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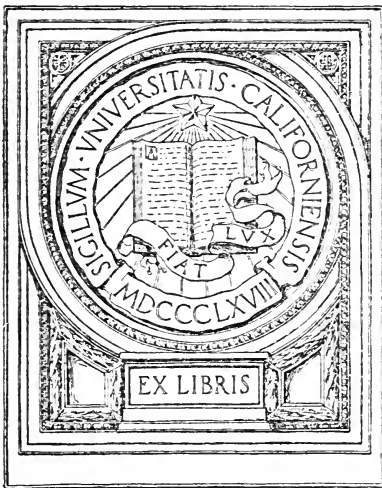
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THE LICORICE PLANT

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LICORICE CIRCULAR.

DEPARTMENT OF STATE,
Washington, February 10, 1885.

To _____:

SIR: In view of the large import into the United States of licorice, in its various forms—the import of the root alone, in 1884, amounting to 39,057,000 pounds, valued at \$800,000—and believing that the plant can be grown in some portions of the United States, many parties interested herein have requested the Department to secure through its consuls resident in the licorice-producing districts, certain information, embraced in the following questions:

1. Does the plant grow wild, or is it cultivated?
2. What kind of soil and climate are best suited to its growth?
3. If cultivated, describe the mode and manner of its cultivation.
4. How long does it require to reach maturity?
5. Beyond the root is the plant or stalk utilized?

In addition to the foregoing you are requested to supply as much information as possible concerning the plant; the manner in which the root is prepared for the market; whether it is subject to any adulteration in its preparation for the market; the amount exported from your district to the United States, where it is raised, prepared, and how it is shipped hither, &c., in fine, everything which can be of service to parties engaged in the trade, or who contemplate the cultivation of the plant in the United States.

I am, sir, your obedient servant,

W. HUNTER,
Second Assistant Secretary.

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CONSULAR REPORTS

ON

THE LICORICE PLANT, &c.

AUGUST, 1885.

THE LICORICE PLANT.

REPORT BY CONSULAR AGENT WHITMAN, OF HUDDERSFIELD, ENGLAND.

LICORICE AND ITS USES.

Before proceeding to give an account of the cultivation of licorice in this district, it may not be amiss briefly to quote from several authorities some facts regarding the introduction of the plant into England, its other habitats, uses in the pharmacopœia, &c.:

Licorice is cultivated throughout the warmer parts of Europe, especially on the Mediterranean shores, and its geographical limits travel eastward throughout Central Asia to China, where its cultivation is also prosecuted.

In the United Kingdom it is grown in Surrey and Yorkshire. The roots for use are obtained in lengths of 3 or 4 feet, and averaging in diameter from one-fourth to one inch. * * * The root is an article of some commercial importance on the continent.

Stick licorice is made by crushing and grinding the root to a pulp, which is boiled in water over an open fire, and the decoction, separated from the solid residue of the root, is evaporated in copper pans till a sufficient degree of concentration is attained, after which, on cooling, it is rolled into the form of sticks or other shapes, for the market. The preparation of the juice is a widely extended industry along the Mediterranean coasts; but the quality best appreciated in the United Kingdom is made in Calabria, and sold under the name of Solazzi and Corigliano juice. The licorice grown in Yorkshire is made into a confection called Pontefract cakes.

Licorice in various forms is a popular remedy for coughs, and it is largely used by children as a sweetmeat.

It enters into the composition of many cough lozenges and other demulcent preparations, and in the form of aromatic sirups and elixirs it has a remarkable effect in masking the taste of nauseous medicines, a property peculiar to glycyrrhizin.

A considerable quantity of licorice is used in the preparation of tobacco for chewing.

Commercial licorice paste is frequently much adulterated and often contains distinct traces of copper, apparently derived from the vessels in which the juice is inspissated.—*From the ninth edition of Encyclopædia Britannica (vol. 14, pp. 687, 688), now in course of publication in England.*

Referring to the writer's statement as to its growth in Surrey, I quote from Murray's Handbook to that county, p. 101:

At Mitcham we are in the midst of the great Surrey "flower-farms." The soil of the parish is a deep black mold, some hundred acres of which are covered with plantations of lavender, rosemary, mint, peppermint, licorice, chamomile, and other herbs for the use of the great London druggists, perfumers, and distillers. * * * Mitcham has been famous for its plantations of medicinal herbs for the last century.

From information of a reliable character obtained at Pontefract, I gather that the plant is cultivated only at Mitcham as regards the county of Surrey, and, as appears from the above account, in but a small way for near consumption.

Referring to the Pontefract industry, the only important one in the British Isles, Murray in his Handbook for Yorkshire, third and last edition, 1882 (p. 359), gives the following account:

Licorice was first cultivated in England in the reign of Elizabeth (Stowe). * * * The plant, very graceful, with feathery leaves, is planted in ridges, and does not come to perfection until the fourth year.

The sandy soil suits it, and the fibrous roots are sometimes ten or twelve feet deep. These are dug in autumn, and pounded in the following winter; the juice thus extracted is boiled down and mixed with gum arabic and other ingredients, and mixed into large cakes. * * * The trade is slowly decaying since Spanish licorice is now imported free of duty.

