Park and Turner Hall woods. The Pearce place is situated on Bluff Boulevard and Second Avenue. The Mount Pleasant Park is on Second Avenue and Turner Hall woods are beyond. Mrs. Pearce told me the barberry hedge was planted on

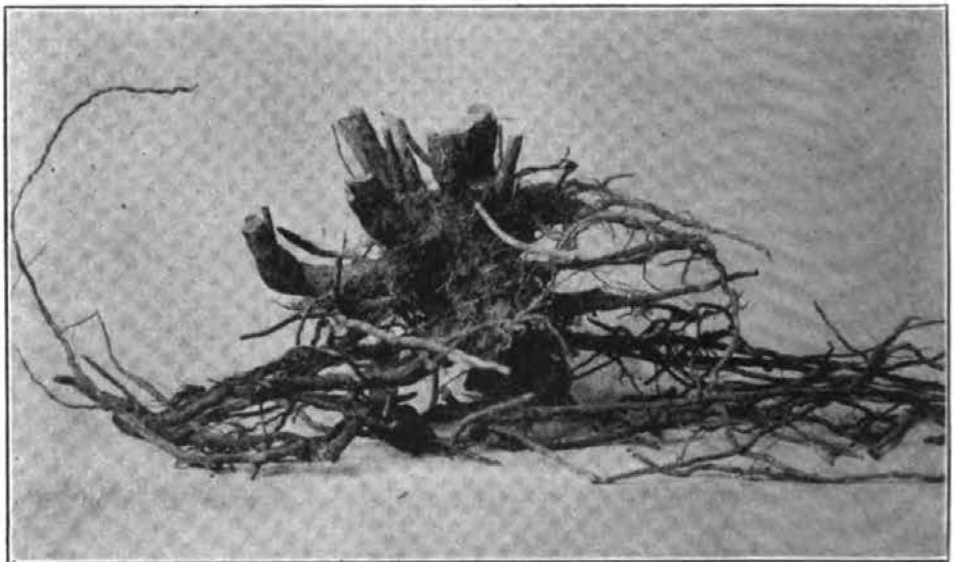


FIG. 79.—Clump of Barberry on Johnson place near LeClaire. Photographed by C. R. Quade, 1918.

the property about forty years ago. Mount Pleasant is situated on a hill, and on Second Avenue there is a trimmed osage orange hedge. To the west of this enclosure there is an old barberry hedge and some osage. This hedge originally separated the wooded pasture from the other ground to the east. There are some fairly good sized white pine adjacent, running north, and with the hedge are willow and Scotch pine. Adjacent to this hedge is the pasture, which consists of various hardwood, bur oak, red oak, *Carya ovata*, *Ulmus Americana*, *U. fulva* and some *Catalpa k mpferi*. There were also some *Sambucus canadensis*, *Quercus velutina*, *Tilia Americana*, *Celtis occidentalis* and *Rubus occidentalis*.

Among the other plants observed in this pasture, mention may be made of *Eupatorium urtic folium*, *Hedeoma pulegioides*, *Monarda fistulosa*, *Verbena stricta*, *Arctium major*, *Verbena urtic folia*, *Solidago canadensis* and *S. serotina*, *Brunella vulgaris*, *Muhlenbergia Schreberi*, *Bromus inermis* (abundant along the fence and hedge rows), thoroughly naturalized, *Poa pratensis*, *Dactylis glomerata*.

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Agrostis alba, *Phleum pratense*. There was also some naturalized *Symphoricarpos orbiculatus* along the hedge and *Smilax* (Green Brier).

There are some rather large clumps of escaped barberry in this wooded pasture (north side of Second Avenue and west of the build-

