beet. A variety known as the Takanozawa, raised chiefly near Tokyô, has a slender root, about four feet long, and is of very fine quality. In the vegetable market of Tokyô it commands a respectable price. The Owara variety, so named from a small place in the province of Shimosa, where they produce only about two thousand roots a year, attains the huge size of one and a half feet in circumference and two and a half feet in length; this kind is sold at the rate of about twenty sen (a sen being a hundredth part of a Japanese dollar) apiece. In its form this variety is like the beet. The two kinds most popular in the markets of Kyôto are the Yamato and the Horikawa; in fact, these seem to be only different names of the same variety.

In raising Lappa much attention is naturally devoted to the best selection of the soil. It is a common belief among cultivators that a light sandy soil is specially adapted to it, and it is true that roots grown from such soil are long and slender, but they are prone to be hollow at the centre and rather tough at the rind. A stronger and deeper soil, say clayey loam, seems to impart firmness to the root and a better flavor. To gain the most satisfactory results, the soil must be plowed deep and finely pulverized, or else an undue amount of labor will be required in harvesting the roots. Indeed, digging Burdock is a proverbially hard task; it has become almost a fine art to do it well. Many an old writer recommends digging the soil to the depth of some four or five feet, and then putting in green leaves, stalks, turf, and the like, in order to improve the quality of the roots. I am told that in this way the Lappa is not likely to become forked. It is also grateful for good manures—compost, night-soil, and especially to rice-bran—but if compost is applied it must be well decomposed, or else the roots will rot off too many branches.

When the soil is properly prepared seeds are planted in rows three feet apart, five or six seeds being placed every six to eight inches in a row. In Owara, the usual time for sowing is the early part of May or late in April. Before the early part of June the young plants are thinned out, leaving but one in the hill. Very often liquid manure is applied two or three times before the roots are harvested late in December. Another method is to plant the seeds in August, so as to have the vegetable ready for spring use. If they are sown close together they do not grow as vigorously as those planted in single rows. Lappa is a slow grower and takes over two hundred and twenty days to mature. Seeds retain their vitality for five years, and many a gardener asserts that the best crop is obtained from those three years old. They say that new seeds produce roots which throw off too many branches and flower-stalks. This statement, however, is not absolutely verified. For keeping and marketing, the vegetable may simply be left where it was grown or kept buried in the earth like beets or turnips.

I am aware that a discourse on Burdock will be of little interest to Americans unless it contains some information regarding the mode of using it, but it must be remembered that Japanese cuisine differs widely from the American. Need only state in general terms that, after their skin is scraped or peeled off, the roots may be sliced into long strips or cut into pieces of less than an inch in length, and boiled with soy, salt or Spanish pepper, to impart savor to them; or if preferred, they may afterward be browned in a sesame oil, which of itself will flavor them. Another common way of cooking them is to scrape off the outer skin and cut them into pieces about two inches long, then, when they are boiled soft, to take them out of the pan and mash them; then make them into cakes, much as you treat oyster-plants. A kind of salad, though not uncooked, is also made of them. A rather unique and more elegant process consists in stuffing the roots with sea-eel, and boiling them, after dipping them in a preparation containing soy and pepper. Slices of lappa fried and eaten with some condiments form one of the commonest dishes with us. The roots are sometimes pickled in miso. There are many other ways of preparing this valuable vegetable for table use, but a longer description would be better left to the user or amusing only to the curious. Each country has its own Victua to inspire it with oracles in the mysteries of national taste and national cookery. American housewives will naturally turn to a Mrs. Lincoln or a Mrs. Rorer for inspiration on this score, and I may forbear further gastro-nomic dissertation concerning our plant.

Inazo Niole.

Sapporo, Japan.

Plant Notes.

Lilium pardalinum.

This is another of the Turk's Cap Lilies, and is nearly related to Lilium superbum of the Atlantic coast of North America. The Lilium pardalinum has been found along the Coast Range, the Sierras and the Cascades, from Mono County, in eastern California, and San Luis Obispo County on the coast side, to the British Columbian coast, and north-east to Lake Winnipeg. I lack information as to whether it extends farther in southern California, or exists in the high ranges of Nevada and Arizona. As it extends east of the Rocky Mountains, I suppose it would be found in at least the northern Rocky Mountains. I should appreciate information regarding its distribution in these regions.