As showing how widely diffused the growth of this plant seems to have been I find in an account of its introduction into England, given by McKenzie's Cyclopædia (unfortunately I cannot quote the article, not having the volume in the town), that it originally came from Germany. If true, the plant must indeed be a hardy one, since the German winters often rival those of the United States in severity. Further on, I shall again refer to the question of climate, naturally a very important one to growers in the United States.

Messrs. Chambers give an excellent account of the plant in their popular Encyclopædia, revised edition 1874 (vol. 6, p. 147), from which I may pertinently furnish a few extracts:

The roots of licorice * * * are a well-known article of materia medica, and were used by the ancients, as in modern times, being emollient, demulcent, very useful in catarrh and irritation of the mucus membrane.

The roots of the common licorice are chiefly in use in Europe. * * * It is cultivated in many countries of Europe, chiefly in Spain. * * * The roots are extensively employed by porter brewers. They are not imported into Great Britain in considerable quantities, but the black inspissated extract of them (black sugar or stick licorice) is largely imported from the south of Europe, in rolls or sticks packed in bay leaves or in boxes of about 2 cwt., into which it has been run.

Licorice is propagated by slips, and after a plantation has been made, almost three years must elapse before the roots can be taken up for use. The whole of the roots are then taken up.

Licorice requires a deep, rich, loose soil, well trenched and manured; the roots penetrating to the depth of more than a yard, and straight tap-roots being most esteemed.

The old stems are cleared off at the end of each season, and the root-stalks so cut away as to prevent overgrowth above ground next year.

The plant is propagated by cuttings of the root-stalks.

The root of the prickly licorice (*Glycyrrhiza echinata*) are used in the same way, chiefly in Italy and Sicily, Russia, and the East. The only American species is *Glycyrrhiza lepidota*, which grows in the plains of the Missouri.

CULTIVATION OF LICORICE IN ENGLAND.

Thinking that something might be learned from persons in the business residing at Pontefract, I visited this place armed with letters of introduction to several of the largest manufacturers there. Before entering on the method pursued for making the so-called "Pontefract cakes" from the licorice juice, I, perhaps, cannot do better than describe the system of cultivation, soil, &c., as obtained on the spot from three practical men, two out of the three being growers of the plant, which I was then told had been introduced into Pontefract by the monks, whose simple pharmacopœia embraced licorice root among the large number of herbs prepared by them for medicinal purposes.

The soil about Pontefract is well suited for the growth of the plant,

being of a sandy, loamy character, though from all I could hear in this particular, a rich black soil would answer equally as well, the only requisite being considerable depth, to allow of the downward growth of the roots.

The beds are prepared by being well trenched, the width of trench and bed averaging 3 feet, having the appearance, when finished, of wide celery beds. Commencing early in April or late in March, a top dressing of good stable manure is applied, and then lightly covered over, leaving the trench, perhaps, 6 inches below the level of the raised bed. Buds and suckers, slips or runners, specimens of which (Nos. 1 and 2) are herewith forwarded to the Department, are then lightly stuck into the soil by one person—in the field I saw a girl was employed in this task—while another follows along with a small spud or (local) dibber with which holes are made at a distance of some few inches apart, and the buds and suckers inserted therein, say 4 inches below the surface—that is, the tops covered by about 4 inches of soil.

This forms the double crop, that is, the buds growing downwards producing licorice roots (specimen No. 3), the suckers forming buds for future planting, width of bed permitting of cross rows of plants. The buds and suckers are left in the ground for three years and a half, no crop being obtained until the September following the fourth spring. The first manuring is sufficient, the plants being weeded as required during each summer. They do better in a hot, dry summer after the first season, the last five or six wet years before that of 1884 not having proved good ones for the crop.

Frost, it seems, does not harm the plant, though in this matter I judge that our very severe New England winters might prove harmful—the coldest season in Yorkshire seldom showing a greater degree of frost than several degrees above zero, though the ground is often frozen solid to some depth. I was assured that the plant is very hardy, had no worm or parasite, and gave little trouble in its cultivation. Having the trenches virtually idle for the first two years, since the tops of the plants do not until the third years show any luxuriance of growth, the universal custom is to plant the trenches for the first year with “ash” potatoes, described as being a potato with a very small top, since the ordinary potato vine would overshadow the staple, which, of course, is the grower's prime care. For the second year, cabbages are grown between the beds; but for the third and fourth (that is, six months) the trenches must lie fallow, as the licorice plant is then luxuriant, and presents in the summer months the appearance of a plantation of young ash trees, for instance.

The grower plants a fresh crop in the spring of each year, and in the fall of the same year harvests the one of three years and a half's growth. The only labor required beyond this is that the beds in all their stages must be kept free from weeds, and in November or December, when the sap is out of the plants, they must be cut down. If a winter proves unusually severe the tops of the plants may be protected by a light covering of earth. No irrigation is required even in the driest summer.

GATHERING AND PREPARING THE ROOT.

The mode of gathering the root is as follows, namely: The trench, not the bed, must be dug down to a great depth, thus exposing, without injuring, the roots, and the whole plant carefully taken out of the ground. The earth from the second trench is thrown into the first, and so on, to the other side of the field.