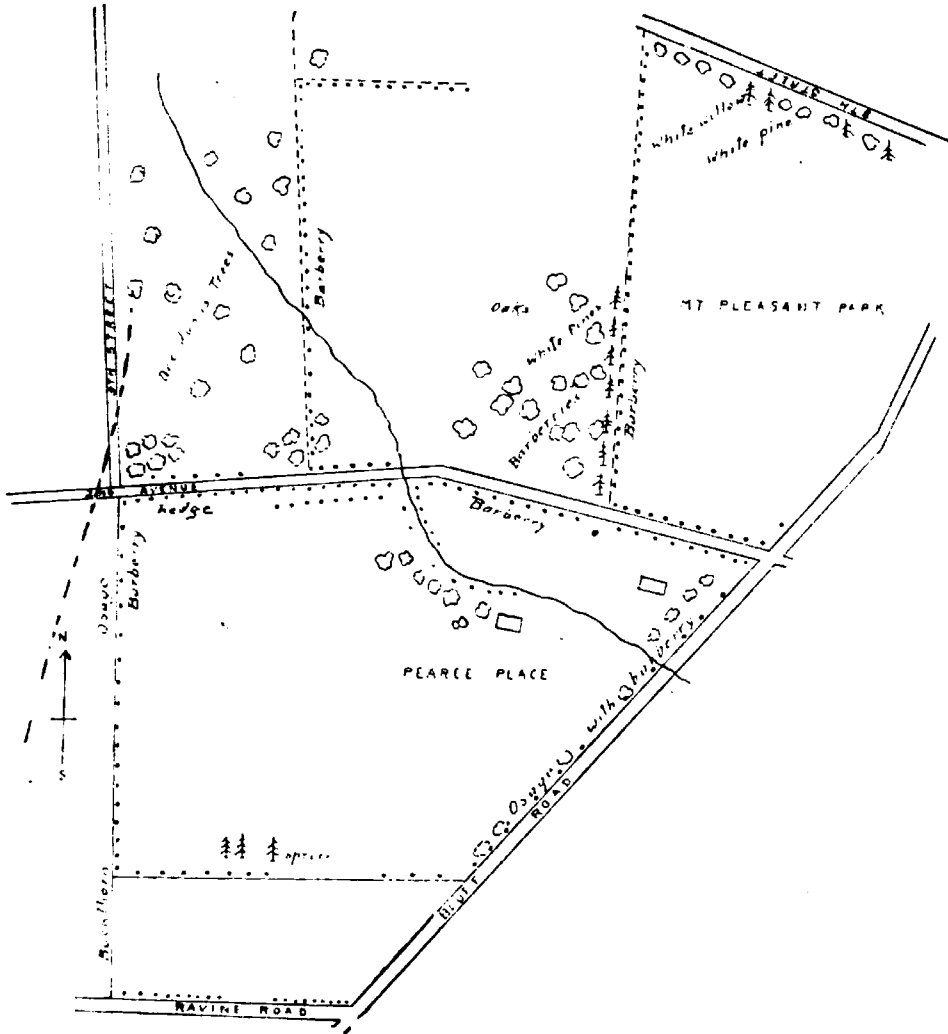


FIG. 80.—Wild Barberrry, Clinton. Barberrry marked by dots. R. S. Kirby, L. H. Pammel and C. M. King.

ings belonging to the Spiritualists). One clump I found may have been twenty to twenty-five years old. On one of the larger of the stalks, one and one-half inches in diameter, I counted fourteen annual rings. Two of the others were between ten and fifteen years old. The larger clump had a large number of young seedlings from one to three years old under the tree. The large wild barberry had an abundance of fruit, about 5,000 seeds. This plant was about 450 feet from Second Avenue and about 200 feet from

the nearest barberry bush. The bushes in northwest corner of the pasture were some 300 feet from the nearest barberry bush. All of the plants occur on the hillside. The larger ones are on the north slope. Several ravines run through this pasture. The plants in the Pearce hedge had few seeds. Many of the plants had been cut back. Where the plants had been cut back a large number of young shoots have appeared from suckers.

As to the rust an abundance was found on the old stems of *Hordeum jubatum*, *Agrostis alba*, and some on timothy, nothing on orchard grass. No recent pustules of *P. graminis* were seen on volunteer oats or on green stems of *Hordeum jubatum*. The rust pustules were found on *Phleum pratense* but no *P. graminis* was seen on volunteer oats and very little of *P. coronata*. Nothing (*P. graminis* or *P. coronata*), was present on *Bromus inermis*. There was an abundance of uredo spores on blue grass, but nothing, however, on orchard grass. There was a buckthorn hedge west of the Pearce place. There was some *P. simplex* near the Chicago & North Western Railway depot in Clinton, but no *P. graminis* on barley.

This trip was made late in November, which accounts for the scarcity of uredo pustules on the wild grasses and oats. The volunteer oats had been killed nearly to the ground.