Lilium pardalinum is usually called a bog Lily, though not altogether correctly. As a matter of fact, while it is found frequently in bogs or wet places, it more often makes its home in open moist meadows, in sandy soil rich in lime and in places washed by limy, incredibly large clumps deposits along the banks of mountain streams. The bulb, as it moves to a hill although it is properly a rhizome, is a curious and interesting study. It may be described as a thick, fleshy root-stock, covered closely with one, two or three jointed, closely overlapping scales, which break off easily. Generally, the young rhizome terminates in two or three buds, each of which produces a stalk the succeeding year. As each of these growing buds will in like manner produce one to three growing bulbs (for lack of a better name) the following year, it is evident that in a term of years very large clumps will be formed. Again, as each growing bulb is produced at an angle to the axis of the growth of the preceding year, branches of the intricate, ramifying rhizome are soon turned around and cross the earlier growth. In like manner incredibly large clumps deposits are formed. The older branches two or three deep, the interior ones are compressed and starved, the exterior growing bulbs strong and vigorous, and the entire mass easily traceable to the original parent. The older rhizome becomes yellow, the new growing bulbs are white, and by the scars left on the rhizomes by the succeeding stalks many years' growth can be traced. I have frequently seen masses of from fifty to two hundred growing bulbs, while I once saw one of five hundred in a single clump on a hillside in a bog. The vitality of the rhizome is great, and pieces cut from the old rhizome will form bulbs. Where a rich, loose soil permits the fullest development, a clump of L. pardalinum bulbs is really beautiful. The size, shape and the jointing of the scales vary greatly in different kinds, and although not strictly reliable in their characteristics are on some determining the species. Some forms of L. pardalinum usually produce but one terminal growing bulb, and in such forms no clumps are produced and the rhizome is long and zigzag.

This Lily grows readily from seeds or scales, and is but little subject to disease. In earlier days it grew in wild profusion in some mountain meadows, and there are still numerous out-of-the-way places where it treats the hunter or mountain climber to gorgeous displays of color.

Mr. Luther Burbank, the well-known hybridizer, many years ago secured some bulbs of Lilium pardalinum near
the geysers in Sonoma County, California. From seedlings of these, selections were made, which on arriving at maturity were cross-fertilized, and this process was repeated several times. I saw a field of the last crosses, and parallels could be seen of nearly every native form of L. pardinum, with giant and dwarf, one flowered and many-flowered forms which nature had never attempted. Mr. Burbank firmly believes that not only all of our varieties of L. pardinum, but all other Pacific coast Lilies, have a common parentage and have diversified in obedience to environment, and in support of his belief adduces the ease with which all can be hybridized. In this connection I take the liberty of quoting Mr. G. Reuthe, the able superintendent of the Thomas S. Ware Nurseries, in London, on the same subject: "Lilium pardinum seems, in my mind, the easiest for crossing, and I have not the slightest doubt, judging by these results obtained under the most unfavorable circumstances, that most of the so-called species are natural varieties." If Nature, unaided, has not been quite localities have the same type. As this is true of L. pardinum, it is plain to be seen that, although a description based on a large number of specimens, all drawn from the same locality, may seem to its author quite definite, it becomes of little value when, by a wide acquaintance with localities, we find an endless chain of types varying to one side or the other of the published description. In such a species we may, like Mr. Burbank with his seedlings, select some form of unusual merit which we can maintain by propagation or by continuously collecting from the same locality. From the florist's point this is the proper thing to do. I fear that we will never be able to divide L. pardinum into botanical varieties which the field botanist can follow.

