Collecting trip to Hawaii - August 8-10, 1983
M. N. Westwood, National Clonal Germplasm Repository
Corvallis, Oregon - October 10, 1983

I met Dr. Royce Bringhurst at San Francisco where we took United flight 35 to Honolulu. (My wife Wanda went along for a few day's vacation). At 5 pm we took a half hour flight to Hilo where Dr. Philip Ito picked us up and lodged us in the Hilo Lagoon Hotel, where we began the process of adjusting to a 3-hour time difference.

Hilo, August 8, 1983

Dr. Ito picked us up at 8 am and drove us to the Volcano Experiment Station 3800 ft. elevation, where we collected seed of several Rubus species and of the white-fruited Fragaria vesca. The strawberry and the non-native Rubus have naturalized very well here and seem quite as at home as the native R. hawaiiensis dark red raspberry. The soil here is volcanic debris plus organic matter at the surface, pH about 5.0.

We drove on to the Kilauea Volcano Visitor Center, left Wanda and proceeded on up the road to Mauna Loa. A brief visit at Bird Park indicated that Fragaria vesca was well established there but there was no sign of the native F. chiloensis which we hoped to find. We went on to the end of the Mauna Loa road which ended at near 6500 ft. elevation. No Fragaria were found here but at that point we collected more Rubus hawaiiensis, and at 5500 feet obtained both red-blue and yellow fruited Vaccinium reticulatum and more of the imported wild blackberry (R. procerus?). We noted that the Vaccinium (local 'Ohelo') with red fruit was more acid and tastier than the yellow-fruited ones in the same area. The imported escaped blackberry had small fruits with very few drupelets and set was poor. We saw no evidence of natural hybridizing among the four Rubus species found.

Having got a sandwich lunch at a nearby gas station we went on to the 'Ohelo' flats near the Kilauea Military Camp at near 4000 ft. elevation. These Vaccinium reticulatum are one of the dominant species in the area, both in the open and under shrubs and small trees. Here the fruit were of three colors: dark red, bright red and yellow with a slight blush. Again the dark red berries were most acid, the yellow non-acid and the bright red intermediate. The plants grow to a foot in height, rarely two feet; in poor volcanic soil of pH 5.0, rainfall _____. A number of people were gathering these 'Ohelo' along roadsides, to be used for pies and preserves. In a broad swing around the south side of the Kiluaea Volcano caldera we saw a number of 'Ohelo' growing in relatively recent lava deposits.

At Kilauea Iki lookout, 4000 ft. elevation we found another Vaccinium of bright red color. The bushes were 3 to 4 feet tall and the leaves were ovate and much larger than those of 'Ohelo'. The berry is about the same size as 'Ohelo' (ca. 1.0 cm diam.) but has more red in the flesh and has an astringent flavor somewhat like our commercial cranberry.

The remainder of the day was spent returning to Hilo and writing up notes on the day's collecting activities.

Hilo, August 9, 1983

Phil Ito picked Royce and me up at 8 am at the Hilo Lagoon Hotel in a 4-wheel drive Chevy Blazer. We headed directly up saddle road which runs between Mauna Loa and Mauna Kea. At about 3500 ft. elevation near the 17 mile marker, we observed numerous Vaccinium at roadside in an old crumbly

lava bed, pH 5.0, rainfall about 50 inches per year.

The first species (15) was a handsome scarlet berry of pyriform shape with a long, slender stem. The plant is about twice as tall as V. reticulatum and has much larger leaves of ovate form. Nearby was a similar clump (16) except that the fruit were round. Both appear to be variants of a single species.

Next we found another Vaccinium (17) with even larger leaves than the pyriform type and with somewhat larger fruit of an attractive bright red color. Down the road a few hundred feet we found more of the type first found at Kilauea Iki lookout. This species (18) has red astringent berries on a rather long stalk. The plant is about 1 meter tall and the leaves are lanceolate, about 10 cm long, petiole 0.5 cm.

Finally, we got another sample of red 'Ohelo' fruit (19). This is by far the most numerous Vaccinium species on the island, later to be found all the way up to 7500 feet in open areas and partly wooded forests.

