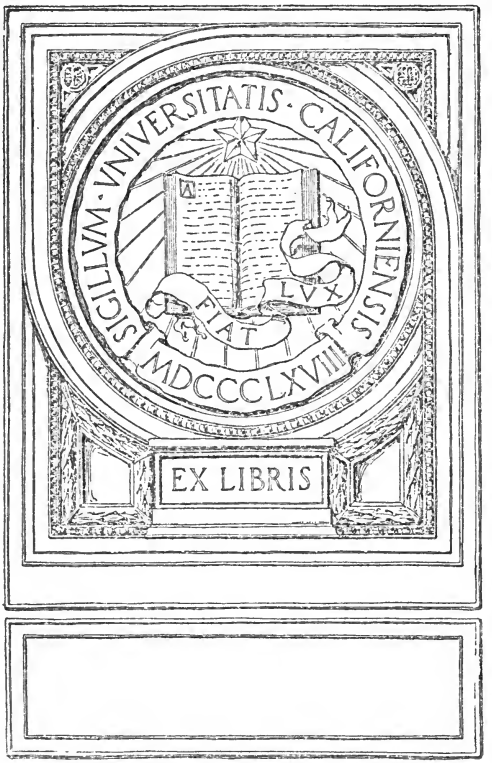
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THE

MISCELLANEOUS DOCUMENTS

OF THE

HOUSE OF REPRESENTATIVES

FOR THE

FIRST SESSION OF THE FIFTY-FIRST CONGRESS.

1889-'90.

See p. 393

IN FORTY-SEVEN VOLUMES.

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1891.

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51ST CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { MIS. DOC. No. 268.

SPECIAL

CONSULAR REPORTS.

Volume I.

ARRANGEMENT.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

SPECIAL.—CONSULAR REPORTS.

COTTON TEXTILES

IN

FOREIGN COUNTRIES.

REPORTS, FROM THE CONSULS OF THE UNITED STATES, ON THE COTTON TEXTILES IMPORTED INTO THEIR SEVERAL DISTRICTS, ETC.

ISSUED FROM THE BUREAU OF STATISTICS, DEPARTMENT OF STATE. ALL REQUESTS FOR THESE REPORTS SHOULD BE ADDRESSED TO THE SECRETARY OF STATE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

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CONTINENT OF AFRICA.

CONTINENT OF AMERICA.

DEPARTMENT CIRCULAR.

DEPARTMENT OF STATE,
Washington, May 27, 1889.

GENTLEMEN: You are directed to prepare, at your earliest convenience, reports upon the cotton textiles imported into your districts, covering the following points:

1. Quantity and kind imported, per annum.
2. Weight per yard.
3. How purchased.
4. Place of manufacture and whence imported.
5. Duties charged thereon.

It being represented to the Department that reports upon these points will be of great value to the cotton manufacturers of the United States, you are expected to give the fullest information thereupon obtainable.

I am, gentlemen, your obedient servant,

WILLIAM F. WHARTON,
Assistant Secretary.

The CONSULAR OFFICERS OF THE UNITED STATES.

SPECIAL CONSULAR REPORTS

ON

COTTON TEXTILES IN FOREIGN COUNTRIES.

CONTINENT OF AFRICA.

BRITISH AFRICA.

CAPE COLONY.

REPORT BY CONSUL HOLLIS.

Having given much time and attention to this subject, as directed in the circular of the Department of May 27, I regret exceedingly that the report submitted is so unsatisfactory.

QUANTITY AND KIND IMPORTED PER ANNUM.

During the year 1888 there was imported into this colony cotton textiles to the value of £543,888 ($2,647,000), distributed as follows:

Blankets	£75,500
Piece goods	368,088
Hosiery	100,300

WEIGHT PER YARD.

To this question I am unable to give any satisfactory reply, for the reason that no weight is shown or indicated upon the cotton goods imported from the United Kingdom, and therefore to determine the weight it would be necessary to weigh each bale of the various kinds and qualities and thus calculate the weight per yard, a procedure manifestly out of the question. Importers informed me that they paid no attention to the weight, as that could be much affected by sizing, and their opinions of the value of goods was based entirely on the evidence of examination.

HOW PURCHASED.

Goods are purchased almost entirely through commission houses either after an inspection of samples, or, more generally, by ordering well-known goods, such as had been previously furnished.

PLACE OF MANUFACTURE AND WHENCE IMPORTED.

The places of manufacture were as follows:

Piece goods:	
United Kingdom	£367,642
Germany	200
United States	246
Blankets:	
United Kingdom	75,000
All other countries	500
Hosiery:	
United Kingdom	100,000
All other countries	300

DUTIES CHARGED THEREON.

The value of the goods imported are declared at the customs at the cost price at the place of purchase, with the addition of the usual charges, commissions, etc., as in the United States, and a duty is levied thereon, 12 per cent. ad valorem.

Some four or five years ago no inconsiderable amount of cotton goods was sold here, the product of the United States. At the present time it will be seen that a relatively small amount is imported from the United States. One importer informed me that he was forced to dispose of the last of his stock of unbleached goods at a loss. One of the largest importers of cotton goods in Cape Town informed me that he had recently gone so far as to get out samples of nearly all descriptions of cotton fabrics, such as duck, denims, bleached and unbleached cottons, cottonades, and prints, and had established his private telegraph code. Upon comparing his line of samples with his goods in stock of English manufacture he came to the conclusion that he could get better value by the purchase of the latter. I made an exhaustive examination of the samples, comparing them with like quality of English goods. I could not, of course, argue the question as an expert, and, though the admission was made that the American goods were of high quality, they could not compete in price with the English.

These samples were furnished by a New York commission house, and embraced the product of many mills, from Maine to Georgia. Whether the prices quoted were unduly enhanced by excessive commission charges I have no means of knowing.

GEO. F. HOLLIS,
Consul.

UNITED STATES CONSULATE,
Cape Town, July, 1889.

PORT ELIZABETH.

REPORT BY CONSULAR AGENT CHABAUD.

1. It is impossible to give quantity—the Government, as will be seen from annexure A (customs comparative returns), only give the value—to wit, for the year 1888, £230,360, and keep no record of quantity or kind. From the principal importing merchant of cotton goods in this

town I have ascertained that the kinds imported are cords, calicoes (gray and white), prints, blankets for natives, in short, cotton fabrics of all descriptions.

2. Can not give weights. Manufacturers alone can give this.

3. Indent sent from here to London house who negotiate.

4. Great Britain and Germany supply the goods. Larger quantity from Manchester. A small proportion of colored prints from Germany.

5. The imported goods are simply declared at the local customs at English cost. The duty payable thereon to 30th June 1889, was 15 per cent. ad valorem. From 1st July 1889, this duty has been reduced to 12 per cent. ad valorem. I annex pro forma bill of entry B, applicable to an entry for such goods.

JOHN A. CHABAUD,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Port Elizabeth, July 24, 1889.

B.—*Pro forma bill of entry.—For payment of duty.*

[Sadler & Co., importers, in the steam-ship *Garth Castle*, whereof Webster is master, from London, British ship.]

Nos. pack-ages.	Particulars of the quality and quantity of all the goods contained in the several packages, and whether such goods are the produce or manufacture of the United Kingdom, or of some British possession or not.	Quantity.	Current value of goods at the port whence imported.	Duty.
			£ *s.*	£ *s. d.*
39½	Cotton piece goods.....bales..	3	86 0	
394	Woolen piece goods.....do...	1	34 0	
395	.....do.....cases..	1	53 0	
396–8	Haberdashery.....do...	3	104 0	
399	Oil-baize.....do...	1	3 0	
400–1	Haberdashery.....do...	2	46 0	
402	Wrapping paper.....bales..	1	2 0	
403–6	Cotton blankets.....do...	4	26 0	
407	Mats.....do...	1	3 0	
408	Woolen clothing.....cases..	1	23 0	
409	Cotton clothing.....do...	1	25 0	
410	Woolen clothing.....do...	1	24 0	
	Charges.....	.....	1 0	
			430 0	
			21 10	
	Wharfage, £1 13*s.* 11*d.*			
	Total.....	20	451 10	67 14 6

I, E. G. Palmer, for Sadler & Co., for importers, do hereby declare that the current value of the articles mentioned in this entry, and contained in the packages specified, at the port whence the same are imported is £430.

Duty £67 14*s.* 6*d.*

Place within the port where the goods are to be unladen and landed: Jetty.

Witness my hand the 22d day of July, 1889.

———— ————.

The above declaration signed the 22d day of July, 1889, in the presence of ————.

————, *Subcollector, No.* —.

To the EXAMINING OFFICER.

N. B.—This form must be filled up on one side only of the paper whereon it is written.

SIERRA LEONE.

REPORT BY VICE-CONSUL MAY.

The importation of cotton textiles into the district of Sierra Leone is of an extensive character. The country is tropical, and the garments of the people are largely made up of this material in almost every shape, and worn nearly all the year round. Cotton textiles are much more used than woolen fabrics. In Freetown, the capital of Sierra Leone, cotton textiles is one of the principal articles offered for sale. In the largest mercantile houses and in the smallest trading shanties is exposed to the view of the buyer this important commercial article. Large trading caravans, from the vast interior countries outlying the peninsula, visit periodically the city, and bring with them gold-dust, ivory, india-rubber, hides, bees-wax, camwood, benne-seed, and other African produce, which are bartered for cotton textiles, principally, and rum and tobacco. Merchants, not being content to await the slow and tedious progress of these periodical trading visitors, have themselves penetrated the interior countries and established factories in the midst of the people, thus carrying to their very doors their immediate wants. A flourishing trade is known to be done in these countries and particularly in cotton textiles. So valuable is one yard of cotton cloth to the eyes of an aborigine in the interior that he is prepared to exchange any quantity of his produce for this coveted treasure. Near to Sierra Leone, however, the people have more light through the frequent visits of merchants and traders, and demand value for value.

The quantity and kind imported is considerably varied. The following list, however, furnished by one of the large mercantile firms in this country, will help to give an idea of such variety needed for the market.

Gray Cotton.—(1) T cloth or a better class of cotton. (2) Domestics and Mexicans. (3) Massachusetts cotton (Manchester imitation). (4) Silk finished and scoured. (5) Delver and Osnaburg.

Bleached Cotton.—(1) Pure shirtings. (2) Imperial shirtings. (3) Wigan shirtings. (4) Horrocks long cloth. (5) Drills. (6) White lawn. (7) Brocade. (8) Brilliant. (9) Herringbone stripe. (10) White satin stripe. (11) Tape checks.

Dyed Cotton.—(1) India pondicherry bafts. (2) Manchester bafts. (3) Turkey. (4) Red twills. (5) Succatoons. (6) Colored lawn. (7) Crapes. (8) Cotton velvets.

Printed Cotton.—(1) Pink pads. (2) Purple pads. (3) White ground prints. (4) Waste scarves. (5) Crape cloth. (6) Muslins. (7) Satellites. (8) Linneas. (9) Reversible. (10) Handkerchiefs. (11) Fancy printed.

Woven Cotton.—(1) Oxfords. (2) Ginghams. (3) Zephyrs. (4) Noil. (5) St. Jago. (6) Bantis. (7) Madras handkerchiefs. (8) Imitation Madras handkerchiefs. (9) Denims. (10) Native cloth.

Fancy Cotton.—(1) Towels. (3) Jacquard. (3) Damasks. (4) Quilts.

No actual idea can be formed of the weight per yard of cotton, so varied is the quantity and texture, from fine muslin to maddapolum.

It is purchased in bales in the following manner:

Ordinary cottons in bales containing from 80, 100, to 250 pieces of 7, 8, 10, 12, 18, 24, 36 and 40 yards.

Imitation of American cotton sheeting costs in Manchester (place of manufacture) from 3 to 5 cents per yard.

Osnaburg in pieces of 30 to 50 yards cost 13*s.* per 40 yards. Shirtings in bales of 100 to 300 pieces of 6, 7, 8, 10, 12, 24, 30, and 40 yards, cost from 2 to 6 cents per yard.

Bafts in bales of 200 to 300 pieces of 8, 10, 12, 14 yards, cost 4 to 8 cents per yard.

India bafts or pondicherry, bales of 80 pieces from 13 to 14 yards.

Checks in bales of 150 to 300 pieces of 8, 10, 12 yards, from 3 to 10 cents per yard.

Prints in bales of 50 to 250 pieces of 8, 10, 12 yards, from 3 to 8 cents per yard.

Madras handkerchiefs in bales of 200 to 400 pieces of 8 to 12 handkerchiefs, cost from 3*s.* to 18*s.* per dozen.

Cotton handkerchiefs in cases and bales of 250 to 500 pieces, from 1*s.* 9*d.* to 2*s.* 6*d.* per dozen handkerchiefs.

Muslin in cases of 200 pieces of 10 and 12 yards, cost 2*s.* 3*d.* to 3*s.* per 12 yards.

Pagnes in pieces of 1 pair in bales of 150 to 250 pieces, cost from 1*s.* 3*d.* to 7*s.* per pair.

Cottons are generally imported from Manchester, Lancashire, England.

The following table will show quantity, description, and customs value of cotton imported into the colony of Sierra Leone from 1879 to 1888.

Cotton goods imported into the colony of Sierra Leone from 1879–'88.

[Description: (1) Gray or unbleached cottons. (2) White cottons, such as shirtings, etc. (3) Blue bafts. (4) Striped or printed cottons.

Years.	Quantity.	Value.	Years.	Quantity.	Value.
	Packages.	£ *s.* *d.*		*Packages.*	£ *s.* *d.*
1879	6,086	156,097 2 8	1886	4,068	93,621 14 7
1880	6,959	179,539 16 8	1887	7,368	143,411 18 0
1881	6,540	153,404 16 3	1888	4,584	88,713 12 7
1882	6,634	161,599 8 11			
1883	8,461	194,537 4 4	Aggregate for ten years	62,723	1,447,970 13 3
1884	7,264	171,936 9 7	Annual average	6,272⅔	144,797 1 3
1885	4,759	105,108 9 8			

Duty is not levied on cotton goods by quantity. By ordinance No. 13, of December 30, 1887, cotton goods are made subject to an ad valorem duty of 5 per cent. in addition to wharfage duty at the rate of 10*s.* per ton.

Measurement or weight, whichever mode of computation shall in each case be capable of yielding the larger wharfage duties.

The falling off in both quantity and value in 1888 is owing to a larger importation about the close of 1887 to escape the new duties in prospective.

CORNS. MAY,
Vice-Consul.

UNITED STATES CONSULATE,
Sierra Leone, October 16, 1889.

EGYPT.

REPORT BY CONSUL-GENERAL SCHUYLER, OF CAIRO.

The trade in foreign cotton textiles is almost entirely in the hands of British importing houses at Alexandria, who are very jealous of competition. I had hoped to obtain some information from a friend connected with one of these merchants, but he had at last to confess to me his inability to give me what I wished, as he was "flouted and jeered at, and accused of being unpatriotic, and of taking part in the conspiracy to substitute American for British goods in the Egyptian market."

EUGENE SCHUYLER,
Consul-General.

UNITED STATES AGENCY AND CONSULATE-GENERAL,
Cairo, November 29, 1889.

Note by the Department: The exports of British cottons to Egypt were as follows during the year 1888:

Description.	Quantity.	Value.	Price.
			Cents.
Twist and yarn.....pounds..	4,499,000	$890,000	per lb., 19.78
Piece goods, unbleached.....yards..	55,621,000	2,072,000	per yd., 3.73
Piece goods, bleached.....yards..	46,800,000	2,265,000	per yd., 4.84
Piece goods, printed and dyed.....yards..	19,956.705	1,429,000	per yd., 7.16
Piece goods, mixed.....	.....	37,000	.....
All other.....	.....	243,000	.....
Total.....	.....	6,936,000	.....

LIBERIA.

REPORT BY CONSUL-GENERAL SMITH, OF MONROVIA.

COTTON TEXTILES IMPORTED INTO LIBERIA.

(1) During the fiscal year ending September 30, 1885, there were imported into the Republic 971,615 yards of cotton textiles, valued at $73,114.08, of which there were imported from—

Countries.	Quantity.	Value.
	Yards.	
Great Britain	420,840	$38,402.53
Germany	218,659	17,353.51
United States	56,744	3,643.29
Holland	175,372	13,714.75
Total		73,114.08

In 1886 the total imports from the above-mentioned countries, and from Belgium, amounted to 923,289 yards of cotton textiles valued at $71,201.40. These years may be taken as fair sample years of the import of cotton textiles, comprising the following kinds of cotton goods: Printed calicoes, shirtings, sheetings, bleached and unbleached cottons, denims, tickings, domestics, printed and dyed handkerchiefs, muslins, etc.

In the customs returns they are not classified, but simply given as cotton goods.

(2) In Liberia, imported cotton textiles are not tested by weight.

(3) They were purchased in exchange for products of the country, viz: Palm-oil, palm kernels, camwood, ivory, gold, rubber, sugar, ginger, coffee, and a small portion in remittances of cash and bills.

(4) They were manufactured in Great Britain, Germany, the United States, Holland, and Belgium, and imported from the same countries.

(5) An ad valorem duty of 10 per cent. is charged upon these goods.

E. E. SMITH,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Monrovia, Liberia, August 26, 1889.

MOROCCO.

Quantity and kind imported per annum: 11,981 bales, manufactured.
Weight per yard: From 4 to 5 ounces.
Purchased by commission agents.
Manufactured in and imported from Great Britain.
Duties, 10 per cent.

WM. REED LEWIS,
Consul.

UNITED STATES CONSULATE,
Tuxpan, September 19, 1889.

PORTUGUESE, AFRICA.

CAPE VERD ISLANDS.

REPORT BY CONSUL PEASE, OF SANTIAGO.

Statement showing the imports of cotton textiles into the Cape Verd Colony for the year ended December 31, 1888, and the countries from which imported.

[Quantities converted into avoirdupois pounds; duties into United States currency.]

Description.	Portugal.		United States.		England.		Total.
	Quantity.	Duty per pound.	Quantity.	Duty per pound.	Quantity.	Duty per pound.	
	Pounds.	*Cents.*	*Pounds.*	*Cents.*	*Pounds.*	*Cents.*	*Pounds.*
Brown cottons	48,157	5.3	32,000	7.4	35,290	7.4	115,447
Bleached cottons	28,097	9.5	18,250	12.3	19,870	2.3	66,217
Transparent	953	35.4	1,100	39.2	3,222	39.2	5,245
Colored cottons and prints	55,000	17.1	28,000	.....	40,000	.....	123,000
Denims	7,000	14.0	43,000	20.0	.....	20.0	50,000
Total	139,177	.....	122,350	.....	98,382	.....	359,909

I have to state that owing to the method of accounting for cotton goods in the different custom-houses of this colony the desired information required by the circular is unobtainable.

HENRY PEASE,
Consul.

UNITED STATES CONSULATE,
Santiago, Cape Verd, October 20, 1889.

MADEIRA.

REPORT BY CONSUL JONES, OF FUNCHAL.

In answer to your circular in regard to the importation of cotton textiles into this district, I beg to hand you the inclosed report.

These tables were made for me by the officer of customs.

The largest importation into this city is from Lisbon, and as no Government duty is charged on this no accounts are kept by the customs-officer.

One piece calico, manufactured in Manchester, 36 inches wide, 60 yards in length, 13 pounds per piece, cost 7 cents per yard; discount, 7½ per cent.; weight per yard, 0.108 pound; duties and other taxes per pound, 24 cents; duties per yard 2.5 cents.

One piece of unbleached calico, from Manchester, 28 inches wide, 81 yards in length; weight per piece, 22 pounds; cost per yard, 3 cents; discount, 1½ per cent.; weight per yard, 0.136 pound; duties and other taxes per pound, 17.8 cents; duties per yard, 2.5 cents.

Freight and expenses average 6 to 10 per cent. on the first cost. As a rule these goods are bought on a credit of three months.

Cotton textiles imported during the year 1889.

Articles.	Duties per pound.	Total imports.	Value.	Articles.	Duties per pound.	Total imports.	Value.
	Cents.	*Pounds.*			*Cents.*	*Pounds.*	
Cotton, wool, and wadding	11½	322.6	$610.00	Calico	9¼	82,516.6	$23,888.00
Cotton yarn	11¾	29	8.00	Worked calico (towels)	13½	281.8	301.50
Twisted cotton	18½	17,347.4	7,911.60	Twilling and drill	16½	7,644.4	2,661.00
Cotton lace	83	425.4	615.70	Printed cotton	26¾	30,970.6	11,969.40
Crinoline	13½	999.4	228.30	Ribbons	30	6,341.2	1,068.50
Nett	59	1,220.8	1.013.20	Handkerchiefs	32	2,388.8	1,378.20
Fancy net	58½	17	59.00	Wicks	28½	217.4	124.10
Cambric	11¾	23.4	29.50	Knitting	54½	1,618.6	2,159.10
Muslin	45	719.6	864.80	Cotton fancy lace	38	1,055.6	743.00
Worked cambric	67½	12	30.00	Twilling and drill worked	24¾	634	943.80
Blankets	26¾	33	22.00				
Canvas	6	142	52.60	Total			82,076.60
Unbleached calico	8	188,769	25,395.30				

THOMAS C. JONES,
Consul.

UNITED STATES CONSULATE,
Funchal, November, 1889.

ST. PAUL DE LOANDA.

REPORT BY CONSUL NEWTON.

(1) It is difficult to ascertain the quantity imported, etc., as this is more or less regulated by the prospective crop of coffee in each year. As the crop is expected to be large this year, a large quantity of cotton goods of all descriptions has been imported.

(2) The weight varies according to the styles of cloth, of which there are so many varieties to suit the different markets and articles of produce that no reliable weight can be stated.

The principal kinds are in the following sizes, of yard, length and inches width:

Grey domestics: 10 yards, 21 inches; 12 yards, 21 inches; 12 yards, 15 inches; 30 yards, 22 inches; 20 yards, 21 inches; 20 yards, 27 inches; 30 yards, 28 inches; average cost, 4 to 5 cents per yard; other sizes in proportion.

Striped and checked domestics: 7 yards, 21 inches; 12 yards, 27 inches; 18 yards, 27 inches; 18 yards, 40 inches; 18 yards, 22 inches; 18 yards, 29 inches; 4½ to 6½ cents per yard; other sizes in proportion.

Prints: 12 yards, 24 inches; 23 yards, 28 inches; 5 to 7 cents per yard; other sizes in proportion.

Satin stripes: 12 yards, 24 inches; 3½ to 4 cents per yard.

Blue baftas: 18 yards, 38 inches; 18 yards, 40 inches; good heavy cloth; 12 to 14 cents per yard.

Handkerchiefs of all sorts and sizes.

Moreens: 24 yards, 28 inches; 24 yards, 35 inches; 7 to 9 cents per yard.

(3) Usually all purchased in Lisbon from agents established there by Manchester houses, and also in Manchester itself.

(4) Manufactured principally in Manchester and Glasgow and shipped to Lisbon, where they pay a small duty and are afterwards classified as Portuguese goods, and coming by Portuguese steamers pay only 70 per cent. of the full duties. No cotton goods come in vessels under foreign flags, otherwise they would pay full duties.

(5) The full duties on cotton goods are:

		Cents.
Plain cotton	Per kilogram	16
Prints	do	43½
Stripes and checks	do	43½
Blue baftas	do	43½
Moreens	do	27
Handkerchiefs	do	43½
Colored cotton blankets	do	21¾
Woolens	do	76
Baize blankets	do	43½

ROBT. S. NEWTON,
Consul.

UNITED STATES CONSULATE,
St. Paul de Loanda, August 15, 1889.

ZANZIBAR.

REPORT BY CONSUL PRATT, OF ZANZIBAR.

Cotton textiles imported.

Description.	Average quantity imported per annum.	How purchased.	Place of manufacture and whence imported.	Duties charged thereon.
	Bales.			*Per cent.*
Unbleached shirtings 28 inches	1,250	6 months.	United States.	5
Unbleached sheetings 36 inches	2,000	do	do	5
Unbleached drills 30 inches	800	do	do	5
Unbleached shirtings	12,000	do	India	5
Unbleached sheetings (of all sorts)				
Bleached goods (limited quantity of various kinds).		do	England and United States.	5

In former times America supplied this market with cotton goods. But within the past twelve years, the products of the Bombay mills, while in no sense being an imitation, have by their remarkable cheapness taken possession of the markets.

SETH C. PRATT,
Consul.

UNITED STATES CONSULATE,
Zanzibar, September 2, 1889.

CONTINENT OF AMERICA.

BRITISH NORTH AMERICA.

GRAY COTTON MANUFACTURES OF CANADA.

REPORTS BY CONSUL TANNER, OF PICTOU, NOVA SCOTIA.

The manufacturers in Canada of gray cotton recently held a conveniton for the benefit of that industry in the Dominion. Delegates from all the mills in Canada were present, including an agent of a New York commission house with factors in China who have hitherto been the chief purchasers of cheap Canadian manufactured cotton goods for the Celestial markets.

Owing to the present condition of the trade in Canada it was proposed that prices should be augmented and terms modified.

After some discussion and objections on the part of small mill owners this proposition was postponed until the quarterly meeting in March next when it is confidently expected an advance in prices will take place and terms be reduced to sixty days and a discount of 2 per cent. for cash.

The trade with China, owing to the presence of Mr. Frazon, formed a principal subject of discussion.

It appeared that the total capacity of Canadian mills working on gray cotton is 35,000 to 37,000 bales per annum, and that the home consumption absorbs almost 30,000 bales of this. How to get rid of surplus has been a problem to the Canadian manufacturers for some years past.

Communication with South America was more difficult than with China, hence the latter country offered a better field, and after many efforts successful negotiations with selling agents were effected and special arrangements were also made with carrying companies at exceedingly low rates which enabled the manufacturers here to send their goods half around the globe at rates that would enable them to compete to advantage with manufacturers in the United States.

An inferior quality of goods as well as goods at a low price are an essential to trade in China, and those requisites seem to be met in the productions in Canada. This will readily appear when the fact is understood that Canadian goods which cost from 26 to 28 cents per pound to manufacture are sold to the trade here at 23 cents, and the cloth consumed by the Chinese can be manufactured for 16 to 17 cents per

pound. The prices realized on the latter in Chinese market are from 17½ to 19 cents per pound, which will net a slight margin of profits.

It can be seen by the prices quoted above that the profits are so small that the carrrying rates must be next to nothing, and it is this one factor that in all probability enables Canadian manufacturers to enter the field as competitors in any class of manufactured cotton, and pocket a small profit.

The advantage of long runs in the manufacture of textile goods is well known. The goods required for the Chinese market are low and of coarse quality, and the amounts secured from their sale is equitably divided among the different mills, each agreeing to confine its productions of these goods to 15 per cent. of its capacity, but with the option of keeping the same proportion of machinery at a standstill.

The total exportation of Canadian gray cottons to China during the past year was 8,000 bales, and from recent demands there is not much probability that this will be decreased. On the other hand, the exportation from England in the same time into China shows a falling off of 105,000,000 yards, and a total falling off of 150,000,000 yards, the United States being the next greatest sufferer with England. This deserves attention from our manufacturers.

Stock on hand in China at the present time is not one-half of what it was at a corresponding period of last year. This stock was estimated very recently to amount to 4,980 bales, while the orders on hand amounted to 4,505 bales, or that the supply is not in proportion to the demand, and this was one of the reasons for the discussion of an advance in prices on the part of Canadian manufacturers, alluded to at the outset of this dispatch. The position of the Canadian consumer is improved from that of ten years ago, when the change in the tariff gave such an impetus to their cotton industry. At that time stuff that had to pay 30 cents a pound for the same goods can now be purchased at 22 cents. The mill-owners complain, however, of discouragingly small profits, but reap some satisfaction from the fact that the "Yankee" suffered as well as themselves.

This dispatch it is hoped will be of some value to our manufacturers of the class of goods spoken of therein by showing them in what way Canada can enter the competitive field with them. In my opinion the ability to do so hinges on the low rates of carriage effected with steam-ship lines (lines which, in my opinion, are subsidized by the Government) and organization and judicious co-operation among the manufacturers of cotton goods in Canada.

The Canadian manufacturer learned at once how to cater to Chinese prejudices. The Chinaman must have his gray cotton exactly 40 yards long, it must be exactly 36 inches wide, and the bale must be fastened with 8 ropes, no more no less.

GEO. C. TANNER,
Consul.

UNITED STATES CONSULATE,
Pictou, December 26, 1889.

BRITISH COLUMBIA.

REPORT OF CONSUL STEVENS, OF VICTORIA.

GENERAL TRADE OF THE PROVINCE.

In replying, under instructions conveyed in circular of May 27, 1889, concerning importation, into this consular district, of cotton textiles, it is proper in explanation of the meager matter set forth that I should give a brief description of the business of this place and the commercial scope of the consulate.

This town, situated on the southern extremity of the island of Vancouver, is the principal port of entry, and mainly the distributing point of the province. The town of Vancouver, on the mainland, at the terminus of the Canadian Pacific Railway, which has been built within the last three years, consequent upon the completion of the railway, and is now nearly as populous as this, and fast increasing, of late somewhat divides the business.

Neither of these towns has cotton manufactories. The general merchandising business of this town is not systemized. Besides the Hudson's Bay Company's store, in which almost everything can be purchased, there are some seven other principal firms carrying on business in the same manner, and combining a shipping business. These two towns, Victoria and Vancouver, are the principal towns of the province. Nanaimo is not much more than a coal port, and New Westminster, on the Fraser River, is as yet comparatively unimportant; the interior towns are unimportant and remote.

During the last fiscal year ten vessels, bringing a total of 11,812 tons of freight, arrived in this port from the United Kingdom. A considerable portion of this was assorted merchandise from London and Liverpool, and a part of it naval stores for the station at Esquimalt.

Add to this constant arrivals by regular packets, from San Francisco principally, from the ports on Puget Sound and other ports, and the total imports of last year were $2,922,395 in value, upon which $748,613.98 duty was paid.

A certain quantity of such goods, of which no record is obtainable, may be received at a town, small and remote, along and near the line of the railway which spans the width of the province, as well as at the terminal town of Vancouver.

IMPORTS OF COTTON TEXTILES.

The following from the Dominion revenue-books shows the imports of cotton textiles for the last fiscal year, entered principally at Victoria:

Articles and whence imported.	Quantity.	Value.	Duty.
Bleached and unbleached sheetings, drills, ducks, not stained, painted, nor printed:			
Great Britain ..... square yards..	27,620	$2,561	$665.30
United States ..... do....	31,954	5,719	1,177.39
Ginghams or plaids dyed or colored:			
Great Britain ..... do....	906	102	33.37
United States ..... do....	7,136	741	253.95
Denims, drillings, bed-tickings, Canton flannels, ducks, and drills, dyed or colored, checked and striped shirtings, cottonades, etc.			
Great Britain ..... square yards..	23,393	2,741	679.01
United States ..... do....	75,984	14,183	3,847.14
Printed or dyed cotton fabrics, not elsewhere specified:			
Great Britain ..... yards..	163,074	13,019	4,206.38
United States ..... do....	75,059	5,016	1,630.20
France ..... do....	119	54	17.55
China ..... do....	917	57	18.50
Japan ..... do....	310	16	5.20
Damask of cotton bleached, unbleached, or colored:			
Great Britain ..... do....	17,337	1,410	352.50
United States ..... do....	4,716	378	94.50
Handkerchiefs, plain or printed, in the piece or otherwise:			
Great Britain ..... do....	.....	4,228	1,057.00
United States ..... do....	.....	134	33.50
Shirts, of cotton:			
Great Britain ..... dozen..	292	1,702	802.50
United States ..... do	116	1,063	434.98
China ..... do....	9	50	24.00
Bed comforters or quilts, not including woven quilts or counterpanes:			
Great Britain ..... number..	300	904	314.15
United States ..... do....	13	43	15.05
China ..... do....	29	85	29.75
Clothing, or other material not otherwise provided for, including corsets and similar articles made up by seamstress or tailor; also tarpaulin, plain or coated with oil, paint, tar, or other composition:			
Great Britain	.....	9,447	3,297.61
United States	.....	9,967	3,488.45
France	.....	483	169.05
China	.....	823	288.05
Japan	.....	91	31.85
Clothing not otherwise provided for:			
Great Britain	.....	73	21.90
United States	.....	201	60.45
China	.....	8	2.40
Colored fabrics, woven, of dyed or colored cotton yarn, or part jute and part cotton, or other material, except silk:			
Great Britain ..... yards..	177	45	11.25
United States ..... do....	240	37	9.25
Cotton bags, made up by the use of the needle, not elsewhere specified:			
Great Britain	.....	3	1.05
United States	.....	605	211.70
Lamp-wicks:			
United States	.....	264	279.20
China	.....	13	3.90
Prunella, for boots and shoes:			
Great Britain	.....	72	7.20
Parasols, umbrellas, and sun-shades:			
Great Britain	.....	3,731	1,119.30
United States	.....	119	35.70
Japan	.....	4	1.20
Shawls:			
Great Britain	.....	123	30.75
United States	.....	2	.50
Socks and stockings:			
Great Britain ..... pounds..	4,825	4,295	1,768.79
United States ..... do....	430	293	130.90
Germany ..... do....	224	133	62.30
China ..... do....	461	322	142.70
Towels:			
Great Britain	.....	2,715	668.75
United States	.....	75	28.85
China	.....	11	2.75

Articles and whence imported.	Quantity.	Value.	Duty.
Velveteens and cotton velvets:			
Great Britain ..... yards..	8,325	$2,450	$491.00
United States ..... do...	166	66	14.20
Winceys of all kinds, not elsewhere specified:			
Great Britain ..... yards..	10,543	741	166.6
Winceys, checked, striped, or fancy cotton winceys, not over 25 inches wide:			
Great Britain ..... yards..	717	57	22.89
All other manufactures of cotton, not elsewhere specified:			
Great Britain	.....	9,002	1,800.40
United States	.....	1,906	381.67
China	.....	3	.60
Total	.....	102,416	30,245.17

It is almost impossible to arrive at a practical estimate of the quantity of cotton textiles imported from eastern Canada annually. One of the dealers, the most intelligent and the heaviest, puts it at $100,000 value; others, again, place it at a less figure, and most of them can give no statement.

ROBT. J. STEVENS,
Consul.

UNITED STATES CONSULATE,
Victoria, June 27, 1889.

ONTARIO.

FORT ERIE.

REPORT BY CONSUL WHELAN.

The importation of cotton fabrics, of which entry is made at the port of Fort Erie, is insignificant (as this is not a distributing point), and consists of small quantities brought in from the United States by a few retail dealers and by families for private use. Such goods coming into Canada at this point go through in bond, and entry is made at Hamilton, Brantford, London, St. Thomas, and other interior ports of entry. The cotton textiles of which entry is made here are manufactured in the United States and are imported from Buffalo. There are no direct importations from any other country, dealers being supplied from Hamilton, Toronto, and Montreal.

The following tables show the kind, quantity, and value of manufactures of cotton imported and entered at Fort Erie for the fiscal years ended June 30, 1886, 1887, 1888, and 1889, and the rate of duty charged thereon:

Articles and year of importation.	Quantity.	Value.	Duty.
	Yards.		
Bleached and unbleached sheetings, drills, ducks, etc., not stained or printed:			
1886	2,968	$195	1 cent per square yard and 15 per cent.
1887	2,487	201	Do.
1888	2,260	176	Do.
1889	2,091	170	Do.

Articles and year of importation.	Quantity.	Value.	Duty.
Ginghams, plaids, drillings, etc., dyed or colored:	*Yards.*		
1886	2,195	$205	2 cents per square yard and 15 per cent.
1887	1,007	122	Do.
1888	943	156	Do.
1889	597	65	Do.
Printed or dyed cotton fabrics, not elsewhere specified:			
1886	2,204	431	27½ per cent.
1887	5,620	364	Do.
1888	3,389	213	Do.
1889	3,432	222	Do.
Towels:			
1886	.....	$644	25 per cent.
1887	.....	608	
1888	.....	379	
1889	.....	372	
Clothing, or other material made up by the tailor or seamstress, including corsets, lace collars, and similar articles:			
1886	.....	644	30 per cent.
1887	.....	608	
1888	.....	379	
1889	.....	372	
All other manufactures of cotton, not elsewhere specified:			
1886	.....	647	20 per cent.
1887	.....	97	
1888	.....	103	
1889	.....	50	

JAMES WHELAN,
Consul.

UNITED STATES CONSULATE,
Fort Erie, Ontario, July 30, 1889.

NOVA SCOTIA.

WINDSOR.

REPORT BY CONSUL YOUNG, OF WINDSOR.

I have the honor to submit the following statement of the imports of cotton textiles into this consular district, of which Windsor is the chief port of entry:

QUANTITY AND KIND IMPORTED.

Imported during the fiscal year ended June 30, 1889.

Articles.	Quantity.	Value.	Rate of duty.
Printed or dyed.....yards..	5,127	$430	32½ per cent.
Other cotton goods:			
Cotton clothing.....	.....	252	35 per cent.
Handkerchiefs.....	.....	73	25 per cent.
Batting or wadding .....pounds..	516	72	2 cents per pound and 15 per cent.
Unenumerated	.....	125	20 per cent.

As some small packages that came by mail are not included in the foregoing, the collector of customs estimates the total importation of cotton goods during the fiscal year at not in excess of $1,000.

WEIGHT PER YARD OF TEXTILES IMPORTED.

As white and unbleached cotton goods are manufactured in Canada, the weight of those that are printed or dyed is unknown.

HOW PURCHASED.

Chiefly through agents of the foreign manufacturers in Europe resident in Montreal, and through dealers in Boston of goods manufactured in the United States.

PLACES OF MANUFACTURE.

Chiefly England, some fine goods of French make, and a small part made in the United States.

DUTIES CHARGED THEREON.

The rates of duty on the cotton goods imported are given in the foregoing statement. The duties that prevent the importation of cotton textiles manufactured in the United States are chiefly as follows:

Classification.	Rates of duty.
Gray or unbleached and bleached cotton, sheetings, drills, ducks, cotton flannels, not stained or printed.	1 cent per square yard and 15 per cent. ad valorem.
All cottons, denims, drillings, plaids, ginghams, dyed or colored, Kentucky jeans.	2 cents per square yard and 15 per cent.
White cotton jeans and coutilles	20 per cent.
Over 36 inches wide, for window-shades	15 per cent.
42 inches wide and over, for enameled cloth	15 per cent.
Printed or dyed, not elsewhere specified	27½ per cent.

The duty of 1 cent per square yard and 15 per cent. ad valorem. is sufficient to prevent the importation, from the United States and Great Britain, of cotton textiles subject to that rate. Consequently, under the "protective" tariff of Canada, cotton factories have been established in various parts of the Dominion, manufacturing unbleached cottons chiefly. There is but one in this consular district, that owned by "The Windsor Cotton Company, limited," the sole production of which consists of unbleached cottons, varying in weight from two and a half to six yards per pound.

That the tariff prevents the importation of heavy cotton goods is shown by the fact that in a recent year the whole importation into the Dominion of "unbleached and unbleached cottons, sheetings, drills, ducks for vessels' sails," etc., amounted to only 2,510,000 yards, valued at $301,450, averaging only about one-half yard for each inhabitant.

EDWARD YOUNG,
Consul.

UNITED STATES CONSULATE,
Windsor, N. S., August 21, 1889.

NEWFOUNDLAND.

SAINT JOHN'S.

REPORT BY CONSUL MOLLOY.

The customs department does not keep a very accurate account of cotton importations. From merchants I have called upon I find that there is about $150,000 worth cotton duck imported, paying a duty of 10 per cent. These goods are principally shipped at New York and Boston, purchased for cash and at three months.

Piece cotton from 3 to 5 ounces to the yard.

T. N. MOLLOY,
Consul.

UNITED STATES CONSULATE,
St. John's, N. F., August 14, 1889.

QUEBEC.

REPORT BY CONSUL DOWNS.

The inclosed report was made out from quarterly returns kindly furnished me by Mr. D. O'Meara, acting collector of customs at Quebec, for nine months ending 31st March, 1889. I could not get returns for the year. The report contains all cotton goods imported into Quebec for period named, value, quantity, country whence imported, and rate dutiable.

I could not comply with Nos. 2 and 3 and place of manufacture, as per circular. I may state that merchandise is generally bought on three, four, or six months' time. The weight per yard I can not state, not being able to procure any record of it.

THEODORE W. DOWNS,
Consul.

UNITED STATES CONSULATE,
Quebec, Canada, June 19, 1889.

Imports of cotton textiles, fabrics, etc., at the port of Quebec, Canada, for nine months ending March 31, 1889, *per Quebec custom house returns.*

Articles and countries where imported.	Quantity.	Value.	Rate of duty.
Bleached and unbleached cotton:			
Great Britain.....sq. yards..	49,787	$4,143	1 cent per square yard and 15 per cent. ad valorem.
United States.....do....	8,644	1,684	Do.
Ginghams:			
Great Britain.....do....	801	133	2 cents per square yard and 15 per cent. ad valorem.
United States.....do....	5,684	809	Do.
Denims:			
Great Britain.....do....	3,858	561	Do.
United States.....do....	20,636	3,540	Do.
Printed or dyed:			
Great Britain.....yards..	920,454	60,481	No specific and 32½ per cent. ad valorem.
United States.....do....	49,475	4,123	Do.

Imports of cotton textiles, etc.—Continued.

Articles and countries where imported.	Quantity.	Value.	Rate of duty.
Damask:			
Great Britain ..... yards..	3,488	$541	No specific and 25 per cent. ad valorem.
Handkerchiefs:			
Great Britain	.....	4,141	Do.
Jeans:			
United States ..... yards..	18,111	1,747	Do.
Seamless bags:			
United States ..... pounds...	1,066	131	2 cents per pound and 15 per cent. ad valorem.
Socks:			
United States ..... do....	1	1	10 cents per pound and 30 per cent. ad valorem.
Great Britain ..... do....	2,070	2,078	Do.
Waddings:			
Great Britain ..... do....	32	16	3 cents per pound and 15 per cent. ad valorem.
Knitting cotton (or yarn):			
Great Britain ..... do....	505	114	Do.
Sewing thread in spools:			
Great Britain	.....	503	No specific and 25 per cent. ad valorem.
United States	.....	489	Do.
Sewing thread:			
Great Britain ..... pounds..	74	36	No specific and 20 per cent. ad valorem.
Cotton shirts:			
Great Britain ..... dozen..	13	97	1 dollar per dozen and 30 per cent. ad valorem.
United States ..... do....	½	9	Do.
Towels:			
United States	.....	28	No specific and 25 per cent. ad valorem.
Great Britain	.....	1,685	Do.
Colored fabrics:			
Great Britain ..... yards..	4,836	861	Do.
United States ..... do....	320	43	Do.
Bed-comforters:			
Great Britain ..... number..	30	41	No specific and 35 per cent. ad valorem.
Clothing:			
Great Britain	.....	2,908	Do.
United States	.....	2,208	Do.
Lamp wicks:			
United States	.....	6	No specific and 30 per cent. ad valorem.
Cuffs, cotton:			
United States ..... pairs..	12	4	4 cents per pair and 30 per cent. ad valorem.
Great Britain ..... do....	696	84	Do.
Manufactured cotton n. e. s.:			
Great Britain	.....	10,701	20 per cent. ad valorem.
United States	.....	1,679	Do.
Velveteens:			
United States ..... yards..	915	198	No specific and 20 per cent. ad valorem.
Belting:			
Great Britain	.....	8	No specific and 25 per cent. ad valorem.
Parasols:			
Great Britain	.....	5,182	No specific and 30 per cent. ad valorem.
Velveteens:			
Great Britain ..... yards..	10,994	2,669	
Winceys:			
Great Britain ..... do....	42,699	2,448	No specific and 22½ per cent. ad valorem.
Crapes:			
Great Britain	.....	7,681	No specific and 20 per cent. ad valorem.
Collars:			
Great Britain ..... dozen..	289	288	24 cents per dozen and 30 per cent. ad valorem.
Manufactured cotton:			
Belgium	.....	910	
France	.....	1,429	
Total imports of cotton	.....	126,438	

RECAPITULATION.

Great Britain	$110,379
United States	13,720
France	1,429
Belgium	910
Total	126,438

PRINCE EDWARD ISLAND.

REPORT BY CONSUL GEORGE, OF CHARLOTTETOWN.

I send herewith inclosed a statement prepared under the direction of the collector of customs.

It was understood that the collector would cover all the points, but this he subsequently found could not be done. It is believed that the goods were manufactured in the countries whence imported.

It may be observed that statistics which have been published may be as easily gathered for the whole of Canada as for one province.

N. J. GEORGE,
Consul.

UNITED STATES CONSULATE,
Charlottetown, August 20, 1889.

Cotton textiles imported into Prince Edward Island during the years 1885 *to* 1889, *both inclusive.*

Articles and year of importation.	From United States.		From Great Britain.		Total quantity.	Total value.	Duty.	
	Quantity.	Value.	Quantity.	Value.			Amount.	Rate.
Bleached and unbleached sheetings, drills, ducks, etc., not stained, printed, or painted:								
1884 .....square yards..	44,054	$6,999	33,133	$2,794	77,187	$9,793	$2,243.83	1 cent per square yard and 15 per cent.
1885 .....do....	18,800	3,655	21,299	1,909	40,099	5,564	1,235.59	Do.
1886 .....do....	9,637	1,630	5,427	489	15,064	2,119	468.49	Do.
1887 .....do....	9,730	1,599	5,132	477	14,862	2,076	460.02	Do.
1888 .....do....	5,879	1,126	6,640	548	12,519	1,674	376.29	Do.
1889 .....do....	2,912	783	5,061	442	7,973	1,225	270.68	Do.
Ginghams and plaids, dyed or colored:								
1884 .....square yards..	129	10	494	69	623	79	24.31	2 cents per square yard and 15 per cent.
1885 .....do....	440	48	1,588	187	2,028	235	75.81	Do.
1886 .....do....	1,359	159	824	67	2,183	226	77.56	Do.
1887 .....do....	2,753	328	1,594	147	4,347	475	158.19	Do.
1888 .....do....	516	53	67	16	583	69	22.01	Do.
1889 .....do....	254	31	1,086	146	1,340	177	53.35	Do.
Denims, drillings, bed tickings, canton flannels, ducks, and drills, dyed or colored, checked, etc., striped shirtings, cottonades, etc.:								
1884 .....square yards..	23,378	2,130	18,409	2,320	41,787	5,450	1,654.21	2 cents per square yard and 15 per cent.
1885 .....do....	10,879	1,484	10,569	1,463	21,448	2,947	871.01	Do.
1886 .....do....	5,674	813	3,512	515	9,186	1,328	382.92	Do.
1887 .....do....	320	126	3,522	459	3,842	585	164.59	Do.
1888 .....do....	106	17	7,027	785	7,133	802	262.96	Do.
1889 .....do....	.....	.....	7,144	840	7,144	840	268.88	Do.
Printed or dyed cotton fabrics, not elsewhere specified:								
1884.....yards..	31,095	2,303	184,686	15,872	215,781	18,175	4,566.28	20 per cent. to Jan. 1, 1884, 27½ per cent. from Jan. 1, 1884.
1885 .....do....	34,627	3,145	221,645	22,159	256,272	25,304	6,960.50	Do.
1886 .....do....	68,000	4,069	188,188	16,127	256,188	20,196	5,558.11	27½ per cent.
1887 .....do....	34,460	2,140	257,625	19,701	292,085	21,841	6,067.56	27½ per cent. to May 13, 32½ after.
1888 .....do....	17,078	1,311	140,397	11,602	157,475	12,913	4,198.12	32½ per cent.
1889 .....do....	10,950	630	178,936	13,549	189,886	14,179	4,608.63	Do.

Cotton textiles imported into Prince Edward Island, etc.—Continued.

Articles and year of importation.	From United States.		From Great Britain.		Total quantity.	Total value.	Duty.	
	Quantity.	Value.	Quantity.	Value.			Amount.	Rate.
White cotton jeans and cottilles, including cambrics, castins, and silicias:								
1884 ..... yards..	44,339	$2,695	79,625	$6,970	123,964	$8,665	$1,734.41	20 per cent.
1885 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1886 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1887 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1888 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1889 ..... do....	.....	.....	.....	.....	.....	.....	.....	
Wadding, batting, batts, and warps, and carpet warps, not bleached, dyed, or colored:								
1884 ..... pounds..	2,132	284	.....	.....	2,132	284	85.24	2 cents per pound and 15 per cent.
1885 ..... do....	2,371	239	.....	.....	2,371	239	83.27	Do.
1886 ..... do....	1,260	134	.....	.....	1,260	134	45.30	Do.
1887 ..... do....	1,036	149	.....	.....	1,036	149	43.07	Do.
1888 ..... do....	205	27	.....	.....	205	27	8.15	Do.
1889 ..... do....	.....	.....	.....	.....	.....	.....	.....	Do.
Knitting yarn, hosiery yarn, or other cotton yarn, under No. 40, not bleached, dyed, or colored:								
1884 ..... pounds..	190	31	309	60	499	91	23.63	2 cents per pound and 15 per cent.
1885 ..... do....	46	24	70	17	116	41	8.47	Do.
1886 ..... do....	40	13	.....	.....	40	13	2.75	Do.
1887 ..... do....	132	45	.....	.....	132	45	9.39	Do.
1888 ..... do....	.....	.....	.....	.....	.....	.....	.....	Do.
1889 ..... do....	.....	.....	.....	.....	.....	.....	.....	Do.
Wadding, batting, batts, and wraps, bleached, dyed, or colored:								
1884 ..... pounds..	260	74	43	16	303	90	22.59	3 cents per pound and 15 per cent.
1885 ..... do....	393	75	46	13	439	88	26.37	Do.
1886 ..... do ..	176	39	4	4	180	43	11.85	Do.
1887 ..... do....	120	22	.....	.....	120	22	6.90	Do.
1888 ..... do....	182	34	4	4	186	28	11.28	Do.
1889 ..... do....	40	8	4	3	44	11	2.97	Do.
Knitting yarn, hosiery yarn, and other cotton yarn, under No. 40, bleached, dyed, and colored:								
1884 ..... pounds..	.....	.....	916	215	916	215	59.73	3 cents per pound and 15 per cent.
1885 ..... do....	84	23	2	1	86	24	6.18	Do.
1886 ..... do....	92	36	.....	.....	92	36	8.16	Do.
1887 ..... do....	204	75	.....	.....	204	75	17.37	Do.
1888 ..... do....	124	36	.....	.....	124	36	9.12	Do.
1889 ..... do....	.....	.....	.....	.....	.....	.....	.....	Do.
Seamless bags:								
1884 ..... pounds..	62	13	.....	.....	62	13	3.19	2 cents per pound and 15 per cent.
1885 ..... do....	367	69	.....	.....	367	69	17.62	Do.
1886 ..... do....	335	65	10	1	345	66	16.80	Do.
1887 ..... do....	141	28	.....	.....	141	28	7.02	Do.
1888 ..... do....	568	74	13	1	581	75	22.93	Do.
1889 ..... do....	466	80	.....	.....	466	80	21.82	Do.
Skirts and drawers, woven or made on frames, and all cotton hosiery and knitted cloth:								
1884	.....	305	.....	1,642	.....	1,947	584.10	30 per cent.
1885	.....	357	.....	2,934	.....	3,291	987.30	Do.
1886	.....	379	.....	1,721	.....	2,100	630.00	Do.
1887	.....	502	.....	1,255	.....	1,757	542.89	Do.
1888 ..... dozen..	.....	.....	9	77	9	77	32.60	$1 per dozen and 30 per cent.
1889 ..... do....	6¾	53	6	21	12¾	74	35.07	Do.
Sewing thread on spools:								
1884	.....	7	.....	812	.....	819	163.80	20 per cent.
1885	.....	.....	.....	1,026	.....	1,026	205.20	Do.
1886	.....	.....	.....	123	.....	123	24.60	Do.
1887	.....	.....	.....	45	.....	45	9.00	Do.
1888	.....	.....	.....	163	.....	163	40.75	25 per cent.
1889	.....	.....	.....	21	.....	21	2.25	Do.

Cotton textiles imported into Prince Edward Island, etc.—Continued.

Articles and year of importation.	From United States.		From Great Britain.		Total quantity.	Total value.	Duty.	
	Quantity.	Value.	Quantity.	Value.			Amount.	Rate.
Bed comforters, or quilts of cotton, not including woven quilts or counterpanes:								
1884.....number..	67	$100	30	$51	97	$151	$41.53	27½ per cent.
1885.....do....	37	57	21	34	58	91	25.03	Do.
1886.....do....	1	1	28	22	29	23	6.33	Do.
1887.....do....	20	16	2	9	22	25	6.89	Do.
1888.....do....	.....	.....	.....	.....	.....	.....	.....	35 per cent.
1889.....do....	.....	.....	.....	.....	.....	.....	.....	Do.
Clothing or other material, not otherwise provided for, including corsets, lace collars, and similar articles, made up by seamstress or tailor; also tarpaulin, plain or coated with oil, etc.:								
1884.....	.....	4,011	.....	2,776	.....	6,787	2,036.10	30 per cent.
1885.....	.....	5,979	.....	2,167	.....	8,146	2,443.80	Do.
1886.....	.....	4,133	.....	1,940	.....	6,073	1,821.90	Do.
1887.....	.....	2,796	.....	3,242	.....	6,038	1,826.50	Do.
1888.....	.....	1,168	.....	2,331	.....	3,459	1,189.36	35 per cent.
1889.....	.....	1,787	.....	1,372	.....	3,159	1,105.38	Do.
Cotton bags, made up by the use of the needle, not elsewhere specified:								
1884	.....	.....	.....	.....	.....	.....	.....	30 per cent.
1885.....	.....	141	.....	.....	.....	141	42.30	Do.
1886.....	.....	.....	.....	.....	.....	.....	.....	Do.
1887.....	.....	15	.....	.....	.....	15	4.50	Do.
1888.....	.....	74	.....	.....	.....	74	25.90	35 per cent.
1889.....	.....	165	.....	.....	.....	165	57.75	Do.
Lamp-wicks:								
1884.....	.....	1	.....	.....	.....	1	.30	30 per cent.
1885.....	.....	59	.....	1	.....	60	18.40	Do.
1886.....	.....	66	.....	.....	.....	66	19.80	Do.
1887.....	.....	38	.....	.....	.....	38	11.40	Do.
1888.....	.....	28	.....	.....	.....	28	8.25	Do.
1889.....	.....	62	.....	.....	.....	62	18.60	Do.
Parasols, umbrellas, and sunshades:								
1884.....	.....	.....	.....	93	.....	93	23.25	25 per cent.
1885.....	.....	.....	.....	225	.....	225	63.85	30 per cent.
1886.....	.....	15	.....	930	.....	945	283.50	Do.
1887.....	.....	5	.....	1,438	.....	1,443	432.90	Do.
1888.....	.....	.....	.....	1,059	.....	1,059	317.70	Do.
1889	.....	17	.....	1,274	.....	1,291	387.30	Do.
Damask of cotton bleached, unbleached, or colored:								
1884.....yards..	.....	.....	.....	.....	.....	.....	.....	
1885.....do....	.....	.....	8,720	1,745	8,720	1,745	438.40	25 per cent.
1886.....do....	47	12	83	8	130	20	5.00	Do.
1887.....do....	56	11	895	226	951	237	59.25	Do.
1888.....do....	.....	.....	430	52	430	52	13.00	Do.
1889.....do....	50	3	131	11	181	14	3.50	Do.
Handkerchiefs, plain or printed, in the piece or otherwise:								
1884.....	.....	.....	.....	.....	.....	.....	.....	
1885.....	.....	.....	.....	.....	.....	.....	.....	
1886.....	.....	7	.....	95	.....	102	25.50	Do.
1887.....	.....	43	.....	1,629	.....	1,672	421.45	Do.
1888.....	.....	14	.....	1,103	.....	1,117	279.25	Do.
1889.....	.....	.....	.....	1,293	.....	1,293	323.25	Do.
Towels:								
1884.....	.....	.....	.....	.....	.....	.....	.....	
1885.....	.....	.....	.....	.....	.....	.....	.....	
1886.....	.....	.....	.....	154	.....	154	38.50	Do.
1887.....	.....	12	.....	365	.....	377	94.25	Do.
1888.....	.....	19	.....	150	.....	169	42.45	Do.
1889.....	.....	15	.....	167	.....	182	45.50	Do.

Cotton textiles imported into Prince Edward Island, etc.—Continued.

Articles and year of importation.	From United States.		From Great Britain.		Total quantity.	Total value.	Duty.	
	Quantity.	Value.	Quantity.	Value.			Amount.	Rate.
Colored fabrics woven, of dyed or colored cotton yarn, or part jute and part cotton, or other material except silk, not elsewhere specified:								
1884 ..... yards..	.....	.....	.....	.....	.....	.....	.....	
1885 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1886 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1887 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1888 ..... do....	40	$19	$715	$209	$755	$228	$57.00	25 per cent.
1889 ..... do....	480	111	2,324	481	2,804	592	148.00	Do.
Socks and stockings of cotton:								
1884 ..... pounds..	.....	.....	.....	.....	.....	.....	.....	
1885 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1886 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1887 ..... do....	.....	.....	.....	.....	.....	.....	.....	
1888 ..... do....	125	142	1,435	1,052	1,560	1,194	514.30	10 cents per pound and 30 per cent.
1889 ..... do....	101	108	1,812	1,152	1,913	1,260	569.30	Do.
Velveteens and cotton velvets:								
1884 ..... yards..	.....	.....	9,731	4,353	9,731	4,353	870.60	20 per cent.
1885 ..... do....	.....	.....	16,099	6,271	16,099	6,271	1,254.20	Do.
1886 ..... do....	.....	.....	14,786	5,164	14,786	5,164	1,032.80	Do.
1887 ..... do....	.....	.....	12,699	3,594	12,699	3,594	718.80	Do.
1888 ..... do....	.....	.....	6,718	1,730	6,718	1,730	346.00	Do.
1889 ..... do....	.....	.....	5,896	1,330	5,896	1,330	266.00	Do.
Winceys of all kinds:								
1884 ..... yards..	.....	.....	31,508	2,861	31,508	2,861	572.81	Do.
1885 ..... do....	.....	.....	65,878	5,440	65,878	5,440	1,089.95	22½ per cent.
1886 ..... do....	.....	.....	4,760	384	4,760	384	86.41	Do.
1887 ..... do....	.....	.....	3,130	197	3,130	197	44.30	Do.
1888 ..... do....	.....	.....	9,980	628	9,980	628	141.31	Do.
1889 ..... do....	.....	.....	6,658	447	6,658	447	100.58	Do.
All other manufactures of cotton, not elsewhere specified:								
1884	.....	1,148	.....	11,755	.....	12,903	2,580.60	20 per cent.
1885	.....	586	.....	7,541	.....	8,127	1,625.40	Do.
1886	.....	522	.....	6,481	.....	7,932	1,586.40	Do.
1887	.....	201	.....	2,705	.....	2,906	581.90	Do.
1888	.....	159	.....	2,214	.....	2,373	474.60	Do.
1889	.....	97	.....	2,749	.....	2,846	572.45	Do.

RECAPITULATION.

1884	$74,902
1885	69,074
1886	46,318
1887	43,640
1888	28,025
1889	29,248

MEXICO.

GUAYMAS.

REPORT BY CONSUL WILLARD.

IMPORTS.

The greater portion of the importations for this consular district, which formerly came entirely by sea, are now brought via Nogales on the Mexican-American frontier by the Sonora Railroad, American manufactured goods, as well as European manufactured goods sent in transit through the United States via Galveston, New Orleans, and New York. These goods are dispatched at Nogales paying duty, etc. (our consul at Nogales no doubt will obtain the data of both American and European goods), for this reason I can only give approximate figures as to quantities and values during the year 1888 for Guaymas.

Two-thirds of the cotton goods consumed in this consular district are of American manufacture, and they now occupy the place formerly held by European goods (English and German). Up to 1874 the great bulk of cotton textiles consumed on the west coast of Mexico was of European manufacture. The northern states of Mexico now consume but few European goods in comparison with former years, as the facilities of importing American goods by rail has made this change, and besides the quality of the goods as a rule are superior. This, no doubt, will be confirmed by the reports of our consuls along the Mexican and American border (Paso del Norte, Laredo and Matamoros).

There are no American mercantile exporting houses established in this consular district, the leading commercial houses being German, Spanish, and Mexican. Neither French nor English houses exist that import manufactured cotton goods.

I can state in reply to the five points in which information is requested as follows:

QUANTITY AND KIND IMPORTED.

I can only give that which came by sea to Guaymas for 1888, which is more or less the same for the past two years preceding. The cotton goods so imported of American manufacture brought from San Francisco to Guaymas by steamers (none by sailing vessels), according to the values entered at this Guaymas custom-house, was $105,145 (the number of yards I am unable to obtain), consisting of cotton drillings, sheetings, calicoes, and lawns.

Importations of same class of goods of European manufacture from Germany and England, value $68,000.

Comparative table showing widths, weight per yard, price and duties paid on certain cotton goods imported to Guaymas, Mexico, from the United States, England, and Germany.

Articles.	Width of piece.	Weight per yard.	Price at Guaymas, Mexico.	Import duty.
	Inches.	*Ounces.*	*Cents.*	
American:				
Denims	28	8	33	17 cents per square meter.
Prints	24½	2	16½	12 cents if not over 30 threads to half centimeter square; 15 cents if over 30 threads.
Bleached sheeting	26	1⅛	14	9 cents if not over 30 threads to half centimeter square; 11 cents if over 30 threads.
Gray sheeting	32	2½	20	Do.
Lawn	28	1½	21	Do.
English:				
Prints	28	2¼	18	12 cents if not over 30 threads to half centimeter square; 15 cents if over 30 threads.
Bleached sheeting	26	1⅛	12	9 cents if not over 30 threads to half centimeter square; 11 cent sif over 30 threads.
Lawns	22	⅞	22	Do.
German:				
Cotton drill	30	7	40	17 cents per square meter.
Prints	32	2½	25	12 cents if not over 30 threads to half centimeter square; 15 cents if over 30 threads.

The established importing houses of this port, as a rule, purchase their goods on time. If in the United States, from thirty to sixty days, and in Europe from six to ten months.

The goods are manufactured in and imported from the United States, Germany, and England.

Duties are charged by the square meter, and with prints, sheetings, etc., according as there are under thirty threads to the half centimeter square or over thirty threads. This distribution is not made with denims, drill, and similar heavier goods.

A. WILLARD,
Consul.

UNITED STATES CONSULATE,
Guaymas, July 20, 1889.

TALCAHUANO.

REPORT BY CONSUL VAN INGEN.

In reply to the Department of State's circular of May 27, 1889, with regard to the import of cottons into this consular district, I have to state that no statistics are published here, and only general statistics at the capital (Santiago), and these not for separate districts.

This district includes Concepcion Bay, Talcahuano, Coronel, Valdivia, and, in short, all ports south of this.

I inclose the only data I have been able to obtain, and which I trust may be found useful.

In addition to the tariff duties noted on annexed table, and which are calculated in paper money, there is an additional charge for exchange or gold value, being for the current month of August 39 per cent., and for September will be 38 per cent., reaching in December 35 per cent., which may probably be the rate for the coming year.

JOHN F. VAN INGEN,
Consul.

UNITED STATES CONSULATE,
Talcahuano, August 23, 1888.

Cotton textiles imported, and which have paid duties into this port, during the year 1888.

Articles and whence imported.	Quantity.	Tariff value.	Total value.	Duties.
Bleached cottons:				*Per ct.*
Germany ..... kilograms..	50,347	$1.00	$50,347.00	25
France ..... do	22,221	1.00	22,221.00	25
England ..... do	93,110	1.00	93,110.00	25
United States ..... do	926	1.00	926.00	25
Spain ..... do	78	1.00	78.00	25
Osnaburgs:				
Germany ..... do	26,872	.50	12,279.00	15
England ..... do	43,189	.50	18,020.00	15
France ..... do	7,090	.50	3,545.00	15
United States ..... do	28,020	.50	14,083.00	15
Prints:				
Germany ..... do	26,426	1.50	37,018.00	25
England ..... do	39,244	1.50	58,611.00	25
France ..... do	8,656	1.50	11,937.00	25
Spain ..... do	45	1.50	67.00	25
Italy ..... do	104	1.50	156.00	25
Cotton cloth for pants:				
Germany ..... do	72,419	.90	67,670.00	25
England ..... do	45,238	.90	41,511.00	25
France ..... do	6,222	.90	5,515.00	25
United States ..... do	170	.90	155.00	25
Cotton cloth:				
Germany ..... meter..	5,415	.20	1,083.00	25
England ..... do	6,228	.20	1,245.60	25
France ..... do	2,490	.20	498.00	25
Twilled cottons:				
Germany ..... kilograms..	576	2.50	1,412.00	25
England ..... do	314	2.50	1,259.00	25
France ..... do	196	2.50	681.00	25
Cotton drills:				
Germany ..... do	4,506	.95	4,280.00	25
England ..... do	4,157	.95	4,113.00	25
France ..... do	644	.95	617.00	25
Ticking:				
Germany ..... kilograms..	4,828	1.20	3,907.00	25
France ..... do	2,370	1.20	1,884.00	25
England ..... do	7,458	1.20	6,341.00	25
United States ..... do	258	1.20	322.00	25
Sheeting:				
Germany ..... do	2,197	.....	2,309.00	25
England ..... do	469	.....	469.00	25
France ..... do	1,075	.....	906.00	25
Serged drills:				
Germany ..... do	6,791	.95	6,451.00	25
England ..... do	3,956	.95	3,614.00	25
France ..... do	1,288	.95	1,231.00	25
Cotton thread in balls:				
Germany ..... do	5,347	1.50	7,889.00	25
England ..... do	6,628	1.50	9,257.00	25
France ..... do	1,342	1.50	1,885.00	25
Cotton thread in spools:				
Germany ..... do	876	4.50	3,554.00	25
England ..... do	3,416	4.50	12,859.00	25
France ..... do	123	4.50	705.00	25
Lawn cotton:				
Germany ..... meter..	31,214	.06	1,891.00	25
England ..... do	70,458	.06	4,119.00	25
France ..... do	4,256	.06	255.00	25

Cotton textiles imported, and which have paid duties into this port, etc.—Continued.

Articles and whence imported.	Quantity.	Tariff value.	Total value.	Duties.
Striped cottons:				*Per ct.*
Germany ..... kilograms ..	111	$0.90	$100.00	25
England ..... do	883	.90	707.00	25
France ..... do	170	.90	134.00	25
Cotton stockings:				
Germany ..... dozens ..	12,621	1.20	11,342.00	25
England ..... do	9,728	1.20	9,369.00	25
France ..... do	3,563	1.20	3,314.00	25
United States ..... do	524	1.20	584.00	25
Spain ..... do	131	.90	97.00	25
Cotton wicking:				
England ..... kilograms ..	602	.75	293.00	25
United States ..... do	230	.75	127.00	25
Shawls:				
Germany ..... do	2,956	1.50	4,483.00	25
England ..... do	1,469	1.50	1,588.00	25
France ..... do	110	1.50	152.00	25
Spain ..... do	26	1.50	44.00	25
Handkerchiefs:				
Germany ..... kilograms ..	3,073	1.50	5,424.00	25
England ..... do	5,170	1.50	8,344.00	52
France ..... do	404	1.50	706.00	25
Towels:				
Germany ..... do	159	1.25	248.00	25
England ..... do	705	1.25	1,137.00	25
France ..... do	425	1.25	492.00	25
Unbleached cotton sheeting:				
England ..... do	80,165	.75	61,270.00	25
France ..... do	12,660	.75	9,647.00	25
United States ..... do	600	.75	453.00	25
Germany ..... do	25,235	.75	19,308.00	25
Total	.....	.....	661,648.60	

RECAPITULATION.

England	$337,236.60
Gemany	240,995.00
France	66,325.00
United States	16,650.00
Spain	286.00
Italy	156.00
Total	661,648.60

CENTRAL AMERICA.

COSTA RICA.

REPORT BY CONSUL WINGFIELD, OF SAN JOSÉ.

Cotton textiles imported into Costa Rica for year 1888.

Articles.	Quantity.	Weight.	Width.	Contents of package.
	Kilograms.		*Inches.*	*Yard.*
Brown cotton	142,965	8¾ pounds per piece	27	40
Sail cloth for cart covers	56,886	1 to 2 pounds per yard	40–48–96	50=100
Bleached shirting	106,498	4½ to 10½ pounds per piece according to width	28–36	40
Croydon	6,258	3½ pounds per piece	28½	20
Brown and bleached drilling	104,634	United States, 7¼ pounds per piece	30	.....
		England, 4½ pounds per piece	31½	20
Blue denims	28,998	12½ pounds per piece	26½	31
Bed-spreads	5,556	According to quality and size	.....	.....

Cotton textiles imported into Costa Rica for year 1888—Continued.

Articles.	Quantity.	Weight.	Width.	Contents of package.
	Kilograms.		*Inches.*	*Yard.*
Calicoes	354,430	United States, 6 pounds per piece	25	53
		England and France, 3¾ pounds per piece	25	30
Pique	6,258	4½ pounds per piece	26	30
Percales	5,650	4 pounds per piece	25	28
Muslins	13,518	2⅝ pounds per piece	24	31
Victoria lawns	9,928	2 and 3 pounds per piece, according to width	32 and 39	20
Undershirts	4,287			
Drawers	430			
Damask goods for towels, napkins, etc	93,633	25 pounds		72
Handkerchiefs	29,861			
Collars and cuffs	426			
Tape, trimmings, cord, garters, etc				
Ready-made clothing:				
For men	20,710			
For women	435			
Underwear for men	11,012			
Underwear for women	648			

In addition to information called for by the circular of the Department, I have given the width and number of yards in piece of goods. As to some articles this is insisted on by importers.

Quantity given is the gross weight, as duties in Costa Rica are charged on the gross weight and the statistical report is made up accordingly. This is a point to be specially considered by United States merchants. It is the common complaint here that our merchants do not know how to pack goods. They should be packed strong to stand transport across the mountains and as light as possible.

Articles.	Whence imported.	How purchased.	Duty per kilogram.
Brown cottons	United States	Cash	$0.26
Sail cloth for cart cover	do	do	.26
Bleached shirting	England for most part; from United States too fine thread.	6 to 12 months' credit; interest, 6 per cent., added.	.43
Croydon	England	do	.43
Brown and bleached drilling	United States and England.	United States, cash; England, 6 and 12 months' credit.	.43
Blue denims	do	do	.43
Bed-spreads	England	6 to 12 months' credit	.43
Calicoes	Cheap from United States; better from England and France.	United States, cash; England and France, 6 to 12 months' credit.	.54
Piques	England	6 to 12 months' credit	.54
Percales	do	do	.54
Muslins	do	do	.54
Victoria lawns	do	do	.54
Undershirts	do	do	.65
Drawers	do	do	.65
Damask goods for towels, etc	do	do	.65
Handkerchiefs	England and Germany	do	.65
Collars and cuffs	England and France	do	.87
Tape trimming, cords, garters, etc.	England	do	1.09
Ready-made clothing	England and Germany	do	1.09

Each kilogram is equal to about 2⅕ pounds.

The above tariff of duties is in Costa Rican currency. Exchange here is so variable that it is difficult to say what the equivalent would be in United States gold. During the year 1888 the rate varied, sometimes $1 United States gold was worth $1.35, and sometimes $1.50. The average for 1888 was about $1.40.

J. RICHARD WINGFIELD,
Consul.

UNITED STATES CONSULATE,
San José, Costa Rica, July 30, 1889.

GUATEMALA.

REPORT BY CONSUL-GENERAL HOSMER.

While attempts have been made to manufacture cotton goods in this republic on a small scale, nothing of a successful or permanent character has been effected.

COTTON GROWING IN GUATEMALA.

Some twenty-five years ago Sea Island cotton was planted near the Pacific coast, and an abundant crop of the raw material was raised. It seemed, as I am informed, both practicable and profitable to extend its growth, the soil and climate favoring, to a remarkable degree, the culture of the plant, but during the second or its following season the fatal "army-worm" put in its destructive appearance, committing such ravages that the planting and cultivation was abandoned, and has not been resumed since that time.

IMPORTS BY COUNTRIES.

Hence the republic of Guatemala depends upon foreign markets for the supply of cotton textiles, the principal portion of which is imported from England; next in quantity is from the United States.

I am unable to follow strictly or exactly the requirements of the Department's circular of May 27, 1889, but have endeavored, by careful inquiry, to acquire such facts and figures as will afford approximate information to the cotton manufacturers of the United States for the benefit of their trade.

The custom-house of Guatemala classifies cotton goods of all kinds, with the value of and duty on same, in gross sums, as follows:

From England.—Prints, white shirting, brown cottons, sheetings, bedspreads, cotton clothing, hosiery (half and long hose), undershirts, handkerchiefs, all of cotton, to the value of $873,594.20; duties thereon, $721,676.10.

From United States.—Prints, brown cottons, sheetings, drillings, hosiery (half and long hose), all of cotton, to the value of $89,286.17; duties thereon, $64,298.30.

From France.—Prints, white shirting, calicoes, cotton clothing, hosiery (half and long hose), all of cotton, to the value of $27,395.48; duties thereon, $26,514.

From Belgium and Germany.—Drillings, hosiery (half and long hose), all of cotton, to the value of $26,983.80; duties thereon, $16,619.82.

Total import value, $1,017,259.65; duties, $829,108.22.

These sums are based upon the Guatemalan *peso*, or Peruvian *sol*, which is worth 68 cents United States gold.

The specific kinds of cotton goods imported into this market from the United States are Pacific H sheeting, 36 inches; Massachusetts C,

of same width; Warregan Mills No. 1, of Pawtucket, R. I., and white, and brown drills. These are favorites among the native population, and preferred to any of European manufacture.

The weight per yard is not obtainable for the reasons already stated.

Cotton goods from the United States are purchased through commission-houses in New York.

The place of manufacture and whence imported is included in the general statement of the custom-house under the reply to the first interrogatory of the Department's circular.

The duties on cotton goods imported into this republic are levied upon the gross weight of the packages, including boxes and coverings, and not per yard. They vary from 20 cents per pound for cotton sheetings and its kind, to 30 cents for white calicoes.

JAMES R. HOSMER,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Guatemala, July 31, 1889.

SAN SALVADOR.

REPORT BY CONSUL TUNSTALL.

IMPORTS.

In compliance with directions I have prepared and have the honor to submit the following report upon the cotton textiles imported into this consular district during the year 1888.

The number of packages or bales and the countries whence imported were as follows:

England	13,715
United States	1,854
France	768
Germany	700
Italy	220

These packages or bales are constituted each of fifty and sixty pieces, and each piece contains so many yards of a given width, varying as per the following table:

Width.	Length.	Pieces in bale.	Weight per bale.
Inches.	*Yards.*		
34	24	50	356
34	24	50	367
34	24	50	298
26	24	60	330
26	24	60	349
24	24	60	302
24	24	60	326
24	24	60	296

These bales of domestics or cotton textiles present the shape or bulk in which these importations are shipped, and the weight per yard may

be readily ascertained when the deduction of from 9 to 11 pounds tare is allowed on the gross avoirdupois of the bale, the heaviest being about $3\frac{1}{2}$ yards and the lightest $5\frac{1}{5}$ yards to the pound, or, as I estimated it, about $4\frac{1}{7}$ ounces for the heaviest and $3\frac{1}{5}$ ounces for the lightest per yard.

HOW PURCHASED.

These goods are purchased on a credit of six months in the United States and on nine and twelve months in the European markets.

WHERE MANUFACTURED.

All this class of goods imported from Great Britain is manufactured at Manchester, while those from Germany are imported through Hamburg, but where manufactured I am not prepared to state; nor have I succeeded, after diligent inquiry, in ascertaining where the cotton imported from France and Italy are shipped or manufactured.

DUTIES.

The duty charged upon these goods is 30 cents per kilogram on the gross weight of the bale or package, which amounts to 110 per cent. on cost; 80 per cent. of which is paid in cash, and the remaining 30 per cent. in Government bonds.

EUROPEAN VS. AMERICAN COTTON IN SALVADOR.

In my interview with the merchants I discover that the larger share of American cottons are marked "Indian Head Mills and Massachusetts shirtings."

I am informed by the merchant that there are serious obstacles to overcome in the introduction of this class of American goods, notwithstanding their acknowledged superiority.

He has in the first place a credit of only six months in the States with 6 per cent. interest on his bills, while in the European market he has nine and twelve months with 5 per cent. interest. Besides this discrimination, he alleges there is a difference in freight and exchange in favor of the European market.

Hence it is the manipulations of trade in dry goods and cotton textiles seem to operate against the development of this branch of American interests in this quarter.

Aside from all these drawbacks, however, I have the assurances of some of the most intelligent and enterprising merchants ot San Salvador that in view of the superior merit of the American fabrics they are inclined to make some sacrifices in order to introduce them permanently into these markets.

T. T. TUNSTALL,
Consul.

UNITED STATES CONSULATE,
San Salvador, August 9, 1889.

SOUTH AMERICA.

ARGENTINE REPUBLIC.

REPORT BY CONSUL BAKER OF BUENOS AYRES.

All cotton goods consumed in the Argentine Republic are imported from abroad excepting a very small amount manufactured by hand looms in a few of the upper interior provinces, and which to some extent supplies the local demand. And as but little of the cotton fiber is raised in the country, and as there are no facilities for its fabrication I presume the Argentine Republic will go on receiving its supplies from other countries, "to the end of the chapter." The annual supply, however, does not vary very greatly in quantity or value. The following figures show the amount of the cotton imports for the last ten years:

Years.	Amount.	Years.	Amount.
1878	$5, 555, 647	1883	$8, 008, 221
1879	5, 213, 852	1884	6, 459, 146
1880	5, 494, 043	1885	5, 436, 487
1881	6, 489, 270	1886	6, 434, 914
1882	7, 468, 451	1887	7, 270, 656

IMPORTATIONS OF COTTON GOODS.

The following table gives a comparison of the kinds, quantities, and values of the importations for the years 1886 and 1887:

Kinds.	1886.		1887.	
	Quantity.	Value.	Quantity.	Value.
White cottons ..... kilograms..	5, 277, 485	$3, 688, 715	7, 181, 859	$5, 078, 595
Do ..... meters..	1, 654, 195	211, 961	.....	.....
Printed, colored, and stamped cottons .... kilograms..	2, 292, 278	2, 534, 238	2, 456, 860	2, 192, 061

Since 1886 the duties on cottons have been assessed entirely according to their weights.

I regret that I am not able to give the figures for the last year, but the custom-house statistics of the country for 1888 have not yet been published.

WHENCE IMPORTED.

As to the countries from which the cottons consumed in the Argentine Republic are imported, it is hardly necessary to say that the great bulk was from the British islands. Years ago Great Britain, by its superior trade methods, succeeded in securing the monopoly of the tex-

tile trade of this country, and, although other nations have since managed to make small inroads upon it, she still continues to maintain her supremacy. As showing how uniform has been the course of the cottons trade for the last ten years, I have compiled two tables, the first showing the countries from which the importations were made in 1878, and the second showing the same thing for 1887:

Imports of cottons into the Argentine Republic, 1878.

Countries.	Amount of meters.	Value.	Amount of kilograms.	Valu .
Germany	687, 815	$90, 819	31, 678	$18, 135
Belgium	898, 886	131, 850	26, 368	15, 334
United States	558, 433	66, 851	56, 793	39, 031
France	700, 056	81, 441	3, 472	2, 415
Italy	545, 533	51, 419	3, 118	1, 870
England	18, 217, 070	1, 897, 866	1, 759, 553	1, 285, 283
Chili	1, 762, 102	178, 683	177, 651	120, 530
Uruguay	1, 409, 953	103, 679	73, 468	48, 024
Other nations	214, 840	21, 440	30, 999	29, 905
Transit	7, 819, 902	782, 347	829, 092	597, 685
Total	32, 805, 590	3, 406, 425	2, 992, 192	2, 149, 222

It will be seen that of the total value, $5,555,647, imported during the year 1878, England is credited with furnishing $3,183,149. But to this amount should be put down what in the above table is given to Chili, Uruguay and "transit" (the original shipments being from England), thus making a total of $5,014,097 furnished by England, and leaving only $541,538 as the amount furnished by all other countries; whereas the custom-house returns in the foregoing table puts white cottons and printed goods in the same category; those for the year 1887 very properly separate the two. The following table shows the importations for 1887:

Imports of cottons into the Argentine Republic, 1887.

Countries.	White cottons.		Printed, stamped, and colored cottons.	
	Quantity.	Value.	Quantity.	Value.
	Kilograms.		*Kilograms.*	
Germany	778, 070	$530, 233	67, 196	$60, 476
Belgium	376, 471	309, 529	19, 122	17, 210
United States	214, 115	156, 007	254, 855	210, 688
France	260, 398	240, 001	42, 182	37, 964
Italy	319, 473	237, 399	1, 647	1, 584
England	4, 763, 083	3, 275, 350	1, 874, 185	1, 686, 766
Uruguay	323, 558	215, 813	147, 910	133, 190
Other nations	143, 691	18, 263	49, 763	44, 185
Total	7, 181, 859	5, 078, 595	2, 456, 860	2, 192, 061

Of the total value, $7,270,656, of the cottons imported during the year 1887, it will be seen that England is credited with furnishing $4,962,116;

but adding what is put down to Uruguay, the total furnished by Great Britain amounts to $5,311,117, against $1,959,539 furnished by all other countries.

Comparing the present returns with those of ten years ago, it appears that Great Britain has somewhat lost ground, but it does not necessarily signify that her supremacy is any the less assured now than it was then.

It further appears that during the same time the United States have more than trebled their imports of cottons, those of 1878 amounting to $105,912, and those of 1888 to $366,695.

IMPORTS OF COTTON THREAD.

In the above tables I have not taken into account the importations of cotton thread into the Argentine Republic. I give the following returns for 1887:

Importations of cotton thread into the Argentine Republic, 1887.

Countries.	Spools.	Value.
	Dozens.	
Germany	12,156	$3,619
Belgium	25,035	5,862
United States	48	29
France	25,690	7,570
Italy	3,150	1,890
England	1,668,795	400,965
Uruguay	59,643	13,910
Other nations	41,820	10 329
Total	1,831,337	444,174

Adding what is put down to Uruguay, we have England furnishing $414,875 worth out of a total of $444,174, while the United States is credited with importations of cotton thread to the amount of $29.

WIDTHS, LENGTHS, AND WEIGHTS.

In regard to the make-up and weights of the cotton textiles imported into the Argentine Republic there is such variety as to make it impossible to give an exact statement. In these matters there is probably as little conformity to any fixed rules as you would find in the city of New York. There are no fixed weights; and every mill that turns out such textiles for this market has its own figures. As elsewhere, while you will find on sale here cottons of the very heaviest weights, you will also find millions of yards in stock which are so made up of sizing that after a good washing there is scarcely anything left of them. I suppose, however, that ordinary cotton textiles will run from 2½ pounds per piece of 20 yards up to 6 pounds of European make; while pieces of 40 yards, mostly of American manufacture, will run from 8 pounds to 14 pounds per piece. The following note of a sale of cottons made by an import-

ing house a few days ago will give an idea of the range of weights, perhaps in better form than I could otherwise state it:

	Pieces.	Yards.	Net weight.
			Pounds.
Gray sheeting	60	2,400	496
Do	60	2,400	528
Do	60	2,400	613
Do	60	2,400	734
Do	60	2,400	802
Gray drills	60	2,400	792
Blue drills	30	1,340	345
Bleached drills	30	899	290
Blue drills	30	1,356	463
Bleached sheeting	30	1,200	315

There is also the same variety in widths and lengths that there is in weights. The favorite width, however, is 32 inches, and the favorite length is 20 yards to the piece, this being the size which finds the most buyers among the people of the interior of the country. Except where otherwise ordered, the American cottons sent here are in pieces of 40 yards. But there will be found in stock here cotton textiles of all widths, all lengths, and all weights that are known to the trade.

HOW PURCHASED.

It may be said, with reference to all commercial transactions in this country, that credit is the rule rather than the exception. And the trade in cotton goods is not one of the exceptions. All cottons bought in Europe are purchased on credit. The usual credit given by the cotton mills of England is six months, and the importers from France, Germany, and Belgium have a corresponding credit. While, however, six months is the specified time, it is no unusual thing for such bills to run unpaid for twelve and eighteen months; indeed, in many cases the manufacturers quite wait on the convenience of their Argentine customers for their money. Perhaps the reason for this is the fact that the mercantile firms doing business here are, in many cases, branches of established houses in the business centers of the Old World, or are the immediate agents, if indeed not part owners, of manufacturing estabtablishments in England and France. They are thus enabled to obtain their goods at times and in quantities to suit the trade, accompanied by the most favorable terms and credits. Besides this many wholesale houses in Buenos Ayres now have agents in Europe who, in consideration of the business put in their hands, give an open credit in proportion to the amount of business done; and in this way a large trade which used to be transacted by importers does not now pass through their hands at all. Owing to these facilities for obtaining credit Argentine merchants are very independent, and they have no trouble in obtaining even more cotton goods than the trade calls for on pretty much their own terms. A case was related to me the other day where an English manufacturing company had waited two years on a house in this city for the payment of its overdue bills, and finally sent out an agent to collect

the amount, which reached to nearly $100,000. The agent was told to call on the next day, and the balance was promptly paid; but when he asked for a new order it was respectfully declined on the ground that the house had just arranged better terms with another manufacturing company. This incident illustrates the unrelenting competition which exists among the manufacturers of Europe to obtain a market for their goods. It is this facility in getting long credits in Europe which, among other things, militates against the rapid increase, not only of the cotton, but of the general trade of the Argentine Republic with the United States. Except in a very few cases, where the financial standing of the importing house is above all criticism, I believe that American cottons are still sold here for cash, or for what is equal to cash—the goods in many cases being invoiced to some banking house to be delivered on the payment of the bills drawn against them. Of course, when the business of our manufacturers is thus done through a bank, which charges commissions and interest, or when they pay some banking house in Europe a commission for accepting their drafts, the remittance going through the same house, the intervention of so many middle-men makes the transaction expensive. But all this outlay and percentage is saved by the European manufacturers, who can afford to wait for their money, and in many cases the saving is equal to a fair profit on the goods.

DUTIES CHARGED ON COTTONS.

In regard to the duties charged on cottons I have to say that the Argentine customs tariff is not a continuing law, but runs only for the year for which it is enacted; and that for the imposts levied by the Government the custom-house valuations on imported articles are officially regulated and fixed by the executive department at the beginning of each year. The tariff and official valuations on cotton goods for the 1889 have been fixed as follows:

Argentine cotton tariff—1889.

[Rate of duty 25 per cent.]

Tariff classification.	Unit.	Custom-house valuation.	Tariff classification.	Unit.	Custom-house valuation.
Serge	Kilogram.	$1.50	Brilliantines and dress goods	Kilogram.	$4.00
Almanesques	do	.90	Colored twills	do	.80
Bombazaine	do	$0.80 to 1.00	Duck	do	.75
Bagging	do	.24	Mantles and shawls	do	1.00
Brannant	do	.70	Stockings	do	2.00 to 4.00
Counterpanes	do	.24 to 1.50	Socks	do	.40
Counterpanes, imitation guipure	do	2.50 to 4.00	Anti-Macassars	do	3.50
Curtains	do	2.50 to 4.00	Handkerchiefs and scarfs	do	1.25
Ticking	do	.80	Pocket handkerchiefs	do	.70 to 1.60
Damasks	do	2.00 to 3.80	Pique for vesting	do	2.00
Drilling	do	.80	Napkins	do	1.00
Buckram	do	.70	Toweling	do	.80 to 1.30
Diaper	do	.80	Velvet	do	2.00
Blankets	do	.80	Domestics	do	.70
Prints of all kinds	do	.90	Veiling	do	2.00
Satinets	do	.80	Chintz	do	.90
Zephyr, muslins, etc.	do	1.30	Checks	do	.90
Sheeting and twilled goods	do	.43			

Where the fabrics are mixed with wool they are classified as woolen goods, and pay duties accordingly.

I would further state that the duties established by the foregoing tariff are recharged with an addition of 1 per cent. fixed by the Law of the Estimates (*Ley del presupuesto*).

CAUSES OF ENGLISH SUPREMACY IN THE TRADE.

It will be seen from the statistics I have given in the foregoing tables that the great bulk of the cottons consumed in the Argentine Republic continues to be imported from Great Britain, and that the United States are still without an assured foothold. The figures, however, of the last ten years show that our cottons trade with this country is gradually growing into proportions which are not only encouraging but which render it well worth our while to make increased efforts for a better showing. From $105,912 of importations in 1878 to $366,695 in 1887 proves that there is a movement, although it may be a slow one, in the right direction. There are, however, several very serious obstacles which interfere with our headway, and against which we must continue to contend:

(1) The cottons trade of the Argentine Republic, through all the years since the establishment of an independent government here, has become so firmly fixed, and is so irresistibly set towards Great Britain that it will require an uncommon effort to divert the steady stream from its present channel or, even in a measure to divide it.

(2) Great Britain constantly keeps on hand in the bonded warehouses of the Argentine Republic such an oversupply of cotton goods that it will require more than ordinary inducements from outsiders, like ourselves, to obtain orders for more, especially when it is considered that the stocks on hand are not yet paid for.

(3) The cotton millers of Great Britain are so thoroughly posted in reference to the styles, patterns, make-up, and general details of the Argentine market, a knowledge which they have obtained by long and persistent personal inspection of the field, that they have by long odds the advantage over those who are commercially isolated as we are from the Argentine Republic.

(4) The trade methods of Great Britain, in the matter of regular steam communication, liberal banking facilities, and branch busines houses here in the Argentine Republic—in all of which essentials to a close and reciprocal trade we are so absolutely wanting—are so well established and are of such a permanent and reliable character as to almost defy outside competition.

THE OUTLOOK OF THE TRADE.