Mr. Baker in his synopsis mentions variety Californicum, variety puberulum and variety Bourgasi. In 'Botany of California' the type and variety angustifolium are mentioned, and variety minor has also been described, I think, by Baker. The Lily which has been sold incorrectly for so lavish of her forms of this beautiful Lily as when assisted by so expert a cultivator as Mr. Burbank, she has yet been overbountiful in varieties of L. pardinum, and I long ago gave up trying to fit them to published descriptions. In identifying or, more correctly, in attempting to identify the many forms which I have met in seventeen years of mountainwearing, I had the advantage of Dr. Wallace's 'Notes on Lilies,' which is undoubtedly the best guide, and includes Mr. J. G. Baker's 'Synopsis of Lilies.' In addition to this, Dr. Wallace some years ago favored me with colored drawings of the varieties of this Lily, according to his work. I have seen plants which approximated these descriptions and drawings, but I have to confess that I have seldom seen or grown lots of this Lily which I could unhesitatingly refer to either variety. It is a peculiarity of many variable species of Liliname on our coast, that while in a given locality a vast number of specimens vary within well-defined limits, scarcely two some years as Lilium Rosei is a form of L. pardinum. L. Rosei proper is different. Some of Luther Burbank's seedlings have been named, and the Thomas S. Ware Nurseries, in London, originated and named several hybrids of L. pardinum. Of these L. pardinum, var. luteum, is L. pardinum × L. Parryi. L. pardinum, var. carnatum, is L. pardinum × L. marilimum. Mr. Burbank's beautiful hybrids of L. pardinum on many species have not, I believe, yet been disseminated. In every way the species is extremely variable. I have seen it growing where stalks from seven to nine feet high were common. Four bulbs transplanted from this lot to my garden (a heavy clay loam) produced stalks the first year nine feet high, with from twenty-three to twenty-five flowers on each. Low-growing forms are not uncommon, but under favorable conditions five to seven feet is the ordinary height.

To give any accurate idea of the forms colored plates should accompany descriptions. In default of these I pass...
to the forms in which Lilium pardinum borders on other species. L. pardinum, var. minor, is the connecting link with L. parvulum, and is being more nearly related to L. parvulum I will treat with that species.

In Lilium Wareii, as figured and described, we have a species which bears every indication of being the connecting link between L. pardinum and L. Paryi. It is a clear yellow Lily, revolute as in L. pardinum, fragrant as in L. Paryi. It has a rhizome which clumps up as in L. pardinum, and comes from a region where L. Paryi is the common bog Lily. I think it not unlikely that it is a natural hybrid.

Lilium pardinum and L. martinii can be hybridized readily artificially, but, although in some spots the two grow together, I have never seen anything suggestive of natural hybridization.

Lilium Humboldtii and L. pardinum grow in the same belt of the Sierra Nevada for hundreds of miles, and although L. Humboldtii is a Lily of the hillsides, and L. pardinum of the meadows and stream-banks, they are frequently found close together. I have found but one Lily which even suggested a hybrid. That was in the Bear Valley, mentioned by Dr. Bolander, where a meadow of hundreds of acres was once full of a form of L. pardinum. This is a grand form of the Lily, very heavy and strong, with flowers in which the scarlet scarcely shows at all. My first thought on seeing them was one of wonder that L. Humboldtii should grow in such a locality.

Lilium Roezlitzii was first described by Regel. Mr. Baker gives as its locality "Rocky Mountains in Utah, introduced by Roezlitz into European gardens," also in Santa Cruz Mountains, California. It gradually disappeared from sight in Europe, and its very name became a synonym or was appropriated for a form of L. pardinum. Two years ago a collector in southern Oregon wrote me asking if I wished L. Paryi, and the fresh flowers he sent proved to be a Lily plainly identical with the original L. Roezlitzii. It flowered freely with me last year, and I find it quite distinct. The bulb is close to L. pardinum, but with little tendency to form clumps. The stem and leaves are pale, much as in some varieties of L. pardinum. The flowers are colored exactly as in L. Humboldtii, but are more revolute, and the capsule is like that of the latter or L. Columbiae, and very unlike L. pardinum. It grows beyond the range of L. Humboldtii, but both L. pardinum and L. Columbiae grow in the same region, and it is a good medium between the two.

Lilium pardinum is easily cultivated. The idea that it is a bog Lily and cannot be planted many from trying it. As a matter of fact, it is as easily grown in any good garden loam as potatoes. It does not like a soil that is sour and heavy, nor a very light sandy soil, but any fair loam, either sandy or clayey, suits it, and it will stand some manure. As to moisture it is not particular. I have often seen it in ground which becomes quite dry in summer. The ideal situation for it is in deep, loamy, well-drained soil close to running water, where its roots can extend down to moisture. It is a Lily to which every flower-lover should give a trial, and in eight cases out of ten it will be a success.

Curt Parry.

Cultural Department.

Southern Californian Ferns.

The Ferns of southern California are especially noted for their beauty and grace. The California Gold Fern, Gymnocarpium trimarginatum, is probably the most widely and favorably known species in cultivation, while the Silverback, or Bronze Fern, as it is sometimes called when old, is a close second in point of popularity. These are both easily grown, at least in some of our species, which is the main reason for their greater favor with amateurs.

