

Seven alien plant species

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This report is based upon a study of selected species found in William L. Hutcheson Memorial Forest (Adjemovitch 1958). Alien species is here interpreted as being species which have been introduced into this country with, or after, the arrival of the first settlers. Frei and Fairbrothers (1963) list a total of 71 alien species for Hutcheson Forest. Gray's Manual of Botany (Fernald 1950) is the authority for the names used herein.

Most of the alien species in Hutcheson Forest are herbaceous and for the most part they are annuals. The species studied are: *Acer platanoides*, *Ailanthus altissima*, *Berberis thunbergii*, *Lonicera japonica*, *Paulownia tomentosa*, *Prunus avium*, and *Rosa multiflora*, all of which, as woody perennials, are likely to have a permanent effect on the composition of the stand.

Hutcheson Forest, owned by Rutgers, The State University of New Jersey, offers an excellent opportunity for such a study, as it is an old, comparatively undisturbed oak forest. Some of its individuals date well back into the period of Indian occupancy of this area (Buell, Buell, and Small 1954). It has been referred to as "approximating climax" in development on the Piedmont plateau in New Jersey (Bard 1952). It is believed to have had a minimum of human interference since Colonial times (Monk 1957).

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METHODS

This study is essentially of two parts. The first concerns the phenological data of the seven selected species. Individuals of each species were chosen either because they had previously been studied for several consecutive years or, in other cases, an attempt was made to study individuals in both sunny and shaded environments. These individuals were observed every week for growth of terminal

shoots, and for the appearance and shedding of leaves, flowers and fruits.

The second part of this study deals with mapping the distribution of the seven selected alien species in Hutcheson Forest. A permanent grid system was laid out in the forest with posts at the corners. Twenty-meter strips within the 100-meter grid system were used for this survey. The locations of the individuals of alien species were recorded and later placed on the map (fig. 1). At the same time, a brief note was made as to their size and general appearance. When mapping the occurrence of Japanese honeysuckle (*Lonicera japonica*), a certain amount of subjectivity was resorted to in determining its extent. Honeysuckle is practically ubiquitous in the Forest and only the areas of highest concentration were mapped.

CONSIDERATION OF THE SPECIES

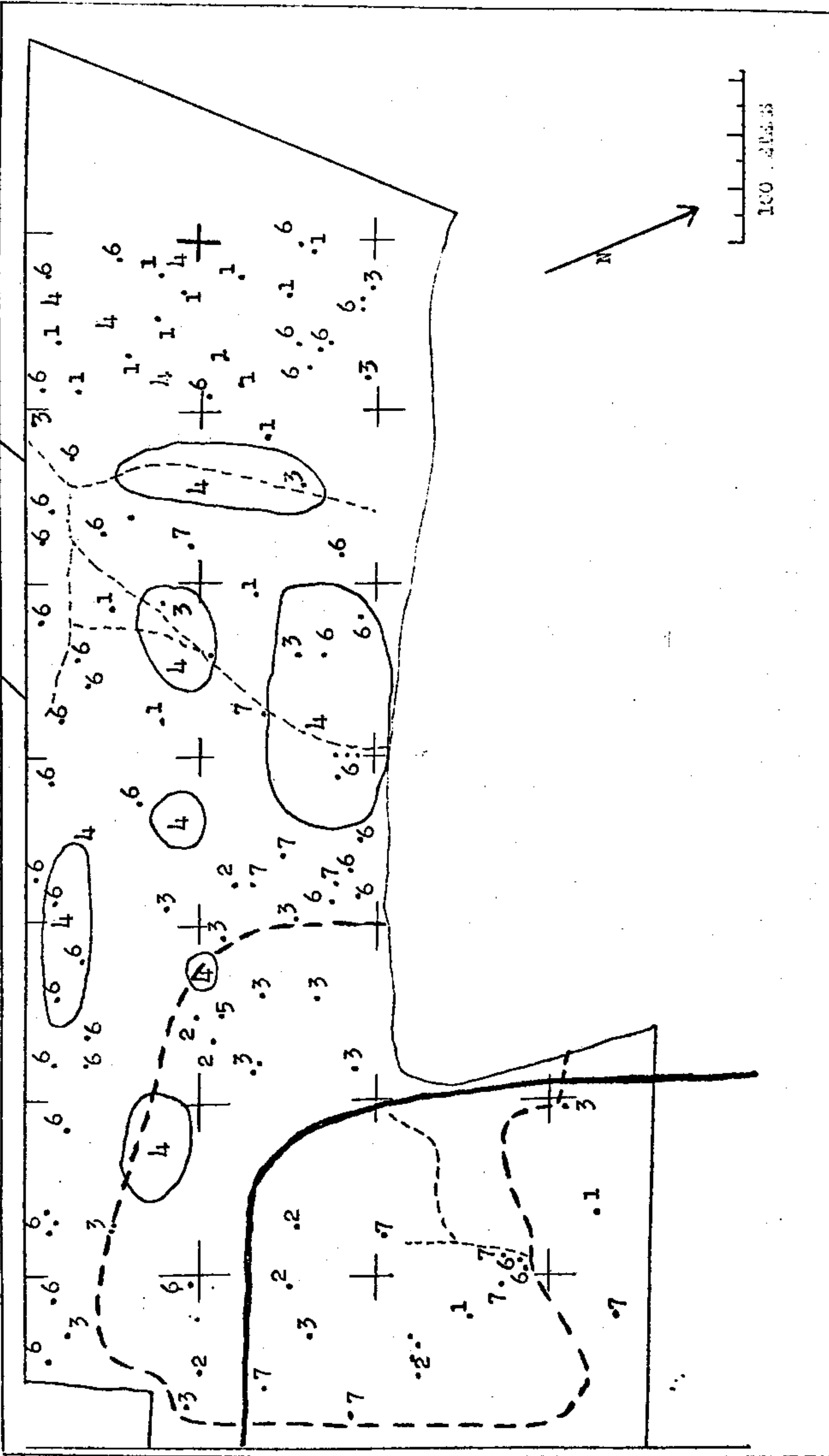
1. Norway maple (*Acer platanoides*). This tree is common in the woods of Lithuania, Finland and Norway where it "clothes hills from seashore to summit" (Loudon 1830); it is frequently found in the central parts of Europe, the Balkans (Panov 1953), as well as in parts of western Asia, on the northern exposures and in the higher parts of mountains (Pettracic and Anic 1952).