In spite, however, of these disheartening conditions, the cottons trade of the Argentine Republic is certainly deserving of the serious attention of American manufactures. As I have heretofore said, in a report

to the Department, it is a trade which, in all the future years, must continue to offer a wider and wider field for the expenditure of enterprise—a field in which there is no local competition and in which probably there never will be any. It is a trade which is not only large now, but which must go on increasing with the growth and development of the country. And in the midst of the monopoly which Great Britain now enjoys, and of the unpromising prospect which is offered to the cotton-millers of the rest of the world, there is at least one circumstance very greatly in our favor, and that is that English cottons are not to be compared with those turned out by the mills of the United States—our fabrics commending themselves at once by their superior body and strength, and by their freedom from dirt and sizing. It is on this fact, and on this alone, that we are able at present to build any hopes of the future. Trade, we know, has a tendency, where other things are equal, to keep in its "old rut," but it can be diverted by furnishing a better article as cheap. Let us proceed in the business on the line of the trade methods which have done so much for British commerce in South America, and the superiority of our cotton goods must eventually command the market of the River Plate.

LOST OPPORTUNITIES.

I regret to have to say that if the sales of American cottons have increased here at all during the last ten years, it is not because our American mills have done anything themselves to assist the situation. On the contrary they have even neglected to take advantage of opportunities when they offered. A few years ago one of the leading commercial houses of Buenos Ayres, well posted by many years' experience in all the details of the cottons trade, not only succeeded in successfully introducing American cottons to the notice of its customers but even pushed the trade overland into Bolivia, and, as the market at home was at that time dull and slow, our mills rejoiced in being able to furnish all that was required by the increasing demand down here. But what ensued? Just then our home trade began to revive, and the very same mills, which had previously been so anxious to gain a permanent foothold in the River Plate, coolly replied to the orders for more cottons, that they had at present a market in the United States for all the cottons they could furnish, and that the orders from the Argentine Republic could not be supplied! The result was that, disgusted with this method of doing business, the importing house, which had worked so faithfully in the matter, was compelled to drop the American trade as unreliable, and go back again to English cottons. Our American mills must understand that, if they would establish a foreign market for their fabrics, they can not temporarily suspend a trade which they have inaugurated, and then take it up again at their pleasure. The millers of Manchester do things better than that. If they have once caught on to the trade of any country they never let go or give it up.

HOW WE MAY YET SECURE THE MARKET.

In a report which I made to the Department nearly ten years ago I offered some suggestions in reference to the cottons trade with this country, which, though they seem to have been neglected then, may perhaps have more weight now, and I therefore venture to repeat them:

To secure a strong and permanent foothold in this market it is necessary that the American cotton manufacturers should do something more than send samples or ask consuls for information. The field is a large one, and it needs to be worked. The manufacturers should unite together and send an agent or agents here, not necessarily to sell or even to solicit orders, but to "spy out the land;" to obtain exact information in regard to the wants and demands of the market, the kinds of fabrics best suited to the trade, the number of yards to the piece, and the proper widths, the most satisfactory weights per yard, with such other points as experts in the business fully understand. Consuls, of course, are ready and willing to afford their countrymen all the assistance in their power, but it is not all of them who are sufficiently acquainted with the details of the business to be able to decide on the qualities of different fabrics or report on the most approved trade-marks. Our cotton mills, I am satisfied, can ultimately have the trade of the Argentine Republic in their own hands, to a very great extent, if they will quietly and systematically work for it; but to effect this it requires time, and, it may be, the expenditure of a little money for the expenses of agents to secure the "points" which the manufacturers must possess to work intelligently. Even then, however, almost an indispensable prerequisite to securing the Argentine market for cotton fabrics (as indeed for nearly all descriptions of dry goods) is the establishment of a direct line of steam-ships with the River Plate. I have referred to this subject so often that I hesitate further to enlarge upon it. It is next to impossible for American manufacturers, even with better goods to sell, to compete with the English market on equal terms without the advantage which sure and quick intercommunication affords. Since the opening of the ocean cable such large stocks of merchandise are not required to be held in this market. They are ordered by cable as they are needed, and the saving of time and the dispatch with which orders can be filled in England and other maritime countries of Europe will still give those markets the preference. When the fleet of ocean steamers by which Europe is connected with the River Plate can put down at this port goods ordered by cable in from twenty to twenty-five days, merchants here, however well disposed they may be, will hesitate about sending orders to the United States, knowing that they can not be filled except by sailing vessels, which require from sixty to ninety days to make the voyage.

Should an American line of steamers be put on direct to the River Plate, in my opinion it would not be long in working great changes if not a revolution in our trade, and especially our cottons trade with the Argentine Republic. Not only from selfish considerations, however, for the development of our foreign trade, but from a broad, political point of view, in its influence in strengthening, confirming, and encouraging this Republic in the promising career which is before it, it is to be hoped that our Government may see its way clear to assist such an enterprise. Our interest in the political prosperity of the South American Republics, nearly all of whose business associations are now monarchical instead of democratic, should prompt us, if possible, to bind our own to the Republics of the River Plate by the strong bonds of a mutual reciprocal trade. Commerce is the great civilizer and political missionary of the world, and the ideas and methods by which the United States have advanced to their present commanding position among the nations of the earth, if brought into close contact and communion with this country, could not fail to act and react most favorably upon its commercial, industrial, and political destinies. In no other way could we better spread and propagate the principles and ideas which have built us

up as a great nation, than by the secret, silent influences of a closer and more intimate intercourse. As it is, we are in a measure isolated from this port of South America. Its possibilities are a sealed book to us. Its heroic struggles against the fearful odds of the old Spanish conquest to rise to a higher level of civil and political freedom have thus far met with no recognition by us, except the cold sympathy of diplomacy. Let us show by practical methods the deep interest we take in the welfare and advancement of the Argentine Republic, and republican government, not only here but everywhere, will be the gainer, and we will be stronger and more firmly established by the re-assuring company of the strong republics we will see marching forward with us in the race of empire.

Such are the triumphs in a national point of view which would result from the establishment of a regular line of steam-ships between the United States and the republics of the River Plate, to say nothing of the stimulus which it would give to our trade, and especially our cotton trade, with this part of South America. But the future which would thus be opened up to our cotton-mills, by placing them on an equality in respect to transportation with those of Manchester, can scarcely be estimated. And it is to be borne in mind that the trade which would thus be placed within the reach of our country is not for a day or for a season, but for all time to come, with an importance which will increase with the growth and development of the Argentine Republic.

E. L. BAKER,
Consul.

UNITED STATES CONSULATE,
Buenos Ayres, August 19, 1889.

BRAZIL.

BAHIA.

REPORT BY CONSUL BURKE.

Information on the first point in the circular, viz, "Quantity and kind of cotton textiles imported per annum," I found could best be obtained from the custom-house. Accordingly in this connection I inclosed a table of such importations covering the year ending December 31, 1888.

In this table, in addition to the quantity and the kind of cotton textiles imported, the duties levied are also given, thereby covering the fifth point in the circular, viz, "Duties charged thereon." I might say right here that the number of cases for the year 1888 differs but little from each of the four years preceding, with the exception of 1885. In 1884 the number was 27,963; in 1885, 19,955 cases; in 1886, 23,589; in 1887, 22,098; in 1888, 28,895 The first six months of the present year show an importation of but 5,267 cases. The falling off is due chiefly to the hard times prevailing.

Quantity, kind, and weight of cotton textiles imported into Bahia from January 1 to December 31, 1888, with the duty paid thereon.

Kinds.	Whence imported.	Quantity.	Duty.
			Milreis.
Cloaks, shawls, and handkerchiefs	Germany ..... kilometers..	80,925	158,453
	Belgium .....do....	338	812
	France..... do....	27,964	58,534
	England .....do	7,158	57,937
	Portugal.....do....	40	80
Long-cloth, piqué, and prints	Germany .....do....	8,626	17,772
	France.....do....	12,480	24,951
	England .....do....	1,954,227	2,812,176
	United States.....do....	1,394	2,374
	Beglium .....do....	2,802	5,604
Counterpanes	Germany .....do....	2,585	3,087
	France.....do...	69	85
	England .....do....	24,160	20,179
	Portugal.....do....	16	78
Starched cotton cambric	Germany .....do....	2,478	2,743
	France.....do....	934	1,292
	England .....do....	4,005	4,042
	Belgium .....do....	225	225
Cotton lace, in lengths	Germany .....do....	380	3,922
	France.....do....	79	792
	England ..... do....	2,825	24,654
Muslins, tarlatans, and grenadines	Germany ..... do....	2,927	11,540
	United States.....do....	133	333
	France .....do....	3,805	13,185
	England .....do....	25,219	58,832
	Portugal .....do...	7	28
Cotton velvet and bombazine	Belgium .....do ..	157	628
	Germany .....do....	799	2,957
	France .....do....	56	141
	England .....do....	1,148	4,179
White and striped drills	Germany .....do....	192,332	193,795
	Belgium .....do....	2,994	2,994
	France .....do....	75,399	85,438
	England .....do....	301,953	285,786
Tape, twist, braid, and ribbons	Germany .....do....	5,132	9,887
	United States .....do....	78	1,004
	France .....do....	903	13,759
	England .....do...	931	1,342
	Portugal.....do ..	3	4
Lace and insertions	Germany .....do...	1,301	2,977
	France.....do....	423	4,316
	England .....do....	8	102
	Portugal.....do....	3	5
Unbleached cotton, white and colored, including "blue drills."	Germany .....kilograms..	1,339	2,089
	Belgium .....do....	86	138
	Coast of Africa .....do....	7,351	12,081
	United States .....do....	240,580	235,510
	France .....do....	345	817
	England .....do....	575,109	406,061
Towels and napkins	Germany .....do....	361	541
	France.....do....	1,058	1,317
	England .....do....	8,359	8,750
Cotton hose, stitched	Germany .....do....	226	423
	France.....do....	1,168	2,443
	England .....do....	1,187	4,715
Hose, gloves, cravats, and neckties	Germany .....dozen pairs..	41,554	35,541
	United States..... kilograms..	61	258
	France ..... dozen pairs..	9,817	14,943
	England .....do....	684	960
Bonnets, hats, and caps	France.....kilograms..	2,519	10,628
	England .....do....	310	784
Men's and boys' clothing	Germany .....pairs and suits..	8,178	35,541
	France ..... dozen pairs..	6,036	27,182
	France ..... kilograms...	102	
	England .....dozen pairs..	1,819	16,719
	Italy.....do....	25	75
	Portugal.....do....	2	16
Clothing for women and girls	France..... do....	898	4,503
	Germany ..... dozen	223	720
	Germany ..... kilograms..	76	
	England ..... do....	612	3,856
	Portugal.....kilograms..	10	28
	Belgium..... ....dozen..	5	64
Not specified	Germany ....do....	1,041	4,221
	Germany ..... kilograms..	118	
	United Siates ..... dozen..	677	1,302
	France..... .....do....	1,939	7,569
	France..... kilograms..	2,575	
	England ....do....	1,399	5,464
	England ....do....	661	
	Portugal... ..... dozen..	1	

As the duty in the foregoing table is given in milreis, it would be well to say that for convenience and readier computation 50 cents of United States money are regarded as the equivalent of 1 milreis, though 54.6 cents are the equivalent when at par.

Owing to exchange being in favor of the Brazilian currency, the milreis is now, and has been for nearly a year, worth more than the standard equivalent. But, as stated in this report, it will be regarded equal to 50 cents. By a footing up of the number of kilos brought from Germany, France, England, and the United States it is found that during the year referred to above, Germany furnished 299,731 kilograms of cotton textiles, on which a duty of 410,970 milreis were paid, or $205,485 United States money. From France were imported to this port 127,304 kilograms, with a duty of 244,871 milreis, or of United States money $122,485; from England, 2,908,689 kilograms, with a duty of 3,688,756 milreis, or $1,844,378, United States money; from the United States, 242,185 kilograms, with a duty of 239,221 milreis, or $119,610, United States money. The importations from the other countries mentioned in the table, being so small, are not here considered.

AMERICAN VS. ENGLISH DRILLS.

The only class of cotton goods imported to this place in which the United States has the lead is blue drills. In fact this class covers nearly the entire importation from the United States in the cotton textile line.

And though the cost to the purchaser is greater than a similar class of goods imported from England, yet the blue drill of the United States holds the field, and most likely will continue to hold it till driven out by home manufacture, as will probably be done if the proposed new scale of duties on this article and similar ones goes into effect The proposed new scale increases the present provincial duty 25 per cent. and the general duty 20 per cent. The present duty is 1 milreis or 50 cents per kilogram.

While some of the purchasers concede the American blue drill to be superior to the English, and though costing more, selling for more also, every purchaser acknowledges that even the negro, who is the chief buyer of this class of goods—no matter how good the English imitation is—can instantly tell, if two pieces, one English and the other American, are placed side by side, which is the American.

The American blue drill has a peculiar smell which is wanting in the English. This smell is one thing that enables the negro and all that use these goods to detect the difference between the former and the latter. Besides the American does not fade as quickly as the English blue drill. Touching the cost of each one, an importer gives the cost of the American laid down in Bahia at 5¼ pence per yard, or say 10½ cents United States money. The cost of the English to the same importer laid down in Bahia is 4½ pence, or say 9 cents per yard. Of the selling price here,

the importer states, the American brings from 40 to 80 reis or from 2 to 4 cents more per yard than the English.

PLACES OF MANUFACTURE.

The greater part of the cotton fabrics imported to this place is manufactured in Lancashire, Glasgow, and Manchester, and are known as Manchester goods. The print works are nearly all Manchester, and all these goods shipped to this place from England come from the manufacturers or printers or their agents at Manchester. Shawls, fancy cotton drills, hosiery, hats, caps, bonnets, lace, ribbons, etc., come largely from Germany and France; linens chiefly from Belfast and Bradford.

WEIGHT PER YARD.

The wide range of imports of this character and the variety of grades render it difficult to obtain the weight of each grade or quality. The best that can be done is to submit the minimum and maximum weight of some of the articles constituting the largest importation of cotton textiles. With this is given the purchase price, the rate of duty, and the selling price.

Printed calicoes having 125 yards to the lump or piece weigh from 12 to 24½ pounds; price in Manchester to the Bahia purchaser 22*s.* to 46*s*; rate of duty, 2 milreis or $1 per kilogram; selling price, from 300 to 700 reis, or from 15 to 35 cents per yard.

Bleached calicoes of 100 pieces, with 24 yards to each piece, weigh from 110 to 220 kilograms; price in Manchester to Bahia purchaser, 2*s.* 8*d.* to 7*s.* per 24 yards; rate of duty, 1 milreis or 50 cents per kilogram; selling price from 160 to 450 reis, or 8 to 22½ cents per yard.

Gray calicoes of 100 pieces, with 24 yards to each piece, weight from 123 to 312 kilograms; price in Manchester to Bahia buyer, 2*s.* 9*d.* to 4*s.* 5*d.*; rate of duty, 680 reis or 34 cents per kilogram; selling price from 160 to 360 reis or 8 to 18 cents per yard.

White drills having 117 yards in each piece weigh from 25 to 36 pounds; price in Manchester to Bahia buyer 3*s.* to 9½*s.*; rate of duty 1 milreis, or 50 cents per kilogram; selling price from 420 to 1,100 ries, or from 21 to 55 cents per yard.

Regattas: A piece of 69 yards weighs 6.872 kilograms; price in Manchester 3⅝*s.*; rate of duty 1 milreis, or 50 cents; selling price, 440 to 560 reis or from 22 to 28 cents per yard.

Plain Oxfords: A piece of 40 yards weighs 4.870 kilograms; price in Manchester from 17*s.* 8*d.* to 31*s.* 4*d.*; rate of duty 1,000 reis or 50 cents per kilogram; selling price from 200 to 460 reis, or from 10 to 23 cents per yard.

Striped Oxfords of 69 and 67 yards weigh. respectively, 3.7 and 6.25 kilograms; cost, duty, and selling price same as plain Oxfords.

Checked Oxfords: A piece of 45 yards weighs 5 kilograms; price in

Manchester, 2*s.* to 3⅝*s.*; rate of duty 1,000 reis or 50 cents per kilogram; selling price from 220 to 480 reis, or from 11 to 24 cents per yard.

Dyed linings: A piece of 70 yards weighing 4.840 kilograms; costing in Manchester 14*s.* to 19*s.* pays a duty of 1,000 reis or 50 cents per kilogram and sells for from 320 to 510 reis, or from 16 to 25 cents per yard.

Black printed cotton shawls, 44 by 66 inches, weighing by the dozen 1.050 kilograms; rate of duty 2 milreis per kilogram; sells from 900 to 1,000 reis each, or 45 to 50 cents.

Printed cotton handkerchiefs, 1 dozen weighing .224 kilogram; costing from 9*s.* to 15*s.* and rate of duty 2 milreis per kilogram; sells for from 1 to 2 milreis, or from 50 cents to $1.

Fancy cloths: A piece of 41 yards, weighing 3.700 kilograms; price in Manchester, from 3*s.* to 12*s.*; rate of duty, 2,500 reis or $1.25 per kilogram; sells from 600 to 1,500 reis, or from 30 to 75 cents per yard.

The principal cotton fabrics imported are printed calicoes, bleached and gray calicoes; drills, white, blue, and gray, regattas, headed cotton sheets, printed cotton sheets, plain, striped, and checked Oxford shirtings, dyed and printed linings, bishop's lawn, Victoria lawn, fancy cloths for costumes, white and dyed, printed cotton shawls, printed cotton handkerchiefs, etc.

HOW PURCHASED.

The usual term of credit for the importer is six months. The term to his customers is from sixty to ninety days, though sometimes he is fortunate if the credit becomes cash in twelve months. In some cases the importer delivers to his customers the goods and the bill at the same time. If goods are paid within a month, payment being made on Tuesdays and Fridays during that time, a discount of 2½ per cent. per payment is allowed. If paid at the end of the month, 1½ per cent. discount is allowed on the whole bill. Purchases are rarely for cash, and sales for cash are the exception rather than the rule. In fact, actual importers are very few, and the very few are mostly Portuguese. The greater part of the Brazilian, the German, and the English houses are merely commission houses, ordering just such goods, such quality, such grades, such designs, such styles, such brands, such marks, and even such prices as the small wholesale or retail dealer calls for, either for his city or country trade. Not infrequently do wholesale or retail dealers order through a commission house prints or drills of a certain design, each piece to contain a specified number of yards not to cost more than a specified price. These orders may be given to the manufacturer to place a well-known mark or brand of a superior quality of goods upon an inferior quality in order to sell, of course, the inferior quality for a better price than it would otherwise bring, the seller representing to the every-day buyer that he is selling this well-known brand for a less price than his merchant neighbor.

The buyer, not knowing the tricks of the seller, takes the poor article with the well-known brand and goes on his way rejoicing, thinking he

has made a good bargain because he pays, it may be, 3 to 5 cents less per yard to Mr. A than Mr. B asks for what he thinks the same quality of goods. In such a method of doing business, while all would say the buyer is certainly tricked, some would only ascribe to the manufacturer and seller a little sharp practice for promoting trade; others would boldly assert that such a proceeding is a dishonesty and an injustice which they could by no means countenance, much less engage in.

In commercial business, as in any other line of life, the manner of dealing depends upon the man. In some cases and in all countries there are men who are square dealers under any and all circumstances. In other cases, and in all countries, too, more move along the line of circumstances, using the same instruments as they move that their competitors employ, or better or worse ones to promote their interests and support their families, and have as full a share as possible in the enjoyments of life.

DESIGNS AND PATTERNS.

Variety designs or patterns are really a necessity for a merchant to have in this country, or at least this province. The greater the variety of designs or patterns of prints displayed for sale by the merchant the greater his trade, other things being equal, and the better pleased the purchaser.

The designs and patterns are nearly all devised in Paris. The Manchester printer or manufacturer purchases different sets which he puts into work to make sample pieces—if not getting orders at once from the designs and from the sample pieces, he distributes patterns to his customers.

This South American trade has been so long in the hands of English, French, and German manufacturers, they understand just what these people need and want, and if they don't know, the English, French, and German houses established here will not fail to keep them posted.

To institute a comparison in the cost of, say, English cotton textiles and American, as here called, is difficult, because so few American cotton goods are imported. The only real exception is as given above in the case of blue drills. In these the United States has practically shut out English blue drills, as well as those from any other country. And why? Because they are just what the people want—the people that use them—while the merchant imports them because he can sell them. Now what has been done and is being done in blue drills by our manufacturers can be done in other lines—can be done in white drills, prints, etc. In other words, in order to find a market for our goods here, our manufacturers must make goods that will meet the requirements of the people, goods that are suitable for their needs and will strike their fancy as well. A cheap article having a good and a showy appearance is much more appreciated and is much more readily pur-

chased by, perhaps, three-fourths of the people, than an article whose actual value is greater than the other but is not as showy. Then if the people, I say, want cheap things and showy and our manufacturers want the trade, they must of necessity make what is wanted here, and not what they think is wanted.

Once having the trade, our manufacturers can control it, and if deeming it necessary, can then throw a better class of goods upon the market, provided they find a better class is required. But let them first make an effort to get it. When it is considered that fully three-fourths of the people of this province—the same ratio will probably hold throughout Brazil—are negroes or Indians or both, with a dash of white-blood here and there mingled and mixed, and that these three-fourths—though not possessed of a very large quantity of such treasure as is required in order to eat and drink and be clothed more or less, to get married and be buried—must of necessity be the largest consumers, it may readily be understood what they need, what they want, and what they can buy.

The other fourth is in circumstances to purchase our better and more expensive manufactures for themselves and their homes. Apparently, and perhaps in reality, the advantage for supplying this country with what it requires for its people is with England, with Germany, with France. These countries have their representatives in business here; they have had long experience in commercial dealing with the people, as before stated, knowing well their methods of transacting business; they have their banking houses, especially the English; they have their steamers, usually arriving and departing with well-timed promptness and regularity. With this state of things in favor of those countries our manufacturers and business houses must compete; against it they must contend. We have no business houses here, we have no banks, we lack experience in business relations with the people, and we have only three steamers arriving here, after leaving New York, anywhere from twenty to twenty-eight days. It is true we have skilled workmen, we have genius, we have any amount of energy, we have untiring push, we have brains, and we have money—all necessary elements to build up and develop our trade with all South America. With these requisites as a foundation, why then can not these things be done which, it strikes me, must be done to accomplish the building up and developing and extending of this trade, viz, establish business houses here, establish banking houses instead of having our business in this line go through London, and construct steam-ships that will give the United States and all South American ports better mail facilities, enabling them to communicate with one another much more frequently than now and in the fastest time possible.

A domestic manufacture is rising here with which we must compete as well as with other nations. Not extensive yet, it is true, but it is beginning to increase. It will doubtless increase more rapidly as soon

as the present economic crisis—the result of emancipation and drought—is passed, and the tide of prosperity sets in. Later I will look into the number of cotton mills in this province, the business and results, and transmit to the Department such information about them as I shall be able to obtain.

DAVID N. BURKE,
Consul.

UNITED STATES CONSULATE,
Bahia, August 23, 1889.

PARA.

REPORT BY CONSUL CLAYTON.

Quantity and kind imported.—There are no statistics to show the exact quantity of cotton textiles imported into Para and Manaos. I estimate the quantity at from 35,000 to 40,000 cases and bales. As to different kinds of these goods Para imports printed cotton, white bleached cotton, colored cotton drills, white cotton drills, gray unbleached cotton, cotton cashmeres, cotton cassimeres.

Weight.—Weight varies from one-fifth to one-half pound per yard.

How purchased.—Bought from commission houses, or, in a few cases, direct from manufacturers. Generally against draft up to ninety days sight after arrival of steamer, or in account-current for six months date of invoice and interest 5 to 6 per cent. Commission charged 2½ to 5 per cent. if not included in prices.

Place of manufacture.—Manufactured in Manchester, Bradford, Dundee, Boston, Philadelphia, New York, Glasgow, Elberfeld, and Silesian and Saxonian places. Imported from Manchester, Liverpool, London, New York, and Hamburg.

Duties.—Duties for white cottons and colored cottons, 1 milreis,* brown unbleached, 680 reis per kilo, with augment of 15 per cent. of this tax and 5 per cent. more for emancipation of slaves.

R. W. CLAYTON,
Consul.

UNITED STATES CONULATE,
Para, October 1, 1889.

PERNAMBUCO.

REPORT BY CONSUL BORSTEL.

I have the honor to inform the Department that I have obtained from the Baron de Souza Leão, collector of customs here, a list showing the total import of cotton goods into this province for the year 1888; the list giving weight in kilograms and value in milreis. I have

* One milreis = 54.6 cents; 1,000 reis = 1 milreis.

therefore copied the same, and given the weight in pounds and value in dollars, weight per yard of three qualities, the best and heaviest being American, from a Fall River mill, and containing no starch, but unfortunately also the most expensive; as a result, cheaper qualities are bought, which are all full of starch, without exception.

I make no comment, because figures will show all that is desired by the Department.

H. CHRISTIAN BORSTEL,
Consul.

UNITED STATES CONSULATE,
Pernambuco, July 20, 1889.

Cotton prints imported into the consular district of Pernambuco during the year 1888.

Where from.	Bareges, muslins.		Drills, cassinets.		Whites.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Great Britain	148,268	$323,441.66	221,816	$130,937.50	873,640	$455,020.83
France	146,738	317,983.33	194,712	114,070.31	.....	.....
Germany	43,596	113,583.85	146,318	90,985.21	.....	.....
United States	.....	.....	.....	.....	.....	.....
Total	338,602	755,008.84	562,846	335,993.02	873,640	455,020.83
Duty paid	.....	362,404.25	.....	161,276.65	.....	218,410.00

Where from.	Prints.		Madapolam cloth.		Sundry cotton woven work.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Great Britain	519,962	$539,960.41	369,214	$131,600.20	3,882	$7,909.37
France	353,946	368,693.75	62,774	30,941.45	1,550	1,795.10
Germany	.....	.....	.....	.....	2,436	4,561.04
United States	.....	.....	113,112	45,428.83	.....	.....
Total	873,908	908,654.16	545,100	207,970.48	7,868	14,265.51
Duty paid	.....	436,154.00	.....	99,825.84	.....	6,824.95

American goods from Fall River mill (no starch), one sort only, one yard, weight 112½ grams; duty 25 cents per pound and 18 per cent. for brokers to get same through the custom-house at Pernambuco. One piece contains 24 yards; price 7⅞ cents per yard, sold here for $4 per piece.

English goods full of starch and many grades below and above this quality, one yard weight, 93½ grams; duty 25 cents per pound and 18 per cent. for brokers to get same through the custom-house at Pernambuco. One piece contains 24 yards, price $1.42 per 24 yards, sold here for $2.85 per piece.

English goods full of starch, inferior quality and many grades, one yard, weight 61½ grams; duty 25 cents per pound and 18 per cent. for brokers to get same through the custom-house at Pernambuco. One piece contains 24 yards; price 84 cents per piece, sold here for $1.85 per piece.

These goods are bought here for cash or for three or six months' credit. Banker's draft reckoned from the time they leave the factories.

RIO GRANDE DO SUL.

REPORT BY CONSUL BENNINGTON.

EXPLANATORY INTRODUCTION.

To prepare an accurate and complete report on the importation of cotton textiles into this province would require much longer time than under the circumstances I deem it necessary or expedient to employ, as one of the custom-houses is on the western frontier, a distance of over 450 miles from my office, and with present mail facilities communications by post would be accompanied by great delay.

I apprehend, however, that the requirements of the cotton manufactures of the United States can be met within a reasonable degree of accuracy by a comparison of the latest official published returns of the annual revenue receipts for the three different custom houses in the province located at Rio Grande, Porto Alegre, and Uruguayana.

Having obtained the importation statistics from the custom-house of Rio Grande for the fiscal year 1888, it will be quite sufficient upon which to base a fair estimate of the entire cotton textile importation of the province by comparison as before stated, thus giving the best obtainable information on the points indicated by the circular issued from the Department.

In some instances, however, the origin of goods is no longer kept up, and many arrive here manifested as foreign goods in transit. This failure to show origin occurs when goods are reshipped or manifested as local cargo in Rio de Janeiro for this and other points in the province.

Some months ago there was an immense contraband business conducted over the southwestern and western frontier, which still exists to a certain extent notwithstanding the special tariff for the province, which went into effect March 15, 1889, reducing the tariff on cotton textiles to at least 50 per cent. of the rate collected in the custom houses of the other provinces of the empire.

By reason of the contraband business the exact amount of cottons brought into the province can not be ascertained, but the average consumption of a million of people, the estimated population of the province, would indicate to a certain extent the probable annual importation of cotton goods, both by legitimate and illegitimate methods.

By comparison, as before stated, of the annual revenue receipts, for the three custom-houses, I estimate importation statistics for the custom-house of Rio Grande to show three-sevenths of the entire legitimate importations of the province.

IMPORTS.

The following table shows the foreign cotton textiles dispatched from the custom-house in the city of Rio Grande do Sul for the year 1888:

Articles, and whence imported.	Weight.	Official value in United States gold.	Articles, and whence imported.	Weight.	Official value in United States gold.
Brown muslin:	*Kilograms.*		Printed cotton—Ctd.	*Kilograms.*	
Germany	8,269	$9,118.50	France	267	$563.00
Uraguay	13,050	10,399.50	Great Britain	49,408	103,630.00
United States	15,228	11,549.00	Italy	120	168.00
France	152	253.00			
Great Britain	43,667	40,153.00	Total	97,286	202,852.00
Total	80,366	71,473.00	Bleached and fine muslins:		
Printed cottons:			Germany	6,049	6,311.00
Germany	23,463	48,575.00	Uraguay	11,207	12,095.50
Belgium	280	588.00	United States	7,239	8,237.50
Uraguay	22,824	47,387.50	Great Britain	34,848	37,139.50
United States	924	1,940.50	Total	59,343	63,783.50

WEIGHT AND QUALITY.

The weight of these goods, which include all the imported cotton materials in the markets, I have not ascertained, but will add that the figures show a large part to be of British origin, and to a casual observer the nationality of the origin of the goods could not be told by mere appearances; the brand must be seen and the quality examined closely to tell the place of manufacture.

This being true, I presume every well-informed manufacturer in the United States knows enough about standard British cottons to judge weights very closely. American bleached muslins and sail duck or canvas is in very high favor with the consumers in all places in the province where they have been introduced.

MANNER OF PURCHASE.

In regard to the manner of purchase, I can only say that they are generally received by the importers in the usual commercial way, upon orders, though many are sent here by foreign exporters on consignment. As to time and terms of payment, which is conceded to be a strictly private business of the importer, I am unable to give information. I am of opinion that the greater part are bought upon credit for certain periods of time, varying accordingly as the agreement is made between the parties.

DUTIES CHARGED.

The following table shows the tariff on the classes of goods referred to, in the foregoing table, in this province, under the special schedule,

together with the per cent. by which the official valuation is made and storage is estimated:

Articles.	Unit.	Duty.	Per cent. for official valuation, etc.
		Cents.	*Per cent.*
Brown, or unbleached, cottons:			
Raw and smooth or plushed, for toweling	Kilogram	.15	15
Damask, for toweling	....do.....	.15	15
Heavy cotton cloth, raw and smooth	....do.....	.10	15
Calico, white muslin, checked and striped cottons:			
Gummed, ordinary, white or in colors, proper for linings, varnished transparent for plans and charts	....do.....	.15	15
Not specified, smooth, white	....do.....	.15	15
Colored or stamped	....do.....	.20	12
Not specified, worked, damasked, or checked	....do.....	.31	13
Striped, for ponchos or shawls	....do.....	.25	15

EXCHANGE FLUCTUATIONS.

The foregoing table includes about all the cottons that are sold in the markets of the province by bale, bolt, or piece, and the duty is estimated on an exchange basis of $24\frac{1}{16}$ pence gold to a millrēis, paper.

Sight-drafts being nearly 2 per cent. below the ninety-day selling value of gold in London, Paris, or Hamburg, and as ninety-day drafts are about $26\frac{3}{4}$ pence to the millrēis at present, it is impossible to foresee what fluctuations may occur in a short time, when a manipulation is commenced to effect a rise or fall of exchange, which has been frequently done in this country. So, I have concluded that a lower rate for the calculation of the duty would be the most reliable under all the surrounding circumstances.

STORAGE AND OFFICIAL VALUES.

To estimate storage and official value it is necessary to cite an example of the method of calculation. For instance, the duty on certain brown, or unbleached, cotton is 15 cents per kilogram, and this sum is followed in its proper column by 15 per cent. (called in the Brazilian tariff table "razão"). This means that the duty of 15 cents per kilogram is 15 per cent. of the official value of the goods. Whatever percentage follows the amount of duty on the unit indicated in the table, then the duty is that per cent. of the official value of the goods. As storage on all goods entering the custom-houses of Brazil must be paid for at least one month, if the goods do not remain one hour, it is a matter of interest to the exporter to know something of storage rates. Now, under the tariff regulations, there are eleven different razãos, ranging from 4 per cent. to 60 per cent., but as I only have to deal with two in this report, will endeavor to show the full force of the regulations on storage, or *armazenagen*, which is required to be calculated separately for each month. Under a razão of 12 per cent. the storage for each month

not exceeding two months will be 4.16 per cent. of the duty charged; for each month not exceeding four months, 8.32 per cent.; for each month not exceeding six months, 12.48 per cent.; and for each month exceeding six months, 16.64 per cent. of the duty; so under a duty of 20 cents per kilogram the storage would in six months amount to 99.84 per cent. of the duty. On articles paying a duty of 20 cents per kilogram would be due for storage at the end of six months the sum of 19.96 cents per kilogram. The duty on articles followed by 15 per cent. razão pay for each month not exceeding two, 3.33 per cent. of the duty; for each month not exceeding four, 6.66 per cent.; for each month not exceeding six, 10 per cent., and for each month over six, 13.33 per cent.

By calculation it will be found that the storage for each month not to exceed two equals 0.5 per cent. of the official value of the goods; for each month not exceeding four, 1 per cent. of official value; for each month not exceeding six, 1.5 per cent. of official value, and for each month exceeding six, 2 per cent. of official value of the goods. There are some minor expenses connected directly with the act of dispatching goods from the custom-houses, but if regulated by law the regulations are not generally followed, and I am unable to give information on that point.

LEBBEUS G. BENNINGTON,
Consul.

UNITED STATES CONSULATE,
Rio Grande do Sul, Brazil, July 29, 1889.

BRITISH GUIANA.

REPORT BY CONSUL WALTHALL, OF DEMERARA.

A circular from the Department of State, dated May 27, 1889, calls for information relative to cotton textiles imported into this consular district (as well as others), in reply to the following questions:

1. Quantity and kind imported per annum?
2. Weight per yard?
3. How purchased?
4. Place of manufacture and whence imported?
5. Duties charged thereon?

(1) No definite answer can be made to the first query, for the reason that the custom-house records include "linens and cottons" under one caption, without distinction between the two classes of goods, and it would be impracticable to ascertain the proportion of each without a close and minute examination of the original invoices—a task which would require much time and labor, even if the officers in charge of

those papers should be willing to submit them to the prolonged examination that would be necessary.

The "linens and cottons" imported into British Guiana during the year 1888 amounted to 5,108 packages—a package of cotton goods consisting of from 10 to 25 pieces of 40 to 50 yards each. The value of the whole, $609,703.85 Of this total, the United Kingdom furnished 4,861 packages, valued at $592,109.85, and the United States furnished 212 packages, valued at $16,051.28. The remaining 35 packages, valued at $1,542.72, were chiefly from the British West Indies, though partly from other countries and colonies.

(2) The weight per yard, not being an element either in the purchase or sale of the goods, cannot be ascertained.

(3) The goods are purchased by the yard in pieces of 40 to 50 yards each.

(4) The British goods (cottons) are manufactured in Manchester and other places in Lancashire, England, and imported thence. The cotton goods from the United States are generally imported from New York or Baltimore. As far as can be ascertained, they are manufactured chiefly in South Carolina, but partly in Massachusetts.

(5) The duty on all linen and cotton goods is 7 per cent. ad valorem.

W. T. WALTHALL,
Consul.

UNITED STATES CONSULATE,
Demerara, August 26, 1889.

DUTCH GUIANA.

REPORT BY CONSUL BROWNE, OF PARAMARIBO.

I am unable to state the quantity of cotton textiles imported in this colony per annum, as no separate account of such is kept at the custom-house office in this city.

The different kinds imported are, as far as I could learn, known under the names: Long-cloth, croyden, shirting, unbleached cotton, twilight-cotton, and madapolanas.

I could not succeed in learning the weight per yard, as of the above-named kinds different qualities are imported, and the merchants are not inclined to give such minute information.

The cotton textiles used in this colony are shipped at the ports of Glasgow, London, and Amsterdam, and are manufactured in Manchester and Liverpool.

The duties charged on cotton textiles are: 10 per cent. of the amount of first cost-price (packing, insurance, commission, etc., not included)

plus 20 per cent.; for instance, first cost-price $2 + 20 per cent. = $2.40; 10 per cent. duties = 24 cents.

The population of this colony amounts to 57,000, of which nine-tenths wear cotton clothes.

THOMAS BROWNE,
Consul.

UNITED STATES CONSULATE,
Paramaribo, July 24, 1889.

CHILI.*

IQUIQUE.

REPORT BY CONSUL MERRIAM.

Immediately on receipt of the circular of May 27, 1889, concerning cotton textiles, I at once took steps to obtain the requisite data at the custom-house. I was treated very courteously and referred to the chief of the section on statistics, who offered me his hearty co-operation and promised to give me the information required as soon as the pressure of official business should permit. After waiting a proper time I reminded him of the subject, and on that occasion and several subsequent ones I was put off with plausible excuses, proffered with much politeness and apparent regret for his non-compliance with his agreement.

On the last occasion referred to he expressed his regret that through inadvertence the résumé of statistics of importations had all been sent to Santiago, and that no copies had been preserved on file at the custom-house. I thanked him for his promise to have his subordinates go over the work again and extract the data required from the original manifests. The time named by him for the completion and delivery of the work has already expired more than fifteen days ago and I have given up all expectation of obtaining the information necessary to enable me to comply with the instructions of the circular.

J. W. MERRIAM,
Consul.

UNITED STATES CONSULATE,
Iquique, Chili, November 6, 1889.

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* See foot note on next page.

PERU.*

CALLAO.

REPORT BY CONSUL BRENT.

In reply to the Department's circular of the 27th May last, regarding cotton textiles, I beg to report the following:

Imports per annum $67,815 of all kinds, principally fine.

Weight per yard from 2 to 3 ounces.

Purchased in Germany for cash. Places of manufacture, England and Germany; very little from the United States.

Duties, 50 per cent. ad valorem.

H. M. BRENT,
Consul.

UNITED STATES CONSULATE,
Callao, July 12, 1889.

REPUBLIC OF COLOMBIA.

BARRANQUILLA.

REPORT BY VICE-CONSUL WHELPLEY.

On complying with the request of the Department circular of May 27, in regard to the importation of cotton textiles, I found it necessary to compile the accompanying tabular forms from the custom-house records 1888.

Table No. 1 gives names of the ports of shipment and monthly receipts of cotton fabrics in kilograms 2,990,557.

Table No. 2 gives the tariff classification, with the exception of classes 4, 11, and 15, there being but a small item in the two former and none

* NOTE BY THE DEPARTMENT.—The export of cottons from the United Kingdom to Chili and Peru during the year 1888 were as follows:

Description.	Chili.		Peru.	
	Yards.	Value.	Yards.	Value.
Piece goods, unbleached	16,542,600	$840,866	8,597,900	$387,782
Piece goods, bleached	20,477,400	1,066,294	11,880,200	615,276
Piece goods, printed and dyed	24,913,500	1,468,206	20,155,800	1,048,492
All other		629,826		259,038
Total		4,005,192		2,310,588

in the latter. These omissions, principally mining fuse (No. 4), will account for the difference of 397 kilograms between the tables Nos. 1 and 2. The limited space devoted to this report must exclude the mention of all and every article in the respective classes. The duty paid per kilogram on gross weight of packages is the national tariff; the additional 25 per cent. is the provincial.

Table No. 3 comprises the data furnished by the principal importers of white goods and prints. Without making a full and complete list of all the fancy names in use, I have endeavored to present an average variety in grade and quality. The names or brands are placed upon the goods at the option of the purchaser when ordering, or stencil plates are furnished by desire of the purchaser importing them. The same class that one house may be selling as "Rosa Blanca" or "Colombiana," may be "Elephante" or "La Lola" with another.

In prints, purple tints prevail, 30 yards to the piece the general rule.

The retail trader buys by the piece, but sells by the "varra;" the "varra" varies according to the distance from the coast towns.

In remote, sparsely settled districts it often shrinks to 28 inches, but 30 and 32 inches are the ordinary retail measurements.

S. M. WHELPLEY,
Vice-Consul.

UNITED STATES CONSULATE,
Barranquilla, August 7, 1888.

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(1) *Cotton fabrics imported in* 1888.

[Record of Barranquilla custom-house.]

Whence imported.		Whence imported.		Whence imported.	
	Kilograms.		*Kilograms.*		*Kilograms.*
Antwerp	1,539	Hamburg	140,106	Marseilles	2,943
Belfast	595	Havre	11,339	New York	39,277
Bordeaux	590	Havana	727	Paris	54,573
Bremen	6,374	Liverpool	599,148	Southampton	91,701
Barcelona	218	London	138,477	San Nazaire	16,549
Curacoa	15,943	Malaga	163		
Cadiz	143	Manchester	1,866,306	Total	2,990,557
Colon	3,346				

(2) *Cotton fabrics imported at Barranquilla in* 1888.

[Classification by tariff.]

Whence imported.	Candle wick, fifth class, 10 cents.	Lamp wick, sixth class, 20 cents.	Thread, eighth class, 40 cents.	White cottons, ninth class. 50 cents.	Colored cotton prints, tenth class, 60 cents.
	Kilograms.	*Kilograms*	*Kilograms.*	*Kilograms.*	*Kilograms.*
Antwerp			242		
Belfast				300	295
Bordeaux					337
Bremen			2,516	1,000	1,274
Barcelona					
Curaçoa				7,889	7,000
Cadiz					143
Colon				1,750	1,000
Hamburg		1,373	6,280	50,000	51,881
Havre			431	4,000	2,534
Havana					113
Liverpool	291	724	14,888	270,566	284,506
London	739	357	904	100,000	31,964
Malaga					163
Manchester	846	1,170	36,410	974,412	800,427
Marseilles		231	78		2,123
New York	295	355	220	500	231
Paris		995	1,733	12,940	18,793
Southampton			3,573	46,000	40,030
San Nazaire		158	938	1,160	4,100
Total	2,171	5,363	68,213	1,470,457	1,246,914

Whence imported.	Handkerchiefs, shawls, ponchos, twelfth class, 80 cents.	Hosiery, corsets, ready-made clothing, thirteenth class, 90 cents.	Braid and twist, batting, etc., fourteenth class, $1.	Total.
	Kilograms.	*Kilograms.*	*Kilograms.*	
Antwerp		1,297		1,539
Belfast				595
Bordeaux	178	75		590
Bremen	870	714		6,374
Barcelona		218		218
Curaçoa	505	549		15,943
Cadiz				143
Colon		596		3,346
Hamburg	13,826	16,662	84	140,106
Havre	362	4,012		11,339
Havana	614			727
Liverpool	15,307	12,926		509,148
London	3,445	1,068		138,477
Malaga				163
Manchester	38,056	15,545		1,866,866
Marseilles	146	365		2,943
New York	1,454	36,222		39,277
Paris	1,538	18,029	78	54,106
Southampton	1,451	657		91,711
San Nazaire	3,064	7,129		16,549
Total	80,816	116,064	162	2,990,160

Total duties paid.

Fifth class	*$542.75	Twelfth class	80,816.00
Sixth class	1,340.77	Thirteenth class	143,322.00
Eighth class	34,104.80	Fourteenth class	102.00
Ninth class	919,035.65		
Tenth class	935,185.50	Aggregate	2,114,809.41

* The Colombian dollar (pesos) = 68 cents American.

(3) *White and colored cottons imported at Barranquilla.*

[Prices given are the prices per piece at Manchester. Duties payable by kilogram on gross weight of bale, 25 per cent. Provincial duty being added to the national tariff rate.]

Local name.	From.	Weight of bale.	Pieces in bale.	Yards in piece.	Width.	Weight of piece.		Prices.	
WHITE.*		*Kilo-grams.*			*Inches.*	*Lbs.*	*oz.*	*S.*	*D.*
Rosa Blanca	Manchester	180	100	20	31	4	0	4	1
El Condor	do	190	100	20	35	4	4	4	4
La Mariposa	do	165	100	20	31	3	10	3	1½
La Perla	do	173	100	20	35	4	0	4	1
La Diana	do	93	100	20	21	2	2	1	10
La Estupenda	do	206	100	20	40	4	8	4	6½
Bogotana	do	80	100	20	22–23	2	0	2	
Rosa Blanca	do	140	100	20	30	3	8	3	
Rosa Limina	do	123	100	20	23	3	4	2	6½
Colombiana	do	200	100	20	33	4	8	4	6
Reina Victoria	do	144	100	20	27–28	3	0	3	1
Savage Mills (duck)	United States	264	24	50	29	8	0	.....	
COLORED.†									
Bengalas	Manchester	70	60	30	22–23	5	8	3	4
Zarazas Oscuros	do	81	60	30	22–23	5	4	4	10
Holancillos	do	58	100	30	23	4	2	3	5
Holancillos Morados	do	96	88	30	23	5	12	5	6
Zarazas Fantasia	do	72	66	30	22–23	5	1	4	3
Zarazas de Color	do	73	64	30	24	5	4	4	7
Do	do	69	50	30	22–23	5	0	5	6

* Duty, 50 cents per kilogram; ninth class; purchased for cash.
† Duty, 60 cents per kilogram; tenth class; purchased for cash.

CARTHAGENA.

REPORT BY CONSUL MACMASTER.

Over 550 tons (554,433 kilograms) of cotton textiles were imported during the fiscal year 1889, of which a little over 1 ton (1,258 kilograms) came from the United States.

It is within my personal knowledge that American cotton goods are preferred by the consumers of Colombia, but the refusal of American manufacturers to cut their "prints" in pieces 30 yards long, renders their sale impossible in these markets.

As all duties in Colombia are charged on the gross weight of the package, goods should be packed in the lightest way consistent with their preservation during transport. Cotton textiles generally come in iron-banded bales, with a layer of water-proof cloth (or paper) under the outer sacking. When destined for the interior, the bales should strictly conform in weight and size to the directions sent with the order. Table A gives number of pieces a bale for this port should contain, yardage, etc.

"Zarazas" (ordinary calicoes) must be 30 yards long and seven-eighths wide, as the bulk of these goods is used by the poorer people, who make three dresses from each piece of this length and width.

Where lengths or widths are given in table, goods must conform thereto, if manufacturers expect to sell in these markets.

I transmit (in a separate envelope) twenty-seven samples of "prints" and a sample of white goods; prices are marked on these samples, which also show the quality, width, and designs in demand.

The usual credit given in England is six months from date of invoice, in special cases, nine months. A discount of 1½ per cent. is allowed on prices quoted herein, and a further discount of 2½ per cent. for cash.

No data concerning net weight per yard are kept. I therefore weighed several pieces, and place the weight of such pieces in the table. Considerable weight is added by filling the goods with foreign substances; the weights would be less after washing the goods.

Judging from my experience, during a residence of nearly twenty-two years. American prints would soon control the South American markets, if the manufacturers would cut their pieces to the lengths required, and pack their goods properly. American shirtings and sheetings are much preferred, but no trade can be built up until the manufacturers make their pieces of the lengths in demand. 8–8, 10–8, and 12–8 wide domestics are especially liked.

W. B. MACMASTER,
Consul.

UNITED STATES CONSULATE,
Carthagena, August 1, 1889.

Statements showing the imports of cotton goods at Carthagena for the fiscal year 1889.

A. DESCRIPTION.

Articles.	Pieces in each bale.	Contents of each piece.	Weight per yard.	Price.
		Yards.	*Ounces.*	
Bogotanas (white shirting)	100	20	4	2 to 6 shillings.
Crehuelas (Cregüelas)	50	30	2	2½ to 5 pence.
Domestic (domestic)	100	18	3	2 to 5 shillings.
Dril (drill)	24	30	4	4 to 8 pence.
Fulas (blue shirting)	40	20	2	2 to 4 shillings.
Liencellos (domestic shirting)	100	18	4	2 to 5 shillings.
Listados (checks)	50	21	2	5 to 7 marks.
Muselinas (muslins)	200	10	2	5 to 6 shillings.
Olancellos (prints)	60	30	1½	4 to 5 shillings.
Zarazas (prints)	50	30	1½	5 to 7 shillings.
		Meters.		
Taladello (tape)	200	100	.....	3 francs.
Camisas (shirts)	25	*Dozens.*	.....	30 to 40 francs.
Camisetas (undershirts)	40	do	.....	25 shillings.
Calsoncellos (drawers)	30	do	.....	14 francs.
Medias (stockings)	100	do	.....	2 to 12 shillings.
Pannelos (handkerchiefs)	200	do	.....	1 to 30 shillings 6 pence.
Pañolones (shawls)	100	do	.....	2 to 5 shillings.
Ruanas (ponchos)	50	do	.....	1 to to 2 shillings.
Toallas (towels)	50	do	.....	15 to 40 francs.
Trencellas (braid)	200	do	.....	3 francs.

B. WHENCE IMPORTED.*

Articles.	Amberes.	Belfast.	Bradford.	Bremen.	Dundee.	Glasgow.	Hamburg.	London.
White shirting	3,147				37,530			
Cregüetas								43
Domestic								
Drill	3,342	205					7,953	
Blue shirting								
Domestic shirting	11							
Checks								9,162
Muslins						290	737	
Prints	56							
Shirts	697					1,436		10,835
Undershirts	83						1,620	
Drawers			16	16			421	
Tape								
Stockings								
Handkerchiefs			477	326		983	676	
Shawls	224						3,112	605
Ponchos							355	
Towels								
Braid								
Prints								
Dresses								
Totals	7,560	205	3,434	4,731	37,530	2,709	14,874	20,645

C. WHERE MANUFACTURED.*

Articles.	Liverpool.	Manchester.	Milan.	New York.	Paisely.	Paris.	Totals.	Duty in kilograms.
White shirting		217,949					258,626	$0.65
Cregüetas		7,894					8,466	.50
Domestic	134	39,736					39,870	.50
Drill		1,725	133	352			13,710	.75
Blue shirting		1,242					1,242	.75
Domestic shirting	161	777					949	.62½
Checks		1,748					18,240	.75
Muslins		851					1,878	1.10
Prints		16,396					17.147	.75
Shirts		144,501					157,469	.75
Undershirts		628		73			2,404	1.10
Drawers		2,919				1,690	5,062	1.50
Tape		194				220	414	.90
Stockings		110					110	1.10
Handkerchiefs		3,231			156	786	6,635	1.00
Shawls	1,885	8,039					13,865	.75
Ponchos		3,172				2,488	6,015	1.00
Towels		593					593	1.00
Braid		406					406	1.00
Prints		90					90	1.00
Dresses		297		304		614	1,242	1.00
Totals	2,180	452,498	133	1,258	156	6,520	554,433	

*There are some omissions in the details in tables B and C, but the totals are correct.

PANAMA.

REPORT BY CONSUL-GENERAL ADAMSON.

My report upon cotton textiles imported into this district, which is called for in circular instruction of May 27, 1889, has been delayed in the hope that some information of possible value might be obtained, Thus far, however, my earnest efforts have failed to procure any important information.

IMPORTS.

The local government does not keep records to show the quantity, kind, or value of the textile fabrics or other goods imported here, this being a free port. The merchants who might be expected to be able to estimate the value of such imports do not show any willingness to mention an estimate. This may be explained thus: During the flourishing times of the canal enterprise, the imports were large, probably much larger than the Government officials supposed. The commercial tax was enormously high, and would, perhaps, have been increased had it been known how large the importing business really was. The merchants have, therefore, always been reticent as to the amount of their imports.

I think it probable that the value of the cotton textiles imported here from all countries, during 1888, approached nearly $1,000,000, and I doubt its amounting to one-fifth of that sum in 1889.

In fact, there is such a stagnation in business here, owing to the failure of the Canal Company, and such an excess of supply over the demand, that imports must almost entirely cease for some time.

KINDS IMPORTED.

The kinds of cotton textiles imported here are principally bleached and unbleached shirtings and sheetings, printed calicoes, and a moderate quantity of colored drillings, denims, and various goods for men's wear, and that light class of goods for women's use which is known to the dry-goods trade in the United States as "white goods," and which embraces cambric, muslins, lawns, etc. The bulk of the cotton textiles imported consists of bleached and unbleached shirtings and sheetings and fancy prints.

As to the weight per yard, it would be no guide to American manufacturers to state weights, for the goods intended for the local trade are chiefly of inferior cloth, heavily weighted with starch, clay, and other substances used for that purpose, as the trade may demand. All the cotton goods imported for local consumption are weighted with foreign substances, because it gives them a seeming body, and as there are no customs duties on goods brought to this Isthmus the cost is not increased to the dealer. But Panama sells goods to the ports of the Department of Cauca, which embraces the whole west coast of Colombia

south of the department of Panama, and in those ports duties are collected and are charged on the weight. It follows as a matter of course that the Panama merchant orders the goods for his trade with Cauca to be made of light weight, and a light starching gives the requisite finish without the weight given by other processes of loading.

I have examined prints weighing 2 ounces per yard and others of similar cloth weighing 1½ ounces to the yard, so that stating the weight gives no indication of the quality. The buyers here, as in the greater part of Spanish America, are not judges of quality, and their past experience with poor goods does not teach them the greater cheapness of a good article even at a higher nominal price.

HOW PURCHASED.

Cotton goods are generally purchased on a credit of six months, for which a commission is paid to the Manchester agent of 3 per cent., and interest of 5 per cent. per annum on account current not paid at maturity.

WHERE MANUFACTURED.

The greater part of the cotton goods sold in Panama are imported from England, being manufactured at Manchester.

A fair trade was growing up in American cotton fabrics, but advancing prices there, higher rate of exchange here, and other causes hereinbefore mentioned have nearly closed this market against American goods.

DUTIES.

There are no import duties levied at the ports of this isthmus, and as to the duties in other ports of the Republic, the consuls at the duty ports will report.

HOW TO INCREASE AMERICAN TRADE.

The buyers are also very conservative about changing styles of goods and ignorant of the laws of trade, consequently they adhere for a long time to accustomed articles or styles and resist advance in price. When, therefore, cotton rises in price or the currency depreciates in exchange value, the dealer can not put up his prices, but in sending a fresh order he directs his Manchester commission merchant to send the same pattern put up in the old way but with one or two threads less in the square inch or a trifle less in width, and consequently at a rate that enables him to appear to sell the same goods at the old price.

Importers here say that American manufacturers will not do these things; that they will not cut the prices to the lengths they may demand, and that they will not pack as the trade of various sections may require.

It may not be out of place here to remark that local dealers who are good judges freely admit the superiority of American cotton goods and even the greater cheapness of certain kinds when quality is considered. For instance, two of the most prominent dealers told me they had sent samples of the best pink and purple Merrimac prints to Manchester, England, and that they could not have them duplicated there at the American price.

But this market does not require many goods of such superior quality, and in the inferior grades Manchester can undersell the United States. This may partly be owing to the fact that lower grades of cotton are used there and partly to the other fact that American manufacturers are not such adepts in the art of "weighting" goods.

If our manufacturers seriously wish to build up trade with Spanish America, they should come in person and see exactly what these countries demand. The writer of this was bred to the dry-goods business, and can assure his countrymen that they can learn very many useful points by personal observation which they would fail to obtain even though they should read a thousand pages of consular reports on the subject of cotton goods, and those things are what they should know in order to compete for foreign business.

THOMAS ADAMSON,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Panama, July 13, 1889.

VENEZUELA.

LA GUAYRA.

REPORT BY CONSUL BIRD.

KIND IMPORTED.

Owing to the fact that no digested records of imports into Venezuela are obtainable, it is quite impracticable to approximately state the quantity of goods imported. Even though a customs officer should be employed to collate the statistics, it would be impossible to separate the imports of cotton goods from linen and woolen fabrics, and hence any figures he might offer would be unsatisfactory. All the staple cotton goods in fair quantities are imported into Venezuela.

WEIGHT.

The weight of all classes of imported cotton goods is so variable according to kind and quantity that it is deemed unnecessary to furnish

any figures; all kinds and qualities, from the lightest to the heaviest, are imported.

HOW PURCHASED.

Goods are purchased by order from samples on six months' credit, with interest added.

PLACE OF MANUFACTURE.

The great bulk of staple cotton goods imported here is manufactured in England and shipped from Liverpool and Southampton. Many of the finer fabrics are made in France and are imported from Havre and St. Nazaire. The cheaper light-weight staple goods come from Germany through the port of Hamburg. About all the ducks, drills, denims, and first-class heavy-weight white goods come from the United States and all are imported from New York. The English and French prints are much superior to those of the United States in delicacy and variety of figure and color, and hence those countries import quite all of that class of goods.

DUTIES.

Duties are levied on the gross weight of packages, and an additional tax of 12½ per cent. on the amount of duty collected is levied for internal revenue. These duties vary according to the quality of goods, as follows:

Canvas, duck, twine, furniture cloths and sails pay $6.63 per 100 pounds.

Brown cottons, unbleached osnaburgs, and domestic and regatta stripes pay $10.06 per 100 pounds.

Unbleached drilling, ginghams, bleached shirting, sheeting, and hollands pay $22.12 per 100 pounds.

Knit underwear, socks, and stockings, bombazine, table-covers, bedspreads, damask, fustians, table-cloths, nainsook, towels, doylies, handkerchiefs, percales, piqués, poplins, and calicoes, pay $44.23 per 100 pounds.

Shirts, zephyr, gauze, curtains, corsets, shawls, gloves, grenadines, lawns, garters, insertions, laces, fringes, velveteen, muslins, organdies, and tarletans pay $88.46 per 100 pounds.

Ready-made clothing of all kinds pays $176.92 per 100 pounds.

WINFIELD S. BIRD,
Consul.

UNITED STATES CONSULATE,
La Guayra, June 24, 1889.

PUERTO CABELLO.

REPORT BY CONSUL DE BLANC.

QUANTITY AND KIND IMPORTED PER ANNUM.

There are no official data concerning the quantity and kinds of cotton goods imported into Venezuela.

In the statistics which are published yearly by the minister of finance at Caracas the total amount of duties collected on imports at each custom-house of the Republic is given, but no details as to the kinds of goods imported or their quantity are furnished.

The last report of the minister of finance for the fiscal year ended June 30, 1889, states that the total duties collected at the port of Puerto Cabello on imports during that year amounted to 11,844,721.46 bolivares ($2,277,831.04 American gold), but it gives no information with respect to the value or kinds of goods upon which these duties were levied.

If it be true, as the principal merchants at this port have assured me, that the duties on imported merchandise in Venezuela average 54 per cent. of the cost price, we may calculate the total value of the imports at Puerto Cabello for the year above stated at about $4,218,205.62 (American gold), but there is still no means of ascertaining the amount of each kind of goods composing this aggregate.

In the absence of official statistics with regard to the quantity and kinds of cotton goods imported into this consular district, I have had recourse to private sources; and, as the importing business in that class of goods at this port is almost exclusively in the hands of five leading houses, who have very courteously given me all the information I asked of them, I am enabled to state approximately the quantity and accurately the kinds imported.

The total quantity of cotton textiles imported into this consular district yearly is estimated at $2,500,000 (American gold), distributed as follows: From Great Britain, $1,200,000; Germany, $600,000; France, $400,000; United States, $300,000.

The following list shows the kinds of goods imported and the class of the tariff to which they belong:

List of cotton goods imported into this district.

Articles.	Class.	Articles.	Class.
Undershirts, white, brown, colored	6	Victoria lawn, white	7
Listados, striped and checked	5	White shirtings	5
Stockings and socks, white, brown, colored	6	Muslins, white, colored	7
Shirts, white, colored	7	Duck, gray	4
Regattas, striped	5	Towels	6
Collars, white, colored	8	Nets	7
Cuffs, white, colored	8	Dowlas, white	5
Gray sheetings	5	Prints, fancy	6
White drills	5	Blankets, white, colored	5
Printed drills	5	Dimity, white and colored	6
Printed duck	5	Umbrellas	6
Laces, white, colored	7	Curtain-nets, white, colored	7

The two articles most largely imported into this consular district are prints (Zarazas, duty sixth class) and white shirtings (Madapollam, duty fifth class).

Prints, 26 to 30 inches wide, are imported almost exclusively from England (Manchester) at a price which varies from 1¾ to 4*d.* (3½ to 8 cents) per yard. The most salable are those which do not cost over 2½ to 3*d.* (5 to 6 cents). Pink, and especially "purple pad," are the favorite colors, although "fancy styles" are likewise largely sold.

Some houses here have tried to introduce American prints, but the experiment has not proved successful, either because they are not of the width to which the people are accustomed, having 24 to 25 inches instead of 26 to 30, as the English prints, or because, considering this shorter width, they are dearer. Besides, the designs or patterns are too sober for the tastes of the people, who are accustomed to the bright colors and great variety of styles of the English and French prints.

White shirtings.—This article is mainly, almost exclusively, imported from England. The kinds which sell most in this port and the adjacent country, are: Madapollams, 31 to 37 inches, 1⅞ to 2¾*d.* per yard; Savajes 28 to 32 inches, 2 to 2½*d.* per yard.

Domestics and drills.—These goods are imported largely from the United States, and some also from England; but the preference is given to the United States because, as one of the largest importers said to me, "people are confident of getting always the same honest quality." The following kinds are those which are chiefly imported:

Gray or brown sheetings, gray or brown drills, printed cotton duck, printed cotton drills, duty fifth class; gray duck, 44 inches, Nos. 5 and 6, Stark mills gray duck, 28 to 30, duty fourth class; blue stripes, 27 inches, at 4½ to 6 cents per yard, duty fifth class.

Of the above-mentioned gray or brown sheetings those which are chiefly imported into this district are: Massachusetts C, 27 to 28 inches, at 4 cents; P, 26 to 27 inches, at 3¾ cents; J, 27 to 28 inches, at 4¾ cents.

Of the gray or brown drills, Massachusetts D N, 27 to 28 inches, at 6 cents; Appleton, 29 to 30 inches, at 6½ cents.

And of the printed ducks and drills, Bedford A, 24 to 25 inches, at 6¼ cents; thistle duck A, 27 to 28 inches, at 12½ cents; drills B F D, 25 to 26 inches, at 6¼ cents; duck B B, 26 to 27 inches, at 11½ cents.

Blue stripes or regattas are also imported from England, and to a greater extent than from the United States.

Cotton blankets (duty fifth class) white, colored, and striped, 52 by 72 inches and 54 by 75 inches, are also imported here from the United States at prices varying from 65 to 85 cents per blanket; but a larger importation of different qualities and descriptions is made from England and Germany.

Cotton colored handkerchiefs, duty sixth class, of varied descriptions are largely imported from Great Britain, principally from Glasgow, at

7 pence to 4 shillings per dozen, and from Germany, (called "Madras," and "Pignas") at 4 to 5 marks per dozen.

Cotton stockings and socks, duty sixth class, are brought largely from England and from Germany. Those made of fil d'Ecosse thread pay a higher duty, viz, seventh class.

Sewing thread, duty fifth class, is an article considerably imported into this district (it comes almost exclusively from Glasgow), viz, white sewings on reels 6-cord at 200 yards. No. 30, 40, 50, 60, at 10*s.* 6*d.* No. 8, at 11*s.* 2*d.*

White cotton balls, No. 50 to 150, at 11¾*d.* No. 30 to 120, at 10½*d.*

Cotton undershirts, white and striped, duty sixth class, are imported from England, at 6 to 14 shillings per dozen. Germany, at 8 to 15 marks per dozen. Spain at 7½ to 14 pesetas per dozen.

The middling qualities are those which are in demand; colored and striped do not sell as well.

WEIGHT PER YARD.

All inquiries with respect to the weight per yard of the different cotton textiles imported into this district have failed to elicit a satisfactory reply.

The commerce of Puerto Cabello takes no special notice of the weight except as it affects the amount of the duties to be paid. In that respect all the firms I have consulted agree that American goods generally weigh more than European goods. "The prints are too heavy and too good for this market;" "On all white goods the United States pay higher duty than English goods," are the answers which I have obtained on all sides.

One of the largest importers of cotton goods estimates the duty on English prints at 40 per cent.; on American, at 60 to 70 per cent.; on drills, the duty on American is 40 per cent.; on English, not quite 34 per cent.

The same informant tells me that samples of American white goods have been sent to England, where they are made lighter to suit this market.

HOW PURCHASED.

Purchases are made in England, France, and Germany on terms of credit ranging from three up to nine months; but the most usual is six months, counting from the date of the invoice. These credits bear interest at the rate of 5 per cent. per annum.

The usual commission to agents for purchasing is 2½ per cent., and the buyer gets all discounts allowed to agents by the manufacturers.

These discounts, on cotton textiles, are: In England, 1½ to 5 per cent.; in France, 2½ to 6 per cent.; in Germany, 2 to 6 per cent.

DUTIES CHARGED THEREON.

Duties in Venezuela are entirely specific, and are levied on the gross weight of packages.

All foreign merchandise is divided into nine classes, on which duties are collected as follows:

Class.	Duty per kilogram.	Class.	Duty per kilogram.
	Bolivars.		*Bolivars.*
First	Free.	Sixth	2.50
Second	.10	Seventh	5.00
Third	.25	Eighth	10.00
Fourth	.75	Ninth	20.00
Fifth	1.25		

The above duties are collected by the "aduana maritima"; the importer has to pay, besides, 12½ per cent. of the amount thereof to the "aduana terrestre."

The duties are payable in cash; but the importer may obtain six months' credit by furnishing his bond, with two sureties, approved by the administrator of the custom-house. In that case he pays 1 per cent. interest on the amount of his bond for each month of credit.

CONCLUSION.

From the testimony of all the importers with whom I have conversed (none of whom are Americans, but nearly all Germans) two facts may be considered as established:

(1) That American cotton textiles are superior in every respect to the fabrics which are introduced into this consular district from Europe, chiefly from England and Germany.

(2) That the present tariff of Venezuela on gross weight discriminates against American textiles, which, on account of their superior quality, are much heavier than the English and German goods.

Under these circumstances, our manufacturers find themselves under the necessity of choosing between the two following courses:

(1) To change their methods, and make the same class of inferior goods as are imported from Germany and England; or—

(2) Discarding immediate profit, and looking to future and lasting results, persevere in their honorable course in the full confidence that honesty is the best policy and will win in the long run.

CHARLES DE BLANC,
Consul.

UNITED STATES CONSULATE,
Puerto Cabello, August 14, 1889.

WEST INDIES.

BRITISH WEST INDIES.

ANTIGUA.

REPORT BY CONSUL JACKSON.

Upon the matter of cotton textiles imported into the consular district of Antigua I have to report that, owing to the want of statistics at the custom-house, the correct number of yards can not be ascertained.

All imports of cotton goods are placed under the head of "cottons, woolens, and linens," and no separate values are rendered. The whole amount of invoiced value of imports of fabrics, excepting silks, for the year ended December 31, 1888, was $90,408.48; of this amount it is estimated fully 75 per cent. may be credited to imports of cotton fabrics, mostly confined to calicoes, bleached and unbleached cottons.

The value of cotton goods imported from the United States for the above period amounted to $1,248.66 only.

These goods were confined to ducks and denims, and were purchased much cheaper there than they could be purchased for in Manchester, and the trade has been diverted to the United States in consequence.

All cotton goods imported come from Manchester, England, and the United States, and pay a duty upon entry of 6¾ per cent. ad valorem.

Three months' time is generally given from Manchester, or 5 per cent. off for cash, while goods from the United States come through general commission houses which give thirty to sixty days' time.

In order to present a fair and suggestive view of the situation of the trade in cotton goods in Antigua, I submit a list of samples, obtained from one of Antigua's merchants, which I had analyzed by the Government analyst there, and which covers the merchant's importations for the year 1888, and which is estimated to cover one-eighth of the business done in that line in Antigua for that year.

CHESTER E. JACKSON,
Consul.

HOLLEY, N. Y., *September* 18, 1889.

WHITE COTTONS (SHIRTINGS OR BLEACHED).

No. of sample.	Price per yard at manufactory.	Width.	Weight of 1 yard.	Weight of dressing in 1 yard.	Percentage of dressing.	No. of yards imported 1888.
	Cents.	*Inches.*	*Grains.*	*Grains.*		
1	3½	28½	872	163	18.7	54,321
2	4½	33	1,038	77	7.4	29,328
3	4¼	28½	1,260	213	16.9	63,372
4	5½	32	1,453	210	14.5	43,656
5	3	25	771	270	34.9	14,368

PRINTS (CALICOES).

No. of sample.	Price per yard of manufactory.	Width.	Weight of 1 yard.	Weight of dressing in 1 yard.	Percentage of dressing.	No. of yards imported 1888.
	Cents.	*Inches.*	*Grains.*	*Grains.*		
6	5½	29½	1,093	240	22.0	11,389
7	4	29½	1,167	456	39.1	12,689
8	7½	28½	1,439	28	2.0	2,436
8*a*	4⅜	28½	1,203	519	43.2	108,564

BROWN COTTONS (LIKE UNBLEACHED).

9	3½	24½	1,625	640	39.4	54,782
10	5½	30½	2,671	988	37.0	7,876
11	3⅛	23	1,541	772	50.1	48,672
12	4⅜	28	1,958	662	33.8	14,796
13	3	23	1,350	499	37.0	11,628

a Weight of cloth taken after drying at 212° Fah.

FRANCIS WATTS, F. C. S.,
Government Analyst.

GOVERNMENT LABORATORY,
Antigua, West Indies, August 17, 1889.

ANGUILLA.

REPORT BY CONSULAR AGENT REY.

It seems impossible, even after a careful examination, to arrive at a correct estimate of the quantity, expressed in yards, of the cotton goods imported into this island, for the reason that almost every boat and sloop trading to the neighboring islands brings back goods bought by the crew for the use of their friends or family, and when entered their values alone are given. Exact figures being therefore out of the question, we must depend for information on the subject on as close an approximation as may be made in the circumstances.

All cotton fabrics imported here for the year ending 30th June, ultimo, with exception of a small parcel of blue and of white ducks, of the value of $250, from the United States via St. Thomas, were manufactured in Manchester, and imported from London via St. Kitts, and consisted of prints, shirtings, domestics or greys, checks, lawns, lace, and trimmings.

The goods are usually paid for in three months, but the shippers allow very indulgent terms to the buyers who, besides freight and charges, pay an ad valorem duty of 8 per cent. on all importations.

During the year under review—July 1, 1888, to June 30, 1889—there were imported by the regular dealers 62,432 yards of cotton goods, varying in weight between 2½ and 3½ ounces per yard, and in width between 27 and 36 inches, and 4,000 yards of cotton lace and trimming. And, as

the boatmen bring home more than half the goods imported by the dealers, we may safely put at 95,000 to 100,000 yards, the cotton goods brought to this island during the past year.

WAGER REY,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Anguilla, July 10, 1889.

BAHAMAS.

REPORT BY CONSUL M'LAIN, OF NASSAU.

QUANTITY AND KIND IMPORTED.

There are no data obtainable to enable me to state with precision the quantity of cotton textiles imported into this colony per annum. The customs authorities can give me no reliable figures, for the reason that cotton goods are not entered for duty under that name, but are entered indiscriminately with woolens, linens, silks, hardware, boots and shoes, earthenware, and sundry other merchandise, styled "articles paying an ad valorem duty of 20 per centum;" nor are the local merchants to whom I have applied for assistance able to give satisfactory replies. The only information bearing upon this point that I can furnish is to say that after a thorough examination of the subject, including the opinions of well-informed dealers, I believe I can safely state that the total value at wholesale prices of cotton textiles imported into this colony during the past year is about $200,000. As to the kinds of such textiles imported, they may in general terms be specified as follows, viz: bleached and brown cottons, prints, muslins, ducks, denims, cotton flannels, and jeans.

WEIGHT PER YARD.

As merchants here do not order their cottons by weight per yard when ordering from the United States, I can not ascertain the weight of American cottons. The purchaser, as a rule, designates what he wishes to buy by giving the width in inches and the price he is willing to pay. Nearly all American cottons are also known by certain names, perhaps the name of the manufacturer, or of the mills, or by some fancy name, and these are used by the merchants here in ordering. In fact, I have observed from the price lists sent here by our manufacturers that they largely designate their cottons by width and price or name, and seldom, if ever, give weight per yard.

With British manufacturers the custom, at least for colonial purposes, is to give width, weight per piece, and price, though merchants here are not in the habit of mentioning the weight when ordering. The

following table, furnished by merchants here, will show the weight of some of the cottons sent here from England:

Kind.	Width.	Yards in piece.	Weight per piece.
	Inches.		
Printers	26	58	5 pounds 12 ounces to 8 pounds.
Do	32	47	6 pounds to 7 pounds.
Do	34	50	7 pounds 8 ounces to 10 pounds.
Do	36	50	9 pounds 4 ounces to 11 pounds 8 ounces.
Madapollams	32-34	47	6 pounds to 7 pounds.
Long cloths	36	36	7 pounds to 8 pounds.
Do	39	36	8 pounds to 9 pounds.
Shirtings	39	37½	5 pounds 4 ounces to 9 pounds 4 ounces.
Do	45	37½	6 pounds to 10 pounds 8 ounces.
Do	50	37½	9 pounds to 11 pounds.
Jaconets	39	20	1 pound 14 ounces to 2 pounds 14 ounces.
Do	44	20	2 pounds 12 ounces to 3 pounds 4 ounces.
Mulls	39	20	1 pound 1 ounce to 2 pounds.
Do	44	20	2 pounds 1 ounce.

HOW PURCHASED.

The bulk of the cotton goods imported are bought of jobbers and commission houses, or through agents located in the United States and Great Britain. In the United States cash or short credit is expected. In England very much long time credit is given, some large firms keeping an open account with customers and charging small rates of interest on balances after six months.

PLACE OF MANUFACTURE.

The cottons sold here are manufactured mostly in Great Britain and the United States, fully two-thirds being imported from America. A few French and German goods are imported through London houses.

DUTIES.

A uniform duty of 20 per cent. ad valorem is imposed upon all cotton goods imported, without reference to the country whence they may come.

REMARKS.

The trade in cotton goods for a number of years has been slowly drifting from Great Britain to the United States, until now fully two-thirds of all these articles are imported from the latter. The causes of this change are many. Our market is nearer; exchange is cheaper on New York than London; we have steady and reliable steam communication between New York and Nassau, with none direct from England; most of the colonial exports go to the United States; the style and quality of our goods suit the people, and usually our prices are as low as prices are in England.

There are two objections urged by some dealers here against buying their cottons in the United States. First, the fluctuations in prices are

more frequent and are greater in the United States than in England, so that buyers never feel certain that an order filled in January can be duplicated at same prices in April in the United States, whilst they can rely almost to a certainty that there will be no material alteration in England. Secondly, whilst cash or short credit is the rule in the United States, a responsible merchant can, in England, obtain long credit, say six, nine, or twelve months, or even longer by paying a moderate rate of interest, or he may keep an open account running for years. As, however, despite these objections, we have gradually acquired two-thirds of the cotton trade of the Bahamas, I look to see our manufacturers in due time obtain the whole of it.

THOS. J. MCLAIN, JR.,
Consul.

UNITED STATES CONSULATE,
Nassau, N. P., October 4, 1889.

BERMUDA.

REPORT BY CONSUL BECKWITH, OF HAMILTON.

Imports.—The imports during the fiscal year ending June 30, 1888, were as follows: From Great Britain, 103 packages, valued at $7,095.15; from the United States, 85 packages, valued at $2,394.51.

For kinds and weights see inclosed samples, as the weight varies materially.*

The textiles imported are purchased through foreign merchants and dealers.

The countries of manufacture are England (Manchester) and the United States. The goods imported from the United States represent various mills, but are all purchased in New York through wholesale agents or dealers.

The duty is 5 per cent. ad valorem.

HENRY W. BECKWITH,
Consul.

UNITED STATES CONSULATE,
Hamilton, Bermuda, July 25, 1889.

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* The consul inclosed 10 samples, as follows:

Kinds.	Price per yard.	Weight per yard.	Kinds.	Price per yard.	Weight per yard.
Bleached:	*Cents.*	*Ounces.*	Unbleached:		
First sample	8	3½	Seventh sample	9	4¾
Second sample	10	3½	Eighth sample	7	4½
Third sample	12	4¾	Ninth sample	6	4½
Fourth sample	14	4½	Tenth sample	11	5¾
Fifth sample	16	4¾			
Sixth sample	20	4¾			

DOMINICA.

REPORT BY CONSULAR AGENT STEDMAN.

Return of cottons, woolens, and linens imported into the island of Dominica during the year ending 31st December, 1888, showing the value and places from whence imported and duty paid thereon.

Whence imported.	Value.	Whence imported.	Value.
	£ s. d.		£ s. d.
United Kingdom	12,073 19 3	St. Thomas	4 1 4
United States	297 17 7	St. Lucia	45 15 6
France	8 18 5	Trinidad	40 5 4
Barbadoes	511 2 7	Germany	1 0 1
Martinique	6 3 10	Montserrat	4 0
Guadeloupe	3 7 4		
Antigua	780 0 0	Total	13,786 9 11
St. Kitts	13 14 8	Duties charged thereon	1,606 4 6

Cottons, woolens, and linens are kept under one head at the custom-house. It is therefore not possible to obtain a separate value of the cottons imported, or the quantity, kinds, or weight per yard.

WM. STEDMAN,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Dominica, August, 1889.

JAMAICA.

REPORT BY VICE-CONSUL FORWOOD, OF KINGSTON.

I have the honor to report upon the cotton textiles imported into this island, viz:

QUALITY AND KIND IMPORTED.

From United Kingdom	$1,518,209.28
From United States	22,179.18
From foreign states	1,016.74
From British West Indies	452.98
From Germany	588.66
Total	1,542,446.84

All kinds are imported from Osnaburgs to muslins and large quantities of prints.

WEIGHT.

Weight varies from 6½ ounces for Osnaburgs to 2⅔ ounces for muslins. No positive information can be obtained on this head, as the cotton textiles imported here are very numerous and textures variable.

HOW PURCHASED.

Purchased through agents at the above-mentioned countries, and in one or two instances English houses have established branches in this island.

PLACE OF MANUFACTURE.

The goods are manufactured at and imported from the above-mentioned countries.

Duties charged thereon 12½ per cent.

W. PEPLOE FORWOOD,
Vice-Consul.

UNITED STATES CONSULATE,
Kingston, Jamaica, June 18, 1889.

TRINIDAD.

REPORT BY CONSUL SAWYER.

IMPORTS.

The quantity of cotton textiles not being given in any one of the reports of this Government, and to obtain it from the books of the importers here being impracticable, the correct quantity imported can not be given; but, as a knowledge of the approximate amount may be of some value, such quantity is here given by taking the correct total values of all woolens, silks, muslins, and cottons as a base, and deducting the approximate quantity of cotton textiles by analogy.

A leaf from the Trinidad Blue-Book for 1888 shows the following imports of textiles, and this is the only report upon imports of cotton textiles published by the Government:

Imports in 1888.

Articles and whence imported.	Value.	Articles and whence imported.	Value.
Wearing apparel and haberdashery.		Wearing apparel and haberdashery.	
United Kingdom	£243,803	Spain	£6
British West Indies	1,197	Portugal	10
British East Indies	208	Japan	8
British Guiana	2	Dutch West Indies	30
British North America	10	French West Indies	25
United States	4,096	Veneznela	340
France	11,331	United Kingdom	2,789
Germany	2,292	Do	326
Austria	40	British West Indies	17
Holland	14	France	15

Total value of all manufactured texiles imported into Trinidad during the year 1888 amounts to $1,295,476.

The average estimate of ten importing firms as to the proportion of cotton textiles imported into this colony during 1888, to the amount of

all—including silks, muslins, woolens, wearing apparel, and haberdashery—is about five-eighths, or $809,674; number of yards, 11,423,957, being about 7.08 cents per yard. The kinds of cotton textiles imported are printed cottons, long-cloths, ducks and drills, bed-ticks and shirtings, muslins, Victoria-lawns, fancy dress stuffs, corduroy, and velveteens.

WEIGHT.

The average weight of white cotton textiles is found to be $2\frac{8}{9}$ ounces, and the brown cotton textiles $4\frac{1}{4}$ ounces per yard.

HOW PURCHASED.

Cotton textiles are (like many other kinds of goods) purchased by short and also by long accounts. The short account is cash, which means payment in 15 to 30 days.

The long account is for six months or one year, and carries interest at 5 per cent. in England, 6 per cent. in France, 6 per cent. in Germany, and 6 per cent. in the United States.

As a rule the charges for buying are $2\frac{1}{2}$ per cent. in England, France, Germany, and the United States; but there are exceptional cases where it is done for less, according to the amount purchased and other circumstances. English merchants in London often charge their clients 5 per cent., but return them all the discounts, that are generally 2 or $2\frac{1}{2}$ per cent.

When a client covers the indent by remittances the merchant allows him 5 per cent. and buys the goods for him at $2\frac{1}{2}$ per cent.

Some firms of long standing get credit without security, but as a rule the loan must be secured.

Life insurance policies are much used as securities here by the assignment of the policies. A large number of life policies have been effected in Trinidad during the past two years, in the New York Life, New York Equitable, and some English and Canadian companies.

When retailers buy of importers in this colony (either for use here, or in Venezuela or the adjacent islands) it is done at ninety days without charge of interest to the clients, the bank discounting the notes at the lawful interest of the colony—6 per cent.—which of course is against the importers.

There are sometimes other private arrangements made between men of business, but what I have written is the general custom adopted in Trinidad.

PLACE OF MANUFACTURE.

In England these cotton textile manufactured goods are produced in Manchester, and they are imported from Liverpool and London; in France they are manufactured in Rouen, and shipped at Havre; in Germany they are made in Dresden, and imported from Hamburg; and in the United States they are manufactured mostly in Waterbury, Conn.,

and imported from New York. These latter goods are cotton sail-cloth, in which article the Americans supply this market entirely, the goods being held in very high estimation.

DUTIES.

The import duties here are 4 per cent., excepting for a small portion (mentioned above) that are used by the church, the Government, and the troops.

MOSES H. SAWYER,
Consul.

UNITED STATES CONSULATE,
Trinidad, July 20, 1889.

DANISH WEST INDIES.

REPORT BY CONSUL TURNER, OF ST. THOMAS.

The quantity and kind of cotton textiles imported into the Danish West Indies (St. Thomas and Santa Cruz) can not be ascertained from the custom-house statements, as the usual yearly reports show the value only in bulk of each class of goods. The weight per yard, how purchased, and place of manufacture are not given either, but through the courtesy of one of the largest (probably the largest) importers here, I am able to present herewith a statement showing the amount annually imported by said firm during the past two years, giving these particulars; and what is true in this one case is the general rule.

IMPORTS.

The value of all cotton goods imported to the Danish West Indies is as follows for the fiscal year ended March 31, 1889:

Imported into.	Whence exported.						Total value.
	Great Britain.	United States.	France.	Germany.	Italy.	Other countries.	
St. Thomas	$166,408	$8,580	$4,250	$8,639	$140	$179	$188,196
Fredericksted	.....	.....	.....	.....	.....	19,400	19,400
Christiansted	.....	.....	.....	.....	.....	31,197	31,197
Total	166,408	8,580	4,250	8,639	140	50,776	238,793

There is no method of determining the several countries from which the importations to Santa Cruz come, as the custom-house report classifies them as coming from St. Thomas, Denmark, and foreign countries. The amount imported from Denmark is only $175. It is estimated by

the merchants of that island that about one-fifth only of the cotton textiles—about $10,000 in value—imported thither comes from the United States; the total value, as can be ascertained from the above tabulated statement, being $50,597.

HOW PURCHASED.

The purchase is always made through commission merchants.

PLACE OF MANUFACTURE.

The place of manufacture is Manchester, England, where the goods come from Great Britain, and the place of exportation is Liverpool. When from the United States, the place of exportation is New York.

DUTY.

The duty on cotton goods imported to St. Thomas is 2 per cent., and to Santa Cruz 12½ per cent.; in each case, ad valorem.

MORTIMER A. TURNER,
Consul.

UNITED STATES CONSULATE,
St. Thomas, August 1, 1889.

Statement of annual importation of cotton textiles imported to St. Thomas by one firm, showing class of goods, width, quantity, weight per yard, how purchased, and where manufactured.

[Manufactured at Manchester, England. Purchased through commission merchant. Duty, 2 per cent. on value.]

Class of cotton textiles.	Width.	Quantity.	Weight per yard.
	Inches.		*Ounces.*
Shirtings	25	5,500 pieces, 40 to 50 yards each	2¼
Do	31		2⅜
Do	33		3 1/16
Do	34		3⅛
Do	38		4
Gray domestics	25	1,200 pieces, 50 to 60 yards each	4 1/16
Do	28		4 1/16
Gray drilling	24		4⅛
Do	28		5⅛
Gray duck	24		7⅛
Do	28		9⅛
Prints, ⅝	29	11,500 pieces, 26 to 30 yards each	2¾
Do	30–31		2⅞
Prints, ¼	24		2½
Blue cotton checks	23	1,300 pieces, 50 to 60 yards each	2
White cotton checks	26	350 pieces, 30 to 40 yards each	4
Colored cotton checks	26	500 pieces, 30 to 40 yards each	4¼

FRENCH WEST INDIES.

GUADELOUPE.

REPORT BY CONSUL BARTLETT.

On the receipt of circular, I immediately addressed myself to the chief collector of customs of this colony, who graciously sent me all the information it was in his power to give.

His reply and statistical statement I have the honor to transmit herewith to the Department.

I will endeavor to answer the interrogatories above mentioned according to the best information I have obtained from the collector of customs and importers.

There has been imported to the value of 1,062,658 francs worth, during the year 1888. There is imported of all the kinds that are manufactured in France, England, Belgium, and Switzerland, excepting unbleached cotton.

Most every kind has a different weight, impossible to ascertain.

Most all these goods are purchased in France, England, Belgium, and Switzerland, on credit, mostly through merchants in Paris.

The greater part of these goods is manufactured in England and France, and smaller portion in Belgium and Switzerland. Most of these goods are sent to France, where they are admitted in bond and reshipped on board the French transatlantic steamers for this colony. A small quantity only comes direct from England by the English royal mail steamers.

Duties charged thereon are 10 per cent. ad valorem.

CHARLES BARTLETT,
Consul.

UNITED STATES CONSULATE,
Guadeloupe, August 8, 1889.

Mr. Laure to Consul Bartlett.

BASSE-TERRE, *July* 9, 1889.

Mr. CONSUL: In reply to your honored demand of the 2d instant, I beg to point out in the statement hereunto annexed, all concerning the introductions of cotton textiles during the year 1888, such as stated by the commercial balance for the present year.

The customs service do not possess informations more complete than these on the trade of cotton textiles in the colony, but it is a well-known fact that France, England, Belgium, and Switzerland are the markets from which all the products of that kind are imported.

Please accept, Mr. Consul, the assurance of my most distinguished feelings.

L. LAURE,
The Inspector, Chief of Customs Service.

Cotton fabrics imported into Guadeloupe in 1888.

Articles.	From France.		From French warehouses.		Directly from foreign countries.		Total.	
	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.	Quantities.	Values.
	Pkgs.	*Francs.*	*Pkgs.*	*Francs.*	*Pkgs.*	*Francs.*	*Pkgs.*	*Francs.*
Madras handkerchiefs	676	9,698	2,056	23,454	156	1,973	2,888	35,125
Madapollan handkerchiefs	515	5,145	1,603	15,416	62	536	2,180	21,097
Laces	.....	36,580	.....	705	.....	.....	.....	37,285
Hosiery, etc	.....	48,150	.....	14,338	.....	3,004	.....	65,492
Oil-cloth	.....	7,867	.....	1,988	.....	1,418	.....	11,273
Calicoes, cottonades, etc	.....	164,491	.....	774,159	.....	124,008	.....	1,062,658

Basse-Terre, July 9, 1889.

L. LAURE,
Inspector, Chief of the Bureau of Customs.

MARTINIQUE.

REPORT BY CONSUL GARESCHÉ.

In reply to circular of the Department of State, bearing postmark of June 13 and dated May 27, 1889, concerning importation of cotton textiles, I have the honor to inclose herewith translation of a letter from M. Emile Lefebvre, chief of the customs service, in reply to my communication to the administration on the subject.

WILLIAM A. GARESCHÉ,
Consul.

UNITED STATES CONSULATE,
Martinique, July 19, 1889.

M. Emile Lefebvre to Consul Garesché.

FORT-DE-FRANCE, *June* 9, 1889.

MONSIEUR LE CONSUL: In conformity to instructions of the director of the interior, I have the honor to furnish you, at foot hereof, with two points of information which you have asked of the governor under date 24th June (ultimo).

(1) There were imported into the colony, during 1888, 340,325 meters of French cotton manufactured stuffs and 2,160,627 meters of foreign cotton goods; total importation, 2,735,068 yards.

(2) The French manufactured stuffs, in pieces, are submitted (or are subject) to a local or municipal duty as follows:

	Per meter.
Single width ..... francs	0.116
Double width	0.026

Plus 20 per cent. additional on above.

The foreign cotton stuffs pay independently or additionally to the duty above stated a customs duty (*droits de douane*) as follows:

		Per meter.
Single width	francs..	0.05
Double width		0.08

LEFEBVRE.

SAN DOMINGO.

PUERTO PLATA.

REPORT BY CONSUL SIMPSON.

In answer to circular of May 27, 1889, in regard to cotton textiles imported into this district, I have embodied in the accompanying table all the information it is possible to obtain on the subject. It has been difficult to classify the articles under their proper heads, as I am not conversant with the trade names, in English, of some of the articles, nor are any of the merchants; neither is the tariff any guide, as there are a number of different names for the same class of goods.

The weight per yard is never declared or required, as duties are based on width and apparent fineness; each 3 inches, in excess of 24, paying one or more cents per yard additional, according to class.