Wild Barberry at Kelley.—During the winter in a conversation with Mr. P. L. Petersen, I learned that a considerable number of escaped barberries occurred on his place two miles east of Kelley on Walnut creek. The original hedge was planted by Mr. Giddings who sold the farm to Mr. W. P. George. Mr. Raymond Fogelman, who a little later investigated the area for the federal government, found and placarded the area where the escaped barberries occurred. I visited the place with Dr. E. D. Ball and Mr. Ness on May 22, 1919. The wild and cultivated barberries have been in the region for at least twenty years, according to Mr. Weeks. I counted 300 clumps, varying from a few years standing to clumps at least fifteen or eighteen years old. One large clump, six feet across, had eighty stalks and there were others as large. Many of the plants were full of bloom. There seems to be at least some barberry not referable to the true *B. vulgaris*. In leaf character it fits the *B. canadensis*, but the flowers are like *B. vulgaris*. The leaves resemble the leaves of one of the varieties of *B. vulgaris* in our herbarium. The plants, as a whole, were healthy looking, except on some of the steep banks where they suffered somewhat from the drought of last year. The escaped barberry occurred on the east and west sides of the creek, on the farm owned by Messrs. Petersen and Finch, altogether for about one-half mile along the wooded creek, in the valley, as well as on the hillside. In some places it was much more abundant than in others. They were found on the banks, as well as on the slightly

sandy alluvial bottom. The soil on the banks is a bluish, sticky clay, or of a yellowish color in a few places slightly springy.

It may be of interest to make a note of the plants found in the region; the Missouri gooseberry (*Ribes gracile*) is common and is generally distributed in the area. There was also some *Ribes cynosbati* and *Cornus asperifolia*. The only other shrubs found here are *Vitis vulpina*, *Psedera vitacea*, *Rhus Toxicodendron*, *Celastrus scandens*, *Xanthoxylum americanum*, *Rosa arkansana*, *Rubus occidentalis*. The following trees were rather common, hackberry (*Celtis occidentalis*) hickory (*Carya ovata*) bur oak (*Quercus macrocarpa*), a few red oaks (*Q. rubra*) and white oak (*Q. alba*), red haw (*Crataegus mollis*, *C. punctata*), elm (*Ulmus americana*, *U. fulva*), ironwood (*Ostrya virginiana*), basswood (*Tilia americana*), wild crab (*Pyrus ioensis*), choke cherry (*Prunus virginiana*), black cherry (*P. serotina*), hard maple (*Acer nigrum*), red mulberry (*Morus rubra*), the Russian mulberry (*Morus alba* var. *Tatarica*) (naturalized in several places, came from the Giddings place), black walnut (*Juglans nigra*). The herbaceous plants noted were the blue violet (*Viola cucullata*), Sweet William (*Phlox divaricata*), columbine (*Aquilegia canadensis*), *Solidago ulmifolia*, *Poa pratensis*, *Phleum pratense*, *Sanicula marilandica*, *Smilacina stellata*, *S. racemosa*, *Fragaria virginiana* var. *illincensis*, *Vicia americana*, *Aster sagittifolius*, wild cranesbill, *Geranium maculatum*. The question has sometimes been raised as to whether the soil where the plants establish themselves belongs to the calcareous type. The area near Kelley belongs to the Wisconsin drift soil and while limestone is not in evidence on the surface the soil is not acid but must be classed as one having an abundance of lime. It may be of interest to remark that every clump of barberry examined by the writer contained yellow spots, showing infection, and in quite a few cases spermatogonia were evident and in others full developed æcia discharging their spores freely. I found some timothy in the vicinity of the bushes, but the æcial infection, I think, came from the oats some 300 feet away and in all probability also from the squirrel tail which was much nearer, some 150 feet away. There were certainly enough æcia on these barberries to cause a local rust epidemic.

In a previous paper I gave the approximate number of æcial spores produced at Pocahontas, Iowa. The figures I gave there are perhaps too small. On one plant I counted twelve æcial infected leaves. Miss C. M. King estimated approximately 4,000 spores in one of the æcia. This infected leaf had 48,000 spores. Another badly infected leaf had 120 æcia. On the same basis there were

480,000 spores on this single leaf. I did not try to find all of the infected leaves on any single barberry, but on some I counted as many as ten infected leaves, which would make 4,800,000 spores per plant. If we now multiply this by 100 it would give us 480,000,000 æcial spores for this little area, enough to cause a rust epidemic in the region.