The roots are placed in dry cellars, after removing the tops and suckers, the latter serving for the next spring's crop to produce "bud," that is, roots in their early stage for another year, sand being used to cover the roots. After the roots are dry they form the ordinary yellow licorice for producing the juice of commerce, except a small portion of the top of the root next the bud; this, it appears, is not so valuable as the rest, and hence is separated from the root and disposed of to be ground into powder (specimens 4 and 5), which is sold to chemists, and by them retailed for medicinal purposes, for mixing with stout and beer, and as a remedy even for horses in certain cases of sickness. That part of the plant above the ground seems to be of no value except for burning.

The three and a half years' sucker which is gathered with the licorice plant has now produced "buds," which are reserved for planting in the following spring, and the new suckers also to be planted have been propagated from the old root and are cut off from it before storing it. To preserve these "buds" through the winter they are put either into a dry cellar, and, according to McKenzie, covered over with rotten dung, or, as in Pontefract, "pied," that is, made into a mound out of doors and well covered over with earth or moist sand.

They seem in this way successfully to endure the cold, wet winters of Yorkshire.

RENT OF LAND, ETC.

Some particulars I gleaned as to rent of land, &c.: \$30 per acre is the common rent for licorice land, the usual rent for cereal lands being \$10 at present. One man and a boy can carry on several acres, but the work is hard during the planting season.

One informant, Mr. David Longstaff, who has been very many years in the business, stated that he considered \$500 a liberal estimate to allow for "laying down" an acre from the start to yield of the first crop. He gave rent as \$120 out of this, saying that the two crops of ash potatoes and cabbages hardly more than recouped the grower for his trouble, seed, &c.

CULTIVATION OF LICORICE IN THE UNITED STATES.

Mr. Longstaff spoke most hopefully of the introduction of the plant into many of our States, declaring that in Spain it grew wild in great abundance, owing to the hot climate, while he never knew it to be injured by worm, parasite, or frost.

The rainfall of Pontefract, I should say, is, of course, considerably more than that of many of our States.

Mr. Longstaff corroborated what I had heard from others, that the difficulty would be to obtain buds in sufficient numbers to furnish our would-be growers with seed. He stated that some time ago he had endeavored to obtain five hundred buds for a gentleman in London who wished to try some experiment with them, and it was only with considerable difficulty that he finally got them.

No one seemed to think there was any way of planting by seed alone, at least, from the cultivation of the plant in England.

As regards export to the States, Mr. Longstaff said that all the licorice grown in Pontefract was used in this country by chemists, &c., and that "Spanish juice" as now admitted, free of duty (it paid duty up to ten years ago), was so cheap that no English-grown licorice was now crushed and made into the material for Pontefract cakes, &c. In fact,

he thought the cultivation of the plant had decreased in the neighborhood by 100 acres since the large importation from Smyrna and Spain duty free.

Though some little jealousy may exist as to explaining the growth, &c., of the plant, I was assured by Mr. Longstaff that the process described to me, and partly witnessed, was a simple one, the great secret of the trade being the way in which the Spanish juice is boiled and then compounded for being made into cakes, &c.

MANUFACTURE OF LICORICE IN ENGLAND.

Gathering from the general request of the Department for information as to the uses of the plant that some description of the method of manufacture of the crude product into the sweetmeat may not be unwelcome. I will state what I learned from the largest manufacturer there, Mr. Hillaby. This gentleman received me very kindly, and, after some general information as to the growth of the plant in Pontefract, stated that the manufacturers depended for their supplies entirely on Spanish and Smyrna juice, samples of which, Nos. 6 and 7, I inclose. This extract inspissated from the plant either in its wild or cultivated state comes to them in large packing cases of 2 cwt. each, the cases securely dovetailed and lined with paper to avoid leakage in case of heat—the juice being really a solid plastic mass of a dark brown color, feeling like tar and inclined to run if subject to great summer heat. It may, indeed, be run into these cases (*vide* quoted account). This juice, as I gathered from Mr. Hillaby, could not be obtained from the Pontefract roots, partly owing to their small size, and partly because it paid growers better to sell to chemists, &c., who found a ready market for the roots as they were.

I judge, therefore, that our hot summers would produce equally large roots with those crushed in Spain, so that this product, if now largely imported into the United States, could be obtained in paying quantities from the home growth.

Understanding this juice to be unadulterated, I presume there is no secret in the crushing of the roots to furnish it, though I found no one who seemed ready to explain the sort of machine formerly used, and all that I can hence offer on this point is found in the quoted accounts previously given.

Explaining very courteously to me that the mixing and boiling process was a secret, Mr. Hillaby was good enough, however, to show me through his extensive premises in order that I might see the process of manufacture after the juice was properly boiled and mixed for being made into cakes. In the first room I found large masses of the "juice," now perhaps more properly called embryo Pontefract cakes, spread on heavy tables, and there rolled by women as dough is worked. This mass was then rolled out by a machine into thin sheets, laid on trays, and removed into a room at a temperature of about 100° and there left until the following morning, when it was cut out, stamped by machinery into various forms, including the well known "Pomfret cake" (sample No. 8), which holds its own, with many other novelties of design, such as letters of the alphabet, fluted sticks, &c.