On goods purchased in Europe, merchants are allowed a credit of six months, and from the United States from cash to two months.

Duties are specific on all classes of cotton textiles.

THOS. SIMPSON,
Consul.

UNITED STATES CONSULATE,
Puerto Plata, September 25, 1889.

Cotton textiles imported into the district of Puerto Plata during year 1888.

Articles.	England.		United States.		Germany.		France.		Total.	
	Yards.	Duties.	Yards.	Duties.	Yds.	Duties	Yds.	Duties.	Yards.	Duties.
Bleached cottons:										
24-inch	54,728	$1,953.75							54,728	$1,953.75
27-inch	78,202	3,190.64	1,879	$76.66					80,081	3,267.30
30-inch	51,642	2,369.96							51,642	2,369.96
33-inch	70,130	3,397.79							70,130	3,397.79
36-inch	4,416	225.21	7,120	363.12					11,536	588.33
72-inch			1,430	116.68					1,430	116.68
Denims	37,423	2,862.85	45,375	3,470.80					82,798	6,333.65
Drillings:										
27-inch	95,877	7,334.59	39,750	2,530.87			5,810	$444.46	141,437	10,309.92
27-inch (unbleached)			32,390	2,477.83					32,390	2,477.83
Ginghams:										
24-inch	36,867	1,316.15							36,867	1,316.15
27-inch	18,115	739.00							18,115	739.00
30-inch	720	33.00							720	33.00
33-inch	24,314	1,239.70	4,010	204.00					28,324	1,443.70
Lawns	119,169	6,077.60							119,169	6,077.60
Muslin:										
24-inch	222,292	10,203.20					4,550	208.84	226,842	10,412.04
27-inch	77,844	3,970.04	4,051	203.60			4,100	205.41	85,995	4,378.45
Oxfords:										
27-inch	38,021	1,692.16							38,021	1,692.16
30-inch	7,756	395.55							7,756	395.55
33-inch	668	37.47							668	37.47
38-inch							2,460	175.64	2,460	175.64
Plaids:										
24-inch	95,431	3,833.58			6,868	$280.21			102,299	4,113.79
27-inch	8,036	368.85							8,036	368.85
30-inch	2,576	131.50			4,400	224.40			6,976	356.90
Prints:										
24-inch	444,417	20,398.74	426,160	19,560.74					870,577	39,959.48
27-inch	107,359	6,022.83	838	47.00					108,197	6,069.83
30-inch	24,181	1,603.20					800	53.00	24,981	1,656.20
38-inch							4,100	376.00	4,100	376.00
Unbleached cottons:										
24-inch	25,962	820.00	15,716	481.00					41,678	1,301.00
27-inch	34,563	1,233.90	105,519	3,767.00					140,082	5,000.90
30-inch	9,243	377.11							9,243	377.11
27-inch (twld.)			14,340	877.60					14,340	877.60
Total	1,689,952	81,828.37	698,578	34,176.30	11,268	504.61	21,820	1,463.35	2,421,618	117,972.63

SPANISH WEST INDIES.

CIENFUEGOS.

REPORT BY CONSUL EHNINGER.

I have spared no efforts in my endeavors to obtain the information asked for in circular of May 27, ultimo, with regard to the importation of cotton textiles into this consular district, but, owing to various causes, the result has been unsatisfactory. As a general rule, statistics are not kept in this colony, and to obtain them in any public or private office would involve a research which none are willing to undertake, nor will they permit an outsider to prosecute such an undertaking (from obvious reasons). The custom-house records, the same as those of importing houses, are incomplete and unreliable.

I have the honor to inclose herewith such few notes as I have been able to procure from the two principal importing dry-goods houses of

this city, Don Gregorio Castello and Don Celistine Cazés, who do four-fifths of the importation of dry goods in this district.

In naming the goods I have used the nomenclature of the country or assimilated as far as possible to our goods. The equivalents of weights and measures are well known to the Department.

HENRY A. EHNINGER,
Consul.

UNITED STATES CONSULATE,
Cienfuegos, August 15, 1889.

Approximate calculation of the amounts of cotton textiles most in demand imported during an average year by Don Gregorio Castello, of Cienfuegos.

Articles.	Pieces.	Contents of piece.	Weight per yard.	No. threads to centimeter.	Price per yard.	Duties per 100 kilograms.	Place of the manufactory.
		Yards.	*Grams.*				
White shirting	4,000	36½	64	14–16	4*s.* to 6*s.* piece	$21.00	Manchester.*
Do	1,500	30	50	10	1½*d.* per yard	15.00	Do.
Striped shirting	2,500	65–70	55	10	2*d.* per yard	26.00	Do.
White sheeting	1,000	30	90	10	4*s.* piece	15.00	Do.
Do	1,250	30	75	16	2⅛*d.* per yard	21.00	Do.
Printed percales (calico)	2,500	55–60	90	13–16	10 cents per yard	3.50	Barcelona.†
Dress goods	3,000	65–70	27	12	1½*d.* per yard	26.00	Manchester.
Do	2,000	65–70	40	14	1½*d.* per yard	31.50	Do.
Drills	4,000	30–35	110		16 cents per yard	4.00	Barcelona.†

* Imported through Liverpool, England. † Imported through Santander, Spain.

Amounting to 1,039,000 yards of cotton textiles most in demand. Duties are paid on weight, 100 kilograms. Terms of purchase, four months' time from date of bill of lading; interest, 6 per cent. per month.

CIENFUEGOS, *August* 10, 1889.

Importation of cotton textiles during an average year by Celestino Cazés & Co., of Cienfuegos.

	Value.
Goods wholly cotton	$115,000 to $120,000
Goods, mixed cotton	145,000 to 150,000
2,350,000 yards	260.000 to 270,000

Weight of the above goods, 281,750 kilograms; average weight per *yard*, 120 grams.

Conditions of purchase, four months' time from date of bill of lading.

Places of manufacture and exportation.

Barcelona	$160,000 to $165,000
Manchester	85,000 to 90,000
Paris	10,000 to 12,000
New York	2,000 to 2,500

Amount of duties charged upon the above, from $5,900 to $6,000. The $270,000 value of imports corresponds to 2,350,000 yards, weighing 281,750 kilograms, which, at $21, mean of duties per 100 kilograms, amounts to from $5,900 to $6,000. Exportation via Liverpool, England, and Santander, Spain.

CIENFUEGOS, July 24, 1889.

SANTIAGO DE CUBA.

REPORT BY CONSUL REIMER.

In making a report on cotton textiles in this consular district I only refer to this port of Santiago de Cuba and the consular agency of Guantanamo. The Manzanillo and Santa Cruz agencies derive all their supplies of cotton goods from Havana.

I inclose a translation of the Spanish customs tariff now in force in this island and comprising the whole section of cotton textiles. I also add to this translation the imports into this port during the current years of 1887 and 1888. These statistics I obtained from the local custom-house, which vouches for their correctness with the view of answering question No. 2 of circular. I attempted to acertain the weight per yard of each lot imported, but found this an absolute impossibility, owing to the fact of so many different weights being imported under one rubric. This is owing to the mode of valuation adopted by the Spanish custom-house. Importations are classed by the number of threads they contain in the space of six millimeters. They are also classed by the weave of the fabric. I have translated the terms "mano y liso" as straight threads; this means an even weave of perpendicular and horizontal threads. The terms "cruzado," which I translate as "crossed," means an irregular weave, the differences of flag being obliterated by our treaty with Spain, which other nations under the most favored nation clause have also claimed and obtained. The tariff is narrowed down to the two columns of "Spanish manufactures" and "foreign manufactures." Notwithstanding the undeniable intention and purport of article 5 of the treaty of January 2, 1884, and the memorandum of agreement of September 21, 1887, to place our manufactures and products exactly on the same footing here in the island of Cuba as Spanish products and manufactures, our imports of cotton textiles are forced to pay under the column of foreign manufactures. This has given, and is giving more and more (*vide* statistics of exports herewith) an impetus to Spanish manufactures, which no doubt will eventually drive English, French, and German goods out of this market. The duties on foreign manufactures are calculated on a basis of 29 per cent. ad valorem, with the additional 20 per cent. for certain classes of goods, bringing the duties up to very nearly 36 per cent. ad valorem. Duties on Spanish manufactures are calculated on the basis of 10 per cent., with the additional 20 per cent., as explained above.

The only cotton textile imported in quantities into this country from the United States is cotton canvas. All numbers from 1 to 12 are imported. The ordinary width is 22 inches, and the selling price here is: No. 1, 45 cents; No. 2, 43 cents; No. 3, 42 cents; No. 4, 40 cents, etc., down to No. 12, with the difference of 2 cents between each number. These quotations are in Spanish gold. The weights it is unnecessary to give; suffice it to say No. 4 weighs 34 kilograms per 100 yards.

To intelligently answer your query No. 3, I send you herewith a list of the cotton textures mostly used here, their average weight, width, and market value here. I also send some samples which might prove of interest.

By the statistics you will see that Spanish and English manufactures have entirely crowded us out of the market. The Spanish manufactures do so owing to the discrimination made in the tariff; the English and French manufactures because, notwithstanding the high ocean freights, they can be put on this market, even on an equal base of import duties, cheaper than our manufactures. This is claimed by importers here. Then again the importers here state that American manufacturers are not willing to accommodate them by selling small lots of different classes and patterns. English manufactures sell as few as ten pieces of a class or pattern. The goods are generally purchased at net prices, from three to four months credit, and interest at the rate of 5 to 6 per cent. per annum, from time of shipment. If the orders pass through a commission house 2½ per cent. is generally charged, if bought direct 2½ per cent. discount is given. It has been extremely difficult for me to translate the technical Spanish terms into the technical English names for them on account of my not being familiar with the details of the trade in cotton textiles, and should further explanations be necessary, I will be happy to furnish them.

OTTO E. REIMER,
Consul.

UNITED STATES CONSULATE,
Santiago de Cuba, July 15, 1889.

Translation of section of cotton textiles in Spanish customs tariff now in force in the Island of Cuba.

[Nos. 379 to 419 included.]

No.	Group.	Base on which duty is calculated.	Spanish manufacture.		Foreign manufacture.	
			Under Spanish flag.	Under foreign flag.	Under Spanish flag.	Under foreign flag.
	FIRST GROUP.					
	Texture, straight threads, plain, raw, white or dyed, as Madapollam, Rouen, blanquin, calico, nankeen, silesia, wrappings of cotton without carding, and other analogous textures:					
379	Up to 10 threads	Per 100 kilograms	$5.650	$11.250	$15.00	$20.00
380	11 to 16 threads	do	7.900	15.750	21.00	28.00
381	17 to 22 threads	Per kilogram	.121	.278	.350	.447
	23 threads up (see third group).					
	SECOND GROUP.					
	Texture, straight threads, stamped, painted, striped, or whose threads were dyed before weaving, such as chintz, percale, figured gros de tour, haraga, chintz striped, and similar textures:					
382	Up to 12 threads	Per 100 kilograms	9.750	19.500	26.00	34.650
383	13 to 16 threads	do	11.800	23.650	31.500	42.00
384	17 to 19 threads	Per kilogram	.174	.401	.505	.645
385	20 to 22 threads	do	.224	.516	.650	.830
	23 threads up (see third group).					

Translation of section of cotton textiles in Spanish customs tariff, etc.—Continued.

No.	Group.	Base on which duty is calculated.	Spanish manufacture.		Foreign manufacture.	
			Under Spanish flag.	Under foreign flag.	Under Spanish flag.	Under foreign flag.
	THIRD GROUP.					
	Textures, light, fine or ordinary, be they dense or light, and all those which contain more than 23 threads, straight or worked on the loom, bleached, white, stamped, or dyed as muslin, jaconet, organdi and cambric, muslin lining:					
386	Up to 8 threads	Per 100 kilograms	$12.00	$28.00	$35.00	$43.00
387	9 to 12 threads	do	20.550	48.00	60.00	73.700
388	13 to 16 threads	do	34.300	80.00	100.00	122.850
389	17 to 22 threads	Per kilogram	.412	.960	1.200	1.475
390	23 to 28 threads	do	.515	1.200	1.500	1.843
391	29 to 34 threads	do	.686	1.600	2.00	2.452
392	35 upwards	do	.857	2.00	2.500	3.072
393	The textures contained in the above group embroidered by hand or on the loom or adorned by appliqué work, pay according to their group with an addition of 20 per cent. on duties.					
394	The same textures, embroidered by hand or on the loom or adorned with silk or wool, the twisted wicks for candles	Ad valorem	10 p. ct.	23 p. ct.	29 p. ct.	37 p. ct.
	FOURTH GROUP.					
	Tulles, plain, flowered, or embroidered, white or colored:					
395	Up to 5 threads	Per kilogram	.345	.793	1.00	1.276
396	6 threads upwards	do	1.035	2.380	3.00	3.828
	FIFTH GROUP.					
	First species.					
397	Laces, common machine worked	Per kilogram	.311	.714	.900	1.149
	Second species.					
398	Laces, of lighter material or not containing linen and the borders and points plain, worked, or embroidered, white or colored	Per kilogram	.690	1.586	2.00	2.552
	Third species.					
399	Netting, in pieces, shawls, large or small; adorned on top and other forms	Per kilogram	.345	.793	1.00	1.276
	SIXTH GROUP.					
	First species.					
400	Textures, quilted, plain, or worked piqué, white or colored	Per kilogram	.345	.793	1.00	1.276
	Second species.					
401	Textures, crossed threads or like serge, white, stamped, or colored, of common kind, as ticking, canvas, or cotton duck, the wicks for lamps, and others of like kind, also cotton hose (for liquids)	Per 100 kilograms	7.500	15.00	20.00	26.650
	Third species.					
402	Textures of superior kind to the preceding, as drills, flowered weaving, cotton damask, such as German cloth and calico and Madapollam of crossed threads	Per 100 kilograms	13.150	26.250	35.00	46.650

Translation of section of cotton textiles in Spanish customs tariff, etc.—Continued.

No.	Group.	Base on which duty is calculated.	Spanish manufacture.		Foreign manufacture.	
			Under Spanish flag.	Under foreign flag.	Under Spanish flag.	Under foreign flag.
	SEVENTH GROUP.					
403	Textures, meshed and stockinnet, in undershirts, drawers, socks, and stockings, gloves, caps, and other forms.....	Per 100 kilograms...	$48.750	$97.500	$130.00	$173.350
	EIGHTH GROUP.					
	Textures, carded, cotton velvet, cotton plush, and carpetings:					
	First species.					
404	Textures, carded, cotton flannel, shawls, blankets, be they raw, bleached, or colored	Per 100 kilograms...	7.500	15.00	20.00	26.650
	Second species.					
405	Textures, velveteened, as corduroy, be they plain or worked	Per kilogram	.207	.476	.600	.766
	Third species.					
406	Textures of plush, Brussels carpets in pieces, shawls, large and small	Per kilogram	.250	.575	.725	.925
	Fourth species.					
407	Textures of plush, cut, or shaggy cloth in pieces, and towels, such as Turkish towels	Per kilogram	.155	.357	.450	.574
	NINTH GROUP.					
	First species.					
408	Ribbons, narrow, white or colored	Per kilogram	.113	.225	.300	.400
	Second species.					
409	Ribbons of other kinds, plain or worked, white or colored, used for hat ribbons and adorning of dress, be they of velvet (cotton), called velveteen	Per kilogram	.345	.793	1.00	1.276
	Third species.					
410	Ribbons of other kinds, such as are used for loops for shoes and reins for horses.	Per kilogram	.132	.263	.350	.476
	TENTH GROUP.					
	First species.					
	Cotton stuffs in pieces or detached, with or without fringes, but without hand work, pay as per preceding group. (Handkerchiefs.)					
	Second species.					
411	Cotton stuff hemmed or with some hand work belong to the above groups and pay an additional 20 per cent. on the duty. (Handkerchiefs.)					
	Third species.					
	Stuffs open-hemmed, or with lace, pay as follows:					
412	Handkerchiefs up to 17 threads.....	Per kilogram	.449	1.031	1.300	1.659
413	18 to 20 threads.....	....do	.655	1.507	1.900	2.424
414	21 to 22 threads.....	....do	.880	2.023	2.550	3.254
415	23 threads upwards	....do	1.311	3.014	3.800	4.849

No.	Group.	Base on which duty is calculated.	Spanish manufacture.		Foreign manufacture.	
			Under Spanish flag.	Under foreign flag.	Under Spanish flag.	Under foreign flag.
	ELEVENTH GROUP.					
416	Ready-made clothing in general pays according to the textures of this section, with an additional 100 per cent. on the duty. The counting of the number of threads in shirts will be made on the bosoms, collars, and cuffs.					
417	Shirts of cotton, with bosom, collar, and cuffs of linen, pay as linen textiles with the additional 50 per cent. on the duty on linen in the same manner as demands the foregoing number (416), just as if they contained no cotton.					
418	Umbrellas and sunshades, of cotton	Per dozen	$0.450	$0.900	$1.200	$1.600
419	Textiles with base of elastic, called cotton elastic	Per kilogram	.300	.600	.800	1.067

NOTE. (1) The number of threads in valuing cotton textiles are counted in the space of six millimeters.
(2) Doubts are decided, should the textiles contain a thread more in the space above mentioned, in favor of the importer.
(3) Percale, scarlet, pays according to the second group.
(4) Also poplin.
(5) It is decided that cotton shawls the texture of which is of crossed threads and of light damask only, marked on one side, pay according to No. 402.
(6) Shawls or blankets bound with tape or ribbon pay according to No. 404, without the 20 per cent. additional.

Imports of cotton textiles from Barcelona, Spain, to Santiago de Cuba during the years 1887 *and* 1888.

Kind of goods.	Weight.	Duties paid in Spanish gold.
	Kilograms.	
Textures, 10 threads	33,934	$1,190.49
Shirts	1,604	*111.72
Up to 16 threads	26,787	1,346.09
Drawers	1,959	†186.78
Up to 22 threads	27	2.13
Dyed, 12 threads	4,415	280.50
Plain, 16 threads	2,240	172.61
Shirts	270	*41.61
Dyed, 19 threads	692½	77.93
24 threads in shirts	64	*43.05
Awning ticking	12,154	550.77
Handwork	50	†2.95
Crossed threads	12,033	1,186.17
The same in trousers	567	†61.09
Meshed and stockinnetted	4,334½	1,488.10
Blankets	20,140	997.15
Counterpanes	103	6.05
Total	121,374	7,745.19

*This lot pays 50 per cent. additional. †This lot pays 20 per cent. additional.

Imports of cotton textiles from the United States to Santiago de Cuba during the years 1887 *and* 1888.

Kind of goods.	Weight.	Duties paid in Spanish gold.
	Kilograms.	
New York:		
Textures, 10 threads	41	$7.31
Light, 8 threads	6	2.48
Canvas	8,543	2,027.56
Philadelphia:		
Textures, 8 threads	16	5.58
Total	8,606	2,042.93

Imports of cotton textiles from Havre, France, to Santiago de Cuba during the years 1887 *and* 1888.

Kind of goods.	Weight.	Duties paid in Spanish gold.
	Kilograms.	
Embroidery, lace:		
22 threads	485	*$303.67
16 threads	370	*166.68
8 threads	19	7.90
Handkerchiefs, hemmed, 22 threads	5½	*9.41
Embroidery, 24 threads	20	*42.75
Textiles, crossed threads	18	7.48
Shawls	17	9.33
Total	934½	547.22

* This lot pays an additional 20 per cent.

Imports of cotton textiles from St. Thomas, West Indies, to Santiago de Cuba during the years 1887 *and* 1888.

Kind of goods.	Weight.	Duties paid in Spanish gold.
	Kilograms.	
Textures, embroidered, 16 threads	181	*$90.64
Textures, light, 22 threads	39	55.59
Textures in drills	498	206.98
Handkerchiefs, crossed threads	328	*163.56
Textures, meshed and stockinnetted	360	555.30
Total	1,406	1,072.07

* This lot pays an additional 20 per cent.

Imports of cotton textiles from Liverpool, England, to Santiago de Cuba during the years 1887 and 1888.

Kind of goods.	Weight.	Duties paid in Spanish gold.
	Kilograms.	
Textures, 10 threads	698	$124.33
White, 10 threads	7,155½	1,274.32
White, 16 threads	6,636	1,681.49
Handkerchiefs	113	*33.81
Embroidery, up to 16 threads	3,315	*1,652.65
Handkerchiefs (hemmed, basted)	104	*51.88
Textures, dyed, 12 threads	2,503	970.94
Textures, dyed, 16 threads	2,999	1,121.75
Handkerchiefs, hemmed, 16 threads	272	†122.09
Light texture	387	159.43
Embroidery, 8 threads	80	*39.90
Texture, 8 threads	103	85.61
Muslin, 8 threads	239	283.80
Confections of cotton	4½	10.68
Textures, 22 threads	5	7.12
Embroideries, 22 threads	170	*324.91
Embroideries, 28 threads	3½	*6.85
Baby frocks, embroidered	377	‡138.03
Cotton drill	21	24.92
Laces, machine stamped	419	447.81
Light	206½	490.86
Netting	754½	895.97
Crossed threads	580	137.74
Superior	182	153.41
Textures, meshed and stockinnetted	597½	916.30
Carded	826	196.23
Textures, velveteen	102	72.96
Plush	55	29.40
Shawls	4,797	1,992.86
Total	33,704	13,348.05

* These pay an additional 20 per cent.
† This lot pays an additional 50 per cent.
‡ This lot pays ad valorem duties.

Imports of cotton textiles from Glasgow, Scotland, to Santiago de Cuba during the years 1887 and 1888.

	Kilograms.	
Textures, white:		
10 threads	30,831	$5,500.70
16 threads	40,583	10,120.52
Embroideries, up to 16 threads	190	*59.25
Handkerchiefs, hemmed, 16 threads	312	†93.37
Embroideries, up to 22 threads	2,390	*1,191.99
Stamped calicoes, 12 threads	8,825	2,465.38
Do	13,249	4,955.93
Hemmed handkerchiefs, 16 threads	417	*187.17
Hemmed handkerchiefs, 22 threads	78	*72.25
Textures, light, 8 threads	443	184.87
Embroidered, 8 threads	369	*184.04
Embroidered, up to 12 threads	448	319.19
Embroidered, up to 22 threads	136	179.54
Embroidered	3	5.35
Tulles, 28 threads	21	†44.83
Textures without "aplicacion"	254	‡89.25
Drill	22	27.37
Plain lace, stamped and machine worked	646	690.40
Light	384½	911.40
Ghents, light, 5 threads	179	212.55
Calico	1,293	300.66
Counterpanes, w., handwork	111	*31.66
Drill	7,838	3,257.26
Handkerchiefs, w., handwork	87½	*43.65
Textures, meshed and stocking netted, drawers, undershirts, stockings	561	865.33
Blankets	2,579½	643.26
Velveteen	279	198.77
Turkish towels	670	358.02
Textures, up to 16 threads	350½	416.21
Total	113,550	33,580.19

* This lot pays additional 20 per cent.
† This lot pays additional 50 per cent.
‡ This lot pays ad valorem.

Résumé of imports of cotton textiles into Santiago de Cuba during the years 1887 *and* 1888.

Where from.	Weight.	Duties paid in Spanish gold.
	Kilograms.	
United States	8,606	$2,042 93
Spain	121,374	7,745.19
France	934½	547.22
St. Thomas	1,406	1,072.07
England	33,704	13,348.05
Glasgow	113,550	33,580.17
Total	279,574½	58,335.63

Explanation accompanying samples of the cotton textiles principally sold in this province of Santiago de Cuba; their weight, purchase, and selling price, and origin.

Number.	Weight.	Per—	Purchase price.	Selling price here per Spanish yard.	Manufactured in—
	Kilograms.				
1	4,300	70 meters	1.12 reales vellon per meter	7½ cents	Spain.
2	6,260	70 meters	1.50 reales vellon per meter	9½ cents	Do.
3	1,900	40 yards	4*s.* 6*d.* per yard	$2½ per 40 yards	England.
4	1,185	40 yards	4*s.* 10*d.* per yard	5 cents yard	Do.
5	2,870	40 yards	5*s.* 10*d.* per yard	$2.75 per 40 yards	Do.
6	2,102	40 yards	8*s.* 4*d.* per yard	$3.75 per 40 yards	Do.
7	2,500	61 yards	1 5/6*d.* per yard	5 cents per yard	Do.
8	1,220	40 yards	3*s.* 8½*d.* per yard	4¾ cents per yard	Do.
9	2,320	40 yards	2 7/6*d.* per yard	9 cents per yard	Do.
10	2,600	68 to 70 yards	2*d.* per yard	7 cents per yard	Do.
11	4,153	50 meters	0.54 francs per meter	18 cents per yard	France.
12	2,150	68 to 70 yards	1 7/8*d.* per yard	4¾ cents per yard	England.
13	8,200	68 meters	1.30 reales vellon per meter	8½ cents per yard	Spain.
14	7,200	40 yards	1.90 reales vellon per meter	13 cents per yard	Do.
15	3,388	40 yards	7*s.* 7*d.* per 40 yards	$3.50 per 40 yards	England.
16	4,300	70 meters	1.30 reales vellon per meter	9 cents per yard	Spain.

Should samples of cotton undershirts, stockings, and drawers be desired they can be obtained at an outlay of about $10. To secure samples of cotton laces and piece goods, blankets, counterpanes, velveteens, etc., a similar outlay would have to be incurred. Suffice it to say, all goods of light texture and low prices are salable here, and owing to enormous difference in weights, it is impossible to give the weights per yard you desire.

CONTINENT OF ASIA.

BRITISH INDIA.

REPORT BY CONSUL-GENERAL BONHAM, OF CALCUTTA.

After considerable unavoidable delay I now have the honor to submit the following report upon the cotton textiles imported into British India, as called for in your circular letter of date the 27th of May last.

The annexed table marked A shows the quantities and kinds of cotton goods imported for the past five years up to March 31, 1888, as well as the values thereof.

WEIGHT PER YARD.

Under this heading I submit the inclosed very full and complete "statement showing piece goods imported into Calcutta each month from 1883 to 1888, inclusive," which was kindly furnished me by George Henderson, esq., of the large mercantile firm of George Henderson & Co., of this city. This statement, I apprehend, contains a lot of information, not only as to the weight, but as to the different kinds of cotton piece goods which are in demand in this market, which will be of special interest to the cotton manufacturers and merchants of the United States.

HOW PURCHASED.

A credit of forty-five days is usually extended to the Calcutta purchaser of cotton piece goods, with a rebate of 1½ per cent. for cash.

The annexed table marked B gives the place of manufacture and whence imported.

DUTIES CHARGED THEREON.

There is no duty in British India, either upon raw or manufactured cotton goods.

COTTON CULTIVATION.

In this connection it would probably be of interest to give a brief summary of cotton cultivation and manufacture in British India.

For the year 1886–'87 (the latest reported) I find that the acreage under cultivation in cotton was 14,532,513, and the outturn therefrom of cleaned cotton was 818,658,848 pounds, or nearly 57 pounds to the acre.

COTTON-MILLS.

There were 97 cotton mills at work in India in 1887–'88, containing 18,840 looms and 2,375,739 spindles. They consumed about 283,000,000 pounds of cotton during the year, and employed a daily average number of 80,515 operatives, of whom, as far as details have been obtained, there were 46,406 men, 15,057 women, 12,403 young persons, and 2,949 children.

The aggregate capital of said mills is about 100,000,000 rupees, equal, at the present rate of exchange, to $32,300,000.

Of the 97 mills there are 72 in the Bombay Presidency, of which 50 are in the town and island of Bombay itself. There are 6 mills in the province of Bengal, all in the vicinity of Calcutta. In the Madras Presidency there are 6 mills, 4 of which are in the town of Madras; there are 5 in the northwest provinces, all at Cawnpoor; one at Indore, 3 in the central provinces; 3 in Hyderabad, and 1 in Mysore.

The oldest of the Bombay mills was established in 1851, and between that date and 1870 there were but 7 mills established. By 1875 there were 22 mills at work, and 18 more were added between that year and 1880; 10 more were started in 1881, 18 between that year and 1886, 4 in 1887, and 2 in January, 1888. The last fourteen years have seen the creation of 57 of the 72 mills now working in Bombay.

In Calcutta the oldest mill dates from 1864, and in Madras from 1874.

Thus it will be observed that cotton manufacturing in India is what might be termed an "infant industry," although, as I view it, owing to the cheapness of labor in this country and to the proximity of manufactured goods to the great markets of the East, British India will in the near future become a very formidable competitor with Europe and America in the cheap production of cotton fabrics.

Bearing upon this point, I submit the following extract from the Daily Englishman, of this city, of recent date:

ENGLISH VS. INDIAN COTTONS.

[From the Calcutta Daily Englishman.]

How formidable a competitor with Lancashire Bombay has now become is shown by the returns of the annual export of cotton twist and yarn from India. During 1888–'89 the shipments reached the large total of 129,000,000 pounds, representing a value of 5,250,000 crores of rupees. Nearly the whole of these large exports went to China and Japan, to whose ever-increasing demands the remarkable growth of this branch of our foreign trade is entirely due. In the last seven years the total value and quantity of the twist and yarn shipped from this country has quadrupled, while in the same period our imports of cotton twist and yarn, now valued at 3¾ crores, have increased by only 30 per cent. in quantity and 16 per cent. in value. There can no longer be a doubt that, as regards these articles, the Indian mills are destined to ultimately oust Lancashire manufacturers from Eastern markets. As regards piece goods, however, India, though slowly increasing her production and shipments, can not yet be said to have seriously entered into competition with home manufacturers. At the present time Bombay, not less than Lancashire, is feeling the effects of a de-

pression in the cotton industry, and in both short-time working is being resorted to or proposed, with the object of checking production and restoring, if possible, the margin of profit which has, of late, entirely disappeared or greatly dwindled. The depression should, however, only be temporary in India, which possesses many advantages over Lancashire in supplying Eastern markets. Each year shows more clearly how well founded is the concern with which Manchester regards the development of the manufacturing industries of Bombay, and the half-dozen new mills which are about to start working in the Western Presidency will, even at this unpromising time, prove more dangerous to English manufacturers than to their neighbors.

PRESENT CONDITION OF INDIA'S COTTON TRADE.

Some light is thrown on the present condition of the trade in cotton goods in this part of India by the following extracts which I copy from the annual statement of the sea-borne trade and navigation of the Bengal Presidency for the official year 1888–'89:

The importation of cotton goods was much larger in the past year as compared with 1887–'88 and the figures are the highest yet reached.

Gray cotton piece goods advanced by 74,500,000 yards with an increased value of 11½ lakhs of rupees; (a lakh of rupees is 100,000 and for practical purposes 3 rupees equal $1*). White piece goods, by 28,500,000 yards and 45 lakhs. Colored printed or dyed piece goods by 19,000,000 yards and about 32 lakhs, against a decline of about 1½ lakhs in other cotton goods. Yarns, gray and white, turkey red, and other colors, show a small decline of about 400,000 pounds in quantity, and slightly over a ¼ lakh of rupees in value. * * *

It would seem doubtful, however, whether this large trade has been profitable to either manufacturers or importers. In Lancashire spinners have done comparatively well, while manufacturers have fared badly.

The previous year was a fairly good one for the latter, and as a consequence there was an increase in the number of looms, followed of course, by an advance in production. In the past year spinners have obtained better prices for their production while manufacturers have been unable to obtain a corresponding advance for the manufactured article. The spinners too had to cope with small supplies of cotton during the latter half of the year, and the consequent rise in the prices, besides which they had to concede an increase in wages to their operatives.

The quality of the American cotton was not up to the average, and to keep the quality of their yarn, higher grades had to be used than formerly. Speaking generally, the trade for the year has not been satisfactory to either spinners or manufacturers.

EUROPEAN VS. AMERICAN COTTONS IN INDIA.

In this connection I will take occasion to say that it is generally understood that American cotton is of longer staple and materially superior to that grown in India, and the American manufacturers of cotton piece goods, so far as they have been introduced here, are generally conceded to be of superior quality to Manchester goods.

The "Pepperell drills" found their way into India, and are held in high repute for their superior durability. They are used principally for men's and boys' every-day summer clothing.

Mr. Foster, my vice and deputy consul-general, who is a merchant in

* A rupee, Treasury valuation, 32.3 cents.

business here, has at my request favored me with some observations on the subject under review, which I submit in conclusion, as follows:

VICE-CONSUL FOSTER'S REPORT.

Sheetings and shirtings are now almost entirely European. American goods formerly came here and were very much liked, but for some unknown reason they have stopped. Have no doubt they could again be introduced, but it takes time.

Drills.—Drills are largely used. The Pepperell mills from America are the standard for this class of goods. They are imported largely and are known all over India. They have such a good name that the mark is closely imitated by some English manufacturers. Other American brands of good quality could no doubt be introduced if properly persevered in.

Dhoties.—The cloths used by the natives are imported in immense quantities, and it seems as if America might supply a portion. There are many qualities imported, at a large range of prices. The low qualities are made from a cheap cotton, loosely woven and heavily sized. The good qualities worn by the higher classes are much more closely woven, of finer yarn, and are almost free from sizing. All these goods come in pairs, but uncut. There is a stripe on each selvage, sometimes plain, varying from one-half to three-fourths inch wide. There is also a narrow border across the ends and across the uncut joining of the pair.

The poorest quality comes 4 yards per pair, 21 inches wide, sixty-four and seventy-two threads to the inch, and sells at present for about 9 cents per pair. From this they vary in size, quality, and price up to a fine quality that comes 10 yards per pair, 44 inches wide, eighty-eight and ninety-six threads to the inch, and sells for about 64 to 65 cents per pair. Buyers are very particular as to the count of the threads, but no stipulation of weight is made, and of course they are quite light. There are some qualities even finer than the last mentioned, but they do not sell very freely. All these goods are consumed entirely by natives, and they must be made strictly to conform to their requirements as to size, thread, width, and color of border, and style of packing. They all come unbleached, packed in iron-bound bales, varying from two hundred to four hundred pieces per bale.

To introduce any of the above goods requires time and perseverance. The native is very conservative and is very slow to take up a new brand of any goods, but when once established a well-known mark will sell for months ahead. Some attempts have been made from time to time to introduce brands of American drills and shirtings, but the shippers have been discouraged by the slow sales and poor prices and have dropped it before the goods were well known. Any such new goods are sure to pay a loss at first, but when well known will command a paying price. Many Americans have the idea that this market may be made to take surplus goods that have gone out of date in the home markets, or goods of which there happens to be an overstock at home. But this is a mistake; the native will not take anything, no matter how cheap, if it is not exactly according to his requirements. Neither is it any use to try to unload surplus stocks of shirtings and sheetings on this market and then not ship any more for months, or perhaps years, thus giving the brand time to be forgotten.

There is no doubt that the superior quality of American cottons gives them a preference here after they have become well known, and should enable American mills to do a good business in this country. Prices at present are very low, so low, indeed, that Manchester is unable to sell, but that will be remedied as trade improves.

B. F. BONHAM,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Calcutta, September 14, 1889.

A.—*Quantity and kind of cotton textiles imported per annum.*

QUANTITY.

	1883–'84.	1884–'85.	1885–'86.	1886–'87.	1887–'88.
Yarns and textile fabrics:					
Twist and yarn..pounds..	45,378,956	45,799,637	45,915,123	49,013,979	51,542,549
Manufactures, piece goods:					
Gray (unbleached).yards..	1,079,938,865	1,138,343,726	1,105,844,908	1,356,278,808	1,180,175,270
White (bleached) ...do...	342,376,839	277,875,450	279,123,208	387,104,415	320,463,785
Colored, printed, or dyed .....yards..	299,536,491	315,345,829	355,845,715	412,036,168	339,102,827
Handkerchiefs and shawls in piece .....No..	17,001,262	13,997,942	17,928,893	16,449,480	16,449,480
Other sorts.....yards..	162,133	186,981	310,583	293,994	293,994

VALUES.

Yarns and textile fabrics:					
Twist and yarn..pounds..	$11,553,143	$11,201,398	$10,573,610	$11,061,256	$11,939,687
Manufactures, piece goods:					
Grey (unbleached).yards..	39,996,969	40,921,335	39,655,612	48,673,668	44,338,443
White (bleached)....do ..	15,101,025	12,328,233	11,889,110	15,871,796	15,429,491
Colored, printed, or dyed .....yards..	15,520,217	15,733,948	17,110,212	20,007,184	14,292,771
Handkerchiefs and shawls in piece .....No..	742,298	677,593	739,925	613,886	698,897
Other sorts.....yards..	29,180	32,061	53,559	50,160	57,571

B.—*Place of manufacture and whence imported.*

	Quantities.	Value.
Yarns and textile fabrics, twist and yarn:	*Pounds.*	
United Kingdom...	50,728,356	$11,722,435
Austria	574,440	157,748
Belgium.....	122,340	32,026
France	2,300	626
Italy	31,900	8,661
Aden.....	5,500	1,266
Arabia.....	2,595	627
Ceylon	28,162	9,545
China, Hong-Kong	28,730	2,588
Straits Settlements.	16,428	3,840
Other countries	1,798	322
	51,542,549	11,939,684
Manufactures:		
Piece goods, gray (unbleached):		
United Kingdom.....	*Yards.* 1,178,757,726	44,584,741
Austria	6,165	334
France	6,240	755
Italy	25,096	4,555
Egypt.....	16,650	681
United States..	687,000	46,837
Aden	121,528	7,971
Arabia.....	21,600	713
Ceylon	379,849	18,630
Persia.....	11,756	440
Straits Settlements	133,768	5,823
Other countries	7,892	293
	1,180,175,270	44,671,773
Piece goods, white (bleached):		
United Kingdom	315,782,387	15,009,287
Piece goods, etc.—continued.	*Yards.*	
Austria	1,057,401	$112,104
Belgium.....	22,325	1,077
France	202,123	22,662
Italy	726,338	83,128
Eastern Coast of Africa, Zanzibar	245,010	20,296
Egypt.....	43,249	5,300
Aden	6,578	335
Ceylon	51,736	4,026
Straits Settlements	2,314,834	166,927
Other countries	11,804	1,008
	320,463,785	15,426,150
Colored, printed, or dyed:		
United Kingdom.....	332,599,443	16,941,362
Austria	2,601,382	167,194
Belgium.....	149,904	15,218
France	1,667,255	285,028
Germany.....	58,870	5,159
Holland.....	16,028	1,900
Italy	642,070	47,220
Egypt.....	29,620	3,342
Arabia.....	82,350	15,188
Ceylon	14,886	1,178
China, Hong-Kong	8,096	1,207
Persia.....	28,704	1,970
Straits Settlements	1,188,236	139,315
Turkey in Asia	5,425	354
Other countries	10,558	469
	339,102,827	17,626,104

Statement showing piece goods imported into Calcutta each month from 1883 *to* 1888, *inclusive.*

[Compiled from the Monthly Statement of Imports, published by D. M. Traill, 20 British Indian street, Calcutta.

1883.

Months.	Gray goods.												
	Shirtings.												
			37 to 39 inches.								44 to 45 inches.		
	34 inches and under.	35 and 36 inches.	4.4 to 4.8 pounds.	4.12 to 5 pounds.	5.4 to 5.8 pounds.	5.12 to 6 pounds.	6.8 pounds.	7 pounds.	7.8 to 7.12 pounds.	8.4 to 8.8 pounds.	9 to 10 pounds.	7 pounds.	8 pounds.	10 pounds.
Jan	288	671	.....	.....	20	240	24	594	401	8,332	5,356	8	38	723
Feb	78	280	.....	.....	.....	157	42	122	118	3,417	3,212	12	26	599
Mar	221	518	.....	.....	.....	322	53	577	476	7,056	4,697	5	46	694
Apr	191	465	8	11	.....	547	66	862	599	9,052	5,018	21	29	857
May	122	454	2	14	1	141	109	1,033	852	6,719	3,646	13	46	690
June	66	269	49	22	48	127	68	484	573	6,652	3,511	13	48	620
July	35	232	44	.....	29	77	84	463	215	5,971	3,565	7	32	559
Aug	178	287	71	.....	20	63	117	464	233	8,034	5,751	.....	48	869
Sept	76	209	63	.....	31	138	32	114	387	4,370	3,833	44	.....	552
Oct	179	293	106	9	77	51	127	155	428	5,849	5,773	43	50	627
Nov	219	295	68	7	40	77	24	150	222	5,438	5,523	7	63	568
Dec	138	356	8	.....	7	30	25	46	149	4,277	4,842	8	57	426
Total	1,791	4,329	419	63	273	1,970	771	5,064	4,653	75,167	54,727	181	483	7,784

Months.	Gray goods.											
	Shirtings.		Madapollams.				Jaconets.			Mulls.		
	50 inches.	54 inches.	32 inches.			50 inches.						
	10 pounds.	11 pounds.	2.4 to 2.8 pounds.	2.12 to 3 pounds.	3.3 to 4 pounds.	5.4 pounds.	39 inches.	44 inches.	49 to 50 inches.	39 inches.	44 inches.	50 to 54 inches.
Jan	41	145	43	251	115	144	429	1,006	.....	6	67	.....
Feb	.....	15	50	95	32	114	231	479	.....	.....	63	.....
Mar	25	24	69	157	68	54	533	909	.....	30	97	.....
Apr	43	54	40	516	129	10	427	755	.....	24	92	.....
May	57	34	115	473	160	38	419	962	.....	.....	176	.....
June	48	98	99	327	44	35	547	658	.....	.....	130	.....
July	137	160	134	135	63	113	578	1,022	4	.....	165	.....
Aug	697	307	163	368	126	183	606	1,214	2	.....	131	.....
Sept	544	233	52	359	84	68	285	756	6	.....	67	.....
Oct	660	521	123	588	296	126	659	1,129	17	.....	66	.....
Nov	264	298	98	636	327	102	373	914	17	.....	25	.....
Dec	128	149	61	312	194	99	399	723	2	8	12	.....
Total	2,644	2,038	1,047	4,217	1,638	1,086	5,486	10,527	48	68	1,091	.....

Statement showing piece goods imported into Calcutta, etc.—Continued.

1883—Continued.

Months.	Gray goods.													
	T-cloths.				Sheetings.	Drills and jeans.	Chudders.	Dhooties.	Dhooty bordered.					Sundries not classified.
	3 to 4 pounds.	5 pounds.	6 pounds.	7 pounds.					Shirtings.	Madapollams.	Jaconets.	Mulls.	T-cloths.	
Jan	569	361	263	287	28	729	295	3,959	25	50	.....	.....	.....	50
Feb	373	93	88	52	16	408	67	2,145	29	52	.....	.....	.....	18
Mar	408	176	138	41	24	863	98	4,210	48	87	.....	.....	.....	70
Apr	195	35	122	23	5	246	53	4,557	8	24	.....	.....	.....	10
May	275	11	108	133	2	196	89	4,417	21	65	.....	.....	.....	29
June	267	.....	72	75	2	147	351	4,392	13	41	.....	.....	.....	14
July	275	.....	119	88	18	98	233	4,246	37	31	.....	.....	.....	13
Aug	494	74	411	190	9	371	988	7,300	37	6	.....	.....	.....	37
Sept	244	44	306	115	4	322	1,122	4,267	14	10	.....	.....	.....	73
Oct	239	12	262	123	73	321	1,305	5,978	4	.....	.....	.....	.....	46
Nov	226	4	65	124	10	350	913	5,862	24	40	.....	.....	.....	56
Dec	214	50	51	115	5	208	367	5,324	4	49	.....	.....	.....	10
Total	3,779	860	1,005	1,366	196	4,259	5,881	56,657	264	455	.....	.....	.....	426

Months.	White goods.											
	Shirtings.	Jaconets.		Mulls.				Cambrics.	Tanjibs.	Book muslins.	Stripes, checks, spots, etc.	Lappets.
		39 inches.	44 inches.	39 inches.	44 inches.	50 to 54 inches.	60 inches.					
Jan	1,357	925	761	469	710	259	36	27	344	81	85	452
Feb	822	611	407	224	437	45	211	15	64	62	35	269
Mar	1,113	905	748	496	1,314	186	47	79	127	45	159	368
Apr	1,391	871	625	614	1,153	120	244	65	104	56	233	430
May	961	701	870	447	687	160	263	63	218	28	245	297
June	575	642	1,049	459	410	52	632	69	164	32	296	177
July	670	651	862	472	738	62	61	21	144	57	207	398
Aug	1,004	1,045	1,369	581	1,110	209	264	12	104	36	206	417
Sept	753	814	864	292	567	198	.....	7	112	41	110	146
Oct	830	1,065	1,103	484	732	100	146	20	140	72	134	390
Nov	891	1,047	906	471	876	164	210	42	26	38	173	335
Dec	834	968	631	517	698	152	432	20	2	71	87	261
Total	11,201	10,245	10,195	5,526	9,432	1,707	2,546	440	1,549	619	1,970	3,940

Statement showing piece goods imported into Calcutta, etc.—Continued.

1883—Continued.

Months.	White goods.					Colored goods.							
						Turkey-red.							
						Cambrics.							
	Scarfs.	Sarries.	Dhooties.	Drills and jeans.	Sundries not classified.	7-8.	9-8.	Shirtings.	Jaconets.	Mulls.	Mull stripes.	Twills and dimities.	Lappets.
Jan	733	64	308	8	54	2,276	102	773	49	258	5	.....	12
Feb	434	90	136	32	43	1,221	66	490	12	121	.....	9	7
Mar	849	56	267	64	74	986	291	395	49	85	4	6	.....
Apr	980	97	258	14	62	1,221	299	531	78	199	18	.....	.....
May	948	33	265	45	66	780	114	387	53	81	17	4	1
June	1,066	50	180	23	19	830	39	427	18	14	.....	.....	.....
July	1,074	69	424	33	54	574	7	448	47	23	2	.....	.....
Aug	1,799	121	672	17	85	1,112	88	531	69	68	35	.....	.....
Sept	1,049	30	328	.....	29	764	70	316	16	36	2	.....	.....
Oct	1,541	76	495	8	92	959	119	534	40	69	9	.....	4
Nov	1,037	50	489	14	114	996	69	412	26	106	20	.....	.....
Dec	870	40	428	22	80	558	26	402	21	16	30	.....	.....
Total	12,380	776	4,250	280	772	12,277	1,290	5,646	488	1,076	142	19	24

Months.	Colored goods.										
	Turkey-red.					Dyed.					
	Prints.										
	7-8.	9-8.	Scarfs.	Sarries and dresses.	Sundries not classified.	Shirtings.	Jaconets.	Mulls.	Cambrics and madapollams	Drills.	Sundries not classified.
Jan	14	167	15	167	15	95	50	.....	201	44	358
Feb	45	95	12	113	19	63	35	2	108	5	190
Mar	.....	56	.....	80	.....	81	44	1	151	9	168
Apr	31	56	.....	128	1	66	15	6	180	57	280
May	165	92	2	120	1	54	3	4	122	70	180
June	100	155	.....	144	7	58	2	6	210	44	178
July	75	64	.....	121	.....	66	5	.....	246	35	253
Aug	219	226	5	172	5	111	21	1	334	72	488
Sept	68	84	.....	64	.....	132	28	47	339	41	277
Oct	183	213	.....	154	.....	276	46	20	592	44	366
Nov	139	147	.....	156	.....	105	131	29	461	9	361
Dec	84	127	.....	78	.....	55	156	6	187	90	155
Total	1,114	1,482	34	1,497	48	1,162	536	122	3,131	520	3,254

Statement showing piece goods imported into Calcutta, etc.—Continued.

1883—Continued.

Months.	Colored goods.										
	Printed.				Woolens.						
	Muslins.	Cambrics (prints).	Handkerchiefs.	Sundries not classified.	Broadcloths.	Other woolens.	Merinoes.	Flannels.	Blankets.	Braid (worsted).	Sundries not classified.
Jan	20	997	63	24	30	82	10	49	20	84	319
Feb	17	636	82	3	21	23	3	30	34	35	201
Mar	27	962	99	27	8	21	.....	24	3	72	95
Apr	84	758	64	103	8	7	2	10	.....	41	165
May	83	750	105	60	19	108	2	21	4	15	87
June	10	1,841	65	43	37	199	27	65	24	21	115
July	5	2,883	42	117	64	234	9	47	119	27	195
Aug	.....	4,160	117	136	50	473	51	105	164	40	380
Sept	7	1,630	74	72	177	249	75	153	80	36	349
Oct	1	2,173	54	76	126	380	36	113	37	50	557
Nov	10	1,211	21	130	74	270	24	78	140	60	495
Dec	.....	575	46	6	52	118	15	55	30	44	203
Total	264	18,576	832	797	666	2,164	254	750	655	525	3,163

Months.	Sundries.												
								Thread.					
								Cotton.					
	Nets (cotton).	Silks.	Satins.	Tickings.	Canvas.	Linen piece goods.	Shawls.	Hosiery.	Ball.	Reel and card.	Linen.	Fancies and sundries.	Umbrellas.
Jan	93	55	47	25	63	61	171	.....	342	44	.....	258	658
Feb	23	27	15	9	72	71	17	.....	238	11	2	174	407
Mar	73	19	23	43	12	108	14	.....	223	6	15	233	639
Apr	46	44	34	13	133	25	47	.....	164	20	5	155	635
May	45	47	58	6	56	17	161	.....	98	15	6	113	524
June	42	60	38	14	78	22	179	.....	145	15	4	161	257
July	33	94	15	12	90	8	290	.....	141	4	1	215	218
Aug	26	82	50	23	94	4	414	.....	75	3	.....	422	357
Sept	33	136	62	9	42	18	557	.....	158	26	1	380	279
Oct	12	90	67	7	54	1	447	.....	103	15	2	405	404
Nov	64	87	61	1	122	25	427	.....	192	19	.....	387	289
Dec	109	51	37	10	80	29	205	.....	257	5	1	204	330
Total	599	792	507	172	896	389	2,929	.....	2,136	183	37	3,107	4,997

Statement showing piece goods imported into Calcutta, etc.—Continued.

1883—Continued.

Months.	Yarn and twist.														
	Gray yarns.											Colored yarns.	Turkey-red twist.	Monthly total.	Totals from Jan. 1.
	20s. and under.	30s.	40s.	50s.	60s.	70s.	80s.	90s.	100s.	110s. and upwards.	Assorted numbers.				
Jan	1,654	129	645	117	112	59	39	19	22	21	4	256	1,301	44,725	.....
Feb	1,263	25	442	35	63	64	47	22	20	14	1	251	753	24,209	68,934
Mar	1,381	41	569	266	97	121	83	45	41	20	1	66	938	138,532	107,466
Apr	988	125	1,362	270	215	77	57	49	46	26	3	431	816	42,607	150,073
May	1,156	....	982	202	127	71	38	37	46	18	3	316	761	36,326	186,399
June	1,355	....	1,009	120	53	54	57	25	15	5	17	184	690	35,083	221,482
July	1,530	....	685	70	70	81	68	35	26	8	9	180	1,078	35,648	257,130
Aug	1,310	10	1,377	174	228	129	114	53	45	23	36	153	1,144	54,470	311,480
Sept	2,047	....	503	122	78	84	69	35	20	114	20	147	580	34,870	346,350
Oct	1,884	70	1,115	63	109	91	71	40	33	30	22	234	1,109	47,452	393,802
Nov	1,255	100	782	63	121	38	35	25	21	12	4	167	1,230	41,519	435,321
Dec	1,883	48	421	61	45	84	56	21	16	21	4	165	779	33,023	468,344
Total	17,706	548	9,892	1,563	1,318	953	734	406	351	312	124	2,550	11,179	468,464	2,946,781

1884.

Months.	Gray goods.													
	Shirtings.													
	34 inches and under.	35 and 36 inches.	37 to 39 inches.									44 to 45 inches.		
			4 to 4.8 pounds.	4.12 to 5 pounds.	5.4 to 5.8 pounds.	5.12 to 6 pounds.	6.8 pounds.	7 pounds.	7.8 to 7.12 pounds.	8.4 to 8.8 pounds.	9 to 10 pounds.	7 pounds.	8 pounds.	10 pounds.
Jan	110	245	.....	.....	8	34	15	119	168	5,021	5,945	2	11	474
Feb	73	394	.....	.....	8	30	5	140	158	3,892	4,761	17	4	388
Mar	116	430	.....	.....	.....	22	39	201	204	4,558	5,578	18	12	339
Apr	77	554	3	.....	3	89	28	720	357	6,615	7,479	.....	38	479
May	82	634	.....	16	11	11	32	584	257	5,035	5,212	.....	.....	253
June	51	586	20	.....	.....	71	58	590	264	5,491	5,047	2	6	272
July	123	385	40	.....	5	161	122	891	561	6,455	5,537	...	.....	314
Aug	266	547	55	5	40	218	121	636	805	6,025	5,287	18	.....	392
Sept	185	586	58	13	49	244	82	489	697	5,219	4,219	20	37	569
Oct	272	1,031	20	10	33	185	58	701	1,019	7,773	8,042	23	8	888
Nov	111	784	15	52	18	77	100	263	1,101	6,006	5,513	8	65	737
Dec	128	894	.....	.....	14	213	78	296	1,151	7,247	8,366	34	30	800
Total	1,594	7,070	211	96	189	1,355	738	5,630	6,742	69,337	70,986	142	211	5,905

Statement showing piece goods imported into Calcutta, etc.—Continued.

1884—Continued.

Months.	Gray goods.											
	Shirtings.		Madapollams.				Jaconets.			Mulls.		
	50 inches.	54 inches.	32 inches.			50 inches.	39 inches.	44 inches.	49 to 50 inches.	39 inches.	44 inches.	50 to 54 inches.
	10 pounds.	11 pounds.	2.4 to 2.8 pounds.	2.12 to 3 pounds	3.3 to 4 pounds.	5.4 pounds.						
Jan	127	112	119	478	148	148	357	691	10	6	23	.....
Feb	78	37	32	170	166	85	433	600	4	20	14	.....
Mar	30	40	52	209	208	36	313	686	.....	5	31	.....
Apr	42	61	135	514	170	119	482	845	6	15	94	.....
May	59	42	54	98	83	125	309	489	6	8	99	.....
June	55	156	84	135	105	78	510	535	.....	14	63	1
July	255	372	14	112	205	86	547	583	10	8	88	3
Aug	680	702	146	216	327	146	537	732	8	6	87	.....
Sept	705	617	193	248	124	121	487	424	24	.....	65	.....
Oct	634	1,081	507	357	310	35	830	555	26	.....	69	.....
Nov	175	348	282	126	199	42	486	383	5	.....	61	.....
Dec	96	132	265	99	111	93	478	502	23	10	75	.....
Total	2,936	3,700	1,883	2,762	2,156	1,114	5,769	7,025	122	92	769	4

Months.	Gray goods.												
	T-cloths.				Sheetings.	Drills and jeans.	Chudders.	Dhooties.	Dhooty bordered.					Sundries not classified.
	3 to 4 pounds.	5 pounds.	6 pounds.	7 pounds.					Shirtings.	Madapollams.	Jaconets.	Mulls.	T-cloths.	
Jan	382	120	179	295	4	493	250	4,719	.....	7	.....	.....	.....	13
Feb	240	140	79	289	5	706	85	4,246	53	16	.....	.....	.....	28
Mar	249	43	70	88	20	375	49	3,508	3	32	.....	.....	.....	21
Apr	227	76	173	183	20	856	63	4,608	6	29	.....	.....	.....	16
May	338	44	135	82	36	495	35	3,851	.....	21	.....	.....	.....	.....
June	425	44	282	185	10	305	169	4,646	16	12	.....	.....	.....	11
July	665	129	185	188	4	507	352	5,999	24	21	.....	.....	.....	42
Aug	392	384	122	256	10	1,736	158	5,556	23	.....	.....	.....	.....	43
Sept	381	93	70	91	5	121	1,048	4,678	28	.....	.....	.....	.....	74
Oct	459	289	338	86	11	328	2,232	4,847	59	.....	.....	.....	.....	26
Nov	382	173	145	74	103	557	617	3,377	5	22	.....	.....	.....	20
Dec	615	223	180	220	6	694	215	3,553	70	90	.....	.....	.....	13
Total	4,755	1,758	1,958	2,037	234	7,173	5,273	53,588	,287	250	.....	.....	.....	307

Statement showing piece goods imported into Calcutta, etc.—Continued.

1884—Continued.

Months.	White goods.												
	Shirtings.	Jaconets.			Mulls.				Cambrics.	Tanjibs.	Book muslins.	Stripes, checks, spots, etc.	Lappets.
		39 inches.		44 inches.	39 inches.	44 inches.	50 to 54 inches.	60 inches.					
		36	39½										
Jan	844	965	86	1,081	528	907	279	334	32	25	156	109	468
Feb	760	570	179	409	512	1,321	217	266	46	35	71	84	505
Mar	654	502	108	513	300	1,432	226	279	16	20	86	133	316
Apr	628	402	134	510	382	1,559	279	355	14	79	113	171	505
May	419	234	41	390	413	801	109	561	25	32	107	187	281
June	641	268	111	611	599	921	164	276	54	12	55	201	306
July	526	256	130	816	591	809	192	162	32	11	97	156	488
Aug	388	151	134	651	470	786	240	10	42	.....	42	102	222
Sept	468	248	83	620	333	670	175	14	13	.....	14	37	114
Oct	1,110	261	286	571	748	788	148	19	47	.....	90	109	299
Nov	935	221	70	555	428	547	150	5	41	.....	111	119	208
Dec	1,331	382	118	546	643	549	127	68	34	.....	66	120	285
Total	8,704	4,460	1,450	7,403	5,946	11,090	2,306	2,299	396	214	1,008	1,528	3,997

Months.	White goods.					Colored goods.							
	Scarfs.	Sarrics.	Dhooties.	Drills and jeans.	Sundries not classified.	Turkey-red.							
						Cambrics.		Shirtings.	Jaconets.	Mulls.	Mull stripes.	Twills and dimeties.	Lappets.
						7. 8.	9. 8.						
Jan	1,071	33	494	37	51	670	164	399	51	45	7	.....	1
Feb	1,075	57	395	34	75	1,075	104	663	58	66	20	.....	.....
Mar	1,065	34	432	23	108	638	114	605	1	52	14	.....	.....
Apr	1,251	41	476	39	103	819	262	989	3	71	33	.....	.....
May	809	17	314	6	93	485	129	721	29	128	.....	.....	7
June	737	26	357	20	90	718	167	1,079	68	116	24	.....	3
July	1,239	39	702	19	114	853	144	957	82	198	27	.....	39
Aug	1,127	20	499	16	122	684	42	776	12	126	53	.....	19
Sept	962	10	455	4	57	477	148	820	.....	112	20	.....	20
Oct	1,076	44	608	73	60	736	143	1,034	49	312	48	.....	47
Nov	1,048	15	322	1	24	624	29	794	23	168	8	14	16
Dec	1,009	23	333	10	42	731	28	768	61	195	26	15	12
Total	12,469	369	5,387	282	939	8,510	1,474	9,605	437	1,589	280	29	164

Statement showing piece goods imported into Calcutta, etc.—Continued.

1884—Continued.

Months.	Colored goods.										
	Turkey-red.				Dyed.						
	Prints.		Scarfs.	Sarries and dresses.	Sundries not classified.	Shirtings.	Jaconets.	Mulls.	Cambrics and madapollams.	Drills.	Sundries not classified.
	7-8.	9-8.									
Jan	76	195	.....	76	.....	90	100	14	105	57	211
Feb	153	80	16	110	5	145	50	53	210	25	254
Mar	65	111	1	14	.....	113	48	29	295	20	178
Apr	140	87	5	73	11	114	70	39	283	3	158
May	117	27	11	57	.....	72	45	.....	137	35	76
June	127	28	.....	110	2	39	44	3	156	14	149
July	176	66	1	118	3	29	25	2	170	6	212
Aug	155	71	11	74	.....	42	20	4	125	7	252
Sept	119	43	.....	61	.....	25	10	1	127	27	267
Oct	147	61	.....	103	1	18	32	1	171	30	509
Nov	149	40	3	58	1	34	43	1	143	10	186
Dec	42	64	.....	34	.....	75	.....	5	148	82	122
Total	1,466	873	48	888	23	796	487	152	2,070	316	2,574

Months.	Colored goods.										
	Printed.				Woolens.						
	Muslins.	Cambrics (prints).	Handkerchiefs.	Sundries not classified.	Broadcloths.	Other woolens.	Merinoes.	Flannels.	Blankets.	Braid (worsted).	Sundries not classified.
Jan	.....	362	53	43	19	87	10	41	15	77	193
Feb	76	431	37	49	12	24	.....	30	12	71	176
Mar	40	291	57	26	20	10	9	10	3	27	89
Apr	67	502	36	27	15	47	6	57	4	38	137
May	7	489	28	22	12	155	6	12	3	36	134
June	38	1,024	29	10	8	116	4	11	32	46	123
July	2	1,751	49	35	39	393	47	84	36	42	344
Aug	2	1,826	61	48	74	528	51	148	71	57	572
Sept	8	1,835	55	45	133	351	24	125	87	53	546
Oct	.....	2,426	91	119	82	454	85	157	84	75	682
Nov	.....	1,424	27	65	99	191	29	88	44	70	430
Dec	.....	944	52	34	71	143	13	56	72	110	207
Total	240	13,305	575	523	584	2,499	284	819	466	702	3,633

Statement showing piece goods imported into Calcutta, etc.—Continued.

1884—Continued.

Months.	Sundries.												
									Thread.				
									Cotton.				
	Nets (cotton).	Silks.	Satins.	Tickings.	Canvas.	Linen piece goods.	Shawls.	Hosiery.	Ball.	Reel and card.	Linen.	Fancies and sundries.	Umbrellas.
Jan	104	43	54	2	70	46	137	92	245	33	.....	111	665
Feb	43	35	69	1	138	60	26	33	210	21	5	71	701
Mar	44	39	56	2	79	26	13	99	155	12	.....	52	619
Apr	72	29	67	5	171	17	66	38	181	20	23	78	776
May	34	25	21	5	71	11	113	40	160	18	4	34	710
June	33	30	21	11	197	19	99	45	169	19	8	69	852
July	18	70	30	2	120	6	299	114	230	21	5	81	857
Aug	24	125	52	6	86	5	641	196	159	27	10	96	624
Sept	4	88	41	6	51	5	412	309	114	33	.....	159	475
Oct	13	176	90	11	74	10	589	414	265	19	.....	279	722
Nov	40	67	65	.....	71	17	310	200	247	26	3	121	454
Dec	76	104	43	1	55	34	137	85	369	44	1	90	439
Total	505	831	609	52	1,183	256	2,842	1,659	2,504	293	59	1,241	7,894

Months.	Yarn and twist.														
	Gray yarns.											Colored yarns.	Turkey-red twist.	Monthly total.	Totals from Jan. 1.
	20s. and under.	30s.	40s.	50s.	60s.	70s.	80s.	90s.	100s.	110s. and upwards.	Assorted numbers.				
Jan	1,816	14	628	66	47	84	63	38	38	31	1	233	1,379	37,534	.....
Feb	1,606	109	1,161	64	35	40	38	24	19	23	10	431	2,126	35,061	72,595
Mar	1,702	80	874	66	86	59	52	32	28	51	5	295	1,654	32,916	105,511
Apr	1,372	....	743	54	92	60	67	38	41	28	4	265	2,378	43,005	148,516
May	1,254	17	445	78	56	52	26	21	21	20	2	168	993	30,755	179,271
June	1,296	9	780	35	25	57	51	24	21	9	2	293	2,088	36,298	215,569
July	738	....	764	99	150	104	39	25	45	13	6	449	1,824	43,411	258,980
Aug	1,724	....	622	47	71	66	38	15	14	18	22	503	1,290	44,096	303,076
Sept	1,012	57	833	115	31	51	15	17	17	18	1	27	676	36,477	339,553
Oct	2,389	70	1,277	150	84	64	51	27	29	32	7	302	1,220	55,640	395,193
Nov	2,430	55	969	60	55	56	36	14	14	10	3	394	1,035	38,795	433,988
Dec	1,832	17	1,104	169	134	47	85	24	20	12	....	229	1,088	43,049	477,037
Total	19,171	428	10,200	1,003	866	740	561	299	307	265	63	3,589	17,751	477,037	2,929,289

Statement showing piece goods imported into Calcutta, etc.—Continued.

1885.

Months.	Gray goods. Shirtings. 34 inches and under.	35 and 36 inches.	37 to 39 inches. 4.4 to 4.10 pounds.	4.11 to 5.2 pounds.	5.3 to 5.10 pounds.	5.11 to 6.2 pounds.	6.3 to 6.10 pounds.	6.11 to 7.3 pounds.	7.4 to 7.15 pounds.	8 to 8.11 pounds.	8.12 to 9.11 pounds.	9.12 to 10.11 pounds.	10.12 pounds and upwards.
Jan	204	853	.....	.....	.....	79	13	170	406	3,579	2,801	1,795	495
Feb	174	1,331	1	8	18	219	76	92	783	4,606	3,770	1,874	632
Mar	144	1,329	132	3	57	243	264	477	746	6,932	3,646	2,092	385
Apr	96	1,503	162	.....	.....	185	27	360	1,091	6,361	3,064	1,884	438
May	237	666	10	.....	15	44	57	71	535	2,995	1,852	986	298
June	169	942	.....	.....	....	53	68	127	713	4,033	3,249	1,352	170
July	58	542	46	.....	14	46	37	65	469	3,091	2,178	1,582	380
Aug	50	1,719	34	.....	69	6	27	51	673	5,402	4,003	3,057	650
Sept	144	1,404	20	.....	.....	41	27	30	934	4,337	3,254	3,028	899
Oct	162	956	40	11	47	3	25	58	278	3,380	2,714	2,481	955
Nov	59	1,631	31	7	6	47	50	87	231	2,840	2,680	1,960	787
Dec	20	2,084	15	.....	.....	38	26	99	207	2,962	2,628	1,680	651
Total	1,517	14,960	491	29	226	1,004	697	1,687	7,066	50,518	35,839	23,771	6,740

Months.	Gray goods. Shirtings. 42 to 45 inches. 7.7 pounds and under.	7.8 to 8.7 pounds.	8.8 pounds and upwards.	47 to 51 inches.	52 inches and upwards.	Madapollams. 32 inches and under. 2.4 to 2.8 pounds.	2.12 to 3 pounds.	3.3 to 4 pounds.	45 inches and upwards.	Jaconets. 39 inches.	44 inches.	49 to 50 inches.
Jan	32	35	527	46	20	128	88	100	56	271	288	.....
Feb	42	51	986	87	36	96	133	234	48	322	400	3
Mar	35	23	1,051	183	24	342	188	198	32	855	449	5
Apr	30	9	764	74	48	364	192	310	21	1,055	653	25
May	21	2	470	32	20	202	168	263	10	434	517	4
June	.....	17	434	103	50	252	233	214	40	957	812	.....
July	.....	.....	307	210	272	164	128	100	58	687	412	.....
Aug	.....	.....	521	528	529	147	389	155	171	1,237	548	10
Sept	.....	41	571	788	517	123	200	234	96	1,078	447	47
Oct	.....	.....	546	320	384	173	90	172	35	931	269	.....
Nov	.....	.....	592	177	273	117	127	98	.....	631	154	21
Dec	.....	.....	470	129	65	43	3	56	48	526	178	12
Total	160	178	7,239	2,677	2,238	2,151	1,939	2,134	615	8,984	5,127	127

Statement showing piece goods imported into Calcutta, etc.—Continued.

1885—Continued.

Months.	Gray goods.																
	Mulls.			T-cloths.								Dhooty bordered.					
	39 inches.	44 inches.	50 to 54 inches.	3 to 4 pounds.	5 pounds.	6 pounds.	7 pounds.	Sheetings.	Drills and jeans.	Chuddars.	Dhooties.	Shirtings.	Madapollams.	Jaconets.	Mulls.	T-cloths.	Sundries not classified.
Jan	10	10	...	314	186	189	95	4	349	79	1,932	44	25	....	....	....	....
Feb	....	26	...	269	115	261	70	34	221	39	3,267	4	8	....	....	....	14
Mar	9	64	...	293	177	150	48	20	335	46	3,721	2	13	....	....	....	....
Apr	20	75	...	358	42	86	67	1	325	17	4,632	....	56	....	....	....	10
May	....	30	...	185	48	103	34	4	676	67	3,020	2	21	....	....	....	....
June	....	55	...	391	86	110	72	12	1,923	208	5,032	23	5	....	....	....	14
July	....	41	...	243	4	52	149	17	188	228	3,394	....	5	....	....	....	27
Aug	....	49	...	627	105	83	126	58	210	254	5,953	14	10	....	....	....	34
Sept	6	21	...	484	93	123	162	15	648	1,256	5,973	37	17	....	....	....	44
Oct	2	24	...	318	48	109	133	64	301	1,166	4,754	78	37	....	....	....	77
Nov	2	85	...	280	81	137	77	9	265	806	3,332	14	4	....	....	....	68
Dec	....	30	...	185	125	33	78	44	163	936	3,408	16	16	....	....	....	50
Total ..	49	510	...	3,947	1,110	1,436	1,111	282	5,604	5,102	48,418	244	214	....	....	....	338

Months.	White goods.													
		Jaconets.			Mulls.					Cambrics and cottons.	Taujibs.	Book muslins.	Checks, spots, stripes, etc.	Lappets.
	Shirtings.	36 inches and under.	36½ to 39½ inches.	40 inches and upwards.	36 inches and under.	Over 36 to 39½ inches.	40 to 45 inches.	46 to 54 inches.	Over 54 inches.					
Jan	973	326	189	549	256	97	577	66	2	25	30	148	106	574
Feb	918	608	345	995	221	120	937	121	50	37	19	96	79	347
Mar	923	733	349	1,026	274	183	975	86	71	42	51	140	169	359
Apr	997	636	343	858	135	159	718	102	13	16	57	129	134	645
May	620	250	134	496	21	60	413	84	59	34	20	49	41	152
June	610	374	192	684	89	97	582	57	24	22	44	75	154	320
July	458	267	257	669	8	34	604	104	1	16	27	30	37	69
Aug	828	606	246	1,588	137	148	893	59	9	42	24	60	147	273
Sept	780	361	221	1,206	107	133	821	131	8	18	41	62	97	123
Oct	692	226	182	1,185	103	66	569	149	7	74	35	55	82	621
Nov	602	221	193	692	105	37	527	186	9	36	37	55	102	161
Dec	392	168	231	440	76	68	589	188	5	100	70	36	92	244
Total ..	8,793	4,776	2,882	10,388	1,532	1,202	8,205	1,333	258	462	455	935	1,240	3,888

Statement showing piece goods imported into Calcutta, etc.—Continued.

1885—Continued.

Months.	White goods.					Colored goods.							
						Turkey-red.							
						Cambrics.							
	Scarfs.	Sarries.	Dhooties.	Drills and jeans.	Sundries not classified.	7–8.	8–9.	Shirtings.	Jaconets.	Mulls.	Mull stripes.	Twills and dimities.	Lappets.
Jan	551	23	306	33	24	467	39	656	70	235	.....	15	9
Feb	1,009	22	295	21	34	655	118	1,121	72	194	38	.....	20
Mar	1,307	32	254	36	105	914	125	935	191	248	.....	.....	11
Apr	719	68	144	7	97	1,066	244	1,442	130	145	12	5	37
May	597	21	108	10	28	940	110	1,151	59	158	6	6	27
June	886	96	444	23	54	1,402	341	1,000	114	158	10	.....	15
July	964	31	339	6	45	900	326	770	8	72	15	.....	4
Aug	1,853	121	594	30	128	1,621	274	870	75	210	6	.....	.....
Sept	1,354	63	487	13	96	1,219	230	541	73	33	.....	.....	.....
Oct	1,053	60	333	31	85	1,290	242	710	48	42	14	.....	.....
Nov	1,100	68	281	36	41	1,200	216	437	29	44	9	5	1
Dec	772	49	122	14	12	1,018	195	568	53	70	3	5	1
Total	12,165	654	3,707	260	749	12,692	2,460	10,201	922	1,609	113	36	125

Months.	Colored goods.										
	Turkey-red.					Dyed.					
	Prints.										
	7–8.	9–8.	Scarfs.	Sarries and dresses.	Sundries not classified.	Shirtings.	Jaconets.	Mulls.	Cambrics and madapollams.	Drills.	Sundries not classified.
Jan	38	12	.....	55	20	16	15	1	125	28	164
Feb	45	171	.....	7	18	55	32	13	345	59	169
Mar	162	56	.....	103	5	28	36	14	162	73	145
Apr	93	82	.....	59	4	44	8	19	128	68	168
May	65	167	3	122	8	37	10	4	108	17	62
June	173	74	33	110	5	145	17	1	396	6	158
July	82	67	10	53	22	194	21	7	266	55	203
Aug	199	57	.....	161	22	260	34	1	323	42	450
Sept	133	59	1	127	.....	131	59	1	184	47	516
Oct	160	100	.....	162	.....	54	23	1	323	31	165
Nov	109	68	.....	127	.....	110	5	.....	252	7	260
Dec	90	77	.....	141	.....	47	24	1	209	16	143
Total	1,349	990	47	1,227	104	1,121	284	63	2,821	449	2,603

Statement showing piece goods imported into Calcutta, etc.—Continued.

1885—Continued.

Months.	Colored goods.											
	Printed.						Woolens.					
	Muslins.	Cambrics.			Handkerchiefs and scarfs.	Sundries not classified.	Broadcloths.	Other woolens.	Merinoes	Flannels.	Braid (worsted).	Sundries not classified.
		7–8, under 25 inches.	9–8, 25 to 30 inches.	Over 30 inches.								
Jan	28	10	918	191	82	12	24	72	11	26	89	115
Feb	8	.....	618	435	66	113	13	36	.....	26	39	137
Mar	45	32	743	358	44	54	26	32	7	41	66	155
Apr	23	11	947	326	29	78	28	45	1	14	55	80
May	9	4	736	244	25	37	26	108	2	25	107	131
June	.....	71	1,233	318	19	37	46	213	5	39	54	349
July	.....	33	866	296	58	64	82	195	1	57	56	181
Aug	8	77	2,847	240	54	73	107	519	28	282	91	451
Sept	6	12	2,504	467	119	35	111	645	51	225	58	429
Oct	13	6	1,917	172	31	84	98	295	13	111	86	321
Nov	.....	34	1,787	218	45	88	78	283	15	67	65	309
Dec	1	8	1,392	307	8	9	58	147	22	61	76	213
Total	141	298	16,508	3,572	580	684	697	2,590	156	974	842	2,871

Months.	Sundries.										
	Nets (cotton).	Silks and satins.	Sateens, (cotton, white and colored).	Canvas.	Shawls.		Hosiery.	Cotton thread.		Fancies and sundries.	Umbrellas.
					Woolen (including melton).	Cotton.		Ball.	Reel and card.		
Jan	108	63	14	60	7	24	49	254	25	143	437
Feb	122	40	39	22	4	.....	44	392	13	118	649
Mar	64	39	67	71	20	3	67	426	31	184	745
Apr	59	16	43	136	120	4	34	350	20	111	635
May	50	37	15	124	107	6	24	220	16	87	203
June	33	31	14	249	208	13	68	240	23	200	299
July	21	42	11	153	94	14	39	185	14	276	182
Aug	22	154	41	146	492	150	182	201	19	310	148
Sept	40	270	53	58	636	266	254	185	52	331	264
Oct	32	178	8	70	459	47	208	210	29	189	258
Nov	31	128	12	87	287	95	155	138	16	215	202
Dec	20	94	6	116	193	56	124	227	19	212	204
Total	602	1,092	323	1,292	2,627	678	1,248	2,938	277	2,376	4,226

Statement showing piece goods imported into Calcutta, etc.—Continued.

1885—Continued.

Months.	Yarn and twist.														
	Gray yarns.											Colored yarns.	Turkey-red twist.	Monthly total.	Totals from Jan. 1.
	20s and under.	30s.	40s.	50s.	60s.	70s.	80s.	90s.	100s.	110s and upwards.	Assorted numbers.				
Jan	2,055	....	638	28	79	38	37	8	11	4	1	209	1,103	29,016	.....
Feb	1,542	1	600	35	53	30	23	15	15	17	8	304	1,245	36,488	65,504
Mar	1,179	6	812	37	29	95	52	31	34	27	2	316	1,188	42,164	107,668
Apr	842	42	1,272	85	51	81	78	37	34	19	10	258	1,327	41,437	149,105
May	726	....	879	97	56	24	20	13	13	9	12	157	909	25,614	174,719
June	1,176	38	1,195	91	127	64	39	26	19	12	4	169	1,186	38,712	213,431
July	1,492	82	808	151	90	29	55	25	14	5	2	167	441	28,516	241,987
Aug	2,175	32	1,700	173	194	36	57	27	18	14	1	190	755	51,904	293,891
Sept	2,190	20	557	177	139	35	40	18	12	19	42	181	539	47,655	341,546
Oct	1,070	25	405	64	111	56	78	31	26	15	2	283	739	37,854	379,400
Nov	701	2	789	108	69	30	48	21	22	21	12	278	923	32,510	411,910
Dec	2,230	....	788	18	28	63	35	17	16	14	52	395	1,041	31,623	443,533
Total	17,378	248	10,443	1,064	1,026	581	562	269	234	176	148	2,907	11,396	443,493	2,822,694

1886.

Months.	Gray goods.												
	Shirtings.												
			37 to 39 inches.										
	34 inches and under.	35 and 36 inches.	4.4 to 4.10 pounds.	4.11 to 5.2 pounds.	5.3 to 5.10 pounds.	5.11 to 6.2 pounds.	6.3 to 6.10 pounds.	6.11 to 7.3 pounds.	7.4 to 7.15 pounds.	8 to 8.11 pounds.	8.12 to 9.11 pounds.	9.12 to 10.11 pounds.	10.12 pounds and upwards.
Jan	154	2,689	5	13	2	32	24	195	405	3,378	3,013	2,299	846
Feb	210	3,158	36	.....	49	114	72	278	507	3,723	3,304	2,876	910
Mar	189	4,046	.....	8	93	95	46	246	657	4,334	3,151	2,941	1,325
Apr	98	5,317	40	11	67	117	151	552	701	5,433	3,544	3,332	1,203
May	107	5,129	57	23	65	237	338	351	470	4,954	3,079	2,252	509
June	130	5,433	58	.....	107	168	144	344	938	5,034	2,924	1,637	571
July	118	5,846	56	39	38	44	95	322	618	4,797	2,835	1,495	494
Aug	55	4,840	9	11	32	66	54	317	360	3,355	1,828	1,435	574
Sept	152	6,492	.....	.....	74	13	20	162	336	3,064	1,806	1,115	509
Oct	140	5,013	.....	.....	2	8	40	45	240	1,885	1,224	653	226
Nov	88	5,988	10	.....	.....	6	105	31	281	2,496	1,025	710	320
Dec	136	8,274	.....	.....	.....	25	38	30	360	2,155	1,310	704	346
Total	1,577	62,225	271	105	529	925	1,127	2,873	5,873	44,608	29,043	21,449	7,833

Statement showing piece goods imported into Calcutta, etc.—Continued.

1886—Continued.

Months.	Gray goods.											
	Shirtings.					Madapollams.				Jaconets.		
	42 to 45 inches.			47 to 51 inches.	52 inches and upwards.	32 inches and under.			45 inches and upwards.	39 inches.	44 inches.	49 to 50 inches.
	7.7 pounds and under.	7.8 to 8.7 pounds.	8.8 pounds and upwards.			2.4 to 2.6 pounds.	2.12 to 3 pounds.	3.3 to 4 pounds.				
Jan	.....	.....	923	167	40	46	74	242	63	429	196	3
Feb	7	116	1,380	157	56	170	159	195	96	811	291	.....
Mar	.....	195	1,617	194	39	131	197	218	93	730	292	4
Apr	12	301	1,645	241	127	124	309	226	132	1,000	332	8
May	17	112	941	63	176	90	333	136	68	1,138	316	15
June	.....	17	1,016	216	81	181	157	203	89	743	381	16
July	.....	52	964	389	383	191	260	221	27	1,241	480	17
Aug	10	.....	664	804	692	285	144	279	54	1,190	425	7
Sept	.....	.....	540	767	523	453	170	190	60	1,216	450	18
Oct	34	.....	468	571	382	378	138	89	23	1,200	216	25
Nov	.....	.....	898	486	260	449	195	39	11	1,150	141	13
Dec	.....	5	793	177	179	343	175	59	15	1,571	216	11
Total	80	798	11,849	4,232	2,938	2,841	2,271	2,097	731	12,419	3,736	137

Months.	Gray goods.															
	Mulls.			T-cloths.				Sheetings.	Drills and jeans.	Chuddars.	Dhooties.	Dhooty bordered.					Sundries not classified.
	39 inches.	44 inches.	50 to 54 inches.	3 to 4 pounds.	5 pounds.	6 pounds.	7 pounds.					Shirtings.	Madapollams.	Jaconets.	Mulls.	T-cloths.	
Jan	10	60	...	224	127	62	159	5	392	109	2,856	20	30	....	....	....	46
Feb	14	84	...	426	174	34	113	5	293	46	3,514	25	40	....	....	....	38
Mar	8	107	...	375	66	75	112	15	642	49	4,506	36	30	....	....	....	40
Apr	14	123	...	675	72	43	168	71	530	136	5,001	23	24	....	....	....	22
May	41	74	...	367	65	145	110	20	505	40	4,654	36	1	....	....	....	.....
June	18	95	...	376	104	123	67	6	371	299	5,103	28	8	....	....	....	5
July	40	75	...	298	78	84	71	8	223	286	7,053	44	13	....	....	....	50
Aug	15	24	...	535	38	43	91	26	416	780	6,045	16	17	....	....	....	92
Sept	20	18	...	485	31	40	23	30	555	866	7,274	11	....	....	....	....	85
Oct	....	21	...	391	51	14	37	7	557	1,783	4,892	23	8	....	....	....	46
Nov	....	....	....	498	224	96	81	26	715	1,438	6,190	36	....	....	....	....	56
Dec	....	45	...	422	242	124	144	14	953	254	7,173	11	....	....	....	....	79
Total	180	726	...	5,072	1,272	883	1,176	233	6,152	6,086	64,261	309	171	....	....	....	559

Statement showing piece goods imported into Calcutta, etc.—Continued.

1886—Continued.

Months.	White goods.														
		Jaconets.			Mulls.										
	Shirtings.	36 inches and under.	36⅛ to 39½ inches.	40 inches and upwards.	36 inches and under.	Over 36 to 39½ inches.	40 to 45 inches.	46 to 54 inches.	Over 54 inches.	Cambrics and cottons.	Tanjibs.	Book muslins.	Checks, spots, stripes, etc.	Lappets.
Jan	650	139	196	579	67	98	723	94	25	13	69	88	168	522
Feb	636	209	524	8-0	186	110	867	150	36	26	54	66	172	492
Mar	652	331	338	1,282	168	155	796	212	9	38	98	90	123	369
Apr	1,141	563	415	1,659	208	183	1,346	237	10	54	132	126	157	374
May	689	481	315	1,145	157	140	983	279	30	34	111	37	220	253
June	1,069	418	466	935	138	140	1,076	240	67	18	60	64	231	272
July	1,137	392	513	1,738	226	260	1,003	233	19	23	84	48	201	272
Aug	1,199	510	477	1,557	116	256	836	167	9	18	113	22	114	99
Sept	1,164	599	743	1,569	173	366	660	90	16	26	136	10	93	400
Oct	1,103	445	382	1,108	74	229	738	142	29	3	76	38	132	160
Nov	1,164	391	383	1,172	187	362	812	96	13	7	72	33	127	251
Dec	1,069	405	383	1,052	147	625	1,235	63	38	4	54	108	127	398
Total	11,673	4,883	5,135	14,676	1,847	2,924	11,075	2,003	301	264	1,059	730	1,865	3,862

Months.	White goods.					Colored goods.							
						Turkey-red.							
						Cambrics.							
	Scarfs.	Sarries.	Dhooties.	Drills and jeans.	Sundries not classified.	7-8.	9-8.	Shirtings.	Jaconets.	Mulls.	Mull stripes.	Twills and dimities.	Lappets.
Jan	666	76	282	86	49	1,458	57	398	29	108	.....	.....	.....
Feb	946	70	241	56	35	1,460	171	695	39	210	3	9	7
Mar	953	57	215	110	94	1,468	134	678	70	169	17	.....	.....
Apr	909	65	222	56	59	1,737	155	1,038	61	45	2	.....	5
May	998	73	170	121	100	1,670	210	1,206	38	100	2	37	.....
June	1,033	54	302	67	70	1,854	239	1,201	47	95	.....	6	.....
July	1,361	84	307	70	45	2,425	167	1,540	100	139	.....	4	.....
Aug	1,435	73	370	20	9	1,868	187	1,102	93	103	46	28	.....
Sept	1,674	64	417	30	41	1,776	154	906	70	115	9	25	.....
Oct	1,445	63	235	19	15	1,017	333	735	29	69	20	.....	.....
Nov	1,319	107	235	29	41	1,905	234	1,022	18	21	.....	.....	14
Dec	1,109	111	389	21	54	2,099	109	1,299	18	45	3	.....	11
Total	13,848	897	3,385	685	612	20,737	2,150	11,820	612	1,219	102	109	37

Statement showing piece goods imported into Calcutta, etc.—Continued.

1886—Continued.

Months.	Colored goods.											
	Turkey-red.					Dyed.						
	Prints.		Scarfs.	Sarries and dresses.	Sundries not classified.	Shirtings.	Jaconets.	Mulls.	Cambrics and madapollams.	Drills.	Sundries not classified.
	7-8.	9-8.									
Jan	90	65	.....	182	.....	74	49	20	153	9	190
Feb	140	84	.....	128	.....	114	14	7	180	30	210
Mar	61	94	.....	99	.....	188	46	10	230	24	206
Apr	102	79	5	178	.....	210	32	5	301	93	258
May	81	47	15	113	.....	97	2	4	180	55	225
June	53	118	.....	110	3	115	12	.....	213	47	202
July	286	184	.....	135	6	48	3	.....	178	48	334
Aug	256	46	10	133	.....	101	.....	.....	164	16	325
Sept	198	10	.....	245	.....	182	3	3	280	17	323
Oct	163	5	.....	119	.....	67	12	4	94	26	202
Nov	168	62	.....	154	3	94	28	.....	175	51	165
Dec	129	31	15	156	11	28	.....	3	105	48	159
Total	1,727	825	45	1,752	23	1,318	201	56	2,253	464	2,799

Months.	Colored goods.											
	Printed.						Woolens.					
	Muslins.	Cambrics.			Handkerchiefs and scarfs.	Sundries not classified.	Broadcloths.	Other woolens.	Merinoes.	Flannels.	Braid (worsted).	Sundries not classified.
		7-8, under 25 inches.	9-8, 25 to 30 inches.	Over 30 inches.								
Jan	2	43	979	249	15	53	50	103	27	27	69	138
Feb	.....	37	595	202	32	22	14	79	9	14	45	106
Mar	.....	17	863	316	28	51	19	75	16	29	79	227
Apr	1	74	900	476	34	68	27	80	3	22	57	134
May	4	81	939	690	39	64	10	77	1	14	59	109
June	.....	51	1,622	706	37	58	79	230	30	13	25	235
July	5	115	2,496	951	95	64	58	639	29	79	45	300
Aug	.....	173	2,950	741	192	83	140	661	65	203	60	508
Sept	4	172	3,679	1,052	50	52	238	626	67	190	80	669
Oct	....	95	1,900	900	10	184	190	361	36	97	74	351
Nov	4	131	1,735	533	50	64	192	365	38	76	103	383
Dec	2	57	934	310	7	29	77	220	2	25	72	269
Total	22	1,046	19,592	7,126	589	792	1,094	3,516	323	789	768	3,420

Statement showing piece goods imported into Calcutta, etc.—Continued.

1886—Continued.

Months.	Sundries.										
	Nets (cotton).	Silks and satins.	Sateens (cotton, white and colored).	Canvas.	Shawls.		Hosiery.	Cotton thread.		Fancies and sundries.	Umbrellas.
					Woolen (including melton).	Cotton.		Ball.	Reel and card.		
Jan	79	93	13	76	67	11	128	159	54	190	155
Feb	45	74	24	69	7	.....	39	175	25	261	214
Mar	41	80	25	52	14	6	27	158	10	276	317
Apr	103	114	32	48	8	23	34	243	37	189	472
May	51	79	23	95	51	22	20	125	7	155	386
June	38	85	29	68	28	43	27	152	14	194	322
July	39	170	26	76	233	85	59	160	24	205	500
Aug	9	223	23	110	829	198	94	197	29	271	358
Sept	43	349	21	69	990	150	168	235	12	446	385
Oct	7	227	20	26	743	96	154	166	55	225	328
Nov	3	131	8	126	462	30	193	217	55	210	341
Dec	44	155	10	93	115	42	106	143	28	162	309
Total	502	1,780	254	908	3,547	706	1,049	2,130	350	2,784	4,187

Months.	Yarn and twist.													
	Gray yarns.											Colored yarns.	Turkey-red twist.	Monthly total.	Totals from Jan. 1.
	20s and under.	30s.	40s.	50s.	60s.	70s.	80s.	90s.	100s.	110s and upwards.	Assorted numbers.				
Jan	2,082	2	883	57	100	41	41	15	10	18	53	455	1,240	34,587	.....
Feb	1,732	20	632	60	71	45	52	31	30	24	5	287	1,213	39,028	73,615
Mar	2,013	10	1,146	118	165	58	52	26	26	22	4	220	1,425	44,497	118,124
Apr	1,570	1	1,551	210	121	47	70	26	30	27	5	260	1,317	52,571	170,695
May	1,104	....	948	159	92	80	45	29	28	24	1	346	1,409	44,818	215,513
June	1,609	....	502	91	51	57	43	28	25	36	4	321	1,770	46,749	262,377
July	1,783	13	811	105	29	49	29	28	35	31	2	479	2,230	55,035	317,412
Aug	3,176	....	817	145	53	40	17	13	15	9	4	236	1,597	51,755	369,167
Sept	837	..	291	99	93	80	48	20	22	18	2	97	1,431	53,000	422,167
Oct	738	20	435	54	83	34	22	14	15	21	....	29	624	38,495	460,662
Nov	1,352	50	690	81	140	32	36	12	13	18	1	308	735	43,929	504,591
Dec	1,720	34	901	100	127	59	25	15	6	17	7	300	1,082	45,639	550,329
Total	19,726	150	9,607	1,279	1,125	622	480	257	255	265	88	3,338	16,073	550,103	3,464,652

Statement showing piece goods imported into Calcutta, etc.—Continued.