Adiantum emarginatum is a special favorite of mine. It lacks, perhaps, the grace of A. Capillus-Veneris, or the Maiden-hair Fern of the eastern states (which also occurs in California) but possesses richer coloring and beauty of habit peculiar to itself. It grows in dry situations with the Gold and Silver Ferns, while the Maiden-hair Fern with us is restricted to perennially moist banks or canals.

The Cheilanthis and Notoloma species are a distinctive group of Ferns adapted to dry climates, and able to stand long periods of drought. California and Mexico are both rich in species belonging to these genera—species that captivate the eye of the tourist, but, alas, are seldom responsive to the culture given them by the amateur. Yet they may be induced to grow and flourish by a skilful hand even years after they have been dried and placed in the herbarium.

The Lace Fern, Cheilanthis Californica, is one of the best known southern Californian species, and perhaps the easiest of successful cultivation. The Cotton Fern, Notoloma Newberryi, is scarcely less favorably known to the tourist, and is most frequent in the composite productions with which he is familiar in the east. Cards with elaborately produced pictures, made from dissected Mosses and Ferns, are as familiar souvenirs of the west as the picture bearing cards that are familiar to the east. With elaborate produced pictures, made from dissected Mosses and Ferns, are as familiar souvenirs of the west as the picture bearing cards that are familiar to the east.

Cheilanthis Clevelandi, a Lip Fern of more local distribution, is rarely seen in cultivation, and seldom enters into California Fern work, except from San Diego. Outside of San Diego its place is occupied by Fendler's Lip Fern, Cheilanthis myriophylla. It grows at a higher elevation in the mountains, but is scarcely more susceptible to cultivation.

On the confines of the inhospitable Colorado Desert, in certain parts of a part of the year, where there is not much vegetation is subjected to intense heat, often about 150 degrees, Fahrenheit, we find Dr. Parry's Cloak Fern, Notoloma Parryi, Cheilanthis viscosa and other Ferns, including what I believe properly called Notoloma crenatum; (recently divided as N. candida). They are all small-growing species, the Cheilanthis seldom over six inches high, and the others with fronds only two to four inches long, as a rule.

The Chain Fern of our mountains, Woodwardia radicans, is strikingly contrasted with the immense fronds, sometimes measuring ten feet in height, deep in the shade of some ravine with a perennial stream of water beneath its almost tropical luxuriance. 

Peris aquatiles and Adiantum pedatum (the latter rare) are two Ferns which are equally at home in the mountains of California and of New England, and with the local variety incusum of Asplenium Trichomanes, our Feather Fern, are the principal species of our Fern flora not closely restricted in distribution.

Aspidium munitum, Polypodium Calycanthum and several species of Pteridium are peculiar to west America, the latter known as Tea, Wire and Cliff Brakes, locally.

Ophioglossum nudicaule is a dwarf Alder's tongue Fern, first found by Dr. C. C. Parry in southern California in 1850, and as the last sight of him. He was the first to redescribe cover on our mesas in early spring.

Woodasia Mexicana is a rare Fern which I have occasionally found in the mountains of Baja California, near our boundary. It is one of few others which are entirely unknown in cultivation and not worthy of special mention.

San Diego, Calif.

C. R. Orcutt.

Ouvirandra fenestrilis.

In the Royal Botanic Gardens at Edinburgh this singular aquatic, commonly known as the Lattice, or Lace Plant, has been very successfully grown for the last twenty-five years. It is started by the lady James McNab, who has a happy knack of hitting the right treatment for many newly introduced plants. Since its introduction many specimens have measured over four feet in diameter; the plants flower annually. The seeds ripen in堡垒 and are scattered on the surface of the water, where they germinate in a few days after ripening. Seedlings are, however, hardly worth bothering with when old plants are available for the purposes of propagation, as they too long remain in a fair-sized stage. The plants of Edinburgh are grown in shallow oak tubs, about five feet in width; they are placed on a row of hot-water pipes in one of the warmer houses where the temperature of the water seldom falls below 70 degrees, and to which it is agitated about three times a week by adding a little water with the hand-syringe. Care is taken to keep the plants shaded from the sun, and when the infusorial growth appears on the leaves the basket is excluded for a day or two at a time by means of a tarpaulin drawn over the tops of the tubs.

By following these conditions we have been enabled to grow the Ouvirandra into quite large specimens in the gardens here;