The sweetmeat, as it has now become, is again subject to a high temperature to "skin over," and is then packed in card-board boxes, which are placed in wooden cases and sent off to all parts of the British Isles and the colonies.

Mr. Hillaby's manufactory is fitted up with machines entirely of his own invention for the conversion of the crude product into pomfret cakes, &c., to the perfection of which he has devoted the best years of his life, the result of which is an extensive business and an increasing demand for his special make.

Since writing the above report I have obtained the following additional information from Mr. Longstaff:

(1) The average cost of Spanish or Smyrna juice is about \$11 per cwt. In consequence of the low price of foreign juice there is none now made in England.

(2) The inferior part of the root, called the "chumps," is ground into powder [*vide* sample Nos. 4 and 5]. A much finer powder is made from the finest root (decorticated), and is used for medicinal purposes. The main part of the root is sold in sticks, of which a considerable quantity is consumed by children.

(3) The average price of buds and runners is about \$3 per thousand. The grower must wait until the crop is ready before the buds produced from the runners are available, being taken up with the crop.

(4) If any grower writes to me I will, as you request, do my best to procure for him a sufficient number of buds for an experiment.*

(5) The approximate cost of an acre of licorice on new ground is about \$450, which I arrive at as follows:

Trenching and preparing land.....	\$80 00
Forty thousand buds, at \$2.50.....	100 00
Planting and manure.....	85 00
Four years' rent and rates (taxes).....	125 00
	390 00
Four years' interest on above, say.....	75 00
Total.....	465 00
Average produce of one acre of licorice, 45 cwt., at \$14.....	630 00

This calculation is on the assumption that this is the *first* crop of licorice, the cost of preparing the land afterward being about one-half.

The value of the buds will fully repay the cost of cleaning, taking up, &c.

The rent is calculated at \$30 per acre.

C. W. WHITMAN,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Huddersfield, April 7, 1885.

LICORICE IN SPAIN.

REPORT BY CONSUL MARSTON, OF MALAGA.

I have the honor to acknowledge the receipt of Department circular under date of February 10, 1885, upon the subject of licorice, and to make the following answers to the questions contained therein, viz:

The plant grows wild. It requires wild, low, marshy ground, along the banks of rivers. The climate of Spain, say in the provinces Murcia, Aragon, and Toledo, is most suitable. It cannot be cultivated so as to increase yield.

In Spain it requires, say, on an average, eight years to reach maturity. The plant or stalk is not utilized beyond the root.

* Mr. Longstaff's address is "David Longstaff, esq., Monkroyd House, Pontefract, Yorkshire, England."

Exports of licorice from Malaga to United States in 1882, 1883, and 1884.

Year.	Paste.		Root.	
	Quantity.	Value.	Quantity.	Value.
1882.....	<i>Boxes.</i> 1, 348	\$32, 841 15	<i>Boxes.</i> 3, 365	\$9, 336 51
1883.....	1, 264	30, 152 46	8, 285	24, 371 59
1884.....	200	4, 770 96	7, 309	21, 688 39
Total	2, 812	18, 959

LICORICE ROOT.

There are several districts in Spain in which licorice root is obtained and large exports are made from Spanish sea-ports to the United States.

France also consumes large quantities of this root in the manufacture of licorice paste, and probably takes nearly as much as the United States.

This root is used in the United States principally for sweetening in the manufacture of plug tobacco; it is also used in the manufacture of drugs and in the preparation of medicines.

It grows wild in the lower lands, in marshy grounds, and on the banks of rivers. Probably the best quality obtained in Spain is found in the provinces of Aragon, Murcia, and Toledo. The very best Spanish licorice root is found near the margin of the Ebro, in Aragon. The next in point of quality is obtained near Cordova. Where it once takes root it is almost impossible to eradicate it. It grows in many countries, and varies in quality according to soil. Spanish licorice differs quite materially in the several provinces, the principal variations being that in some parts the bark is red, brown, and light color, the inside varying from light yellow to brown; the proportions of saccharine and starch vary also. Many kinds are fibrous, while others are almost as hard as wood. The ground is pulled at intervals of three, four, or five years, according to circumstances, by digging trenches, pulling everything visible as long as possible until it breaks.

After a year or two it shows above the ground with a little stem; in the spring over this stem there are little flowers.

From the time this stem appears until the flowers have all fallen this root is not in condition to extract, for the sap does not return to the root till then.

Each year, till the ground is culled, the quantity of roots and tops increases, until the ground is unfit for cultivation of any kind.

It is from September till March that the root is gathered, and goes through a process of drying or curing before it is considered marketable, the time required for the drying or curing process being from four to five months and requires a dry climate.

LICORICE IN THE SEVERAL COUNTRIES.

Licorice root is also found and gathered in Asiatic Turkey, Greece, Italy, in the Sicilies, &c. In the Sicilies and in Italy very little, if any, is exported as root, it being used in the manufacture of roll or stick licorice. There is a small section in England which produces a limited quantity. The United States also have licorice root in several parts of the country, but the quality is not such as to give it value.

The quality of root produced in the different countries is as follows, viz: Asiatic Turkey, decidedly bitter; Greece, bitter, but not so bitter as Asiatic Turkey; Sicily, sweet, but less so than Spanish; Spain, rich and sweet; Italy, richest and sweetest of all.