1887.

Months.	Gray goods.												
	Shirtings.												
	34 inches and under.	35 to 39 inches.								41 to 44 inches.		47 to 51 inches.	52 inches and upwards.
		4 to 4.15 pounds.	5 to 5.15 pounds.	6 to 6.15 pounds.	7 to 7.15 pounds.	8 to 8.11 pounds.	8.12 to 9.11 pounds.	9.12 to 10.11 pounds.	10.12 pounds and upwards.	8.7 pounds and under.	8.8 and upwards.		
Jan	168	.....	49	227	1,021	4,024	2,454	1,897	456	.....	525	18	17
Feb	123	.....	36	170	1,155	4,674	3,569	2,040	645	54	896	64	1
Mar	52	5	88	374	1,232	5,754	3,747	2,841	516	12	667	62	.....
Apr	146	52	35	91	1,418	5,306	5,829	4,003	1,013	3	894	171	7
May	137	74	214	10	1,470	4,854	4,181	3,099	697	12	800	100	54
June	94	.....	42	75	1,087	3,961	3,209	2,070	498	.....	443	167	176
July	103	.....	46	84	720	4,069	3,204	1,816	314	3	423	251	169
Aug	154	10	59	366	1,592	4,992	3,251	3,144	673	.....	636	501	565
Sept	121	....		279	1,445	4,094	2,925	2,569	675	15	488	482	554
Oct	278	5	50	183	1,604	5,434	3,732	3,295	888	5	1,104	473	548
Nov	244	.....	15	238	1,174	5,086	4,460	3,086	1,031	5	1,068	204	175
Dec	250	1	28	157	899	4,374	3,418	2,909	1,015	9	980	138	16
Total	1,870	147	662	2,254	14,817	56,622	43,979	32,769	8,421	118	8,924	2,631	2,282

Months.	Gray goods.											
	Madapollams.				Jaconets.			Mulls.			T-cloths.			
	32 inches and under.			45 inches and upwards.	39 inches.	44 inches.	49 to 50 inches.	39 inches.	44 inches.	50 to 54 inches.	3 to 4 pounds.	5 pounds.	6 pounds.	7 pounds.
	2.4 to 2.8 pounds.	2.12 to 3 pounds.	3.3 to 4 pounds.											
Jan	108	121	117	30	1,112	90	5	17	5	.....	277	92	105	74
Feb	133	89	71	63	1,214	170	5	5	34	.....	262	102	78	75
Mar	113	65	164	87	862	142	6	15	58	.....	386	67	77	94
Apr	132	167	241	17	806	163	49	46	69	.....	484	166	74	99
May	143	267	154	59	905	189	31	52	40	5	143	89	7	40
June	61	215	206	119	910	92	6	66	18	.....	190	15	67	97
July	109	262	97	76	978	183	6	18	35	.....	201	19	2	53
Aug	149	354	292	33	1,611	218	14	44	57	.....	235	63	80	27
Sept	185	247	177	25	1,030	131	3	21	20	.....	117	64	119	35
Oct	237	299	543	.....	1,097	209	2	16	24	.....	236	143	52	62
Nov	184	278	390	.....	1,357	267	8	8	35	.....	379	37	39	66
Dec	81	115	134	18	862	241	21	27	40	.....	414	29	13	37
Total	1,635	2,469	2,586	527	12,744	2,095	156	335	435	5	3,324	888	718	759

Statement showing piece goods imported into Calcutta, etc.—Continued.

1887—Continued.

Months.	Gray goods.										White goods.			
					Dhooty bordered.							Jaconets.		
	Sheetings.	Drills and jeans.	Chudders.	Dhooties.	Shirtings.	Madapollams.	Jaconets.	Mulls.	T-cloths.	Sundries not classified.	Shirtings.	36 inches and under.	36½ to 39½ inches.	40 inches and upwards
Jan	.....	379	84	4,213	23	.....	.....	.....	.....	17	720	314	345	488
Feb	13	889	83	5,640	11	.....	.....	.....	.....	13	824	431	225	646
Mar	18	381	145	6,074	41	13	.....	.....	.....	3	853	445	201	903
Apr	35	132	105	6,890	66	17	.....	.....	.....	22	1,129	269	228	1,230
May	31	149	229	5,911	45	.....	.....	.....	.....	.....	1,093	132	184	850
June	36	581	224	5,403	41	11	.....	.....	.....	4	651	145	238	550
July	13	140	491	6,405	101	.....	.....	.....	.....	17	853	156	222	586
Aug	14	384	1,383	7,721	90	20	.....	.....	.....	58	842	184	258	832
Sept	24	588	1,193	4,531	42	14	.....	.....	.....	57	424	140	259	746
Oct	.....	891	1,149	4,388	97	8	.....	.....	.....	67	765	177	371	863
Nov	11	531	730	3,946	140	7	.....	.....	.....	63	1,033	179	595	843
Dec	9	641	388	3,675	102	7	.....	4	.....	28	949	157	410	732
Total	204	5,686	6,204	64,797	799	97	.....	4	.....	349	10,136	2,729	3,536	9,268

Months.	White goods.														
	Mulls.					Cambrics and cottons.	Tanjibs.	Book muslins.	Checks, spots, stripes, etc.	Lappets.	Scarfs.	Sarries.	Dhooties.	Drills and jeans.	Sundries not classified.
	36 inches and under.	Over 36 to 39½ inches.	40 to 45 inches.	46 to 54 inches.	Over 54 inches.										
Jan	141	699	501	139	14	5	34	51	108	548	682	136	420	26	27
Feb	195	404	1,058	73	30	21	7	78	160	357	905	115	537	63	27
Mar	205	178	1,054	112	8	16	18	73	183	288	1,238	40	406	44	98
Apr	216	345	1,039	125	14	9	10	117	99	412	1,032	83	262	44	178
May	64	280	968	83	17	.....	29	56	165	228	904	85	363	101	88
June	75	269	661	80	14	12	11	24	77	92	630	52	303	50	31
July	83	405	381	88	46	10	10	54	63	205	1,203	130	499	51	97
Aug	115	216	627	163	28	33	55	75	132	256	2,142	215	935	90	63
Sept	88	128	540	59	12	17	4	49	42	122	1,246	45	400	44	51
Oct	67	107	669	86	8	15	....	158	68	302	1,621	32	371	93	85
Nov	39	143	678	129	21	29	22	117	87	313	1,180	70	337	49	138
Dec	15	93	604	102	7	10	35	185	90	265	677	56	345	105	177
Total	1,303	3,267	8,780	1,239	219	177	235	937	1,274	3,383	13,460	1,059	5,178	760	1,060

Statement showing piece goods imported into Calcutta, etc.—Continued.

1887—Continued.

Months.	Colored goods.												
	Turkey-red.												
	Cambrics.		Shirtings.	Jaconets.	Mulls.	Mull stripes.	Twills and dimities.	Lappets.	Prints.		Scarfs.	Sarries and dresses.	Sundries not classified.
	7-8.	9-8.							7-8.	9-8.			
Jan	1,427	93	590	39	54	.....	.....	5	99	106	10	97	2
Feb	1,491	54	777	45	107	.....	1	9	79	34	5	197	1
Mar	1,152	26	1,037	18	22	5	.....	9	61	53	.....	119	7
Apr	1,146	120	1,690	95	82	1	.....	4	35	25	10	222	24
May	1,117	49	1,428	43	95	.....	.....	.....	5	167	10	128	2
June	1,025	111	1,596	24	28	.....	.....	.....	60	112	.....	187	2
July	1,197	145	1,057	41	72	.....	.....	12	60	172	5	200	2
Aug	1,556	65	1,618	44	119	.....	.....	27	165	274	.....	403	3
Sept	583	..	809	17	68	.....	.....	12	148	47	.....	96	.....
Oct	837	55	1,368	22	83	.....	.....	36	115	94	.....	212	26
Nov	1,439	45	1,381	5	86	.....	.....	41	80	87	.....	119	43
Dec	1,178	23	929	2	82	.....	.....	12	7	98	.....	191	90
Total	14,148	786	14,280	395	898	6	1	167	914	1,269	40	2,171	202

Months.	Colored goods.											
	Dyed.						Printed.					
	Shirtings.	Jaconets.	Mulls.	Cambrics and madapollams.	Drills.	Sundries not classified.	Muslins.	Cambrics.			Handkerchiefs and scarfs.	Sundries not classified.
								7-8, under 25 inches.	9-8, 25 to 30 inches.	Over 30 inches.		
Jan	25	.....	7	84	16	181	5	33	399	308	44	36
Feb	54	20	5	79	3	187	10	82	577	561	70	74
Mar	121	29	7	93	22	128	.....	52	321	331	58	68
Apr	37	23	3	77	46	159	5	62	601	496	41	65
May	9	1	2	97	75	116	.....	20	565	475	15	30
June	6	.....	.....	88	19	119	.....	18	696	252	12	25
July	8	.....	.....	81	26	228	5	30	869	523	133	52
Aug	11	.....	4	203	94	240	.....	74	1,036	424	113	60
Sept	75	23	3	123	54	157	.....	120	675	282	30	46
Oct	131	52	3	200	48	232	.....	22	722	470	45	58
Nov	84	7	14	184	77	215	.....	47	598	380	67	55
Dec	13	4	11	97	49	212	.....	10	293	252	52	136
Total	574	159	59	1,316	529	2,174	25	570	7,352	4,754	680	705

Statement showing piece goods imported into Calcutta, etc.—Continued.

1887—Continued.

Months.	Colored goods.						Sundries.									
	Woolens.										Shawls.			Cotton thread.			
	Broadcloths.	Other woolens.	Merinoes.	Flannels.	Braid (worsted).	Sundries not classified.	Nets (cotton).	Silks and satins.	Sateens (cotton, white and colored).	Canvas.	Woolen (including Melton).	Cotton.	Hosiery.	Ball.	Reel and card.	Fancies and sundries.	Umbrellas.
Jan	67	84	1	15	73	163	57	84	4	52	31	2	57	213	35	142	261
Feb	21	52	15	24	51	120	45	38	8	58	21	3	42	189	9	185	420
Mar	21	44	....	37	74	89	77	75	14	67	14	....	71	211	14	157	622
Apr	36	63	1	16	38	200	176	51	3	151	.....	....	74	245	26	157	833
May	29	73	3	34	98	101	58	65	13	94	1	....	71	175	11	218	687
June	81	64	4	52	31	135	19	40	28	111	26	15	50	105	13	177	562
July	78	243	1	127	52	226	25	73	34	114	87	79	102	112	7	226	563
Aug	68	684	6	230	99	501	35	206	23	263	263	125	258	129	9	433	664
Sept	138	537	22	237	34	454	6	189	17	124	614	177	263	47	3	273	179
Oct	130	551	41	209	82	526	18	327	17	169	665	102	339	111	4	387	327
Nov	52	470	33	98	96	485	37	217	30	141	377	45	173	112	5	315	263
Dec	21	167	25	93	57	209	74	130	34	101	131	49	123	93	....	273	275
Total ...	742	3,032	152	1,172	785	3,209	627	1,495	225	1,38	2,220	597	1,623	1,742	136	2,943	5,676

Months.	Yarn and twist.															
	Gray yarns.											Colored yarns.	Turkey-red twist.	Monthly total.	Totals from Jan. 1.
	20s and under.	30s.	40s.	50s.	60s.	70s.	80s.	90s.	100s.	110s and upwards.	Assorted numbers.				
Jan	1,327	....	667	9	37	50	22	18	16	19	3	297	1,078	31,667	.....
Feb	1,925	22	896	59	23	59	29	19	17	12	7	216	1,182	38,822	70,489
Mar	1,720	65	1,181	77	83	63	32	36	41	20	4	245	1,198	40,632	111,121
Apr	1,049	132	1,217	104	48	78	69	45	50	25	7	292	1,993	47,828	158,949
May	986	22	250	56	36	52	31	38	26	14	9	383	1,677	39,631	198,529
June	2,270	15	322	72	15	35	27	24	22	18	8	110	1,225	34,225	232,754
July	1,849	10	599	62	103	40	38	23	27	32	12	235	823	36,469	269,223
Aug	2,091	2	466	174	113	98	68	32	34	40	10	403	1,124	51,272	320,495
Sept	1,628	....	717	145	98	54	52	39	43	25	4	253	681	37,092	357,587
Oct	1,576	13	815	125	140	81	63	39	34	29	4	376	1,059	46,167	403,754
Nov	1,922	43	479	117	123	83	47	26	30	32	....	485	1,246	44,000	447,185
Dec	2,074	15	978	125	89	94	56	44	40	23	5	443	1,022	36,653	484,153
Total ...	20,417	339	8,587	1,125	908	787	525	373	380	289	73	3,738	14,308	484,458	3,054,239

Statement showing piece goods imported into Calcutta, etc.—Continued.

1888.

Months.	Gray goods.												
	Shirtings.												
	34 inches and under.	35 to 39 inches.								41 to 44 inches.		47 to 51 inches.	52 inches and upwards.
		4 to 4.15 pounds.	5 to 5.15 pounds.	6 to 6.15 pounds.	7 to 7.15 pounds.	8 to 8.11 pounds.	8.12 to 9.11 pounds.	9.12 to 10.11 pounds.	10.12 pounds and upwards.	8.7 pounds and under.	8.8 pounds and upwards.		
Jan	168	.....	35	231	1,080	3,234	3,245	2,679	840	19	892	84	8
Feb	114	2	26	194	1,140	3,589	3,652	2,377	994	.....	1,298	30	18
Mar	161	.....	.....	270	1,092	4,476	3,343	2,221	969	21	1,306	21	.....
Apr	207	3	125	473	1,567	5,282	3,112	1,850	1,116	.....	999	40	.....
May	124	9	120	578	1,470	4,835	2,671	1,911	705	.....	806	20	17
June	196	90	110	645	1,492	5,965	3,104	1,977	666	25	1,018	124	20
July	142	70	165	460	1,655	4,128	2,189	1,085	290	11	555	78	116
Aug	214	29	76	607	1,981	5,126	3,265	1,529	494	6	890	513	368
Sept	263	40	62	511	1,839	5,314	2,817	1,765	647	16	989	507	461
Oct	256	36	39	492	1,840	5,536	3,130	1,582	732	26	1,311	650	556
Nov	441	55	69	304	2,125	6,852	4,460	2,288	744	15	1,193	838	502
Dec	291	39	111	316	1,885	5,220	3,594	2,356	508	13	1,070	262	133
Total	2,577	373	938	5,081	19,166	59,557	38,582	23,620	8,705	152	12,327	3,167	2,199

Months.	Gray goods.												
	Madapollams.				Jaconets.			Mulls.			T-cloths.			
	32 inches and under.			45 inches and upwards.	39 inches.	44 inches.	49 to 50 inches.	39 inches.	44 inches.	50 to 54 inches.	3 to 4 pounds.	5 pounds.	6 pounds.	7 pounds.
	2.4 to 2.8 pounds.	2.12 to 3 pounds.	3.3 to 4 pounds.											
Jan	44	89	132	35	1,034	225	1	122	50	2	400	78	10	15
Feb	61	153	105	23	1,009	201	5	47	141	4	608	73	28	3
Mar	69	134	205	47	1,058	100	7	33	50	3	581	8	107	77
Apr	107	215	200	55	1,017	157	17	104	56	.....	601	19	32	39
May	49	163	111	5	1,181	109	5	44	33	.....	429	8	23	21
June	75	208	184	42	1,120	200	7	78	42	.....	366	72	4	2
July	24	145	109	6	1,262	173	5	24	31	.....	351	13	52	9
Aug	109	310	79	30	1,760	148	4	38	24	.....	129	6	8	95
Sept	179	145	126	38	1,600	107	10	7	14	.....	214	5	5	53
Oct	82	144	194	70	1,906	126	.....	.....	9	.....	88	39	15	34
Nov	102	308	371	106	2,247	148	2	28	13	.....	55	29	1	49
Dec	41	262	251	49	1,558	124	7	26	18	10	57	79	44	80
Total	942	2,276	2,067	506	16,752	1,818	70	551	481	19	3,859	429	329	477

Statement showing piece goods imported into Calcutta, etc.—Continued.

1888—Continued.

Months.	Gray goods.										White goods.			
					Dhooty bordered.							Jaconets.		
	Sheetings.	Drills and jeans.	Chudders.	Dhooties.	Shirtings.	Madapollams.	Jaconets.	Mulls.	T-cloths.	Sundries not classified.	Shirtings.	36 inches and under.	36½ to 39½ inches.	40 inches and upwards.
Jan	15	261	280	4,309	65	5	.....	.....	.....	8	1,151	312	599	812
Feb	7	200	620	4,823	123	1	.....	.....	.....	17	1,120	479	537	925
Mar	28	552	260	4,686	78	19	.....	.....	.....	.....	1,461	311	663	987
Apr	4	655	464	4,642	115	28	.....	.....	.....	11	1,528	426	849	1,458
May	12	544	408	5,973	74	7	.....	.....	.....	5	1,334	294	849	1,187
June	33	710	356	5,892	40	.....	.....	.....	.....	25	1,495	282	1,044	1,501
July	7	686	556	4,731	18	.....	.....	.....	.....	45	995	166	787	1,076
Aug	63	907	1,385	6,688	.....	.....	.....	.....	.....	80	977	230	1,071	1,432
Sept	9	686	1,282	6,697	12	.....	.....	.....	.....	90	863	171	866	1,588
Oct	8	594	2,142	5,421	97	2	.....	.....	.....	56	776	222	828	1,108
Nov	10	1,116	1,221	6,215	156	4	.....	.....	.....	56	952	295	1,024	832
Dec	7	965	927	4,992	90	2	.....	.....	.....	38	721	264	555	480
Total	203	7,876	9,901	65,069	868	68	.....	.....	.....	431	13,383	3,452	9,672	13,386

Months.	White goods.														
	Mulls.														
	36 inches and under.	Over 36 to 39½ inches.	40 to 45 inches.	46 to 54 inches.	Over 54 inches.	Cambrics and cottons.	Tanjibs.	Book muslins.	Checks, spots, stripes, etc.	Lappets.	Scarfs.	Sarries.	Dhooties.	Drills and jeans.	Sundries not classified.
Jan	49	169	678	161	11	29	67	113	66	508	983	97	390	96	113
Feb	47	182	846	231	58	53	53	109	118	401	1,762	184	388	94	100
Mar	31	173	737	225	21	90	26	159	87	395	1,161	133	317	111	187
Apr	139	149	650	197	31	24	32	123	157	294	975	96	344	133	124
May	101	214	489	183	51	15	22	99	176	220	727	78	178	186	150
June	197	233	512	116	13	16	9	53	158	90	1,023	27	253	226	99
July	51	239	385	164	61	37	.....	64	128	354	1,099	50	356	46	92
Aug	52	510	476	112	81	20	29	104	130	140	1,614	70	613	103	55
Sept	135	613	598	89	32	20	11	66	104	215	1,498	110	526	97	35
Oct	81	525	860	107	141	22	75	73	85	319	1,390	71	323	62	81
Nov	143	525	880	151	30	36	21	174	34	342	1,462	46	271	69	36
Dec	83	481	799	308	16	26	.....	74	85	246	956	49	151	55	79
Total	1,109	4,013	7,910	2,044	546	388	345	1,211	1,328	3,524	14,650	1,011	4,110	1,278	1,151

Statement showing piece goods imported into Calcutta, etc.—Continued.

1888—Continued.

Months.	Colored goods.												
	Turkey-red.												
	Cambrics.		Shirtings.	Jaconets.	Mulls.	Mull stripes.	Twills and dimities.	Lappets.	Prints.		Scarfs.	Sarries and dresses.	Sundries not classified.
	7-8.	9-8.							7-8.	9-8.			
Jan	1,384	23	662	.....	137	.....	.....	10	.....	46	.....	102	113
Feb	1,408	83	535	5	107	.....	.....	.....	17	59	.....	260	86
Mar	1,405	98	735	28	100	.....	.....	1	107	69	.....	181	35
Apr	1,466	83	1,011	53	118	.....	.....	.....	37	91	.....	157	30
May	1,463	23	958	46	95	.....	.....	.....	176	75	10	334	10
June	1,564	73	955	71	101	.....	.....	.....	141	90	1	68	12
July	1,316	93	1,343	99	143	57	.....	5	73	89	12	237	19
Aug	1,001	16	847	39	211	.....	.....	3	185	32	2	307	19
Sept	975	26	717	21	136	.....	.....	6	115	75	.....	186	12
Oct	996	14	1,189	42	122	.....	.....	18	60	47	19	216	56
Nov	1,051	64	1,557	80	170	.....	.....	16	60	60	1	156	44
Dec	903	16	1,186	27	130	.....	.....	7	17	17	.....	141	56
Total ...	14,932	612	11,695	511	1,570	57	.....	66	988	750	45	2,345	492

Months.	Colored goods.											
	Dyed.						Printed.					
								Cambrics.				
	Shirtings.	Jaconets.	Mulls.	Cambrics and madapollams.	Drills.	Sundries not classified.	Muslins.	7-8, under 25 inches.	9-8, 25 to 30 inches.	Over 30 inches.	Handkerchiefs and scarfs.	Sundries not classified.
Jan	22	15	3	82	103	295	.....	24	214	248	103	57
Feb	21	4	3	147	96	298	5	13	352	239	86	125
Mar	27	10	11	147	36	317	.....	18	265	452	59	45
Apr	5	.....	9	132	42	282	9	47	389	485	83	88
May	15	10	16	85	58	240	30	14	336	489	49	98
June	26	.....	8	69	73	175	20	67	428	471	61	193
July	39	.....	14	99	67	166	.....	11	823	578	57	211
Aug	50	.....	4	171	56	246	5	183	889	630	297	379
Sept	60	10	10	207	47	306	2	143	867	838	37	174
Oct	65	.....	16	158	45	206	9	65	1,030	744	69	65
Nov	17	.....	1	129	27	231	4	187	1,002	571	34	52
Dec	29	.....	4	77	56	223	1	121	539	432	41	33
Total ...	376	49	99	1,503	706	2,985	85	893	7,134	6,177	976	1,520

Statement showing piece goods imported into Calcutta, etc.—Continued.

1888—Continued.

Months.	Colored goods.						Sundries.									
	Woolens.										Shawls.			Cotton thread.			
	Broadcloths.	Other woolens.	Merinoes.	Flannels.	Braid (worsted).	Sundries not classified.	Nets (cotton).	Silks and satins.	Sateens (cotton, white and colored).	Canvas.	Woolen (including Melton).	Cotton.	Hosiery.	Ball.	Reel and card.	Fancies and sundries.	Umbrellas.
Jan	26	169	35	30	84	226	66	109	42	100	11	20	62	119	15	250	508
Feb	14	32	2	63	78	110	110	64	45	76	5	18	74	174	12	215	766
Mar	55	34	4	56	62	204	116	94	50	39	3	16	65	175	....	230	987
Apr	38	40	3	39	81	147	98	92	21	102	9	7	97	144	14	352	949
May	31	67	1	60	150	102	22	135	32	82	2	6	115	111	11	253	918
June	47	201	36	59	55	181	9	64	23	96	14	8	81	104	15	299	999
July	43	193	16	77	79	235	5	134	9	95	187	38	76	120	14	359	657
Aug	80	498	27	174	89	634	4	130	39	104	934	38	294	173	14	420	419
Sept	63	451	53	182	82	453	17	169	30	83	651	127	426	61	7	350	289
Oct	102	276	50	185	75	477	4	125	50	74	518	89	371	144	19	303	499
Nov	120	150	45	267	103	329	25	145	4	81	498	85	365	132	8	306	480
Dec	47	99	13	50	117	222	7	70	12	102	216	23	141	186	16	219	414
Total	666	2,210	285	1,242	1,055	3,320	483	1,331	357	1,034	3,048	475	2,167	1,643	145	3,556	7,885

Months.	Yarn and twist.														
	Gray yarns.											Colored yarns.	Turkey-red twist.	Monthly total.	Totals from Jan. 1.
	20s and under.	30s.	40s.	50s.	60s.	70s.	80s.	90s.	100s.	110s and upwards.	Assorted numbers.				
Jan	2,055	133	757	76	94	63	55	27	21	26	....	429	1,498	36,848	.....
Feb	2,328	15	1,008	129	146	63	45	27	38	40	3	575	1,240	40,847	77,695
Mar	1,229	49	937	93	196	100	76	42	39	31	2	642	1,333	40,362	118,057
Apr	770	36	893	104	175	130	88	38	30	18	3	662	1,429	42,267	160,324
May	898	15	939	18	143	84	62	17	16	13	4	445	1,264	39,669	199,993
June	1,273	27	865	50	77	71	87	37	21	20	....	170	841	42,732	242,725
July	3,412	20	841	100	65	46	49	21	18	19	6	161	880	38,867	281,592
Aug	2,346	5	698	152	62	66	69	32	34	36	11	164	564	48,642	330,234
Sept	2,689	11	535	57	54	79	44	21	25	17	1	151	457	46,752	376,986
Oct	1,676	88	1,199	149	59	75	38	28	23	21	1	257	636	47,224	424,210
Nov	1,293	84	1,120	175	72	71	50	28	27	18	2	527	925	52,491	476,701
Dec	2,940	....	908	139	49	71	75	29	26	16	4	633	1,026	42,779	519,480
Total	22,909	483	10,700	1,242	1,192	919	738	347	318	275	37	4,816	12,093	519,480	3,207,997

BOMBAY.

THE CHAMBER OF COMMERCE,
Bombay, July 24, 1889.

B. F. FARNHAM, Esq.,
Consul for the United States, Bombay:

DEAR SIR: With reference to your letter No. 476 of the 18th instant, I am directed by the committee of the Chamber of Commerce to hand you the accompanying statements showing the quantities and values of textile fabrics imported into Bombay from foreign countries during the years 1887–'88 and 1888–'89. As to the weight per yard, I regret it is not possible to give this in each particular case, but the average values of the different descriptions of goods imported have been shown, and these may also give you an idea as to how the various goods are purchased. As regards the place of manufacture, this also can not be given, but the countries from which the goods have been imported are shown as fully as possible.

There are no import duties on any kind of cotton goods.

I am, dear sir, yours faithfully,

JOHN MANHALL,
Secretary.

Quantities and values of cotton textile fabrics imported into Bombay from foreign countries during the official years 1887–'88 and 1888–'89.

Articles and countries whence imported.	1888–'89.		1887–'88.	
	Quantities.	Value.	Quantities.	Value.
PIECE GOODS.				
Gray (unbleached):	*Yards.*	*Rupees.**	*Yards.*	*Rupees.**
United Kingdom	324,974,641	37,256,705	299,224,112	32,653,295
Austria	8,717	4,113	.....	.....
France	8,000	3,906	.....	.....
Italy	39,746	21,650	25,096	13,566
Zanzibar	1,550	325	1,950	230
United States	2,528,800	548,333	627,000	128,512
Aden	44,790	9,544	121,528	23,914
Arabia	10,433	2,226	21,600	2,141
China	44,029	7,773	64	13
Japan	.....	.....	78	7
Persia	3,615	280	10,156	1,020
Straits Settlement	2,157	327	900	150
Total	327,666,478	37,855,182	300,032,484	32,822,848
White (bleached):				
United Kingdom	176,017,058	21,480,823	118,564,498	15,900,841
Austria	375,499	117,541	562,383	177,018
Belgium	6,800	900	22,325	3,231
France	134,962	49,007	34,879	11,187
Germany	.....	.....	436	463
Italy	793,783	230,179	350,945	110,954
United States	.....	.....	2,000	600
Zanzibar	600	225	245,000	60,888
Natal	100	22	.....	.....
Aden	2,912	315	6,578	1,016
Arabia	4,600	890	1,150	375
Ceylon	3,580	1,495	.....	.....
China	3,191	630	160	70
Straits Settlement	4,138	692	872	141

*One rupee = 32.3 cents.

Quantities and values of cotton textile fabrics imported into Bombay, etc.—Continued.

Articles and countries whence imported.	1888–'89.		1887–'88.	
	Quantities.	Value.	Quantities.	Value.
PIECE GOODS—continued.				
White (bleached):	*Yards.*	*Rupees* *	*Yards.*	*Rupees.**
Persia	4,600	835	1,206	134
Turkey in Asia	40	5	1,592	255
Madagascar	.....	.....	280	56
Mauritius	.....	.....	20	16
Total	177,351,863	21,883,559	119,794,324	16,267,245
Colored, printed, or dyed:				
United Kingdom	148,562,785	21,281,954	132,178,916	19,417,850
Austria	400,847	102,052	881,622	173,767
Belgium	117,178	30,663	127,567	37,754
France	426,433	273,817	1,268,763	718,807
Germany	54,221	17,745	56,754	14,554
Holland	13,945	5,042	11,250	3,500
Italy	920,869	178,801	280,988	80,112
Zanzibar	20,148	4,653	1,108	187
Egypt	16,508	5,100	10,886	3,598
Mauritius	5,430	543	.....	.....
Natal	174	68	.....	.....
Aden	8,168	1,087	3,826	560
Arabia	29,219	16,834	82,350	45,558
Ceylon	1,932	869	44	35
China	1,610	514	4,820	2,066
Japan	679	171	144	48
Straits Settlement	43,996	8,242	13,615	2,821
Persia	36,054	7,790	28,704	5,912
Turkey in Asia	5,378	957	5,425	1,062
Total	150,665,574	21,936,902	134,956,782	20,508,191
Handkerchiefs and shawls:	*Number.*		*Number.*	
United Kingdom	11,891,244	1,280,520	10,796,875	1,133,995
Austria	99,582	24,363	8,060	6,117
France	1,596	996	.....	.....
Germany	22,660	21,556	25,264	21,480
Italy	65,856	15,876	8,772	2,369
Zanzibar	4,080	426	8,020	1,470
Egypt	74	100	.....	.....
China	288	72	1,200	50
Japan	108	9	.....	.....
Straits Settlement	2,616	436	36	5
Persia	3,604	606	3,330	6,985
Turkey in Asia	181	61	199	66
Arabia	.....	.....	64	128
Victoria	180	20	.....	.....
Ceylon	.....	.....	24	9
Total	12,092,069 =1,007,672 dozens.	1,345,041	10,851,814 =904,320 dozens.	1,172,674
Lace and patent net:	*Yards.*		*Yards.*	
United Kingdom	1,264,866	283,538	1,801,409	387,611
Austria	86,087	39,269	67,462	38,339
France	10,009	6,524	11,919	5,525
Italy	53,588	29,366	31,575	20,172
Egypt	6,231	1,724	.....	.....
Ceylon	.....	.....	200	100
China	.....	.....	353	104
Total	1,420,781	360,421	1,915,918	451,851
Thread, sewing:	*Pounds.*		*Pounds.*	
United Kingdom	308,928	463,490	361,075	484,792
Austria	.....	.....	760	713
Belgium	426	155	2,857	2,671
Germany	2,254	2,856	2,526	2,647
Aden	186	343	.....	.....
Ceylon	7,206	1,328	.....	.....
Persia	70	70	.....	.....
China	.....	.....	1,000	2,500
Straits Settlement	.....	.....	1	1
Turkey in Asia	.....	.....	3	1
Total	319,070	468,242	368,222	493,325

* One rupee = 32.3 cents.

Quantities and values of cotton textile fabrics imported into Bombay, etc.—Continued.

Articles and countries whence imported.	1888-'89.		1887-'88.	
	Quantities.	Value.	Quantities.	Value.
PIECE GOODS—continued.				
Hosiery, canvas, etc.:	*Yards.*	*Rupees.**	*Yards.*	*Rupees.**
United Kingdom		646,830		615,136
Austria		61,176		17,396
Belgium		18,135		9,217
France		1,310		896
Germany		32,415		6,096
Italy		8,182		222
Egypt		75		580
United States		37		22
Aden		438		150
Ceylon		146		
Zanzibar		175		
China		177		
Straits Settlement		8		62
Persia		547		6,778
Turkey in Asia				6
Arabia				1,665
Total		776,651		658,226
Total imports of cotton fabrics		84,625,998		72,374,360

* One rupee = 32.3 cents.

B. F. FARNHAM,
Consul.

UNITED STATES CONSULATE,
Bombay, July 26, 1889.

CEYLON.

REPORT BY VICE-CONSUL PATERSON.

(1) The quantity imported per annum is about 3,000,000 pieces.

(2) The weight per yard depends on the kind. Gray shirting, for instance, varies from 7 to 12 pounds per piece of 30 yards.

(3) They are purchased by the piece.

(4) They are manufactured chiefly in and imported from the United Kingdom and British India.

(5) The duty charge is 5 per cent.

W. B. PATERSON,
Vice-Consul.

UNITED STATES CONSULATE,
Colombo, September 2, 1889.

CHINA.

CHIN KIANG.

Table of cotton goods imported at Chin Kiang (from Shanghai and Hong-Kong) during 1888.

Description of goods.	Pieces.	Length.	Width.	Weight per piece.	Duty.		Place of manufacture.
					Per piece.	Total.	
Shirtings:		*Yards.*	*Inches.*	*Pounds.*	*m. c. c.*	*Hk. tls.m.c.c.*	
Gray, plain	892,971	39	39	10	0 8 0	71,437 6 8 0	Manchester, England.
White, plain	113,894	40	36	7	0 8 0	9,111 5 2 0	Do.
White, figured, etc.	50	40	36	7	1 0 0	5 0 0 0	Do.
Dyed, plain	770	40	36	6	1 5 0	115 0 0 0	Do.
Dyed, figured, brocaded, etc	19,936	40	36	7	1 5 0	2,990 4 0 0	Do.
T-cloths	96,481	24	32	7	0 4 0	3,859 2 4 0	Do.
Drills:							
English	41,216	40	29	15	1 0 0	4,121 6 0 0	Do.
Dutch	2,280	40	30	15	1 0 0	228 0 0 0	
American	21,660	40	30	15	1 0 0	2,166 0 0 0	Massachusetts.
Jeans:							
English	1,810	30	31	8	0 7 5	135 7 5 0	Manchester, England.
American	280	30	31	8	0 7 5	21 0 0 0	Massachusetts.
Sheetings:							
English	38,565	40	36	15	0 8 0	3,085 2 0 0	Manchester, England.
American	1,548	40	36	15	0 8 0	123 8 4 0	Massachusetts.
Chintzes, furnitures, etc	69,213	24	30	5	0 7 0	4,844 9 1 0	Manchester, England.
Printed twills	12,993	25	31	3	0 7 0	909 5 1 0	Do.
Turkey red cottons	30,926	25	31	4	1 5 0	4,638 9 0 0	Glasgow.
Cotton lastings, plain and figured	44,475	30	31	5	2 0 0	8,895 0 0 0	Manchester, England.
Cotton damasks	403	40	36	10	2 0 0	80 6 0 0	Do.
Velvets	2,846	35	22	6	1 8 0	512 2 8 0	Do.
Velveteens	1,112	35	18	9	1 5 0	166 8 0 0	Do.
Jaconets and cambrics	6,150	24	30	7	0 7 0	430 5 0 0	Do.
Lawns and muslins		12	42	2			
Dimities		12	40	3			

A. C. JONES,
Consul.

UNITED STATES CONSULATE,
Chin Kiang, November 8, 1889.

FOO-CHOW.

REPORT BY CONSUL CAMPBELL.

COTTON TEXTILES IN CHINA.

The principal imports from foreign countries into China are received first at Hong-Kong and Shanghai and from thence are carried by coasting vessels to other points and find their way into the country Regular communication by steam-ships and sail vessels is kept up between the great shipping centers of the world and these two ports. The carrying trade with foreign country is largely done through this medium, coasting vessels, however, run regularly from these points to

the several ports along the sea-board thus distributing the cargoes discharged at Hong-Kong and Shanghai. The returns made by the custom-house officials of imports received at Hong-Kong and Shanghai should show from what countries the goods received at these points were imported, whereas at other points all imports received through these two places are tabulated under Hong-Kong and Shanghai respectively. This statement is made to show that there is no way of ascertaining here the place of manufacture of the goods received here through Hong-Kong or Shanghai.

FOO-CHOW IMPORTS.

The importation of cotton textiles for the year 1888 shows an increase over the preceding year.

The total importation of cotton goods of all kinds in 1887 amounted to 762,046 taels; in 1888 the imports amount to 783,792 taels, showing a net increase of 21,746 taels. The cotton productions of America show an appreciable gain over the preceding year.

The value of American drills imported in 1887 amounts to 13,313 taels. In 1888 the returns show their value to be 15,330 taels. There is quite an increase in the imports of English drills. In 1887 the figures were 927 taels, while for this year they are 3,226 taels.

Cottons imported into Foochow in 1888.

Kinds.	Value.	Kinds.	Value.
	Taels.		*Taels.*
Shirtings:		Cotton damasks	456
Plain	139, 763	Velvets	10, 004
White	68, 321	Velveteens	285
Dyed	8, 218	Jaconets, cambrics, lawns, muslins, and dimities	11, 351
Figured, etc	6, 044	Handkerchiefs	5, 967
T-cloths	464, 705	Towels	1, 363
Drills:		Japanese cotton cloth	1, 738
English	3, 226	Cotton goods, unclassed	3, 677
American	15, 330	Cotton yarn	4, 285
Jeans, English	870	Cotton thread	2, 606
Sheetings, English	7		
Chintzes and furniture	9, 533	Total	783, 792
Cotton prints, plain	984		
Turkey red, cottons	16, 884		
Cotton lastings, plain and figured	8, 175		

IMPORTS FROM THE UNITED STATES.

There are no means of ascertaining the kind and quality of goods imported at this port. There are two large American houses engaged in trade here, but, strange to say, most of the goods sold are purchased from London instead of from American cities. Various explanations are given for this, but the most convincing is that goods can be laid down here at less cost from London than from the United States cities. Trade is rarely governed by patriotic principles; profit is its guiding star.

It is certainly true that the American merchants do not exercise that care and judgment in packing goods shipped to foreign countries that the English or Germans do, and this is having a deleterious effect upon the American foreign trade.

I witnessed an English ship discharging its cargo here and the difference in the packing of goods put up in London and San Francisco was plainly seen. There was not that strength and neatness in the packages from San Francisco as in those from London. The officers of the ship spoke of this, and demonstrated clearly the loss and damage which resulted from careless and insufficient packing. The English predominate in business affairs in this country. The banking houses and steam-ship companies are largely under the control of the English.

DUTIES ON IMPORTS.

The officials at this port do not keep a separate record of the amount of duties paid on piece goods alone. If imported from Hong-Kong full import duties would be charged thereon, but if imported from Shanghai or other Chinese ports they would probably be covered by exemption certificates, and therefore would not be chargeable with import duties at this port. The import duties are levied in accordance with the British Treaty of Tientsin of 1858, agreed upon at Shanghai in November 1858.

This tariff is identical with the tariff appended to the treaty between China and the United States of America concluded Juy 3, 1844, and proclaimed April 18, 1846. Class 10 of that tariff covers all cotton fabrics and is as follows.

[*Extract from Chinese tariff.*]

	*T.	M.	C.
Fabrics of cotton and canvas:			
From 75 to 100 chik long and 1 chik to 2 chile 2 tsun wide, per piece	0	5	0
Cotton, allowing 5 per cent. for tare, per 100 catties	0	4	0
Long white cloths 75 to 100 chik long 2 chik 2 tsun to 2 chik 6 tsun wide, formerly divided into superior and inferior fine cotton cloth, per piece	0	1	5
Cambrics and muslins from 50 to 60 chik long and 2 chik 9 tsun to 3 chik 3 tsun wide, per piece	0	1	5
Cottons, gray or unbleached domestic, etc., from 75 to 100 chik long and 2 chik to 2 chik 9 tsun wide, formerly classed as coarse long cloths, per piece	0	1	0
Twilled cottons, gray, same dimensions, per piece	0	1	0
Chintz and prints of all kinds from 60 to 75 chik long and from 2 chik 9 tsun to 3 chik to 3 tsun wide, formerly called ornamental or flowered cloths, per piece	0	2	0
Cotton yarn or cotton thread, per 100 catties	1	0	0
Linen, fine, not formerly in the tariff, from 50 to 75 chik long and 1 chik 9 tsun to 2 chile 2 tsun wide, per piece	0	0	1
Bunting, per chang	0	0	1½

*The tael is the Haikwan tael, and of the value of $1.21 in gold. 1 Haikwan tael equal 10 mace. 10 mace equal 100 candareens. 100 candareens equal 1,000 cash. *T.* stands for tael. *M.* for mace. *C.* for candareens.

All other imported articles of this class, as ginghams, pulicats, dyed cotton, velveteens, silk, and cotton mixtures and mixtures, of linen and cotton, etc., 5 per cent. ad valorem.

Articles not enumerated on the tariff list nor on the free list pay an ad valorem duty of 5 per cent.

CONCLUSION.

There is no information obtainable covering the manner of purchasing from abroad of goods imported, nor is it possible to give an estimate of the weight per yard of the cotton cloth used here. The greater portion of it is manufactured in Manchester, England. In time the manufacturers of the United States may be enabled to increase the sale of their goods in the far East, but competition is strong and active, having well-established communication and a net-work of agencies connecting the treaty ports of China with the places of supply. A knowledge of the wants of the people is almost indispensable, but judgment in the selection of articles, care in packing, and quick dispatch, should never be lost sight of by the exporter.

JNO. TYLER CAMPBELL,
Consul.

UNITED STATES CONSULATE,
Foo-Chow, July 31, 1889.

HONG-KONG.

REPORT BY VICE-CONSUL WITHERS.

Hong-Kong being an entirely free port there are no customs returns, and as no regulations exist (with the exception of those referring to opium) requiring returns of merchandise either imported or exported, the trade of Hong-Kong, large as it is, is not officially recorded. In the absence of recognized statistics, reference to figures is of little value; but even a partial reply to the inquiries contained in the circular of instructions may be of some interest.

Hong-Kong being a distributing center rather than a place of consumption, the bulk of the goods entered here find their way by different routes to the coast ports and ultimately to the interior of China.

The greater part of the cotton goods sold in Hong-Kong are the product of Lancashire looms and are divided into two classes, plain and colored. These are shipped to this country direct from Liverpool and London. Some few imports of cotton goods manufactured in India have taken place, but so far only in insignificant quantities. The trade done in Indian cotton yarn, however, is considerable. American cottons that come here are merely passing through on their way to Chinese ports. Goods are purchased for cash by a class of middlemen acting between the importers and the Chinese dealers.

The following figures are compiled from returns made to the Hong-Kong General Chamber of Commerce during the year 1888, and are, I am informed by the secretary who kindly furnished them, incomplete, as a large part of the trade is carried on by firms who are not members. These figures therefore serve only to show the nature of the trade, as they are misleading as regards quantities:

Articles.	Quantity.	Weight.	Width.	Length.
			Inches.	*Yards.*
Gray shirtings.....pieces..	470,000	6 to 10 pounds..	39	38½
White shirtings.....do....	406,000	.....	36	40
T-cloths.....do....	417,000	6 pounds to 8 pounds 4 ounces.	32	24
English drills.....do....	19,000	14 to 15 pounds	30	40
Turkey reds.....do....	10,000	.....	.....	.....
Brocades, dyed.....do....	11,000	.....	.....	40
Chintzes, assorted.....do....	3,000	.....	28	28
Velvets, black.....do....	4,000	.....	22	.....
Velveteens.....do....	3,000	.....	18	.....
Handkerchiefs, imitation silk.....dozens..	10,000	.....	.....	.....

R. E. WITHERS, JR.,
Vice-Consul.

UNITED STATES CONSULATE,
Hong-Kong, July 30, 1889.

NINGPO.

REPORT BY CONSUL PETTUS.

I have the honor to inclose my reports on cotton textiles imported into this consular district as instructed. It has been a hard matter to arrive at the facts outside of the quantity.

As I had to procure information from native merchants, which but few of them would give, my report is not as full as I would wish. We have no merchants here who are direct importers; all cotton textiles are bought by native merchants here from importers at Shanghai.

I have only given the weight of cotton goods imported from and manufactured in Europe. I find that our American goods are of full weight, of better quality, and much liked by the Chinese.

They are growing in favor with the intelligent Chinese merchants and customers.

McCaslin & Co., American merchants here, inform me that they have just got in a few hundred pieces of American sheetings, drillings, etc., imported direct; this is their first venture in this direction. I hope it may lead to further importation of our cotton textiles.

THOS. F. PETTUS,
Consul.

UNITED STATES CONSULATE,
Ningpo, August 21, 1889.

Import of cotton goods at Ningpo for the half year ending June 30, 1889.

Description.	First quarter.	Second quarter.	One-half year.
EUROPEAN GOODS.			
Shirtings:	*Pieces.*	*Pieces.*	*Pieces.*
Gray	88,910	171,601	260,501
White	25,671	14,413	40,084
T-Cloths	50,695	53,520	104,215
Drills, English	1,260	690	1,950
Jeans:			
English	425	370	795
Dutch	180	.....	180
Sheetings, English	1,545	2,833	4,378
Chintzes	3,976	3,327	7,303
Turkey-red cloths	3,630	963	4,593
Velvets	100	144	244
AMERICAN GOODS.			
Drills	1,875	1,410	3,285
Sheetings	6,120	6,580	12,700

American goods imported into Ningpo (in bales) via Shanghai, in the year 1888.

Articles.	Quantity.	Weight per yard.
		Ounces.
Drills	13,984	5⅜
Jeans	4,060	6 to 8
Sheetings	17,270	5 to 5¼
T-Cloths	1,000	4.

European cotton piece-goods imported (via Shanghai) into Ningpo in the year 1888.

Description.	Quantity.	Weight per yard.	Manufactured.	Duty, United States Gold.
	Pieces.	*Ounces.*		
Shirtings, gray, plain	421,786	2–5	England	Per piece 40 yards by — inches, 8.8 cents.
Do	41,893	3–5	do	
White Irishes	30,496	.....	do	
Shirtings, dyed:				
Plain	200	3¼–4	do	Per piece 40 yards by — inches, 1.65 cents.
Figured, brocaded, and spotted	2,195	3¼–4	do	
T-Cloths	141,876	4–4⅓	do	Not over 24 yards by 34 inches, 4.4 cents; over 24 yards by 34 inches, 8.8 cents.
Drills:				
English	7,730	5½–6	do	Not over 30 inches by 40 yards, 11 cents; not over 30 inches by 30 yards, 8.35 cents.
Dutch	60	3¾–4½	Holland	
Jeans:				
English	9,900	4½–5	England	
Dutch	2,670	4½–5	Holland	
Sheetings, English	4,250	5⅝	England	Per piece, 8.8 cents.
Chintzes and furnitures	11,660	.....	do	Per piece, 7.7 cents.
Printed T-cloths	3,202	4–5½	do	Not over 34 inches by 48 yards, 8.8 cents; not over 34 inches by 24 yards, 4.4 cents.
Printed cotton twills	1,676	.....	do	Exceeding 34 inches by 40 yards, 8.8 cents.
Turkey red:				
Shirtings	8,820	4–5½	do	Not over 46 inches by 24 yards, 7.7 cents.
Cambrics	840	2–2¼	do	Not over 46 inches by 12 yards, 3.85 cents.

European cotton piece-goods imported (via Shanghai) into Ningpo, etc.—Continued.

Description.	Quantity.	Weight per yard.	Manufactured.	Duty, United States Gold.
	Pieces.	*Ounces.*		
Cotton lastings:				
Plain	1,584	.....	England ..	Per piece, 3.85 cents.
Figured	60	.....	....do	
Cotton, Italian:				
Plain	2,248	.....	Italy.....	
Figured	910	.....	....do	
Velvets	1,320	.....	England ..	Not over 34 yards long, 1.65 cents.
Velveteens	102	.....	....do	
Muslins	3,550	.....	....do	Not over 46 inches by 24 yards, 8.35 cents; not over 46 inches by 12 yards, 3.85 cents.
Taffachellas	5,781	5–10	....do	
Blue Denims	300	6	....do	
Cottonades	20	5–8	....do	
Dyed shirtings, short cuts (5 yards and under)	840	*3¼	....do	
Japanese cotton cloths	1,715	.....	Japan	
Cottton goods unclassed	624	.....	.....	

*Average.

PROVINCE OF KWANGTUNG.

REPORT BY CONSUL SEYMOUR, OF CANTON.

QUANTITY AND KIND IMPORTED PER ANNUM.

The official return of the six Imperial custom-houses at the coast port of the province of Kwangtung, show that in 1888, which was nearly an average year, cotton manufactures or textiles were imported to the value of $3,062,640 United States currency. Of this amount about three-fourths (or $2,300,000) consisted of white and gray shirtings; including the better qualities gray shirting cloths, which are designated in custom-house returns, and by British traders and merchants in market reports, as T-cloths, which are really "gray shirtings."

The other fourth of imported cotton textiles (stated in their relative order as to value of imports), consists of chintz and furnitures, velvets and velveteens, dyed, figured, brocaded, and spotted shirtings, drills, towels, plain and printed cambrics, muslins, and lawns, damasks, quilts, and handkerchiefs, cretonne, mosquito netting, Turkey reds, etc.

WEIGHT AND QUALITY.

The circular called for "weight of cotton textiles per yard;" but in China, as in all other countries, such goods as "gray and white shirtings" are described, bought, and sold, with reference to width, length, and weight per piece; and buyers and sellers also take into consideration the fineness or coarseness of texture, and styles of dressing, with the presence or absence of pipe-clay or other materials affecting weight and appearance; as many European goods are "*loaded*." Gray shirtings in lengths of 38½ to 39 yards, and from 36 to 39 inches in width, vary from 6 to 10 pounds per piece in weight.

Gray T-cloths (gray shirtings) in lengths of 24 yards, and 32 inches in width, vary from 6 to 8¼ pounds per piece. White shirtings, in

lengths of 40 yards, and 36 inches in width, vary in weight from 9 to 13 pounds, or even more for strong cloths; and are designated as to quality by reeds 54 to 56 reeds being common, 58 to 60 reeds middling, 64 to 66 being good.

HOW PURCHASED.

Having carefully compared the descriptions and valuations of custom-house appraisers at Canton, with the commercial reports of the Hong Kong Chamber of Commerce, and the most reliable trade reports of Shanghai, for the week ending July 26, 1889, and reduced the Mexican dollar currency of Hong Kong, the "commercial taels" of Shanghai, and of China generally, and the "Haikwan taels" of the Chinese Imperial Customs, to the standard of United States gold currency, I beg to state the following particulars, showing how cotton textiles, and especially gray and white shirtings, are bought and sold in Canton, and at the two great or chief markets for cotton textiles on the coast of China, or Eastern Asia, for Chinese consumption, or use.

Canton and the other ports of Kwangtung province and of southern China get or buy imported or foreign textiles principally in Hong-Kong, where stocks are kept by the large and wealthy foreign merchants, who are well and widely known as commission merchants, ship agents, and owners, etc., to whom consignments are made direct from Europe and America—sometimes, perhaps, on joint account.

The sales are made through Chinese brokers and compradores to native jobbers and dealers in Hong-Kong and Canton; and payments are usually made promptly, or within a week or ten days, if not on delivery of the goods.

At Canton, as at most of the Chinese ports, the foreign merchants give their attention chiefly to execution of orders from Europe and America for the productions of China.

The two ports at which foreign cotton textiles are bought and sold in large quantities are Hong-Kong (for southern China trade) and Shanghai (for central and northern China trade). The quotations of prices at Hong-Kong are given or stated in trade circles in Mexican dollars and cents currency; 74 cents United States currency being about the present value of the Mexican dollar. When the goods are purchased in Hong-Kong they have not been subjected to any duty, as that is a free port; but upon reaching Canton and other ports of China the Chinese imperial customs collect a specific duty on the goods on the basis of pure silver, stated in the Haikwan taels, of the value of about $1.56 Mexican currency, or about $1.15 United States currency. At Shanghai, as throughout China, the commercial tael is about $1.39 Mexican, equal $1.04 United States currency; and the price quoted includes the duty.

Traffic between Canton and Shanghai is extensive enough to keep in motion about fifteen steam-ships, aggregating 20,000 tons. Freights are moderately low. The trip seldom exceeds four days each way. Can-

ton capital seeks and finds employment and investment in all portions of the Chinese Empire and along the cost of eastern Asia, between India and Japan, and it is reasonable to assume that Canton merchants watch the markets of Shanghai and Hong-Kong to get the benefit of the lowest prices of imported cotton textiles, although the two markets might be supposed to assimilate by the ordinary tendency of trade.

Fluctuations in prices of imported cotton textiles are more frequent, sudden, and severe in Shanghai because of the prevalent custom in that city of selling these goods at auction sales, which occur several days in each week, and tend to disturb and unsettle valuations.

Thus Canton and other Chinese trade centers have to look to the two prominent markets of Hong-Kong and Shanghai for supplies of imported cotton textiles, and the prices of those two markets determine valuations of cotton goods of foreign manufacture.

At Shanghai and Hong-Kong regular and accurate trade reports are published on Friday of every week.

It should be kept in view that the Hong-Kong markets are reported in Mexican dollars and cents, and the Shanghai markets are reported in commercial taels, and the Chinese custom-house tariff of duties and valuations is in Haikwan taels. Quotations need explanation. In each tael are 10 mace. In each mace are 10 candarines. In each candarine are 10 cash. The value of the cash is about 1 mill, or one-tenth of a United States cent. The commercial tael is about $1.39 Mexican, equal to $1.04 United States currency, and the Haikwan tael is about $1.56 Mexican, equal to $1.15 United States currency.

PRICES.

Cotton textiles, mostly for this province of Kwangtung, were sold in Hong-Kong during the week ended July 26, 1889, as follows (United States currency):

Gray shirtings, 36 to 39 inches wide, 38½ yards long:	
6 pounds weight	$0.89
7 pounds weight	1.40
8¼ pounds weight (3,550 pieces)	1.37–1.80
9 to 10 pounds weight (1,550 pieces)	2.00–2.25
T-cloth, 32 inches wide, 24 yards long (ordinary):	
6 pounds weight	.89
7 pounds weight	1.22
T-cloths (Mexicans), 32 inches wide, 24 yards long:	
7 pounds weight (7,650 pieces)	1.37–1.80
8 to 8¼ pounds weight (1,250 pieces)	1.52–1.63
Drills (English) 14 pounds weight, 40 yards long (300 pieces)	2.03–2.26
White shirtings, 36 inches wide, 40 yards long:	
54 to 56 "reeds"	1.27
58 to 60 "reeds"	1.63
64 to 66 "reeds" (1,250 pieces)	1.78–1.85
Bookfolds and fine (11,200 pieces)	1.27–3.40
Bombay cotton yarn (1,490 bales)	45.00–60.00

The Canton or Chinese duty, added to the above prices, is about 10 cents, United States currency, per piece (8 candarines) on gray shirtings, heavy T-cloths, and white shirtings; and 5 cents, United States currency, on light T-cloths and about 1 cent per pound on cotton yarn.

Cotton textiles, mostly for northern China, during the week ended July 26, 1889, were sold (United States currency) in Shanghai (duty paid) viz:

Article.	Quantity.	Weight per piece.	Price per piece.
	Pieces.	*Pounds.*	
Gray shirtings	3,000	5½	$0.93
Do	3,000	6	0.98–1.05
Do	3,000	7	1.10–1.65
Do	200,000	8¼	1.42–2.00
Do	.....	9–10	1.73–2.45
Do	6,000	9¾–11	2.08–2.29
Do	.....	12	2.57–2.70
T-cloths	.....	6	.78–1.10
Do	.....	7	.90–1.25
T-cloths (Mexican)	.....	6	1.04–1.15
Do	.....	7	1.04–1.40
Do	.....	8–8½	1.40–2.02
English drills	15,000	.....	2.25–2.78
American drills	25,000	.....	2.57–2.74
White shirtings	12,000	.....	1.69–2.10
English sheetings	30,000	14	2.32–2.60
American sheetings	70,000	14	2.30–2.80
English jeans	6,000	8–8½	1.78–1.82
Bombay yarns	*2,130	.....	56.00–65.00

*Bales.

Probably three-fourths of these goods went to Tien-Tsin for distribution in northern China. The yarn was for central and southern China.

PLACE OF MANUFACTURE.

Fully nine-tenths of the imported cotton textiles brought to Canton (exclusive of yarn) were manufactured in England and imported from Hong-Kong.

The Japanese cotton manufacturers caught the idea of making narrow, plain, and dyed cotton textiles of the ordinary width of native cloth in China, viz, a Chinese foot, or about 14½ English inches; and last year Canton imported these Japanese textiles to the value of about $14,000.

Probably three-fourths or four-fifths of all imported cotton textiles in China are of British manufacture, which are kept in large quantities in hands of foreign merchants in the two principal markets for foreign goods—Hong-Kong and Shanghai.

With my No. 127, dated June 30, 1887, I sent to the Department of State twenty-five specimens of native cotton textiles, made at Canton and vicinity, used in Chinese garments.

Cotton manufactures are being built up in southern China. This province last year imported (mostly from India) yarn to the value of $9,612,000, or more than three times the value of all imported cotton goods besides yarn, and used large quantities of native and imported

raw cotton, which are indications that cotton manufactures are here assuming important and significant proportions.

The Chinese will not change the styles or materials of garments, which have been the same for centuries, and they greatly prefer "home manufactures" to foreign goods for use.

It is merely a question as to time when Chinese prejudice against the improved machinery of Europe and America shall be cast aside for the application of cheap labor to manufactures of cotton and other goods that formerly came from the western nations.

In the meantime British goods take the lead, because there are so many and strong British interests working for the supremacy of British commerce in the East and throughout the world.

DUTIES CHARGED THEREON.

The imperial maritime customs tariff of duties is based partly on the ad valorem and partly on the specific plan.

On gray shirtings, sheetings, and better qualities of T-cloths, and also on white shirtings, the duty is 8 Haikwan candarines per piece (about 10 cents). Narrow and light or thin T-cloths pay a duty of 4 candarines (about 5 cents). Drills call for a duty of 1 mace, or about 15 cents per piece. Jeans duty is about 9 cents per piece. Printed twills pay about 9 cents per piece. Chintz pays the same. On spotted shirtings (white) the duty is 15 cents per piece, and on dyed spotted shirtings the duty is 22½ cents per piece.

The treaty provides for exemption of foreign goods, for interior markets, from all likin and other taxes, upon payment of one-half additional duty, but the exactions of likin-tax officials effectually defeat this treaty stipulation.

COUNTERFEITING AMERICAN BRANDS.

I once took the liberty, in my dispatch No. 75, dated June 15, 1885, to the Department of State, to endeavor to indicate "the best means of extending American commerce in the East," in competition with the formidable organizations of British and German merchants, manufacturers, and capitalists, in strong and close alliance with enterprising business friends from Europe, in all of the cities and trade-centers of the eastern countries, and am now more than ever persuaded and convinced that nothing short of systematic effort and pressure by American manufacturers and merchants upon native dealers in foreign merchandise, through trained and judicious American salesmen, will secure for American productions a merited share in the benefits of Chinese and other Asiatic markets.

British cotton goods are branded to suit the favorable regard of Asiatic buyers with dragons in various forms, elephants, tea-caddies, and Chinese characters giving assurances as to quality, weight, etc.,

with occasional mention of the "hong" or firm by or for whom the merchandise was specially made and imported.

At the Industrial and Cotton Centennial Exposition of New Orleans, in 1885, were exhibited, through the attention of the Department of State, samples of cotton drill, of which large quantities, bearing as the brand or trade-mark the Dragon of China, and the words "Pure and Best American Cotton," with the name of a German firm, found in the Directory of Manchester, England, where the goods were manufactured for the Chinese market, where I found the goods on sale, and more recently, as you are aware, I obtained from the Canton authorities a proclamation for the vindication of a highly reputable trade-mark of an American firm, fraudulent imitations of whose labels were used in selling an inferior article of food in the Chinese market. Such matters need attention.

By concert of action, in promoting their interests in these distant markets, the American manufacturers and merchants would achieve many benefits.

I see no means that would be so effective in guarding and furthering commercial, manufacturing, and industrial interests of the United States, by supplying Asiatic markets with American productions, as the adoption of a vigorous system of exploration and supply, by an efficient corps of well-equipped American salesmen, backed by strong and enterprising merchants and manufacturers in the United States.

CHARLES SEYMOUR,
Consul.

UNITED STATES CONSULATE,
Canton, August 7, 1889.

SHANGHAI.

REPORT BY CONSUL-GENERAL KENNEDY.

In making reports on the trade of Shanghai, which I have done as often as the arduous and varied duties of the office has permitted, I have from time to time furnished the Department with all the information I have been able to obtain on this the most important branch of our trade. I can not obtain such information as will enable me to give a technical report on the numerous phases of this intricate business. The merchants here meet the sharpest of competition, and naturally will not disclose their own secrets.

In answer to point 1, I beg to refer to inclosure No. 1, which shows the import of cotton goods from foreign countries for 1887 and 1888, and inclosure No. 2, showing the import and stocks for the first half year of 1889. In answer to points 2 and 5 I refer to inclosure No. 3,

which is a report made by the Shanghai Chamber of Commerce, dated July 13, giving weight, duty, and market price of the principal lines of cotton goods.

In answer to points 3 and 4, our merchants either have branches or correspondents in the leading cotton goods markets of the United States through whom they buy or receive consignments on commission. I have no data regarding the place of manufacture. Cotton goods are imported from New York principally.

The Haikwan tael, in which the customs revenue is paid, is equivalent to United States $1.15. The Shanghai tael and the United States dollar are, for all practical purposes, the same. The picul is equivalent to 133⅓ pounds avoirdupois.

J. D. KENNEDY,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Shanghai, July 26, 1889.

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1. *Imports (net) of cotton goods from foreign countries*, 1887–'88.

	1887.		1888.	
	Quantities.	Value.	Quantities.	Value.
		H. taels.		*H. taels.*
Shirtings:				
Gray, plain ....pieces..	5,340,363	7,122,074	6,094,638	8,389,516
White, plain ....do....	2,196,127	3,624,469	2,941,433	5,108,698
White, figured, brocaded, and spotted..do....	2,268	3,653	25,678	39,726
Dyed, plain....do....	141,230	295,081	195,581	330,106
Dyed, figured, brocaded, and spotted ..do....	84,285	178,223	78,361	169,973
T-cloths ....do....	2,321,512	2,512,468	2,610,426	2,973,875
Drills:				
English ....do....	288,781	515,076	542,826	982,324
Dutch ....do....	43,501	86,133	56,970	113,940
American ....do....	465,674	1,110,297	496,096	1,244,193
Jeans:				
English....do....	228,002	324,440	106,342	149,251
Dutch ....do....	39,134	63,788	22,650	35,787
American ....do....	40,486	72,847	8,412	15,603
Sheetings:				
English ....do....	662,960	1,358,766	1,039,642	2,128,646
American ....do....	1,368,114	3,311,198	1,557,830	3,894,641
Chintzes, furnitures, and plain prints....do....	661,875	768,509	556,414	689,394
Twills, printed ....do....	46,012	83,957	182,788	350,925
Turkey red....do....	316,823	349,159	494,868	513,133
Lastings, plain and figured....do....	636,649	1,733,991	920,741	2,454,678
Damasks ....do....	5,146	18,920	3,238	10,718
Velvets....do....	51,129	251,075	51,645	256,699
Velveteens ....do...	22,612	105,503	24,294	120,140
Jaconets, cambrics, lawns, muslins, and dimities pieces....	61,992	53,667	368,965	220,686
Handkerchiefs ....dozens..	597,058	241,846	604,032	241,695
Towels ....do ...	172,444	51,356	648,472	184,403
Goods unclassed....pieces..	242,235	220,855	284,229	323,043
Yarn ....piculs..	592,867.55	12,547,653	683,468.40	13,427,150
Thread ....do....	859.96	42,927	1,490.63	68,582
Total	....	37,047,931	....	44,437,525

2. *Description of imports.*

Goods.	Total deliveries.			Total imports.		
	For the fortnight.	For the year from Jan. 1, 1889	Against last year to July 12.	For the fortnight.	For the year from Jan. 1, 1889	Against last year to July 12.
Gray shirtings *.....pieces..	161,472	3,050,592	3,374,115	152,629	3,273,078	3,174,654
T-cloths:						
32-inch .....do....	46,258	750,893	778,824	29,116	689,657	832,539
36-inch .....do....	8,314	184,182	110,095	21,155	274,941	195,955
White shirtings .....do....	45,919	1,002,562	1,006,878	47,502	996,481	1,369,379
Drills:						
English and Dutch.....do....	7,755	147,518	175,200	2,925	244,934	288,762
American .....do....	17,620	163,803	155,165	3,435	344,625	259,490
Jeans:						
English and Dutch .....do....	1,060	64,717	68,714	4,710	48,791	91,983
American .....do....	.....	640	6,945	.....	.....	9,000
Sheetings:						
English .....do....	21,250	289,443	503,306	3,260	182,585	632,653
American .....do....	42,075	587,300	473,886	18,865	433,715	965,305
Dyed shirtings.....do....	2,740	97,340	85,047	2,332	57,934	121,477
Brocaded and spotted shirtings:						
White.....do....	167	1,754	200	.....	1,006	2,502
Dyed .....do....	1,030	17,359	18,765	500	13,376	24,432
Damasks, dyed.....do....	.....	130	600	.....	12	1,132
Chintzes .....do....	9,895	140,540	146,099	3,341	83,610	218,880
Printed T-cloths .....do....	4,581	85,381	99,133	4,128	42,991	107,564
Printed twills. .....do....	744	43,041	47,736	4,591	38,961	103,411
Turkey-red shirtings.....do....	7,733	209,657	204,091	1,432	185,427	242,077
Velvets .....do....	835	17,579	13,534	300	11,495	27,386
Velveteens .....do....	431	6,883	7,784	43	7,430	9,615
Handkerchiefs .....dozens ..	11,990	246,108	163,806	10,533	197,213	368,252
Muslins .....pieces ..	5,897	160,071	183,359	13,691	204,055	310,033
Dimities.....do....	.....	100	630	.....	9	758
Cotton yarn:						
Bombay .....parcels..	5,312	88,234	86,629	630	87,092	91,196
English .....do....	417	20,75	26,718	54	14,939	29,520
Spanish stripes .....pieces ..	1,162	48,507	19,915	746	21,146	29,480
Medium and broad cloths.....do....	253	9,117	11,067	126	8,243	16,228
Camlets .....do....	2,490	45,026	48,334	2,250	56,015	43,268
Long ells.....do....	2,420	35,936	29,929	1,420	46,560	41,237
Lastings ....do....	2,156	52,402	59,387	3,730	60,540	80,978
Lastings crape .....do....	50	1,040	790	.....	820	540
Cotton lastings and Italians...do....	11,223	244,998	311,742	6,297	162,172	712,483
Lusters, plain.....do....	.....	2,206	1,039	.....	2,002	3,296
Figured Orleans.....do....	1,090	14,745	17,129	160	9,117	18,216
Lusters, crape .....do....	.....	.....	.....	.....	.....	.....

Goods.	Stocks at date based on the chamber of commerce returns January 1, 1889.		Stock as returned by importers, June 30, 1889.
	†At date, estimated.	Against July 12, 1888.	
Gray shirtings*.....pieces..	1,181,625	616,616	1,280,997
T-cloths:			
32-inch.....do....	385,034	778,824	561,194
36-inch .....do....	232,514	83,400	201,454
White shirtings.....do....	571,056	449,987	565,866
Drills:			
English and Dutch .....do....	359,601	190,334	338,409
American.....do....	183,857	88,640	170,610
Jeans:			
English and Dutch.....do....	26,150	88,337	28,703
American .....do....	.....	22,260	.....
Sheetings:			
English .....do....	397,148	326,946	436,315
American.....do....	540,050	632,590	520,650
Dyed shirtings.....do....	6,550	36,946	21,581

* Including English and Dutch 12-lbs.

†Exclusive of undeclared import cargoes per Malwa, Glenavon, Ghazee, Dardanus, Yangtsé, Glaucus, Antenor, Jaeon, and Pekin.

2. *Description of imports*—Continued.

Goods.	Stocks at date based on the chamber of commerce returns January 1, 1889.		Stock as returned by importers, June 30, 1889.
	At date estimated.	Against July 12, 1888.	
Brocaded and spotted shirtings:			
White ..... pieces..	302	4,400	2,248
Dyed ..... do....	3,337	4,730	9,259
Damasks, dyed ..... do....	210	303	4,999
Chintzes ..... do....	182,340	17,965	16,619
Printed T-cloths ..... do....		263,423	157,518
Printed twills ..... do....	93,380	19,309	135,096
Turkey-red shirtings ..... do....	154,960	111,263	154,693
Velvets ..... do....	16,800	32,169	15,880
Velveteens ..... do....	9,070	7,670	13,230
Handkerchiefs ..... dozens ..	199,875	287,829	287,552
Muslins ..... pieces ..	183,031	122,328	165,766
Dimities ..... do....	1,775	2,753	1,613
Cotton yarn:			
Bombay ..... parcels ..	14,970	10,904	21,260
English ..... do....	11,820	7,590	12,510
Spanish stripes ..... pieces..	22,152	22,468	22,432
Medium and broad cloths ..... do....	27,610	28,287	25,861
Camlets ..... do....	31,749	29,930	34,750
Long ells ..... do....	30,575	25,950	31,923
Lastings ..... do....	72,748	78,919	80,316
Lastings, crape ..... do....	660	520	1,708
Cotton lastings and Italians ..... do....	409,140	513,674	420,065
Lusters, plain ..... do....	530	598	1,598
Figured Orleans ..... do....	24,856	28,538	30,018
Lusters, crape ..... do....	3,680	.....	2,050

Import cargoes declared during interval: Sachsen, Glenearn, Djemnah, Deucalion, Ulysses, additionals ex Telemachus, Patroclus, Rohilla.

3. *Weights, duty, price, etc.*

Piece goods.	Duty in Haikwan Sycee, at exchange 111.4 sh. tls. per 100 tls.	Prices at private sale.	Prices realized at auction.
Gray shirtings, 38½ yards 39 inches:	*m. c.*		
5 and 6 pounds ..... per piece..		.....	$0.86\frac{3}{4}$–1.11
7 pounds ..... do....		.....	1.16¾–1.43¾
8½ pounds ..... do....	0 8 per piece	$1.43–1.87½	1.30 –1.90½
9.12 to 10 pounds ..... do....		2.06–2.20	1.83¼–2.22½
10.8 to 11 pounds ..... do....		2.29	1.94 –2.40
Heavy ..... do....			
Continental, 12 pounds ..... do....	.....	.....	.....
T-cloths:			
Mexican:			
7 pounds ..... do....	0 8 per piece	1.37½	1.00½–1.42½
8 pounds ..... do....		.....	1.23½–1.65¾
Common:			
7 pounds ..... do....		1.05	.....
8 pounds ..... do....		.....	.....
Printed ..... do....	0 4 per piece	.....	.....
Bombay:			
6 pounds ..... do....		.....	.....
7 pounds ..... do....		.....	.....
8 pounds ..... do....		.....	.....
White shirtings, 40 yards 36 inches:			
60 to 64 reeds ..... do....	0 8 per piece	1.72½–2.02½	1.41–1.47½
66 to 72 reeds ..... do....		.....	1.61¾–1.90½
Fine to finest ..... do....		.....	2.07 –2.10½
White Irishes ..... do....	.....	.....	2.50 –2.21¾
American drills, 40 yards 30 inches ..... do....	1 0 per piece...	2.67½–2.77½	.....
American jeans, 30 yards 30 inches, 8½ pounds.. do....	0 7½ per piece...	.....	.....
American sheetings, 40 yards 40 inches ..... do....	0 8 per piece...	2.20–2.74½	.....
English drills, 40 yards 30 inches, 14 to 15 pounds, per piece	1 0 per piece...	2.65–2.70	1.62½–2.60½
English Jeans, 30 yards 30 inches, 8¼ pounds.. do....	0 7½ per piece...	.....	1.84¾–1.85¾

3. *Weights, duty, price, etc.*—Continued.

Piece goods.	Duty in Haikwan Sycee, at exchange 111.4 sh. tls, per 100 tls.	Prices at private sale.	Prices realized at auction.
English sheetings, 40 yards 40 inches, 14 pounds, per piece	0 8 per piece	2.25	2.10½–2.56½
Bombay sheetings do	1 0 per piece		
Dutch drills, 30 inches, 40 yards do			
Dutch jeans, 30 inches, 30 yards do	0 7½ per piece	1.71	
Dutch sheetings do			
Handkerchiefs, blue, 28 inch per dozen	0 2½ per dozen		
Gentian shirtings per piece			
Brocades and spotted shirtings:			
White do	1 5 per piece		
Dyed do			
Dyed shirtings do			
Damasks, assorted, 40 yards 36 inches do	2 0 per piece		
Chintz, assorted, 28 yards 28 inches do	0 7 per piece		
Turkey reds, 24 yards 32 inches, 1½ to 8 pounds per piece	1 5 per piece		
Velvets, black, 22 inches per yard	1 8 per piece		
Velveteens, black:			
18 inches do	1 5 per piece		.26
26 inches do			
Muslins, 12 yards 42 inches do	0 3½ per piece		
Cotton yarn:			
Bombay, 16–24 per bale	7 0 per picul	57.25–63.00	
English, 24–32 do			
English twist, 28–32 do			
Woolens and worsteds:			
Spanish stripes:			
Scarlet per yard	1 2 chang of 141 inches.		.399–.471
Assorted do			
Medium and broad cloths do	1 2 chang of 141 inches.		
Camlets, English, 56 yards 31 inches per piece	0 5 chang of 141 inches.		8.88 –10.28
Long ells:			
Scarlet, 24 yards 31 inches, 12 pounds do	0 4½ chang of 141 inches.		4.60 –5.17½
Assorted do			
Lastings, 30 yards 31 inches do	0 5 chang of 141 inches.	6.25–8.10	6.80 –8.70
Cotton lastings and Italians do	0 3½ per piece		
Orleans, figured, 30 yards 31 inches assorted per piece			

SIAM.

REPORT BY CONSUL-GENERAL CHILD.

Cotton textile imports of Siam during the year 1888.

Kind.	Pieces.	Value.
White shirtings	128,729	$259,458
Gray shirtings	177,015	283,224
Figured shirtings	16,180	226,696
Turkey red cloth	11,030	14,856
Colored piece goods	109,025	152,275
Long cloths	245	1,220
Prints and chintzes	62,040	74,448
Jaconets and muslins	9,580	10,533
Madopollams	5,090	7,657
Cambrics	74,321	74,321
Miscellaneous piece goods	653,068	489,598
Chowls	102,587	671,460
Total	1,146,910	2,265,746

Cotton textile imports of Siam during the year 1888—Continued.

Kind.	Quantity in piece.	Weight.
	Yards.	*Pounds.*
Gray shirtings	38½	6–12
White shirtings	38½	6–10

These goods are purchased from commission houses in Singapore, Hong Kong, and Penang.

They are imported from Singapore, Hong Kong, and Penang, and are manufactured in Great Britain, Germany, and Switzerland.

Three per cent. duty is charged on these goods.

JACOB T. CHILD,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Bangkok, September 8, 1889.

SPANISH ASIA.

PHILIPPINE ISLANDS.

REPORT BY CONSUL WEBB, OF MANILA.

As may be supposed, in a country where the climate forbids at all seasons of the year the wearing of woolen or other heavy clothing, cotton textiles form an exceedingly important feature of the imports of the Philippine Islands. The millions of natives, the thousands of Chinese, and the majority of the European residents here wear cotton clothing, and, as frequent changes are necessary, the latter, as a rule, consider it expedient to have an abundant supply at all times. The majority of the natives and Chinese generally wear nothing but a shirt and pants of the lightest, cheapest cotton goods, usually white, allowing them to become very much soiled before exchanging them for clean ones. But as the material is the cheapest and flimsiest imaginable, it soon wears out and the wearer is therefore continually replenishing his wardrobe, thus assisting materially in sustaining the cotton-goods trade.

IMPORTS.

The only place at which reliable statistics concerning importations can be obtained is at the Manila custom-house, but the methods of compiling these statistics in vogue there are so very deliberate that it is exceedingly difficult, not to say impossible, to procure the footings of recent entries. And as the Government report for 1888 has not yet been issued, I am compelled to use the report for 1887 in order to reply

to the first question in your instructions regarding the quantity and kind of cotton textiles imported per annum. But as there is no good reason to suppose that there was a marked increase or diminution of the cotton imports in 1888, or that there has been thus far in the current year, the report for 1887, may be taken as representing a fair average of the annual imports.

In the following table the quantities are expressed in pounds and tons instead of in yards, as the custom-house records show for cotton goods kilograms only, and the weight per piece varying so widely it is impossible to estimate the yards imported with any degree of accuracy:

Countries whence imported.	Coarse goods, plain, twilled; figured cloth, double-dyed and stamped, inclusive of warp and woof, counted under a 6-millimeter glass.			Transparent.	
	Up to 25 threads.	26 to 35 threads.	36 threads and upward.	Up to 30 threads.	31 threads and upward.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
England	4,794,944	1,73 9,837	372,363+	524,334+	82,242+
Spain	23,388+	30,278+	255+	466+	8
Scotland	37,019+	70,334	3,920+	10,922+	4,017+
Germany	24,389+	26.353+	6,784+	4,349+	270+
France	54,938	60,926+	17,591+	12,432+	5,880+
Switzerland	8,837+	22,356+	1,966	20,092+	4,615+
Holland	792	402+	1,553+	3,951+	336+
Belgium	2,017+	Nil.	Nil.	451	1,001
Austria	26+	Nil.	Nil.	Nil.	Nil.
United States	858	440	Nil.	Nil.	Nil.
China	9,631+	189+	90+	264	Nil.
Total					

Countries whence imported.	Quilts and piqués.	Velveteens, plushes, and veils.	Tulle, lace, edging, crochet cotton.	Pieces of stuff for suits, etc.	Total weight.	Total value in United States gold.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Tons.*	
England	17,019+	4,078+	13,824+	9,477+	3,779+	$3,310,937.60
Spain	22	149+	242	87,491+	71+	107,316.80
Scotland	1,715	Nil.	Nil.	Nil.	63+	75,364.80
Germany	1,005+	803	2,426+	8,186+	37+	49,595.80
France	226	1,529	1,141+	2,884	78+	93,108.80
Switzerland	Nil.	22	319	275	29+	51,056.80
Holland	Nil.	6½	19¾	6½	3+	6,295.20
Belgium	Nil.	341	Nil.	Nil.	2+	3,095.20
Austria	Nil.	9	Nil.	Nil.	*35	24.20
United States	Nil.	Nil.	Nil.	Nil.	*1,298	472.00
China	Nil.	Nil.	Nil.	Nil.	5+	655.20
Total					4,067+	3,697,962.40

* Pounds.

Two thousand two hundred and forty-eight pounds of cotton lampwick, valued at $490.40 (United States gold), was imported from Spain during the year, and 242 pounds, valued at $52.80, from the United States; 292 pounds of cotton rubber cloth, valued at $425.60, was also imported from the United States.

WEIGHT PER YARD.

The weight per yard is said to vary somewhat even in what are classed as the same grades of goods, and hence it is not possible to give a fixed standard of weight for each class. The following tables, however, will show the weight and wholesale price of, and the duty charged on, eight of the leading white and gray staples:

Class.	Width.	Length.	Weight.	Duty, Manila currency.	Wholesale price per piece.	Threads counted under a 6-millimeter glass.
White shirtings:	*Inches.*	*Yards.*	*Pounds.*			
Fine white	31	40	5.70	$0.68⅛	*$3.62½	44
Medium fine	32	40	6.25	.54½	2.87½	34
Ordinary	32	40	6.80	.59½	2.87½	31
Second ordinary	35	40	7.25	.63	3.00	31
Common	32	40	6.50	.35½	2.50	25
Gray shirtings:						
Fine gray	33	36	7.50	.40½	2.37½	24
Medium heavy	33	36	8.50	.46	2.50	23
Heavy drill	30	40	14	1.21	4.00	27

* The value of the Manila dollar will average 80 cents, United States gold.

Colored goods, prints, ginghams, etc., usually come in pieces of 24 yards each, weighing 3¼ to 5 pounds; the wholesale price to jobbers is from $2.25 to $5 per piece, Manila currency. Prints of the ordinary grades sell to jobbers at from $1.62½ to $ 2.25 per piece.

HOW PURCHASED.

Nearly all the large importing houses in Manila that handle cotton goods are branches of establishments in England or Scotland, which purchase their goods in Europe on private terms and send them here for sale. The managers of the Manila houses are, therefore, principally interested in the actual cost of the goods and their selling price here, and, as a rule, are not authorized to purchase new lines of goods without consulting the heads of the firm in Europe. This applies to the wholesale importing houses only; the larger retail houses of course are at liberty to buy wherever they can make the best terms, although nearly all of them have agents or representatives in Europe through whom most of their goods are bought. When goods of a particular class are needed by the wholesale houses a cablegram or letter is sent to Europe and the goods are sent on by steamer as soon as possible. Goods are usually bought, I am told, on thirty days, or longer time if special arrangements are made between seller and buyer.

Agents or traveling salesmen for cotton goods manufactories very rarely, if ever, come here; a gentleman who represented an English woolen house and who made a business trip to Manila more than a year ago, told me that he could sell no goods here as the retail houses had representatives in Europe, and besides were not willing to accede to

any terms which he considered would warrant his giving them credit. He left, I believe, without making a sale.

Quantities of fancy cotton goods are consigned to the larger houses to be sold on commission, but nearly all the staples are purchased regularly at thirty and sixty days.

PLACE OF MANUFACTURE.

As will be seen by the first table, England furnishes the greatest amount of cotton textiles to the Philippines, the major portion of which comes from Manchester. Probably 75 per cent. of all the white cotton fabrics received at Manila come from and are manufactured in that city. Last year there were imported from Manchester alone 4,374 bales of 50 pieces each, and 13,200 cases or 41,087,164 yards of plain cottons; 7,663,542 yards of dyed and colored; 50,964,227 yards of prints, and 1,074,700 yards of twist. Much of the underwear found in the larger retail stores—the better class of goods—is imported from Spain and France. These stores are generally conducted by Spaniards, and as all goods imported from Spain are admitted free of duty they quite naturally give the preference to them, although, as a rule, the prices are considerably higher than those asked for the corresponding classes of English and German goods.

It will be seen that American cotton fabrics are not largely represented in the list of imports, and although very few of them are seen in this market their reputation is excellent, as is shown by the fact that English made goods are stamped "American" in order to give them character. I was shown recently a piece of goods made at Manchester, which was stamped in large blue letters, "Gray American drill," while 2 or 3 inches below in very small letters were the words: "English manufacture." The merchant who had these goods told me that the American cotton fabrics were much better and more durable than those now sold here, and that this fact was generally admitted, but that the prices were too high to justify their importation. The masses, he said, wanted cheap goods, and while those of American manufacture would wear much longer than any other, this was not deemed a sufficiently strong consideration to warrant the payment of the extra price asked; that several houses here had tried the experiment of importing American cotton goods, but it had never been successful.

AMERICAN VS. ENGLISH COTTONS.

This information is given me by English merchants and importers, who are of course interested in English trade and in maintaining the credit of their country and the reputation of its exports. There is no American house here that imports cotton goods. In reply to my questions upon the subject propounded to merchants here, the statement is invariably made that the high price of American cottons, as well as of

some other classes of goods, is what keeps them out of this market, but it seems to me that I have seen better muslin retailed for 5 cents a yard in Chicago and St. Louis than that which retails here at 7 and 8 cents a yard. It appears possible, therefore, that American muslin could compete here with the English and German goods if the proper effort were made to push it into the trade. The market is here, and it remains with American merchants and manufacturers to say whether it shall be monopolized by England and Germany without a vigorous effort at competition. While I have received circulars and letters from American manufacturers of other goods who are showing a disposition to get into this market, I have never seen any evidence that the cotton manufacturers desired to place their products in this archipelago, where there are over 7,500,000 who, as a rule, wear nothing but cotton clothing.

At present there is not a single house here that imports American cotton goods direct from the United States; those that come here are usually shipped from England or are brought in by the captains of sailing vessels who have a piece or two, sometimes, to give or sell to friends here who want something better than can be had in the stores at about the same price they would have to pay to a Chinese peddler for English or German cotton.

Spanish cottons would be quite as scarce as American were it not for the fact that they are admitted free of duty, for their price to the importer, I am told, is very little, if any, less than that of the latter, and their quality is not as good generally.

German and Swiss muslins and ginghams have a better reputation here than those of any other country, as it is believed that they hold their color better.

The "American drill of English manufacture," just referred to, comes in pieces of 30 yards, 31 inches wide, weighing 11 pounds, and costs $1.87½ per piece, Manila currency; the duty of 96 cents per piece added runs the total wholesale cost up to $2.83½. American goods of the same weight cost, I am told, at least $1 more per piece. There are shirtings of English and German make that cost $3.50 per piece laid down here; American goods of the same grade, it is asserted, cost $4.50 per piece. An English importer tells me that a good American brown cotton drill, 30 inches wide and 40 yards long, weighing 14 or 15 pounds, would have a large sale here if it could be bought for from $4.31¼ to $4.37½ per piece.

THE RETAIL TRADE.

Excepting the half-dozen large retail dry goods stores on the Escolta, the principal business street of Manila, and a few little shops kept by natives in San Fernando, the entire retail trade in cotton goods is in the hands of the Chinese. They occupy little shops or dens, perhaps 8 feet wide and 10 deep, against the three walls of which are piled or stored in compartments their stocks of English and German cotton fabrics. Some

of the Chinese merchants have quite large and attractive stores, but the majority are the little dens just described. They fill one entire side of a wide street less than a quarter of a mile long, called the Rosario, a small portion of the Escolta, and one side of a block of Calle Nueva. Many of them sell at wholesale to, or supply on commission, hundreds of Chinamen who plod about the streets of the city and suburbs with packs of prints and white goods on their backs, or follow a coolie who carries a load of cotton goods large enough for a horse at each end of a bamboo pole resting on his shoulders. They sell to Europeans as well as to natives, and by far the greater portion of the cotton goods sold at retail are disposed of in this way, for the climate is not favorable to "shopping," and white goods can frequently be bought more cheaply from the Chinese peddlers than at the stores or shops. The peddler usually fixes his price at from 50 to 100 per cent. more than he expects to receive, and trusts to the ignorance or indifference of his customer to regulate the amount of his profit.

I was somewhat surprised to learn that the average profit made by one of these peddlers on a piece of cotton goods of 30 or 40 yards was not more than 5 or 6 cents; that the profit made by the Chinese jobber was from 2½ to 3 cents a piece, and that the importer was quite well satisfied if he made from 5 to 8 per cent. on his stock. For instance, a piece of gingham, 24 yards long, of the best English or German make, costs $5, list; the Chinese jobber gets a discount of 5 per cent. by paying cash and divides this discount with the peddler. The latter will at first ask $7.50 for the piece but will sell it for $5 rather than lose the sale. It has become a fixed rule among people who have resided here any length of time never to pay the first price asked, but to offer from 50 to 100 per cent. less. Occasionally a peddler will meet a stranger who will pay him a profit of a dollar or more on a piece of cotton goods, but this is always considered an unexpected bit of good luck. But the profit of the importer and jobber is invariable, and the margins being so small it will be seen why the extra price said to be asked for American goods may act as a bar to their importation.

DUTIES.

The import duty on cotton goods is as follows:

Up to 25 threads counted under a six-millimeter glass, per kilogram	10
From 26 to 35 threads, inclusive	16
From 36 upward	22
Diaphanous cotton goods up to 30 threads	22
From 31 threads up	34

Added to this is 20 per cent. for the construction of the new port.

EXPERIMENTS IN COTTON GROWING.

Until a comparatively few years ago considerable bush cotton was raised in the Philippine archipelago, and nearly all of it was made into

coarse cloth for the natives, by means of rude machinery; but it was found that the English and German cotton fabrics could be bought for very much less than the Philippine goods, and the industry was allowed to languish until it died out entirely. The rapid growth of the hemp and sugar trade here probably contributed largely to this result, for the natives, as well as the Europeans, soon learned that there was much money to be made out of hemp and sugar and very little, if any, out of cotton.

But within the past two years interest in the subject of cotton growing has been revived by the experiments made with American and Egyptian cotton seed by some Spaniards and Mestizos, who have conceived the idea that the Philippines can be made to yield to Spain a rich revenue if the plant is cultivated after modern methods. The climate and soil in some parts of the archipelago have been declared favorable to the rapid growth of cotton, and the experiments, which thus far have been conducted on a small scale, have supported this conclusion. Last year a small quantity of excellent cotton was raised and sent to Barcelona, where it was manufactured into table-cloths and napkins and returned to Manila, where they were exhibited in the retail dry goods stores as evidence of the possibilities of cotton culture here, and attracted a great deal of attention. This has encouraged those who have taken an active interest in the subject, and it is considered possible that within a few years cotton may have a place among the exports of the Philippines.

TREE COTTON.

The tree cotton, which is very plentiful in nearly all the islands, has been experimented with to some extent, but, I am told, without satisfactory results, the fiber being too short for spinning. Again it is asserted that if the proper machinery were used for cleaning it it would be found that it could be spun and might take the place of bush cotton for many purposes. Its production would cost nothing except the expense of gathering, as it needs no cultivation. Samples of it were sent to England a short time ago, where it was mistaken, it is said, for Tahiti or Sea Island cotton, the fiber being found quite long enough for spinning if properly cleaned. Here it is used for stuffing pillows, cushions, mattresses, etc., but I believe that no attempt has ever been made here to spin it. It is thought, however, that if a proper machine for cleaning and preparing it for market could be had it might be made a good profit-yielding article of export.