It was introduced into North America in the early part of the 19th century by William Hamilton of Philadelphia who, at the close of the Revolutionary War, planted most of the ornamental and hardy fruit trees, known at that time in Europe, on his estate—"The Woodlands"—on the right bank of Schuylkill (Hedrick 1950). It may well have been introduced earlier by other horticulture patrons, but it must not have been widespread in its distribution during the 19th century, as the species is not given in the 7th edition of Gray's Manual of Botany (Robinson and Fernald 1908).

Once introduced as an ornamental and used extensively as a street tree, to which it was well suited, the Norway maple escaped into adjoining areas. There are seed-bearing trees on Mettler's property and elsewhere in nearby East Millstone from which the species has presumably spread to the Hutcheson Forest where seedlings can be found abundantly.

There are several seed-bearing individuals of *Acer platanoides* in Hutcheson Forest. Monk (unpublished

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Spooky Brook; heavy dashed line==main trail; fine dashed line==secondary trails; fine solid line (4) == approximate extent of *Lonicera* patches; cross==posts in grid system.

Fig. 1. Location of seven alien species in eastern half of William L. Hutcheson Memorial Forest. 1. *Acer platanoides*, 2. *Ailanthus altissima*, 3. *Berberis thunbergii*, 4. *Lonicera japonica*, 5. *Paulownia tomentosa*, 6. *Prunus avium*, 7. *Rosa multiflora*. Heavy solid line==

data) counted 14 trees over 5 inches d.b.h. and 69 of 1 to 5 inches d.b.h.. They are all restricted to the better drained portions of the forest, where they occur in greatest concentration along the peripheral zone in the younger parts of the forest. There are a few saplings in the older part of the forest. The phenological data show that the Norway maple has a longer growing period and displays its leaves for a greater length of time than the other maples in the forest. Table 1 gives the length of the growing season for a terminal shoot on the branch of one of these saplings, as well as the period during which the tree had leaves. The leaves of the Norway maple turn from a summer green to brown, going through a transitional yellow coloration in a one to two week interval, and do not display the vivid colors seen on the two native maples present in the forest. This change in coloration occurs around the second or third week in November for the Norway maple, while for both the red and sugar maples the change in leaf coloration is already noticed in the third and fourth weeks of October. Some trees were seen in bloom from April 17th to May 11th in 1957 and the fruits were noted from May 15th to July 17th.