EXPORTS OF SPANISH LICORICE.

Malaga has not up to the present time been considered an important shipping point for root; Seville, Alicante, Barcelona, and Bilbao are nearer the producing districts, yet during the past three years a marked increase in shipments from Malaga has taken place, as per statistics inclosed, while the shipments of licorice paste have materially decreased. The value of this root does not in Spain admit of its being increased in crop by cultivation, and the quantity gathered depends greatly upon the severity or mildness of the winter. If severe it lessens the quantity gathered.

Again, if other crops are good, labor being scarce, less root is gathered; consequently prices are higher.

MANUFACTURE OF LICORICE PASTE IN SPAIN.

There are one or two large French establishments in Spain for making paste and stick licorice, one in Seville and the other in Saragossa, besides a few small Spanish concerns also engaged in the manufacture of licorice paste.

H. C. MARSTON,
Consul.

UNITED STATES CONSULATE,
Malaga, March 9, 1885.

LICORICE IN WESTERN ANDALUSIA.

REPORT BY CONSUL OPPENHEIM, OF CADIZ.

In deference to directions given in Department dispatch dated February 10, 1885, I have the honor to forward herewith such data as I have been able to gather upon the subject of licorice production in this district.

I regret to have to say that the information is somewhat meager and not likely to be of much value in the way of practical guidance to any one wishing to introduce the licorice culture; yet it seems to be all that was obtainable in Seville, the point whence most of the root produced in this district is exported.

Here in Cadiz I could find no one at all conversant with licorice culture or production, neither could I obtain any hint as to the existence of the needed data in agricultural reports or text-books.

From a practical botanist, at present temporarily absent from this city, I expect to obtain data as to the plant's position in the Linnean system of classification, its morphology, mode of development, &c., and as soon as the information reaches me it shall be forwarded to the Department to serve as a complement to what is herewith inclosed.

The plant grows wild in this district and it is believed that it is not cultivated in any part of Spain.

A clayey alluvium produces the best quality of root, but alluvial soils

of a sandy character give the heaviest yields. The bottom lands of the great Spanish rivers, such as the Ebro, the Tagus, and the Guadalquivir, are the plant's usual habitat, and such lands are presumably more retentive of moisture than the uplands.

A warm climate and the absence of severe ground frost seem to be conditions necessary to its existence, but data as to the way the plant's growth and the annual yield are affected by the variations in the rainfall or temperature are wanting.

The plant and stalk are not utilized in this district; they are burnt or removed.

The licorice plant is here looked upon as a weed, and such a vigorous one as not to need the interference of man to protect it from the encroachment of other weeds or other noxious influences. The cropping consists in simply cutting the roots at the depth of about 1 yard; the roots are stocked in well-ventilated sheds until dry, and are then cleaned and packed into bundles for shipment.

The yield is stated to vary from 30 to 40 cwt. per aranzada (0.9284 of an acre), worth usually about 5 pesetas per cwt. The usual mode of preparing paste from the root is by crushing, boiling, and evaporating, but there are said to be other processes in use which are looked upon in the light of valuable business secrets and are jealously guarded from would-be inquirers.

The proportion of paste extracted from a given weight of root varies in subjection both to the richness of the root and to the quality of paste it is desired to produce. The dried root generally yields from 18 to 20 per cent. of its weight in paste of the best grade, and from 25 to 28 per cent. in that of ordinary quality.

The licorice root and paste exported from this district to the United States are shipped at Seville, both by steamer, via England, and, direct, by sailing vessels. The shipments (root and paste) for the last three calendar years were as follows:

1882.....	\$21,683 91
1883.....	46,028 70
1884.....	46,840 02

ERNEST L. OPPENHEIM,

Consul.

UNITED STATES CONSULATE,
Cadiz, March 20, 1885.

CULTIVATION OF LICORICE IN SICILY.

REPORT BY CONSUL WOODCOCK, OF CATANIA.

In answer to circular of February 10, 1885, calling for information relative to the licorice plant that grows in this district, I have the honor to communicate the following:

Licorice grows to the height of 2 or 3 feet. It bears a small yellow flower. Its leaves are pinnate. The roots grow from 6 to 20 feet in length.

The valley of the river Simeto (ancient Symæthus) in this consular district is rich in vegetation. Here not only all the cereals grow to perfection under the rude culture of the rustic Sicilian husbandman, but the wild plants with which the farmer has to contend spring up spontaneously. Among the latter may be classed the licorice plant.

In response to a question asked of a Simeto Valley farmer if the licorice plant grew upon his farm, he replied, "God forbid, for of all wild vegetation it is the most difficult to subdue."

If any particle of the root is left in the ground, it grows and sends up shoots. It is not cultivated in this district; it grows in a wild state. In the fields where it grows are cultivated not only the various grains, such as wheat, oats, barley, &c., and vegetables, but also oranges, lemons, and the various other fruits of this climate. Of course this plant is injurious to the grains and fruits, but the thorough digging of the soil for the roots of the licorice is beneficial to the production of crops.

The agriculturist here uses the most rustic of implements. His plow is that of the old Romans, consisting of an iron point which simply scratches the soil without turning a furrow. In digging for the licorice root, the soil is thoroughly turned over and is dug to the depth of from 1 to 3 feet.