This site is in a fog belt as well as having frequent rains, thus all of the exposed lava is covered with lichens and moss. Even though this is a relatively recent lava flow, it is mostly covered with vegetation. Phil indicated that in such areas where there is frequent moisture, re-vegetation occurs rapidly. Here none of the trees are more than a few inches in diameter or more than 20 to 30 feet tall.

We continued along saddle road to a higher drier area near the 6500 foot summit between the broad bases of the two big mountains. We stopped at a small hill which is fenced as a forest reserve. This hill contains numerous species, many individuals of which are very old. Some Koa tree trunks here measure a meter or more in diameter. Previous recent lava flows from an arm of Mauna Loa have surrounded this hill, making it a green island in a sea of black stone. Skirting the fringes of the hill we found numerous clumps of Rubus hawaiiensis with both immature and ripe fruit. Most of the berries at this site are yellow but we found some red ones too (samples 20 and 21). This raspberry is large, rounded, somewhat tart and of moderate quality. The drupelets and the seed are relatively large. The leaves are pale to medium green, about 10 cm long, pinnately compound with three leaflets, the terminal one of which is much larger than the laterals. The margins are irregular serrate and crinkled. The habit is upright, from 1 to 3 meters tall, with perennial canes. The one-year canes are spiny, but older ones shed their spines with the bark and are smooth. The berries are 2 to 3 cm diameter and are by far the largest of any raspberry I've seen.

Near the top of the hill we found a single Prunus tree, a pin cherry which Phil said was evergreen. Possibly this is P. pleiocerasus. We picked the few ripe fruits (22) which are red and about 0.5 cm diameter. Also near the top was an open spot in which had grown numerous mullen plants. Now dead, the last year's seedstalks formed a small forest of black "poles" 2 cm in diameter and 2 to 3 meters tall, the largest I have seen. Having scouted the hill we met back at the Chevy for a cool drink. We saw no animals here but Royce found a single wing feather from a wild turkey which he stuck in his hat. Phil gave us a choice of soft drinks, as it had warmed up to near 90° by then. Royce, being the number one strawberry nut of the universe, chose strawberry soda. He complained mildly that it was imitation strawberry flavor but noted that the flavor balance was pretty good anyway.

We proceeded along saddle road, then shortly turned right toward Mauna Kea on a blacktop road leading to the observatory. Two or three miles along the observatory road we took a dirt road to the right. Shortly we crossed a cattle guard and found ourselves at the edge of a vast cattle range. We were now in strawberry country, so stopped at the first likely

spot to look around. We were now well up the slope of Mauna Kea at about 6500 feet. This mountain was originally a volcano but has been dormant for the past several hundred years. Soil has evolved and covered most of the exterior evidence of volcanic action. Trees and shrubs here had a look of permanency and some of the giant koa trees must be 300 to 400 years old. Range grasses had been planted on the lower and middle slopes and now supports a host of fine fat cattle. The range remains green, well watered by the frequent summer rains. Few trees grow at this site, and the mid-day sun had driven the white-face cattle into the shade of the few trees in the area.

The site we selected to hunt for the native strawberry, Fragaria chiloensis was a sizeable rock out-cropping with a few shrubs but numerous open areas where direct sunlight strikes the ground. Here in protected rocky crevices the berries might be found. Royce was sure the planted grasses would have crowded them out of the open range. The main range of this species is the coastal regions from Alaska to southern South America. It was undoubtedly brought to Hawaii by a bird during prehistoric times.

We were disappointed not to find any strawberries at this site, but we found an excellent population of dark red and yellow raspberries (R. hawaiiensis), the largest fruit we had yet seen. The fact that we also found berries intermediate in color, indicates that fruit color is controlled by a single gene. The yellow is likely homozygous recessive. Both the large fruit size and the perennial cane trait will be valuable in breeding domestic cultivars.

Our route along the dirt road led us around the east side of the mountain at about the 6000 to 7000 foot level. The open grassland gave way to more and more trees and tall shrubs. We saw no streams but there were numerous catchment reservoirs partly filled with rainwater. Not only were these being used by the livestock but by wild pigs, wild turkeys and numerous ducks and waterfowl, all of which we saw from time to time. The road got progressively rougher and more crooked, with some spots needing the help of 4-wheel drive. Still we found no Fragaria despite finding a number of likely places. We continued to see the native 'Ohelo' and raspberry, plus the naturalized himalayan blackberry. Most of the species we saw were alien to me, so Phil answered questions like a tour guide. The dominant tree here is the koa or Hawaiian Mahogany (Acacia koa) which grows to heights of 100 feet, with trunks 3 feet in diameter. It is used for furniture, ukuleles and novelties which display its beautiful red-grained wood. Formerly it was used to make canoes and surf boards.