2. **Tree-of-heaven** (*Ailanthus altissima*). A native of China, this species was brought into England in 1751 (Nicholson 1887), and from there to America at the beginning of the 19th century (Hedrick 1950). Despite the disagreeable odor of the staminate flowers it has been favored in cities due to its rapid growth, ornamental leaves and resistance

to smoke. "It grows rapidly for the first ten or twelve years, in favorable situations, afterwards growing more slowly. It is quite hardy and thrives in almost any soil, though one that is light and somewhat humid as well as sheltered, suits it best" (Hedrick 1950). The wide distribution and naturalization of this species since its introduction indicates a wide range of adaptability. Hartel (1955) describes the native habitat of this tree.

It is found on the better drained sites in Hutcheson Forest in areas of light shade. It is almost entirely limited to blowdown openings and is not a numerically important member of the community. The majority of the trees are under six years of age. They are almost always associated with *Rubus allegheniensis*.

Data on growth of shoot apex for a tree of this species have been kept since 1955 and are summarized in table 2. Growth started in the second half of April and continued throughout August for two years. The shortened growth period in 1957 was undoubtedly caused by the severe drought. No flowering was noticed in 1957, but a tree with fruit was recorded in 1963 and 1964.

The tree-of-heaven has become a naturalized member of the flora of the northeastern United States, invading new areas by means of its wind-borne samaras. When once established, it can spread by root suckers becoming, as Fernald (1950) states, "too aggressive". The youth of the plants present in this forest indicates that they are either recent arrivals or, so far, unsuccessful recurrent invaders.

TABLE 1. Summary of phenological data from observations made in Hutcheson Forest from 1951 through 1957.

Year	Species	Terminal growth of branch tip			Leaves		No. of weeks plant in leaf
		begin	end	no. of weeks	appear	all off	
1951	<i>Acer platanoides</i>	4/14	6/15	8	4/28	11/28	31
	<i>A. rubrum</i>	4/21	6/1	5	5/5	11/17	28
	<i>A. saccharum</i>	no record			no record		—
1952	<i>A. platanoides</i>	4/5	6/13	9	5/2	11/26	29
	<i>A. rubrum</i>	no record			5/9	11/5	26
	<i>A. saccharum</i>	no record			no record		—
1953	<i>A. platanoides</i>	4/4	5/30	8	4/25	11/26	31
	<i>A. rubrum</i>	4/18	5/30	6	5/9	11/26	29
	<i>A. saccharum</i>	4/11	5/30	7	5/9	10/28	25
1954	<i>A. platanoides</i>	3/24	no record	—	4/21	12/1	32
	<i>A. rubrum</i>	4/7	6/9	9	5/5	12/1	30
	<i>A. saccharum</i>	3/24	6/2	10	5/5	11/17	28
1955	<i>A. platanoides</i>	4/6	6/1	8	4/27	11/23	31
	<i>A. rubrum</i>	4/6	5/25	10	5/6	11/16	26
	<i>A. saccharum</i>	3/23	5/19	8	5/4	11/9	25
1956	<i>A. platanoides</i>	4/11	6/22	10	5/2	11/28	29
	<i>A. rubrum</i>	4/11	6/6	8	5/9	11/21	28
	<i>A. saccharum</i>						
1957	<i>A. platanoides</i>	4/3	6/26	11	4/24	12/4	32
	<i>A. rubrum</i>						
	<i>A. saccharum</i>	4/10			5/16		

TABLE 2. Data on growth of a tree of *Ailanthus*.

Year	Growth of terminal shoot		Period of growth, in weeks	Leaves	
	start	end		appear	off
1955	4/13	8/24	19	5/9	11/9
1956	4/18	8/8	17	5/11	11/2
1957	4/24	7/24	14	5/8	11/6

The seed source for the trees in Hutcheson Forest, was not determined but the fruit being a samara could have been carried a long way during a wind-storm such as the one which produced the blow-down openings.

At present it can be concluded that the tree-of-heaven occurs too sparsely to be of any great importance; it does not seem to be vigorously invading the forest and remains in isolated islands which are not excessively shaded. There are gaps in the canopy over these areas and this would indicate that availability of light is an important environmental factor for its successful establishment.