There are two species of the licorice plant here. The one sends down a main root to the depth of from 3 to 6 feet with but few lateral roots; the other does not sink so deep into the earth, but creeps beneath the surface at a depth of from 6 inches to 2 feet.

The latter plant is most productive and is the most highly prized.

Doubtless if the licorice plant were cultivated it would yield larger results. The people here think its culture will not pay, hence they are satisfied to collect it as produced by nature in its wild state. There is no use made of the stem except for fuel.

The licorice plant grows most luxuriantly in the valleys adjacent to streams of water. It is, however, found among the foot-hills of the mountains, but here grows less luxuriantly. It requires a moist soil consisting of a clay loam. The climate must be warm, such as is adapted to the growth of oranges, lemons, and the other semi-tropical fruits. It cannot endure frosts, or cold, high altitudes.

The root continues to grow for four or five years, when it is considered in the best condition for gathering. The root will continue to grow for ten or twelve years longer, but it is not considered so rich in juice-yielding quality.

The crop is gathered from the same ground once in four or five years. On the average 100 pounds of the root produces 16 pounds of licorice paste. During the months of June, July, August, and September, and the first part of October the root is not disturbed, for the reason that it is then in full vegetation, and for the further more important reason that the ground is dry and hard-baked by the sun, and it is with much difficulty and great expense that it can then be dug.

As soon as the autumn rains set in in sufficient quantity to saturate the ground the root harvest commences.

During the months aforesaid the manufactories of licorice are idle, doing little or nothing in the way of manufacture. In Catania there are some seven manufactories of licorice, which employ from twenty to forty hands each, and are capable of manufacturing 750,000 pounds of the root. There is also a factory in Paterno; another in Caltagerone, and another in Terranova, in this district.

When the roots are taken from the earth they are bound in bundles, and upon the backs of mules transported from the fields to the factories. Here they lie in store for a time in a state of seasoning.

When the roots are sufficiently cured men and women, with hatchets, cut them in bits of from 3 to 6 inches in length. These are then plunged into a vat of water and thoroughly washed. They are then crushed in a mill of rude construction. It consists of two circular stones of lava.

The one is in horizontal position; the other, perpendicular, rests upon it. Through the center of the upper stone is an axle, to which is attached a mule, which revolves it slowly in a circle (cart-wheel like) upon the lower stone. A workman with a wooden shovel is constantly employed in keeping the roots beneath the revolving stone. When the roots are sufficiently crushed they are placed with water in kettles and boiled for twenty-four hours. They are then removed from the kettles and placed beneath a screw-press, and all the juice is thoroughly squeezed out, which runs into a cistern beneath. This juice is pumped from the cistern and passed through a sieve into kettles and the boiling resumed. The sediment from the strainer is again pressed.

The contents of the boiling kettles is a second time filtered. When boiled to the proper consistency it is removed to a broad, shallow kettle over a slow fire, where workmen with spades continue to stir it until it becomes dense enough for paste. Then it is removed and placed in wooden molds of the size they wish the cakes or by workmen worked into little rolls or sticks. When cold and hard the cakes are wrapped in paper and boxes for export.

The little rolls or sticks of licorice are placed upon shelves to dry. When they become perfectly dry and hard they are packed in laurel leaves in boxes.

In preparing the root for market, women with knives scrape off the bark and then cut it into bits of one-half inch or longer in length, as the purchaser may wish. These are then dried in the sun and placed in bags for export.

In response to my question a manufacturer answered that licorice paste may be adulterated with starch, rice flour, wheat flour, flour of the carraba (locust bean), or even wood ashes; but he expressed the opinion that the manufacturers of Catania could not be so recreant to honesty as to resort to these base methods.

The Chamber of Commerce of Catania report that in the year 1883 440,920 pounds of the root were prepared by the manufacturers and exported to the United States, in value amounting to \$11,580, and that 79,126 pounds of the root were manufactured and exported to France, in value amounting to \$2,079, the total export for the year being 520,080 pounds of the root manufactured, valued at \$13,659.

As shown by my records for the year 1884, there were exported to New York of licorice paste 112,746 pounds, valued at \$14,965.85, and of the root 14,047 pounds, valued at \$567.24; the total value of the article exported for the year being \$15,533.09.

ALBERT WOODCOCK,
Consul.

UNITED STATES CONSULATE,
Catania, March 12, 1885.

CULTIVATION OF LICORICE IN PORTUGAL.

REPORT BY VICE CONSUL-GENERAL WILBOR, OF LISBON.

I have had the honor to receive your circular dated February 10, 1885, propounding interrogatories in relation to the growth and cultivation of licorice.

I beg to report that licorice grows in Portugal, in a few districts, spontaneously, but no use whatever is made of it. Such of the various

preparations of that root as are used in this Kingdom are entirely of foreign origin.

The licorice root and paste exported from Portuguese ports are originally sent hither from Spain for shipment.

J. B. WILBOR,
Vice and Deputy Consul-General.

CONSULATE-GENERAL OF THE UNITED STATES,
Lisbon, March 12, 1885.

CULTIVATION OF LICORICE IN ASIA MINOR.