Some time after noon we stopped at a little-used picnic site for lunch. A small sign indicated that the "Doctor's Pit" was nearby. This of course refers to the place where David Douglas met a tragic death in 1834. Douglas was a Scot whose fame as a plant collector is well known in the Pacific Northwest, where he collected more than 75% of all higher plant species from 1825 till shortly before his death. It was for him that the Douglas fir (and many other plants) were named. Douglas was visiting in Honolulu in 1834 and had taken a ship from Oahu to Hawaii. He had disembarked at Kohala Point, the northwest corner of the island, and planned to collect plants as he followed a trail across the Kohala Highlands and around the north and eastern slopes of Mauna Kea toward Hilo to the southeast. He had obtained information from Edward Gurney about the practice of trapping wild cattle in camouflaged pits at a water hole near the trail ahead (see sketch). He apparently fell into the pit while examining it and was found later, trapped under a wild bull, dead at the age of 35.

This area is in the high rainfall area and has much more the appearance of a tropical jungle than other areas we visited. Here the wild raspberries are not yet ripe but the plants are much larger than those seen at other sites. The perennial canes of these plants are 3 to 4 inches in diameter and perhaps 10 feet tall. On our return trip to saddle road we found and collected more Vaccinium reticulatum of a bluish color, more nearly resembling the color of North American blueberries than others we had found. Still no sign of the wild strawberries so abundant when David Douglas climbed the slopes of Mauna Kea 149 years ago.

Hilo, August 10, 1983 - Stalking the wild strawberry

Our final day of collecting was specifically designed to obtain Fragaria chiloensis. While we have many sources of that strawberry along the west coasts of North and South America, those to be found here are an ecotype with distinct genetics. Having grown here for hundreds or perhaps thousands of years in the tropical latitude of Hawaii, their responses to day length and temperature must be quite different than those we find on the temperate shores of Oregon.