ALEX. R. WEBB,
Consul.

UNITED STATES CONSULATE,
Manila, August 8, 1889.

TURKEY IN ASIA.

PALESTINE.

REPORT BY CONSUL GILLMAN, OF JERUSALEM.

The director of the custom-house at Jaffa refuses to give to any foreign consulate any such information as that required in this instance unless he should be authorized to do so by special order from headquarters. I have therefore been obliged to direct my inquiries to such private sources of information as were available to enable me to give the following answers to your questions:

IMPORTS.

Cotton textiles are imported into this district to the amount of $120,000 per annum. They are of the following-named kinds: T-cloth, gray; long cloth; bleached shirtings; prints.

WEIGHT.

The weight varies from 5 to 8 pounds per piece of from 24 to 30 yards, which would make the weight per yard range from twenty to twenty-seven hundredths of a pound.

HOW PURCHASED.

It is invariably the case that all such goods are purchased by piece or by yard, not by weight. The price paid to the wholesale dealers in England varies from 3⅓ to 6⅙ cents per yard, or about from 80 cents to $2 per piece, a credit of from two to three months being generally allowed.

PLACE OF MANUFACTURE.

The place of manufacture and whence imported is England, and no other country, and the importation is not direct, but via Beirut.

DUTIES.

The duties charged thereon are 8 per cent. ad valorem.

There are a number of small articles which would come properly under the head of cotton textiles, but which I have omitted from this report from the impossibility of obtaining statistics upon the subject. Also, the business done in them is of so trifling an amount as to render them of hardly sufficient importance in this connection.

HENRY GILLMAN,
Consul.

UNITED STATES CONSULATE,
Jerusalem, July 18, 1889.

MERSINE.

Importations of British cotton textiles at Mersine from the year 1878 *to* 1888.

Years.	American cloths.			Manchester goods.			Madapollams.		
	Bales.	Weight.	Cost.	Bales.	Weight.	Cost.	Bales.	Weight.	Cost.
		Tons.			*Tons.*			*Tons.*	
1878	3,850	500	$250,000	4,000	550	$200,000	2,000	260	$100,000
1879	3,500	455	120,000	3,800	530	180,000	1,500	200	150,000
1880	4,000	520	170,000	4,000	580	210,000	2,500	320	125,000
1881	4,200	550	190,000	4,150	595	218,000	2,720	350	140,000
1882	3,800	485	145,000	4,500	600	230,000	2,200	310	120,000
1883	4,000	520	170,000	4,100	590	213,000	2,000	260	100,000
1884	3,400	450	118,000	4,100	585	215,000	2,300	300	118,000
1885	4,200	600	220,000	4,500	620	230,000	2,600	330	200,000
1886	3,550	400	110,000	3,800	460	165,000	1,500	210	165,000
1887	3,000	350	86,000	2,500	330	100,000	2,000	260	100,000
1888	4,100	550	190,000	3,800	530	180,000	2,000	260	100,000

TOTALS.

Bales	108,170
Weight	tons.. 113,410
Cost	$5,328,000

WM. DAWSON,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Mersine, September 1, 1889.

SYRIA.

REPORT BY CONSUL BISSINGER, OF BEIRUT.*

I have the honor to submit the inclosed answers to the interrogations contained in cotton circular. It is proper to state, however, that much difficulty was encountered in the effort to collect approximately correct and reliable data and material for this report, owing to the reluctance on the part of merchants, importers, and commission-houses to impart information concerning this industry, for fear of prejudicing their own business thereby; and official statistics, as it will be remembered are not accessible in Syria. Even if they were procurable they would be of comparatively little value in a report like this on account of the rather confused and imperfect manner of keeping the records of the custom-house. Notwithstanding these obstacles, it is confidently believed that the inclosed statements are as correct and true an exhibit of all the

* Consul Bissinger, under date of October 24, 1889, calls the attention of the Department to a paragraph which has just appeared in the Official Gazette of the Beirut Vilayet to the effect that "Pursuant to a decision by a special council of ministers, an imperial iradé had been issued exempting all cotton, woolen, and kindred textiles produced in the imperial Ottoman dominions from customs duties when transported from one place in the Turkish Empire to another."

To fully comprehend this discrimination in favor of domestic tissues it is necessary to state that heretofore all textiles shipped from one point in the Empire to another, including Egypt, were subject to 4 per cent. export duty, and 1 per cent. when sent to foreign countries.

"cotton textiles imported into Syria during the fiscal year ended June 30, 1889," as it was possible under the circumstances to secure:

Quantity and kind of cotton textiles imported per annum into Beirut from July 1, 1888, *to June* 30, 1889.

Gray cloth, 800,000 pieces, length 24 yards each, width 20 to 42 inches, price from 14 to 23 cents per pound, or 74 cents to $2.22 per piece (put up in bales from 200 to 300 pieces)	$1,184,000
Gray shirtings, 200,000 pieces, length 36 to 38 yards each, width 33 to 50 inches, price from 14 to 25 cents per pound, or $1.36 to $2.73 per piece (in bales from 200 to 300 pieces)	409,000
Bleached shirtings and sheetings, 200,000 pieces, length 39 to 40 yards, width 31 to 38 inches—most desirable breadth 35 inches—price from $1.42 to $4 per piece (put up in bales of 100 pieces)	542,000
Prints (printed calico), 400,000 pieces, length 40 to 50 yards, width 20 to 32 inches—most salable breadth 27 to 28 inches—price from 4 to 12 cents per yard—weight varies considerably (in bales of 150 pieces)	1,440,000
Muslins and tanjibs, 100,000 pieces, 10 to 20 yards long (width of muslins 18 to 42 inches, width of tanjibs, 30 to 42 inches), price from 35 to 89 cents per piece (weight varies considerably)	62,000
Yarns—bleached, Turkey-red and dyed (water-twist)—300,000 bundles, from No. 12 to 24, reeled into skeins, put up in 10-pound bundles, price from $1.42 to $3.10 per bundle	678,000
Sashes, scarfs, handkerchiefs, towels, napkins, belts, stockings, head-coverings (keffiyehs mendils), clothes of different sizes for the peasants, and sundry other cotton fabrics (of these about 500 cases, at $160 a case, or $80,000, are cloths in various sizes, selling at from 2.8 cents to 8 cents per piece)	165,000
Total	4,480,000
Amount of cotton textiles imported during the same period into—	
Alexandretta, including Aleppo, Antioch, etc	5,318,000
Mersine, including Adana, Tarsus, etc	900,000
Haifa, including Nazareth, Nablus, etc	52,000
Tripoli, Latakia, and all other Syrian ports, about	300,000
Total	6,570,000

RECAPITULATION:

Beirut, including Damascus, etc	4,480,000
Rest of Syria	6,570,000
Total for Syria	11,050,000

For a more comprehensive and fuller understanding of this trade with Beirut, the imports for the past ten years are appended herewith:

Imports of cotton textiles into Beirut during the years of 1879–'80 *to* 1888–'89, *inclusive (years ending June* 30).

Years.	Amount.	Years.	Amount.
1879–'80	$4,698,332	1886–'87	$4,003,000
1880–'81	4,833,740	1887–'88	4,226,000
1881–'82	4,486,347	1888–'89	4,480,000
1882–'83	4,486,300		
1883–'84	4,710,000	Total for Beirut	46,673,719
1884–'85	4,950,000	Average	4,667,372
1885–'86	5,800,000		

Yarns.—The yarns which are imported into this country—almost wholly from England—are used in the manufacture of materials for shirts, dresses, turbans, scarfs, belts, sashes, handkerchiefs, towels, mendils, keffiyehs, and notably for the manufacture of a kind of native cloth called "dima," varying in length per piece from 8 to 9 yards, and in width from 15 to 19 inches, price from 30 to 75 cents per piece; also, in various textile fabrics of native wool and silk, in which the warp is produced from English yarns.

WEIGHT.

Gray cloth: Weight from 4 to 12 pounds a piece, or four-twenty-fourths to twelve-twenty-fourths pounds per yard.

Gray shirtings: Weight from 7 to 14 pounds a piece, or one-fifth to one-third of a pound per yard.

Bleached shirtings: Weight varies considerably—say from 6 to 16 pounds a piece, or one-sixth to two-fifths of a pound per yard.

Prints (printed calicoes): Weight varies considerably—say from 4 to 10 pounds a piece, or one-tenth to five-tenths of a pound per yard.

Muslins and tanjibs: Weight varies considerably, from $1\frac{1}{4}$ to 4 pounds a piece, or two-tenths to three-tenths of a pound a yard for muslins, and 3 to 4 pounds a piece, or one-tenth to two-tenths of a pound a yard for tanjibs.*

It will be observed that weights vary considerably; the reason assigned for this discrepancy is said to be not only due to the different qualities and weights of the textiles, but also to the "sizing" which notably bleached shirtings, prints and muslin and tanjibs contain. As these last-mentioned goods are not sold by weight in Syria, the object of deteriorating them by such a questionable process is not manifest; and although, I am informed, this practice in nowise interferes with their salability here, I would not recommend its adoption by American manufacturers.

HOW PURCHASED.

All cotton goods imported from England are purchased direct from the English manufacturers, either by the agents or the partners of the Syrian firms, most of whom have branch houses in either Manchester or Liverpool. This trade is now largely in the hands of native merchants who have gradually replaced the foreign and English commission merchants formerly established here. The English manufacturers have at present no direct representatives in Syria for the sale of their cotton textiles, and there is now but one English firm left in Beirut which is engaged in the sale of Manchester goods. On the other hand, by far the greater part of the muslins, scarfs, sashes, clothes of various kinds for the use of the peasants, stockings, and sundry other cotton

* The subdivision of the pound is purposely given in these fractions to accord as near as possible with the corresponding lengths in yards of the various pieces.

goods, which are imported from Germany, Switzerland, and Austria, are purchased through foreign commission houses established in Beirut, who charge the wholesale dealers from 2½ to 3 per cent. commission on their orders, or rather an advance equivalent to that on the foreign invoices produced. The precise arrangements between the commission houses here and the European manufacturers are, of course, not made known, and it must be left to conjecture whether the original invoices are always the ones produced by the commission merchants.

The conditions under which cotton textiles are usually purchased are (1) either for *cash*, after delivery, and in this case the payment is generally effected in from three to fifteen days; but if settlement is prolonged beyond this term, interest at the rate of 5 per cent. is charged; or (2) on *credit*, generally against bills at three months' date, bearing interest at the rate of 5 per cent. per annum.

It is not at all a rare occurrence that when the native agents of the Syrian houses in England are short of funds, they purchase their goods for cash from the Manchester manufacturers, and pay them with the proceeds of an advance upon the merchandise shipped to Syria by pledging the bill of lading with a banker or with the agent of the steam-ship company carrying the goods, as security for the money advanced on the shipment. Upon the arrival of the merchandise in Syria, the merchant can withdraw the same, by liquidating the amount advanced, plus the interest accrued thereon.

All purchases are subject to a discount of from 2 to 2½ per cent.

The Syrian wholesale dealer allows the retail dealer usually four months' time on his purchases of gray T-cloth, gray shirtings, and bleached cloth, and six months on prints; or if the retailer buys for cash, he is entitled to a discount of 4 per cent. on the first three articles mentioned, and 6 per cent. on the last. The other cotton goods are not governed by any special rule, except that the prices quoted are always understood to mean "cash," and if time is required, interest is added from date of bill.

PLACE OF MANUFACTURE.

The "place of manufacture and whence imported" can not be better or more graphically answered than by presenting the annexed exhibit, showing the imports from England during ten years on the one hand, and the combined imports from Austria, France, Germany, and Switzerland on the other.

Imports of cotton textiles into Beirut from Great Britain on the one hand, and Austria, France, Germany, and Switzerland on the other, during a period of ten years.

Period.	England.	All other countries.	Total.
1879–'80	$3,259,776	$1,438,556	$4,698,332
1880–'81	3,467,309	1,366,431	4,833,740
1881–'82	3,036,048	1,450,299	4,486,347
1882–'83	3,729,408	756,892	4,486,300
1883–'84	3,047,944	1,662,056	4,710,000
1884–'85	4,435,200	514,800	4,950,000
1885–'86	4,784,640	1,015,360	5,800,000
1886–'87	3,456,000	547,000	4,003,000
1887–'88	3,686,400	539,600	4,226,000
1888–'89	3,842,120	637,880	4,480,000
Total	36,744,845	9,928,874	46,673,719
Annual average	3,674,484	992,887	4,667,372
Per cent	78.7	21.3	

Comment upon the preceding table would seem superfluous; from it, it is manifest that 78.7 per cent. of all the cotton textiles to which this report has reference are manufactured in Manchester and its district, and are imported direct from Liverpool. A small quantity of prints and miscellaneous cotton fabrics are manufactured in France and imported via Marseilles, while the largest part of the muslins, sashes, handkerchiefs, and socks are manufactured in Saxony, Germany, in Austria, and in Glaris, Switzerland; this country supplies the Syrian market principally with handkerchiefs, keffiyehs, and mendils, or head cloths and coverings, worn mainly by the peasants; the different sizes are 55 by 55 centimeters (21.658 inches); 65 by 65 centimeters (25.598 inches); 75 by 75 centimeters (29.528 inches); 85 by 85 centimeters 33.468 inches), and 95 by 95 centimeters (37.398 inches), and are sold at a price varying from 14 centimes=2.8 to 8 cents per piece. A large portion of the pocket-handkerchiefs formerly manufactured there for Syrian consumption are now also imported from England. All goods imported from Austria, Germany, and Switzerland com via Trieste.

From what has been said in this report, it will appear manifest that the English (Manchester) manufacturers are very firmly intrenched in this market; but I would here repeat what I at great length stated in my annual report of 1885–'86, namely, that if American manufacturers and merchants would not attempt the effort to successfully compete with markets now monopolized by Austria, England, France, or Germany, they would forever have to abandon every hope of finding a foreign outlet for their numerous surplus manufactured products, for the country where these nations have not established trade relations is yet to be discovered.

Like those countries, our manufacturers must enter the Syrian market by carefully studying the wants of the people, and, by offering them a superior article or some novelty or specialty, succeed in securing a share

of its trade. Persistent and intelligent efforts are certain to be ultimately crowned with success.

The uniform import duty on all cotton goods is 8 per cent. ad valorem.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, July 31, 1889.

AUSTRALASIA.

FIJI.

REPORT BY COMMERCIAL AGENT ST. JOHN.

QUALITY AND KIND.

The cotton goods that are most imported and used here are of an inferior grade and poor quality, being used principally by the natives for their scanty dress (sulus). The kinds are mostly domestic prints, sheeting and shirting (gray calico), in single and double widths.

WEIGHT.

The weight per yard is variable according to quality, but is purchased exclusively by the yard and not by weight.

HOW PURCHASED.

Nearly all the merchants, I should say importers, purchase by sight draft. A few, however, purchase upon thirty, sixty, and ninety days sight draft.

PLACE OF MANUFACTURE.

The cotton goods used here are, practically speaking, all manufactured at Manchester, England, and imported from London. A small quantity of American sail cloth of the Mount Vernon and Raven's Rock brands is imported from New York.

AMERICAN COTTONS IN FIJI.

I will say that the importers here object to the package of American sail cloth, for the reason that it is too loosely rolled, while the English sail-cloth is more closely rolled and then subjected to heavy pressure, making the package occupy as little space as possible.

The reason for the preference of the English package is, that as freights are paid for by the measured ton, the loosely rolled package occupying the more space, pays the most freight and consequently increases the cost to such an extent, consequent upon the long distance

it is shipped, as almost to keep it out of this market; for although American cotton sail-cloth is considered much superior to that of English manufacture, but little is imported for the reason above given.

As to cotton goods generally, the merchants here, almost to a man, tell me that American cotton goods are too good for this market, and that they (the merchants) buy such goods as suit the market, and that they buy them where they can best obtain them.

DUTIES.

Drapery, which includes all cotton goods of all qualities and kinds, pays duty at the rate of 12½ per cent. ad valorem, upon invoice. Therefore it is very difficult to get the exact importation of cotton goods separate from the general line of drapery. From the best information that I can obtain I would say that $250,000 would be nearly a correct estimate of the value of cotton goods imported into this colony per year.

POPULATION.

For the benefit of those interested I will state that the population of this colony is in round numbers 200,000, of which about 1,850 are white, the rest either native Fijian or Polynesian, and would suggest that manufacturers and shippers produce an article that suits the natives if they wish to trade in the South Sea Islands.

ANDREWS A. ST. JOHN,
Commercial Agent.

UNITED STATES COMMERCIAL AGENCY,
Fiji, August 22, 1889.

NEW ZEALAND.

REPORT BY CONSUL CONNOLLY, OF AUKLAND.

It is impossible to obtain reliable information as to the quantity shipped from the following undermentioned countries; the value and kind of goods alone is obtainable:

WHENCE IMPORTED.

Colored cotton shirtings:	
American	$1,265
United Kingdom	236,890
Victoria, Australia	1,225
New South Wales, Australia	520
Belgium	70
Total	239,970
Calico, white and gray, in the piece:	
United Kingdom	521,330
Victoria, Australia	18,150
New South Wales, Australia	640
Total	540,120

Cotton-dress prints:	
America	605
United Kingdom	27,260
Victoria, Australia	110
New South Wales, Australia	5
South Sea Islands	275
Total	28,255
Corduroy:	
United Kingdom	10,230
Moleskin:	
United Kingdom	78,210
Victoria, Australia	970
Total	79,180
Unenumerated cotton goods:	
America	3,655
United Kingdom	437,000
Victoria, Australia	3,100
New South Wales, Australia	1,295
France	150
Germany	155
Total	445,355
Cotton, raw:	
Victoria, Australia, 1,145 pounds	200
South Sea Islands, 79,957 pounds	2,310
Total	2,510
Cotton waste:	
United Kingdom, 2,613 cwt.	20,095
Cotton wick:	
United Kingdom, 23,774 pounds	9,230
Victoria, Australia, 2,234 pounds	845
Total	10,075
Grand total	1,375,790

It may be observed from the foregoing tables that the United Kingdom furnished $1,340,245 worth of all cotton materials imported during the year, while the United States furnished only $5,485 worth, leaving only $30,060 to be divided among all the countries enumerated above.

HOW PURCHASED.

Importing firms in New Zealand have branch houses in England, or agents to whom orders for goods are forwarded substantially as follows:

WINTER ORDER.

Gray Mexican (cotton), 100 yards:	Per yard.
26-inch width, 100 pieces at	1½ *d.*
29-inch width, 60 pieces at	1¾ *d.*
32-inch width, 80 pieces at	2¼ *d.*
36-inch width, 50 pieces at	3 *d.*

The above is an exact copy of an order sent by this mail for goods. The agent, or whoever receives the order, proceeds at once to the wholesale houses and leaves copies of the order, with a request that samples be sent to his address. The agent upon receiving the samples selects the best material obtainable from among the samples furnished by the various business houses, and gives his order accordingly. Payments are invariably required to be made for soft goods (in England) to the manufacturers within six months from the date of purchase. Much of the cotton goods purchased in England is paid for in New Zealand produce and copra from the South Sea Islands; the remainder is paid in cash or draft.

DUTIES.

The following articles pay duty or are admitted free as more fully appears by the subjoined list: Cotton counterpanes, 20 per cent.; costumes as apparel, 20 per cent.; cotton braids and bindings, tailors' trimmings, free; cotton dimity, 10 per cent.; cotton piece goods, not otherwise enumerated, to include cotton prints, muslins, Attalia and Indian twills, dungaree, derries, denims, dimity, lamb skins, swan skins, and all cotton goods unmixed with other material, and unenumerated in tariff or decisions, when in the piece as it leaves the loom, 10 per cent. Cotton, polished for lining coat sleeves, for fabrication of goods in the colony, free. Cotton rugs, 20 per cent.; cottons, crochet, darning, knitting, and angola mending, as haberdashery, 20 per cent.; cotton, sewing, free; cotton shirtings, colored, in the piece, free; cottons, silks, and threads, sewing, free; cotton waste, free; cotton yarns, free; coverings for couches and chairs, Chinese, as furniture, 25 per cent.; table coverings in the piece, not embroidered or sewed, as textile piece goods, 20 per cent.; covers, rick and wagon, 15 per cent.; table and toilet, 20 per cent.; crêpes, as drapery, not otherwise enumerated, 20 per cent.; cravats, as apparel, 25 per cent.

Crimean shirtings 25 per cent.; crinolettes, as apparel, 25 per cent.; crochet cottons, as haberdashery, 20 per cent.; crochet, Swiss, and embroidered edgings of all kinds, as drapery, not otherwise enumerated, 20 per cent.; crumb-cloths, as textiles, piece goods, 20 per cent.; cuffs, cotton, paper, or other material, as apparel, 25 per cent.; corduroy (cotton), in piece, free; cotton (stay-maker's binding) free; corsets, as apparel, 25 per cent.; corset fasteners, stay-maker's binding, free.

The above list of articles subject to duty, or admitted free, is taken from the customs tariff and decisions, submitted by the tariff commissioner, and is therefore thoroughly reliable.

JOHN D. CONNOLLY,
Consul.

UNITED STATES CONSULATE,
Auckland, New Zealand, September 4, 1889.

NEW SOUTH WALES.

REPORT BY CONSUL GRIFFIN, OF SYDNEY.

IMPORTS.

The customs authorities do not publish itemized returns of the quantity and value of cotton textiles imported into New South Wales. All merchandise of this kind is classed under the general head of drapery. The value of drapery imported into New South Wales during the year 1888 was $13,849,562, against $10,844,231 for 1887. Of the imports for 1888 Great Britain sent goods to the value of $10,316,497, and the United States only $6,603, the remainder coming from Belgium, France, Germany, and other countries.

The subjoined table, taken from the annual statement of trade of the United Kingdom, shows the quantity and value of cotton goods exported from the United Kingdom to New South Wales for each year from 1884 to 1888 inclusive:

Years.	Quantity.	Value.	Entered value.
	Yards.		
1884	29,094,900	$2,512,870	$1,576,843
1885	34,441,700	2,907,217	1,692,105
1886	25,545,000	2,126,412	1,440,069
1887	24,654,100	1,999,133	1,171,069
1888	36,905,700	2,824,847	1,362,712

In the Colony of Victoria, the population of which is about the same as that of New South Wales, the returns are made out in a different manner and show the quantity and value of cotton goods imported into that colony to be, for 1888, $5,495,903, against $4,019,159 for 1887, and $4,682,186 for 1886. Of these, the great bulk comes from England. Of the imports of cotton piece-goods, for 1888, the value from Great Britain was $4,965,265, and of articles of cotton manufacture, $348,708. The United States only supplied $11,158. Of cotton-waste the imports into Victoria in 1888 were $57,724. Great Britain sent £9,705 worth; New York, $875.97 worth. The imports of cotton-wick likewise were, £3,820. Great Britain furnished, $17,392, and New York only $306.58.

The value of the imports of all kinds of manufactured cotton goods into the Australasian colonies is about $14.05 per head of population, and as the population of the whole of the group is about 4,000,000, this would make the total value of the imports $58,398,000. The population of New South Wales at the close of June, 1889, was estimated at little over 1,000,000, so by the same method of calculation the cotton imports would amount to $14,599,500. If the value of the goods mixed with cotton were added to these figures, the value of the imports of cottons would be fully $4,866,500 more for the colony of New South Wales.

KINDS, PRICES, ETC.

Bleached cottons.—On account of the absence of classified returns of the cotton imports I have been obliged to rely upon such information as I could obtain from the principal importers of cotton textiles in Sydney and other places. The firm of Messrs. Riley Bros, who are among the largest importers in Sydney, not only of cotton textiles, but of other merchandise, inform me that bleached cottons usually imported to this market vary in width from 20 to 36 inches. The prices in Manchester are from 2.5 cents, to 9 cents per yard. The width most desired here is 30 inches. The double bleached cottons are from 50 to 72 inches in width, and cost in England from 8 to 20 cents per yard. There is a fair demand here for cottons of the widths of 68 to 72 inches, and the price paid at the place of purchase is from 14 to 16 cents per yard. The great bulk of the trade, however, is in the narrow widths. There is always a heavy demand for soft white cottons made in imitation of what are known as American sea-side cottons. The Manchester price varies from 4 to 20 cents per yard. The most reliable widths are 36 inches. Cottons of this width, when soft and of good quality, cost 7 to 8 cents per yard in England. Horrock's long cloths, 42 yards to the piece, 36 inches in width, are very popular in this market.

Printed cottons.—The styles of these goods are constantly changing. Sometimes there is a heavy demand for large-figured patterns, and at other times the smaller are most salable. The latter are at present most in fashion, and are made chiefly at Manchester and Glasgow. A heavy trade is done here in calicoes or prints for men's shirts. These are also of Manchester and Glasgow manufacture. The widths are from 27 to 33 inches. The cost in London, Manchester, or Glasgow is from 5 to 12 cents per yard.

Moleskins for men's trousers: There is only a slight demand, either for white or colored. The usual width for these goods is 27 inches; price, 16 to 36 cents. Most useful, price 26 cents per yard. They all come from Manchester.

Linings, silecias, and other cotton linings come from Manchester. Large quantities of these goods are sold throughout Australasia. The prices are from 3 to 12 cents, for 32 to 42 inch widths.

Bed-ticking.—In plain stripes, blue, and fancy colors, widths 26 to 54 inches, cost from 5½ to 14 cents per yard at Manchester.

Bed quilts.—In heavy court patterns and imitation of Marseilles, varying from 60 by 70 to 90 by 120 inches, cost from 48 cents to $4.86, either in white or colors. White, however, predominates.

Towels.—The bulk of these imports are in honey-comb and Turkish. The prices of the former vary from $1.46 to $2.43 per dozen. The latter from 73 cents to $4.86.

AMERICAN VS. ENGLISH COTTONS.

The cost of freight, exchange, and commission, and in fact all kinds of business transactions, are greater with the United States than with England and form obstacles in the way of successful introduction of American cotton manufactures into this market. One great obstacle is the absence of a permanent and direct steam communication between the cities on the Atlantic coast of the United States and the Australian ports. These difficulties may be overcome in time but the fact nevertheless remains that the bulk of the trade has been monopolized by Great Britain.

I have conferred very fully on the subject with Mr. R. G. Vallack, of the firm of Messrs. W. Gardiner & Co., of Sydney, who has had more experience than any other merchant in Australia with regard to American cotton goods, and he has very kindly given me the results of his experience. In regard to such articles as rubber duck, rubber drill, enameled duck, tan-back drill, tan-back moleskin, he says that all these goods are suited to the Australian market, being used for coach building and other purposes. The consumption, however, is not large and he things the total imports of these goods into New South Wales would not exceed 300 pieces per annum.

There is also a very limited demand for ticks and denims, the ordinary cotton tick having, in a great measure, given place to manufactures of more recent introduction, in which the widths are either 36 or 72 inches. Such goods comprise quite a large variety of woven colored stripes of different patterns. The consumption of the woven striped ticks is large and steadily increasing. All such manufactures come from England and Mr. Vallack thinks that they are not produced in America. Blue denims were, until a few years ago, comparatively unknown; but they are now an item of almost daily demand. They are used chiefly by sailors, and Sydney seems to be the depot for the neighboring ports. Mr. Vallack states that his firm uses about 500 pieces of these goods in the year.

Cotton duck, cotton drill, "Stark," or other mill, 7 to 12 ounces Army duck, "Druid" duck or canvas, and blue duck are all in fair demand in Sydney. Of these Mr. Vallack says the American market seems to supply makes and weights which meet the wants of the people quite as well as any produced in England. The demand for such is a growing one. His firm imports direct from New York between 400 and 500 pieces a year.

Several other Sydney firms have done exceedingly well with American ducks, such as the Ontario, 60 inches in width, weighing 12 ounces to the yard. This article can be landed in Sydney, freight and all charges paid, at 26 cents per yard, and I am informed that there is no European article of a similar make that can at all compare with it.

Canton or cotton-flannel, called swan-skin, gray and bleached, here and in England has a limited sale on account of the mild climate; in fact this material is seldom used here for underclothing, but such as finds its way into the market, and especially bleached cotton-flannel, is generally of American manufacture. A few gray canton-flannels are also sold, but the demand is so small as not to be worth taking into notice. Mr. Vallack has very kindly furnished me with a list of a certain class of American cottons sold here, which comprises gray calicoes, gray sheetings, bleached long-cloths, and bleached sheetings—plain and twilled. Mr. Vallack states that the demand for the goods mentioned is very considerable and says:

I may be permitted to remark, *especially* with regard to the items enumerated in this group and more broadly with reference to American manufactured cottons *generally*, that they can not hold their own *in this market*, and the consumption of the items is very large, running to thousands, perhaps tens of thousands of packages in the course of a year. I have nothing whatever to say against the make or finish; as to finish they are perhaps superior to the English, but their cost is so high as to create no demand for them. This is the chief obstacle. For a period extending over some seven or eight years the Wamsutta company consigned very largely to this market, and I have from first to last purchased many hundreds of packages both in the open market and direct from the consignees; of the earlier shipments, many were sold by auction and probably realized remunerative rates, but I think if reference be made to this company it will be found that their consignments resulted in a series of losses, and sometimes very heavy losses. They would not, I think, be inclined to repeat their experiment. In the event of American manufacturers being desirous of competing with the Manchester Mills, I shall be most happy to report upon any samples that may be submitted through you with the view of their being brought into competition with the products of Great Britain.

With regard to white long-cloth I learn that the demand is mostly for 36-inch widths, while for sheetings it is principally for from 72 to 100 inch widths. In grays the demand is chiefly for 36 to 72 inch widths, and very few of other widths are sold in this market.

Ready made cotton goods.—Blue denim jumpers, blue denim trowsers, blue duck trowsers, and fancy cotton-made trowsers from America, occasionally find their way to this market. They meet with fair sale in the hands of those dealing in clothing for sailors.

Sizing.—The beauty and purity of American cotton fabrics and their entire freedom from sizing or adulteration attract attention wherever they are seen; but the high cost, as I have said previously, alone prevents them from being profitably and largely imported, the cheaper and more or less adulterated article taking their place. Various matter is used for sizing, some of which does little harm, while other kinds are washed out of the fabrics after the first laundrying. About 50 per cent. of this adulteration is sometimes used, but it would be a mistake to suppose that all Manchester goods are adulterated. Many are so slightly mixed with other substances, or the weights added to, as not to affect the quality or indeed to alter the appearance after washing. An indifferent article is not desired here any more than anywhere else, but

a fair article at a low price is demanded; and what I have said of cottons is equally true of woolen goods. It is a well-known fact in Australia, that the blankets imported from New Zealand, as from the United States, are of much better quality than those placed on the market from England; but the high cost of the former kinds makes the demand for them very limited. The English blankets have neither the weight, finish, or quality of the American article, and while a great many very mean articles of this class are sold to those who demand a low priced blanket, considerable quantities, fairly good, are also sold to the working classes at remunerative prices and give very general satisfaction, especially when their low price is considered.

BANKING AND METHOD OF PURCHASE.

The banking system with the United States is an important item to be considered with regard to the importation of American cotton goods as well as of other merchandise.

There is no direct exchange with New York, the medium being by way of London. The few banks here having facilities for the sale of drafts on New York or San Francisco, payable at sight, charge from 2½ to 5 per cent., while the exchange by way of London is only ¼ per cent. The direct transactions with New York seldom occur, and when they do they are for very small amounts, the exchange, as I have said, being conducted by way of London.

The Australian merchant who has no established credit in New York has either to send a bank draft along with his order for the goods he desires to purchase, and thus loses the interest on his money, or else he is obliged to go to his banker here and arrange for a bank credit. When this is done the Australian importer orders his goods generally from a New York commission merchant, who purchases them and charges 2½ per cent. for so doing. The colonial bank in the mean time authorizes its New York agent to purchase drafts from the commission merchant on the importer in these colonies for a fixed amount at the current rate of exchange on London. The colonial bank's agent is instructed at the same time to see that the drafts are accompanied by proper shipping documents, bills of lading, insurance policy, etc. When the bank's agent is in possession of these documents, which virtually amounts to the ownership of the goods, he purchases the American merchant's drafts and an order is given for the shipment of the goods, which may be done either direct to Australia or by way of London. The agent of the colonial bank in New York then forwards the drafts, bills of lading, etc., to the bank agent in London with instructions to write to the bank in Australia and authorize the delivery of the goods upon payment of the drafts and all other necessary expenses not included in the draft, such as the current rate of exchange between London and Australia.

This is the usual method of purchasing and paying for the goods in the United States. If the credit of the Australian merchant is established, the goods are ordered in the same way through the commission merchant and the transaction is completed in the manner described, but the only saving to the importer is the cost of establishing a bank credit, namely, 1 per cent. Until some convenient method is pursued, the cost of business transactions will be much greater with America than with England. There are very few Australian houses who have agents in New York or other American cities for the purchasing of goods.

London manufacturers have their representatives on the spot and merchandise is ordered regularly by post. The cable notifies the prices of all English merchandise, whilst American prices are seldom mentioned. The completion of the proposed ocean cable between San Francisco and Australia would remedy this evil.

PRICES OF COTTONS IN SYDNEY.

In this report I have not given the Sydney prices of cotton textiles, but probably from 10 to 20 per cent. above cost would be considered fair selling rates.

Mr. A. J. Riley estimated the cost of bringing cotton textiles from England to Sydney at 17½ per cent. by sailing vessels and 22½ per cent. by steamers when freights are $7.30 and $14.60, respectively. The cost of packing in wood and zinc cases of 3-feet cube is about 2 per cent. on the value of the goods. A great many of the lower priced cotton manufactures are packed in bales covered with canvas and tar.

CUSTOMS DUTIES.

There are no customs duties charged on cotton fabrics imported into New South Wales, whether of English, American, or any other manufacture.

At one time there was an ad valorem duty on such goods, but it has been repealed.

G. W. GRIFFIN,
Consul.

UNITED STATES CONSULATE,
Sydney, September 28, 1889

CONTINENT OF EUROPE.

AUSTRIA-HUNGARY.

TRIESTE.

REPORT BY CONSUL GILBERT.

Agreeable to instructions contained in circular dated May 27, 1889, relating to cotton textiles imported into this consular district, I have the honor to inclose a communication received from the chamber of commerce of this city in reply to my letter requesting the statistics covering the points stated in the mentioned circular of the Department, and such other statistics as are obtainable on the subject. The following is a translation of the letter of the chamber of commerce addressed to this consulate:

No. 1764.

To the honorable consulate of the United States in Trieste:

We can only respond to your letter of the 17th instant with the following statistics, which we have the honor to inclose herein. Upon the weight per yard, which varies according to the quality of the goods, we can furnish no information. It is the same with regard to the place of manufacture and the way in which the goods are purchased. At Trieste no import duty is paid.

For importation into the monarchy we refer you to the various customs tariffs-general, with the modifications according to international treaties.

Trieste, 24 July, 1889.

Direction of the Bourse.

F. DIMMER,
Vice-President.

It is to be noted that Trieste being a free port all statistics are approximate only.

Imports and exports, by sea and land, into and from the port of Trieste, for the year 1888.

	Imports.	Exports.
RAW COTTON.		
By sea:	*Metric quintals.*	*Metric quintals.*
East India	437,153	.....
Egypt	109,643	6
Italy	30,149	69,620
Turkey	16,764	272
United States	5,451	.....
Great Britain	3,558	738
Hamburg	461	.....
Greece	259	205
Belgium	234	.....
RAW COTTON—continued.		
By sea:		
Austro-Hungarian ports	19	315
France	18	.....
Malta	13	.....
Russia	1	.....
Montenegro	.....	25
Tripoli	.....	4
Tunis	.....	4
Total	603,723	71,189

Imports and exports, by sea and land, into and from the port of Trieste, etc.—Continued.

	Imports.	Exports.
RAW COTTON—continued.		
By land:	*Metric quintals.*	*Metric quintals.*
Austria	2,070	346,098
Italy	245	2,341
Hungary	2	7,722
Germany	.....	111,220
Switzerland	.....	50,572
Russia	.....	105
Bosnia and Herzegowina	.....	24
Servia	.....	8
Total	2,317	518,090
COTTON MANUFACTURES.		
By sea:		
Great Britain	92	4
Malta	88	75
Italy	68	2,037
Turkey	49	4,904
Austro-Hungarian ports	23	2,568
Greece	23	1,441
Netherlands	8	.....
Bulgaria	5	144
Egypt	1	1,118
India	.....	8,151
United States	.....	262
Zanzibar	.....	210
Roumania	.....	244
Montenegro	.....	62
China	.....	55
Tunis	.....	38
Mozambique	.....	34
Brazil	.....	29
Massana	.....	27
Aden	.....	7
Russia	.....	4
Australia	.....	4
Spain	.....	3
Tripoli	.....	3
Japan	.....	3
Total	357	21,427

	Imports.	Exports.
COTTON MANUFACTURES—continued.		
By land:	*Metric quintals.*	*Metric quintals.*
Austria	35,408	1,116
Switzerland	8,132	17
Germany	4,886	25
Italy	65	145
Hungary	34	234
France	1	.....
Bosnia and Herzegowina	.....	614
Servia	.....	261
Total	48,526	2,412
COTTON YARNS.		
By sea:		
Italy	100	34
Austro-Hungarian ports	8	.....
France	6	.....
Malta	1	6
Turkey	1	534
Tripoli	.....	232
East India	.....	53
Greece	.....	30
Tunis	.....	21
Montenegro	.....	11
Roumania	.....	6
Bulgaria	.....	4
Great Britain	.....	3
Total	116	1,942
By land:		
Austria	6,848	5,196
Germany	703	.....
Italy	52	3
Switzerland	31	.....
France	3	.....
Bosnia and Herzegowina	.....	345
Hungary	.....	242
Servia	.....	115
Roumania	.....	1
Total	7,637	5,902

HENRY W. GILBERT,
Consul.

UNITED STATES CONSULATE,
Trieste, July 25, 1889.

DENMARK.

REPORT BY CONSUL RYDER, OF COPENHAGEN.

I have the honor to acknowledge the receipt of circular instruction dated May 27 last, requesting me to report on the cotton textiles imported into my consular district, namely, (1) quantity and kind imported per annum, (2) weight per yard, (3) how purchased, (4) place of manufacture and whence imported, (5) duties charged thereon, and beg herewith to transmit subjoined a table with explanations covering as near as possible all the points in question, viz:

Imports into the consular district of Copenhagen, 1887.

[Quantities in half kilograms.]

	Duty per ½ kilogram.	Total, 1887.	Norway.	Sweden.	England.	Germany.	France	Belgium.	Holland.	United States.	Other countries.
No. 1.	3.4	109,259	538	2,417	72,632	24,088	.....	.....	.....	7,768	1,816
No. 2.	2.7	225,461	120	257	121,262	87,175	560	144	43	6	15,904
No. 3	18	581,526	170	1,364	297,747	263,697	68	2,474	889	13	15,104
No. 4.	13.5	243,953	163	9,744	106,357	112,443	2,823	4,716	8	9	7,690
No. 5.	11.3	789,367	328	19,182	468,540	261,740	291	4,323	177	58	34,728
No. 6.	6.8	2498,748	425	28,219	1,970,546	357,723	141	86,591	1,244	22,097	31,762

DESCRIPTION.

No. 1.—Cotton canvas above 16 ounces the square yard equal to 7.22 inches American canvas. Bleached linen canvas of the same weight and color and uncolored carpets of hemp, linen, and jute, or parts thereof. The cotton canvas is imported from the United States and the other goods from England.

No. 2.—White goods, such as bobbinets, curtains, mulls, and similar goods, are imported from Germany and England, and weigh about 4¼ ounces to the square yard.

No. 3.—Printed goods, velvets, and hosiery. The printed goods are nearly all the usual cotton prints from 30 to 32 inches in width, weighing 2½ ounces per yard. Prints are not manufactured in Denmark. The bulk of this import is from England; some of the better class of goods from Germany. Hosiery is mostly imported from Germany, the import of this article has declined on account of home production. Velvets are nearly all imported from England.

No. 4.—Woven colored goods containing more than one color. These goods are nearly all imported from England and Germany, are from 27 to 30 inches in width, and weigh from 2 to 2½ ounces per yard. The duty being comparatively high and manufacturing easy, a large home production in fast-colored goods has sprung up, preventing a larger import.

No. 5.—Colored goods of one color, either dyed or printed, white goods, woven in a pattern, such as damasks, etc. The dyed goods are nearly all cotton twills for lining purposes, 30 to 36 inches in width, weighing about 3 ounces per yard, and are imported from England and Germany.

No. 6.—Bleached, unbleached, and twilled cotton goods. The import of unbleached cotton goods has decreased very much, the home production being preferred on account of its good and solid quality The imported goods are partly unbleached twills, 36 inches in width, weighing 3 ounces per yard, and some heavier qualities for dying purposes, such as unbleached domestics, twills, and drillings of narrow width, 24 to 30 inches wide, weighing from 2 to 6 ounces per yard. These goods are imported from England. The 22,097 pounds imported under this head from the United States of America are probably unbleached cotton ducks and canvas of lighter make than 16 ounces per square yard.

The bulk of the white cotton goods is bleached domestic, 27 to 32 inches wide, weighing from 3 to 4 ounces per yard; bleached shirtings, 30 to 36 inches wide, weighing about 2 ounces per yard; also, bleached cotton sheetings, 50 to 60 inches in width and from 6 to 8 ounces in weight per yard. These goods are imported from England and partly from Germany.

It may be observed that the Copenhagen custom-house does not make any special note in the entry of cotton or linen goods. The duty on both being paid according to weight, it is therefore impossible to arrive at a correct statement as to how much under Nos. 1 to 5 in the foregoing statement is cotton or linen.

The purchases are made for cash—that is to say, from three to thirty days. Still, the usual terms are a credit of ninety days, with or without bill of acceptance, and in many instances, more especially amongst the small retail dealers in the provincial towns, by an extension of credit to six months.

HENRY B. RYDER,
Consul.

UNITED STATES CONSULATE,
Copenhagen, August 11, 1889.

BELGIUM.

ANTWERP.

REPORT BY CONSUL STEWART.

The manufacture of cotton goods is a very extensive and important industry in the Kingdom of Belgium, but the province of Antwerp has no direct part therein, this city acting simply as the transit depot for the receipt and delivery of the raw material and the product therefrom. A large quantity of raw cotton is brought into this port, coming from India, the United States, and England, to be forwarded to its destination, the greater part going to a market, such as Ghent (every Friday being special cotton day there), to be sold and distributed among the factories of the kingdom, and the rest into the neighboring countries. The quantity of the manufactured article passing through here is also very large, both in transit from one foreign country to another and also from home manufacturers for export, and for the large home dealers established in the interior. In this city there are no importers or dealers of any consequence; Brussels being so near and so accessible interferes greatly with the retail trade of this city; most persons having orders to give or purchases to make go to Brussels, where they claim to find more taste and skill, more extensive assortments and lower prices, hence the large merchants are to be found there.

For our products Antwerp offers one of the most desirable and important markets on the continent, but for our industries there is not much scope or encouragement.

The cotton factories are located principally in Ghent, and nearly all are in the Province of Flanders; their product is protected by a high tariff duty, which cripples foreign competition and makes the importation of manufactures of cotton very trifling, whilst the exports are very large.

There is a very extensive bleaching and dyeing establishment located near Antwerp. The proprietor informs me that he receives a great deal of material from abroad to be operated upon, and that, when finished, he returns or forwards it to its destination without any interference on the part of the customs authorities.

Cotton fabrics are purchased by the merchants here from the representatives of the manufacturers or the large wholesale merchants, from samples exhibited by them, the usual credit being three months, or cash in fifteen days, with from 2 to 3 per cent. discount, as already stated.

Quantities and kinds imported.—The official statistics not giving the different kinds of cotton goods imported into Antwerp, and not being able to get them at this custom-house, I applied to the bureau of finance in Brussels, and in response have received the statistics giving the desired information, as shown in Table A, subjoined to this report.

Weight.—I have no means of ascertaining the weight per yard of the many different kinds.

How purchased.—The usual conditions are three months' credit, or cash in fifteen days with 2 to 3 per cent. discount.

Place of manufacture.—An answer to this is found in Table A, herewith.

Duties.—Table B, herewith inclosed, gives a copy of the Belgian customs tariff on cotton tissues.

A.—*Quantities of cotton tissues imported into Antwerp during the years* 1887 *and* 1888.

[As furnished by the Bureau of Finance in Brussels.]

Articles and whence imported.	1887.	1888.	Articles and whence imported.	1887.	1888.
Unbleached:	*Kilograms.*	*Kilograms.*	Dyed—Continued.	*Kilograms.*	*Kilogram.**
Brazil	.....	31	France	4,834	4,524
France	138	55	Germany	11,986	16,245
Germany	28	198	Gibraltar	2,496	.....
Great Britain	7,532	5,820	Great Britain	17,448	16,313
Hamburg	.....	34	Hamburg	5	10
Holland	169	401	Holland	814	921
Spain	39	.....	India (British)	15	.....
United States	28	10	Italy	20	1
Total	7,934	6,549	Switzerland	.....	334
Bleached:			United States	39	.....
Australia	.....	595	Total	37,683	38,348
Gibraltar	122	.....	Printed:		
Germany	3,271	6,287	France	153	287
Germany (Bremen)	36	.....	Germany	5,364	3,094
Great Britain	11,387	9,794	Gibraltar	895	.....
France	7,186	4,296	Great Britain	6,862	5,988
Holland	1,847	1,150	Holland	248	377
India (British)	48	.....	Russia	502	.....
Italy	.....	2	Turkey	.....	15
Switzerland	101	93	United States	.....	5
United States	27	54	Total	14,024	9,766
Total	24,025	22,271	Total from all countries.	83,666	76,934
Dyed:					
Africa (Congo)	26	.....			

* One kilogram equals 2.204.621 pounds avoirdupois.

B.—*Amount of duties imposed upon cotton tissues, plain, twilled, and ticking.*

[Extract from the Belgian customs tariff.]

Kind.	Thread per square centimeter.	Basis.	Duty.
Unbleached:			
First-class, weighing 11 kilograms and more, per 100 square meters	35 threads and less	100 kilograms	*Francs.* 50.00
Do	36 threads and more	do	72.00
Second-class, weighing from 7 to 11 kilograms, exclusive, per 100 square meters	35 threads and less	do	60.00
Do	36 threads to 43	do	100.00
Do	44 threads and more	do	180.00
Third-class, weighing from 3 to 7 kilograms, exclusive, per 100 square meters	27 threads and less	do	80.00
Do	28 threads to 35	do	120.00
Do	36 threads to 43	do	190.00
Do	44 threads and more	do	300.00
Bleached:			
First-class, weighing 11 kilograms and more, per 100 square meters	35 threads and less	do	57.50
Do	36 threads and more	do	82.80
Second-class, weighing from 7 to 11 kilograms, exclusive, per 100 square meters	35 threads and less	do	69.00
Do	36 threads to 43	do	115.00
Do	44 threads and more	do	207.00
Third-class, weighing from 3 to 7 kilograms, exclusive, per 100 square meters	27 threads and less	do	92.00
Do	28 threads to 35	do	138.00
Do	36 threads to 43	do	218.50
Do	44 threads and more	do	345.00
Dyed:			
First-class, weighing 11 kilograms and more, per 100 square meters	35 threads and less	do	75.00
Do	36 threads and more	do	97.00
Second-class, weighing from 7 to 11 kilograms, exclusive, per 100 square meters	35 threads and less	do	85.00
Do	36 threads to 43	do	125.00
Do	44 threads and more	do	205.00
Third-class, weighing from 3 to 7 kilograms, exclusive, per 100 square meters	27 threads and less	do	105.00
Do	28 threads to 35	do	145.00
Do	36 threads to 43	do	215.00
Do	44 threads and more	do	325.00
Printed		Ad valorem	15 per ct.
Velvets:			
Imitation silk:			
Unbleached		100 kilograms	85.00
Dyed or printed		do	110.00
All others:			
Unbleached		do	60.00
Dyed or printed		do	85.00
Twilled, dimity, "faconnés," damaskeened, and "brillantés," weighing 3 kilograms and more, per 100 square meters		Ad valorem	15 per ct.
Lace, hand-made and spindle-made			Free.
All other cotton tissues, not specially enumerated, as also mixed tissues where cotton predominates in weight		Ad valorem	10 per ct.

One square centimeter equals .39 inch square; 1 square meter equals 1.093.621 square yards, equaling 3.280.867 square feet; 1 kilogram equals 2.204.621 pounds avoirdupois; 1 franc equals 19.3 cents.

FRANCE.

HAVRE.

REPORT BY CONSUL DUFAIS.

The official figures of the importations for the year 1888 are not yet published, but by the courtesy of the collector of the port I am enabled to send you herewith a full list* of last year's importations of cotton articles, such as cloths, calicoes, tickings, embroidered goods, curtains, laces, etc., in kilograms (of 2.20 pounds), specifying the countries from which imported, the flag under which they came, those in transit for the interior under the head of general commerce, etc., those for local consumption under that of special commerce, and duties collected here on the latter.

The total importations into Havre sum up as follows for—

Year.	Quantities.	Value.
	Pounds.	*Francs.*
1888	11,496,000	(*)
1887	9,604,000	12,120,000
1886	8,696,000	11,366,000
1885	6,640,000	8,972,000
1884	7,328,000	9,341,000
1883	6,942,000	9,044,000
1882	7,105,000	8,045,000
1881	6,050,000	7,285,000
1880	5,016,000	4,541,000

*Not yet made up.

The importations for local consumption are so insignificant, all for retail stores, that I have found it impossible to get at the weight of cotton cloth per yard.

F. F. DUFAIS,
Consul.

UNITED STATES CONSULATE,
Havre, France, July 31, 1889.

MARSEILLES.

REPORT BY CONSUL MASON.

IMPORTS.

The trade in cotton manufactures at Marseilles is relatively unimportant, being principally confined to landing the goods from vessel or railway and re-shipping them to the remote countries which are reached by the extensive system of steam-ship lines which has its focus at this port. Taking, as an example, the commerce of 1888, we find that of 5,560,289 kilos of cotton textiles imported here by sea and rail, only 122,960 kilos, or one forty-fifth part of the whole amount, was entered for local consumption, while 5,437,329 kilos were reshipped abroad.

The same proportion exists in the imports of preceding years, as the following table will show:

* Table not in shape for publication.

Year.	General commerce.	Entered for consumption.	Amount of duty paid.
	Kilograms.	*Kilograms.*	*Kilograms.*
1887	4,347,424	302,665	100,074
1886	4,717,647	214,882	171,636
1885	5,438,804	117,290	103,355
1884	5,045,855	66,991	58,658
1883	6,018,364	102,899	100,229

Southern France has no cotton manufactures of any consequence, and receives its supplies of muslins, sheetings, calicoes, etc., from the great mills of Roubaix, Rouen, Tourcoing, and other manufacturing centers in the North. The protection which these industries enjoy under the present tariff laws, and the rebates or discriminations which are secured to cotton textile imports coming from certain nations, which have special treaties of commerce with France, viz, Great Britain, Belgium, Switzerland, Spain, Austria, Portugal, Sweden, Norway, Turkey, and finally Germany, by virtue of the treaty of Frankfort, are indicated by the following tables, per 600 kilograms:

Description.	General tariff.	Treaty rates.
Cotton cloths not bleached, dyed, or printed:		
Weighing 11 kilograms or more per 100 square meters (20.27 per 100 yards square:	*Francs.*	*Francs.*
Not exceeding 30 threads to 5 square millimeters	62	50
Over 30 threads	100	72
Weighing from 7 to 11 kilograms:		
Not exceeding 35 threads	95	60
From 36 threads to 43	125	100
From 44 threads upwards	250	180
Weighing from 5 to 7 kilograms:		
Not exceeding 27 threads	100	80
From 28 threads to 35	145	117
From 36 threads to 43	235	190
From 44 threads upwards	300	242
Weighing from 3 to 5 kilograms:		
Not exceeding 20 threads	230	110
Not exceeding 27 threads		148
From 28 threads to 35	300	193
From 36 threads to 43	410	270
From 44 threads upwards	625	403
Weighing less than 3 kilograms per 100 square meters:		
Bleached, an additional duty of	15 per cent.	15 per cent.
Dyed in Andrinople red, an additional duty of	60	----------
Dyed in any other color, an additional duty of	30	25
Printed (linings), an additional duty of	2.50	----------
Printed in one or two colors, an additional duty of	3.75	2
Printed in 3 to 6 colors, an additional duty of	6.25	4
Printed in 7 or more colors, an additional duty of	10	7.50

In the long list of duties assessed upon other fabrics, which range from 8 francs per 100 kilograms for oil-cloth to 1,000 francs per 100 kilograms for cotton gloves, it will be sufficient to mention only those which are imported to any extent:

Description.	General tariff.	Treaty rates.
	Francs.	*Francs.*
Blankets	68	55
Tulle	496	400
Tulle when exceeding 7 meshes to the square centimeter	700	562
Muslin	360	180
Muslin curtains	300	140
Muslin curtains weighing 10 kilograms or more per 100 square meters	600	280

It is seen that in all cases cotton goods imported to this country pay a specific duty graded according to certain limits of weight per 100 square meters, and all entries in French ports being recorded in weights without regard to measurement, it has been found impossible to ascertain the weight per yard of any of the textiles passing through this port in transit. In the table of quantities entered for consumption at this port during the year 1888 the classification is based upon the rates of duty applied to the imports from each country.

Imports during 1888, *including quantities shipped in transit to other countries.*

Description of goods.	From—								Total.
	Algeria	Belgium.	Germany.	Great Britain.	Italy.	Switzerland.	Turkey	Other countries.	
Cloth and dress goods:									
Bleached and unbleached	*Kilos.* 6,109	*Kilos.* 25,862	*Kilos.* 41,629	*Kilos.* 94,092	*Kilos.* 13,876	*Kilos.* 24,275	*Kilos.* 2,729	*Kilos.* 2,293	*Kilos.* 210,865
Dyed	.....	62,839	85,463	25,835	23,347	2,059,987	218	3,631	2,261,320
Printed	32,220	10,369	28,808	2,185,713	7,250	435,522	19,156	2,579	2,721,617
Upholstery goods	.....	3,350	.....	59,382	.....	461	.....	11	63,204
Muslins, embroidered, brocaded	.....	.....	1,136	2,091	.....	3,783	96	4	7,110
Velveteens	.....	690	6,272	495	1,217	1,701	17	1,382	11,774
Embroidered goods	.....	43	712	740	167	54,777	4,649	284	61,372
Knit goods	598	340	5,721	417	2,605	25,390	125	4,987	40,183
Mixed goods	1,699	54,861	4,263	125	25	9,580	23	38	70,614
All other	620	3,719	2,365	2,220	742	6,201	56,285	40,078	112,230
Total	41,246	162,073	176,369	2,371,110	49,229	2,621,677	83,298	55,287	5,560,289

Cotton fabrics entered for consumption at Marseilles during the year 1888.

Description of goods.	Algeria.	Belgium.	Germany.	Great Britain.	Italy.	Switzerland.	Turkey.	Other countries.	Total.
Cloth and dress goods weighing 11 kilograms or more per 100 square meters:	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*
Unbleached	.....	.....	.....	203	10	.....	7	97	317
Bleached	.....	.....	3	849	851	10	15	175	1,903
Dyed	.....	.....	2	.....	15	7,661	56	90	7,824
Printed	.....	1,205	.....	267	.....	.....	11	51	1,534
From 7 to 11 kilograms:									
Unbleached	.....	.....	.....	32	4	.....	.....	3	39
Bleached	.....	.....	.....	9	8	6	1	3	27
Dyed	.....	.....	.....	2,534	.....	214	3	6	2,757
Printed	.....	.....	.....	562	383	28,925	7	2	29,879
Cloth and dress goods weighing per 100 square meters:									
From 5 to 7 kilograms:									
Bleached	.....	.....	.....	923	8	1	.....	3	935
Dyed	.....	.....	.....	.....	1	544	.....	36	581
Printed	.....	.....	2	.....	.....	6	.....	.....	8
From 3 to 5 kilograms:									
Bleached	.....	.....	.....	469	.....	.....	5	.....	474
Dyed	.....	.....	.....	.....	.....	.....	10	.....	10
Free of duty, weight per yard not recorded	4,439	.....	.....	.....	.....	.....	.....	.....	4,439
Upholstery goods	.....	2,903	.....	56,835	.....	.....	1	10	59,749
Muslins embroidered or brocaded	.....	.....	.....	5	.....	652	96	4	757
Velveteens	.....	.....	23	5	1	1,075	17	1	1,122
Embroidered goods	.....	43	6	.....	.....	414	183	299	945
Gimps	.....	.....	7	.....	.....	23	2,434	.....	2,464
Knit goods	598	.....	527	2	18	244	.....	4	1,393
Mixed goods	1,699	.....	.....	.....	.....	23	.....	10	1,732
All other	620	30	371	357	26	1,083	94	1,490	4,071
Total	7,356	4,181	941	63,052	1,325	40,881	2,940	2,284	122,960

It follows from what has been already stated, and the very small proportion of cotton textiles passing through Marseilles which are entered for consumption, that the importation of such goods in the ordinary commercial sense is not of sufficient volume and importance to form the basis of any general analysis or deductions. No statistics exist from which the amount or value of cotton goods brought here for consumption from other parts of France can be approximately derived. The prices and methods of purchase which apply to the trifling imports for consumption from England, Belgium, and Switzerland are those which ordinarily rule in the markets of those countries.

HOW PURCHASED.

Purchases are either for cash or thirty days' payment, but the Swiss and German manufacturers send some goods on consignment, paying a commission on sales. There are no brokers in this line of trade at Marseilles, and all transactions are direct between the purchaser and the manufacturer or his agent. Hence each transaction is made upon special and often varying terms, and there are no general rules by which the trade—relatively unimportant in itself—is uniformly governed.

FRANK H. MASON,
Consul.

UNITED STATES CONSULATE,
Marseilles, July 10, 1889.

GERMANY.

HAMBURG.

REPORT BY CONSUL LANG.

COTTON TEXTILES.

Kind imported.—The statistics obtainable by this consulate do not show the different kinds of cotton textiles imported into Hamburg, but from reliable information, obtained from experts in this line, it is safe to say that every kind manufactured finds its way into this port. The quantity imported per annum for the years 1885, 1886, and 1887 (the statistics for 1888 have not yet been completed) was 31,230,815 pounds, 32,862,669 pounds, and 36,650,020 pounds, respectively.

Weights.—The weight per yard can not be furnished, as the goods are weighed in bulk and not by measure. Besides, no statistics exist regarding the measurement.

How purchased.—This is a very difficult question to answer. Most of the cotton textiles arriving in Hamburg are in transit and are almost immediately shipped from here to foreign ports. The firms handling

these wares are, with few exceptions, forwarding agents who receive the goods from the interior and know nothing about the mode of purchase. Even the small percentage of the goods which actually remains in this district is purchased in a hundred different ways and mostly in comparatively small lots.

Place of manufacture.—By far the greater part of the German cotton textiles are manufactured in Saxony. The following two tables, comprising the years 1885, 1886, and 1887 will show from where the goods are imported, the respective quantities and values.

Duties.—As the most simple and at the same time most reliable manner of replying to this question, I give below a translation of a part of the New Imperial German Tariff. (Duties assessed per 100 kilograms):

	Marks.
Cotton and cotton goods:	
Cotton, raw, combed, dyed	free
Cotton batting	1.50
Cotton thread, unmixed, or mixed with linen, silk, wool, or other vegetable or animal spinning stuffs:	
Single cord, raw—	
Up to No. 17 English	12
Over No. 17 to No. 45 English	18
Over No. 45 to No. 60 English	24
Over No. 60 to No. 79 English	30
Over No. 79 English	36
Double cord, raw:	
Up to No. 17 English	15
Over No. 17 to No. 45 English	21
Over No. 45 to No. 60 English	27
Over No. 60 to No. 79 English	33
Over No 79 English	39
Single and double cord, bleached or dyed:	
Up to No. 17 English	24
Over No. 17 to No. 45 English	30
Over No. 45 to No. 60 English	36
Over No. 60 to No. 79 English	42
Over No. 79 English	48
Triple cord or more, twisted once or more, raw, bleached, dyed	48
Double cord, repeatedly twisted, raw, bleached, dyed, also cut cotton thread, manufactured for retail sale of every description	70
Wicks, unwoven	24
Cotton textiles without and in connection with metal threads, without admixture of silk, wool or other animal hair:	
Raw, (manufactured from raw yarn) solid textiles with exception of cut velvets, tulle, raw without designs	80
Bleached solid textiles, also finished, with exception of uncut velvets	100
All solid textiles not included in Nos. 1, 2 and 6, raw (manufactured from raw yarn), loose textiles with exception of curtainings, as far as not classed under No. 1; hosiery, upholsters' and button-makers' wares, also textiles in connection with metal threads	120
Curtainings, bleached and finished	230
All loose textiles, as jaconet, muslin, tulle, marly, gauze, as far as not classed under Nos. 1, 3, and 4	200
Laces and all embroideries	350

Cotton and cotton goods—Continued.

Cotton fishing nets, new	3
Packing and scrubbing cloth	10
Emery cloth	6

WM. W. LANG,
Consul.

UNITED STATES CONSULATE,
Hamburg, July 8, 1889.

Quantities and whence imported into Hamburg during 1885, 1886, *and* 1887.

Whence imported.	1887.			1886.		1885.	
	Quantities.	Value.	Average value per 100 kilos. or 220 pounds.	Quantities.	Value.	Quantities.	Value.
	Pounds.			*Pounds.*		*Pounds.*	
United States	998,460	$258,846	$58	872,140	$193,977	912,043	$204,209
Chili	6,380	928	32	12	31	.....	614
Japan	440	114	.....	4,409	1,245	.....	.....
Africa on the Atlantic	.....	.....	.....	2,425	747	.....	.....
Great Britain	11,733,920	4,528,088	85	11,349,942	4,320,185	12,406,838	5,224,214
Belgium	768,680	113,281	32	714,731	89,925	654,766	88,089
France	76,120	34,184	99	43,430	23,136	52,249	27,729
Netherlands	27,280	10,529	87	29,762	8,860	26,014	9,082
Portugal	16,280	5,907	80	663	219	.....	.....
Spain	5,720	2,453	94	9,480	4,370	3,968	2,033
Italy	3,740	1,552	91	6,834	3,495	2,646	1,257
Bremen and Weser	4,620	1,468	70	441	248	5,372	1,801
Norway	880	386	.....	1,764	1,097	2,646	1,169
Baltic ports	.....	.....	.....	.....	.....	88,184	28,298
Via Altona	128,480	47,110	81	101,632	41,117	111,332	46,631
Berlin-Hamburg railroad	12,283,480	5,202,463	93	9,949,800	4,680,944	8,304,287	4,177,045
Venlo-Hamburg railroad	8,213,920	3,593,060	96	7,514,159	3,213,226	6,743,431	3,396,381
By wagon	1,232,220	612,060	109	982,380	484,097	818,568	469,215
By post	299,420	267,410	196	304,235	292,007	360,231	351,574
Altona-Kiel railroad	477,400	171,431	79	626,988	226,976	511,688	200,774
Upper Elbe	343,200	117,803	75	306,880	98,076	178,352	40,948
Lübeck-Hamburg railroad	38,060	14,275	83	39,462	16,001	45,635	22,115
Various directions	1,320	697	116	1,100	988	1,764	1,411
Total	36,650,020	14,984,345	90	32,862,669	13,702,967	31,230,815	14,294,589

STETTIN.

REPORT BY CONSUL FAY.

In reply to your circular dated May 27, 1889, I have the honor to offer the following relative to the instructions therein named.

The imports of cotton textiles at Stettin, during the year 1888, amounted to—

	Tons.
Coarse cottons of thick textiles	4.0
Bleached cottons	1.1
Colored cottons	6.2
Cotton yarns	679.0

It will be observed that the principal imports were cotton yarns, and for the most part of the cheaper kinds, used by the peasants for spinning purposes.

WEIGHT PER YARD.

I find it quite difficult to correctly and satisfactorily answer this interrogatory, for the reason pieces of cotton goods of the same quality but of different factories seldom have the same weight.

I have secured five samples of the principal kinds imported, which I beg to herewith inclose. The weight of these pieces per yard is, viz:

	Grams.
Sample 1	99
Sample 2	64
Sample 3	104
Sample 4	87
Sample 5	60

HOW PURCHASED.

The usual time given to jobbers is, 30 days with a discount of 2 per cent., or 90 days net.

PLACE OF MANUFACTURE.

All cotton textiles imported at this port during the year 1888 came from England, Belgium, and Holland, namely:

	Tons.
England:	
Cotton goods	2.1
Cotton yarns	675.7
Belgium: Cotton goods	2.4
Holland:	
Cotton goods	3.2
Cotton yarns	3.3

(One ton = 2,200 pounds.)

DUTIES CHARGED.

The duties on cotton textiles per 100 kilograms are as follows:

Coarse cottons	$19.04
Bleached cottons	23.80
Colored cottons	28.56
Cotton velvets	28.56
Coarse yarns, single thread:	
Nos. 10 to 17	2.856
Nos. 17 to 45	4.284
Nos. 45 to 60	5.712
Nos. 60 to 79	7.14
Nos. 79 and above	8.568

Three marks additional duty is levied on double thread yarns.

Bleached and colored yarns:	
Nos. 10 to 17	$5.712
Nos. 17 to 45	7.14
Nos. 45 to 60	8.568
Nos. 60 to 97	9.996
Nos. 97 and above	11.42

One kilogram = 2.205 pounds.

PRICES.

The present cost prices of the inclosed samples, that is, what the jobber pays the manufacturer, are as follows:

	Per meter.
Sample 1	$0.088
Sample 2	.0785
Sample 3	.119
Sample 4	.0856
Sample 5	.138

One meter = 1.09363 yards.

The larger portion of cotton textiles used in Germany are manufactured in Alsace and Lorraine.

ANDREW F. FAY,
Consul.

UNITED STATES CONSULATE,
Stettin, July 10, 1889.

HOLLAND.

REPORT BY CONSUL ECKSTEIN, OF AMSTERDAM.

The custom-house records and returns and the statistics published by the department of finance do not state the quantity of cotton textiles imported, but they do show their value.

The reason for this, as explained to me, is that the duty upon manufactures of cotton is payable and assessed upon their value.

VALUE OF IMPORTS.

The following statement shows the value (in florins) of manufactures of cotton into Holland during the years 1886, 1887, and 1888, and the countries whence imported, viz:

Articles and whence imported.	1886.	1887.	1888.
Manufactures of cotton, unbleached or bleached:	*Florins.*	*Florins.*	*Florins.*
Africa:			
East coast	9		
West coast			20
Belgium	361,797	410,485	446,184
Denmark			
France	10		350
Great Britain	1,782,804	2,251,995	2,297,436
Dutch Guiana			
Hamburg	25	259	556
Java	297	111	173
Prussia	285,554	230,137	232,305
United States		70	
Sweden	4,000		
Total	2,434,496	2,893,057	2,977,024
Imported at Amsterdam	749,073	796,261	750,671

Articles and whence imported.	1886.	1887.	1888.
Manufactures of cotton, colored or printed:	*Florins.*	*Florins.*	*Florins.*
Africa, west coast	.....	8	30
Belgium	511,407	483,616	506,427
Denmark	.....	.....	120
France	264	.....	.....
Great Britain	2,882,602	2,887,326	2,775,483
Dutch Guiana	70	18	.....
Hamburg	445	60	45
Java	110	1,015	579
Prussia	2,086,823	2,163,173	2,218,074
United States	50	18	.....
Sweden	26	.....	220
Total	5,481,797	5,535,234	5,500,978
Imported at Amsterdam	1,440,088	1,431,640	1,331,054
Manufactures of cotton, laces, etc.:			
Belgium	119,647	67,958	56,201
Great Britain	174,832	163,296	151,648
Hamburg	.....	.....	666
Prussia	36,907	38,935	31,998
Total	331,386	270,189	240,513
Imported at Amsterdam	69,147	71,382	70,265

From the above statement an inference may or must be drawn as to what has been the quantity of the imports during the years which it covers.

It appears as if the local manufacturers of cotton textiles were constantly making increased efforts to supply as far as possible the domestic demand and consumption, and with tolerably fair success.

It would therefore be safe to assume that the markets of this country are not likely to require increased supplies of cotton goods from abroad whilst present conditions continue to prevail.

The sum total of the imports for an entire year as stated above may seem rather small, nor do I think that it really represents the full value of all cotton goods imported.

WEIGHT PER YARD.

My efforts to obtain information upon this point were entirely unsuccessful.

In official quarters nothing whatever is known or on record touching the matter, and the principal dealers and importers of manufactures of cotton goods assure me that they can not and that no one here can give an intelligent or reliable answer upon this point.

They say that the sorts or classes of goods imported differ so very much, each from the other, as to make it impossible to indicate or describe their correct weight per yard or meter.

HOW PURCHASED.

When not otherwise specially agreed upon, cotton goods are generally purchased by the importers for cash, which is held to be equivalent to one month's time, with 1½ per cent. discount. It is, however, optional on the part of the buyer who is regarded to be of good reputation and

standing, to avail himself of the privilege of the longer credit, which is frequently extended and consists of four months.

Cotton textiles are generally bought of commission houses or merchants who send their travelers with sample collections.

Large buyers often go into the market or send on their orders.

PLACE OF MANUFACTURE.

The particular places where the goods are manufactured in the different foreign countries and imported into Holland have not been pointed out to me, although I endeavored to procure the information as to whence the same are produced. I have been able to ascertain only that the bulk of the imports from England are turned out at Manchester and Glasgow. Some of the better qualities of printed goods imported from Germany are made at different places in Alsace and in Baden.

At certain places in Belgium and in Switzerland are manufactured some of the articles which enter this country for consumption.

As to whence cotton goods are imported into Holland I would refer to the previous tabular statement in answer to the first point.

DUTIES CHARGED.

All manufactures of cotton as well as those of part wool and cotton are dutiable at the rate of 5 per cent. ad valorem.

Exempt from duty are raw and unbleached cottons which are intended for the domestic print-works, and also sail-cloth for ship's use.

Cotton yarns are admitted free of duty; woolen yarns more than double twisted (tweedraads) pay 3 per cent. on their value.

D. ECKSTEIN,
Consul.

UNITED STATES CONSULATE,
Amsterdam, September 6, 1889.

ITALY.

REPORT BY CONSUL-GENERAL BOURN.

In response to your circular of May 27, 1889, requesting reports upon cotton textiles imported into this district, I have the honor to report as follows, and to submit the accompanying tables taken from official and other sources. Statistics pertaining to importations into the entire consular district are not accessible, as distinct from importations into the entire kingdom. I have therefore collected the importations into the Provinces of Rome-Cagliari and Sassari, which constitute, however, only a part of this consular district, to which I have added the statistics for the kingdom.

Italy has no complete official statements of cotton industries, but according to an unofficial report there are about 647 cotton factories with

about 800,000 spindles, using about 30,000 tons of raw cotton per year. In these factories there are about 13,517 power and 14,300 hand looms, besides about 42,000 hand-looms in rural residences scattered throughout the country, making a total of about 70,000 looms. The cotton industry is said to employ 70,000 persons.

The yarn or thread manufactured in Italy is generally of the highest numbers. About 8,000,000 pounds were imported in 1889, chiefly from Great Britain, Switzerland, and Germany. The production of woven goods is valued at about $32,800,000 per year, being insufficient for home consumption. The imports of the usual cotton tissues for 1889 were about 20,000,000 pounds.

Linen goods are used in Italy very much more extensively than in the United States, which accounts for the comparatively limited consumption of cotton textiles.

Various attempts have been made to introduce cotton goods from the United States into Italy with greater or less success. So far as I have been able to learn our fabrics have given great satisfaction. The business of the last person who undertook in this city the importation from the United States was broken up by his death, and no one seems to have taken it up. Were serious attempts to be made to introduce our cotton textiles into this country no doubt larger sales could be effected. But it must not be forgotten that the channels of trade have been for a long time established, and that it will not be an easy task to establish new ones. The English, German, and Swiss manufacturers would no doubt be unwilling to surrender any portion of their trade without an effort to retain it. But the present unsettled condition of trade would seem to offer an unusually favorable opportunity for our manufacturers to make the attempt.

Cotton goods are generally sold by agents or travelers sent out by the manufacturers. For our manufacturers to successfully introduce their goods they must employ the proper means, and have trustworthy agents on the spot, or skillful travelers who understand the customs of the trade and the Italian language. They must also ascertain the wants of the people as to styles, widths, weights, and packages. Large quantities of calicoes are used here, but the designs that would suit the American trade would not be acceptable in every part of Italy.

I will append to this tables showing:

(1) The imports of cotton, threads, warps, and tissues, into the Province of Rome for 1886 and 1887.
(2) The same for the Province of Cagliari, Sardinia, for 1888.
(3) The same for the Province of Sassari, Sardinia, for 1888.
(4) Cotton tissues imported into Italy in 1887, with duties and countries of origin, in detail.
(5) The same for 1888, with duties and countries of origin, in detail.
(6) Threads and warps imported in 1887, with duties and countries of origin, in detail.
(7) The same for 1888, with duties and countries of origin, in detail.

(8) The imports of cotton, cotton-batting, threads, yarns, warps, tissues, etc, for 1888 and 1889, in pounds, with a summary.

(9) The imports of cotton, threads, yarns, warps, and tissues, plain, wrought, or damasked, brocaded and embroidered, Tulles, muslins, and veilings, also laces, by country of origin.

(11) Imports and exports of cotton and cotton manufactures, 1880–1888.

I also send by another mail a package of samples of cotton cloths, such as I have been able to procure. I found the wholesale dealers very unwilling to give prices, samples, or any other details of their business. I will inclose a statement showing such details as to cost, etc., of threads and cloths imported, as I have been able to procure—statement No 10.

AUGUSTUS O. BOURN,
Consul-General.

U. S. CONSULATE GENERAL,
Rome, March 31, 1890.

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(1) *Imports of cotton textiles into the Province of Rome in* 1886 *and* 1887.

[1 kilogram = 2.205 pounds.]

Description.	Quantity.	
	1886.	1887.
Cotton:	*Kilograms.*	*Kilograms.*
In bales or in mass	52	.....
In wadding	3,122	1,105
Threads, untwisted and unbleached, measuring from 10,000 to 20,000 meters for every half kilogram	107	.....
Threads, untwisted and bleached, measuring more than 30,000 and up to 40,000 meters for every half kilogram	.....	55
Threads, untwisted, dyed:		
Measuring more than 50,000 and up to 60,000 meters for every half kilogram	5	.....
Measuring more than 60,000 meters for every half kilogram	2	.....
Threads, twisted, unbleached:		
Measuring from 10,000 to 20,000 meters for every half kilogram	24	.....
Measuring more than 20,000 and up to 30,000 meters for every half kilogram	36	16
Measuring more than 30,000 and up to 40,000 meters for every half kilogram	.....	4
Measuring more than 40,000 and up to 50,000 meters for every half kilogram	8	36
Threads twisted, bleached:		
Measuring not more than 10,000 meters for every half kilogram	1,123	142
Measuring from 10,000 to 20,000 meters for every half kilogram	2,247	241
Measuring more than 20,000 and up to 30,000 meters for every half kilogram	2,132	2,171
Measuring more than 30,000 and up to 40,000 meters for every half kilogram	1,860	1,504
Measuring more than 40,000 and up to 50,000 meters for every half kilogram	1,989	1,628
Measuring more than 50,000 and up to 60,000 meters for every half kilogram	239	389
Measuring more than 60,000 meters for every half kilogram	117	94
Thread, twisted, dyed:		
Not measuring more than 10,000 meters for every half kilogram	.....	35
Measuring from 10,000 up to 20,000 meters for every half kilogram	1,008	876
Measuring from 20,000 to 30,000 meters for every half kilogram	2,950	2,837
Measuring from 30,000 to 40,000 meters for every half kilogram	2,006	1,682
Measuring more than 40,000 and up to 50,000 meters for every half kilogram	3,567	3,539
Measuring more than 50,000 and up to 60,000 meters for every half kilogram	129	296
Measuring more than 60,000 meters for every half kilogram	18	148

(1) *Imports of cotton textiles into the Province of Rome, etc.*—Continued.

Description.	Quantity.	
	1886.	1887.
	Kilograms.	*Kilograms.*
Tissues, unbleached:		
Of the weight of 13 kilograms or more per 100 square meters that contain in warp and woof on a square of 5 millimeters:		
27 elementary threads or less	8,353	3,568
More than 27 threads	1,341	7
Of the weight of 7 or more kilograms but less than 13 per 100 square meters that contain in warp and woof in a square of 5 millimeters:		
27 elementary threads or less	457	.....
More than 27 threads	30	9
Of the weight of less than 7 kilograms per 100 square meters that contain in warp and woof in a square of 5 millimeters:		
27 elementary threads or less	729	9
More than 27 threads	46	.....
Tissues, bleached:		
Of the weight of 13 kilograms or more per 100 square meters that contain in warp and woof on a square of 5 millimeters:		
27 elementary threads or less	2,535	2,625
More than 27 threads	95,441	82,595
Of the weight of 7 or more kilograms but less than 13 per 100 square meters that contain in warp and woof in a square of 5 millimeters:		
27 elementary threads or less	2,463	5,462
More than 27 elementary threads	12,977	12,067
Of the weight of less than 7 kilograms per 100 square meters that contain in warp and woof in a square of 5 millimeters:		
27 elementary threads or less	4,048	3,310
More than 27 elementary threads	738	1,298
Tissues, colored or dyed:		
Of the weight of 13 kilograms or more per 100 square meters that contain in warp and woop on a square of 5 millimeters		
27 elementary threads or less	5,626	1,145
More than 27 threads	37,757	49,994
Of the weight of 7 or more kilograms but less than 13 per 100 square meters that contain in warp and woop in a square of 5 millimeters:		
27 elementary threads or less	50,186	48,548
More than 27 threads	49,339	74,877
Of the weight of less than 7 kilograms per 100 square meters that contain in warp and woop in a square of 5 millimeters:		
27 elementary threads or less	793	519
More than 27 threads	96	70
Tissues, printed:		
Of the weight of 13 kilograms or more per 100 square meters that contain in warp and woof on a square of 5 millimeters:		
27 elementary threads or less	7,218	16,565
More than 27 threads	2,207	5,252
Of the weight of 7 or more kilograms but less than 13 per 100 square meters that contain in warp and woof in a square of 5 millimeters:		
27 elementary threads or less	36,668	29,625
More than 27 threads	67,027	70,193
Of the weight of less than 7 kilograms per 100 square meters that contain in warp and woof in a square of 5 millimeters:		
27 elementary threads or less	6	3
More than 27 threads	29	34
Tissues, embroidered:		
In chain stitch	237	271
In double stitch	915	528
Tulles, gauze, and muslins:		
Bleached or dyed	7,388	8,998
Embroidered	294	390
Tissues:		
Oil cloths for floors and ditto tarred	125	185
All others	1,325	998
Buttons, hosiery, guipures, and blankets	3,916	5,016
Galloons and ribbons	1,170	1,623
Laces	4,656	4,081
Velvets, dyed	5,953	7,006
Sewed articles	19,753	24,384

(2) *Cotton textiles imported into the Province of Cagliari, Sardinia, in* 1888.

Description.	United States and Canada.		France.		Germany.		England.		Spain.		Tunis and Tripoli.		Total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.
Tissues:	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*
Unbleached	27	69	8	20	.....	.....	2,194	5,582	.....	.....	3	8	2,232	5,679
Bleached	.....	.....	106	382	3	11	3,129	11,523	.....	.....	3	11	3,241	11,927
Colored or dyed	.....	.....	353	1,305	4,009	14,833	1,534	5,674	.....	.....	17	62	5,913	21,874
Printed	.....	.....	3,909	22,281	42	239	66	376	1	6	6	38	4,024	22,940
Wrought and damasked bl'ched	.....	.....	.....	.....	60	220	.....	.....	.....	.....	.....	.....	60	220
Wrought and damasked, dyed	.....	.....	6	27	225	843	.....	.....	.....	.....	.....	.....	231	870
Embroidered	.....	.....	1	15	.....	.....	.....	.....	.....	.....	.....	.....	1	15
Waxed, tanned, or oiled	.....	.....	195	779	15	60	.....	.....	.....	.....	40	160	250	999
Laces	.....	.....	17	335	.....	.....	.....	.....	.....	.....	.....	.....	17	335
Velvets:														
Common	.....	.....	100	1,198	1,800	21,563	100	1,198	.....	.....	.....	.....	2,000	23,959
Fine	.....	.....	.....	.....	305	3,666	.....	.....	.....	.....	.....	.....	305	3,666
Tissues:														
Mixed with silk	.....	.....	54	213	.....	.....	111	437	.....	.....	.....	.....	165	650
Mixed with wool	.....	.....	43	169	12	47	19	76	.....	.....	.....	.....	74	292
Total	27	69	4,792	25,724	6,471	41,482	7,153	24,866	1	6	69	279	18,513	93,426
Total in pounds and dollars	59	13	10,564	4,965	14,266	8,006	15,769	4,799	2	1.15	152	54	40,814	18,031

(3) *Cotton textiles imported into the Province of Sassari, Sardinia, in* 1888.

Description.	United States and Canada.		France.		Germany.		England.		Spain.		Other Countries.		Total.	
	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.	Weight.	Value.
Tissues:	*Kilograms*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*	*Kilograms.*	*Lire.*
Bleached	.....	.....	1	3	.....	.....	396	1,362	.....	.....	3	10	400	1,375
Colored or dyed	.....	.....	770	2,926	180	684	4,120	15,656	.....	.....	.....	.....	5,070	19,266
Printed	.....	.....	1,255	6,940	157	856	.....	.....	.....	.....	.....	.....	1,412	7,796
Wrought and damasked bl'ched	.....	.....	.....	.....	.....	.....	189	1,682	14	125	2	18	205	1,825
Waxed, tarred or oiled	.....	.....	4	9	2½	6	.....	.....	.....	.....	.....	.....	6	15
Velvets:														
Common	.....	.....	68	555	393	3,428	1,639	14,341	2,401	20,989	.....	.....	4,501	39,353
Fine	.....	.....	.....	.....	50	600	80	960	20	240	.....	.....	150	1,800
Total	.....	.....	2,098	10,473	782½	5,574	6,424	34,001	2,435	21,354	5	28	11,744	71,430
Total in pounds and dollars	.....	.....	4,625	2,021	1,725	1,076	14,163	6,562	5,368	4,121	11	5.40	25,891	13,786

(4) *Imports of cotton textiles into Italy in* 1887.

[Quantities in quintals of 220.46 pounds.]

Description.	General duties.	Total.	Austria.	Belgium.	France.	Germany.	Great Britain.	Greece and Malta.	Holland.	Switzerland.	China.	Egypt.	Algeria.	United States and Canada.
		Quintals.	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*
Tissues, unbleached:														
Of the weight of 13 kilograms or more per 100 square meters that contain in warp and woof on a square of 5 millimeters:														
27 elementary threads or less	62 lire per quintal	1,218	16	.....	49	8	1,078	13	.....	47	.....	.....	.....	7
More than 27 threads	74 lire per quintal	2,559	13	.....	306	65	1,631	3	.....	535	.....	.....	.....	6
Of the weight of 7 or more kilograms, but less than 13 per 100 square meters that contain in warp and woof in a square of 5 millimeters:														
27 elementary threads or less	84 lire per quintal	35,480	101	.....	7,184	4,320	20,443	.....	.....	3,432	.....	.....	.....	.....
More than 27 threads	100 lire per quintal	7,072	3	.....	1,508	1,352	3,479	.....	.....	730	.....	.....	.....	.....
Of the weight of less than 7 kilograms per 100 square meters that contain in warp and woof in a square of 5 millimeters:														
27 elementary threads or less	110 lire per quintal	2,502	188	.....	402	606	178	.....	.....	1,128	.....	.....	.....	.....
More than 27 threads	130 lire per quintal	27	2	.....	12	.....	11	.....	.....	2	.....	.....	.....	.....
Tissues, bleached:														
Of the weight of 13 kilograms or more per 100 square meters that contain in warp and woof on a square of 5 millimeters—														
27 elementary threads or less	.....	6,619	212	.....	509	539	5,089	.....	.....	261	.....	.....	.....	9
More than 27 threads	74.40 lire per quintal	17,742	464	11	914	1,049	14,833	6	.....	462	.....	.....	.....	3
Of the weight of 7 or more kilograms, but less than 13 per 100 square meters, that contain in warp and woof in a square of 5 millimeters—														
27 elementary threads	88.80 lire per quintal	2,359	164	.....	182	107	1,702	.....	.....	204	.....	.....	.....	.....
More than 27 threads	100.80 lire per quintal.	5,301	158	.....	779	392	3,636	3	.....	330	.....	.....	.....	3
Of the weight of less than 7 kilograms per 100 square meters, that contain in warp and woof in a square of 5 millimeters—														
27 elementary threads or less	120 lire per quintal	588	29	.....	97	213	105	.....	.....	144	.....	.....	.....	.....
More than 27 threads	132 lire per quintal	287	4	.....	72	28	175	.....	.....	8	.....	.....	.....	.....

Tissues, colored or dyed:														
Of the weight of 13 kilograms or more per 100 square meters that contain in warp and woof on a square of 5 millimeters:														
27 elementary threads	97 lire per quintal	1,609	222	10	354	289	705	.....	.....	29	.....	.....	.....	.....
More than 27 threads	109 lire per quintal	9,289	856	285	2,314	1,297	4,121	.....	.....	411	.....	.....	.....	5
Of the weight of 7 or more kilograms, but less than 13, per 100 square meters, that contain in warp and woof in a square of 5 millimeters:														
27 elementary threads or less	119 lire per quintal	8,807	493	7	1,636	831	5,248	.....	.....	592	.....	.....	.....	.....
More than 27 threads	135 lire per quintal	14,180	1,108	180	2 784	1,929	7,240	.....	48	891	.....	.....	.....	.....
Of the weight of less than 7 kilograms per 100 square meters that contain in warp and woof in a square of 5 millimeters:														
27 elementary threads or less	145 lire per quintal	171	61	.....	34	17	21	.....	.....	38	.....	.....	.....	.....
More than 27 threads	165 lire per quintal	154	9	.....	62	4	70	.....	.....	9	.....	.....	.....	.....
Tissues, printed:														
Of the weight of 13 kilograms or more per 100 square meters that contain in warp and woof on a square of 5 millimeters:														
27 elementary threads or less	154.40 lire per quintal.	5,439	515	7	1,195	1,080	1,601	5	291	745	.....	.....	.....	.....
More than 27 threads	168.80 lire per quintal.	2,559	112	.....	260	71	1,996	4	.....	114	.....	.....	2	.....
Of the weight of 7 or more kilograms but less than 13 per 100 square meters that contain in warp and woof in a square of 5 millimeters:														
27 elementary threads	180.80 lire per quintal.	12,872	2,390	.....	1,327	1,831	6,063	.....	.....	1,261	.....	.....	.....	.....
More than 27 threads	200 lire per quintal	16,695	1,573	.....	3,321	.....	.....	.....	.....	.....	.....	.....	.....	.....
Of the weight of less than 7 kilograms per 100 square meters that contain in warp and woof in a square of 5 millimeters:														
27 elementary threads or less	212 lire per quintal	53	.....	.....	23	6	21	.....	.....	3	.....	.....	.....	.....
More than 27 threads	236 lire per quintal	34	6	.....	25	.....	3	.....	.....	.....	.....	.....	.....	.....
Tissues, embroidered:														
In chain stitch (a catenella)	200 lire per quintal in addition to the duty on the tissue.	84	15	.....	40	16	6	.....	.....	7	.....	.....	.....	.....
In double stitch (a punto passato)	300 lire per quintal in addition to the duty on the tissue.	384	42	.....	134	94	3	.....	.....	111	.....	.....	.....	.....

Imports of Cotton textiles into Italy in 1887—Continued.

Description.	General duties.	Total.	Austria.	Belgium.	France.	Germany.	Great Britain.	Greece and Malta.	Holland.	Switzerland.	China.	Egypt.	Algeria.	United States and Canada.
		Quintals.	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*
Tulles, gauze, and muslins:														
Unbleached	(1)	84	.....	.....	30	6	33	.....	.....	15	.....	.....	.....	.....
Bleached or dyed	(1)	1,557	163	3	453	288	437	.....	.....	213	.....	.....	.....	.....
Embroidered	(1)	386	38	.....	132	127	20	.....	.....	60	.....	.....	.....	.....
Tissues:														
Oil-cloths for floors and oil-cloths tarred	tarred, oiled, and the like, 30 lire.	93	6	.....	17	3	61	.....	.....	6	.....	.....	.....	.....
All others	waxed, 60 lire	1,207	22	.....	311	100	762	.....	.....	9	.....	.....	.....	3
Buttons, hosiery, guipures, and blankets	(2)	2,467	272	.....	976	306	788	.....	.....	123	.....	2	.....	.....
Galloons and ribbons	lire, 120	349	39	.....	145	117	9	.....	.....	39	.....	.....	.....	.....
Laces	7 lire per kilogram	1,806	183	.....	578	324	594	.....	.....	127	.....	.....	.....	.....
Velvets, dyed	Common and plush, 165 lire; fine, 200 lire.	3,682	293	5	785	402	1,985	.....	6	203	3	.....	.....	.....
Sewed articles	(3)	4,176	828	19	1,172	940	900	.....	3	307	.....	4	.....	3
Total	.....	169,891	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Tulles, unbleached, 400; bleached or dyed, 450. Muslins and velveting, sand nettings, unbleached, 200; bleached, 20 per cent. more than the duty on unbleached; colored or dyed, 35 lire per quintal more than the duty on the unbleached; printed, 80 lire per quintal more than the duty on the unbleached; wrought, 20 lire per quintal more than the duty on plain, brocaded, 40 lire per quintal more than the duty on the tissue; embroidered in chain stitch, 200 lire, in addition to the duty on the tissue; embroidered in double stitch, 300 lire per quintal, in addition to the duty on the tissue.