Wild Barberries in Other Localities.—During the summer of 1919 the writer observed wild barberries at the following points in Iowa:

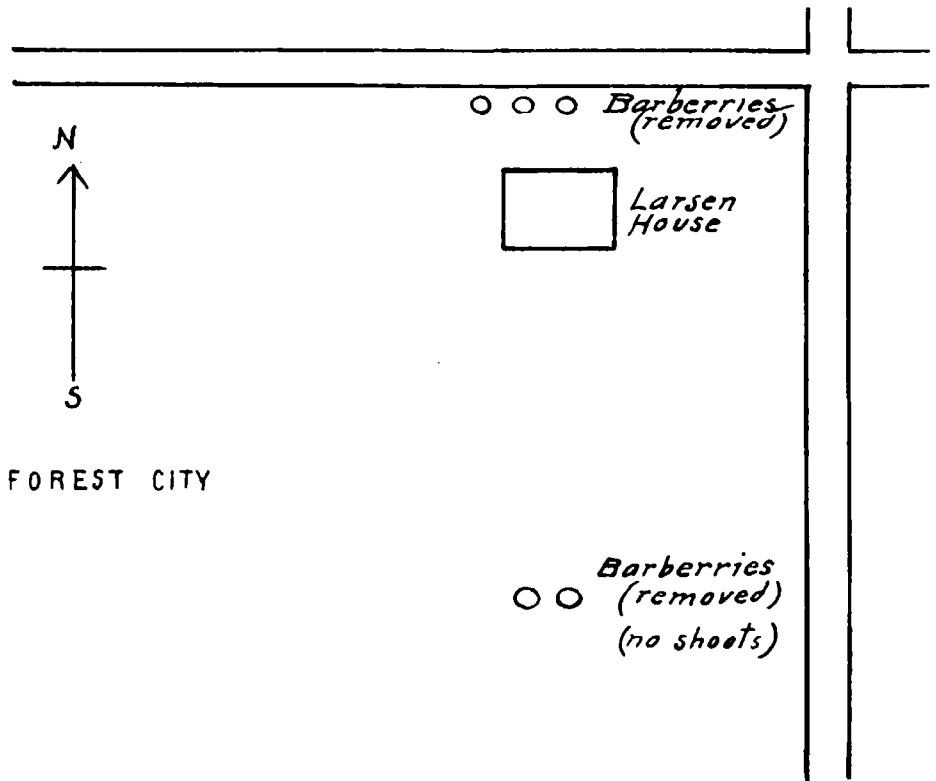


FIG. 81.—Barberry removed, but an abundance of young shoots.

McIntosh woods shore of Clear Lake, Doughty woods shore of Iowa Lake, a mile southwest of Monmouth in Jackson county, Van Wert where it was collected by Mrs. E. E. Castor and a mile from Mt. Carmel on the farm of Albert Wiederin, section 30, Sheridan township, in northern Carroll county where it was found by the writer and Mr. J. F. Coupe. The circumstances under which these wild barberries occur are so different that it may not be amiss to say a few words about it.

The Carroll county specimens were found on the banks of the highway and growing with such plants as *Solidago Missouriensis*, *S. rigida*, *Aster laevis* and *Kuhnia eupatorioides*. It is on the divide

between the Missouri and the Mississippi basin and the soil is Missouri loess.

The specimens at Monmouth were growing in Maquoketa limestone rock, associated with bur oak (*Quercus macrocarpa*) *Solidago nemoralis*, *S. rigida* and *Aster azureus*.

The specimens at Clear Lake occurred on drift soils associated with *Quercus macrocarpa*, *Ostrya virginiana*, *Prunus serotina*, *P. virginiana*, *Tilia americana*, *Ulmus fulva* and *Celtis occidentalis*.

The specimens on the shores of Iowa Lake also are in drift soil. Some of the plants noted by me as being found in the woods were as follows: *Quercus macrocarpa*, *Ulmus fulva*, *U. americana*, *Tilia americana*, *Celtis occidentalis*, *Prunus virginiana*, *P. serotina*, *Rhus typhina*.