3. Japanese barberry (*Berberis thunbergii*). An ornamental, native of Japan, the Japanese barberry has spread from cultivation and become a naturalized member of the flora of eastern United States since 1908. It is not listed in the 7th edition of Gray's Manual of Botany but it is listed in the 8th edition. Out of 14 plants that were found in Hutcheson Forest, four are in the woods proper and the remaining eight are along the paths and the periphery of the woods. Two plants did not survive the drought period of 1957.

Two plants, growing in areas of different light exposure, were studied with respect to length and actual time of growth, leafing, flowering and fruiting. One plant was along a narrow path in the woods adjacent to a blowdown. There was little shading produced by understory and canopy trees, and the shrub layer was sparse. The other plant was in the woods. A heavy tree canopy, and the dogwoods in the understory, screened out much of the light. In both locations, *Viburnum acerifolium* (maple-leaved viburnum) is the dominant shrub. Both barberry plants showed first signs of growth on March 20, 1957. There were leaves present the following week but these were much more abundant on the plant exposed to the greater amount of sun. Likewise, flowering was noticed at the same time on both plants, but again the greater abundance was present in the sunny area. The same was true when fruiting occurred. The plant in the woods was heavily browsed throughout the year of 1957, but during the summer it kept regenerating stems. No fruits were retained on this plant throughout the winter into the spring. Some of the previous year's fruit were found on the other plant located in the sunny area, a difference which undoubtedly is related to the heavy browsing of the former.

The flowers, which appeared in the second half of April, were seen to be pollinated by a bumblebee. Starlings and sparrows were observed feeding on the fruit. All plants occurred in isolated spots in the well drained sections of the woods. They ranged from less than a foot in height to just over two and a half feet. In comparing these plants with others grown in cultivation, the ones in the woods are shorter. Those plants which were exposed to the greatest amount of light, and showed least browsing, were the tallest and all of these retained their fruit throughout the winter.

It may be concluded that the Japanese barberry has been introduced by birds and some of the plants are thriving, and the species does seem to be spreading throughout the area. It does not seem that it will become detrimental to the native flora of the woods, but it may remain a sparse and colorful ornamental in Hutcheson Forest.

4. Japanese honeysuckle (*Lonicera japonica*). This is another Asiatic species, being a native of China and Japan. It was brought into this country in the 19th century (Nicholson 1887). It was first found in Williamsburg, Virginia, in 1806 (information obtained from a mimeographed sheet handed out on a garden tour in Williamsburg, August 1957). It was introduced into this country as an ornamental and later extensively recommended as a trellis plant and as a soil erosion preventive. Japanese honeysuckle has repeatedly escaped from cultivation and by now it has become naturalized and aggressive. In many places it is changing the nature of local communities where it often prevents the growth of native seedlings (Nelson 1953).

In Hutcheson Forest, Japanese honeysuckle forms a dense intertwining mass as long as it is exposed to light or half shade. In dense shade the plant grows but little. It is present almost throughout the entire forest, being absent in only a few areas: along Spooky rook, in poorly drained areas and in the oldest, least disturbed sections with the thickest canopy overhead. In blowdowns, where there is an extensive growth of poison ivy and Virginia creeper, little or no honeysuckle is found. In other blowdowns and open areas it has formed a sufficiently dense ground cover to inhibit establishment of other species, as no seedlings were found under it. The Japanese honeysuckle had been studied from November 30, 1950, through March 14, 1952, and again during 1957. Records were kept on a patch of honeysuckle in a blowdown area and another under dense shade, the latter patch being far less extensive in area than the former. Observations were also made on a patch growing on some maple-leaved viburnum at the periphery of a blowdown area. In all three sites growth was noticed to have started by March 20, 1957. In or on the periphery of the blowdown openings it continued through to

November 3, 1957. However, the plant in the shade ceased to grow; on June 26, 1957 the shoot tip turned black and shortly afterwards the leaves shrivelled up and the plants died. Up until June 26, the shoot had grown 15.3 cm as compared with a plant in the blowdown area which had a growth in stem length of 37.7 cm. By the end of the growing season, the latter reached a length of 71.0 cm.

Very few flowers were seen in the woods and none were on the shoots observed for record. In an extensive blowdown locality almost entirely covered with honeysuckle a total of only eight flowers was seen. None of these matured fruits but some fruits were found near the end of a vine in the younger section of the woods where the vine had successfully climbed up a dogwood. However, fruiting is not usual. In many areas, some leaves remain green throughout the entire year. Wherever the infrequent browsing or other physical injury occurred during the growing season new growth appeared.