REPORT BY CONSUL STEVENS, OF SMYRNA.

In acknowledgment of circular under date of February 10, 1885, calling for information concerning licorice root, how it is grown, prepared for market, &c., I have the honor to report as follows:

The root grows wild. Being indigenous, it requires no cultivation. The best root is found on the borders of streams, creeks, and rivers, where the soil is sandy but subject to overflow.

The climate must be mild, as the quality is affected by frost. The plant reaches maturity in three years; sometimes, under favorable conditions of soil and climate, in two years. Once it has taken root, it is very tenacious of life, growing spontaneously, and although the ground be dug over every two or three years it will continue to reproduce itself. The plant itself, which attains to a height of from 3 to 4 feet, is not utilized, the root alone possessing value. The root does not take a deep hold of the soil, seldom reaching below 2 feet, and is easily extracted. The best time for digging is when the sap is in the root, say during the months of October, November, and December. After being dug it is carefully dried, to prevent mold, and kept from freezing, until it is perfectly dry. It is then packed in bales of 300 pounds weight, and subjected to hydraulic pressure to reduce space and thus save freight. Great care must be observed in these processes, as the slightest moisture is hurtful, and if one bale in a cargo is injured the injury is communicated to the whole. The prepared root must be free from the slightest blemish, as other wise it is well nigh valueless. Hence no adulteration is possible.

A very large proportion of the root produced in this province finds a market in the United States, being conveyed thither in sailing vessels flying the Italian and Austrian flags, at an average freight of \$4.80 per ton of 2,240 pounds. The exports of licorice root from this consular district to the United States during the twelve years were as follows:

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	<i>Cwt.</i>			<i>Cwt.</i>	
1873	44, 015	\$96, 831	1879	127, 061	\$267, 939
1874	63, 646	138, 464	1880	214, 628	445, 886
1875	81, 598	168, 529	1881	264, 177	701, 781
1876	42, 112	80, 543	1882	193, 690	471, 028
1877	112, 307	176, 274	1883	288, 458	649, 057
1878	184, 405	398, 672	1884	269, 732	618, 100

The quality of the root produced in this province is superior to that found in Greece or Syria, and perhaps to that of any other country.

The very best grown is at Menemen, a place situated about 23 miles from Smyrna, in the valley of the river Hermus, and on the line of the Cassaba Railway.

In the neighborhood of Alascheir (ancient Philadelphia), the present terminus of this railway, large districts are given over to the growth of licorice. The largest yield is, however, in the neighborhood of Sakia, on the line of the Ottoman Railway, which at this place skirts the valley of the Meander. This territory is monopolized by the wealthy English firm of McAndrews & Forbes, who make heavy shipments to the United States.

The Alascheir territory is now largely controlled by an American manufacturing company, of which John H. Leeds, of New Haven, Conn., is manager. The energy and enterprise shown by Mr. Leeds in getting possession of this property are worthy of emulation by other American capitalists. He has also secured extensive licorice-producing grounds in Syria, and is no longer at the mercy of the one or two firms who formerly monopolized the product in this region.

It is now only about fifty years since the fact became known that licorice root was growing wild on the banks of the rivers which drain the fertile regions of Asia Minor. A German archæologist made the discovery. Some time after an enterprising English resident of Smyrna secured from the Turkish Government the sole right for a series of years to dig the root, which then, as now, was growing for the most part upon land owned by the Government. He realized a fortune out of the monopoly, and then sold it to the English firm before mentioned. The concession expired a number of years ago, and has not been renewed; but until the advent of Mr. Leeds, about eighteen months since, the monopoly was maintained against all efforts of individuals to break it.

I see no reason why licorice may not be produced in California, New Mexico, Texas, in fact, all the Southern States of the Union, with the exception of those in the northern tier. Whether it could be produced in competition with this region is perhaps a question, inasmuch as the labor of digging it is considerable, and labor of the kind required can be had here at one-fourth the cost of the cheapest labor in the United States.

As I have said, however, when once the plant is well rooted its eradication is difficult, so rank is its growth and so tenacious is its life, and it may be experiment would prove that its introduction would be attended with highly beneficial consequences.

The amount of the annual product in Asia Minor is certainly limited, and as the demand for it, in one form or another, by other countries is increasing rapidly, some new region must soon or late be discovered or created in order to meet this demand.

I hope to be able in a few days to gather more facts bearing upon this subject, which I shall embody in a supplementary report.

W. E. STEVENS,

Consul.

UNITED STATES CONSULATE,
Smyrna, March 27, 1885.

SYRIAN LICORICE ROOT.*REPORT BY CONSUL ROBESON, OF BEIRUT.*

I have the honor to acknowledge the receipt of a circular from the Department of State dated February 10, requesting certain information about licorice root. I beg now to transmit the following answers to the questions contained in said circular:

The licorice plant grows wild.

A temperate or warm climate with a rich, deep soil are best suited to its growth.

The licorice plant is not cultivated in Syria or elsewhere to my knowledge.

Licorice root is only considered of commercial value after it has attained from three to five years' growth. As a rule, the ground is dug over every three or four years, according to the condition of the plant. In the autumn and winter the soil is removed, when the root is gathered and dried in the open air.