[2] Buttons, 150. Hosiery, plain, 150; fashioned, 50 per cent. more than the duty on plain. Guipures, 150. Blankets, same as the tissues or sewed articles.

[3] Bags, bed, and table linen, towels, and the like, 10 per cent., in addition to the duty on the tissue; collars, wristbands, and men's shirts, double the duty on the tissue. All others, 50 per cent., in addition to the duty on the tissue.

(5) *Imports of cotton textiles into Italy in* 1888.

[Quantities in quintals of 220.46 pounds.]

Description.	Total quantity imported.	Austria.	Belgium.	France.	Germany.	Great Britain.	Greece and Malta.	Holland.	Switzerland.	European Turkey.	Egypt.	United States and Canada.
Tissues, smooth:	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*
Unbleached	16,428	347	20	981	1,167	9,626	.....	2	4,276	.....	.....	9
Bleached	17,043	409	34	481	1,688	13,508	.....	5	892	.....	.....	26
Colored or dyed	15,187	575	92	1,232	1,995	9,209	.....	63	2,013	.....	.....	8
Printed	17,447	1,194	46	729	4,822	7,716	.....	63	2,863	.....	.....	14
Tissues, wrought or damasked:												
Unbleached	310	10	.....	.....	26	260	.....	.....	14	.....	.....	.....
Bleached	732	37	14	28	63	582	.....	.....	8	.....	.....	.....
Colored or dyed	1,288	74	68	72	181	729	.....	13	151	.....	.....	.....
Printed	211	.....	.....	4	21	73	.....	.....	113	.....	.....	.....
Tissues, brocaded:												
Smooth	67	.....	.....	1	9	57	.....	.....	.....	.....	.....	.....
Wrought and damasked	18	.....	.....	.....	.....	16	.....	.....	2	.....	.....	.....
Tissues, embroidered:												
In chain stitch	28	.....	.....	.....	.....	10	.....	.....	18	.....	.....	.....
In double stitch	253	13	.....	11	32	.....	.....	.....	197	.....	.....	.....
Tulles, unbleached	36	2	.....	.....	3	27	.....	.....	4	.....	.....	.....
Tulles, bleached or dyed	315	18	.....	49	75	107	.....	.....	66	.....	.....	.....
Muslins and tissues of veiling or netting:												
Smooth:												
Unbleached	18	.....	.....	4	3	11	.....	.....	.....	.....	.....	.....
Bleached	39	2	.....	17	7	7	.....	.....	6	.....	.....	.....
Colored or dyed	57	2	.....	39	5	6	.....	.....	5	.....	.....	.....
Printed	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wrought:												
Unbleached	35	8	.....	6	4	15	.....	.....	2	.....	.....	.....
Bleached	239	32	.....	7	25	143	.....	.....	32	.....	.....	.....
Colored or dyed	106	4	.....	16	25	53	.....	.....	8	.....	.....	.....
Brocaded	26	4	.....	4	4	7	.....	.....	7	.....	.....	.....
Wrought and brocaded	31	.....	.....	7	6	13	.....	.....	5	.....	.....	.....
Embroidered:												
In chain stitch	13	.....	.....	4	1	4	.....	.....	4	.....	.....	.....
In double stitch	51	.....	.....	11	4	3	.....	.....	33	.....	.....	.....
Tissues:												
Tarred, oiled, and the like	81	2	.....	2	11	61	.....	.....	5	.....	.....	.....
Oil-cloths	1,151	6	13	48	120	862	.....	.....	102	.....	.....	.....
Polished with emery	247	98	.....	7	100	36	.....	.....	6	.....	.....	.....
Buttons	6	.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....
Hosiery:												
Plain	74	8	.....	11	37	5	.....	.....	13	.....	.....	.....
Wrought	77	5	.....	24	25	19	.....	.....	4	.....	.....	.....

Imports of cotton textiles into Italy in 1888—Continued.

Description.	Total quantity imported.	Austria.	Belgium.	France.	Germany.	Great Britain.	Greece and Malta.	Holland.	Switzerland.	European Turkey.	Egypt.	United States and Canada.
	Quintals.	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*	*Quintals.*
Trimmings	669	33	.....	208	260	99	.....	.....	69	.....	.....	.....
Galoons and ribbons	333	22	.....	80	167	28	.....	.....	36	.....	.....	.....
Laces	436	25	1	50	78	204	.....	.....	73	4	1	.....
Velvets:												
Common, and plush:												
Unbleached	10	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....
Bleached	11	.....	.....	.....	.....	11	.....	.....	.....	.....	.....	.....
Dyed	799	6	.....	105	72	593	.....	.....	23	.....	.....	.....
Printed	48	2	.....	6	12	28	.....	.....	.....	.....	.....	.....
Fine:												
Dyed	955	32	.....	16	212	656	.....	3	36	.....	.....	.....
Printed	372	8	.....	.....	73	286	.....	.....	5	.....	.....	.....
Tissues mixed:												
With less than 12 per cent. of silk	190	17	21	47	50	35	.....	.....	20	.....	.....	.....
With less than 50 per cent. of wool:												
Smooth:												
Unbleached	94	.....	.....	.....	7	87	.....	.....	.....	.....	.....	.....
Colored or dyed	2,064	104	24	31	700	1,144	.....	27	34	.....	.....	.....
Printed	13	.....	.....	.....	6	7	.....	.....	.....	.....	.....	.....
Wrought and damasked:												
Unbleached	37	.....	.....	.....	.....	37	.....	.....	.....	.....	.....	.....
Colored or dyed	532	32	3	72	70	355	.....	.....	.....	.....	.....	.....
Wrought or damasked and brocaded	64	.....	.....	.....	6	58	.....	.....	.....	.....	.....	.....
With less than 12 per cent. of silk and with less than 50 per cent. of wool	94	12	.....	9	45	25	.....	.....	3	.....	.....	.....
With threads of fine gold or silver and gilded or silvered	1,952	215	59	750	656	204	.....	.....	36	32	.....	.....
With threads of common metal	1,548	230	126	446	557	102	29	.....	58	.....	.....	.....
Sewed articles:												
Bags, bed and table linen, etc	297	8	.....	19	59	188	.....	.....	23	.....	.....	.....
Collars, wristbands and men's shirts	244	10	.....	55	111	38	.....	.....	30	.....	.....	.....
All others	1,806	194	19	278	850	339	.....	.....	186	.....	.....	.....

(6) *Threads and warps imported,* 1887.

[In quintals of 220.46 pounds.]

Description.	Duty per quintal.	Austria-Hungary.	Belgium.	France.	Germany.	Great Britain.	Greece and Malta.	Switzerland.	Total.
Threads, untwisted and unbleached (for every half kilogram):									
Not more than 10,000 meters	$3.47	.....	.....	308	278	379	10	63	1,038
10,000 to 20,000 meters	4.25	.....	9	49	45	1,330	.....	172	1,605
20,000 to 30,000 meters	5.02	.....	.....	353	1,974	850	.....	891	4,068
30,000 to 40,000 meters	6.18	.....	.....	490	269	339	.....	200	1,298
40,000 to 50,000 meters	7.53	.....	.....	61	9	35	.....	71	176
50,000 to 60,000 meters	9.26	.....	27	92	.....	55	.....	42	216
Over 60,000 meters	11.58	.....	.....	31	.....	14	.....	13	58
Threads, untwisted and bleached (for every half kilogram):									
Not more than 10,000 meters	4.17	5	10	149	.....	1,049	.....	.....	1,213
10,000 to 20,000 meters	5.10	8	.....	26	36	350	.....	55	475
20,000 to 30,000 meters	6.02	.....	.....	81	11	54	.....	.....	146
30,000 to 40,000 meters	7.41	.....	.....	5	.....	.....	.....	.....	5
Threads, untwisted and dyed (for every half kilogram):									
Not more than 10,000 meters	8.30	503	.....	102	454	.....	.....	26	1,085
10,000 to 20,000 meters	9.07	483	.....	32	192	120	.....	27	854
20,000 to 30,000 meters	9.84	5	.....	21	17	5	.....	36	84
30,000 to 40,000 meters	11.00	.....	.....	11	.....	.....	.....	13	24
40,000 to 50,000 meters	12.35	.....	.....	.....	6	.....	.....	.....	6
Over 60,000 meters	16.40	2	.....	3	.....	.....	.....	.....	5
Threads twisted and unbleached (for every half kilogram):									
Not more than 10,000 meters	4.52	.....	.....	37	5	90	.....	.....	132
10,000 to 20,000 meters	5.52	.....	42	47	31	4,447	.....	.....	4,567
20,000 to 30,000 meters	6.52	.....	.....	2.08	57	3,460	.....	8	3,733
30,000 to 40,000 meters	8.03	33	.....	396	33	5,907	7	.....	6,376
40,000 to 50,000 meters	9.79	.....	41	248	.....	83	.....	9	381
50,000 to 60,000 meters	12.04	.....	.....	139	42	166	.....	10	358
Over 60,000 meters	15.05	.....	.....	329	53	310	.....	94	786
Threads twisted and bleached (for every half kilogram):									
Not more than 10,000 meters	5.42	5	18	69	.....	660	.....	.....	752
10,000 to 20,000 meters	6.62	50	55	96	163	4,843	.....	9	5,216
20,000 to 30,000 meters	7.83	1.89	53	78	292	1,576	.....	23	2,211
30,000 to 40,000 meters	9.63	62	25	27	136	1,778	.....	26	2,054
40,000 to 50,000 meters	11.74	21	21	24	113	170	.....	23	372
50,000 to 60,000 meters	14.46	5	.....	6	49	54	.....	21	135
Over 60,000 meters	18.06	7	.....	51	32	75	.....	5	170
Threads twisted and dyed (for every half kilogram):									
Not more than 10,000 meters	10.79	5	.....	3	47	28	.....	16	99
10,000 to 20,000 meters	11.79	199	43	53	351	629	.....	23	1,298
20,000 to 30,000 meters	12.80	302	79	232	688	633	.....	43	1,977
30,000 to 40,000 meters	14.30	57	13	87	130	247	.....	18	552
40,000 to 50,000 meters	16.06	34	9	32	72	107	.....	28	282
50,000 to 60,000 meters	18.32	3	.....	24	25	31	.....	2	85
Over 60,000 meters	21.33	8	.....	49	34	95	.....	7	193
Warps untwisted and unbleached (for every half kilogram):									
Not more than 10,000 meters	4.00	.....	.....	.....	.....	714	.....	.....	714
10,000 to 20,000 meters	4.88	.....	.....	.....	.....	287	.....	.....	287
20,000 to 30,000 meters	5.77	.....	.....	.....	.....	436	.....	5	441
Warps untwisted and bleached, 10,000 to 20,000 meters (for every half kilogram)	5.86	.....	.....	.....	.....	21	.....	.....	21
Warps untwisted and dyed, 20,000 to 30,000 meters (for every half kilogram)	11.32	.....	4	.....	.....	.....	.....	.....	4
Warps twisted and unbleached (for every half kilogram):									
10,000 to 20,000 meters	6.35	.....	.....	.....	.....	850	.....	.....	850
20,000 to 30,000 meters	7.50	.....	.....	103	.....	938	.....	.....	1,041
30,000 to 40,000 meters	9.24	.....	.....	10	.....	59	.....	.....	69
60,000 meters	17.31	.....	.....	.....	.....	32	.....	.....	32
Total	.....	.....	.....	.....	.....	.....	.....	.....	47,543

(7) *Imports of threads and warps for the year* 1888.

[In quintals of 220.46 pounds.]

Description.	Austria-Hungary.	Belgium.	France.	Germany.	Great Britain.	Malta and Holland.	Switzerland.	Total.
Threads:								
Untwisted:								
Unbleached	27	60	89	1,274	2,461	17	5,884	9,812
Bleached	5	.....	14	82	730	.....	41	902
Dyed	50	15	23	1,081	167	.....	133	1,469
Twisted:								
Unbleached	23	7	55	243	10,798	16	290	11,432
Bleached	40	9	61	214	5,193	.....	162	5,679
Dyed	51	.....	73	501	465	.....	123	1,213
Warps:								
Untwisted	.....	.....	.....	13	750	.....	.....	763
Twisted	.....	.....	.....	4	314	.....	96	414
Sewing tread on spools and bobbins	49	9	35	905	1,327	.....	7	2,332
Llama thread:								
Untwisted, dyed:								
Not over 10,000 meters for every half kilogram	.....	159	.....	162	.....	.....	.....	321
10,000 to 20,000 meters for every half kilogram	5	.....	.....	178	.....	.....	3	186
Twisted, dyed:								
Not over 10,000 meters for every half kilogram	.....	.....	.....	3	.....	.....	.....	3
Cordage	.....	.....	.....	3	.....	.....	6	9
Fishing-nets	.....	.....	.....	2	.....	.....	2	4
Total	.....	.....	.....	.....	.....	.....	.....	34,439

(8) *Cotton threads, warps, and tissues imported into Italy in the years* 1888 *and* 1889.

Description.	1889.	1888.
Cotton:		
Raw ..... tons..	89,843	74,978
Batting ..... do...	59½	57
Thread:		
Untwisted—		
Unbleached ..... pounds..	2,478,631	2,163,154
Bleached ..... do....	252,426	198,885
Dyed ..... do....	600,092	323,856
Twisted—		
Unbleached ..... do....	2,442,917	2,520,299
Bleached ..... do....	1,089,072	1,251,992
Dyed ..... do....	147,267	267,418
Warps:		
Untwisted ..... do....	132,496	168,211
Twisted ..... do....	12,346	91,270
Sewing thread, spooled ..... do....	840,834	514,113
Llama thread:		
Untwisted ..... do....	96,782	111,773
Twisted ..... do....	6,393	661
Cord ..... do....	.....	1,984
Fishing-twine ..... do....	2,205	882
Tissues:		
Unbleached ..... do....	5,155,898	3,621,717
Bleached ..... do....	4,365,549	3,757,299
Colored or dyed ..... do....	3,138,910	3,348,126
Printed ..... do....	5,474,021	3,846,365
Wrought or damasked—		
Unbleached ..... do....	70,327	68,343
Bleached ..... do....	263,008	161,377
Colored or dyed ..... do....	358,027	283,953
Printed ..... do....	40,344	46,517
Brocaded—		
Smooth ..... do....	12,566	14,772
Wrought or damasked ..... do....	6,173	3,969
Embroidered—		
Chain stitch ..... do....	1,323	6,173
double stitch ..... do....	64,595	55,776
Tulles:		
Unbleached ..... do....	13,228	7,936
Bleached or dyed ..... do....	72,752	69,446

(8) *Cotton threads, warps, and tissues imported into Italy, etc.*—Continued.

Description.		1889.	1888.
Muslins and veilings:			
Unbleached	pounds	1,984	3,968
Bleached	do	13,007	8,598
Colored or dyed	do	13,007	12,566
Printed	do	441	442
Worked	do	23,369	83,775
Brocaded	do	4,850	12,566
Embroidered—			
Chain stitch	do	882	2,866
Double stitch	do	1,984	11,243
Tissues:			
Tarred, oiled, etc	do	12,787	17,857
Oil cloths	do	291,889	253,749
Polished with emery	do	84,436	54,454
Buttons	do	1,102	1,323
Hosiery:			
Plain	do	3,257	16,314
Wrought	do	3,307	16,975
Trimmings	do	133,598	147,488
Galloons and ribbons	do	72,090	73,413
Laces	do	58,992	96,083
Velvets:			
Common and plush, dyed	do	185,848	191,359
Fine, dyed	do	277,118	262,750
Tissues, mixed:			
With silk	do	72,090	41,887
With wool	do	1,769,632	618,170
With silk and wool	do	20,503	20,723
With gold and silver, or gilt and silvered threads	do	3,346	4,304
With other metallic threads	do	5,805	3,413
Sewed articles:			
Bags, bed, and table linen, etc	do	111,194	65,477
Collars, wristbands, and mens' shirts	do	47,399	53,792
All other	do	386,461	415,788

SUMMARY.

Cotton, raw and batting	tons	89,903	75,035
Yarn, threads and cord	pounds	8,101,461	7,614,498
Buttons	do	1,102	1,323
Hosiery	do	6,764	33,289
Trimmings	do	133,598	147,488
Tissues	do	19,096,245	15,427,793
Tissues, tarred, oiled, polished, etc	do	389,112	326,050
Galloons and ribbons	do	72,090	73,413
Laces	do	58,092	100,492
Velvets	do	462,966	291,809
Tissues mixed with other materials	do	1,869,376	688,497
Sewed articles	do	545,054	535,057

(9) *Cotton, threads, warps, and tissues imported into Italy in* 1888 *and* 1889 *by Countries of origin.*

Countries, etc.	1889.	1888.
Cotton:	*Tons.*	*Tons.*
Great Britain	4,874.2	3,015.1
English Possessions in Asia	44,352.8	35,875.6
Egypt	10,368.0	8,066.4
South America	19,455.0	22,845.8
Central and North America	4,964.6	2,201.2
Other countries	5,828.3	2,974.3
Total	89,842.9	74,978.4
Threads and warps, excluding llama thread, cord, and fishing twine:	*Pounds.*	*Pounds.*
Germany	1,009,265	951,726
Great Britain	4,890,244	4,895,314
Switzerland	1,962,976	1,485,018
Other countries	133,599	167,108
Total	7,996,084	7,499,166
Tissues, plain, wrought, or damasked, brocaded, and embroidered, tulles, muslins, and veilings:		
Germany	2,420,871	2,241,416
Great Britain	12,767,500	9,299,888
Switzerland	2,966,730	2,362,449
Other countries	941,144	1,524,040
Total	19,096,245	15,427,793
Laces:		
Austria-Hungary	919	5,538
France	3,710	11,089
Great Britain	42,273	44,996
Germany	9,824	17,220
Switzerland	1,136	16,089
Other countries	229	1,151
Total	58,091	96,083

(10) *Note on Threads.*

The thread imported is largely that made by J. & P. Coats, England, and by Zwirmerei in Göggingen, Germany. The spools contain 80, 200, and 500 yards, and cost for 80-yard spools 94½ cents per gross; 200-yard spools, $1.97 per gross; 500-yard spools, $5.50 per gross for the German manufacture.

The English threads are in 500-yard spools, and cost 33 shillings, about $8.01 per gross. The five samples of bleached cloth cost as follows:

Mark.	Length of piece.	Price per meter.
	Yards.	*d.*
LLL	45	7⅞
M. M. M.	42½	8⅝
M2	44	5⅝
H	44½	4¾
M7	.....	6⅛

Pieces average about 42½ yards.

Prints.

Sample.	Where manufactured.	Length.	Width.	Cost.
		Meters.	*Centimeters.*	
No. 1	Vienna			10¼ cents per meter.
No. 2	Germany			6⅜ cents per meter.
No. 3*	....do			8 1/10 cents per meter.
No. 4	Manchester, England	55		3⅞ pence per yard.
No. 5	....do	55		2⅞ pence per yard.
No. 6	....do	55		2⅞ pence per yard.
No. 7	....do	55		3⅜ pence per yard.
No. 8	....do	55		4½ pence per yard.
No. 9	....do	55		3 pence per yard.
No. 10	....do	55		2¼ pence per yard.
No. 11	Italy	25–30	1.30	20¼ cents per meter.
No. 12	....do	45–50	.70	10 5/10 cents per meter.
No. 13	....do	40–50	.70	10 5/10 cents per meter.
No. 14	....do	40–50	.70	10 5/10 cents per meter.
No. 15	....do	44–46	.60	8½ cents per meter.
No. 16	....do	60	.65–.70	8⅝ cents per meter.
No. 17	....do		.55	9½ cents per meter.
No. 18	....do	45–50	.70	9⅝ cents per meter.
No. 19	....do	45–50	.70	9½ cents per meter.
No. 20	....do	40–45	1.10	14½ cents per meter.
No. 21	....do	40–45	.78–.80	9⅝ cents per meter.
No. 22	....do	50–55	.70	9½ cents per meter.
No. 23	....do	35		8 3/10 cents per meter.

* This varies in width from 77 to 79 centimeters and in price from 7.7 to 8.7 cents per meter.

(11) *Italian imports and exports of cotton and cotton manufactures from* 1880 *to* 1888.

Years.	Cotton, in bales or in mass, and wadding.			Cotton yarn and thread.*			Cotton tissues.†		
	Imports.	Exports.	Excess of imports over exports.	Imports.	Exports.	Excess of imports over exports.	Imports.	Exports.	Excess of imports over exports.
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1880	47,265	18,086	29,179	5,774	152	5,622	9,747	632	9,115
1881	48,494	16,696	31,798	11,923	67	11,856	14,090	611	13,479
1882	62,888	14,620	48,268	9,072	57	9,015	12,761	599	12,162
1883	67,318	22,264	45,054	9,046	103	8,943	14,265	609	13,656
1884	66,138	20,323	45,815	8,994	174	8,820	14,276	670	13,606
1885	78,573	19,161	59,412	7,682	99	7,583	14,157	584	13,573
1886	68,011	17,386	50,625	6,259	171	6,088	13,698	683	13,015
1887	76,226	13,135	63,091	4,754	340	4,414	16,989	936	16,053
1888	75,035	13,292	61,743	3,454	402	3,052	8,078	980	7,098

* Cotton yarn and thread also includes warps, both plain and twisted.
† Cotton tissues, also includes buttons, galloons, laces, velvets, and made-up articles.

CATANIA.

REPORT BY CONSUL LAMANTIA.

In compliance with Department circular of May 27, referring to cotton textile imports in this consular district, I have the honor to submit the following report, the data of which were obtained from this chamber of commerce, the proper source wherefrom accurate information could be got.

IMPORTS.

The total quantity of raw, dyed, whitened, and stamped cotton textile imports of last year amounted to 479¼ tons, of a value of $249,112, an average annual import of 1,111 tons for the last five years, as will be shown in the annexed table.

WEIGHT.

The weight per yard of said articles is as follows:

Textiles presenting 5 millimeters square, with 27 threads between chain and woof:

	Ounces.
Raw	5
Whitened	3⅛
Dyed	3
Stamped	2½

HOW PURCHASED.

The same are purchased in Italy at four and six months from date of invoice, or for cash on arrival of goods, less 4 per cent. discount; England at three and four months, and cash less 2½ per cent.; France at four months, and cash less 3 and 5 per cent.; Germany at four months, and cash less 3 and 5 per cent.; Austria at six months, and cash less 5 per cent.; and so on according to agreement.

PLACE OF MANUFACTURE.

Those imported from Italy are manufactured at Turin, Milan, Genoa, Leghorn, and Naples; those from England, at Manchester; from France, at Lyons; from Austria, at Vienna; from Germany, at Stuttgart and Chemnitz.

Duties on textiles (raw).	Kilograms.	Rates of duties.
		Lire.
Weighing 13 kilograms or more, for 100 square meters, presenting 5 millimeters square:		
With 27 threads, or less	100	62
With more than 27 threads	100	74
Weighing 7 kilograms or more, for 100 square meters, presenting 5 millimeters square:		
With 27 threads or less	100	84
With more than 27 threads	100	100
Weighing less than 7 kilograms per 100 square meters, presenting 5 millimeters square:		
With 27 threads or less	100	110
With more than 27 threads	100	130

* Whitened, 20 per cent. augumentation on the raw textiles.
Stamped, 80 lire augumentation for 100 kilograms on the whitened.
Dyed, 35 lire augumentation for 100 kilograms on the raw textiles.

According to the statistical data during the last five years it seems that Italian textile imports had increased from 551 tons in 1884 to 1,340 tons in 1886, but since then commenced to decline up to last year considerably. The same was the case with all the other importing countries and especially with France, on account of the war-tariff with Italy.

The general decline has been caused by the crisis which has for the last three years greatly affected the trade of this whole island, and especially this consular district, where several heavy and important failures have occurred, causing demoralization in commerce, loss of confidence, trust, and credit, and a general discouragement.

* Raw textiles mixed with white cotton are considered as whitened.

Common whitened, stamped, colored, and mixed textiles imported into Catania during the year 1888.

[In kilograms and United States currency].

Cotton textiles.	Italy.		England.		France.	
	Kilograms.	Value.	Kilograms.	Value.	Kilograms.	Value.
Common:						
No specification given	87,451	$34,229	.....	.....	.....	.....
Weighing 13 kilograms or more, presenting 5 millimeters square, with 27 threads or less	.....	.....	.....	.....	.....	.....
More than 27 threads	.....	.....	.....	.....	.....	.....
Weighing 7 kilograms or more, but less than 13 kilograms, with 27 threads or less	.....	.....	.....	.....	.....	.....
White:						
No specification given	174,181	14,030	.....	.....	.....	.....
Weighing 13 kilograms, etc	.....	.....	9,343	$5,606	79	$47
More than 27 threads	.....	.....	59,306	42,107	324	230
Weighing 7 kilograms or more, but less than 13 kilograms, with 27 threads or less	.....	.....	2,612	2,000	.....	.....
More than 27 threads	.....	.....	15,159	11,430	49	37
Colored:						
No specification given	15,431	11,437	.....	.....	.....	.....
Weighing 13 kilograms, etc	.....	.....	34	22	2,382	1,686
More than 27 threads	.....	.....	182	160	.....	.....
Weighing 7 kilograms or more, but less than 13 kilograms, with 27 threads or less	.....	.....	18,459	13,873	25	20
More than 27 threads	.....	.....	9,702	7,665	.....	.....
Stamped:						
No specification given	7,431	28,950	.....	.....	.....	.....
Weighing 13 kilograms, etc	.....	.....	25	56	.....	.....
More than 27 threads	.....	.....	.....	.....	.....	.....
Weighing 7 kilograms or more, but less than 13 kilograms, with 27 threads	.....	.....	6,759	7,300	382	412
More than 27 threads	.....	.....	28,690	36,150	785	989
Total	284,494	88,646	150,271	126,368	4,426	3,421

Cotton textiles.	Austria.		Germany.		Other countries.		Total.	
	Kilograms.	Value.	Kilograms.	Value.	Kilograms.	Value.	Kilograms.	Value.
Common:								
No specification given	.....	.....	.....	.....	.....	.....	87,451	$34,229
Weighing 13 kilograms or more, presenting 5 millimeters square, with 27 threads or less	103	$62	65	$40	.....	.....	168	102
More than 27 threads	438	231	3,778	2,682	.....	.....	4,216	6,460
Weighing 7 kilograms or more, but less than 13 kilograms, with 27 threads or less	.....	.....	.....	.....	.....	.....	.....	.....
White:								
No specification given	.....	.....	.....	.....	.....	.....	174,181	14,030
Weighing 13 kilograms, etc	.....	.....	4	3	.....	.....	9,426	5,650
More than 27 threads	.....	.....	283	213	400	$282	60,313	42,832
Weighing 7 kilograms or more, but less than 13 kilograms, with 27 threads or less	1,314	1,151	.....	.....	143	98	4,067	3,249
More than 27 threads	251	189	.....	.....	59	51	15,518	11,707
Colored:								
No specification given	.....	.....	.....	.....	.....	.....	15,431	11,437
Weighing 13 kilograms, etc	21	14	131	86	.....	.....	2,568	1,808
More than 27 threads	50	37	1,087	810	.....	.....	1,319	1,007
Weighing 7 kilograms or more, but less than 13 kilograms, with 27 threads or less	.....	.....	287	212	724	572	19,495	14,676
More than 27 threads	615	586	711	562	583	461	11,611	78,274
Stamped:								
No specification given	.....	.....	.....	.....	.....	.....	7,431	28,950
Weighing 13 kilograms, etc	.....	.....	179	175	4,097	4,425	4,301	4,656
More than 27 threads	.....	.....	7,270	7,850	1,679	1,645	8,949	9,495
Weighing 7 kilograms or more, but less than 13 kilograms, with 27 threads	1,123	1,213	.....	.....	.....	.....	8,264	8,925
More than 27 threads	1,023	1,289	12,833	5,738	.....	.....	43,331	44,166
Total	4,918	4,772	26,629	18,371	7,534	7,534	479,267	249,112

Total imports during years 1884, 1885, 1886, 1887, *and* 1888.

Years.	Italy.		England.		Francee.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
1888	284⅓	$88,646	150⅓	$126,368	4⅓	$3,421
1887	867	541,322	232	136,078	29	27,057
1886	1,340	973,058	263	198,687	45	36,749
1885	587	518,060	351	295,134	39	37,642
1884	551	473,013	316	226,279	31	51,304
Total	3,629½	2,584,099	1,312⅓	982,546	148⅓	156,173

Years.	Austria.		Germany.		Other countries.		Total.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
1888	5	$4,772	26⅓	$18,371	7½	$7,334	479¼	$249,112
1887	27	24,642	30	25,711	8	6,634	1,193	761,444
1886	59	52,799	21	26,914	51	46,287	1,779	1,334,494
1885	60	69,196	40	39,044	35	32,764	1,110	991,840
1884	59	67,849	26	26,313	12	12,122	995	856,880
Total	210	219,258	143½	136,353	113½	105,341	5,556¼	4,193,770

Average annual imports 1,111 tons; value of, $838,754.

VINCENT LAMANTIA,
Consul.

UNITED STATES CONSULATE,
Catania July 14, 1889.

FLORENCE.

REPORT BY CONSUL DILLER.

In pursuance of directions contained in cotton textile circular, I herewith append a table which contains full information on the above points, so far as the immediate district of the province of Florence is concerned.

I have found it impossible to procure reliable information from the seven remaining provinces connected with this consular district in time for this report, and as this is the great center for the importation of goods embraced in the inquiry, the table I inclose will, I think, cover the objects mentioned in your circular.

I again repeat what I have heretofore reported that, in my opinion, Florence presents, from its geographical position, many advantages for the establishment of a grand *entrepôt* for the sale and exhibition of American products, chief among them being our cotton textiles, agricultural machinery and implements, mechanics' tools, and wooden ware. This *entrepôt* should be in charge of persons fully acquainted with all the details of the business of each department and familiar with the language of the country.

I also inclose several samples of cotton textiles in general use in this city, with the retail price in pencil, marked No. 2.

I have great pleasure in acknowledging the valuable services of Spirito Bernardi, esq., the vice-consul here, for his assistance in preparing this report and collecting the accompanying samples.

ISAAC R. DILLER,
Consul.

UNITED STATES CONSULATE,
Florence, Italy, July 6, 1889.

Statement showing the imports of cotton textiles into Florence, 1888.

Cotton textiles and whence imported.	Weighing 13 kilograms (28.652 pounds) or more to every 100 square meters (119.59 square yards) and having in a square of 5 millimeters of warp and woof—		Weighing 7 kilograms (15.428 pounds) or more and less than 13 kilograms (28.652 pounds) to every 100 square meters (119.59 square yards) and having in a square of 5 millimeters of warp and woof—		Weighing less than 7 kilograms (15.428 pounds) to every 100 square meters (119.59 square yards) and having in a square of 5 millimeters of warp and woof—		Total.	Duties charged thereon.
	27 or less elementary threads.	More than 27 elementary threads.	27 or less elementary threads.	More than 27 elementary threads.	27 or less elementary threads.	More than 27 elementary threads.		
	Pounds.	*Pounds*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	
Unbleached:								
France	112							
Germany	448							
Great Britain	2,086	787	2,059					
Switzerland			976		461			
Turkey	13							
	2,659	787	3,035		461		6,942	$463.47
Bleached:								
Austria	428			53				
Belgium		190						
France	1,955	1,843	42	1,036	26	205		
Germany	3,084	3,959	209	580	430	265		
Great Britain	16,870	54,537	5,531	17,765	858	1,845		
Switzerland	33	2,846	212	465	1,283	1,188		
	22,370	63,375	5,994	19,899	2,597	3,503	117,738	9,594.22
Colored or dyed:								
Austria	161	123						
France	2,132	2,348	893	2,238		187		
Germany	7,167	3,726	1,177	4,288	470			
Great Britain	6,832	32,386	57,348	53,376		108		
Switzerland	26	511	5,459	1,779	875			
Turkey			7					
	16,318	39,094	64,884	62,181	1,345	295	184,117	19,266.40
Printed:								
Austria								
France	684	238	119	1,091				
Germany	1,501	1,995	12,877	11,021				
Great Britain	1,045	4,976	9,198	20,104	31	143		
Switzerland	842		8,382	1,457				
Turkey			7					
Egypt				35				
	4,072	7,209	30,583	33,708	31	143	75,746	11,688.56
Sized, imitation damask, bleached:								
Belgium		154						
France	9	73		71				
Germany		474		4				
Great Britain	1,561	3,750	430	64	42			
	1,570	4,451	430	139	42		6,632	617.66

Cotton textiles and whence imported.	Weighing 13 kilograms (28.652 pounds) or more to every 100 square meters (119.59 square yards) and having in a square of 5 millimeters of warp and woof—		Weighing 7 kilograms (15.428 pounds) or more and less than 13 kilograms (28.652 pounds) to every 100 square meters (119.59 square yards) and having in a square of 5 millimeters of warp and woof—		Weighing less than 7 kilograms (15.428 pounds) to every 100 square meters (119.59 square yards) and having in a square of 5 millimeters of warp and woof—		Total.	Duties charged thereon.
	27 or less elementary threads.	More than 27 elementary threads.	27 or less elementary threads.	More than 27 elementary threads.	27 or less elementary threads.	More than 27 elementary threads.		
Sized, imitation damask, colored or dyed:	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	
Belgium	.....	7,482	.....	11	.....	.....		
France	35	2,176	117	159	.....	.....		
Germany	258	1,742	.....	582	.....	4		
Great Britain	941	481	.....	1,208	.....	.....		
	1,234	11,881	117	1,960	.....	4	15,196	$1,860.41
Sized, imitation damask, printed:								
France	44	.....	.....	.....	.....	.....		
Germany	465	.....	317	1,488	.....	.....		
Great Britain	42	.....	.....	2,121	.....	.....		
	551	.....	317	3,609	.....	.....	4,477	740.17
Brocaded, colored or dyed:								
Germany	.....	.....	.....	9	.....	.....		
Great Britain	.....	9	.....	174	.....	.....		
	.....	9	.....	183	.....	.....	192	29.18
Embroidered in chain stitch, colored or dyed:								
France	.....	.....	.....	.....	.....	31		
Germany	.....	.....	.....	.....	.....	2		
	.....	.....	.....	.....	.....	33	33	8.93
Embroidered in double stitch, unbleached:								
Switzerland	.....	.....	.....	.....	.....	.....	22	7.41
Embroidered in double stitch, bleached:								
Austria	16	.....	.....	.....	.....	.....		
France	152	.....	.....	.....	.....	.....		
Germany	443	.....	.....	.....	.....	.....		
Great Britain	62	.....	.....	.....	.....	.....		
Switzerland	390	.....	.....	.....	.....	.....		
	1,063	.....	.....	.....	.....	.....	1,063	409.20
Embroidered in double stitch, colored or dyed:								
France	.....	.....	168	.....	.....	.....		
Germany	.....	.....	388	.....	.....	.....		
Great Britain	.....	.....	58	.....	.....	.....		
Switzerland	.....	.....	404	.....	.....	.....		
Egypt	.....	.....	2	.....	.....	.....		
	.....	.....	1,020	.....	.....	.....	1,020	466.12
Embroidered in double stitch, printed:								
France	.....	.....	.....	24	.....	.....		
Germany	.....	.....	.....	9	.....	.....		
Great Britain	.....	.....	.....	4	.....	.....		
	.....	.....	.....	37	.....	.....	37	18.72

Cotton textiles and whence imported.	Weighing 13 kilograms (28.652 pounds) or more to every 100 square meters (119.59 square yards) and having in a square or 5 millimeters of warp and woof—		Weighing 7 kilograms (15.428 pounds) or more and less than 13 kilograms (28.652 pounds) to every 100 square meters (119.59 square yards) and having in a square of 5 millimeters of warp and woof—		Weighing less than 7 kilograms (15.428 pounds) to every 100 square meters (119.59 square yards) and having in a square of 5 millimeters of warp and woof—		Total.	Duties charged thereon.
	27 or less elementary threads.	More than 27 elementary threads.	27 or less elementary threads.	More than 27 elementary threads.	27 or less elementary threads.	More than 27 elementary threads.		
Mixed with silk, bleached:	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	
France		55						
Germany		18						
Switzerland		11						
		84					84	$15.59
Mixed with silk, printed:								
Germany				18				
Great Britain				11				
				29			29	6.02
Mixed with silk, colored or dyed:								
Austria				15				
France				84				
Germany				653		20		
Great Britain				216				
Switzerland				31				
				999		20	1,019	162.98
Mixed with silk, sized and brocaded, colored or dyed:								
Belgium		2,205						
France		146						
Germany		143						
Great Britain		68		33				
		2,562		33			2,595	422.49
Mixed with wool, smooth, colored or dyed:								
Germany	7,249							
Great Britain	8,657							
Switzerland	9							
	15,915						15,915	1,995.72
Mixed with wool, sized, colored or dyed:								
Belgium		681						
France		35						
Germany		77						
Great Britain		6,290						
		7,083					7,083	911.14
Mixed with wool and silk, sized, imitation damask, colored or dyed:								
Belgium					31			
Germany					106			
					137		137	22.62
Aggregate							440,077	48,707.01

Terms.—Payments are usually made either three or six months after production of bill of lading.

GENOA.

REPORT BY CONSUL FLETCHER.

On account of the peculiar manner in which statistics are recorded by officials of the Italian Government in this consular district, and the different mode of levying duties on imported merchandise, as compared with United States laws on such subjects and in such cases, questions Nos. 1 and 4, of Department circular, relating to cotton textiles, must be answered as one interrogatory. The same with interrogatories Nos. 2 and 5.

Imports of cotton textiles imported into Genoa during year 1888.

Description.	Austria.	Belgium.	France.	Germany.	Great Britain.	Spain.	Switzerland.	Total.
Plain textiles of cotton:	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*
Unbleached	2	.....	57	631	125,994	.....	.....	126,684
Bleached	206	.....	685	5,617	104,615	.....	2,721	113,844
Colored	1,951	2,218	3,389	7,342	97,436	.....	5,977	118,313
Printed	3,109	.....	2,469	22,693	205,246	.....	34,489	268,006
Total	.....	.....	.....	.....	.....	.....	.....	626,847
Damask cotton textiles:								
Unbleached	.....	.....	.....	40	1,691	.....	38	1,769
Bleached	.....	.....	.....	754	5,637	.....	.....	6,391
Colored	76	.....	336	1,729	6,384	480	432	9,437
Printed	.....	.....	12	344	2,399	.....	4,081	6,836
Total	.....	.....	.....	.....	.....	.....	.....	24,433
Cotton brocades:								
Colored	.....	.....	26	.....	177	.....	.....	203
Embroidered cotton textiles:								
Chain stitch	.....	.....	15	29	371	.....	235	650
Long stitch	2	.....	17	180	33	.....	541	773
Tulle	.....	.....	21	673	1,929	.....	146	2,769
Muslin	.....	.....	414	494	685	.....	31	1,624
Oil-cloth	.....	.....	.....	448	1,275	.....	17	1,740
Waxed cloth	.....	89	.....	.....	30,754	.....	729	31,572
Emery-cloth	.....	.....	.....	4,279	1,141	.....	.....	5,420
Aggregate	.....	.....	.....	.....	.....	.....	.....	696,031

All cloth from Great Britain, Spain, and Belgium is imported by sea, whereas the same class of merchandise from Austria, France, Germany, and Switzerland comes by rail.

HOW PURCHASED?

Three months, credit is usually given buyers of cotton textiles.

DUTIES.

On unbleached textiles weighing 13 kilograms or more per 100 square meters, and which present in a square of 5 millimeters each side, adding the number of threads of the warp to those of the weft, 27 threads or less, 62 lire per 100 kilograms; if more than 27 threads 74 lires per 100 kilograms.

On unbleached cotton textiles weighing 7 kilograms or more, but less than 13 kilograms per 100 square meters, which present in a square of 5 millimeters each side, adding the number of threads of the warp to those of the weft, 27 threads or less, 84 lire per 100 kilograms; more than 27 threads 100 lire per 100 kilograms.

Unbleached cotton textiles weighing less than 7 kilograms per 100 square meters, and which present in a square of 5 millimeters each side, adding the number of threads of the warp to those of the weft, 27 threads or less, 110 lire per 100 kilograms; more than 27 threads 130 lire per 100 kilograms.

Bleached cotton textiles pay 20 per cent. more duties than the unbleached above mentioned.

Unbleached cotton textiles mixed with white threads pay as much as bleached cotton.

Colored cotton textiles pay 35 lire per 100 kilograms more than unbleached, varying according to the qualities above named.

Printed cottons pay 80 lire per 100 kilograms more than bleached textiles, as above noted.

Damask cotton textiles pay 20 lire per 100 kilograms in addition to the tissue as above.

Cotton brocades pay 40 lire per 100 kilograms besides the duty on the cloth.

Bleached and unbleached cloth with few and narrow colored stripes, indicating the use thereof for hospitals or similar institutions, or for the army, or for making bags, pays the same duty as for bleached or unbleached cloth.

Oil or tarred cloth, also, if covered with paper, pays 30 lire per 100 kilograms, besides the duty on the cloth as above stated.

Waxed cloth pays 60 lire per 100 kilograms in addition to the regular duty on the cloth.

Emery cloth pays half the duty the cloth itself would pay if without emery.

Tulle, unbleached, pays 400 lire per 100 kilograms; bleached or colored pays 450 lire per 100 kilograms.

Muslins, unbleached, at the rate of 200 lire per 100 grams; bleached, 20 per cent. more than unbleached; colored, 235 lire per 100 kilograms; printed, 320 lire per 100 kilograms; brocades, 40 lire besides the duty on the cloth; embroidered, chain stitch, 200 lire, as well as the duty collected on the cloth; embroidered, long stitch, 300 lire, in addition to the amount levied on the cloth.

Any cotton textiles weighing less than 3 kilograms per 100 square meters, pay the same duties as muslins; likewise those cotton goods of any weight which are only in part muslins or veils.

Any kind of cotton textiles, embroidered, in which less than 12 per cent. of silk is used, if chain stitch, 200 lire, if long stitch, 300 lire, besides the duty on the cloth.

Any kind of cotton textile, embroidered, in which not less than 12 per cent. and not more than 50 per cent. of silk is employed, the rates per 100 kilograms are as follows:

	Embroidered.	
	Chain stitch.	Long stitch.
	Lire.	*Lire.*
Black and plain cloth	600	700
Black and worked cloth	900	1,000
Colored and plain cloth	700	800
Colored and worked cloth	1,000	1,100

Any kind of cotton cloth embroidered with gold or silver threads, or gilt or silvered threads, 500 lire per 100 kilograms, besides the duty on the cloth. Any kind of cloth embroidered with ordinary metal threads, 200 lire per 100 kilograms, in addition to the regular duty on the cloth.

I beg to give Mr. Willy Hasenbalg, a young German cotton merchant, at present residing in Genoa, my sincere thanks for valuable assistance in the compilation of the statistics above submitted.

JAMES FLETCHER,
Consul.

UNITED STATES CONSULATE,
Genoa, July 17, 1889.

MESSINA.

REPORT BY CONSUL JONES.

ITALIAN *versus* FOREIGN COTTONS.

Messina was deprived January 1, 1880, by act of Parliament, of its ancient privileges, and ceased to be a free port. Under the old régime Messina was the distributing point for Sicily and Calabria, and through this artificially stimulated trade large fortunes were made by importers. Since 1880, all merchandise entered at this port has been subject to the tariff existing for the whole kingdom, and the imports from abroad of cotton textiles, as well as of many other articles, have greatly decreased, their place being taken by national industrial products. The latter, first, from being protected for a number of years by the premium on gold during the legal tender period (1874–'83), and, secondly, by the increase in import duties, have developed rapidly and have reached such a point as to successfully meet foreign competition, especially as concerns shirtings, gray long cloth, ect., that constitute the principal articles of consumption in Sicily. Foreign fancy articles still retain their supremacy, but their sale is not very large.

Formerly England and Switzerland supplied this market almost entirely; they have gradually lost ground, and the imports from these countries have fallen off at least 75 per cent. since 1880.

The imports from France and Germany, consisting more especially in silks, woolen goods, etc., rather than in cotton goods, have also fallen off very materially since Italian manufacturers have begun to produce the same articles with increased success. Recourse must still be had to foreign countries for articles of "haute nouveauté," and for textiles of superior quality.

Tuscany produces principally light cotton goods; Piedmont and Liguria manufacture heavier articles; Lombardy excels in the production of shirtings. Of late years the manufacturers have not only improved the quality of their goods, but have also improved in the dressing and bleaching. Shirtings, gray cloths, etc., are salable in southern Italy, provided they contain more or less starch, hence they are not sold by weight but by measure.

There is an establishment at Messina that produces cotton shirting and prints. The shirting is woven by hand. The calicoes (used for prints) are imported from England (the duty on the same being comparatively light) and the printing is done at a very handsome profit. They have still much to learn in this art, but as the great majority of the population seeks cheapness rather than quality, this establishment finds ready sale for its goods, both in Sicily and on the continent.

KINDS IMPORTED.

As to the quantity of cotton textiles imported into Messina during the year 1888, the figures furnished by the director of the Messina custom-house are as below:

Plain woven cotton goods, weighing, per 100 square meters:	Kilograms.
13 kilograms and upwards	96,796
7 to 13 kilograms	170,830
Less than 7 kilograms	1,656
Cotton goods not specified	20,024
Total	289,306

WHENCE IMPORTED.

	Kilograms.
England	259,566
Austria	3,691
France	16,094
Germany	3,149
Switzerland	4,994
Belgium	353
United States	1,459
Total	289,306

DUTIES.

Total duties collected on above, $60,418. Goods are usually bought at thirty days, with 2 per cent. discount, or at three months without discount.

Goods from all countries pay the same duties, except those coming from France, which latter, since the abrogation of the treaty of commerce between France and Italy, pay a duty 50 per cent. higher. Goods entering Italy must be accompanied by a certificate showing their place of manufacture, otherwise duties are exacted as though the merchandise were of French origin.

A schedule of import duties (per 100 kilograms) on cotton textiles is subjoined.

Schedule of import duties on cotton textiles per 100 kilograms.

[1 kilogram = 2.20 pounds; 1 meter = 39.37 inches.]

Cottons, unbleached:	
Not exceeding 27 threads to a square of 5 millimeters counting the warp and filling, and weighing 13 kilograms or upwards the 100 square meters	$12.00
Exceeding 27 threads, etc	14.00
Not exceeding 27 threads, etc., weighing 7 kilograms or upwards, but less than 13 kilograms, the 100 square meters	16.20
Exceeding 27 threads, etc	19.30
Weighing less than 7 kilograms:	
Not exceeding 27 threads	21.23
Exceeding 27 threads	25.00

Bleached, duty as on unbleached with 20 per cent. additional.
Colored, stained, or printed, duty as on unbleached with 35 per cent. additional.
Printed, duty as on unbleached with 80 per cent. additional.
Damasks, duty as on unbleached with 20 per cent. added.
Brocades, $8 per hundred weight and the duty on material added.
Embroideries, $38.60 per hundred weight and duty on material added.

Tulles:	
Unbleached	$77.20
Bleached	86.80

Muslins, unbleached, $38.60; bleached, 20 per cent.; colored, 35 per cent.; printed, 80 per cent.; embroidered, $38.60 added to duty on unbleached.

Oil-cloth	$5.80
Buttons	29.00
Stockinet	29.00
Trimmings	29.00
Galloons and gimps	23.20
Laces and lace-curtains, per kilogram	1.35
Velveteens:	
Common, per hundred weight	23.20
Bleached	27.00
Colored, stained	31.90
Printed	42.50
Velvets:	
Common	27.00
Bleached	32.90
Colored, stained	38.60
Printed	48.40

Textiles, mixed: With less than 12 per cent. silk, duty according to material, with $7.84 per hundred weight added; with less than 50 per cent. wool, duty as above, with $3.92 per hundred weight added; with metallic threads, 98 cents per kilogram, with duty on material added.

Sheets, table-cloths, towels, etc., duty according to material, with 10 per cent. added.

Collars, cuffs, and men's shirts, double the duty on material.

Whenever a manufactured article can not be classified by its weight and measure and the number of threads in a square of 5 millimeters, the highest duty of the class to which it belongs is charged.

WALLACE S. JONES,
Consul.

UNITED STATES CONSULATE,
Messina, July 8, 1889.

NAPLES.

REPORT BY CONSUL CAMPHAUSEN.

ITALIAN VS. FOREIGN COTTONS.

In obedience to the instructions of your circular of May 27, 1889, I have the honor to present the following report upon the cotton textiles imported into this consular district:

From persons for many years engaged in manufacturing and importing this article, I have reliable information, that twenty years ago nearly all cotton textiles used in Italy were imported, but the high duty on imports, which has steadily increased year after year, has given impetus to Italian industries, and to-day 75 per cent. of all articles of this description are produced in this country.

National spinning and weaving is progressing continually and rapidly.

The present almost prohibitory tariff on French goods gave additional advantages to German competitors, who inundate the markets with dress goods, both sightly and cheap, gradually cutting out English products. Alsatian prints are being preferred to those of Manchester on account of superior finish and better color, notwithstanding that great progress has been made in English productions.

Furniture prints, once important articles, are now to a large extent superseded by jute fabrics, which are cheap and more durable, and are largely manufactured in this country. Gray madapollams to be used for linings are imported from Manchester, England, and from Switzerland; bleached shirtings and long-cloths from Manchester; piques and white fancy cotton materials suitable for dress and other purposes mainly from Manchester and to some extent from Switzerland and Austria;

printed cottons for furnishing purposes, curtains, etc., from Manchester, better qualities from Mülhause, in Alsace; also small quantities of low-priced goods from other parts of Germany; Turkey red twills from Switzerland and England; Victoria lawns from Manchester, England.

The weight of madapollams is less than 15 pounds per 100 square yards. Bleached shirtings and long cloths from 15 to 27 pounds per 100 square yards; also in smaller quantities weighing more than 27 pounds per 100 square yards.

Furniture cretonnes more than 27 pounds per 100 square yards, dress prints and Turkey red twills from 15 to 27 pounds per 100 square yards, and Victoria lawns less than 15 pounds per 100 square yards. These goods are purchased principally through agents residing in Naples or some other city in Italy, and who travel to the different important commercial centers. These agents represent commission houses and manufacturers. The usual terms are three months from date of invoice, and frequently longer time is given. As a general rule, I think Neapolitan merchants are very slow payers, and usually take their own time to pay their bills.

The statement of cotton textiles imported at Naples during the year 1888, herewith presented, is a correct copy from the records of the custom-house here, and in every respect authentic and reliable, showing the multiplicity of cotton goods imported and the respective duty imposed. From the recapitulation it appears that the total quantity of cotton textiles imported in Italy during the year 1888 is 2,917,514.845 pounds avoirdupois. The present indications are that the importations this year, judging from those of the first six months of 1889 will slightly exceed those of 1888. Attached to the statement is an instrument used to ascertain how many threads are contained in 5 millimeters square, counting both warp and weft.

I also present a description of the principal imports of cotton goods into Naples, with the duties in Italian lire per kilogram, or 2.20485 pounds avoirdupois.

EDWARD CAMPHAUSEN,
Consul.

UNITED STATES CONSULATE,
Naples, August 5, 1889.

Cotton textiles imported at Naples, Italy, during the year 1888.

Description and whence imported.	Weight.	Rate of duty per 100 kilograms.
UNBLEACHED TEXTILES.		
Weighing 13 kilograms or more, for every 100 meters, and counting in 5 millimeters square 27 threads or less, including warp and weft (used for bagging):	*Kilograms.*	*Lire.*
Germany	70	62.00
Great Britain	482	
Of more than 27 threads (used for sheeting and shirting):		
Austria	136	74.00
France	106	
Germany	226	
Great Britain	5,036	
United States	63	
Smooth, weight 7 kilograms or more, 27 threads or less (used for sheeting and shirting):		
Austria	8,411	84.00
France	5,527	
Germany	11,786	
Great Britain	16,139	
Switzerland	13,361	
West Indies	7	
Of more than 27 threads (used for same purpose):		
Austria	136	100.00
France	18	
Germany	1,809	
Great Britain	1,573	
Weighing less than 7 kilograms, 27 threads or less (used for linings):		
Austria	2,433	110.00
France	1,459	
Germany	7,132	
Great Britain	806	
Switzerland	5,397	
BLEACHED TEXTILES.		
Weighing 7 kilograms or more, 27 threads or less:		
Austria	1,167	74.40
France	1,109	
Germany	6,536	
Great Britain	202,485	
Switzerland	50	
United States	12	
Holland	5	
Malta	41	
Weighing 13 kilograms or more for every 100 meters, and counting in 5 millimeters square more than 27 threads (calicoes):		
Austria	4,262	88.80
France	5,272	
Germany	7,189	
Great Britain	213,021	
Switzerland	305	
Belgium	251	
Holland	447	
United States	18	
Weighing 7 kilograms or more, etc., 27 threads or less (calicoes):		
France	13	100.80
Germany	208	
Great Britain	57,515	
Turkey	5	
United States	14	
Same, more than 27 threads (calicoes):		
Austria	1,137	120.00
France	949	
Germany	8,942	
Great Britain	40,724	
Holland	39	
Tunis	59	
Massana	172	
Same, less than 27 threads (calicoes):		
Austria	57	132.00
France	36	
Germany	188	
Great Britain	3,819	
Switzerland	155	
Weighing less than 7 kilograms, more than 27 threads (colored calicoes):		
Austria	1	156.00
France	13	
Germany	253	
Great Britain	5,036	

Cotton textiles imported at Naples, Italy, etc.—Continued.

Description and whence imported.	Weight.	Rate of duty per 100 kilograms.
BLEACHED TEXTILES—continued.		
Colored, weighing 13 kilograms or more, 27 threads or less (lawns):	*Kilograms.*	*Lire.*
Austria	1,863	97.00
France	2,317	
Germany	2,684	
Great Britain	7,907	
Holland	2,473	
Weighing 13 kilograms or more for every 100 meters and counting in 5 millimeters square more than 27 threads (calicoes and lawns):		
Austria	2,071	109.00
France	4,432	
Germany	10,343	
Great Britain	107,814	
Switzerland	847	
Holland	131	
Belgium	441	
Massana	39	
United States	48	
7 kilograms or more, 27 threads or less (calicoes):		
Austria	1,338	119.00
France	416	
Germany	6,036	
Great Britain	48,166	
Switzerland	4,630	
Belgium	1,026	
Holland	477	
Turkey	22	
United States	571	
Same, more than 27 threads (calicoes).		
Austria	6,946	135.00
France	7,699	
Germany	15,261	
Great Britain	61,703	
Switzerland	7,044	
Holland	3,067	
Belgium	266	
Massana	182	
TINTED TEXTILES.		
Weighing less than 7 kilograms, 27 threads or less (Turkey-red, plain prints, one color):		
France	634	145.00
Germany	986	
Great Britain	3,462	
Switzerland	52	
STAMPED TEXTILES.		
Weighing 13 kilograms or more, 27 threads or less (furniture cretonnes):		
Austria	759	149.40
France	593	
Germany	2,156	
Great Britain	9,036	
Switzerland	1,565	
Holland	947	
Weighing 13 kilograms or more for every 100 meters, and counting in 5 millimeters square 27 threads or less (furniture cretons):		
Austria	17,688	175.80
France	2,725	
Germany	12,932	
Great Britain	71,284	
Switzerland	29,511	
Holland	1,540	
Belgium	2,829	
United States	355	
Seven kilograms or more, more than 27 threads (dress prints):		
Austria	5,552	195.00
France	16,865	
Germany	19,368	
Great Britain	62,891	
Switzerland	2,201	
Belgium	427	
Holland	338	
United States	229	
Less than 7 kilograms, 27 threads or less (batistes):		
France	2	207.00
Germany	62	
Great Britain	1,957	

Cotton textiles imported at Naples, Italy, etc.—Continued.

Description and whence imported.	Weight.	Rate of duty per 100 kilograms.
COLORED TEXTILES.		
Less than 7 kilograms, more than 27 threads (batistes):	*Kilograms.*	*Lire.*
France	925	
Germany	338	
Great Britain	1,046	165.00
Switzerland	313	
Massana	15	
STAMPED TEXTILES.		
Thirteen kilograms or more, 27 threads or less (batistes):		
Austria	12	
France	1,437	
Germany	626	163.80
Great Britain	18,851	
Same, more than 27 threads (batistes):		
Germany	31	
Great Britain	1,368	231.00
Same, operati, damasked, 13 kilograms or more, 27 threads or less (batistes):		
Germany	443	
Great Britain	615	82.00
UNBLEACHED TEXTILES.		
Weighing 13 kilograms or more for every 100 meters, and counting in 5 millimeters square 27 threads or less:		
France	46	
Germany	749	
Great Britain	6,720	94.00
Switzerland	487	
Belgium	651	
Seven kilograms or more, more than 27 threads (batistes):		
Austria	145	
Germany	1,206	120.00
Great Britain	582	
BLEACHED TEXTILES.		
Thirteen kilograms or more, 27 threads or less (batistes): Germany	3	94.40
Same, and more than 27 threads (batistes):		
Austria	380	
France	2	
Germany	83	108.80
Great Britain	9,652	
Belgium	196	
Seven kilograms or more, 27 threads or less (batistes): Great Britain	97	120.80
Same, and more than 27 threads (batistes):		
France	9	
Great Britain	317	140.00
Same, and 27 threads or less (batistes): Great Britain	506	117.00
Tinted, 13 kilograms or more, more than 27 threads (batistes):		
Austria	1,272	
France	654	
Germany	902	
Great Britain	1,913	129.00
Turkey	11	
Belgium	95	
Holland	799	
Same, 7 kilograms or more, 27 threads or less (batistes):		
Great Britain	2,884	
Switzerland	44	139.00
TINTED TEXTILES.		
Weighing 7 kilograms or more for every 100 meters, and counting in 5 millimeters square 27 threads or less, including warp and weft (batistes): Austria and Great Britain	430	165.00
Same, more than 27 threads (batistes):		
Austria	151	
France	93	
Germany	765	
Great Britain	3,470	155.00
Switzerland	166	
Holland	485	
Tunis	2	
Same, more than 27 threads: Switzerland	98	185.00
Same, stamped, more than 27 threads:		
Germany	215	
Great Britain	622	183.80
Weighing 7 kilograms or more, more than 27 threads (batistes): France	10	220.00

Cotton textiles imported at Naples, Italy, etc.—Continued.

Description and whence imported.	Weight.	Rate of duty per 100 kilograms.
BROCADED TEXTILES.		
Unbleached, weighing less than 7 kilograms, 27 threads or less:	*Kilograms.*	*Lire.*
Germany	158	150.00
Switzerland	324	
Bleached, weighing 13 kilograms or more, more than 27 threads: France	1	128.00
Same, weighing less than 7 kilograms, more than 27 threads: Germany	21	196.00
Tinted, weighing 13 kilograms or more, more than 27 threads:		
France	56	149.00
Germany	71	
Great Britain	219	
Greece	2	
Weighing 7 kilograms or more for every 100 meters and counting in 5 millimeters square 27 threads or more: Great Britain	224	175.00
Stamped, weighing less than 7 kilograms, 27 threads or less: West Indies	5	247.00
BROCADED AND FIGURED OR DAMASKED.		
Less than 7 kilograms, 27 threads or less: West Indies	5	170.00
Thirteen kilograms or more, 27 threads or less: Germany	8	157.00
More than 27 threads: France	27	169.00
Weighing 7 kilograms or more, more than 27 threads: Germany	25	195.00
Same, stamped, weighing 7 kilograms or more, more than 27 threads: Austria	2	255.00
EMBROIDERED TEXTILES.		
Smooth tinted, weighing 7 kilograms or more, more than 27 threads: France	66	335.00
Thirteen kilograms or more, more than 27 threads: France	4	309.00
Less than 7 kilograms, more than 27 threads: Switzerland	2	365.00
Figured and damasked, unbleached, weighing 7 kilograms or more for every 100 meters, and counting in 5 millimeters square more than 27 threads: France	38	320.00
Tinted, 13 kilograms or more, 27 threads or less:		
Austria	4	317.00
France	47	
Plain, bleached, 7 kilograms or more, 27 threads or less: Germany	38	400.80
Same, more than 27 threads:		
Germany	686	420.00
Austria	93	
France	229	
Great Britain	48	
Switzerland	1,123	
Less than 7 kilograms, more than 27 threads:		
Austria	189	456.00
France	5	
Tinted, 7 kilograms or more, more than 27 threads:		
Austria	8	435.00
France	261	
Germany	338	
Great Britain	89	
Switzerland	97	
Massana	17	
Figured and damasked and bleached, 7 kilograms or more, more than 27 threads:		
France	50	440.00
Germany	6	
Switzerland	193	
Tinted, same, more than 27 threads: Switzerland	19	485.00
Brocaded and bleached, weighing 7 kilograms or more for every 100 meters and counting in 5 millimeters square more than 27 threads: France	1	460.00
Veils, bleached and colored:		
Austria	103	450.00
France	500	
Germany	331	
Great Britain	987	
Switzerland	20	
Belgium	25	
Bleached and tinted veils, unembroidered:		
Austria	8	750.00
France	135	
Germany	810	
Switzerland	5	
Muslins and thin textiles, bleached, plain:		
Austria	3	240.00
France	302	
Germany	38	
Great Britain	181	
Massana	1	
Same, colored:		
France	392	235.00
Great Britain	96	
Massana	7	

Cotton textiles imported at Naples, Italy, etc.—Continued.

Description and whence imported.	Weight.	Rate of duty per 100 kilograms.
EMBROIDERED TEXTILES—continued.		
Same, figured and bleached:	*Kilograms.*	*Lire.*
Austria	4	
France	2	
Great Britain	708	260.00
Switzerland	49	
Turkey	2	
Muslins and thin textiles, figured in tinted colors:		
France	146	
Austria	15	
Germany	255	255.00
Great Britain	1,118	
Switzerland	89	
Same, stamped: Germany	19	340.00
Same, brocaded and bleached: France	13	280.00
Muslins tinted in colors:		
France	7	275.00
Great Britain	13	
Same stamped: France	7	360.00
Muslins and thin textiles, figured and brocaded, tinted in colors:		
France	21	295.00
Great Britain	34	
Same plain, bleached: Switzerland	137	440.00
Same figured, tinted in colors: France	4	455.00
Same embroidered, plain tinted in colors:		
France	4	
Germany	40	535.00
Massana	2	
Same embroidered, tinted:		
Austria	14	
France	56	555.00
Germany	187	
Great Britain	19	
Gummed and oiled textiles and others of the same kind:		
Austria	6	
France	19	
Germany	20	
Great Britain	1,286	25.00
Switzerland	17	
Belgium	9	
Waxed textiles:		
Austria	48	
France	162	
Germany	318	
Great Britain	11,631	60.00
Holland	14	
Massana	4	
United States	186	
Emery textiles made from unbleached textiles weighing 13 kilograms or more for every 100 meters and counting in 5 millimeters square more than 27 threads:		
France	106	31.00
Germany	83	
Same made from bleached textiles weighing 13 kilograms or more, 27 threads or less: Germany	93	37.20

RECAPITULATION.

	Kilograms.
Austria	59,093
Belgium	5,565
France	68,842
Germany	121,433
Great Britain	986,462
Holland	11,413
Massana	439
Switzerland	68,377
Tunis	59
Turkey	40
United States	1,484
West Indies	19
Total	1,323,226
Total pounds	2,917,515

Weight and cost of the principal imports of cotton goods into Naples, Italy.

[The duties are quoted per kilogram, or 2.205 pounds avoirdupois.]

Description.	Weight: 13 kilograms or more per 100 square meters and counting in 5 millimeters square including warp and weft:		Weight: 7 kilograms or more but less than 13 kilograms per 100 square meters and having in 5 millimeters square including warp and weft:		Weight: less than 7 kilograms per 100 square meters having in 5 millimeters square including warp and weft:	
	27 threads or less.	More than 27 threads.	27 threads or less.	More than 27 threads.	27 threads or less.	More than 27 threads.
	Lire.	*Lire.*	*Lire.*	*Lire.*	*Lire.*	*Lire.*
Gray calicoes	.62	.72	.75	.86	1.00	1.24
Bleached shirting and long cloths	.744	.864	.90	1.032	1.20	1.48
Piqués, etc						
Dyed cottons:	.944	1.088	1.208	1.40	1.52	1.76
Plain, Turkey twills	.97	1.07	1.10	1.21	1.35	1.59
Damasked	1.17	1.29	1.39	1.55	1.65	1.85
Printed calicoes	1.444	1.564	1.60	1.732	1.90	2.188
Furniture cretonnes	1.444	1.564				
Victoria lawns					1.20	1.48
White cotton lace damask	.944	1.088	1.208	1.40	1.52	1.76
Goods for dresses:						
Brocade	1.144	1.288	1.408	1.60	1.72	1.96
Brocaded damask	1.344	1.488	1.608	1.80	1.92	2.16

PALERMO.

REPORT BY CONSUL CARROLL.

I have the honor to acknowledge the receipt of circular of the Department, dated May 27 last, and to inclose herein, in accordance therewith, a statement of the cotton textiles imported into or entering this port during the year ended December 31, 1888.

The total cotton goods imported into Palermo during the period referred to appears from the statement in question to have been 316,652 kilograms. Besides this quantity 2,068,807 kilograms came from Messina and various places in continental Italy, viz: Genoa, Leghorn, and Naples. Purchases of cotton textiles are made with the understanding that payment shall be made in thirty, sixty, or ninety days from date of invoice, with the exception of purchases made in England, upon which 5 per centum is charged from date of sale or invoice until paid.

Importation of cotton textiles, etc., were made from Austria, England and Germany during the period under consideration.

Quantity, etc., of the cotton textiles imported into Palermo during the year 1888.

Description.	Quantity.	Duty per 100 kilograms.
SMOOTH, BLEACHED COTTON TISSUE.		
	Kilograms.	
Weight, 13 kilograms or more for every 100 square meters, having a side of 5 millimeters, containing 27 elementary threads or less	8,375	$14.88
Containing more than 27 threads	135,826	17.28
Weighing 7 kilograms or more, but less than 13, for every 100 square meters, containing 27 elementary threads or less	4,605	18.00
Containing more than 27 threads	8,294	20.64
Weighing less than 7 kilograms for every 100 square meters, containing 27 elementary threads or less	89	24.00
Containing more than 27 threads	640	29.76
COTTON, DYED TISSUE.		
Weighing 13 kilograms or more for every 100 square meters, having a side of 5 millimeters, and containing 27 elementary threads or less	2,919	19.40
Containing more than 27 threads	12,891	21.40
Weighing 7 kilograms or more, but less than 13, for every 100 square meters, containing 27 elementary threads or less	6,881	22.00
Containing more than 27 threads	27,371	24.20
Weighing less than 7 kilograms and containing 27 elementary threads or less	47	27.00
Containing more than 27 threads	1,318	31.80
COTTON PRINTED TISSUE.		
Weighing more than 13 kilograms for every 100 square meters, having a side of 5 millimeters, and containing 27 elementary threads or less	11,298	28.88
Containing more than 27 threads	9,441	31.28
Weighing 7 kilograms or more, but less than 13, for every 100 square meters, and containing 27 elementary threads or less	21,741	32.00
Containing more than 27 threads	63,979	34.64
Weighing 7 kilograms for every 100 square meters and containing 27 elementary threads or less	365	38.00
Containing more than 27 threads	572	43.76
Total	316,652	.....

Besides the above, which was imported from Austria, England, and Germany, the following quantities of cotton goods of Italian manufacture entered this port during the year 1888, from—

	Kilograms.
Genoa	1,312,370
Leghorn	188,205
Messina	29,922
Naples	538,310
Total	2,068,807

PHILIP CARROLL,
Consul.

UNITED STATES CONSULATE,
Palermo, July 24, 1889.

VENICE.

REPORT BY CONSUL JOHNSON.

The answers to the questions contained in the circular in regard to cotton textiles have been arranged in the accompanying tabulated form, with the exception of that part of question No. 1 as king for the quantity imported per annum, which for the year 1887 was 1,409.57 tons and for the year 1888 1,233.66 tons, showing a diminution of 175.91 tons.

The first column of table gives the various kinds of textile fabrics of cotton imported into this district.

Importation of cotton textiles into Venice.

Description.	Place of manufacture and whence imported.	Weight per yard.	Duty per yard.	Size of piece.
		Ounces.	*Cents.*	
White cotton cloth, 27.3 to 29.25 inches wide (purchased by the meter, yard, or piece).	England	24	2	38.5 to 39.6 yards.
		27	2	
		30	2	
		35	2	
Cotton stamped in colors, 26.52 to 28.08 inches wide (purchased by the meter or yard).	England, Prussia, and Switzerland.	22	2	30.8 to 33 yards.
		24	2	
		27	3	
Colored handkerchiefs, 30 by 42 to 31 by 20 inches (purchased by the dozen).	....do	*18	*18	
		*24	*25	
Damask, 27.3 to 29.25 inches wide (purchased by the yard or meter):				
White	England and Switzerland	22	2	26.4 to 33 yards.
Tinted	....do	24	2	
Plain tinted cotton cloth, 23.35 to 31.20 inches wide (purchased by the meter or yard).	England	24	2	26.40 yards.
		27	2	33 yards.
		30	2	55 yards.
		33	2	
Velvet tinted damask, 18.72 to 19.5 inches wide (purchased by the yard or meter).	....do	27	.....	
		27	3.2	19.8 yards.
		30	4	22 yards.

* Per dozen.

The duties are those given in the latest tariff revision, that of April 15, 1889.

Tulles, muslins, and cotton embroideries are imported from England and Switzerland, but it is impossible to give accurate statistics in regard to those articles, their values, and hence the duties paid, being so variable.

H. ABERT JOHNSON,
Consul.

UNITED STATES CONSULATE,
Venice, August 7, 1889.

PORTUGAL.

THE AZORES.

REPORT BY CONSUL DABNEY, OF FAYAL.

In answer to the principal points contained in the circular of the 27th of May, issued by the Department of State, I subjoin the following statistics of the importation of cotton goods at this place for the fiscal year ended June 30, 1889:

Kinds.	Weight.	Duty.
From Great Britain:	*Kilograms.*	
Unbleached	3,967	$551.93
Bleached	9,586.4	1,542.16
Twilled	440.8	126.49
Dyed	3,489	1,622.21
Tulle	69	70.90
Muslins	649	50.79
Flannel	21	10.95
Velvet	250.8	130.59
Shawls	559.6	315.82
Trimmings	70.692	46.72
Total		4,468.56
From the United States:		
Unbleached	37,575	$5,227.95
Bleached	1022	164.41
Canvas	1174	71.46
Twilled	116.3	33.37
Dyed	1868.6	869.30
Trimmings	13.8	6.84
Total		$6,373.33
From Germany:		
Bleached	12	1.90
Velvet	38	19.83
Shawls	14.3	8.07
Trimmings	9.200	8.68
Total		$38.48

Weight of goods per yard.

	Width.	Weight.
English:	*Inches.*	*Pounds.*
Bleached regress	27	.060
Unbleached $\frac{J}{B}$	28	.059
Denims	27	.147
American:		
CCC	36	.148
Wachusett, B	30	.137
Androscoggin, L	36	.108
Cabot S	36	.103
Langdon, 76	36	.121

A comparison of these importations shows that nearly all the unbleached is of American manufacture, while of the bleached Great Britain furnishes the greater part.

It is acknowledged here that the unbleached American cotton is superior to the English, and in vain have the shop-keepers who trade mostly with England endeavored to have the American successfully imitated.

Per contra, the English bleached cottons are more in favor, which I am informed is probably due to the fact that they contain more sizing, deluding the buyers into the belief in their superiority.

The purchases in England are made generally through agents, but some of the more enterprising shop-keepers go and select the goods themselves.

In the United States purchases are made through agents residing there, and also by the masters of the sailing packets, who take many orders, receiving payment after delivery of the merchandise.

The trade between the Azores and the United States is limited, of course, owing to the small population of the former, but it is carefully cultivated by those engaged in it.

Calicoes that formerly were almost entirely imported from England are now furnished by Portugal, the fabrics being taken from England principally to be dyed in the Portuguese factories that are protected by high duties.

I have limited this report to the island of Fayal, for it is difficult to get statistics at some of the other islands, and if it went beyond it should properly extend over the consular district which embraces the nine islands, the population of which is only about 250,000.

S. W. DABNEY,
Consul.

UNITED STATES CONSULATE,
Fayal, October 22, 1889

LISBON.

REPORT BY VICE-CONSUL-GENERAL WILBOR.

I have to report that no custom-house returns of cotton textiles imported into this Kingdom are procurable of a later date than 1887. These returns give no details of length or weight per yard nor of place of manufacture. They treat only of weight, gross amount of duty collected thereon, and country from whence imported.

IMPORTS.

Declared value and duty collected on imports.

Description.	Value.	Duty collected.
	*Millreis.**	*Millreis.*
Printing cloths	39,484	17,174
Unbleached cotton textures	976,000	422,867
Bleached cotton	953,604	320,465
Cotton dyed, printed, or stamped twill	410,358	236,972
Cotton velvets and similar textiles	73,363	21,716
Cotton ribbons	22,804	11,838
Cotton shawls and handkerchiefs	157,383	77,264
Cotton underclothes	78,457	31,189
Cotton, other woven goods not specified	89,635	20,749
Cotton laces	27,760	14,000
Cotton, heavy coarse textures	19,500	5,100
Cotton, transparent cambric	48,400	12,000
Cotton canvas for sails	10,520	1,364
Cotton, loose woven	65,572	28,581
Cotton velveteens	16,000	4,634
Cotton galloons	22,047	8,004
Bobinet and similar textures	25,520	14,293

* Millreis, equal $1.08.

Weight.—No returns per yard exist. Gross weight only given.

How purchased.—Mainly on orders given to commercial travelers; no goods sent on consignment.

Place of manufacture.—No "place of manufacture" given. Countries from which the largest importation is made are:

	Millreis.
Great Britain	2,056,074
Germany	279,050
France	193,651
Belgium	26,896
United States	49,582

Duties charged:

Open textures, laces, and insertings, duty per kilogram in United States money	$1.62
Open textures, barege, duty per kilogram in United States money	.64
Open textures, tarlatan webbing, common tulle, crinoline, and similar textures	.16
Fine veiling, bobinet, tulle, and similar goods	1.18
Open textures not specified plain	1.18
Open textures not specified worked	1.62
Transparent textures, muslins, and cambric, unbleached	.21
Transparent textures, muslins, and cambric, white	.25½
Transparent textures not specified	.75

Close textures, plain, heavy canvas, not proper for sails, bleached or unbleached	$0.10½
Rough and coarse, unbleached or whitened	.07½
Glazed, brown, or whitened	.16
Cambric, muslin, white	.29
Textures not specified, unbleached	.13½
Textures not specified, white	.16
Textures napped in one color	.59½
Textures napped in more than one color	.81
Counterpanes and blankets	.59½
Mole skins, dyed	.24
Mole skins, white or stamped	.45
Close textures	.59⅜
Close textures, velveteens	.24
Close textures, imitation velvets	.48
Braids, twills, damasked or dazed, transparent or close, brown or white	.32
Textures, twilled, dyed, or stamped	.54
Twills for stamping	.21
Counterpanes	.59⅜
Tape	.48
Handkerchiefs and shawls of whatever description	.64
Carpets	.21
Wicks	.54
Cravats and neckties in any shape, finished or not, 10 per cent. to be added to respective duties.	
Ribbed textures	1.08
Binding, bobbin-work, and galloon, including tares, excepting cartons, paper, or wood	.75

The total declared value of cotton textiles imported into Portugal during 1887 amounted to 3,335,590 millreis, upon which a duty of 1,362,644 millreis was collected.

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

UNITED STATES CONSULATE-GENERAL,
Lisbon, July 28, 1889.

SPAIN.

BARCELONA.

REPORT BY CONSUL SCHEUCH.

I have the honor to forward a detailed list of the importations of cotton tissues received into this port during the year 1888, as follows:

The class and lot corresponding to the present tariff.

The amount, in pesetas, of the duties imposed on each kilogram net proceeding from favored and unfavored nations.

The most current goods of importation.

Their origin and manufacture.

The total amount received from each nation during the year 1888, according to the official report of this custom-house.

The total amount for 1888 by lots or class of goods according to the general tariff.

The comparative total of 1887, 1886, and of 1889 up to September 30 ultimo.

The length and width of the pieces of goods which we took as samples (in meters and yards).

The weight, per meter or yard, of the same.

The corresponding price per yard or meter.

These last notes I extracted from the original invoices allowed me by the merchants, besides weighing and measuring the pieces with the greatest exactness.

Fixing our attention somewhat to the details of the annexed list we observe:

(1) That the importation of 1888 exceeded that of 1887 by 34 per cent., due, without doubt, to the greater consumption caused by the travelers attracted to the late Universal Exposition of Barcelona.

(2) That England alone contributed about 70 per cent. of the supply of cotton goods in this capital, France about 20 per cent., Germany about 6 per cent., and Switzerland 3 per cent.

Here it will be proper to observe that this subdivision, as regards France, Germany, and Switzerland, requires more exactness because the goods from these three countries, which are embarked at the French ports of Cette and Marseilles, are very often noted down at this custom-house as of French origin, though not being in reality, and thus constituting by these declarations an erroneous base for the official report.

(3) That the stamped, checkered, and ornamented goods proceed preferably from England, the novelties from France and Switzerland, and knit-work and lace from Germany.

(4) As to prices, taking a certain kind of goods which comes from different countries, the German goods turn out the cheapest and most inferior.

Respecting considerations of sale and delivery, I observe that the English sell free on board at the port of embarking, taking upon themselves the packing, transport, embarking, and insurance, the freight remaining on account and risk of the owner, paid at thirty, sixty, and ninety days in pounds sterling at the exchange of that date.

That the French and Swiss sometimes impose the same conditions, and others deliver the merchandise free on board at Marseilles or Cette, giving the franc for a peseta, that is to say, without difference for exchange.

That the Germans now almost always make it a rule to deliver free on board at Barcelona without difference of exchange, this custom of theirs being one of the reasons which explain the marked preference towards the business with German houses, whenever it is a question of articles of the same quality as those of any other origin. In fact to give the most approximate appreciation possible of the importation of

cotton goods in this capital, I would state that during the year 1888 there passed from France to Spain by the land route of Cerbere—Port Bon—the amount of 1,110,434 kilograms of goods of all classes, that is to say of silk, cotton, wool, linen, and other fabrics the relative proportion of which it would be impossible to determine, because the railroad statistics do not classify them, mentioning only in a nominal way some 62,000 kilograms of cottonades, which remain included in the above specified quantity. Moreover all these goods do not come to Barcelona, because they are divided amongst the different towns on the road from the frontier to Barcelona and still beyond.

Notwithstanding, it must be admitted that cotton goods are those that are introduced in much less quantity, when it is considered that the region of Catalonia is a cotton manufacturing region, as it works up annually from 35,000,000 to 40,000,000 kilograms of raw cotton.

Barcelona exports annually to Cuba, Manila, Porto Rico, Guadaloupe, Trinidad, and the South American republics, about 1,300,000 to 1,500,000 kilograms of cotton goods, and supplies all the principal central deposits throughout Spain, where there are numerous warehouses and deposits. What with thread, cotton twist, and cotton goods of all kinds, there are in all the manufacturing region about 400 factories, amongst which there are about 70 of the finest that employ from 200 to 800 men each, and a few from 1,000 to 2,000 men each. Including the auxiliary branches, that is, bleaching, dyeing, printing, and the minor industries, such as stockings, galloons, fringes, bands, ribbons, cords, and many other articles in the manufacture of which cotton is employed, there existed in 1885 about 3,000 establishments with about 160,000 workmen (men, women, and children), who all lived by this industry.

FREDERICK H. SCHEUCH,
Consul.

UNITED STATES CONSULATE,
Barcelona, November 1, 1889.

Importations of cotton textiles at Barcelona during the years 1886, 1887, 1888, *and the first nine months of* 1889, *their weight per yard, &c.*

Paragraph of tariff.	Duties paid by nations. Without treaty.	Duties paid by nations. With treaty.	Class of goods.	Principal manufacturers and origin.
	Pesetas.	*Pesetas.*		
104.	3.00	1.54	Cotton flannels, white or colored, up to 25 threads:	
			White	Emile Columbier, St. Quentin, France.
			White percalin	Kronig & Ziegler, Manchester, England.
			Blue and yellow	Do.
			Rose, green, red	Do.
			Spotted	McCall & Co., Belfast, England.
			For book-binding	G. Hoffman, Uznach, Switzerland.
			White	Scheurer & Rott, Thann, Alsatia.
			Colored	T. M. Veil & Co., St. Galle, Switzerland.
			Colored handkerchiefs	Kronig & Ziegler, Manchester, England. Flersheim & Co., Nottingham, England.
105.	2.70	1.74	Cotton flannel, 26 threads and above:	
			Calico	Roame (& Hance), Agiro.
			Cretonne	Simon May & Co., Nottingham, England.
			Madapollams	T. M. Veil & Co., St. Galle, Switzerland.
			White, for ladies and children.	Taffe Bros., Belfast, England. Kronig & Ziegler, Manchester, England.
106.	4.00	2.40	Printed textiles, striped and figured, up to 25 threads:	
			Percale	Koechlin, B. & Co., Loerrach, Alemania.
			White damask	Kronig & Ziegler, Manchester, England.
			Fancy damask	Do.
			do	Do.
			White, worked both sides.	Moore Winberg, Belfast, England.
			Satin	Scheurer & Rott, Thann, Alsace.
			do	Koechlin Fréres, Mülhouse, Alsace.
			Satin, colored	Koechlin Fréres, Mülhouse and Thann, Alsace.
			Novelties	Do.
			Satin chine	Weiss Fréres, Kingersheim, Germany.
			Brilliants	Ed. Vaucher & Co., Mülhouse, Alsace.
			Percale	Do.
			Satin	Do.
			Crépe	Do.
			Lefir	T. Anhart Solivo, Dietikon, Switzerland.
			Satin, white brocade	Kronig & Ziegler, Manchester, England.
			Brilliants, white	Do.
			Brilliants, creme	Do.
			Fancy, white	Do.
			Fancy, creme	Do.
			Colored, brilliants	Do.
			Percale, for shirts	Do.
			Black, damask satin	Henri Fiery, Mülhouse, Alsace.
			Goods for trunk linings	Alf. Meyer & Co., Paris, France.
			Goods for trunk lining, colored.	Do.
107.	3.70	2.49	Printed textiles, striped and figured, from 26 threads and upwards:	
			Worked brilliants	Wilh. Braddenghouse, Elberfeld, Germany. Singapoore & Co., China.
108.	3.00	2.24	Diaphanous textiles:	
			Batistes, diaphanous	Kronig & Ziegler, Manchester, England.
			Victorias	Do.
			Organdies	Chatelard Pére & Fils, Tarare, France.
			Linons	Do.
			Batistes	Stegelin Bros., St. Galle, Switzerland.
			Nainsooks	Do.
			White tarlatanes	Chatelard Pére & Fils, Tarrare, France.
			Colored tarlatans	Do.
			Muslins	Beddin & Gode, Tarrare, France.
109.	4.50	2.10	Ticks, piqués, and the like:	
			Tick, muleton	Truffaud & Co., Roubaix, France.
			do	Weiss Fréres, Kingersheim, Germany.
			Piqué	Kell & Co., Bradford.
			Tick, piqué	Ang. de Taeger, Courtrai, Belgium.
			Plush, piqué	Ed. Vaucher & Co., Mülhouse, Germany.
			Colored reps	Em. Colombier, St. Quentin, France.

Importations of cotton textiles at Barcelona during the years 1886, 1887, 1888, *etc.*—Cont'd.

Paragraph of tariff.	Duties paid by nations.		Class of goods.	Principal manufacturers and origin.
	Without treaty.	With treaty.		
	Pesetas.	*Pesetas.*		
110	3.50	2.49	Manchester and finer velvets:	
			Cotton velvets, colored	Stiebel Kaufman & Co., Manchester.
			------do	Rolp & Lehmann, Lyon.
			------do	Mech. Weberei, Linden, Hanover.
111	5.00	4.18	Tulles:	
			Ordinary	T. C. Van Ackére, Courtrai.
			Brown cotton net	Simon May & Co., Nottingham.
			Fine	Wilh. Benger Soehne, Stuttgart.
			------do	Simon May & Co., Nottingham.
			------do	T. C. Van Ackére, Courtrai.
			------do	Lille.
			Curtains in pieces	Jacobi & Co., Nottingham.
			------do	Stiebel Kaufmann & Co., Nottingham.
			Curtains, pair, 2½ to 3½ yards.	Do.
112	6.25	5.40	Laces:	
			Colored laces	Thomas Adams & Co., Nottingham.
			------do	Jacobi & Co., Nottingham.
			------do	Stiebel Kaufman, Nottingham.
113	3.00	2.35	Lace curtains:	
			Curtains, machine crochet	Thomas Adams & Co., Nottingham.
			Curtains, festooned crochet	Vizille, France.
114	2.62	1.97	Underwear:	
			Drawers, English, fancy	Manchester.
			Undershirts, English, fancy	Do.
			Undershirts, plain	Josef Marx, Chemnitz.
			------do	Desgrez & Knotte, Troyes.
115	5.25	2.54	Gloves and hosiery:	
			Socks, of Ternsel cotton	Joseph Marx, Chemnitz.
			Socks, of Persian thread	William Benger Soehne, Stuttgard.
			Socks, plain white	Desgrez & Knotte, Troyes, France.
			------do	Joseph Marx, Chemnitz.
			Hose, colored cotton	Do.
			------do	Hirsh Reyley & Co., Paris.
			Hose, Scotch (lisle)	Manchester.
			------do	Do.
			Gloves	Donnez & Lamotte, Troyes.
			Mittens	Do.
			Handkerchiefs	Hans & Ulrich, Chemnitz.
			------do	Bazin & Co., Troyes.
			------do	Josef Marx, Chemnitz.
			Hose, colored	Hans & Ulrich, Chemnitz.

Imports of cotton textiles at Barcelona—Continued.

Description of goods.	Length of piece, meter or yard.	Width..	Weight of, meter or yard.	Price in factory.
	Meters.	*Meters.*	*Kilos.*	*Francs.*
Cotton flannels, white and colored up to 25 threads:				
White	40	.80	{0.085 / 0.135}	0.625
White percales	58	.80	.070	.25
Blue and yellow	58	.80	.056	.285
Rose, green, and red	58	.80	.064	.315
Spotted	55	.80	.060	.26
For book-binding	30	.80	.166	.86
White	52	.80	.077	.62
Colored	64	.80	.101	.38
	Inches.			
Colored handkerchiefs	14 by 14	.80	.167	*2.06
Cotton flannels, 25 threads and upwards:				
	Meters.			
Calico	40	.80	.090	1.40
Cretonne	40	.80	.100	.90
Madapollams	40	.80	.100	1.00
	Yards.	*Inches.*		
White, for ladies and children	20	32-33	.118	$3\frac{5}{16}$
Printed textiles, striped and figured, up to 25 threads:				
	Meters.	*Meters.*		
Percales	60	.80	.0803	.75
White damask	56	.80	.092	.40
Fancy damask	39	.80	.115	.60
Do	39	.80	.064	.40
White, worked on both sides	60	.80	.129	.505
Satins	40	.80	.081	.85
Do	42	.80	.090	.90
Satins, colored	40	.80	.081	.85
Novelties	25	.80	.126	1.40
Satin chine	43	.80	.093	1.40
Brilliants	40	.80	.125	1.44
Percales	46	.80	.097	.65
Satines	50	.80	.080	1.05
Crepe	20	.80	.200	1.
Zephyr	64	.80	.093	.42
	Yards.	*Inches.*		*d.*
Satin, white brocade	21	27-8	.083	$6\frac{3}{4}$
Brilliants, white	25	26-7	.070	$2\frac{13}{16}$
Brilliants, creme	26	26-7	.068	$3\frac{5}{16}$
Fancy white	21	26	.815	$4\frac{1}{4}$
Fancy creme	26	26-7	.059	$2\frac{13}{16}$
Colored handkerchiefs	20	27	.080	----------
Percale for shirts	30	31-2	.095	$4\frac{1}{8}$
	Meters.	*Meters.*		*Francs.*
Black damask satins	25	.80	.096	.95
Trunk-linings	40	.80	.281	1.20
Trunk-linings, colored	40	.80	.481	1.75
Printed textiles, 25 threads and upwards:				
Worked brilliants	38	.....	.145	.70
	38	.....	.237	1.15
Diaphanous textiles:				
Batistes	11	.....	.064	.42
Victorias	11	.....	.065	.36
Organdies	27	.....	.041	.34
Linons	26	.....	.038	.58
Batistes	26	.....	.044	.80
Nainsooks	26	.....	.058	.80
White tarlatans	15	.....	.020	.29
Colored tarlatans	.....	.....	.020	.185
Muslins	26	.....	.040	1.10
Ticks, piqués, etc.:				
Tick muleton	20	.80	.250	1.53
Do	30	.80	.240	1.05
Piqué	30	.80	.150	1.40
Plush piqué	21	.80	.060	.60
Tick piqué	24	.80	.235	1.30
Colored reps	21	.80	.122	.80
Manchester and fancy velvets:				
Cotton velvets, colored	32-35	.50	.095	.77
Do	25	.50	.100	1.16
Do	25	.50	.094	0.88

*Dozen.

Imports of cotton textiles at Barcelona—Continued.