Thus there is ample evidence that the Japanese honeysuckle is shade intolerant. The reduced growth in length in the shadier parts of the woods seems directly correlated with the reduction of light availability.

The scarcity of flowers and consequently of fruits produced in the woods appears to be no handicap to the local spread of the plant. There are many seed sources all around the area. The fleshy fruits are eaten by birds which in turn bring the seed to Hutcheson Forest. Once there, it grows very vigorously in openings and spreads vegetatively, encroaching on the native vegetation and twining up saplings. Young ash trees often serve as supports for the climbing vine, and both ashes and dogwoods are sometimes pulled over by it. These young trees had undoubtedly started growth and passed through the seedling stage before the invasion of the honeysuckle, as few new seedlings can be found growing in the densely infested areas. However, the May-apple (*Podophyllum peltatum*) does come up in certain areas under the honeysuckle, and its leaves may spread above in places, but it lasts for only a short period each year. There seems to be no competition between the two plants.

The major impact of the honeysuckle may be felt in terms of the future nature of the forest more than it is evident at present. With each successive opening of the canopy, the honeysuckle is at an advantage and it may be able to move in and inhibit or damage or even eliminate slower growing species.

5. **Princess-tree** (*Paulownia tomentosa*). Named after a princess of the Netherlands, daughter of an Emperor of Russia, the princess tree is a native of China (Hume 1929). It is listed in the 7th edition of Gray's Manual of Botany. It was known in Williamsburg by 1834 where it was and still is a very popular ornamental. It is adapted to the climate

of the eastern coast of the United States as far north as New York. It is propagated through winged seeds and also fairly extensively by root sprouts. Since it is hard to eradicate once it becomes established (personal interview with Professor R.F. West, of the Department of Forestry), it is a very unpopular forest weed. It grows very rapidly. A growth of twenty-one feet and nine inches was recorded during the year of 1956 on one erect branch of a bent-over sapling located in a blowdown opening. This tree is the only representative of the species in the forest. It would seem that by the time this sapling reaches maturity and produces seed, the blowdown area would be well shaded by surrounding plants, and any seedlings which might germinate, or root sprouts that may arise, would be suppressed because of its low shade tolerance. There is no evidence of an increase in its numbers in the forest.

Phenological records have been kept on the one princess-tree in the forest since fall 1954 and in all three years growth was first observed in the fourth week of April (on April 28, in 1955, April 27 in 1956 and April 24 in 1957). Growth appeared to cease about the last week of August. However, in 1957, all evidence of growth ended in the fourth week of July. This shortening of the growing season by a whole month may well be attributed to the severe drought of that year. In all the three years, the leaves have remained green to at least within two weeks of leaf fall, commonly turning a blackish-brownish green, approximately a week before abscising. During the periods of drought, the leaves curl up but with rains they unfurl. It is quite frequent that leaves are abscised while still green in the last week of October and the first week of November.

No seed source has been located for this tree, but the seed that started the one tree present must have been brought in by a strong wind from some distance.

6. **Sweet cherry** (*Prunus avium*). Brown (1938) reports that the sweet cherry is "said to have been introduced between 1621 and 1629". Long a favorite garden plant it can be found on "The Woodlands" (estate of William Hamilton), to which it was brought from Europe. It has been used extensively throughout Europe for its fruit and for the alcohol prepared from its fruit. It is found as a member of mixed stands covering areas of the Crimean mountains (Sokolov 1952). Hough (1936) names several varieties whose fruit is prized, cites its use for lumber, and calls attention to double flowering, variegated and other ornamental varieties. It has been studied in reference to its pathology, and in horticulture, as a possible new stock for grafting varieties (Grasso 1951; Boucek 1952).

Dissemination by birds is universally recognized as the means of seed dispersal for cherry species. *Prunus avium* flowers before any of the native

species; and its flowers are seen before its leaves. It is in bloom as early as April 11 and has been through flowering as late as May 16. The usual flowering period for *Prunus avium* is fourteen days in contrast to seven days for the native species, *Prunus avium* (table 3), although the first of the cherries to flower, is never the first to start growth and is one to three weeks behind *Prunus serotina* which is the first to start growing in the spring. *Prunus avium* is the first of the three species to shed its fruits and it retains them for the shortest time. *Prunus avium* keeps its leaves over the longest period of time.