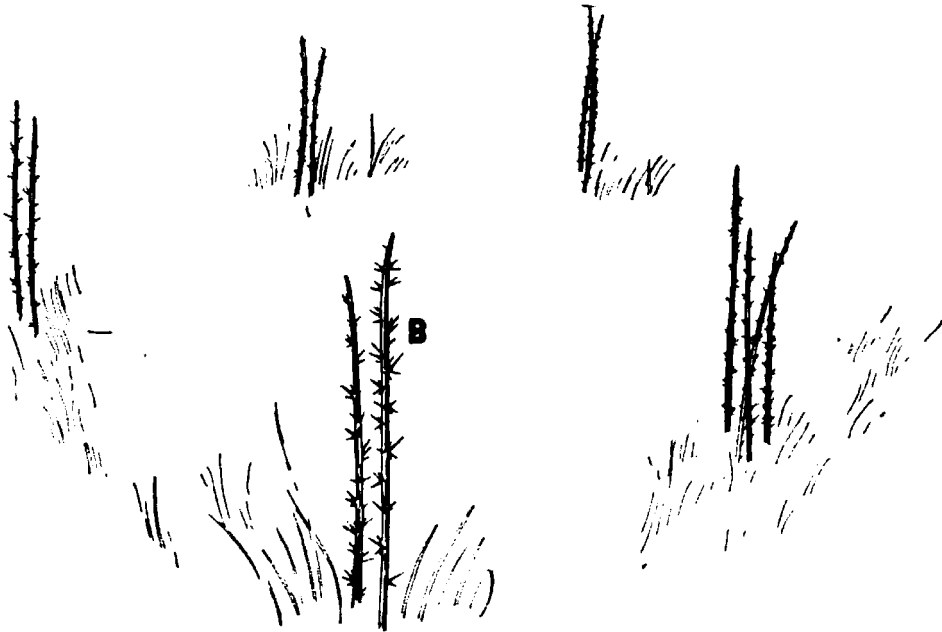


FIG. 82.—Young Barberry shoots coming from roots of old plant removed two feet from the center of the area B. Drawn by C. M. King.

It is difficult to say from what I have observed that calcareous rocky soil is particularly favorable to the establishment of the barberry. The habit of the plant has been changed because of its long period of migration from Asia. It has established itself wherever birds have scattered its seed.

Mr. J. J. Wilson tells me that there are also some escaped barberries near Colo. These escaped from an old nursery.

The localities of wild escaped barberries in Iowa and adjacent states known to the writer may be summarized as follows:

| LOCALITY | COLLECTOR |
|---|---------------------------------|
| Calamus, Clinton county, Iowa..... | J. J. Wilson |
| Near Calamus, Scott county..... | J. J. Wilson |
| Kelley, Story county, Iowa..... | L. H. Pammel |
| Clinton, Clinton county..... | R. S. Kirby |
| Clinton, Clinton county..... | L. H. Pammel |
| Manchester, Delaware county, Iowa..... | L. H. Pammel |
| Le Claire, Scott county, Iowa..... | L. H. Pammel |
| Montpelier, Muscatine county, Iowa..... | L. H. Pammel |
| Montpelier, Muscatine county, Iowa..... | First reported 1900 |
| Mankato, Minnesota | J. B. Leiberger, 1884 |
| Galena, Illinois | L. H. Pammel |
| Postville, Allamakee county, Iowa..... | L. H. Pammel |
| Clermont, Fayette county, Iowa..... | L. H. Pammel |
| McGregor, Clayton county, Iowa..... | L. H. Pammel |
| McGregor, Clayton county, Iowa..... | Carl Bickel |
| Monmouth, Jackson county..... | L. H. Pammel |
| Mt. Carmel, Carroll county..... | L. H. Pammel and F. J. Coupe |
| Shores of Clear Lake, Cerro Gordo county..... | L. H. Pammel |
| Shores of Iowa Lake, Emmet county..... | L. H. Pammel |
| Van Wert, Decatur county, Iowa..... | Mrs. E. E. Castor |
| Garner, Hancock county, Iowa..... | L. H. Pammel |
| Garner, Hancock county, Iowa..... | Winifred Gilbert |

In conclusion, I wish to express my thanks to C. R. Ball and to Dr. H. B. Humphrey of the Cereal Investigations Bureau of Plant Industry, U. S. Department of Agriculture, for their kindness in the prosecution of this work; to Dr. I. E. Melhus, R. S. Kirby and L. W. Durrell for the use of some unpublished manuscript, to Prof. A. Paarman for notes on birds in connection with the distribution of the barberry and some photographs, and to Miss Charlotte M. King for sketching of maps showing distribution of the barberry.

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