Description of goods.	Length of piece, meter or yard.	Width.	Weight of meter or yard.	Price in factory.
	Meters.	*Meters.*	*Kilos.*	*Francs.*
Tulles:				
Ordinary tulles	25	.50	.070	1.60
Brown net tulles	24	.60	.083	1.05
Fine	25	.50	.018	0.50
Do	25	.50	.017	0.90
Do	25	.50	.040	1.50
Do	25	.50	.055	2.50
	Yards.	*Inches.*	*Yards.*	*d.*
Curtains in pieces	50	38	.080	4.
	Meters.			*Francs.*
Do	25	20–26	.050	0.39
	Yards.			*d.*
Do	65	51	.112	0.5½
				s. d.
Curtains, 2½ to 3½ yards	6½	.....	.600	2 6
Laces:				
	Meters.			
Colored	11	.....	.009	1.15
Do	11	.....	.011	4.65
Do	11	.....	.008	.58
Do	30	.....	.010	.20
Do	30	.....	.007	.09
Do	30	.....	.015	.35
Lace curtains:				
	Pair.			
Machine crocheted	6.40	.....	1.482	12.48
Do	6.40	.....	1.200	10.88
Do	6.40	.....	0.868	5.12
Machine (festooned) crocheted	6.40	.....	0.892	7.04
Machine crocheted	6.40	.....	1.020	9.60
	Meters.			
	30	.....	.140	0.44
Underwear:				
Drawers, fancy	1	.....	.300	4.50
Undershirts, fancy	1	.....	.300	4.25
Undershirts, plain	1	.....	.430	3.00
Do	1	.....	.280	2.50
Gloves and hosiery:				
	Pair.			
Socks	12	.....	.400	9.50
Socks, Persian thread	12	.....	.350	16.00
Socks, plain white	12	.....	1.000	8.00
Do	12	.....	.600	11.50
Hose, colored	12	.....	.600	12.00
Do	12	.....	.500	8.50
Hose, Scotch (lisle)	12	.....	.800	1.00
Do	12	.....	.700	14.50
Gloves	12	.....	.150	6.00
Mittens	12	.....	.150	6.00
Handerchiefs	*Dozen.*	.....	1.200	12.00
Do	*Dozen.*	.....	1.600	13.50
Do	*Dozen.*	.....	2.200	15.50
Hose, colored	*Dozen.*	.....	.807	7.45
Do	.....	.....	.500	5.85
Do	.....	.....	.410	7.55
Do	.....	.....	.160	7.55

Imports of cotton textiles at Barcelona.

Classification, etc.	Quantity imported in 1888.						
	England.	France.	Helvetia.	Germany.	Belgium.	Italy.	Various.
	Kilos.	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*	*Kilos.*
Cotton flannels, white and colored, up to 25 threads	88,245	51,056	10,154	4,900	488	522	47
Cotton flannels 26 threads and upwards	350	231	96	.....	.....	.....	.....
Prints, striped and figured, up to 25 threads	157,587	11,993	3,316	5,028	34	447	132
Prints 26 threads and upwards	.....	.....	.....	25	.....	.....	9
Diaphanous textiles	2,296	2,891	1,048	396	.....	.....	.....
Ticks, piqués, etc	1,138	1,695	.....	987	202	.....	.....
Manchester and finer velvets	2,913	1,088	.....	658	.....	1	.....
Tulles	360	86	28	12	.....	.....	.....
Laces	367	1	.....	3	.....	.....	.....
Lace curtains	14,018	434	.....	306	.....	.....	.....
Underwear	1,685	1,359	.....	441	4	.....	.....
Gloves and hosiery	191	628	.....	7,917	.....	.....	.....
Total	269,150	71,462	14,642	20,673	728	970	188

Classification, etc.	Total.			Jan. 1 to Sept. 30, 1889.
	1888.	1887.	1886.	
	Kilos.	*Kilos.*	*Kilos.*	*Kilos.*
Cotton flannels, white and colored, up to 25 threads	155,412	185,310	179,731	167,132
Cotton flannels, 26 threads and upwards	677	709	3,033	821
Prints, striped and figured, up to 25 threads	178,537	32,583	24,254	51,060
Prints, 26 threads and upwards	34	60	2,164	25
Diaphanous textiles	6,631	6,897	9,897	8,908
Ticks, piqués, etc	4,022	5,173	5,140	3,036
Manchester and finer velvets	4,660	7,183	8,602	4,468
Tulles	486	1,111	629	2,580
Laces	371	1,244	848	781
Lace curtains	14,758	21,472	16,350	7,595
Underwear	3,489	2,658	2,575	3,845
Gloves and hosiery	8,736	2,826	815	12,314
Total	377,813	267,226	253,998	362,565

SWITZERLAND.

REPORT BY CONSUL-GENERAL WASHBURN, OF BERNE.

Cotton and cotton goods thereof imported into Switzerland during the calendar year 1888.

[Duty and value per quintal of 220 pounds.]

Whence imported.	Quantity.
Cotton, raw (average value, 145 francs; duty, general tariff, .30 francs):	*Quintals.*
Germany	8,068
Austria	3,627
France	6,164
Italy	1,323
Belgium	3,067
Holland	1,842
England	4,110
Russia	2
European Turkey	200
Egypt	86,024
British Indian	11,154
East Asia	110
United States	99,028
Central America	98
Total, 1888	224,817
Total, 1887	276,420
Cotton waste (average value, 90 francs; duty .30 francs, general tariff):	
Germany	10,595
Austria	816
France	1,593
Italy	69
Belgium	434
England	4,208
Total 1888	17,715
Total 1887	18,141
Cotton wadding (average value, 250 francs; duty, general tariff, 4 francs):	
Germany	77
France	62
Italy	7
England	2
Total 1888	148
Total 1887	122
Cotton yarn, single, raw, until No. 40 English (average value, 180 francs; duty, general tariff, 6 francs):	
Germany	58
Austria	1
France	1
Italy	2
Belgium	344
England	25
Total 1888	431
Total 1887	768
Yarn, single, raw, No. 41 and over (average value, 330 francs; duty, general tariff, 6 francs):	
Germany	29
France	2
Belgium	45
England	140
Total 1888	216
Total 1887	363

Whence imported.	Quantity.
Yarn, single, bleached (average value, 315 francs; duty, general tariff, 8 francs):	
Germany	81
France	1
Italy	4
Belgium	5
England	12
Total 1888	103
Total 1887	235
Yarn, twisted, ganzed or not, raw, bleached (average value, 400 francs; duty, general tariff, 8 francs):	
Germany	466
Austria	15
France	5
Italy	15
Belgium	507
Holland	231
England	6,317
United States	30
Total 1888	7,586
Total 1887	7,418
Yarn, twisted, dyed (average value, 315.16 francs; duty, general tariff, 11 francs):	
Germany	2,725
France	19
Italy	3
England	19
Total 1888	2,766
Total 1887	3,404
Yarn, single, dyed (average value, 335 francs; duty, general tariff, 11 francs):	
Germany	419
Austria	1
France	20
Italy	2
Belgium	5
England	17
Total 1888	464
Total 1887	392
Yarn, on spools, balls, skeins, for retail (average value, 760 francs; duty, general tariff, 35 francs):	
Germany	973
Austria	1
France	85
Italy	65
Belgium	62
Holland	74
England	1,386
Total 1888	2,646
Total 1887	2,520

Cotton and cotton goods thereof imported into Switzerland, etc.—Continued.

Whence imported.	Quantity.
Tissues, plain, twilled, écru; plain tulle (average value, 1,000 francs; duty, general tariff, 4 francs):	*Quintals.*
Germany	11
Austria	3
France	1
Belgium	1
Holland	4
England	1,186
Total, 1888	1,206
Total, 1887	1,538
Tissues of 38 threads or less to 5 millimeters square, except tissues of yarn, averaging No. 70 English or finer number (average value, 335 francs; duty, general tariff, 8 francs):	
Germany	436
Austria	3
France	191
Italy	9
Belgium	547
Holland	101
England	5,993
Total, 1888	7,280
Total, 1887	9,897
Tissues of over 38 threads to 5 millimeters square, and tissues of 38 threads and less, from yarn averaging No. 70 English or finer (average value, 625 francs; duty, general tariff, 14 francs):	
Germany	128
France	16
Belgium	40
Holland	3
England	12,015
Total, 1888	12,202
Total, 1887	11,187
Tissues, plain, twilled, bleached (average value, 630 francs; duty, general tariff, 35 francs):	
Germany	1,811
Austria	13
France	308
Italy	69
Belgium	63
Holland	1
England	338
British India	1
Total, 1888	2,604
Total, 1887	2,961
Tissues, plain, twilled, of dyed yarns (average value, 750 francs; duty, general tariff, 35 francs):	
Germany	72
Austria	88
France	64
Italy	23
Belgium	68
Holland	8
England	32
Total, 1888	355
Total, 1887	217

Whence imported.	Quantity.
Tissues, plain, twilled, dyed (average value, 600 francs; duty, general tariff, 35 francs):	*Quintals.*
Germany	2,259
Austria	86
France	1,248
Italy	277
Belgium	115
Holland	11
England	1,231
Total, 1888	5,227
Total, 1887	5,762
Tissues, plain, twilled, printed (average value, 740 francs; duty, general tariff, 35 francs):	
Germany	2,256
Austria	9
France	656
Italy	45
Belgium	98
Holland	6
England	944
Total, 1888	4,014
Total, 1887	4,068
Cotton velvet (average value, 1,600 francs; duty, general tariff, 50 francs):	
Germany	223
Austria	5
France	118
Italy	2
Belgium	13
England	605
United States	1
Total, 1888	967
Total, 1887	1,096
Tissues, figured, piqué, dimity, damask (average value, 700 francs; duty, general tariff, 16 francs):	
Germany	613
Austria	5
France	120
Italy	7
Belgium	112
Holland	1
England	488
Total, 1888	1,346
Total, 1887	1,231
Tissues, crochê, tulle, gauze, muslin broché (average value, 1,500 francs; duty, general tariff, 50 francs):	
Germany	160
Austria	3
France	80
England	109
Total, 1888	352
Total, 1887	371
Blankets, common, without needle-work or trimming (average value, 500 francs; duty, general tariff 12 francs; conventional tariff 4 francs):	
Germany	1
France	5
Italy	15
Belgium	3
Total, 1888	24
Total, 1887	19

Cotton and cotton goods thereof imported into Switzerland, etc.—Continued.

Whence imported.	Quantity.	Whence imported.	Quantity.
	Quintals.		*Quintals.*
Blankets, bleached, dyed, printed, with needle-work or trimming (average value 821.72 francs; duty, general tariff, 50 francs):		England	8
Germany	196	Russia	2
Austria	6	Total, 1888	987
France	76	Total, 1887	943
Italy	10		
Belgium	6	**Hosiery, without needle-work (average value, 1,350 francs; duty, general tariff, 50 francs):**	
England	45	Germany	356
Total, 1888	339	Austria	2
Total, 1887	213	France	54
		Italy	8
Felt tissues for the manufacture of paper (average value, 675 francs; duty, general tariff, 40 francs):		England	10
Germany	2	Total, 1888	430
England	1	Total, 1887	396
Total, 1888	3	**Embroidery and lace (average value from 1,475 to 6,000 francs; duty, general tariff, 100 francs):**	
Ribbons and trimmings (average value, 1,200 francs; duty, general tariff, 50 francs; conventional tariff, 16 francs):		Germany	156
Germany	664	Austria	10
Austria	5	France	41
France	245	Italy	8
Italy	53	Belgium	6
Belgium	8	England	63
Holland	2	Total, 1888	284
		Total, 1887	296

JOHN D. WASHBURN,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Berne, August 27, 1889.

TURKEY.

CONSTANTINOPLE.

REPORT BY CONSUL-GENERAL PRINGLE.

I have the honor to inclose a report upon the cotton textiles imported into my consular district. I do not, however, consider the statictics sufficiently trustworthy for publication, although they are the only ones to be obtained.

Quantity and kind imported per annum: 6,016$\frac{11}{20}$ tons; 5,534,338 pieces; and 9,062,700 meters of all qualities.

Weight per yard, varies between 4 to 6 ounces, according to quality.

Purchased by commission.

Place of manufacture and whence imported: All European countries, and imported from same.

Duties charged thereon: 8 per cent.

D. LYNCH PRINGLE,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Constantinople, Turkey, August 6, 1889.

UNITED KINGDOM.

LONDON.

REPORT BY CONSUL-GENERAL NEW.

Referring to Department of State circular of May 27, 1889, directing a report to be made on the importation of cotton textiles into this district, I regret to have to report that I find it is impossible to obtain the particulars required. The value of cotton manufactures imported into London in 1888 was $2,850,790, but no further details can be ascertained.

I transmit copy of letter received from Mr. R. Giffin, of the board of trade, on this subject.

JOHN C. NEW,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
London, August 16, 1889.

Mr. Giffin to Consul-General New.

[Inclosure in Consul-General New's report.]

BOARD OF TRADE, COMMERCIAL DEPARTMENT,
London, S. W., July 6, 1889.

SIR: With reference to your letter of the 1st instant, asking for certain information respecting the imports of cotton textiles to London, I am directed by the board of trade to state that they regret that they are not in a position to be of much assistance to you in the matter. The detailed particulars you require are not available from the official returns, and the board can only refer you for information, to the gross value of the imports of cotton manufactures into the port of London, to the figures contained in the volumes of the Annual Statement of the trade of the United Kingdom. According to the last issue of this statement, the value of cotton manufactures imported into London from abroad in 1888 was 572,158 pounds.

R. GIFFIN.

LIVERPOOL.

REPORT BY CONSUL SHERMAN.

I have to acknowledge the receipt of circular of instructions, dated May 27, 1889, directing consular officers to report upon the cotton textiles imported into their districts, covering points specified.

The receipts of cotton goods in this district are so very small, comparatively, as to make a detailed reply by me to the circular almost, if not quite, unnecessary, and only one of the questions can be directly answered without considerable expense.

THOMAS H. SHERMAN,
Consul.

UNITED STATES CONSULATE,
Liverpool, August 27, 1889.

LEITH.

REPORT BY CONSUL WALLING, OF EDINBURGH.

QUANTITY AND KINDS IMPORTED.

The customs authorities at Leith, in answer to my inquiries on this subject, inform me that no record is kept of either the quantity or kind of cotton textiles imported into Leith. The value only is recorded. In the "bill of entry" supplied to the custom-house from each vessel arriving the item frequently occurs expressed thus: "Cotton manufactures, unenumerated," and only the number of "cases" or "packages" of these and their total value are given. Such imports are almost always consigned "to order," and the consignee in the course of his sales may distribute the consignment to many merchants or dealers.

From the "annual statement of the trade of the United Kingdom for the year 1888, compiled in the custom-house at London from documents collected by that department," I learn that the total value of cotton manufactures imported to Leith in 1888 was £26,137. Neither the quantity nor kind of such manufactures is stated. From the same source I find that the total value of cotton manufactures imported in same year to Grangemouth, a port in this district on the Firth of Forth, a few miles west from Leith, was £8,565.

The questions of the weight per yard, how purchased, the place of manufacture, and whence imported can not be ascertained.

There are no customs duties charged at Leith on imports of cotton textiles.

WILLOUGHBY WALLING,
Consul.

UNITED STATES CONSULATE,
Edinburgh, August 9, 1889.

GIBRALTAR.

REPORT BY CONSUL SPRAGUE.

I have the honor of acknowledging the receipt of your circular, under date of the 27th ultimo, on the subject of the importation of cotton textiles in this district, and beg to state in reply that it is quite impossible to obtain here any reliable information as to the quantity and description of the cotton textiles imported yearly in this market, there being no custom-house or any other Government department established in Gibraltar, where any statistics are kept on the subject for affording the required information.

Gibraltar being a free port, no duties are levied upon any description of cotton goods arriving here.

I may add, however, that the whole or the greater portion of the importations of cotton goods to this market proceed from Manchester and other leading manufacturing centers in Great Britain, which are generally disposed of by two or three merchants and several shop-keepers established here.

A considerable quantity of cotton goods also arrives at this port from the same quarters in transit for the Morocco markets, for account and risk of the consignees residing in the towns and sea-ports of that kingdom, who have an understanding direct with parties in England, for the cost of their orders and purchases.

HORATIO J. SPRAGUE,
Consul.

UNITED STATES CONSULATE,
Gibraltar, June 29, 1889.

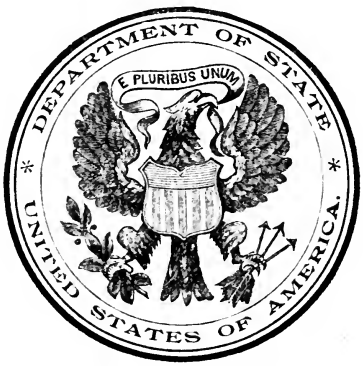
SPECIAL CONSULAR REPORTS.

FILES IN SPANISH AMERICA.

REPORTS FROM THE CONSULS OF THE UNITED STATES ON THE FILE TRADE IN MEXICO, AND IN CENTRAL AND SOUTH AMERICA, IN ANSWER TO A CIRCULAR FROM THE DEPARTMENT OF STATE.

ISSUED FROM THE BUREAU OF STATISTICS, DEPARTMENT OF STATE.

ALL REQUESTS FOR THESE REPORTS SHOULD BE ADDRESSED TO THE SECRETARY OF STATE.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

FILE CIRCULAR.

DEPARTMENT OF STATE,
Washington, August 28, 1889.

To the consuls of the United States in Mexico and in Central and South America.

GENTLEMEN: Some of the leading file manufacturers of the United States are desirous of extending their commercial relations to Mexico and to Central and South America, and, to that end, have submitted to the Department the following interrogatories, which you are requested to answer at your earliest convenience:

(1) Is there any demand for American files in your districts? If there is, give particulars; if there is not, what is the prospect for creating such demand?

(2) Are any files imported into your districts? Whence and kinds imported.

(3) Are files manufactured in your districts?

(4) Give prices at which files are purchased by the wholesale dealers in your districts, based on the inclosed list, by discount. This request (No. 4), if it can be even approximately correctly answered, will enable the American manufacturers to form a correct estimate of the value to them of the trade, as well as their ability to compete therein with other foreign manufacturers.

Give all the necessary information as to tariff and other charges to which the introduction of files into your districts are subject.

I am, gentlemen, your obedient servant,

WILLIAM F. WHARTON,
Acting Secretary.

ENGLISH vs. AMERICAN FILES.*

REPORT BY CONSUL MERRIAM, OF IQUIQUE, CHILI.

There is no demand for American files in this district, for the reason that dealers find that they can buy files from Sheffield much cheaper. So considerable is the difference in price, as may be seen from the accompanying comparative table, that one is inclined to believe that the question of quality may be an important factor in favor of the American article.

This point, however, can not now be determined here, as there is not an American file in the market to enable me to make the comparision.

Still, one thing is certain. While as a rule, speaking of merchandise in general, first-class articles are in demand, and are sold at remunerative prices, in some lines of goods, as files, for instance, people have become accustomed to pay a certain price for them, and will not pay a higher price for a similar article, which may be better, while the inferior can be obtained.

The only way for the American manufacturer to compete with the English in the sale of files in this district, is to furnish them to the dealers here at the English prices, even though at the outset they may gain nothing, or even suffer a small loss. If the American file is really superior to the Sheffield article people will soon find it out and will readily pay a higher price, once accustomed to its use and convinced of its superiority.

The accompanying table shows the comparative prices in Troy, N. Y., and Sheffield, England. On the prices in the Sheffield list, there is at present in this market a discount of 60 and 5 per cent. The duty on all classes of files is 15 cents on 30 cents the kilogram, payable in silver with the surcharge corresponding to the rate of exchange from month to month.

J. W. MERRIAM,
Consul.

UNITED STATES CONSULATE,
Iquique, December 29, 1889.

* Constant reference to Sheffield file prices are made throughout these reports. Consul Merriam, however, was the only consul who forwarded a Sheffield price-list. For this reason (for ready reference), as well as for his table comparing American and Sheffield prices, Consul Merriam's report is inserted first in the series.

[Inclosure 1 in Consul Merriam's report.]

SHEFFIELD PRICES OF FILES AND RASPS.

[Descuento (discount) 60 and 5 per cent.]

In consequence of considerable advances both in wages and materials, it was unanimously resolved at a general meeting of file manufacturers, held at the Cutlers' Hall, Sheffield, on the 16th May, 1872, that the following list of prices be adopted by the trade from this date:

Flat, half-round, square, round, entering, taper cotter, horse, shoe, flat, and half-round rasps. Mill saws, one or two square edges, single and double cut. Topping files, single and double, left at point, and safe edges.

[Per dozen.]

Inches.	Rough and bastard.			Second cut, flat and half-round gunstockers' and round rasps.			Smooth and cabinet files and rasps.			Dead smooth and extra smooth cabinets.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d*
1 to 4		4	9		5	6		6	9		10	3
4½		5	3		6	0		7	6		11	2
5		5	9		6	9		8	3		12	6
5½		6	3		7	6		9	0		13	6
6		7	0		8	3		9	6		14	6
6½		7	6		8	9		10	6		15	9
7		8	6		9	9		11	6		17	6
7½		9	6		10	9		12	3		18	6
8		10	6		12	0		13	6	1	0	0
8½		11	0		12	9		14	6	1	2	0
9		12	0		13	6		15	6	1	3	6
9½		13	6		15	3		17	0	1	5	6
10		15	0		17	0		19	0	1	8	6
10½		16	6		18	6	1	0	6	1	11	0
11		18	0	1	0	0	1	3	0	1	15	0
11½	1	0	0	1	2	0	1	5	0	1	18	0
12	1	1	6	1	4	0	1	6	6	2	0	0
12½	1	3	0	1	5	6	1	8	0	2	2	0
13	1	5	0	1	7	0	1	10	0	2	5	0
14	1	10	0	1	13	0	1	16	0	2	14	0
15	1	16	0	1	19	0	2	2	0	3	3	0
16	2	3	0	2	7	0	2	12	0	3	18	0
17	2	10	0	2	15	0	3	3	0	4	14	0
18	3	0	0	3	5	0	3	14	0	5	11	0
19	3	8	0	3	15	0	4	4	0	6	6	0
20	4	1	0	4	9	0	4	19	0	7	9	9
21	4	13	0	5	1	0	5	13	0	8	10	0
22	5	6	0	5	15	0	6	8	0	9	12	0
23	6	1	0	6	12	0	7	6	0	11	0	0
24	7	0	0	7	11	0	8	6	0	12	10	0

Extras.—All above 24 inches, 20*s.* per inch extra. Flat files, double cut on the edge, to advance half inch. Topping, square cut edges, to advance half inch. Mill saw, two round edges, advance half inch. Feather edge and knife files, to advance 3 inches.

Three square hand, equaling one safe edge, parallel cotter, pillar, needle, round off, bone pottance, round edged flat. Extra thin flat, and flat and high back half-round.

[Per dozen.]

Inches.	Rough and bastard.			Second cut.			Smooth.			Dead smooth.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1 to 4		5	3		6	0		7	6		11	3
4½		5	9		6	9		8	3		12	6
5		6	3		7	6		9	0		13	6
5½		7	0		8	3		9	6		14	6
6		8	6		9	9		11	6		17	6
6½		9	6		10	9		12	3		18	6
7		10	6		12	0		13	6	1	0	0
7½		11	0		12	9		14	6	1	2	0
8		12	0		13	6		15	6	1	3	6
8½		13	6		15	3		17	0	1	5	9
9		15	0		17	0		19	0	1	8	6
9½		16	6		18	6	1	0	6	1	11	0
10		18	0	1	0	0	1	3	0	1	15	0
10½	1	0	0	1	2	0	1	5	0	1	18	0
11	1	1	6	1	4	0	1	6	6	2	0	0
11½	1	3	0	1	5	6	1	8	0	2	2	0
12	1	5	0	1	7	0	1	10	0	2	5	0
12½	1	8	0	1	10	0	1	13	0	2	10	0
13	1	10	0	1	13	0	1	16	0	2	14	0
14	1	16	0	1	19	0	2	2	0	3	3	0
15	2	3	0	2	7	0	2	12	0	3	18	0
16	2	10	0	2	15	0	3	3	0	4	14	0
17	3	0	0	3	5	0	3	14	0	5	11	0
18	3	8	0	3	15	0	4	4	0	6	6	0
19	4	1	0	4	9	0	4	19	0	7	9	0
20	4	13	0	5	1	0	5	13	0	8	10	0
21	5	6	0	5	15	6	8	0	0	9	12	0
22	6	1	0	6	12	0	7	6	0	11	0	0
23	7	0	0	7	11	0	8	6	0	12	10	0
24	7	19	0	8	12	0	9	8	0	14	2	0

Extras.—All above 24 inches, 20*s.* per inch extra. Pin files and tanged horse rasps, to advance 1 inch. Round-off, with points, to advance 1 inch. Needle, exceeding breadth of hand files, as equaling cut on both edges. Equaling and cotter files, extra thin, to advance 1 inch.

Hand and equaling cut both edges, or with one double cut edge. Lock, arch, riffler, tumbler, oval saw files, cant, taper cross, bellied three square. Double tanged mill saw, topping, two round edges.

[Per dozen.]

Inches.	Rough and bastard.			Second cut.			Smooth.			Dead smooth.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1 to 4		6	3		7	6		9	0		13	6
4½		7	0		8	3		9	6		14	6
5		7	6		8	9		10	6		15	9
5½		8	6		9	9		11	6		17	6
6		9	6		10	9		12	3		18	6
6½		10	6		12	0		13	6	1	0	0
7		11	0		12	9		14	6	1	2	0
7½		12	0		13	6		15	6	1	3	6
8		13	6		15	3		17	0	1	5	6
8½		15	0		17	0		19	0	1	8	6
9		16	6		18	6	1	0	6	1	11	0
9½		18	0	1	0	0	1	3	0	1	15	0
10	1	0	0	1	2	0	1	5	0	1	18	0
10½	1	1	6	1	4	0	1	6	6	2	0	0
11	1	3	0	1	5	6	1	8	0	2	2	0
11½	1	5	0	1	7	0	1	10	0	2	5	0
12	1	7	0	1	10	0	1	13	0	2	10	0
12½	1	10	0	1	13	0	1	16	0	2	14	0
13	1	13	0	1	16	0	1	19	0	2	19	0
14	1	19	0	2	3	0	2	8	0	3	10	0
15	2	6	0	2	11	0	2	18	0	4	6	0
16	2	15	0	3	0	0	3	7	0	5	2	0
17	3	4	0	3	10	0	3	19	0	5	18	0
18	3	14	0	4	2	0	4	11	0	6	18	0
19	4	7	0	4	15	0	5	6	0	8	0	0
20	5	0	0	5	8	0	6	0	0	9	0	0
21	5	14	0	6	3	0	6	16	0	10	6	0
22	6	11	0	7	1	0	7	16	0	11	16	0
23	7	10	0	8	1	0	9	2	0	13	14	0
24	8	8	0	9	2	0	10	8	0	15	12	0

Extras.—All above 24 inches 20 *s.* per inch extra. Hand and equaling with round edges, advance 1 inch; if double cut, 2 inches. Two-tanged mill saw, two round edges, advance half inch.

Best refined cast-steel saw files.

[Per dozen.]

Inches.	Taper saw files.			Frame saw files and gulleting.		Blunt, segment saw files, and taper cut to point, second cut single.	Blunt, second cut double, and band saw, second cut single.
	Second cut single.	Second cut double.	Smooth single.	Second cut single.	Second cut double.		
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1 to 3½	4 0	4 9	5 6	4 9	5 9	5 0	6 6
4	4 6	5 3	6 0	5 3	6 3	5 6	7 6
4½	5 0	6 0	6 3	5 9	6 9	6 6	8 6
5	5 6	6 6	7 0	6 6	7 6	7 6	9 6
5½	6 6	7 6	8 0	7 6	8 6	8 6	10 6
6	7 6	8 6	9 0	8 6	9 6	9 6	12 0
6½	8 6	9 6	10 0	9 6	10 6	10 6	13 6
7	9 6	11 0	1 0	10 6	12 0	12 0	15 6
7½	10 6	12 0	12 6	12 0	13 0	13 6	17 6
8	12 0	13 6	14 0	13 6	14 6	15 6	19 6
8½	13 6	15 0	15 6	14 6	16 0	17 6	1 1 6
9	15 6	17 0	17 0	16 0	17 6	19 6	1 4 0
9½	17 6	19 6	19 6	18 0	19 6	1 1 6	1 6 6
10	19 6	1 1 0	1 1 0	1 0 0	1 2 0	1 4 0	1 9 0
11	1 4 0	1 6 0	1 6 0	1 5 0	1 7 0	1 9 0	1 14 0
12	1 9 0	1 11 0	1 11 0	1 10 0	1 12 0	1 14 0	2 0 0
13	1 14 0	1 17 0	1 17 0	1 16 0	1 19 0	2 0 0	.....
14	2 0 0	2 3 0	2 3 0	2 3 0	2 6 0	.....	.....

Reaper-knife files.

[Net prices per dozen.]

Inches.	Plain and swaged.		Knife shape.		Cant shape.	
	Single.	Double.	Single.	Double.	Single.	Double.
	s. d.	s. d.	s. d.	s. d.	s. d.	£ s. d.
7	8 6	9 0	8 6	9 6	12 6	13 6
8	9 3	10 0	9 6	10 6	13 6	14 9
9	11 6	12 9	11 9	13 3	16 3	17 6
10	13 6	15 6	13 9	16 0	19 0	1 1 3

Extras.—Taper saw files, double cut smooth, to advance half inch on single smooth. Frame equaling saw files, 3 inches on frame saw price.

Extras.

	s.	d.
Rubbers:		
Rough and bastard, per pound	1	3
Second cut, do	1	5
Smooth, do	1	7
Rough and bastard:		
1 pound rubber, per pound	1	8
2 pound rubber, do	1	5
3 pound rubber, do	1	4
Second cut:		
1 pound rubber, per pound	1	9
2 pound rubber, do	1	6
3 pound rubber, do	1	5
Smooth:		
1 pound rubber, per pound	1	10
2 pound rubber, do	1	7
3 pound rubber, do	1	6

Strong flat files and half-thicks:

Rough and bastard	per pound	1 5
Second cut	do	1 7
Smooth	do	1 9

Three-square 1*d.* per pound, extra to flat files; horse mouth rasps, 5*s.* each; bread rasps, handled, 30*s.* per dozen; single improved shoe rasps, one-half inch on flat price; double improved shoe rasps, 1 inch on flat price; last makers' rasps, to advance 2 inches; saddle-tree rasps, to advance 3 inches; all parallel files to advance 1 inch on their respective descriptions; all quarter inches, the price of the next size above. Round, half-round, and cross files, double cut, second cut, to advance half an inch; round double cut smooth, to advance 1 inch; flat, three-square, and hand files, rough and middle cut above 14 inches, 6*d.* per dozen extra to bastard cut. New cut files to advance 1 inch.

TROY PRICE LIST OF FILES AND RASPS.

[Inclosure 2 in Consul Merriam's report.]

Inch.	Mill and round.			Flat and square.		
	Bastard.	Second cut.	Smooth.	Bastard.	Second cut.	Smooth.
4	$1.80	$2.15	$2.40	$2.00	$2.40	$2.65
5	2.00	2.40	2.65	2.20	2.60	2.90
6	2.25	2.65	2.95	2.50	2.95	3.25
7	2.55	3.00	3.30	2.90	3.40	3.75
8	2.90	3.40	3.70	3.40	4.00	4.35
9	3.30	3.85	4.20	4.00	4.70	5.10
10	3.80	4.40	4.80	4.70	5.45	5.90
11	4.50	5.20	5.65	5.60	6.50	7.05
12	5.40	6.20	6.75	6.70	7.70	8.40
13	6.50	7.45	8.05	8.00	9.15	10.00
14	7.80	8.90	9.65	9.50	10.90	11.80
15	9.30	10.60	11.45	11.20	12.75	13.75
16	11.00	12.50	13.40	13.10	14.85	16.00
17	12.90	14.60	15.60	15.25	17.25	18.45
18	15.10	16.90	18.10	17.65	19.75	21.20
19	17.60	19.70	21.10	20.30	22.75	24.35
20	20.40	22.85	24.50	23.20	26.00	27.85
	Extras.—Mill double cut, advance 1 inch. Mill narrow points, advance 1 inch. Cross-cut saw (blunt), advance 2 inches.			*Extras.*—Cant blunt (double cut), advance 2 inches.		

TROY PRICE LIST OF FILES AND RASPS—Continued.

Inch.	Hand, warding, and pillar.			Half-round and three-square.		
	Bastard.	Second cut.	Smooth.	Bastard.	Second cut.	Smooth.
4	$2.25	$2.70	$3.00	$2.50	$3.00	$3.30
5	2.50	3.00	3.30	2.80	3.35	3.70
6	2.80	3.30	3.65	3.20	3.80	4.15
7	3.20	3.75	4.15	3.70	4.35	4.80
8	3.70	4.35	4.75	4.30	5.00	5.50
9	4.35	5 10	5.55	5.00	5.85	6.40
10	5.20	6.00	6.55	5.80	6.75	7.30
11	6.30	7.30	7.95	6.70	7.75	8.45
12	7.50	8.60	9.40	7.80	9.00	9.75
13	8.90	10.20	11.00	9.10	10.40	11.25
14	10.50	12.00	13.00	10.60	12.10	13.10
15	12.30	14.00	15.10	12.40	14.15	15.25
16	14.30	16.20	17.50	14.50	16.50	17.70
17	16.60	18.75	20.10	16.90	19.10	20.50
18	19.20	21.50	23.00	19.60	22.00	23.50
19	22.10	24.75	26.50	22.60	25.30	27.10
20	25.30	28.35	30.35	26.00	29.10	31.20
	Extras.—Ginsaw (single cut), take bastard price; slotting (blunt), advance 2 inches.			*Extras.*—Knife, advance 1 inch; high back half-round (blunt), advance 2 inches; cross (blunt), advance 2 inches; feather edge (blunt), advance 2 inches.		

Description.	3-inch.	3½-inch.	4-inch.	4½-inch.	5-inch.	5½-inch.	6-inch.	7-inch.	8-inch.	9-inch.	10-inch.	11-inch.	12-inch.	13-inch.	14-inch.
Tapers, single cut	1.10	1.10	1.20	1.40	1.70	2.00	2.40	3.00	3.80	4.60	5.70	7.20	9.00	11.00	13.20
Tapers, double cut	1.60	1.60	1.75	2.00	2.40	2.75	3.25	4.00	4.95	5.90	7.10	8.80	10.80	12.90	15.20
Slim tapers, single cut	1.20	1.20	1.30	1.45	1.70	1.90	2.10	2.50	3.00	3.70	4.50	5.50	6.80	8.30	10.00
Slim tapers, double cut	1.80	1.80	1.90	2.10	2.40	2.60	2.85	3.30	3.90	4.70	5.60	6.75	8.20	9.75	11.50
Pitsaw blunt, single cut	2.10	2.10	2.20	2.30	2.50	2.80	3.20	3.70	4.30	5.00	5.80	6.70	7.70	.....	.....
Hooktooth blunt, single cut	.....	.....	.....	.....	.....	.....	3.60	3.90	4.40	5.10	6.00	7.10	8.40	.....	.....

Extras.—Bandsaw, heavy, blunt, take taper double cut price. Bandsaw, light, blunt, take slim taper double cut price; taper points same price. Cantsaw, blunt, single cut; round gulleting, blunt, single cut, take pitsaw price. Round off, blunt, single cut, take hooktooth price. Tapers, pointed at both ends (without handles), double the price of slim tapers of half their length.

Description.	6-inch.	7-inch.	8-inch.	9-inch.	10-inch.	11-inch.	12-inch.	13-inch.	14-inch.	15-inch.	16-inch.	17-inch.	18-inch.
Horse rasps:													
Plain	.....	.....	.....	.....	6.50	7.50	9.00	10.70	12.70	15.00	17.60	20.50	23.70
Beveled and three-quarters rasp	.....	.....	.....	.....	7.20	8.30	10.00	11.80	14.00	16.50	19.40	22.50	26.00
Tanged	.....	.....	.....	.....	9.00	10.25	12.00	14.00	16.50	19.50	23.00	.....	.....
Wood rasps:													
Half-round and flat	4.20	5.00	6.10	7.30	8.75	10.40	12.30	14.50	16.90	19.60	22.50	.....	.....
Cabinet:													
Rasps	6.00	7.00	8.20	9.60	11.20	13.00	15.00	17.20	19.60	22.20	25.00	.....	.....
Files	4.20	5.00	6.10	7.30	8.75	10.40	12.30	14.50	16.90	19.60	22.50	.....	.....
Shoe rasps:													
Half-round and flat	4.60	5.30	6.10	7.00	8.00	9.10	10.30	11.60	13.00	.....	.....	.....	.....
Oval	5.30	6.10	7.00	8.00	9.10	10.30	11.60	.....	.....	.....	.....	.....	.....

Extras.—File rasps, flat and half-round, take flat and half-round wood rasp price. Wood files, flat and half-round, take flat and half-round bastard price. Last maker's rasps, one inch advance on cabinet rasp price.

Extras (general).

One round edge, advance 7½ per cent., and two round edges, 15 per cent. on respective kinds and cuts. Blunt files, not specified, advance one inch on respective kinds and cuts. Dead-smooth, double the price of bastard cut. Equalings (bellied),

advance two inches on respective kinds and cut. Sizes below 4 inches, not extended, take 4-inch price; one-half inches not specified, take next higher full-inch price. Rough, coarse, union cut, brass, or other than regular cuts (not specified), made upon regular or standard shaped blanks, advance one inch on respective kinds and cuts. Single or float cut (not specified), on regular shapes, take double cut price.

Irregular goods.—All lengths above those listed, and files varying from standard sizes, to be classed as irregular, and subject to special prices.

[Inclosure 3 in Consul Merriam's report.]

Sheffield vs. Troy prices.

MILL AND ROUND.

Inch.	Bastard.		Second cut.		Smooth.	
	Troy.	Sheffield.	Troy.	Sheffield.	Troy.	Sheffield.
4	$1.80	$1.15	$2.15	$1.33	$2.40	$1.64
5	2.00	1.35	2.40	1.64	2.65	2.00
6	2.25	1.70	2.65	2.00	2.95	2.31
7	2.55	2.06	3.00	2.37	3.30	2.79
8	2.90	2.55	3.40	2.92	3.70	3.28
9	3.30	2.92	3.85	3.28	4.20	3.77
10	3.80	3.65	4.40	4.13	4.80	4.62
11	4.50	4.38	5.20	4.87	5.65	5.60
12	5.40	5.23	6.20	5.84	6.75	6.45
13	6.50	6.08	7.45	6.57	8.05	7.30
14	7.80	7.30	8.90	8.03	9.65	8.76
15	9.30	8.76	10.60	9.49	11.45	10.21
16	11.00	10.46	12.50	11.43	13.40	12.65
17	12.90	12.16	14.60	13.38	15.60	15.33
18	15.10	14.60	16.90	15.81	18.10	18.00
19	17.60	16.54	19.70	18.25	21.10	20.44
20	20.40	19.71	22.85	21.66	24.50	24.09

FLAT AND SQUARE.

4	$2.00	$1.15	$2.40	$1.33	$2.65	$1.64
5	2.20	1.35	2.60	1.64	2.90	2.00
6	2.50	1.70	2.95	2.00	3.25	2.31
7	2.90	2.06	3.40	2.37	3.75	2.79
8	3.40	2.55	4.00	2.92	4.35	3.28
9	4.00	2.92	4.70	3.28	5.10	3.77
10	4.70	3.65	5.45	4.13	5.90	4.62
11	5.60	4.38	6.50	4.87	7.05	5.60
12	6.70	5.23	7.70	5.84	8.40	6.45
13	8.00	6.08	9.15	6.57	10.00	7.30
14	9.50	7.30	10.90	8.03	11.80	8.76
15	11.20	8.76	12.75	9.49	13.75	10.21
16	13.10	10.46	14.85	11.43	16.00	12.65
17	15.25	12.16	17.25	13.38	18.45	15.33
18	17.65	14.60	19.75	15.81	21.20	18.00
19	20.30	16.54	22.75	18.25	24.35	20.44
20	23.20	19.71	26.00	21.66	27.85	24.09

HAND AND PILLAR.

4	$2.25	$1.27	$2.70	$1.46	$3.00	$1.82
5	2.50	1.52	3.00	2.19	3.30	2.19
6	2.80	2.06	3.30	2.37	3.65	2.79
7	3.20	2.55	3.75	2.92	4.15	3.28
8	3.70	2.92	4.35	3.28	4.75	3.77
9	4.35	3.65	5.10	4.13	5.55	4.62
10	5.20	4.38	6.00	4.87	6.55	5.60
11	6.30	5.23	7.30	5.84	7.95	6.45
12	7.50	6.08	8.60	6.61	9.40	7.30
13	8.90	7.30	10.20	8.03	11.00	8.76
14	10.50	8.76	12.00	9.49	13.00	10.21
15	12.30	10.46	14.00	11.43	15.10	12.65
16	14.30	12.16	16.20	13.38	17.50	15.33
17	16.60	14.60	18.75	15.81	20.10	18.00
18	19.20	16.54	21.50	18.25	23.00	20.44
19	22.10	19.71	24.75	21.66	26.50	24.09
20	25.30	22.63	28.35	24.57	30.35	27.49

MEXICO.

LA PAZ.

REPORT BY CONSUL VIOSCA.

In acknowledgment of receipt of circular dated August 28, 1889, wherein the Department of State, for the benefit of the file manufacturers of the United States, desires to be informed as per interrogatories within contained of the extent of the demand for American files, etc., I have the honor, in obedience with the said instructions, to say that the demand for files is here limited to insignificance; the small supply required for this market is imported from San Francisco.

No industry in the form of iron and wood manufacture has as yet found its way into this country. Mining is also very limited; therefore it makes it impossible to give a formal reply to the questions contained in the aforesaid interrogatories.

JAS. VIOSCA,
Consul.

UNITED STATES CONSULATE,
La Paz, Mexico, October 26, 1889.

MAZATLAN.

REPORT OF CONSUL KELTON.

(1) There is some demand for American files in this district. They are considered superior to English files but are said to cost more.

(2) Files are imported from England, Germany, and the United States. The total value of the importations does not exceed $1,500 per annum.

(3) No files are manufactured in this district.

(4) I am informed that the prices of files imported from England and Germany are 60 and 10 per cent. lower than the prices quoted in the Troy list inclosed with the circular.

EDWARD G. KELTON,
Consul.

UNITED STATES CONSULATE,
Mazatlan, Mexico, October 1, 1889.

PIEDRAS NEGRAS.

REPORT BY CONSUL FECHÉT.

The demand for American files in this district is very small, being limited to the machine-shops of the Mexican International Railway. The few mining companies that employ machinery use a small number of files; as more work shops are erected the demand for files will increase.

As a rule, the nationality of the owners of industrial plants in Mexico, or that of the manager in charge locally, generally will determine in what market foreign supplies are purchased. At present more English files are sold to Mexico than American. Files are imported into this district for railway use only. Files are not manufactured in this district.

The Mexican International Railway use American files of all kinds in their shops here. Price is that of the "American Association List," less 50 per cent. off.

The tariff on files at the Mexican customs is 10 cents per kilogram, or about 4½ cents per pound.

EUGENE O. FECHÉT,
Consul.

UNITED STATES CONSULATE,
Piedras Negras, September 20, 1889.

TUXPAN.

REPORT BY CONSUL DRAYTON.

In answer to file circular dated August 28, 1889, I state as follows:

(1) There is very little demand here for files, as there are very few machines.

(2) Files are principally imported from the United States, some from England, which are cheaper than those from the United States.

(3) Files are not manufactured here.

(4) The prices at which files are purchased by dealers is according to the valuation which wholesale dealers in the United States place upon them, and can not be correctly stated here.

The duties on same are 10 cents per kilogram, gross weight, being considered a tool for mechanical purposes.

All other charges are according to freights and lighterage, if any, and vary from three-quarters of a cent to 1 cent per pound, gross, as may be the case.

JOHN DRAYTON,
Consul.

UNITED STATES CONSULATE,
Tuxpan, Mexico, October 4, 1889.

CENTRAL AMERICA.

NICARAGUA.

MANAGUA.

REPORT BY CONSUL WILLS.

In response to "file circular," dated August 28, 1889, I give the following answers:

(1) There are six saw-mills in Nicaragua, all brought from the United States. These mills use American files.

(2) The files imported by the merchants are very few. They come mostly from England, a few from Germany. The kinds are triangular, in lengths from 3 to 5 inches. Mill and blacksmith files are not salable, no horse-shoeing being done here.

(3) No files are manufactured in this country.

(4) Assorted triangular files, in lengths 3, 3½, 4, 4½, 5, and 5½ inches, cost $3 for 6 dozen in England.

A leading merchant of Managua told me he bought in England, four years ago, 4 dozen 8-inch mill files, costing $5. He has 2 dozen still on hand. The tariff on files is 5 cents (American gold, 3½) a pound, gross weight, including the package in which they are brought.

CHAS. H. WILLS,
Consul.

UNITED STATES CONSULATE,
Managua, February 4, 1890.

SOUTH AMERICA.

ARGENTINE REPUBLIC.

REPORT BY CONSUL BAKER, OF BUENOS AYRES.

I am in receipt of the circular of the Department of State of the 25th of August last, stating that some of the file manufacturers of the United States are desirous of extending their trade to South America; and, to that end, have submitted certain interrogatories, which I am requested to answer.

(1) There is no call for American files in the Argentine Republic, for the reason, perhaps, that little if anything is known in regard to them. If, however, they were properly introduced, and they should meet the views of the market, it is not improbable that a demand could be created for them.

(2) Files are imported into this country of almost every variety, and they come mostly from France, Germany, and England.

(3) No files are manufactured in the Argentine Republic.

(4) It is somewhat difficult to get the price of purchase at which importers or wholesale dealers are supplied by manufacturers, for the reason that they do not care to reveal the secrets of their trade to outsiders. By inquiry, however, I learn that wholesale dealers, when gold was at 50 per cent. premium, sold three-cornered files, sizes 3 to 5 inches, at 90 cents to $1.20, Argentine paper currency, per dozen, according to brand. To-day, with gold at 112 per cent. premium, they are selling them at $1.50 to $2, Argentine paper currency, per dozen.

To-day, with gold as I have said at 112 per cent. premium, wholesale dealers are selling flat, half-round, and square files of all kinds, coarse cuts, at from 5 to 6 cents per inch, Argentine paper currency, per

dozen, and fine cuts at from 6 to 8 cents per inch, Argentine paper currency, per dozen.

(5) The duty on files is 25 per cent. on the value; and for custom-house purposes the official value on all sizes and classes of files is fixed at 50 cents per kilogram. To reduce this duty to the paper currency the government adds 15 per cent. to the amount.

E. L. BAKER,
Consul.

UNITED STATES CONSULATE,
Buenos Ayres, November 15, 1889.

BRAZIL.

BAHIA.

REPORT BY CONSUL BURKE.

I have the honor to submit the following answers to questions contained in the "File circular," dated August 28th, and received at this consulate October 9. I would say, while the circular of the Troy file manufacturers that accompanied the "File circular," with its "price-list of files and rasps," is well enough to forward to the consul, it would be much better if the Troy manufacturers would inform the consul at the same time whether the prices mentioned in the list are subject to any discount, and if so, to how much or what? While the consul is seeking information from the dealers, the dealers in turn would like information from the consul. But the latter, as in this case, when asked if the prices in the circular are subject to a discount, could reply, "I don't know exactly, but suppose so." It is embarrassing for the consul and does not aid him in obtaining the information he seeks, when he displays so much ignorance of a subject about which the manufacturers should thoroughly post him.

Manufacturers ought to understand that it is the consul's business not only to obtain the information they desire, but to impart information to the dealer in the article or articles about which inquiries are being made.

And if such information regarding styles, qualities, prices, etc., of certain articles is not given to the dealer when asked, why, he will simply conclude the consul does not know his business; or, knowing it, withholds the information sought by him, and is acting as a sort of detective from some motive for a certain manufacturing concern.

Then, I say, every manufacturer desiring information in regard to his line of manufactures, in sending questions to be answered, inquiries to be made, etc., should, in a private letter, if not otherwise, thoroughly

inform the consul about the prices, qualities, kinds, discounts, etc., of the manufactures he may desire to introduce.

(1) There is no demand for American files. In the three principal hardware stores in the city not an American file could be found.

(2) The only prospect for creating a demand is to have American manufacturers deliver as good a quality, and perhaps it would be necessary now to deliver a better quality of the articles at the same or at a less price to the dealers than they pay in England, where the most of that class of articles is now purchased. When the Bahia purchaser is perfectly satisfied with the manufacturers from whom he purchases, as one of the parties said to me, better inducements must be offered from other manufacturers in order to cause him to change. Files are imported into this district principally from Sheffield. All kinds that are manufactured, are imported.

(3) Files are not manufactured in this district.

(4) I give herewith as taken from the bill forwarded from Sheffield to one of the purchasers in this city the following prices of files and rasps corresponding to some mentioned in the price-list of the Troy manufacturers:

Kind and size.	Cost per dozen. £	s.	d.
Single cut, steel taper saw files:			
3-inch		4	0
3½-inch		4	0
4-inch		4	6
4½-inch		5	0
5-inch		5	6
6-inch		7	6
Up to 14-inch	2	0	0
Double cut, taper saw files:			
3½-inch		4	9
4-inch		5	3
4½-inch		6	0
5-inch		6	6
6-inch		8	6
Up to 14-inch	2	3	0
Rough and bastard:			
4-inch or less		4	9
5 inch		5	9
5½-inch		6	3
6-inch		7	0
Up to 24-inch	7	0	0
Smooth and cabinet files and rasps:			
1 to 4 inch		6	9
4½-inch		7	6
5-inch		8	3
6-inch		9	6
7-inch		11	6
Up to 24-inch	8	10	0
Dead smooth and extra smooth cabinets:			
1 to 4 inch		10	3
4½-inch		11	3
5-inch		12	6
6-inch		14	6
7-inch		17	6
Up to 24-inch	12	10	0
Frame saw files and gulleting (second cut single):			
3½-inch or less		4	9
4-inch		5	3
4½-inch		5	9
Frame saw files and gulleting (second cut singles)—Continued.			
5-inch		6	6
6-inch		8	6
Up to 14-inch	2	5	0
Frame saw files and gulleting (second cut double):			
3½-inch or less		5	9
4-inch		6	3
5-inch		7	6
6-inch		9	6
Up to 14-inch	2	10	0
Rough and bastard:			
4-inch		6	3
4½-inch		7	0
5-inch		7	6
5½-inch		8	6
6-inch		9	8
Up to 24-inch	8	15	0
Second cut:			
4-inch		7	6
4½-inch		9	3
5-inch		8	9
5½-inch		9	9
6-inch		10	9
Up to 24-inch	9	3	4
Smooth:			
4-inch		9	0
4½-inch		9	6
5-inch		10	6
5½-inch		11	6
6-inch		12	3
Up to 24-inch	10	13	4
Dead smooth:			
4-inch		13	6
4½-inch		14	6
5-inch		15	9
5½-inch		17	6
6-inch		18	6
Up to 24-inch	15	10	0

Every one of the above prices is subject to a discount that now is and for some time has been 62½ per cent.

Any and every article manufactured under the foregoing specified list at Sheffield has a fixed price as specified above. The dealer here must make the best terms possible with the Sheffield dealer. It is needless to go through the entire list in the Troy circular. There are the prices for the above articles and a proportional price runs through the entire list of this class of goods manufactured in Sheffield. In fact, the Sheffield manufacturers formed an organization some years ago, fixed their prices, and have not deviated from those established prices since,—so I am informed.

I have no doubt the Troy File Works Company can obtain on application to any Sheffield manufacturer a price-list of all articles manufactured by them.* To this price list, I am informed, the manufacturers adhere. As far as I can learn, the purchasers here pay cash on receipt of goods, receiving as before stated a discount that has often reached 62½ per cent.

The rate of discount varies, of course, with the demand for the articles. There are three large hardware houses in the city; one English, selling on its own account and on commission also, and two Brazilian houses doing business in the same way, I believe.

The present rate of duty on all files and rasps is 500 reis, or say 25 cents per kilogram.

It is probable on or about January 1 proximo, the present tariff schedule will be revived. Whether the duty as it now stands on these articles will undergo a revision is as yet unknown. The other charges for discharging, employment of lighters, etc., are more or less the same as paid to similar labor in the United States.

DAVID N. BURKE,
Consul.

UNITED STATES CONSULATE,
Bahia, December 9, 1889.

PERNAMBUCO.

REPORT BY CONSUL BORSTEL.

For the following information, in answer to the file circular, I am indebted to Mr. William Halliday, the principal of the largest wholesale iron-mongers in this city. Mr. Halliday informed me that if this matter was pushed by a competent salesman he had no doubt but sales of American files could be made here.

* The Sheffield price-list, was transmitted by Consul Merrian, and is printed, page 244.

(1) There is no demand for American files in our market, but with much perseverance and efforts they might be introduced if at prices to compete with English and German manufacturers.

(2) Files sold in this market are generally English and German makes, of sizes and shapes as noted at end.

(3) No files are manufactured in this province.

(4) The following are the current prices in wholesale stores, subject to 14 per cent. discount in thirty days.

Quotations for first-class English files.

[Prices per dozen.]

Size.	Round.	Flat and square.	Half round and three square.	Wood rasps.	Tapers.
3-inch	.....	.....	.....	.....	$0.90
3½-inch	.....	.....	.....	.....	1.00
4-inch	.....	.....	.....	.....	1.10
4½-inch	.....	.....	.....	.....	1.20
5-inch	.....	.....	.....	.....	1.35
6-inch	$1.65	$1.65	$1.65	$1.65	2.00
7-inch	1.80	1.80	1.80	1.80	2.75
8-inch	2.50	2.50	2.50	2.50	3.00
9-inch	3.50	3.50	3.50	3.50	.....
10-inch	6.50	6.50	6.50	6.50	.....
12-inch	8.50	8.50	8.50	8.50	.....
14-inch	12.00	12.00	12.00	12.00	.....
16-inch	15.00	15.00	15.00	15.00	.....

Quotations for common German files.

[Prices per dozen.]

Size.	Round.	Flat and square.	Half round and three square.	Wood rasps.	Tapers.
3-inch	.....	.....	.....	.....	$0.55
3½-inch	.....	.....	.....	.....	0.75
4-inch	.....	.....	.....	.....	0.85
4½-inch	.....	.....	.....	.....	1.00
5-inch	.....	$1.00	$1.00	$1.00	1.10
6-inch	$1.30	1.20	1.20	1.20	1.30
7-inch	1.50	1.40	1.40	1.40	1.50
8-inch	1.75	1.60	1.60	1.60	1.95
9-inch	2.45	1.90	1.90	1.90	.....
10-inch	3.55	2.40	2.40	2.40	2.45
12-inch	5.50	3.50	3.50	3.50	.....
14-inch	6.60	5.40	5.40	5.40	.....
16-inch	8.00	7.50	7.50	7.50	.....

The only charges to which files are subject are 30 cents per kilogram duties in custom-house.

H. CHRISTIAN BORSTEL,
Consul.

UNITED STATES CONSULATE,
Pernambuco, October 15, 1889.

RIO DE JANEIRO.

REPORT BY CONSUL-GENERAL DOCKERY.

(1) There is no demand for American files.

(2) Files are imported from England and Germany.

(3) Files are not manufactured here.

(4) I can not obtain much information in regard to your fourth question. A short time ago the leading importers here attempted to introduce American files for Henry Diston & Sons, of the Keystone works. It was asserted that American files were as good or better than others, but prices were too high. The trade here demands cheap files, even if of inferior quality. There is a general complaint that American manufacturers will not make goods suitable to this market.

The Troy price-list of files is very much above prices paid in England and Germany. This company must make a large reduction, even if they make files of inferior quality, before they can sell here.

O. H. DOCKERY,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Rio de Janeiro, Brazil, November 5, 1889.

RIO GRANDE DO SUL.

REPORT BY CONSUL BENNINGTON.

As the only industry of this country of which it is worth while to speak is grazing, the demand for files of any kind or origin is naturally very limited, and unless there should occur great changes in the inauguration of manufacturing industries the present demand will not soon be increased.

By reference to the records of foreign imports for the civil year 1888, custom-house of Rio Grande do Sul, one box of files only appears to have been despatched; the number or kind of files it contained is not given.

The railway machine-shops, Southern Brazilian, Rio Grande and Bagé line, a small foundry and machine repair shop in this city, a small government arsenal, and a foundry and machine-shop in Porto Alegre, all quite small in their way, are the only establishments of the kind in this province so far as can be ascertained.

The railway shops use English files, furnished direct from England by the company which owns and controls the road.

American files are unknown. All importations in this line are from England and Germany.

I give the following as the wholesale prices of English files, by the dozen here, according to the best obtainable information. What the importers pay for their files in England I am unable to say:

Size.	Half round, bastard.	Flat bastard.	Tapers, saw files.
3¼-inch			$0.76
4-inch	$0.97	$0.97	.87
4½-inch			.98
5-inch	1.19	1.19	1.08
5½-inch			1.25
6-inch	1.41	1.41	1.46
7-inch	1.78	1.78	
8-inch	2.08	2.08	

The foregoing prices are subject to a discount of 10 per cent. I applied to a German importing hardware establishment in this city for information respecting prices, but was informed that they imported no German files, but that German files ranged from 10 to 15 per cent. cheaper than English manufacture.

By the special tariff for this province the duty on files is 27 cents per kilogram and the official value, according to a razão of 48 per cent., is 1.020 reis, or about 55 cents; the storage, according to this rate of razão on each kilogram, will be one-half of 1 per cent. of the official value for the first month, which must be paid if goods do not remain in the custom-house one hour.

The prices and tariff referred to are based upon a rate of 54 cents United States gold to 1,000 reis Brazilian currency, the ruling sight rate of exchange on London this date.

LEBBEUS G. BENNINGTON,
Consul

UNITED STATES CONSULATE,
Rio Grande do Sul, November 6, 1889.

CHILI.

COQUIMBO.

REPORT BY CONSUL GRIERSON.

It is impossible to give the amount of files imported here, as all iron articles are simply described as iron goods, and when dispatched from the custom-house are weighed and valued at 30 cents per kilogram, the duty being 15 per cent. on this quantity with a recargo on account of exchange of 37 per cent., which is diminishing 1 per cent. monthly.

J. GRIERSON,
Consul.

UNITED STATES CONSULATE,
Coquimbo, November 14, 1889.

TALCAHUANO.

REPORT BY CONSUL VAN INGEN.

The importation of files into this consular district is very limited, and there is not sufficient business done in that article in this market to interest American exporters. The trade is so small that it would be very difficult to give the information required by the circular.

I have no doubt the Valparaiso consulate, which is more of a center in the hardware business, will forward with much greater facility the requisite in formation, and that will apply to the whole country.

J. F. VAN INGEN,
Consul.

UNITED STATES CONSULATE,
Talcahuano, October 29, 1889.

DUTCH GUIANA.

REPORT BY CONSUL BROWNE.

There are no American files in use in this colony at the present time. A demand for such may be created by the American manufacturers forwarding their illustrated price-lists and sample-cards to the principal hardware dealers in this colony, P. A. Bruggemann, L. C. Leefmans, J. de la Parra, and Reelfs Bros.

The following is a list of the different kinds of files in use in this colony, imported from England and Germany:

Taper saw files, 3 to 6 inch; four square bastard file, 8 to 14 inch; flat bastard file, 8 to 18 inch; flat file, second cut, 8 to 18 inch; flat file, smooth, 8 to 18 inch; flat file, dead-smooth, 8 to 18 inch; half-round bastard file, 8 to 20 inch; second cut, smooth, 8 to 20 inch; dead-smooth, round bastard file, 8 to 10 inch; second cut, smooth, dead-smooth, half bastard equaling file, smooth and bastard; knife-files, smooth and bastard; rasp-files; shoe-makers' files; wood-rasps; cabinet files; taper saw files, 3 to 6 inch; frame saw files 6 to 7 inch. These are the files mostly in use in this colony, while there is little demand for the following: Square blunt file, 4 to 6 inch; entering file, smooth and bastard, 8-inch; taper lopping file, 6 to 12 inch; topping file, 12-inch; mill saw file, 8 to 16 inch; needle file, 8 to 16 inch; round-off file, 8 to 16 inch.

Files are not manufactured in this colony.

The prices at which files are purchased by wholesale dealers in this colony are very varying, German files being generally cheaper than English.

The following is an approximate list of prices per dozen for files most in use in this colony:

Size.	Taper saw files.	Frame saw files.	Knife file, smooth.	Half round, bastard.	Half round, smooth.
	s. d.	s. d.	s. d.	s. d.	s. d.
3-inch	4 0				
4-inch	4 6				
5-inch	5 6				
6-inch	7 6	8 6	15 6	7 0	9 6
7-inch		10 8	19 6	8 6	10 6
8-inch			23 0	10 6	13 6
10-inch				12 6	16 6

Discount 57½ per cent.

Files imported in this colony are subject to an ad valorem duty of 10 per cent.

THOMAS BROWNE,
Consul.

UNITED STATES CONSULATE,
Paramaribo, October 16, 1889.

PERU.

CALLAO.

REPORT BY CONSUL BRENT.

In reply to your inquiry concerning files, dated August 28 last, I have to state that no such articles are manufactured in this consular district.

I can recommend Messrs. Humphreys & Co. and Evanisto Barrios, of Lima, as reliable representatives for all American manufacturers. Letters to them, directed to my care, will be safely delivered.

Files dispatched in the custom-house here are valued at 2 sols per dozen (1 sol equals 68 cents American) and 40 per cent. duties on the same.

H. M. BRENT,
Consul.

UNITED STATES CONSULATE,
Callao, October 10, 1889.

REPUBLIC OF COLOMBIA.

BARRANQUILLA.

REPORT BY VICE-CONSUL WHELPLEY.

Any community within the United States or Canada, of 3,000 inhabitants, would use more files in one year than this consular district, say of 50,000 inhabitants, would use in two. In the United States, in city or country, the merchant, mechanic, farmer, artisan, or citizen of any grade, would consider his household equipment incomplete without his kit of tools, among which the file ranks as one of the most important. Mechanical ability has been very sparsely distributed in this country. Comparatively speaking, there are no agricultural tools or machinery in use, no constructive mechanics, coppersmiths, lock-smiths, brass-fitters, farriers, gas-fitters, plumbers; no makers of cutlery, fire-arms or labor-saving devices. Every article of iron, steel, copper, or brass must be imported. Outside of the towns, among the gente of the country (the bogas, foresters, herdsmen, etc., that comprise four-fifths of the population), the only use for a file may be to be driven into one of the posts of the ranch as a peg; or, if a flat file, to be converted into a knife blade at the nearest native smithy.

The two steam-boat companies navigating the Magdalena River import their own files from England, and being under English management are unwilling to concede any merit whatever to American tools.

The company under German management seems to entertain the same idea relative to the superiority of German files.

I am indebted to Mr. Oswald Berne, the largest dealer in tools, hardware, and house-furnishing implements in Colombia, for the following data in regard to the trade in files. His sales, of all sizes, amount to from 4 to 6 dozen a year. He orders 2 dozen of each size at a time as his stock diminishes. He has remnants of stock upon his shelves ordered in 1883.

He called my attention to a letter from a New York house in regard to some American files shipped to him some months ago, urging the sale at one-third reduction from the original invoice prices, which would still be 12 per cent. higher than English files of the same grade.

He gets part of his file stock from Germany, at the following prices: 8 marks* per dozen for 12-inch flat; 12 marks per dozen for 14-inch flat. Discount, 25 per cent.

English prices are: 21*s.* 6*d.* per dozen for 12-inch flat; 30*s.* per dozen for 14-inch flat; 33*s.* per dozen, second cut, 14-inch flat; 43*s.* per dozen for 16-inch flat. Discount, 55 per cent.

The 12 and 14 inch are the only sizes called for, and are quoted to illustrate prices in comparison with the Troy company's list.

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* 1 mark = 23.8 cents.

Most of the other different styles and "extras" are unknown and uncalled for, with the exception of the 4-inch, and more rarely the 6-inch triangular. Rasps are seldom called for, except from the mountainous regions of the interior, where horses are shod; but local sales do not amount to a dozen a year.

Probably 10 dozen a year of all kinds would be a liberal estimate of sales by the three or four traders in this district.

I submit the inclosed memorandum, marked A, as compiled from the books of M. Berne, under his direction.

S. M. WHELPLEY,
Vice-Consul.

UNITED STATES CONSULATE,
Barranquilla, October 7, 1889.

German files.

[Marks per dozen.]

Size.	Triangular, square, flat, round, and half-round.									Shoe rasps.	Horse rasps. *	Watchmakers' files.†	
	First quality.			Second quality.			Extra quality.						
	Bastard.	One-half fine.	Fine.	Bastard.	One-half fine.	Fine.	Bastard.	One-half fine.	Fine.			First quality.	Second quality.
4-inch	1.65	2.20	2.40	1.35	1.85	2.10	1.80	2.30	2.65	.....	.....	.....	.....
5-inch	2.20	2.65	3.00	1.75	2.15	2.60	2.35	2.90	3.40	.....	.....	.....	.....
6-inch	2.65	3.25	3.85	2.25	2.75	3.20	2.95	3.70	4.40	.....	.....	.....	.....
7-inch	3.25	4.00	4.60	2.60	3.25	4.00	3.70	4.40	5.20	.....	.....	.....	.....
8-inch	4.00	4.75	5.60	3.10	4.00	4.65	4.50	5.40	6.40	7.00 to 8.50	.....	.....	.....
9-inch	4.75	5.80	6.75	4.00	4.90	5.60	5.35	6.50	7.65	8.50 to 10.00	.....	.....	.....
10-inch	5.80	7.00	8.45	5.15	5.70	6.90	6.90	8.00	9.50	10.00 to 12.00	.....	12.00	8.00
11-inch	7.25	8.60	10.25	6.15	6.90	8.10	8.40	9.85	11.50	.....	.....	.....	.....
12-inch	8.75	10.40	12.25	7.30	8.00	9.60	10.25	12.00	13.75	.....	.....	15.00	9.00
13-inch	10.50	12.50	14.75	8.80	10.10	11.50	12.50	14.75	17.00	.....	.....	.....	.....
14-inch	12.75	15.00	17.50	10.25	12.25	13.50	15.00	18.00	20.50	.....	.....	17.00	18.00	11.00
15-inch	15.00	18.00	21.00	12.00	14.50	16.00	18.00	21.50	25.00	.....	.....	19.50	.....	.....
16-inch	18.00	21.50	25.00	13.50	16.50	19.00	22.00	26.00	30.00	.....	.....	23.00	24.00	.....

* Second quality, marks 1.20 per kilogram, all sizes. † Per gross.

Discount 25 and 4 per cent.

English files.

[Per dozen.]

Size.	C. S. pit saw.	Round bastard.	Flat bastard.	Square bastard.	Half-round bastard.	Half-round rasps.	Flat rasps.	Triangular saw files.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
4-inch	.....	.....	.....	.....	.....	.....	.....	4 6
4½-inch	.....	.....	.....	.....	.....	.....	.....	5 0
6-inch	8 6	7 0	.....	7 0	.....	.....	.....	.....
8 inch	.....	10 6	10 6	10 6	10 6	.....	.....	.....
10-inch	.....	15 0	15 0	15 0	15 0	15 0	15 0	.....
12-inch	.....	21 6	21 6	21 6	21 6	.....	.....	.....
14-inch	.....	.....	30 0	.....	30 0	.....	.....	.....
16 inch	.....	.....	.....	.....	43 0	.....	.....	.....

Duty on files, 30 cents per kilogram.

COLON.

REPORT BY CONSUL VIFQUAIN.

(1) There is no demand now for files or anything else; the few dealers have enough of a supply to do them for a long time, all industries being virtually dead since the work on the canal has stopped.

A file is not a luxury, it is not an ornament, it is in fact a tool, and there is only a demand for tools where there is industry. At the present time there is no such a thing as industry here. But I dare say that if the Panama Canal resumes work the demand for files will be greatly enhanced.

(2) Files are not imported into this district now. In the good days of the canal there were probably 5 tons of files per annum imported at this place for distribution along the line of the canal, and for the use of the industries necessary to supply the works with the necessary material, such as timber for bridges, fences, ties for railroads, etc.

The kind imported was nearly all American. There are some English files, also some Belgian; but nearly 99 per cent. are American.

The English ranks first for temper, the American for cut and shape, the Belgian for cheapness; but withal the American rules the market.

(3) Files are not manufactured in this district.

(4) The price-list of the Troy manufacturers is far in excess of the prices at which files are bought from other American manufacturers, and, as I have been able to secure the exact prices of such files as are here, I deem it wiser to give those prices. The several files cited are bought in the States at wholesale per dozen, as follows:

	3-inch.	4-inch.	5-inch.	6-inch.	7-inch.	8-inch.	10-inch.	12-inch.	14-inch.	16-inch.	18-inch.
Taper	$0.40	$0.43	$0.71	.....	.....	.....	.....	.....	.....	.....	.....
Bastard flat	.....	.....	.....	.....	.....	$2.45	.....	.....	.....	.....	.....
Flat	.....	.....	.....	.....	.....	1.22	$2.08	.....	.....	$4.71	.....
Half-round bastard	.....	.....	.....	.....	.....	.....	.....	$1.94	$2.81	5.00	$6.35
Rasps	.....	.....	.....	$1.58	$1.81	2.09	.....	.....	.....	.....	.....

To these prices must be added the freight, and they are sold here, as a general rule, at 10 cents Colombian per inch. The profits on these files therefore average 100 per cent. at the present rate of exchange.

The prices in the States of the four different manufactures cited are virtually the same.

(5) I have found no other files in this market for sale than those cited, and there is no tariff on files in this consular district. There are no charges between the manufacturer in the States and the merchants' stores here except the freight on the goods.

VICTOR VIFQUAIN,
Consul.

UNITED STATES CONSULATE,
Colon, October 1, 1889.

PANAMA.

REPORT BY CONSUL-GENERAL ADAMSON.

(1) There is no special demand for *American* files in this consular district, neither is there a great demand for files from any other country. The conditions under which we live in this country are so different from those that prevail at home that it is difficult to make our people comprehend our case. Briefly stated, there are no roads worthy of mention, and therefore few vehicles to be repaired or horses to be shod. The mechanics who use files are then few. During the time when the works on the Panama Canal were in operation there was a considerable consumption of files in the machine and blacksmith shops of the company, but that demand has ceased, and there is no prospect for creating a fresh demand.

There is but one store in the whole department of Panama which is solely devoted to the business in hardware, and the purchases of files by that establishment amount to $250 a year. Under such circumstances as now exist here the total trade in files for the whole department will hardly reach $1,000 per annum.

(2) All the files used here are imported from Sheffield, England. The kinds imported are such as are most used by blacksmiths, shoemakers, and workers in wood.

(3) Files are not manufactured in this district.

(4) The principal dealer in hardware at this place does not keep in stock all the kinds or sizes of files mentioned in the list which accompanies the circular, and would only quote the cost of a few numbers. For instance, he buys 10-inch bastard round files in Sheffield at 15 shillings per dozen, less 60 and 5 per cent.; 16-inch bastard flat, 43 shillings, less same discount; 8-inch flat bastard, 10 shillings 6 pence, same discount; 16-inch half round, 43 shillings, same discount; 16-inch horse rasps, plain, 43 shillings, same discount.

The ports of this isthmus are "free ports," but in the duty ports there are no higher duties imposed on American files than on those from Sheffield, and consequently the tariff can have nothing to do with the competition.

THOMAS ADAMSON,
Consul-General.

UNITED STATES CONSULATE,
Panama, October 4, 1889.

VENEZUELA.

LA GUAYRA.

REPORT BY CONSUL BIRD.

(1) There is no demand in this consular district for American files. Importers declare that English files are much cheaper in price.

(2) Files of all kinds in sufficient quantity to supply the ordinary demands of trade are imported from England.

(3) No files are manufactured in Venezuela.

(4) Four-inch bastard mill and round files, flat and square files, hand, warding, and pillar files, and half-round, and three-square files, at invoice price, cost 4½ shillings per dozen, with 60 per cent. discount. These figures are so much lower than American quotations that it is probably unnecessary to say more upon the subject.

(5) The duty on files amounts to $6.66 in United States gold per 100 pounds gross weight and 12½ per cent. of amount of duties for internal tax.

The foregoing report is based upon information furnished by Messrs. Becker, Brun & Co., the largest hardware importers in this consular district.

WINFIELD S. BIRD,
Consul.

UNITED STATES CONSULATE,
La Guayra, October 7, 1889.

MARACAIBO.

REPORT BY CONSUL PLUMACHER.

(1) There is little demand for American files in this district, as it is understood that American files are machine-made and customers prefer hand-made ones.

(2) Files are imported into this district from England and Germany, but only the very best quality: flat, half-round, three-square, and rasps.

(3) There are no files manufactured in this district.

(4) Files are not purchased on the spot, but ordered direct from England and Germany at prices well known to American makers.

(5) Files are subject to fourth-class duty of the tariff of Venezuela; that is to say, 15 cents American gold for every kilogram gross weight.

E. PLUMACHER,
Consul.

UNITED STATES CONSULATE,
Maracaibo, September 28, 1889.

PUERTO CABELLO.

REPORT BY CONSUL DE BLANC.

(1) No American files are imported into this district as far as I have been able to ascertain. The hardware importing business in this port is limited to three firms (A. Mestern & Co., Max Reinboth & Co., and L. Seidel & Co.), who also have branch houses in Valencia. A demand for American files might be created by introducing and making them known in this market. For that purpose I would suggest the sending of samples to the above-named houses, who have assured me of their willingness to import from the United States if they can do so on terms as favorable as those they obtain at present from the English manufacturers.

(2) All the files imported into this district come, almost exclusively, from England. The kinds imported are: bastard, half-round, flat, round, and square; taper saw files, and pit saw files.

(3) No files of any kind are manufactured in this district.

(4) The following list shows the prices at which the kinds of files imported into this district are purchased by the wholesale dealers of this port:

List of prices.

Size.	Bastard, half round, round, flat, and square.	Bastard, three square.	Taper saw files, second cut, single.	Pit saw files, second cut, single.
	s. d.	*s. d.*	*s. d.*	*s. d.*
4½-inch	.....	.....	5 0	.....
5-inch	.....	.....	5 6	6 6
6-inch	7 0	8 6	.....	8 6
7-inch	8 6	.....	.....	.....
8-inch	10 6	12 0	.....	.....
9-inch	12 0	.....	.....	.....
10-inch	15 0	18 0	.....	.....
11-inch	.....	21 6	.....	.....
12-inch	21 6	.....	.....	.....

All the above are subject to 65 per cent. discount.

(5) Custom dues in Venezuela are wholly specific, and are levied on the gross weight of packages. All foreign merchandise is divided into nine classes. Files are in the fourth class, and pay 75 centimes of a bolivar per kilogram ($6.6346 United States currency per 100 pounds).

No other charges are imposed on the introduction of files into this district.

CHARLES DE BLANC,
Consul.

UNITED STATES CONSULATE,
Puerto Cabello, October 30, 1889.

o

SPECIAL CONSULAR REPORTS.

CARPET MANUFACTURE

IN

FOREIGN COUNTRIES.

REPORTS FROM THE CONSULS OF THE UNITED STATES ON THE MANUFACTURE OF CARPETS AND RUGS IN THEIR SEVERAL DISTRICTS, IN ANSWER TO A CIRCULAR FROM THE DEPARTMENT OF STATE.

ISSUED FROM THE BUREAU OF STATISTICS, DEPARTMENT OF STATE.

ALL REQUESTS FOR THESE REPORTS SHOULD BE ADDRESSED TO THE SECRETARY OF STATE.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

CARPET CIRCULAR.

DEPARTMENT OF STATE,
Washington, June 10, 1889.

To the Consul at ——— :

SIR: The Department has been requested by representatives of the carpet manufacturers of the United States to secure statistics concerning that industry in the leading countries of Europe. In compliance with such request the following interrogatories and suggestions have been prepared with the view to obtaining the information desired:

(1) Number of mills or distinct establishments engaged in the manufacture of carpets in your district. (Give a list thereof, together with the proper business address of each.)

(2) Number of looms in each establishment. Where exact information in this regard is not obtainable give the closest estimate, making a careful distinction between *hand* and *power* looms.

(3) Proportion of pure carpets to those of lower grades, making, if possible, the following distinctions: (*a*) Brussels, Wilton, Saxony, velvet, etc. (*b*) Rugs and whole carpets—Smyrna, Turkish, etc. (*c*) Ingrain, Kidderminster, Venetian damask, etc.

(4) Number of persons who find wage employment in the manufacture of carpets, rates of wages, hours of labor, manner of living, etc., distinguishing between those employed at their homes from those employed in factories.

(5) Is the industry—dyeing, spinning, weaving, etc.—conducted unitedly or in separate divisions by independent interests?

(6) How is the product placed upon the market—direct from the factories by the factors or through commission agents, etc.?

(7) Where does the product find consumption, at home or abroad? If abroad, to what countries is it exported, and on what terms are sales conducted?

You are requested to prepare a report upon the foregoing interrogatories and suggestions and forward the same to the Department at your earliest convenience.

I am, sir, your obedient servant,

WILLIAM F. WHARTON,
Assistant Secretary.

CARPET MANUFACTURE IN FOREIGN COUNTRIES.

AUSTRIA-HUNGARY.

REPORT BY CONSUL-GENERAL GOLDSCHMIDT, OF VIENNA.

MILLS AND ESTABLISHMENTS.

(1) Imperial, Royal Carpet and Tapestry Factory of Philipp Haas & Sons, in Ebergassing (Actiengesellschaft der k. k. priv. Teppich- u. Möbel-Stoff-Fabrik von Philipp Haas & Söhne).

(2) Johann Backhausen & Sons, Tapestry and Carpet Factory (Möbelstoff- u. Teppich-Fabrik), in Vienna and Hoheneich.

(3) Hackl & Sons, T. R., Carpet and Tapestry Factory (k. k. priv. Teppich- u. Möbelstoff-Fabrik), in Vienna and in Brühl, near Weitra.

(4) Leopold Silberstein, in Vienna.

(5) Gross-Sieghartser Tapestry Blanket and Carpet Factory (Möbelstoff, Decken- u. Teppich-Fabrik), in Gross-Siegharts.

All of the aforesaid are in Nether-Austria.

(6) T. Ginsky, in Maffersdorf, near Reichenberg, Bohemia.

(7) Aubin Protzen & Co., in Reichenberg, Bohemia.

(8) Carl Wagner & Co., in Maffersdorf.

LOOMS.

The number of looms in the foregoing establishments amounted to 756 hand, and 338 power.

GRADES MANUFACTURED.

This question is hard to answer. All the articles named are produced. The production changes according to the fashion and demand, one year is unlike the other, hence it is impossible to make a statement giving the proportion of the different grades of carpets manufactured.

NUMBER OF EMPLOYÉS.

The following table answers the question as to the number of persons who find wage-employment in the manufacture of carpets in Austria and Bohemia:

Countries.	Chambers of Commerce.	Number of spindles.	Machines.					Workmen.				Value of production.
			Hand-looms.			Power-looms.						
			Simple.	Jacquard.	All.	Simple.	Jacquard.	Men.	Women.	Children.	All.	
												Florins.
Austria	Vienna	.....	70	10	80	44	.....	231	209	18	458	675,000
Austria	Linz	600	30	.....	30	2	.....	35	46	10	91	48,000
Steuermark	Graz	1,860	5	.....	5	6	32	44	70	....	144	148,000
Tirol	Tunbruck	1,185	.....	.....	.....	.....	60	.....	.....	....	.....	33,000
Bohemia	Reichenberg	3,500	270	110	380	130	50	780	620	60	1,460	1,900,000
	Budweis	1,000	50	6	56	.....	.....	50	34	2	86	128,000
Mahren	Brünn	1,830	114	22	136	.....	.....	120	112	..	232	300,000
Total	.....	9,975	539	148	687	182	142	1,260	1,091	90	2,441	3,227,000

RATES OF WAGES PER WEEK.

Class.	Men.		Women.	
	Adults.	Children.	Adults.	Children.
Bohemian:				
Formen	$4.00–$5.60	.....	.....	.....
Hand-weavers	2.00– 3.60	$1.30–$1.40	$1.60–$2.00	$1.50
Power-weavers	2.40– 2.80	1.30– 1.50	1.60	$1.20– 1.50
Dyers	2.30– 2.80	1.80– 2.00	1.70– 1.90	.....
Skilled workmen	3.20– 3.40	1.60	.....	.....
Helpers to hand-weavers	2.40– 3.20	1.00– 1.30	1.40– 1.80	1.00– 1.40
Helpers to power-weavers	3.00– 3.40	1.10– 1.40	1.80– 2.00	1.20– 1.60
Shoddy wool-workers	2.40– 2.80	.....	1.60– 2.60	.....
Austria:				
Foremen	5.30– 7.46	.....	.....	.....
Hand-weavers	2.60– 4.80	1.70– 2.00	2.15– 2.65	2.00
Power-weavers	3.20– 3.75	1.70– 2.00	2.15	1.60– 2.00
Dyers	3.10– 3.75	2.40– 2.66	2.30– 2.50	.....
Skilled workmen	4.20– 4.40	2.15	.....	.....
Helper to hand-weavers	3.20– 4.20	1.33– 1.70	1.90– 2.40	1.33– 1.90
Helper to power-weavers	4.00– 4.40	1.46– 1.90	2.40– 2.66	1.60– 2.15
Shoddy wool-workers	3.20– 3.75	.....	2.15– 2.66	.....

The foregoing table shows that the weekly wages in Austria in this particular branch of business are sufficiently moderate, but those paid in Bohemia are starvation wages.

HOURS OF LABOR.

Eleven hours constitute a work day in both countries, one-half hour's time being allowed for dinner.

Work in the Austrian weaving establishments goes on throughout the whole year, with the exception of Sundays and church festivals and certain national or local festivals, which number 76 out of the 365 days, making 289 work days.

Workmen as a rule in this monarchy are usually steady and methodical in their labor, but do not work as energetically as the American workman.

HOW THE WORK PEOPLE LIVE.

They are industrious, but fond of amusement, and are too often interrupted by the numerous holidays observed here. Their homes are far from comfortable. There are few houses inhabited by a single family, generally one house shelters from eight to twelve families; overcrowding is great in these dwellings, and morality is affected by it. On account of the dearness of the land, there is a scarcity of small houses suitable for a single family. The dress of the workman is tolerably good.

Much wine and beer are consumed by the lower classes, though drunkenness does not prevail to a great extent. Since the great battle between capital and labor has begun, the condition of the laboring classes of this monarchy has been visibly and, I trust, permanently improved, although there is great room for improvement in wages in this special line of business.

WOMEN WORKERS.

A great deal of heavy work here is done by women of all ages, not only in carpet factories, but in the open air, such as sawing wood, making and carrying mortar in buckets, and hauling the brick used in building. The wages they earn are 40 cents per day. In the carpet manufactories only a very small percentage of the workmen are employed at their homes.

HOW THE INDUSTRY IS CONDUCTED.

In three factories dyeing, spinning, and weaving are combined, but colored carpet-warp in the Bohemian factories of the firms of T. Ginsky and Aubin Protzen & Co., is obtained from other countries. The other establishments limit themselves to the weaving and finishing of carpets.

HOW THE PRODUCT IS MARKETED.

The manufacturer has large warerooms in the prominent cities, from whence the goods are retailed to the consumer direct; for instance, the firm of Philipp Haas & Sons, of Vienna, has large retail establishments in the following cities: Budapest, Prague, Graz, Linz, Lemberg, Bucharest, Milan, Rome, Naples, and Genoa. They also employ traveling men who canvass the country.

In a few instances, especially in the smaller concerns, commission agents and jobbers market the product of the carpet manufacturers in conjunction with other goods, such as furniture, house-furnishing goods in general, dry goods, etc.

WHERE THE PRODUCT FINDS CONSUMPTION.

The product finds the greatest consumption at home, though there is some exportation to the Orient, Russia, Italy, Servia, Roumania, and other countries.

Terms of sale vary greatly; there are no established rules as to time and discount, each manufacturer having his own method of doing business.

MOTORS IN USE.

In conclusion and in addition to the questions propounded, I give below a table compiled by the various chambers of commerce in the different sections of Austria, showing the motors, representing the amount of horse-power used in the manufacture of carpets and blankets.

Countries.	Chambers of commerce.	No. of establishments.	Steam machines.		Water-power, turbine wheel.		Water-power.		Other motors.		Total.	
			Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse power.
Austria	Vienna	8	4	140	1	114	2	41	1	8	8	303
	Linz	1	.....	.....	.....	.....	2	70	....	....	2	70
Steiermark	Graz	2	1	60	1	7	....	.....	....	....	2	67
Tyrol	Lunsbruck	3	.....	.....	.....	.....	.....	.....	....	....	.....	.....
Bohemia	Reichenberg	4	6	285	3	42	1	30	....	....	10	257
	Budweis	1	1	12	.....	.....	1	15	....	....	2	27
Mähren	Brünn	2	3	128	.....	.....	....	.....	....	....	3	128
Total		21	15	625	5	163	6	156	1	8	27	952

ACKNOWLEDGMENT.

I am indebted and make in consequence my acknowledgment to Mr. Gustav v. Schœller, of Brünn, for most of the information herein embraced.

JULIUS GOLDSCHMIDT,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Vienna, October 31, 1889.

BELGIUM.

REPORT BY CONSUL ROOSEVELT, OF BRUSSELS.

With the exception of a small factory at Tournai, known as the Royal Carpet Manufactory, employing only eight workmen, the carpet industry has completely disappeared from this consular district, owing in part to aversion by the Belgians to new inventions, and greatly to competition by the English. Some years ago the weaving of carpets by

hand was a special feature of the Tournai factory, which produces an article justly renowned for its durability, beauty, and fine workmanship. At present this factory employs machinery, and manufactures only such carpets as are specially ordered.

Owing to the above-mentioned causes and low rate of duty, 10 per cent. ad valorem, on carpets coming into Belgium, this last existing factory is about to suspend operations.

I may add that carpets were never manufactured at Brussels, but in former years beautiful tapestry used for wall decoration was made here. This industry, however, no longer exists, the disappearance of which is also attributed to the English, who adopted the designs and imitated them in carpets which they introduced to the trade as "Brussels tapestry carpets;" hence the origin of the name, Brussels carpets.

The so-called Brussels carpets, manufactured in England, are placed upon this market at a much lower rate than the same article can be produced in Belgium; consequently England supplies this market, and Belgium dealers exporting carpets furnish foreign markets with English goods.

GEORGE W. ROOSEVELT,
Consul.

UNITED STATES CONSULATE,
Brussels, October 31, 1889.

FRANCE.

REPORT BY CONSUL-GENERAL RATHBONE, OF PARIS.

EXPLANATORY.

I have the honor to transmit herewith a report on "French carpets," as per instructions received from you.

I regret to state that it is not better provided with figures and tables and statistics generally, but I have been utterly unable to obtain same. Manufacturers seem to be suspicious, and will not give the figures or particulars. My predecessor, Consul-General Walker, in 1882 sent out forty letters requesting information and got no replies, and I have sent twelve and received two. I also directed a letter to the ministry of commerce, the answer to which I inclose, which states that no statistics have been made on the subject.

The number of establishments devoted exclusively to the manufacture of carpets in France is not so large as the flourishing state of the carpet trade would lead one to suppose. The Government establishments of Les Gobelins and at Beauvais, by producing a quantity of carpets of the very best quality in their own peculiar style, hamper private enterprise. Moreover, in a country like France, where the manufacture

of hangings of all kinds has been brought to such perfection, manufacturers are often induced to make the production of carpets, properly so called, a part only of their business.

The chief centers for the manufacture of carpets, exclusive of the Government ones, are at Aubusson and in the department of the Nord.

NAMES OF MANUFACTURERS.

The following are some of the best houses in France: Messrs. Braguenie et Cie, at Aubusson; Paris house, 16 Rue Vivienne. Messrs. G. and R. Hamot, at Aubusson; Paris house, 75 Rue de Richelieu. Messrs. Croc, père et fils, and A. Jorrand, at Aubusson; Paris house, 12 Rue Cléry. Messrs. Sallandroze frères, at Felletin, near Aubusson; Paris house, 36 Rue des Jeuneurs. Messrs. A. L. Dupont et Compagnie and William, Tetard, L'ainé et Rupp, both at Beauvais.

The manufactories of Bernard Welcomme, Auguste Johuville-Ravesteyn-Rudent are at Roubaix. Those belonging to Raymond Parmentier—Moulin—Pipart, Messrs. Rambaud and Monnier, and Messrs. Lorthiois frères, are at Turcoing. Both these towns are in the department of the Nord. It is impossible to obtain any complete figures relating to the number of looms in the different French establishments. They are not to be found at the ministry of commerce, and the manufacturers to whom application has been made for data have almost unanimously declined to give any. After a great deal of research we can only obtain a more or less correct estimate.

The comparative number of hand and steam looms in use depends on the extent of the establishment in which they are found. As a general rule, the number of hand looms exceeds that of steam ones in the proportion of about four to one.

GRADES OF CARPETS MADE.

The quantity of carpets of first-rate quality manufactured in France is slightly smaller than that of carpets of inferior quality. Carpets of almost every conceivable kind are made in France. The demand for Oriental carpets is steadily increasing, and vigorous efforts have been made by several well-known French houses to produce some of the best Oriental carpets that have ever been placed on the market. Monsieur Ferdinand Leborgne, who has an important establishment at Lannoy, in the department of the Nord, is probably second to none in this respect.

WORKMEN EMPLOYED.

The number of men employed in the manufacture of carpets is very considerable. Aubusson has some one thousand six hundred or two thousand of them, distributed among ten or twelve different houses. A large number of hands are also employed at Les Gobelins and at Beauvais. Though Paris is the center of great industrial activity, it is far from taking the first rank for the manufacture of carpets.

WAGES.

Wages fluctuate from time to time, but since the last quarter of a century they have risen a great deal, especially in Paris. But the rate of wages for women has not risen in anything like the same proportion as for men. At present, wages rise more quickly in the provinces than in the capital, but in spite of this, the Paris workmen are far better paid than their provincial brothers, as the following table will show:

Class of workmen.	Paris.	Usual wages.
	Francs.	*Francs.*
Foremen	7.00	5.50
Overseers, markers	5.50	4.00
Workmen above twenty-one years old	5.00	3.50
Workmen from fifteen to twenty years old	3.00	2.00
Women	2.50	1.75
Boys	1.75	1.25
Girls	1.50	1.00

The figures given in the second column show the usual rate of wages. It must be remembered that wages vary according to the part of the country in which the work-people live, and that, in some places, they are allowed their food. They are often fed, or both fed and lodged, and receive an inferior wage. In this case the figures given above are usually reduced in the proportion of from one-fifth to three-fifths.