Very few sweet cherry trees occur deep in the woods (fig. 1), but there is a concentration in the marginal zone. This is the most abundant tree among the aliens in the woods. There are many of flowering age in the forest and there appears to be no lack of seed, although not all years are very fruitful, as was the case in 1957. Very few flowers set fruit in that year and a very small number of these ripened. There have been some years when the fruit was produced in great abundance and one such year was 1952.

Sweet cherry has been known in this country for about three centuries and is a naturalized member of the local flora (Fernald 1950). Light seems to be an important limiting factor in its distribution. Under favorable conditions *Prunus avium* does become a canopy tree.

7. Multiflora rose (*Rosa multiflora*). A native of China and Japan, multiflora rose was introduced

into this country as an ornamental. It was first listed in Gray's Manual of Botany in the 8th edition. It has been recommended by the Soil Conservation Service for use in conservation plantings and has been widely used for living hedges, wild life borders, odd area plantings, and for stream bank and road bank protection. A study of some of these planted areas was made and it was found that there was no spreading on cropland or on well managed pastures. Spreading did occur in unmanaged areas, unmowed pastures and fence rows near seed producing plants (Lloyd and Eley 1955).

Multiflora rose provides heavy summer cover as well as a partial winter cover, and is one of the first aliens to start growth in the spring. It began growing during the third week of March 1957 and continued to grow through the first week of September. This species was studied in both the sun and the shade. While the growing season was the same, the plant observed at the edge of the woods flowered and set fruit while the one in the woods did not. Only one specimen in the woods bore flowers and fruits. It was located in the younger part of the woods (not mapped in this study), in a relatively lightly shaded area. All individuals of *Rosa multiflora* are located along paths, in a blow-down area or on the forest margin (fig. 1). The ten individuals found in the portion mapped were for the most part vigorously growing but none of them had flowers. Two were heavily browsed but new shoots were soon produced.

Geysel and Lemmien (1955) state that both

TABLE 3. Summary of phenological data from observations made in Hutcheson Forest from 1951 to 1957.

Year	Species	Terminal growth of branch tip			Leaves			Flowers			Fruits		
		begin	end	wks.	begin	end	wks.	begin	end	wks.	begin	end	wks.
1951	<i>Prunus avium</i>	4/14	5/25	5	5/5	11/27	29	4/21	5/5	2	5/5	7/20	11
	<i>P. serotina</i>	3/24	5/25	8	4/21	10/26	27	5/19	5/25	1	6/1	8/3	9
	<i>P. virginiana</i>	4/7	6/8	9	4/28	11/2	27	5/12	5/19	1	5/19	—	—
1952	<i>P. avium</i>	3/28	5/23	8	5/16	11/12	26	4/25	5/9	2	5/9	6/27	7
	<i>P. serotina</i>	3/21	7/11	16	5/16	11/5	25	5/23	5/30	1	5/30	8/9	10
	<i>P. virginiana</i>	4/4	5/30	8	5/9	10/22	24	5/16	5/23	1	5/23	8/30	14
1953	<i>P. avium</i>	3/25	5/22	8	5/9	12/3	30	4/11	5/9	4	5/2	7/6	9
	<i>P. serotina</i>	3/21	7/6	16	6/12	11/4	21	5/16	5/22	1	5/30	—	—
	<i>P. virginiana</i>	4/4	7/6	13	5/3	11/4	27	5/9	5/16	1	5/30	7/19	6
1954	<i>P. avium</i>	4/7	5/20	6	4/21	12/1	32	4/21	5/5	2	5/5	7/21	11
	<i>P. serotina</i>	3/29	5/26	7	5/13	11/24	28	5/20	5/26	1	5/26	8/4	13
	<i>P. virginiana</i>	3/31	7/7	14	5/5	11/10	28	5/5	5/13	1	5/20	7/28	10
1955	<i>P. avium</i>	3/30	5/25	8	4/20	11/30	27	4/13	4/27	2	5/12	6/22	6
	<i>P. serotina</i>	3/16	7/20	18	4/27	11/23	25	5/11	5/19	1	5/25	—	—
	<i>P. virginiana</i>	3/16	6/1	11	5/4	11/2	23	5/11	5/19	1	5/19	7/27	10
1956	<i>P. avium</i>	4/4	6/6	8	5/9	12/5	30	5/2	5/16	2	5/16	7/25	10
	<i>P. serotina</i>	3/10	7/18	19	5/9	—	—	5/30	6/6	1	6/6	—	—
	<i>P. virginiana</i>	4/1	died	—	5/16	10/24	23	5/23	5/30	1	5/30	8/1	9
1957	<i>P. avium</i>	4/3	6/26	12	4/24	11/27	35	4/24	5/1	1	5/6	6/26	7
	<i>P. serotina</i>	—	—	—	—	—	—	—	—	—	—	—	—
	<i>P. virginiana</i>	—	—	—	—	—	—	—	—	—	—	—	—