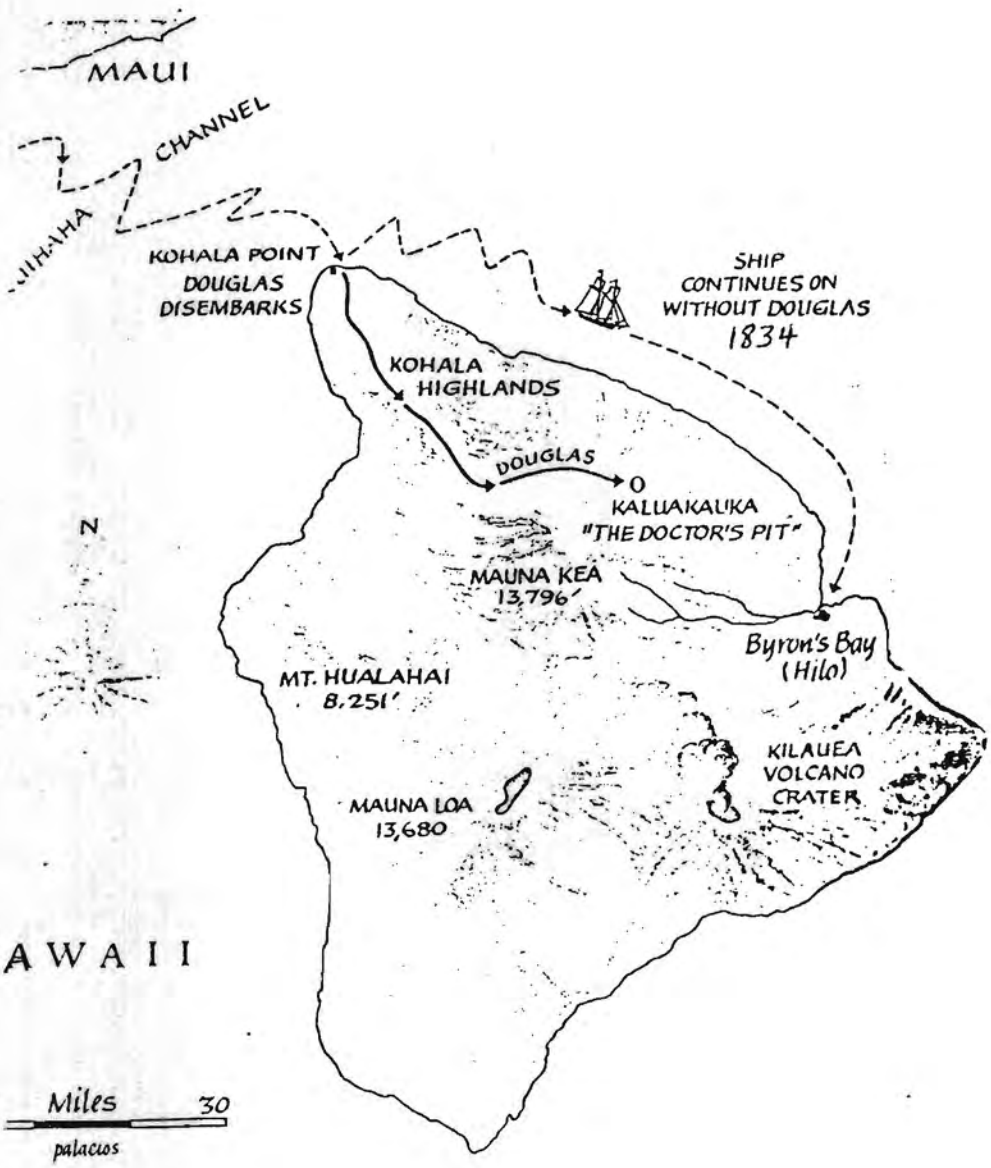
Dr. Ito had contacted a botanist who knew the flora of Hawaii well and obtained directions on where to find the native strawberry. The site specified was an open forest reserve at 6000-7000 ft. elevation, above the vast Kapapala cattle ranch on the slopes of Mauna Loa. So off we went with a fresh lunch, high hopes and cameras at the ready. As we left the lowlands and mounted the steeper slopes, it was apparent that the trail we travelled yesterday was a highway compared with the dimly marked, bone jarring path before us. Every foot was in 4-wheel drive and the worst spots were not conquered on the first try. We finished the course solely on the excellent jeepsmanship of Phil Ito.