Beside the root, no part of the plant is considered of commercial value except in a few localities, where the stalk is used for fuel.

Much care is required in handling and watching the root during the period of drying to prevent it from molding or rotting, frequent turning being necessary. After the root is thoroughly dry, which is not before the July or August following, it is conveyed on camels or mules to some convenient point for shipment and there pressed into bales of suitable size for exportation. It is not subject to adulteration either during or after its preparation for the market. The quantity of licorice root declared at this consulate for shipment to the United States during the year 1884 was 936,980 pounds, valued at \$16,125.35, but I am informed that there were shipments of licorice root from this district to the United States invoiced at the Smyrna consulate. Licorice grows in some parts of the United States, but has never been utilized, nor is it likely to be soon, as the cost of labor is so much more than in Syria, where the wages received for digging and collecting the root average from 10 to 20 cents a day; adults and children are employed. I am of the opinion that much of the southern part of the United States is well adapted for the growth of licorice root, but persons who understand the nature of the plant assert that it is impossible to get rid of it after it gets hold of the soil, and where the licorice root grows land is useless for agricultural purposes, and has to be abandoned. It is found in large quantities in the Euphrates and Tigris Valleys.

JOHN T. ROBESON,
Consul.

UNITED STATES CONSULATE,
Beirut, May 27, 1885.

SYRIAN LICORICE ROOT.*REPORT BY CONSULAR AGENT COIDAN, OF ALEXANDRETTA.*

The plant grows wild, and is not cultivated. All kinds of soil suit the growth of this root, the sandy, argillous, and calcareous, as well as the dark and reddish ground; but the best suited soils are the damp ones, the places which during winter are covered with water. The best soil of all is the smooth and fertile grounds of the plains not exposed

to rigid weather, and the banks of rivers. A cold climate is not suited to its growth, and the root never grows on hills where the snow falls in winter.

It requires three years to reach maturity. The first year after the ground has been dug the root of the new plant is very thin and contains a milky vegetable matter, which, in the second year, is formed into the thick yellow matter of the licorice, but not sufficiently strong to resist the air and sun.

The plant or stalk is not utilized.

The root is not subject to any adulteration in its preparation for the market. It is dug during the end of the winter and the spring, exposed to the sun to dry, and when dry enough it is pressed by hydraulic presses in bales and shipped for export.

STEPHEN J. COIDAN,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Alexandretta, May 13, 1885.

SYRIAN LICORICE ROOT.

REPORT BY CONSULAR AGENT POCHE, OF ALEPPO.

In answer to the circular of the Department of State relative to licorice root, which you have been pleased to transmit to me, I have the honor to inform you that, from all the information I could gather in the vicinity of Aleppo about this plant, it results that it is not cultivated in any part and grows wild in a large tract of this vilayet.

As to the second question, relative to the land, I must inform you that this plant prefers the plains where the soil is deep and red, although it grows as well in the other lands in the east and the west of this province, where the climate is temperate.

The reproduction of this plant is made with great rapidity by its energetic roots as well as by its seed.

The root only is utilized. As to the plant itself, it is of no use. The plant that grows in the vicinity of towns is used for the heating of ovens. The cultivation of this root in this province, for exportation, dates from twenty years ago, and was inaugurated by a French manufacturer, Mr. Vidal, who established a factory in Antioch for the preparation of the root, which, after being dug out of the ground and dried, used to be scraped, made into faggot packages of three different sizes, and exported to France and Spain, where they used it for the preparation of the drink called "coco" (licorice-water) and for pharmaceutical purposes. This enterprise, after some years of existence, failed, owing to bad management.

For a long time this commerce was abandoned, when a few years since some firms of Smyrna, who deal in this article with the United States, sent their agents to Antioch and began, in the plains which surround this city, to cultivate this root, which is exported in its wild state, either to Smyrna or direct to America. The exports have been simultaneously made at the ports of Suedich and Alexandretta. The cultivation of this root—which is considered to be the plague of the lands where it grows, as the latter cannot be used for any other culture and to clear the same of it would require a long, assiduous, and very expensive work—has become an important resource for this province,

which previously used but a very small quantity of it to make the beverage known under the name of "coco." The right to root up this plant from the lands where it grows is bought from the proprietors for a certain number of years, as the reproduction, notwithstanding the uprooting of the plant, is effected very rapidly. As soon as the first rains of November fall, and the plant becomes completely dry, and the sap is reabsorbed by the roots, workmen begin with spades to pull this root out. This article, in a damp condition, is heaped up in stacks on a bed of pebbles placed on sloping ground, which allows the rainwaters during the winter to run easily down. To prevent the overheating and the molding of the root in question, these stacks, in the month of February, are turned upside down. This expensive operation is repeated at different times until the month of June, at which time, the drying being complete, the transport to the port of shipment is made on camels' backs. The firm of Alexander Sidi, of Smyrna, which has effected the most important purchases in this year, for the account of an American company, has just established at Alexandretta presses moved by steam, which will be used for the pressing of the licorice root.

The quantity which will be exported this year from the ports of Suedich and Alexandretta can be estimated at about 6,000 tons, at an approximate value of \$192,000.

F. POCHE,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Aleppo, May 14, 1885.

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