cotton-tail rabbits and white-tailed deer are known to browse it. One or the other or both were undoubtedly responsible for the browsing in Hutcheson Forest as both are present there.

Rosa multiflora is beginning to become aggressive enough to be a pest in certain parts of the country. It had not by 1957 shown signs of becoming aggressive within Hutcheson Forest and probably will not because of the shaded conditions. It is found in neighboring woods, in the later stages of old field succession, and along thickets and roadsides. There is no lack of seed source in the area.

GENERAL DISCUSSION

Most of the references found on the alien species are primarily concerned with their present distribution, their diseases, their use in horticulture and gardening, for the production of new varieties, and their taxonomy. Little has been written about them relative to their position in the native vegetation.

Although accidental introduction of alien species has always occurred, the species studied here were probably all intentionally introduced. The greatest influx of alien species occurred after the Revolutionary War, when many patrons of horticulture began to import interesting ornamentals as well as fruit trees and crop-producing plants from England and Europe. It seems probable that the princess-tree, the sweet cherry and the Japanese barberry were such deliberate introductions. Other aliens are used to retard erosion along river banks and canals. They were introduced and used extensively for that purpose, for example Japanese honeysuckle (Nelson 1953) and multiflora rose (Lloyd and Eley 1955), but they have spread from cultivation with time and are aggressive in the native vegetation. Thus certain aliens which have been brought in as ornamentals and for hedges or other specific purposes, have turned out to have a lasting and far reaching effect.

All seven aliens studied here occur in a relatively large area in the United States (Fernald 1950). The seeds are borne either in samaras or in fleshy fruits; thus the means of dissemination are of two types. In the case of samaras the agent is wind. It is an effective means of dispersal, as *Paulownia tomentosa*, *Ailanthus altissima* and *Acer platanoides* can be found scattered throughout the area. Vegetative reproduction of these species is not common in Hutcheson Forest, even for *Ailanthus* which is so notorious a vegetative clone-former. The four other alien species considered in this paper have fleshy fruits. Although only birds were seen feeding on the fruits, it may be that mammals play a part in the dissemination of their seeds. While the direction of migration of samaras would be limited for the most part by the prevailing wind, dissemination by animals would tend to be radial.

All of the aliens studied withstood the severe drought of 1957 even better than some of the individuals of the native flora. Certain aliens, *Paulownia tomentosa*, *Ailanthus altissima* and *Lonicera japonica*, responded to drought by a curling of the leaves. Those plants which generally continue to grow throughout part of the summer ceased growth earlier in 1957 than shown on records for previous years (see table 2 for *Ailanthus altissima*). As the drought ended, the majority of leaves uncurled and reassumed normal appearance. On the other hand *Acer platanoides* and *Prunus avium* showed no visible effect, and *Rosa multiflora* and *Berberis thunbergii* kept producing new green leaves, while older ones were turning yellow and dropping off.

The fall of a dominant canopy tree provides a favorable habitat for these alien species. Native species can successfully compete and co-exist with most of the aliens, but Japanese honeysuckle has proved to be detrimentally aggressive in the forest.

SUMMARY

Seven woody alien species were studied in Hutcheson Forest, two of which, the Norway maple and the sweet cherry, are present in the canopy of the forest. All have proved hardy to winter conditions as well as to extreme drought as that of 1957.

Both the Norway maple and the sweet cherry have seed sources in the forest and can be considered as successfully naturalized within the area.

At present, the tree-of-heaven and the princess-tree hold a very minor rank in the community.

The most rampant alien locally is the Japanese honeysuckle, being able to shade out seedlings and destroy young saplings.

Berberis thunbergii and *Rosa multiflora* are not abundant or important as of 1957. Of the two, *Rosa multiflora* appears to be increasing in numbers, while *Berberis thunbergii* shows no such trend.

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