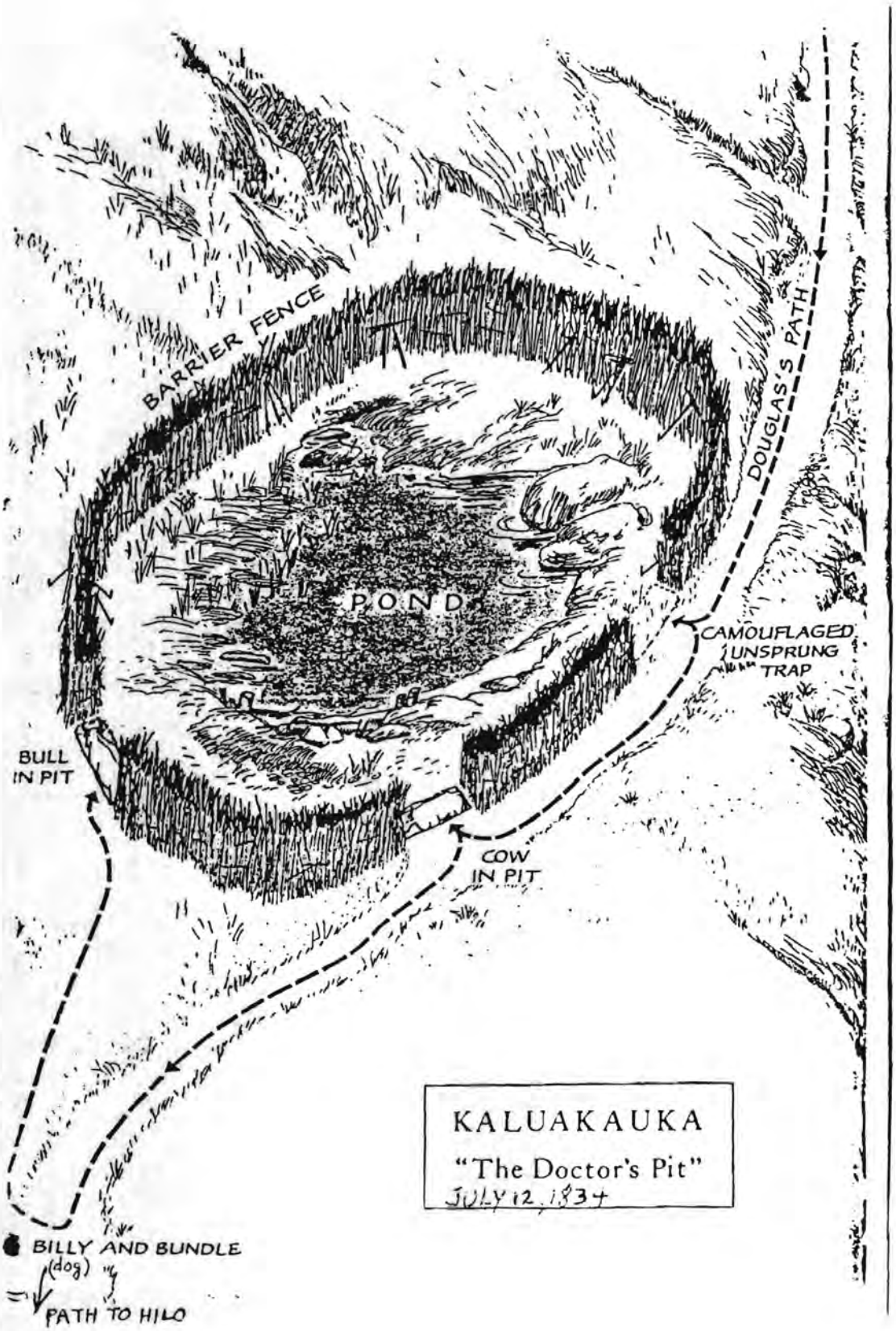
The planted grass seems to have crowded out the strawberry from the open areas. Also, the cattle will graze them if the plants aren't protected by rocky niches.

On we went, finally arriving at a fenced reserve area where the cattle weren't allowed to graze. Again we found numerous suitable sites for strawberry but again found only F. vesca growing there. We finally concluded that the botanist had not been there recently, or else did not know the difference between F. vesca and F. chiloensis. The trip was not a total loss, however, as we were able to collect both yellow-orange and pure yellow 'Ohelo' fruit and a few pure white fruit of the F. vesca strawberry. These fruit are like albinos and contain no pigment whatsoever.

A few general impressions of this trip:

1. There are no snakes, lizards, crocs or other creepy-crawly varmints to contend with; a pleasant datum to deal with.
2. The tree ferns at heights of 15-20 feet, the "tree" raspberries to 8-10 feet, and African flame trees in full bloom gave the appearance of a place you would not look for deciduous fruit species.
3. The lack of permanent creeks or streams on the mountain slopes and the infrequent volcano tubes, half hidden, into which one is prone to fall, gave the dry sides an unfriendly overtone, and not at all the tropical paradise one is led to expect.
4. Even on the "big" island it is easy to find one's way around, as it covers an area of only 4000 sq. miles, which is only 4% of the area of Oregon.
5. If you travel with Royce Bringhurst, don't expect him to collect weedy species like the himalayan blackberry without an argument.


MAUI
CHANNEL
KOHALA POINT
DOUGLAS
DISEMBARKS
SHIP
CONTINUES ON
WITHOUT DOUGLAS
1834
KOHALA
HIGHLANDS
DOUGLAS
KALUAKALIKA
"THE DOCTOR'S PIT"
N
MAUNA KEA
13,796'
Byron's Bay
(Hilo)
MT. HUALAHAI
8,251'
KILAUEA
VOLCANO
CRATER
MAUNA LOA
13,680
HAWAII
Miles 30
palacios


BARRIER FENCE
DOUGLAS'S PATH
POND
CAMOUFLAGED UNSPRUNG TRAP
BULL IN PIT
COW IN PIT
BILLY AND BUNDLE
(dog)
PATH TO HILO
KALUAKAUKA
"The Doctor's Pit"
JULY 12, 1834