HOURS OF LABOR.

All ages and both sexes work twelve hours daily, except apprentices, who work ten hours only.

WOMEN WORKERS.

The number of women and girls employed amounts to nearly 50 per cent. of the entire number of hands. Though the demand for female labor is always considerable, the wages given to women and girls show few signs of increasing in the same proportion as the men's. This is explained by the great abundance of the supply of female labor.

APPRENTICES AND PIECEWORK.

The system of apprenticing boys and girls is fast dying out in the carpet industry. The piece-work method has produced excellent results, on the whole, and it is now being adopted generally. It follows that work-people do not require the same amount of technical skill as formerly. They have to know what more immediately concerns their own particular division of labor, and are not expected to know any more. Any additional knowledge is not generally of use to them, and hardly increases their value in the labor market.

The law on apprentices is very rigidly enforced, and masters hesitate to take apprentices in order not to place themselves within its

reach. Boys and girls when twelve or thirteen years old are therefore taken on as work-people, but with a small wage, and they work twelve hours per day. What technical instruction they require is easily acquired in schools opened on purpose for them, either by the Government or by private individuals.

When it is found necessary to take an apprentice, the boy or girl is bound for the space of one year only. This period of time is usually found to be amply sufficient.

MANNER OF LIVING.

The manner of living among the carpet hands varies greatly according to the importance of the town they inhabit. On the whole the Paris workman is less well off than the provincial one. He has acquired more or less expensive tastes from which the other has abstained. Also the price of rent is very high in the capital and moderate in most of the provincial towns. If we add to a father's earnings those of his wife and children, we obtain a figure which enables him and them to live modestly. It has long been an acknowledged fact that a man cannot earn enough for the support of his family. At the same time, it should be borne in mind that the workmen employed in the carpet trade are poor, because some of them earn less than those engaged in other branches of industry. Many a French operative, in the provinces, is the owner of the cottage he inhabits, and of the plot of ground around; but the number of workmen engaged in the carpet industry, who are at the same time their own landlords, is exceedingly limited. To make matters worse, the conscription deprives many a family of a much-needed pair of arms; and when young men can earn enough to maintain themselves, they often quit the paternal roof. The women are the mainstays of many a home; by doing a great deal of piece-work at home, without neglecting their domestic duties, by their thrift and by their knowledge of turning money to the best advantage, they render services which are too seldom appreciated and acknowledged.

The carpet hands, like the majority of working people, are paid at shorter intervals than formerly. They pay ready-money for all they buy much more frequently than a few years ago, and this may produce beneficial results. Some years back, the small dealers readily gave credit, but this encouraged indiscriminate spending. A reaction followed. The venders, who experienced the greatest difficulty in obtaining their money, began to refuse selling on credit. As a consequence, working people are learning to regulate their expenses according to their means, as they can only buy with ready money.

But no permanent improvement can be expected while the custom still obtains of doing what is popularly called "la Saint-Lundi;" that is to say, working on Sunday morning and then idling and drinking on Mondays from morning till a great deal past evening. This is a fear-

ful cause of demoralization, and unfortunately shows few signs of disappearing.

By far the great number of hands are employed inside the manufactories. Those employed outside are chiefly women and girls. The practice of giving women and girls work at home is becoming more and more popular. The masters like it because it lightens female labor, and the girls and women like it because it enables them to earn money while attending to their domestic duties. Both sexes are employed on night work; but apprentices are entirely free from anything of the kind. Much has been done of late years to improve the sanitary condition of workshops. But much remains to be done in this way, and the zealous surveillance of the authorities is constantly required.

CHEAPENING LABOR.

The cheapening of labor is a question of the very greatest importance to French carpet manufacturers. Having outstripped their rivals in the race for superiority, they are now attempting to surpass them on the score of cheapness; but their efforts in this direction have not always been attended with success. They have to struggle against German and Italian competition, especially the latter. Dyeing, weaving, and spinning are carried on either in the same or in different ones, according to the importance of the firm or the resources of the country in which it is situated. Local customs have sometimes much to do with this distribution of labor. But in the most important firms, such as that of Messrs. Tétard L'ainé, at Rupp, at Beauvais, for example, the three processes are always carried on in the same establishment.

HOW THE PRODUCT IS MARKETED.

The manufactured goods are usually placed on the market by the manufacturers themselves. This is especially the case when they have a *dépôt* or branch house in Paris. The number of firms employing commission agents is constantly decreasing, and this decrease is likely to continue.

WHERE THE PRODUCT FINDS CONSUMPTION.

France buys up the greater quantity of the carpets she produces. Since the last few years she has partially undersold England in several parts of the world in the matter of expensive carpets and of those of inferior quality—this is especially true in the case of Northern Europe, and some parts of South America. The French export carpets to every European country; and in Egypt, where carpets in the oriental style are made in large quantities, the produce of their carpet-looms finds a ready market.

The total value of declared exports of carpets and tapestries (princi-

pally tapestries) from France to the United States was $14,486 for the year ending June 30, 1889.

The total value of carpets exported from France, principally to Belgium and England, during the year 1888, amounted to $570,991.

J. L. RATHBONE,
Consul-General.

UNITED STATES CONSULATE GENERAL,
Paris, October 18, 1889.

ST. ETIENNE.

REPORT BY COMMERCIAL AGENT MALMROS.

On receipt of circular I made immediately diligent inquiries in every department attached to my agency, but in no part of my district could I find that any manufacture corresponding to the character of those mentioned in the circular existed.

There is however a small manufactory situated in the town of Tullius, in the department of the Isère, for the fabrication of a kind of coarse stair-carpeting, owned by a man named Drevet, who employs about twenty workmen; but as this industry is only in its inception the amount of work done is not considerable. Notwithstanding, the owner assured me that he has plant enough to employ two hundred artisans and turn out 2,000 yards of carpeting a day. The material he employs is hemp, and his machinery is moved by water with a force of about fifty horse power. At present the dyeing, spinning, and weaving are all done on the premises, and all sales are effected directly through the manufacturer, no commission agent being employed. He exports none of his fabrication save a little to Algeria. As regards the pay and manner of living of the workmen, M. Drevet vouchsafed the following information: The pay of the men ranges from 2.50 to 3 francs a day (5.18 francs=$1), the women, from 1.50 to 2 francs. Their rent does not exceed 60 francs a year ($13). Their manner of living is frugal and simple. A vegetable soup is taken invariably in the morning; for dinner a plate of meat, with generally two kinds of vegetables and a bottle of red wine; in the evening a soup same as in the morning and whatever remains from dinner, the whole coming to about 60 francs a month for a man and his wife and two children.

The men work ten hours a day; the time for breakfast (half an hour) and dinner (an hour and a half) are not included.

OSCAR MALMROS,
Commercial Agent.

UNITED STATES COMMERCIAL AGENCY,
St. Etienne, August 21, 1889.

GERMANY.

AIX LA CHAPELLE.

REPORT BY CONSUL PARSONS.

FACTORY.

There is but one establishment in this consular district engaged in the manufacture of carpets. The business address of said establishment is Gebrüder Schoeller, Düren, Rheinprovinz, Germany.

LOOMS.

With the exception of several hand looms for new designs or patterns of carpets, all looms are power looms. There are about two hundred of these power looms of different sizes and systems. This estimate is the closest obtainable and can not vary more than two or three from the exact figures.

GRADE OF CARPETS MADE.

The principal carpets made are (1) Brussels, (2) velvet carpets (velour), and (3) tapestry carpets. Rugs from smaller sizes up to 4 meters by 4 meters, in these three grades, are also manufactured, as well as carpets and rugs of lower grades. Samples will be forwarded if desired.

EMPLOYÉS.

About five hundred persons, men, women, and children, are employed in this factory of Gebrüder Schoeller in the manufacture of carpets. Gebrüder Schoeller own, in addition to this carpet factory, a cloth man ufactory, which is also located at Düren, under the firm name Leopold Schoeller und Söhne. The spinning of the yarns for the carpets is done in this cloth factory, the dyeing and weaving in the carpet factory. As workmen are employed, therefore, partly in the spinning of carpet material and partly in that of cloth material, it is impossible to fix with entire accuracy the total number engaged in the manufacture of carpets. Five hundred is the closest estimate obtainable.

WAGES.

The wages vary from 6 to 18 marks ($1.43 to $4.28) per week, payable weekly.

HOURS OF LABOR.

The hours of labor are from 6 a. m. to 8 p. m., with intermissions of two hours, as follows: Half an hour between 6 a m. and 12 m., one hour at midday, and half an hour between 1 p. m. and 8 p. m. There

are therefore twelve working hours for six days of the week, excepting Saturday, when work is stopped, as a rule, an hour earlier. It seems hardly necessary to add that no work is done Sunday. All work is done in the factories. There are no persons employed by Gebrüder Schoeller at their homes in the manufacture of carpets.

MANNER OF LIVING.

The manner of living of these employés is simple. During the half-hour intermissions the laborers partake of coffee and bread and butter, brought from their homes. At midday those living near the factory return to their homes for dinner, those living at a distance eating their dinner brought from home in the factory. The dinner consists of soup and vegetables, and occasionally a bit of meat. A few who live in the country and neighboring villages return to their homes but once a week. These sleep also in the factory. The laborers living in the country own for the most part their small homes with garden; those living in the city rent lodgings.

SPINNING, DYEING, ETC.

As stated under answer to question 4, Gebrüder Schoeller own, in addition to the carpet, a cloth manufactory, which is also located in Düren, under the firm name Leopold Schoeller und Söhne. The spinning of the yarn for the carpets is done in the cloth factory, the dyeing and weaving in the carpet factory.

HOW THE PRODUCT IS MARKETED.

The product is placed upon the market direct from the factory, partly through traveling salesmen who receive fixed salaries in addition to their traveling expenses; partly through agents who receive a percentage of the sales. The demand being greater than the supply, the manufacturers are enabled in a measure to choose their customers.

WHERE THE PRODUCT FINDS CONSUMPTION.

The product finds consumption principally at home in Germany, and in Belgium and France. The sales in England are also considerable. Gebrüder Schoeller have exported no carpets to the United States since November 19, 1884, when an invoice amounting to 1,000.90 marks was legalized at this consulate. The usual terms upon which sales are conducted are ninety days, with a discount of 2 per cent. for cash.

Gebrüder Schoeller aim at the greatest secrecy in this carpet manufacture. While the entrance to cloth and most other factories in this district is easy, even for foreign manufacturers, entrance to this carpet factory is strictly forbidden. More than this, the workmen themselves are

separated and watched, so that few of them understand more of the fabrication than comes under their especial charge.

JAMES RUSSELL PARSONS, JR.,
Consul.

UNITED STATES CONSULATE,
Aix la-Chapelle, August 6, 1889.

BARMEN.

REPORT BY CONSUL FALKENBACH.

FACTORIES.

In the United States District of Barmen there are three carpet factories, viz: (1) The Barmen Carpet Factory, formerly Vorwerk Co., Barmen; (2) Engel & Hunsche, Unter-Barmen; (3) Korte & Co., Herford, Westphalia.

LOOMS.

The Barmen Carpet Factory has only power-looms, obtained exclusively from England, the number in operation being from forty to forty-five. Engel & Hunsche have both hand and power looms, but I am not able nor in a position to give any information as to their number, which is likewise the case in regard to Korte & Co.

GRADES OF CARPET MADE.

The Barmen Carpet Factory principally produces piece-goods in rolls (Brussels and Tournay or Wilton) in a width of 68 to 70 centimeters. The factory possesses, in addition, a loom for goods 90 centimeters wide, and several looms in which full-size carpets (130 centimeters—3 yards—wide, and upwards) can be woven. A number of the narrow (68 to 70 centimeters) looms were last year employed in the production of furniture stuffs resembling carpets, which are brought into market partly in running meters, and partly in full sizes. The former is the so-called "Moquette stuff;" the latter are known in the English and American markets as "saddle-bags," and are manufactured in the factory in question in the following sizes: 45 by 45 centimeters, 55 by 58 centimeters, 70 by 70 centimeters, 70 by 135 centimeters (the so-called "divan lengths"), and 90 by 180 centimeters (Daghestans). While the Moquette stuff is only made in one quality, the saddle-bags are produced in two, viz: a fine Moquette quality and a coarse Tournay quality. Notwithstanding the fact that the former is the dearest of the two, it is far more saleable.

Engel & Hunsche do not manufacture many roll goods, and, as far as I could learn, they possess no wide looms. Like the Barmen Carpet Factory, they principally manufacture furniture stuffs, and, in addition,

rugs. Korte & Co. produce cheap woolen carpets in full sizes, with printed designs.

EMPLOYÉS.

The Barmen Carpet Factory employs between one hundred and thirty and one hundred and fifty hands, who are paid according to the nature of their employment or the amount of work done. With a few exceptions the hands in the factory are paid by the piece, and consequently it is very difficult to give information as to the amount they earn.

Carpet weavers earn between 20 and 40 marks per week; the spoolers from 6 to 12 marks, and the girls who examine and darn the goods perhaps even as much. The amount earned depends even too much upon the diligence and the efficiency of the individual hands.

DYEING, SPINNING, ETC.

Connected with the carpet factory are the dye-works; as in this establishment (Barmen Carpet Factory), all such work is generally carried on which is necessary for the manufacture of carpets, etc. The Barmen Carpet Factory dyes the raw yarn, which it imports almost exclusively direct from English spinners; it shears and dresses the warp. The factory likewise has its own steam-spoolers; it steams, shears, and mends the finished manufacture.

HOW THE PRODUCT IS MARKETED.

The finished article is delivered directly to the customer by the Barmen Carpet Factory. Commission agents, and other intermediary persons are, if possible, always avoided. The factory employs its own traveling agents, and, in addition, has agents in the chief commercial centers, who work on commission.

WHERE THE PRODUCT FINDS CONSUMPTION.

The chief market of the Barmen Carpet Factory is Germany, where, in consequence of the protective tariff and the really rare unity among German manufacturers, good prices are obtained. The Barmen factory does an export trade also, though less in carpets than in furniture stuffs. The export of carpets is small, possibly because the factory possesses but few original designs, the majority being copied from those of other manufacturers, particularly of English.

In moquettes and saddlebags, however, this factory possesses many original designs, and exports these furniture goods to England, Holland, Belgium, Denmark, Sweden, Austro-Hungary, Switzerland, and Roumania. Franco delivery is generally not customary in Germany, while to foreign countries it is. The factory allows several per cent. for cash, but seldom gives more than three to four months credit.

JOSEPH FALKENBACH,
Consul.

UNITED STATES CONSULATE,
Barmen, July 24, 1889.

GERA.

REPORT BY CONSULAR AGENT NEUER.

I have the honor to acknowledge the receipt of the Department's circular letter of June 10, ultimo, requesting consular officers in the interest of the carpet manufacturers of our country, to secure statistics concerning that industry in the leading countries of Europe. In compliance with this request I have done my best in order to obtain the desired information, but I am compelled to state that my endeavors in gathering reliable data on the subject in question were attended with great difficulties, the manufacturers refusing to divulge what they call their business secrets. In view of these obstacles many details were obtained from outside parties, and by circuitous routes, and in presenting the following accurate facts, I hope that they may prove of interest to the carpet manufacturers of the United States.

LIST OF FACTORIES.

In conformity with the interrogatories contained in the Department's circular, I begin in giving a list of the factories employed in the production of carpets, together with the proper business address of each, as well as the number of operatives and hand and power looms in each establishment.

Carpet factories in the district of the consular agency at Gera.

Names of the firms.	Place.	No. of operatives.	No. of power looms.	No. of hand looms.
Joh. Fr. Spaethe	Gera	63	41	3
Halpert & Co	Do	55	30	.....
Carl & Portéger	Do	13	8	.....
Hermann Fleck	Do	7	.....	5
Carl Louis Schwalbe	Do	8	.....	5
Hartwig & Poser	Münchenbernsdorf	35	25	.....
C. R. Erdmann	Do	33	22	.....
Krause & Poser	Do	25	7	12
R. Eisenshmidt	Do	16	.....	12
C. E. Schneider	Do	14	.....	10
Häselbarth & Kellner	Weida	60	45	.....
Total		329	178	47

As will be seen from the foregoing table, carpet factories of the proportions of those existing in the United States are unknown in this district. Moreover it will be noted that in Germany it takes comparatively the largest number of operatives to run looms, while in the United States the greatest possible result is derived from the most limited number of operatives.

CONDITION OF THE INDUSTRY.

The condition of the industry under review is according to a recently published report of this city's chamber of commerce considered a satis-

factory one. It is especially a more favorable political outlook and an advance of the prices of raw jute, which have a stimulating influence upon business. As a consequence, yarns of jute forming the main material of the carpets manufactured in this district experienced an upward tendency, and a greater activity is the result. The increased demand is also ascribed to the fact that the jute spinning mills are in the possession of incorporated companies, well provided with capital, and which by agreement manage and regulate the yarn being brought into the market in such quantities and at such prices as to insure good profits. While thus high dividends are paid by these establishments, a complaint being made by the carpet manufacturers is the moderate profit, which however is only justified in so far as the extensive and steadily growing field of competition reduced the former high margin of profit. From a long experience and close observation I can state that the wealth of the manufacturers generally is continually and materially increasing. Besides I am informed on good authority that ordinary carpets yield a profit from 6 to 12, and superior articles from 10 to 15 per cent. which is doubtlessly a fair standard of profit.

GRADES OF CARPETS PRODUCED.

As regards the grades of carpets produced, the inferior qualities form the bulk, and it is stated that only one-fourth of the entire output consists of superior grades. The principal article, and embracing about one-half of the whole production in this region, are so-called "Laeuferstoffe" (stair carpets), a texture of none but jute yarns, and sold in a width from 25 to 35 inches at 35 pfennigs (8½ cents) up to 1.20 marks (29 cents) per meter (39.37 inches). Next to it, and constituting about one-fourth of the entire fabrication, stands a specialty named "Germania," a manufacture composed of jute, cotton, and shoddy, varying from 51 to 79 inches in width and from 57 to 102 inches in length, and selling at from 7 marks ($1.67) to 14 marks ($3.33) a piece. The remainder consists of Brussels, velvets, and tournays, costing, according to size and quality, from about 20 marks ($4.76) to 80 marks ($19.04) per piece. Table-covers, hearth rugs, sofa covers, and shoe findings form also a part of the production, and it is especially the first-named article which finds an extensive and remunerative sale.

The jute yarns entering so largely into the carpets of this district are supplied by two of the leading German spinning mills at Triebes and Meissen. They are spun from No. ½ to No. 7, and, according to a price-list of August 15, ultimo, vary in prices from 47½ marks ($11.30) for No. ½ to ¾ of lowest grade up to 60 marks ($14.28) per 100 kilograms (224 American pounds) for No. 7 of best quality. In case the yarns are twisted an addition is made from 95 cents to $1.42. A discount of 2 per cent. is allowed for cash. Cotton yarns and shoddy are supplied by Saxony and England.

MILL MACHINERY.

The machinery applied in the carpet mills was formerly mostly of English, but is now almost exclusively of German origin. Prominently among the machinery works furnishing same stand the Saxon Machinery Works (formerly Richard Hartman) at Chemnitz. Their power looms are of the latest patterns, and are obtainable in all appliable sizes. Preferentially used by the carpet manufacturers are two looms 70 and 78 inches wide, with wooden Jacquard machines and double-sided five-fold changes of the shuttle, costing 1,245 marks ($296.31) and 1,275 marks ($303.45), respectively. Most of the narrow-power looms for stair-carpets are bought from the Saxon Power Loom Factory (formerly Louis Schönherr) at Chemnitz, at about 500 marks ($119) to 800 marks ($190.40) apiece. Winding machines are extensively supplied by the machinery works of Rudolph Voigt, also at Chemnitz, and vary in prices from 220 marks ($52.36) to 1,070 marks ($254.66), according to the number of spindles and the height of the spools. Hand looms are obtainable from joiners at an expense from 40 marks ($9.52) to 50 marks ($11.90) each.

The rate of wages stands in sad contrast with the earnings of our factory hands. While the standard of wages remain stationary, provisions are constantly rising in prices. Thus food can only be scantily provided by the laboring classes, and the means of their subsistence have to be restricted to the barest necessaries of life. Much of the daily diet of an American workman would be considered a luxury in a German workingman's family.

WAGES AND HOURS OF LABOR.

The following is an exhibit of the weekly wages paid in Gera in the carpet trade at the present time. It is an abstract from the pay-roll of one of the principal establishments, and may be considered as correctly representing the wages paid in all factories:

Weavers of ordinary carpets, hearth-rugs, and shoe findings	$3.33–3.81
Weavers of sofa and table covers	4.04–4.52
Weavers of superior quality of carpets	4.28–4.76
Packers	4.04
Shearers	3.81–4.29
Spoolers, women	1.90
Dressers	3.57
Drawers, men	2.38–2.86
Drawers, women	1.67
Pickers, women	2.38
Carpet cleaners, women	1.67
Overseers	8.93

With the exception of the cleaners all of the foregoing laborers are employed in the factories.

The hours of labor are from 6 o'clock in the morning until 7 o'clock in the evening, excepting thirty minutes for breakfast, an hour and a quarter for dinner, and thirty minutes for vespers.

RENTS AND FOOD PRICES.

In this connection it may be of interest to learn that the lodgings of the factory hands in this city consist mostly of two to three comfortless rooms, for which according to locality a rent from 120 marks ($28.56) to 150 marks ($35.70) has to be paid. Rents are somewhat lower in the neighboring villages, and consequently not a few of the working people are living outside the city in spite of one and even two hours' walk to and from the factory, and of being exposed to the inclemency of snow and cold during winter time.

I give also a statement of the retail prices of some of the necessaries of life at Gera, viz:

	Cents.		Cents.
Rye bread ..... per pound..	3	Rice ..... per pound..	5–10
Wheat flour ..... do....	4	Eggs ..... per dozen..	18–21
Pork ..... do....	20	Butter ..... per pound..	16
Beef ..... do....	16	Milk ..... per liter..	5
Veal ..... do....	15	Sugar ..... per pound..	8½
Mutton ..... do....	15	Coffee, ordinary ..... do.....	34
Bacon ..... do....	24	Beer ..... per liter..	4½–7½
Hams ..... do....	34	Petroleum ..... do....	6
Potatoes ..... per 5 liters..	6		

DYEING.

The leading establishment in the city of Gera is the carpet factory of Joh. Fr. Spaethe. It is one of the few mills in this country in which dyeing and weaving are conducted unitedly, and its products are considered the best in this district. Dyeing, weaving, and spinning form in all other cases separate divisions which are owned by independent interests. Almost all of the jute yarns used are dyed in the nearly situated towns of Weida and München and Cernsdorf, by district dye houses.

The following rates are paid for dyeing, viz: For aniline, green, and red, 3½ cents; for black, one-half to three-fourth cents, and for all other colors, 2½ cents per pound.

HOW THE PRODUCT IS MARKETED.

The product is placed upon the market partly direct from the factories by the factors, and partly through commission agents. Many of the orders in the German market, and also in the neighboring Switzerland are procured by traveling salesmen, while in other countries the article is almost exclusively sold through commission agents, having their seat in the principal commercial centers. Prominent manufacturers have also a branch office in Berlin.

WHERE THE PRODUCT FINDS CONSUMPTION.

Almost all of the manufactures find consumption at home. Only limited quantities are exported to Switzerland, Austria, and Italy.

The system on which sales are effected is generally the credit system, and in most cases three months' time is allowed, whereas cash buyers enjoy an advantage of 2, and in exceptional cases of 5 per. cent.

England is the principal competitor of this country in carpets of lower grades, and it is especially a much cheaper supply of raw material which gives her an insurmountable advantage over Germany.

CHARLES NEUER,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Gera, September 28, 1889.

GREAT BRITAIN.

LEEDS.

REPORT BY CONSUL WIGFALL.

In answer to instructions conveyed by carpet circular from Department of State, dated June 10, 1889, the following abstract is transmitted:

MANUFACTURERS AND MANUFACTURES.

The annexed list contains thirty-four names with business addresses covering the carpet and rug making trade of this immediate district so far as identified. Many of the figures given are derived from the firms themselves, others are approximations, and still others mere estimates.

Style of firm.	Business address.	No. of looms.		Operatives.	Character of products.
		Hand.	Power.		
Prayshay, Dockray & Co.	2 Aire street, Leeds	17	0	25	Kidderminster.
Hotham & Whiting	11 Wellington street, Leeds.	12	0	20	Do.
James Fryer	Fryer's Buildings, Wakefield	21	0	30	Kiddderminster or Scotch.
W. S. Lawson & Co	Millford Place, Leeds	14	28	60	Art squares, ingrains and Dutch.
J. & W. Anty	Anchor Mills, Dewsbury	60	0	100	Art squares, Kidderminster and Dutch.
Chas. Hill & Co	Victoria Mills, Baxley Carr, Dewsbury.	0	8 †4	31	Brussels and Wilton.
Henry Lea & Co	Carlton Road, Dewsbury	18		30	Do.
S. Bates & Son	Watergate, Dewsbury	62		120	Ingrains and Dutch.
R. & M. Hirst	Wellington Road, Dewsbury.	100		150	Ingrains and Dutch. rugs, etc.
James France	do	55	*13	125	Ingrains and Dutch.
E. Tolson & Son	Mill Road, Baxley Carr, Dewsbury.	25		37	Ingrains.
George Wallis	Eastfield Mills, Dewsbury	15		20	Rugs, etc.
Daniel Exley	Watergate, Dewsbury	25		37	Do.
Abraham Grime	102 Kirkstall Road, Leeds.	2	0	2	Cloth rugs.
W. Shaw Singleton	30 Metcalfe street, Leeds	15	0	16	Do.
John Beever	Alfred street, Huddersfield.	45	0	100	Cloth hearth-rugs.
Wright, Blackburn & Co.	Slaithwaite, Huddersfield	40	0	70	Do.
Hirst & Co	Providence Works, Henry street, Huddersfield.	51	0	94	Do.
Alfred Sykes & Co	Viaduct Works, Huddersfield	100	0	250	Do.
S. Denton	Albert street, Lockwood, Huddersfield.	20	0	50	Do.

*Estimated number of power looms for these firms. † Building.

Style of firm.	Business address.	No of looms.		Operatives.	Character of products.
		Hand.	Power.		
M. Gledhill	Townend, Golcar, Huddersfield.	12	0	25	Cloth hearth-rugs.
John Shaw	Crimble, Slaithwaite, Huddersfield	12	0	20	Do.
Edmund Swallaw	20 St. John's Road and Page street, Huddersfield.	125	0	300	Do.
W. Armitage	Crosland Moor Bottom, Huddersfield.	12	0	25	Do.
Huddersfield Hearth-Rug Co.	Brook street, Huddersfield	105	0	200	Jute, and cloth hearth-rugs.
John T. Lord & Co	Bradley street, Huddersfield	12	0	15	Jute and cloth rugs.
Benj'n Thornton & Son	Bankfield Works, Huddersfield.	55	0	108	Cloth and yarn rugs.
Edward Haigh	Milnsbridge, Huddersfield	10	0	20	Cloth and finger hearth-rugs.
William Taylor	Albion street, Huddersfield	42	0	100	Cloth, and beam rugs.
George Walker	Moorfield Works, Leeds	12	0	14	Beam rugs and mats.
Chas. Powell & Co	14 Little Woodhouse street, Leeds.	8	0	10	Beam and fingered rugs.
Joseph Hall	22 Browne's Square, Leeds	1	0	1	List carpets.
W. Mortimer & Co	Craven Mills, Wakefield	3	7	40	Cocoa mattings and mats.
Patent Woolen Cloth Co.	Camp Road, Leeds	No looms.		250	Feltings.
		1,106	60	2,495	

The firms whose names appear above, when working to their full capacity, would give employment to perhaps something like 2,500 operatives in the manufacture of floor coverings of various kinds.

RATES OF WAGES.

Rates of wages in the Dewsbury district are quoted:

Dyers (exclusive of foreman) 23*s.* per week	$5.60
Spinners (exclusive of foreman) 29*s.* per week	7.06
Weavers (exclusive of foreman) 25*s.* per week	6.08
Other hands (exclusive of foreman) 21*s.* per week	5.11

Another estimate (general) for weaving Kidderminsters gives 60 yards per week for a man weaver with hand-loom at 6*d.* (12.6 cents) per running yard (1 yard wide) or the equivalent of 30*s.* ($7.30) a week wages.

Two other estimates coincide for an approximate average of 20*s.* ($4.87) per week, taking the range of all grades.

Another gives 6*s.* to 60*s.* per week ($1.46 to $14.60); while, going into details, the same authority reckons as follows:

Weavers:	
Girls, 10*s*–16*s*	$2.43– $3.89
Men, 24*s*–40*s*	5.84– 9.73
Tuners, 12*s*–45*s*	2.92– 10.95
Dyers, 15*s*–40*s*	3.65– 9.73

Still another quotation is for weaving Brussels, three-quarters wide, $2\frac{1}{8}d.$ to $2\frac{1}{4}d.$ ($4\frac{5}{16}$ to $4\frac{9}{16}$ cents) per running yard by power loom; 10*d.* ($20\frac{1}{4}$ cents) per running yard by hand loom. For weaving Kidderminster, 1 yard wide, 5*d.* to 7*d.* ($10\frac{1}{7}$ to $14\frac{1}{5}$ cents) per running yard on hand loom; and for squares and yard-wide goods on power loom $1\frac{1}{4}d.$ to $1\frac{1}{2}d.$ ($2\frac{1}{2}$ to 3 cents) per square yard.

In rug-making young women weavers working ten and one-half hours per day are said to be able to earn 12*s.* ($2.92) a week by piece-work.

Another return shows, girls, per week, 9*s.* ($2.19); men, piece-work, 2*d.* to 1*s.* (4 to 24⅓ cents) per square foot.

Still another one gives mat-weavers, girls, in full work, 8*s.* to 9*s.* per week ($1.95 to $2.19); rug-weavers, girls, in full work, 12*s.* to 14*s.* per week ($2.92 to $3.41).

HOURS OF LABOR AND MANNER OF LIVING.

Working hours, full time, are about fifty-six per week. The factory acts apply to the carpet and rug manufacture as they do to other industries.

The manner of living among the rug and carpet hands is essentially the same as that of other employés in the textile trade.

There is no cottage work worth speaking of. Practically the entire product is derived from factories, larger or smaller, as the case may be.

DIVISION OF MANUFACTURE.

Dyeing, spinning, weaving, and finishing are conducted unitedly in some instances; but this is by no means universally done. It would be hard to assign a proportion.

From the Dewsbury district, on a total estimated loom force of 385 looms, of which 360 were reckoned as hand-looms and 25 as power-looms, with an allowance of about 650 operatives employed, an estimated apportionment is 10 per cent. weaving only, and 90 per cent. spinning, dyeing, and weaving.

In another district the "weaving only" would be likely to show a larger share proportionately of the work.

HOW MARKETED.

The whole output, or nearly the whole, is sold direct from the manufacturers. Most of it goes to merchants; some, perhaps, to retailers. Commission houses, as such, are scarcely dealt with.

WHERE MARKETED.

The product of the district would seem to be consumed in Great Britain as regards the larger part of it. Some export takes place to the continent, to the colonies, and to the United States. Sales are made, as a rule, on short credits with small discounts—say from cash to one, two, three, or four months, and from 5 per cent. discount to net terms.

OUTPUT.

A cloth rug manufacturer in Leeds with fifteen hand-looms reckons them capable of turning out four thousand rugs per annum, working uninterruptedly through the year. In this establishment women only are

weavers. The looms are perpendicular and a long shuttle (about 27 inches) is used. The warp is of linen manufactured at Leeds. The weft or backing is of jute, and is brought from a distance. The face is composed of cloth tufts fixed in during the process of weaving. The strips of cloth, which make the tufts, are trimmings from the cloth mills, clippings from the cutters' tables in ready-made clothing factories, and waste stuff, perhaps, from still other sources.

It may be added that the refuse from these tuftings goes on to the shoddy mills, where it joins the general collection of cast-off material, and is given a fresh start in the round of usefulness. The Dewsbury-Batley district, which lies just outside the municipal limit of Leeds, was the birth-place and is at the present most prominent center of the shoddy trade.

Rugs of the character spoken of, woven in geometrical designs and showing colors, generally somber, by reason of the preponderance of dark stuffs in the waste cloth employed in making them, are much used in England, and particularly in this district, for kitchens and the smaller houses occupied by the working-classes. The rugs are very thick and heavy, and afford the needed protection from the damp stone pavements, which are so frequently found in basements and on ground floors in cottage dwellings.

PRICE-LISTS.

Annexed details are from price-list of a Huddersfield firm.

Yorkshire cloth hearthrugs.

Weight of these cloth hearthrugs run from 9 to 24 pounds per rug according to size, quality, and make.

Something to tread upon—soft, thick, and comfortable to the feet.

	Description.	Size in inches.	Price.
			s. d.
BB.	First quality, black or brown grounds	60 by 27	4 0
B.	Second quality, dark gray grounds	60 27	3 6
BX.	Third quality, dark gray grounds, not so heavy	60 25	2 9
CC.	First quality, black or brown grounds	66 27	4 6
C.	Second quality, dark gray grounds	66 27	4 0
CX.	Third quality, job cloth, all colors	66 27	3 9
EE.	First quality, black or brown grounds	68 31	5 0
E.	Second quality, dark gray grounds	68 31	4 6
EX.	Third quality, dark gray grounds, not so heavy	68 31	3 11
DD.	First quality, black or brown grounds	72 36	6 9
D.	Second quality, light gray or drab, or self-color grounds	72 34	5 9
DX.	Third quality, dark gray grounds	70 34	4 9
H.	Quality, fancy designs, heavier and fuller	72 36	8 0
J.	Quality, fancy designs, little more pattern and color	72 36	9 0
M.	Quality, new art designs and colors	72 36	10 0
N.	Quality, do., 50 ends more warp in	72 36	11 0
O	Quality, do., more warp, better still	76 36	12 0
FF.	Quality, fancy patterns	66 28	6 0

The following mottoes or words will only be made to order. Any other mottoes suggested will be made when ordered.

No.	Description.	Size in inches.	Price. H.	Price. DD.
			s. d.	s. d.
18	Labour brings pleasure	72 by 36	8 0	6 6
19	Wisdom is happiness	72 36	8 0	6 6
20	Waste not, want not	72 36	8 0	6 6
21	Comfort at home	72 36	8 0	6 6
22	Keep good company	72 36	8 0	6 6
23	Home, sweet home	72 36	8 0	6 6
24	Our own fireside	72 36	8 0	6 6
25	No place like home	72 36	8 0	6 6
26	Our own fireside is the best	72 36	8 0	.....

Any of the above mottoes if done in wool, two colors, 1*s.* 6*d.* each extra, or if letters, all scarlet cloth, 1*s.* extra only.

No.	Description.	Price. BB.	CC.	DD.	EE.	FF.	H.
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
27	Home	4 0	4 6	6 6	5 0	6 0	8 0
28	Peace	4 0	4 6	6 6	5 0	6 0	8 0
29	Comfort	4 0	4 6	6 6	5 0	6 0	8 0
30	Welcome	4 0	4 6	6 6	5 0	6 0	8 0
31	Hope	4 0	4 6	6 6	5 0	6 0	8 0
32	Sobriety	4 0	4 6	6 6	5 0	6 0	8 0
33	Sweet home	4 0	4 6	6 6	5 0	6 0	8 0

Cloth mats in H quality 28 by 14 inches, 18*s.* per dozen.

Worsted heald hearthrugs or mats sold by weight, not by size. Crimson is most in demand and kept in stock, from 15*s.* to 30*s.* each, 1*s.* 4*d.* per pound. Mats, 2*s.* to 10*s.* each, 1*s.* 3*d.* to 1*s.* 8*d.* per pound, according to quality, etc.

Imitation heald hearthrugs, 72 by 30 inches, 5*s.* 11*d.* to 10*s.* 6*d.*

Imitation heald mats, 30 by 12 inches, 15*s.*, 16*s.*, 17*s.*, 18*s.*, 19*s.*, and 20*s.* per dozen.

Cloth hearthrugs made to order any particular pattern, quality, or price. Any kind of mottoes or words can be woven in (to order only).

Terms: Accounts monthly, with 2½ discount; for cash in ten days, 1½ extra.

All accounts are to be remitted direct to the firm. Cheques, money-orders, and postal-orders all to be crossed and made payable to John Sykes, the manager.

No carriage paid.

HUDDERSFIELD HEARTHRUG COMPANY,
Brook Street, Huddersfield.

MANUFACTURE OF FELTINGS.

With regard to the Patent Woolen Cloth Company, whose works are at Elmwood Mills, Camp Road, Leeds, it may be premised that they use no looms at all. Their business is the production of feltings. These are of various kinds, and in this variety is included a number of different sorts of floor coverings, all made of felt. They comprise whole carpets, or rugs, stair carpets, and carpeting by the running yard, but none of the stuffs are woven. All the operations of this

manufacture are conducted under one management. The wool is taken as it comes from the bale and the finished product turned out ready for shipment.

These mills sell their goods direct to distributers without the intervention of commission merchants. Most of their production is consumed in the home market, or else goes to the British Colonies.

They use raw wool of almost every grade, particularly the low grades, including the by-product of the cloth-mills (as noils, waste, etc.), together with tow and perhaps other materials, varying as to the quality of the goods turned out. A brief summary of the process by which the felt carpeting is made may be of interest. Much of the wool used by this company is bought washed, and goes from the bale at once to the willeying machine, where it is opened out and the fibers separated. This process is continued by another machine, termed a "teaser." From the teaser the wool is taken to the cards.

The card-cylinders are made sufficiently long and are set in the machine at right angles to their length, so that the desired width of the future piece is accommodated within the length of the cylinder, and when the material passes from the face of the cylinder it has already assumed the requisite dimension of breadth. Length and thickness remain for further operations.

To these card-cylinders the wool from the teasing-machine is fed through the medium of a trough, which automatically weighs and transfers the wool to the cylinders, distributing the material duly along the carding surface as it does so. The weight of the fabric is thus regulated, due allowance, no doubt, being made for waste and any other incident.

From the first set of cards the material passes to a parallel set, whence it is taken in a thin sheet from the face of the last card-cylinder and is transferred to an arrangement in the nature of a reel, which is in width equal to the length the card-cylinder face, and revolves in the same direction as the cards. The filmy web from the cards is wound upon this reel (called an "accumulator") to the extent of sundry turns, and being then cut from the accumulator it gives a fluffy length comprising several folds, which is eventually to go to the making of a piece of felt carpeting. This length is then wound into a roll of not immoderate tightness, in shape somewhat like a roll of bagging, and it is then termed a bat.

The bats are next placed on a machine, where the web is still further thickened by the superimposition of one layer upon another in a very ingeniously combined direct and indirect acting fashion, which it may be attempted to describe.

The machine is of the same width as the preceding ones; that is to say, sufficiently wide to take the fabric flat.

It has a direct action swinging screen hung above and across its length, wherefrom one web is laid down upon another, while the latter

slowly passes across a bed-place which extends before the screen, the second web moving horizontally as to its own surface and at right angles to the direction in which the screen swings.

As a consequence of these movements the web from the screen is delivered flat upon the second web as the latter unrolls from its place at the side of the machine, and, moving across the bed-place, takes the portions deposited from the screen along with it.

Thence this double web goes underneath a third roll or bat lying parallel to the side of the bed-place, and unwinding in the same direction as that in which the material passing under it goes.

This third web is thus deposited together with and on top of the other two combined, with which it forms a threefold strip of incipient felt.

In the process just described an advantage arises with reference to the next step which is to be taken towards converting the raw wool into a felted fabric. The advantage is derived from the fact that during the process of carding the wool fibers have become aligned more or less regularly in the direction of the length of the band or strip, which, as indicated, comes directly from the surface of the card-cylinders on to the accumulator, whence it is rolled into the bats with which we are now dealing.

As the result, therefore, of depositing a layer from one bat (that from the screen) on the surface of the second unrolling before it, which in turn carries the first with itself beneath the third, and taking up the third becomes one thickness of three folds, we find, since the upper and lower folds have the fibers lying in the direction of their length, while the intermediate fold sets its fibers transversely to the other two, that the separate layers as regards the fibers composing them are arranged in the most convenient manner for furthering the next step, viz., that of felting.

This method of combining the several layers into one web, which is quite automatic, facilitates also the use in order to obtain a cheaper product of material inside the fabric different in character from what is shown on the exterior.

Tow, for example, in some of the lower classes of goods may be employed to make the interior layer, or an inferior grade of wool may be put in for mass and weight, but at much less cost.

At the stage where we have now arrived we have a broad band of carded wool (intermixed material not now reckoned with) which, as we have seen, is composed as follows: First, the thin film from the cards folded several times upon itself by being reeled off the card cylinder face on to the accumulator. Next the material taken from the accumulator and formed into a roll or bat, and of these bats three combined by superimposition, as already explained. So that the thickness of the band of material as it now stands is made up of three layers; each of these layers combines several thinner ones in form as the stuff came from the cards and further the wool fibers in the three final layers are

duly set in counter directions within the body of the web all ready for the felting to take place.

The felting is effected by one of two machines used for the purpose. In one of these machines the surface of the web as it unwinds from the roll which has been formed from the separate bats is passed across a series of small revolving cylinders set close together in the same horizontal plane. These small rollers in revolving slightly engage the lower surface of the web as it goes over them gently subtending the material in the direction of its length, and at the same time by a movement horizontally transverse to the direction in which their own revolution occurs and in which the web also is traveling they combine a slight crosswise oscillating motion with the other. The resultant agitation causes the felting of the fibers.

This latter movement of the rollers is accomplished by means of reciprocating attachments fixed at the ends of the separate rollers, which attachments slide the rollers back and forth in their beds as they revolve, and combining with the rotary motion of the rollers set up an action, half of rubbing, half of shaking, operating on the lower surface of the web, and, as already stated, producing in the body of the web that interlocked condition of the fibers which is known as "felted." Steam is passed through the material during the course of the felting process in in order to facilitate the interlacing of the fibers. This is done with each of the felting machines.

The second felting machine referred to is in the nature of a long flat frame, on and to which four rolls of webs are fed simultaneously. The sheets unwinding from these rolls pass horizontally under a square press, which forms part of the machine and is composed of a number of small panels.

The four sheets go under the press together, but are kept separate from one another by strips of like width of stout linen cloth, which separate them while permitting free action to the press. As this quadruple length of the webs, with the intervening folds of the linen, comes into position underneath the press the machine pauses for a moment, then the plate descends upon the four-ply mass below and proceeds to slowly shake itself down and upon it with a peculiar pulverizing sort of motion which is hard to describe, but which results in converting the previously open-textured substance into closely matted felt. As in the other machine, steam is used in this one, also, in order to expedite the felting. At this stage the mechanical constitution of the fabric may be considered pretty nearly complete.

It has still, however, to be milled. This is done in tubs, or stocks, as they are called, where the long pieces after being soaped are beaten with wooden hammers set in motion by steam-power, and working in some of the tubs perpendicularly, in some horizontally.

The pieces are afterwards washed and are then either dyed or printed or finished plain.

In printing the carpets hand-stamps are used. In this operation the sheet of felt having been spread upon a table the printer impresses the pattern from a wooden stamp covered with pigment and struck with the closed hand or with a mallet. The stamps are about 12 by 14 inches on the face, and the pattern is produced over the whole surface by repeated applications in a continuous succession. Where, as is usually the case, more than one color is required a series of stamps are imployed, a separate stamp for each successive color being used to superimpose its portion of the design over those already impressed upon the fabric, with proper reference, of course, to the combined effect; the method being much like that in use for lithographic printing.

In order to remedy imperfections a workman, after the stamping is done, goes over the surface carefully, and where he finds the color defective supplies the deficiency by the aid of a little trowel and some extra coloring matter.

The stamped surface is then dusted over with sawdust and the pieces hung on screens, which, after being folded into comparatively small compass, are shifted as they stand into a hot-air bath to dry the fabric and fix the colors.

The plain-dyed stuffs are passed through a finishing machine, where a sharp revolving knife trims the surface to smoothness.

Exclusive of the printing department, which is nearly all piece-work, the Patent Woolen Cloth Company employs about two hundred and fifty hands.

Women, fillers or feeders, of whom not many are employed, earn about 9*s*. ($2.19) per week; boys, 8*s*. to 15*s*. ($1.95 to $3.65); willeyers and hardeners, fettlers, etc., including stockers, 18*s*. to 22*s*. or 24*s*. per week ($4.38 to $5.35 or $5.84); foremen, of minor importance, 28*s*. to 30*s*. ($6.81 to $7.30); skilled mechanics are paid according to merit and trade usages, presumably higher rates than those mentioned.

The company consumes about 30,000 to 40,000 pounds of material weekly, which, however, is of very mixed character and indeterminate from week to week in respect of value.

F. H. WIGFALL,
Consul.

UNITED STATES CONSULATE,
Leeds, November 14, 1889.

LEITH.

REPORT BY CONSUL WALLING.

On careful inquiry I find that in my district there are only three carpet manufactories. Their proper business addresses are: Henry Widnell & Co., carpet manufacturers, Lasswade; Henry Widnell & Co., carpet manufacturers, Roslin; Stewart Brothers, carpet manufacturers, Dalkeith.

All these establishments are situated within a few miles of Edinburgh.

I have visited the Lasswade manufactory and had an interview with Messrs. George and John G. Stewart, the sole proprietors of it, and representatives of the firm of Widnell & Co., there and at Roslin. They refused to answer any of the interrogatories contained in the circular or give me any information whatever regarding the manufacture of carpets.

In the course of an interview at Dalkeith with one of the partners of Stewart Brothers, above named, he likewise declined to give me any of the information wanted.

The said Stewart Brothers, of Dalkeith, are sons of Mr. George Stewart, the senior partner in the firm of Widnell & Co., Lasswade, and, apparently, have agreed with them to withhold the information which I have sought from them.

WILLOUGHBY WALLING.
Consul

UNITED STATES CONSULATE.
Leith, August 13, 1889.

TUNSTALL.

REPORT BY CONSUL SCHOENHOF.

[From Consular Reports, No. 95, vol. 27.]

COST OF MANUFACTURING INGRAIN CARPETS IN ENGLAND.

The manufacture of ingrain carpets in England is largely constructed on hand looms yet, and very likely will be continued so for some time to come. The reasons are obvious. The cost of production is nearly the same, and hand-loom weaving offers to the manufacturer the great advantage that he need not sink the greater part of his capital into fixed charges of costly machinery.

My first visit was to a manufacturer who employs about 120 looms, all of which are hand looms belonging to the weavers. The cost of his yarns is 10 pence a pound, or 20 cents all around, dyeing included; a pound and a quarter to the yard, 12½ pence or 25 cents. The cost of manufacturing, including wages and expense, delivered free on board, is 7½ pence or 15 cents. A sum total of net cost of 40 cents. The weaver gets his yarn and delivers the finished carpet, all ready for shipment, without any further charge to the manufacturer. That is to say he does the warping, weaving, and all of what is contained in incidental labor in power weaving, and for the completed delivered work he gets 5 pence or 10 cents a yard. The remaining 5 cents cover what, in our estimate, is contained in incidentals and a small profit charge. He has no loom fixers, winders, spoolers, warpers, etc., to pay, no engineer,

no coal for power, etc. The interest on capital is not heavy, as no great capital is required. The wear and tear percentage is entirely absent, and he can conduct his business free of all risks, frequently the outcome of the ownership of a large plant which has to be provided with work in order to save decay and decline resulting from material and pecuniary shrinkage of idle machinery. The cost of a hand-loom is £13, or $63, while a power-loom, such as used in England, costs £120, or $580. A good hand-loom weaver would turn out about 120 yards of this quality in a fortnight, with earnings of $6 a week. Another manufacturer whom I visited employs both hand and power looms. His firm was pointed out to me by others as the largest makers of ingrain carpets by power. But he also stated to me that most all the ingrain carpet weaving was done on hand-looms yet, and that the largest makers were still making them in this manner. They commenced in 1868 as single workingmen weavers, he and his brother, and had gradually worked up. In 1874 they first began power-loom weaving. They were ridiculed by their fellow manufacturers, who all predicted disaster. Many had tried it before and had failed. Still they persisted and succeeded. In England they used the Murkland loom, the loom in use in America, where they are making room now for the newer and improved ones, Knowles & Crompton's, alluded to before. All of these are American inventions, as power-weaving in ingrains has taken its rise there. Indeed, all the first power machines used in England were of American make. They were, however, soon superseded by English makers, as the American were found too poor—castings being used where hammered iron and steel are employed in the English loom, as my informant stated. That power-weaving has not taken deeper root in England is due to causes partly stated above, and also to the fact that to make power-loom weaving profitable would require a large output with infrequent changes.

The output is not large enough per loom to warrant the introduction of costly machinery. If a girl, these are the words of my informant, earns 12*s*. a week, she is satisfied and can not be brought to work up higher than 15*s*. If she gets above that in times of great pressure, when some work up to £1 and even £1 4*s*., they soon fall back again. If we discharge them and take new ones it would be the same again in a very short time. They lack the ambition to rise above their station. Their present earnings suffice them to maintain that and the mode of living they are used to. Those who go to America go there to make their fortune, and then, of course, they work with a different spirit, as they are there freed from home influences and take up the spirit of their surroundings.

I have expressed this view frequently in reports and otherwise. Its correctness has been questioned in some quarters. It will therefore be of value to have the corroborative opinion of an English manufacturer whose experience and intelligence make him well qualified to judge the subject of comparative productiveness of labor from the English standpoint. He says further "that the English go along in the same way as their fathers. They want no changes. It is the same in Sheffield and

other places." This firm (and many others do the same) is selling its own goods direct to the retail trade. One brother is almost always traveling in England and Scotland, while the other remains at home attending to the business and the factory.

The wages paid for power-loom weaving are 2*d.* farthing, or 4½ cents per yard of this quality. They employ, besides the hand-looms, 26 power looms, with an average in a busy week of 3,000 yards. They employ besides the weavers—

1 loom boss, at 45*s*	$10.80
2 loom-fixers, at 30*s*., or $7.20	14.40
5 spool-winders, at 12*s*., or $2.88	14.40
2 winders, at 12*s*., or $2.88	5.66
2 warpers, at 12*s*., or $2.88	5.66
1 shearer, at 16*s*	3.84
1 twister, at 9*s*	2.16
1 engineer, at 30*s*	7.20
1 cop boy, at 12*s*	2.88
1 card-cutter, at 12*s*	2.88
1 designer, at £5	24.00
Total	93.88

Burling is paid by the piece of 60 yards at 1*s.* 7*d.*, or 38 cents per piece, equal to .636 cents per yard; $93.88 of general labor divided on 3,000 yards is 3.129 cents, and with burling, 3.765 cents against 2.67 cents in America. This is, however, for a larger weekly output than ordinary, and for a week where a lower output would be realized a corresponding higher additional general labor-cost would be the result.

For wear and tear they allow 10 per cent., and in very good years write off as high as 15 per cent. The selling expenses, as they have a good deal of traveling to do, are also higher than in the American cost statement, and amount to from 5 to 6 per cent. of the value of the goods.

The selling price is 2*s.* 2*d.*, or 52 cents a yard.

The cost of the yarns used in goods of this quality is 1*s.* 2⅜*d.* per yard, or 28¾ cents.

J. SCHOENHOF,
Consul.

UNITED STATES CONSULATE,
Tunstall, July 9, 1888.

HOLLAND.

AMSTERDAM.

REPORT BY VICE CONSUL VINKE.

MILLS AND MANUFACTURERS.

There are in all forty-five manufactories engaged in the production of carpets in the Netherlands.

The following list gives the names of the manufacturers and their business addresses:

Smyrna carpets.—Royal Carpet Manufactory, Deventer; Garjeanne & Co., Amersfoort; W. Stevens, Kralingen; Henkelsfeldt, Delft.

Brussels and tapestry carpets.—G. de Wit & Co., Hilversum.

Wool and hair carpets.—W. Andriessen, Nzn., Hilversum; D. Andriessen, Nzn., H. Bylard & Co., J. Bylard, Bromver & van der Heyden, W. Esman, J. Fokker, Hzn., J. S. Fokker, F. Ham, Gebrœders van der Heyden, Gebrœders Jesbers, Firma Kniper, J. Kreuning, G. Mulder, J. Reyn Azn, J. Reyn, Jzn., J. van Rhyn, J. C. Reyn, H. Reyn, Jzn., N. Reyn, Zzn., A. van Rood, W. Reysberman, K. P. Vlaanderen & Zoon, C. Vlaanderen, G. Veen, A. de Wit Wyn, Firma A. de Wit Tymen de Wit & Co., Hilversmusche Wevery, of Hilversum; L. van Wyngaarden & Co., Rhenen; Huberts & Co., Deventer; Firma Trins, Dinxperlo; Hamers & van Beck, Amersfoort; Firma van den Brink, Laren, Noord Holland; Firma van Leer, Amersfoort; Willemans & Co., Delfshaven; Gildemeester & Co., Breda; J. A. Kruisbrink, Amsterdam.

NUMBER OF LOOMS.

The total number of looms is 925, of which 15 only are power looms. The number of looms in each factory varies from 5 to 60.

GRADES OF CARPETS PRODUCED.

There are 40 factories, principally situated in the district of Hilversum, near Amsterdam, engaged in the production of the lower grade, cheap wool or hair carpets.

Four factories, in differents parts of the country, produce imitation Smyrna and Persian carpets; and one factory at Hilversum produces Brussels and tapestry.

WAGES AND HOURS OF LABOR.

The total number of persons employed in the carpet industry is about 2,300; nearly all men and boys. They work ten to eleven hours per working-day, and their wages amount to 10 to 11 florins per week for

weavers, and 2 to 5 florins for boys; mostly in piece-work, which is nearly invariably done at the factory.

The manner of living is very simple and economical, the factories being located in the country districts, where the cost of living is much less than in the towns.

HOW THE INDUSTRY IS CONDUCTED.

The industry is conducted in separate divisions by independent interests.

Few factories spin a portion of the yarns which they use; these materials are principally purchased in the English markets.

HOW THE PRODUCT IS MARKETED.

Sales for home consumption are made direct to the store-keepers by the manufacturers.

The carpet industry of the Netherlands is not an extensive one, principally confining itself to the production of the cheaper and lower grades of wool and cow-hair carpets for home consumption.

The few factories producing imitation Smyrna and Persian carpets, woven in one piece, have a well deserved reputation, both at home and abroad, for the excellence of their manufacture, which commands in some instances very high prices, and their sales for home consumption and export are steadily increasing.

Axminster and velvet carpets are not produced in the Netherlands, and the one factory producing Brussels and tapestry has only been in existence since a few years.

The general condition of this industry in the Netherlands is a flourishing one.

There is a considerable importation of foreign-made carpets, principally from England (Brussels, tapestry, Axminster, and velvet), and to a smaller extent from France (velvet), and from Germany (Brussels, tapestry, and velvet).

WHERE THE PRODUCTS FIND CONSUMPTION.

The lower grades of wool and hair carpets are nearly altogether for the home supply; a small quantity is exported to Denmark. Imitation Smyrna and Persian carpets are also manufactured for the home market, and to a lesser extent for exportation to England, France, Denmark, Belgium, and America.

Brussels and tapestry are produced exclusively for home use.

Sales are generally made for cash with 2 per cent. discount, or at three months without discount.

ALBERT VINKE,
Vice Consul.

UNITED STATES CONSULATE,
Amsterdam, August 29, 1889.

ROTTERDAM.

REPORT BY CONSUL ELLIS.

I can not give the Department any information of value from this district, there being only one carpet work here, that of W. Stevens, at Kralingen, a town adjoining the city of Rotterdam, where Persian carpets are made—rugs and whole carpets—by hand looms, at a high price—about $5.50 a square meter. This work is done by women and girls.

Cocoa matting (rugs and carpets), by power looms, is also manufactured by men and boys.

This information was acquired by me, personally, upon a casual visit to these works. Beyond what I have stated I can give the Department no further information. I had hoped to learn all about these works upon the occasion of the visit of the American Workingmen's Expedition, but all access to the works were denied to them upon my application, and in a very curt way, the proprietor stating that he did not want to have anything to do with our people; that he had learned sometime since of some transactions of a carpet works at Delft, now closed, whose workmen are now employed by him, which influenced him to wish not to deal with us; and he added that he could not see why he should give any information to our workingmen, since the duty on carpets was so high in the United States that he could not send his productions there for sale.

I can learn nothing more, there being no official or trade publication to help me. However, there is nothing of real value to the carpet manufacturers of the United States to be stated about these works. The product is small, and for local sale only, the rugs and carpets being made to order for wealthy people, and cocoa matting to supply the retailers in the ordinary stores of Holland. The general carpets in use and sold here are brought here from England, France, and Belgium, the duty being 5 per cent. I have found the prices charged for these carpets much higher in Rotterdam than in London.

I do not see any reason why good carpets of American manufacture should not be sold here. Indeed, there is a good market in Holland for American goods, generally, and a very friendly feeling here towards our people.

HOWARD ELLIS,
Consul.

UNITED STATES CONSULATE,
Rotterdam, October 14, 1889.

ITALY.

FLORENCE.

REPORT BY VICE-CONSUL BERNARDI.

The only distinct establishment engaged in the manufacture of carpets in this district, worthy of remark, among several very limited mills for the production of mats, is managed by the firm of "Eredi di Luisa Parenti, No. 100, Via Borgo Allegri, Florence, Italy," where are to be found fifty hand looms, applied to comparatively coarse and jute carpets.

About one hundred workmen find wage employment in the manufacture of carpet at the daily rate of from 60 cents to $1 for males and 20 to 60 cents for females for ten hours of labor.

As a rule these workmen are poorly fed and miserably housed, being employed at their homes. Their food may be estimated at 18 cents per diem, consisting of bread, 6 cents; coffee, 1 cent; salted pork, 2 cents; cheese or fruit, 2 cents; flour paste, 3 cents; beans, cabbage and potatoes, 4 cents; wine, 3 cents.

The dyeing and spinning are attended to at Prato (a small town half hour distant by rail from Florence), and the weaving in this city, but conducted unitedly.

The carpets are placed upon the Italian markets only and directly from the factory by the factors, or through bagmen.

SPIRITO BERNARDI,
Vice and Deputy Consul.

UNITED STATES CONSULATE,
Florence, August 9, 1889.

LOMBARDY.

REPORT BY CONSUL CROUCH, OF MILAN.

As far as I can ascertain this industry is of very little importance in Italy. Other than the establishments mentioned below, there are said to be only two or three small manufactories in Turin and in Florence. The carpets sold here come mainly from England and Vienna; a smaller quantity is imported from France, Belgium, and Germany.

Number of mills.—As far as I can learn there are only three mills in this district, viz, Giacomo Giacomini, via Quadrouno 19, Milan; Vedova Galizioli and Figlio Carlo, via Nerino 5, Milan; Galizioli Ernesto.

Number of looms.—Giacomo Giacomini, twenty looms; Vedova Galizioli, ten looms; Galizioli Ernesto, four looms. These are all hand-looms.

Quality of the carpets.—The product of these establishments is an in-

ferior article, a Venetian damask. No other qualities are manufactured.

Number of persons employed.—The number of persons employed is from 80 to 90. They work twelve hours a day and receive from three to five lire=58 to 96½ cents.

Dyeing, spinning, weaving.—In these establishments only the weaving is done. The dyeing and spinning are conducted by others quite independently of the carpet manufactories.

Placing the product on the market.—The product is sold directly here in Milan, for the most part. Giacomini has also a traveling agent for Italy.

Exportation.—The products of these establishments are not exported.

In this connection I may mention, as of interest for carpet manufacturers, the fact that a considerable exportation of Italian hemp carpet yarn from this district has sprung up in the last two years, the amount realizing $92,594.52 for the year ending June 30, 1888, and $83,687.58 for the year ending June 30, 1889.

HENRY C. CROUCH,
Consul.

UNITED STATES CONSULATE,
Milan, August 8, 1889.

ROME.

REPORT BY VICE-CONSUL-GENERAL WOOD.

MILLS AND LOOMS.

There is only one factory or establishment engaged in the manufacture of carpets in this province. The proper address is, G. Canestrelli, carpet manufacturer, via Garibaldi, Rome, Italy.

It has twenty-five hand looms. No power looms are used.

GRADE OF CARPETS.

It manufactures exclusively Kidderminster piece carpets, of which it produces about 218,724 yards per year.

WORKERS AND WAGES.

Sixty persons find wage employment in the above mentioned establishment—ten men and fifty women. They are all paid by the job or piece. The daily rates of wages earned are from 58 to 97 cents for men, and from 49 to 58 cents for women.

They all work from eight to ten hours per day and lead a laborious life.

The cost of living to these persons is said to nearly, if not entirely, absorb their wages.

No work is done outside the factory.

DYEING, WARPING, AND WEAVING.

Dyeing, warping, and weaving are united interests, all carried on by the same manufacturer, and are all done within the establishment. The yarn, however, is all imported already spun.

HOW THE PRODUCT IS MARKETED.

The product is by the manufacturer turned over to the firm of F. & A. Cagiate, 249 to 254, via del Corso, of this city. This firm contracts to take the entire product. No commission agents are employed.

WHERE THE PRODUCT FINDS CONSUMPTION.

Two-thirds of the product is consumed in the province of Rome, and the remainder in other parts of Italy. There is no exportation.

IMPORTS AND EXPORTS OF CARPETS.

In connection with this subject it may be interesting to know the foreign commerce in carpets relating to the province of Rome and also to the entire Kingdom. The most recent statistics show that this trade in 1886 and 1887 was as follows:

Description.	Imports.		Exports.	
	1886.	1887.	1886.	1887.
Province of Rome:	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Carpets of woolen waste, shoddy, etc	762	1,025	.....	.....
Carpets and blankets of wool, etc	126,571	136,795	.....	.....
Kingdom of Italy:				
Carpets of woolen waste, shoddy, etc	44,320	63,063	22,711	18,522
Carpets and blankets of wool, etc	856,422	898,317	36,382	54,022

In explanation of the comparative unimportance of the carpet industry in Italy, it is well to remember that, with the exception of certain northern parts of the Kingdom, all houses are built with flooring of tiles, stone, or mosaic; and that this flooring, owing to traditions and climatic reasons, is generally left uncovered.

CHARLES M. WOOD,
Vice-Consul-General.

CONSULATE-GENERAL OF THE UNITED STATES,
Rome, August 24, 1889.

SWITZERLAND.

REPORT BY CONSUL-GENERAL WASHBURN, OF BERNE.

In answer to your circular of June 10, 1889, I have instituted careful inquiry into the subject of carpet manufacture in Switzerland. The result is well expressed in a letter on the subject from the "Union Suisse du Commerce et de l'Industrie," whose headquarters are at Zurich, of which the following is a free translation:

Your honored communication of the 28th ultimo has led us to make inquiries which enable us to state that carpet manufacturing is not carried on in Switzerland. Nevertheless, some years ago attempts were made in the neighborhood of St. Galle to introduce the industry of carpet-weaving, but with no permanent result. In any case, any efforts in this direction which may still exist are not worth naming.

JOHN D. WASHBURN,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Berne, July 9, 1889.

TURKEY IN ASIA.

ASIA MINOR.

REPORT BY CONSUL EMMET, OF SMYRNA.

Factories.—There are no factories, mills, or distinct establishments properly so-called in the districts of Asia Minor where carpets are woven.

Looms.—Nearly every house at Ushak, Ghiordes, and Coula has a loom; some have even two or three. These belong to the owners of the houses themselves. The weavers are all women and girls. The mistress of the house superintends the work of her daughters, or hired journeywomen and apprentices. The looms are of wood, roughly fashioned. A vertical or slightly inclined frame supports two horizontal rollers about five feet apart; the warp divided into two sets of strands by leashes fastened to a horizontal pole is wound around the upper roller and the ends secured to the lower one, from which the work is begun, and on which the carpet is rolled in the process of manufacture.

The weavers kneel or sit cross-legged to their work side by side, each taking about two feet of carpet width. The tufts that form the pile and pattern are tied to the warp in rows, and the woof is passed over with the hand after every row without the help of a shuttle; the pile and woof being then driven together or beaten down with a heavy wooden comb, and the tufts clipped smooth with shears of native make.

Above the weavers are suspended the bobbins of colored yarn from

which the pile tufts are cut. There are now from 800 to 900 looms at Ushak, all worked by private owners in the court-yards or main room of their houses.

At Ghiordes the number of looms is estimated to be about 300; at Coula, to be about 200.

GRADES OF CARPETS PRODUCED.

The proportion at Ushak is 70 per cent. fully of carpets to 30 per cent. of rugs and mats. The carpets vary in size from 12 feet by 9 feet to 50 feet by 25 feet, and in a few exceptional instances more. For a very large carpet, exceeding the last-mentioned dimension, a special loom would have to be constructed.

The mats and rugs vary in size from 2 feet 9 inches by 1 foot 6 inches, to 11 feet by 8 feet.

At Ghiordes it is estimated that the manufacture of carpets and rugs is about the same as at Ushak, while at Coula the proportion of mats and rugs is much larger, and it would not be an overestimate to say that 80 per cent. of rugs and mats to 20 per cent. of carpets is the correct output of that section. The bulk of the looms at Coula are not wider than 5 to 7 feet.

LABOR AND WAGES.

At Ushak, the number employed in the manufacture of carpets and rugs, including the dyers, is from 5,000 to 6,000. At Ghiordes and and Coula the number varies from 1,500 to 2,000 hands each. Forty-four rows of pile are considered an average day's work, for which an ordinary weaver gets about 8 to 10 cents a day. Hours of labor from seven to eight per day, according to the season of the year. The weavers live in the most frugal manner; a meal consisting of bread, cheese, and a raw onion, is considered a good one. The number of hands at work varies according to the season, as many work in the fields in summer and manufacture carpets in winter.

CONDITION OF THE INDUSTRY.

At Ushak the dyeing, save in rare instances, is no longer performed by the weavers themselves, as in former times, but is carried on by a separate class (of men). Spinning is carried on by elderly women at odd moments, when not occupied with their household duties. The yarn is loosely spun, so as to allow the fibers to mix slightly together in the pattern and present a blended appearance. The washing of the wool is performed by men in the streams and combed and spun by women.

The bulk of the wool is spun in the outlying villages of Ushak, etc.

At Ghiordes the division of labor is similar to that of Ushak, while at Coula the spinning and dyeing is usually done by the weavers themselves.

MARKETING THE PRODUCTS.

The carpet merchants in Smyrna have native agents at Ushak, Ghiordes, and Coula, who act as intermediaries between said merchants and the owners of the looms. These native agents are paid a commission varying from 3 to 4 per cent., and their duties consist in superintending the carpets while in process of manufacture and accepting and delivering the same when completed.

Advances are usually made to the owners of the looms, but total payment is not effected until the carpet is taken from the loom and measured. The price is fixed per Turkish arsheen or pike of 26⅝ inches square.

WHERE THE PRODUCTS FIND CONSUMPTION.

The bulk of the carpets and rugs made in the interior are for export and a very small portion of the whole remain in the country.

Ushak turns out about 300,000 arsheens or pikes of carpets and rugs per annum. Ghiordes and Demardjik about 65,000 pikes; Coula 20,000 pikes.

England imports about two-thirds of the whole product.

America ranks next in importance, then France and Austria, and lastly, Germany and Italy.

The Smyrna carpet dealers are either the special agents of the European consuming firms, and as such charge a commission varying from 3 to 5 per cent., or else they submit firm offers free on board at Smyrna, which would include such remuneration as they are able to secure for themselves.

The prices are regulated per arsheen or pike of 26⅝ inches square—about 5 square feet.

W. C. EMMET,
Consul.

UNITED STATES CONSULATE,
Smyrna, November 22, 1889.

SIVAS.

REPORT BY CONSUL JEWETT.

Owing to the want of any system of collecting statistics by the government or otherwise, it is impossible to give any very definite replies to the questions asked as to the number of establishments, looms, and persons employed in the manufacture of carpets.

The carpets and rugs manufactured in this are, of course, only those known as Turkish. They are entirely of wool. The industry is carried on by families in their own houses. There are no factories. It is impossible to say how many persons are employed. In almost every vil-

lage there are a number of families who make carpets. Hand-looms only are used. Most of the work is done by women and young girls. There is no system of rate of wages or hours of labor. The manner of living is the same as with all others of the laboring classes. Their food consists largely of rice and crushed wheat with meat (mutton) at rarest intervals. Three to four piasters (14 to 19 cents) is considered a good day's wages. Cost of living probably does not exceed 12 cents per day.

The dyeing, spinning, weaving, etc., are all conducted unitedly, the women of each family engaged in the business doing all the work from the spinning of the yarn by hand, dyeing it with vegetable dyes, to the weaving and completion of the carpet. The carpets seldom exceed 8 by 4 feet in size.

The product is sold usually at home, being placed on the market by the makers going from house to house, or by sending the carpets to Constantinople to be sold in the bazaars.

There has recently been started in this city by two or three families the manufacture of a new style of carpet which is quite remarkable for the beauty and novelty of the patterns and the excellence of the finish. The prices asked for these are higher than has been usual, and average about 32 cents per square foot.

It may be observed here that the common people invest their savings in carpets as the people of other countries do in savings-banks, handing them down from father to son, and selling one when hard pressed for money, so that one is often surprised to find in the poorest of houses a collection of very valuable rugs.

H. M. JEWETT,
Consul.

UNITED STATES CONSULATE,
Sivas, July 22, 1889.

SYRIA.

REPORT BY CONSUL BISSINGER, OF BEIRUT.

The carpet industry in Syria is still in a most primitive state, as will be observed from the following responses to the several interrogatories:

I.—NUMBER OF MILLS, ETC.

There are no manufactories or establishments in the sense that these words are understood in industrial centers. Carpets are exclusively made by peasant women and girls, residing in villages located within the political subdivisions known as "Hakkar," "Hossu," "Safita," and "Hazzoor," in the Mutessarrifiate of Tripoli, Syria.

The most important of these villages—about a dozen in number—is doubtless that of Haidamoor, about 30 miles east of Tripoli, which

seems to excel all others in the quality, durability, and design of the carpets it produces.

There is also a good quality of rugs made in a village called Fakeh or Fiki, which are marketed at from $8 to $20 per piece. Fakeh is distant about 25 miles from Baalbek, and politically belongs to the district of the same name in the Vilayet of Syria.

II.—LOOMS, ETC.

Power looms do not exist in Syria, and, although it has not been possible to ascertain the precise number of "hand" looms, it may be approximately stated as 350 in all. They are of the simplest construction, and are thus described by eye-witnesses:

Small pegs to which yarns of desired colors are attached are driven close together into the ground. The yarn is carried along the ground the required length and fastened to a corresponding row of pegs. Beginning at the left hand the threads are separated with a strip of board of various widths, generally, however, about 4 inches, which permits the tossing of a ball of the woof; no shuttles are used, a simple ball of yarn replacing them. This board is then advanced about a foot and turned on its flat side, the operator taking a coarse wooden comb to bring the woof together, a rather long and tedious process. One operator can scarcely make more than 3 or 4 inches of carpet per diem; but if exceptionally skillful, may succeed in accomplishing 6 inches. To make the average-sized carpet, for instance, of 3 pics or $2\frac{1}{4}$ yards long by 2 pics, $1\frac{1}{2}$ yards wide, would consume at least six weeks of continuous or uninterrupted work, which is not possible, as the operator is a woman who has domestic duties to perform, besides devoting much time to field labor, such as sowing, reaping, etc., at certain seasons of the year.

Every loom has a female attendant or worker, who is sometimes assisted by a young girl, and the carpet industry in Syria is exclusively in the hands of women.

Most of the rugs are made with a small square of some decided color, generally blue upon a black ground, placed in a very conspicuous place, intended to ward off the "evil eye."

III.—GRADES OF CARPETS.

All the carpets produced in Syria are made of "pure" wool of the ordinary quality grown in the country.

IV.—NUMBER OF PERSONS EMPLOYED, ETC.

The number of persons engaged in the carpet-making in the Tripoli district is problematical, but probably does not exceed 500. As there are no factories, and every woman works on her own account, no wages are received or paid; the assistant, if more than one person is engaged upon a single loom, generally being the child of the operator, as has

been seen in Answer II. These women do not and can not devote their entire time and attention to the carpet industry, and they are therefore not very efficient in this handicraft.

V.—DYEING, SPINNING, WEAVING, ETC.

Cleaning the wool, dyeing, spinning, and weaving it is the exclusive work of women, conducted separately and by independent interests.

VI.—HOW THE PRODUCT IS MARKETED.

Fairs are periodically held in "Calaat-el-Hosson," *i. e.*, "Hosson-el-Akrad," notably on "St. George's feast" (April 23), on the "feast of the cross" (September 14), in the convent of St. George, and in the convent of St. Elijah at Safita, where merchants from Tripoli, Homs, and Hamath gather to make purchases. To these fairs the husbands, brothers, or other relatives of the women operators bring their rugs, where they are readily disposed of at prices much below those that are usually asked of brokers, who sometimes travel to the villages where they are made expecting to secure bargains. As has already been said, the rugs that come from the village of Haidamoor are superior to all others, and command much better prices, sometimes as much as 25 per cent. If carpets or rugs of a special size are desired they must be made to order. The square pic—three-quarters of a yard—is worth from 50 to 60 piasters ($2.20 to $2.64) if made at Haidamoor, and 40 to 50 piasters ($1.76 to $2.20) for those coming from other villages. These rates, of course, are subject to changes, according to design, cost, and quantity of wool used, etc. This latter is about $9\frac{1}{2}$ rottles, or 19 okes ($53\frac{1}{5}$ pounds; 1 oke $= 2\frac{4}{5}$ pounds) for a carpet 3 pics ($2\frac{1}{4}$ yards) long and 2 pics ($1\frac{1}{2}$ yards) wide.

VII.—WHERE THE PRODUCTS FIND CONSUMPTION.

Unless picked up by tourists in their voyages along the coast, these rugs are exclusively marketed in Turkey by merchants from Tripoli, Homs, and Hamath.

HISTORY OF CARPET-MAKING IN SYRIA.

Early in this century a number of people from the vicinity of Broussa emigrated to the Tripoli and Hamath Mutessarrifiates, in Syria. These people were familiar with the art of making rugs and introduced this industry into the various villages in which they settled. The village of Haidamoor became especially celebrated for its rugs, and many specimens remain to testify to the beauty of design and color. Strange as it may appear, however, the present inhabitants of this village, who are the largest producers of carpets in that vicinity, have entirely lost the original designs and coloring introduced by their Turkish ancestors.

The rugs made to-day are of very inferior designs as compared with the ancient ones; the prevailing colors are usually red and black, varied occasionally crimson and black, with black or dark brown figures at both ends.

In one village, distant about 10 miles from Haidamocr, the colors which predominate are red and green with white borders, having white circles about 2 inches in diameter with either red or green centers.

A rude sort of carpet is the specialty of another village; it is from 20 to 30 feet long and 4 feet wide, made in stripes about 2 inches wide of brown color, alternating with a dingy yellow, black, and a dirty white, the white and black being the natural colors of the wool.

The deterioration in design may perhaps be due to the fact that the rug-makers use no pattern to guide them, depending entirely upon memory, often treacherous; and being a simple, uneducated people, they have gradually but irretrievably lost the original art.

Until quite recently a beautiful rug of a brown or velvety black was manufactured, but is no longer to be seen; the color with which to dye the wool was obtained by digging shallow holes in winter streams. In the spring or summer, when the streams were dry, the peasants removed the earth collected therein, which, after repeated washings, produced a beautiful and indelible pigment. The custom has now utterly fallen in disuse, because cheap coloring matter can be secured from France, which has of course greatly deteriorated the quality, beauty, and durability of the rugs and lessened their commercial value correspondingly.

Blue, green, red, old gold, orange, and other colors were formerly extracted from roots, leaves, and barks of trees in the most primitive manner, but the introduction of cheap foreign dye-stuffs have now completely superseded them.

Rugs vary in size from 2 feet square to 3 feet wide by 12 feet long.

E. BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, September 18, 1889.

[Inclosure in Consul Bissinger's Report.]

CARPET WEAVING BY THE NOMADS.

Report prepared by Consul Bissinger from material furnished by Commercial Agent Poche, of Aleppo.

Carpets are made to some extent in the valley of Amouk by the Rihanlis, a semi-nomadic tribe, a fraction of the great family of Turcomans, who also are engaged in the weaving of this article in the country surrounding Marash, Behesne, and Adiyemen.

The carpet industry is not known at all at Aleppo, nor in any of the towns of the Aleppo vilayet.

Nowhere among these semi-nomadic tribes do there exist any workshops, or any regularly organized systems of carpet making, but it is still performed in the most primitive manner, and exclusively by women, who, after shearing the sheep belonging to their families, select the quantity of wool which they consider necessary, and after thoroughly cleaning, washing and combing the same, spin it with the distaff, and dye it the various colors required.

The looms which these women make use of are formed of two wooden cross-bars, separated by two smaller parallel ones. It is upon this rude scaffolding, placed perpendicularly, that the warp is put, while the operation of weaving is by means of a ball of woof without the aid of a shuttle.

To give statistics respecting the quantity of carpets thus produced would be impossible, as nothing can determine, with any degree approaching precision, a production which follows the producers thereof in their wanderings about the country looking after pastures for their sheep and work for their camels. This is also the reason why these carpets are sold throughout Asia Minor, now here, now there, by persons who follow these tribes in their peregrinations and purchase their product from them, which is not known to be exported.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, September 18, 1889.

PERSIA.

REPORT BY CONSUL-GENERAL BENJAMIN, OF TEHERAN.

[From Consular Reports, No. 42, Vol. 13.]

PERSIAN CARPETS AND RUGS.

I have the honor to submit herewith some remarks upon the carpet manufacture and trade of Persia, which forms one of the most important features of its industries and commerce.

It is doubtless generally known that the Persian carpets and rugs are not in the ordinary sense of the term manufactured; that is, they are not produced by any regular and complicated machinery, such as is capable of repeating the same design *ad libitum*. The weaving of these fabrics rather suggest large needlework, in which the worker, conscious of his innate sense of the beautiful, allows a lively fancy to guide the ready fingers, and is satisfied with irregularities in the detail sometimes, provided the general effect is agreeable and artistic.

The carpets of Persia are rarely of large size, and they are woven chiefly by the women and children of the peasantry in the villages. A countryman will thus have a rug made in his own house, and when it is done he takes it to the neighboring city and sells it for what he can get after long bargaining. The rooms of the peasantry are small, and this doubtless has something to do with regulating the size of most of the rugs in the Persian market. But a large house in Manchester, which has several branch houses in Persia, has entered so largely into

the practice of ordering carpets for the foreign market that for several years the average size of Persian carpets exported to Europe has been larger than the sizes preferred by Persians. This firm has not only paid 2 or 3 kraus more than the usual price a square yard, but it has established the practice of making advances to the workmen. This has enabled the latter to efect special rooms of large size, where carpets can be made especially suited for European buyers. The volume of the trade is doubtless increased by the course adopted by this house, while it may be questioned whether the special qualities of design instinctively followed by the exquisite æsthetic perceptions of the Persians may not lose a certain spontaneity and beauty which constitutes the most prominent features of all Persian work of originality and merit. Most of the carpets made for this house are made in the province of Irak, and especially in the city of Sultanabad, but the carpets of Persia are woven in almost every province of the empire. At the same time there has gradually grown up a system or classification in the making of these fabrics which is quite remarkable, when one considers that they are manufactured without concerted action or the aid of capital, excepting, of course, the above-mentioned practice of advances.

The carpet industry of Persia is divisible into three leading classes, the large-sized and the small carpets or rugs and the ghilems, to which may be added a fourth, consisting of the umads or felt carpets. Most of the carpets intended for covering floors, of whatever size, are produced in the central province of Irak, and chiefly at the city of Sultanabad, and in the districts of Sarravend and Garrouste and Malahir. These carpets go by the generic term pharaghan. They are more solid and massive than other Persian carpets, capable for long use and fitted for apartments of size. For ten years past these pharaghan fabrics have been exported in large and increasing quantities. Large Persian carpets which deviate from the usual oblong shape are made to order and cost 3 to 4 kraus a square yard above the average expense. This is partly owing to the increased difficulties of weaving such dimensions with the simple appliances in use and the size of the rooms in the houses of the peasantry.

Besides the pharaghan carpets, floors are also carpeted sometimes with fabrics from Kerwanshab, Hawadan, and the district of Lauristan. Also for this purpose the carpets of Mech-Kabad, in Khorassen, are available, although of inferior texture to the pharaghan. The carpets of Kerwan have also the texture fitted to the rough usage required in covering floors; but while perhaps of superior quality to the pharaghan, they are always small and proportionately more expensive.

The Persian carpet par excellence is the rug. The Persians use these in preference to large sizes. First covering the earth floor with a hasseer or matting of split reeds, they lay over it numerous rugs, which completely conceal the mat. This arrangement, when composed of

rugs of harmonious designs, is very rich, while the cost is actually less than if one large carpet were employed instead.

The varieties or distinct classes of Persian rugs are numerous. In some classes, like the Turkowan, there is general similarity of design, although no two rugs are altogether identical. But in other classes, such as the rugs of Kerwan, Dyochegan, or Kurdistan, there is endless variety in design and texture.

A point to be considered in this connection is the fact that while the small carpets of Persia go under the general designation of rugs it would be a serious mistake to consider them all as merely carpets of small size intended to be trod on by heavy shoes. In the first place, Persians when at home take off their shoes, and thus a carpet of fine, delicate woof and design will last for ages and actually improve with use such as this. In the second place, a large proportion of the rugs of Persia, and especially the finer grades, are never intended to be laid on the floor, but to cover divans or tables, or to hang as tapestries and portieres.

This explains the extreme fineness of texture and velvety surface which many of these rugs display, and also accounts for the fringe at the ends. Some of the rugs of Kerwan are almost as fine as cashmere shawls. The designs of these rugs were formerly of a large pattern with a general ground of red, white, or some other uniform tint, with borders and details of minute tracery harmonizing with rather than disturbing the general effect. These patterns are unquestionably of higher artistic importance, exhibiting a quality designated by artists as breadth.

At present, while there is apparently no difference in texture, there is an evident tendency towards smaller designs, which lose much of the effect unless seen with close inspection. Perhaps this is only the result of a reaction from long-established custom, and it must be conceded that the modern designs of Persian rugs are more popular with the average European and American buyer.

The colors formerly employed in the rugs of Persia were imperishable. Rugs one hundred years old show no deterioration in tint, but rather a softness such as old paintings assume. The introduction of aniline dyes at one time threatened to ruin the manufacture of textile fabrics in Persia, but the law against the employment of aniline dyes enacted by the Persian Government is enforced with some rigor. The Turkoman rugs, in some respects unsurpassed for texture and peculiar beauty of design, are unfortunately not made within the Shah's dominions, but over the border, although they are included among the classes of Persian rugs, because the Turkomans were until recently subject to Persia. The Turkoman carpet weavers show a serious disposition to use aniline dyes, as the prevailing color of the Turkoman rugs is red. This is especially to be deplored. The fraud, for it can be hardly called by a lesser term in connection with elegant fabrics,

can be detected when the eye is in doubt by the application of a wet cloth to the suspected tint.

There is one species of rug which appears to be peculiar to this region in the texture, which suggests knitted rather than woven work. This species of rug is called ghileem. The pattern is identical on both sides, allowing the use of either side, which practically doubles the use. Many of these ghileems are made in the province of Kurdistan. The colors are at once firm and brilliant and the designs often of extraordinary beauty. The lightness and flexibility of these carpets qualify them for portieres, table and sofa covers, and at the same time render them easy for transportation. In consequence large quantities have been exported and found favor in Europe. The ghileems of Shûster are preferable for portieres. Considering their beauty their cost is comparatively moderate. The Garrouste ghileems are well suited for curtain hangings. Those of Lauristan and Zerend, near Teheran, are preferable for carpetings, while the ghileems of Kermanshah excel perhaps for the originality and beauty of their patterns.

The namâds or felt carpets of Persia, although produced by a process which perhaps excludes them from the list of strictly textile fabrics, may yet properly be considered in this report. The namâd is made by forming a frame of the thickness intended or excavating a place in the ground floor of the size and depth equivalent to the namâd intended. The hair is laid in this and beaten with mallets until the original disjointed mass has obtained cohesion and is reduced to the dimensions of the frame. A design of colored threads is beaten into the upper surface, sometimes quite effective. The namâd, however, is desirable less for its beauty than the complete sense of comfort which it affords. It is much thicker than other carpets, and the sensation to the tread is luxurious. No carpet has ever been manufactured that is more suitable for the comfort of a sleeping-room in winter. Of course there is a difference in the quality of these namâds, but the dearest are far cheaper than the same surface of carpets or rugs woven in the usual style. The great weight and clumsiness of the namâds must unfortunately prevent their exportation to any extent until the means of transport are improved. The best quality of namâd is made at Isfahân, but the most massive are produced at Yezd. One would imagine that the size of the namâd must necessarily be limited. But on the contrary the regular Persian carpets rarely equal and never exceed the dimensions of some namâds. The namâd is more often than the carpets intended to cover an entire floor, elegant rugs being laid over it in places. I have seen a namâd 75 feet long by nearly 40 feet wide in one piece.

There is one species of rug special to Persia often spoken of but rarely seen. I refer to the rugs made of silk. It is not uncommon to see rugs of the finer types with silken fringes and sometimes with a woof of silk in the body of the rug. But all silk rugs are rare, and rarer now than formerly. They are generally small and intended for luxury rather than

use. The price is necessarily very high. The chief of the merchants of Teheran told me of one he had seen over a tomb; it was barely two square yards in size; but he said that 200 tomans or $360 would be a low price for it.

Regarding the ruling prices of Persian carpets it is impossible to give more than approximate estimates. Such matters as standard values hardly exist in Persia. The individuality of each rug adds to the difficulty. Goods are sold for what they will bring. One day a merchant sells an article at a loss; the next day, perhaps, a lucky customer will give him a handsome profit for a similar article. He averages the profit and loss, and, if shrewd, by the end of the year manages to have the balance in his favor. But small profits are the rule, and such a thing as a fixed price is utterly unheard of.

Members of old or prominent families are often obliged to realize on carpets or embroideries or other articles, which are both rare and costly. They intrust these articles to a dellâb or peddler to sell on commission. In such cases articles worth 100 tomans are often sold for 30 to 40 tomans. As a large part of the trade in the cities is done by the dellâs this naturally has a tendency to keep down prices.

The carpets ordered and sold by the Ziegler Company follow more uniform rates; but in all other cases it is impossible to affirm that one can ascertain more than the probable market value of Persian carpets and rugs in Persia. It may be stated, however, that a buyer experienced in Oriental ways can purchase good rugs in Persia at such rates as to leave a fair margin for good profits in America over and above the cost, transportation and duties included.

The European demand for old Persian carpets has so far fallen off as to leave but a poor market for those which are much worn or decayed. But there seems to be an increasing demand on the part of connoisseurs and amateurs for the better grades of well preserved antique rugs of Persia. Their artistic qualities are so undeniable that they must always be in fashion for almost every class of household decoration, while their texture and durability well suits them to impart an air of comfort to interiors.

S. G. W. BENJAMIN,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Teheran, April 29, 1884.

EGYPT.

REPORT BY CONSUL-GENERAL SCHUYLER, OF CAIRO.

There is little to be said about the carpet trade of Egypt. In certain parts of the country a few carpets of coarse quality are still made in private houses. A few years ago there existed a manufactory in Boulak, one of the suburbs of Cairo, but this has been closed.

Cairo is still one of the headquarters for the sale of carpets, Eastern make, whether imported here for the purpose of catching the eye of the traveler, or whether coming from stores already accumulated, or the possessions of rich houses.

In the year 1888 there were imported into Egypt 24,546 carpets and rugs, worth $110,485, of which 21,802, worth $107,055, came from Algeria, Morocco, India, Persia, and Turkey; the small remainder from Europe. In 1888 there were also imported 186,580 yards of carpeting, worth $76,685, chiefly from England.

In the same year there were exported from Egypt 1,020 carpets and rugs, worth $8,065, and there were re-exported 6,377 rugs and carpets, worth $25,600.

EUGENE SCHUYLER,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Cairo, October 19, 1889.

BRITISH INDIA.

REPORT BY CONSUL-GENERAL BONHAM, OF CALCUTTA.

There are no mills or factories proper in British India where carpets are manufactured as in Europe, and the only industry of that kind in this country is carried on by the natives with the aid of very rude and primitive hand looms, which have been in vogue from time immemorial.

Some very fine rugs and center pieces are manufactured in this way in different parts of India, some small consignments of which are occasionally shipped to the United States.

It is really wonderful that such fine work can be produced with such simple appliances; but the *modus operandi* is more like knitting or crochet work than weaving, and serves to illustrate the patience and artistic skill of these peculiar people.

B. F. BONHAM,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Calcutta, July 26, 1889.

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MALT AND BEER

IN

SPANISH AMERICA.

REPORTS FROM THE CONSULS OF THE UNITED STATES ON THE TRADE IN MALT AND BEER IN THEIR SEVERAL DISTRICTS, IN ANSWER TO A CIRCULAR FROM THE DEPARTMENT OF STATE.

ISSUED FROM THE BUREAU OF STATISTICS, DEPARTMENT OF STATE.

ALL REQUESTS FOR THESE REPORTS SHOULD BE ADDRESSED TO THE SECRETARY OF STATE.

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MALT AND BEER CIRCULAR.

DEPARTMENT OF STATE,
Washington, December 15, 1889.

To the Consular Officers of the United States in Mexico, Central and South America, and the West Indies:

GENTLEMEN: Some of the leading maltsters and brewers of the United States have requested the Department to procure information relative to the malt and beer trade in your respective districts.

The information desired covers such points as the following:

1. The imports of malt, and whence imported; duties charged thereon; cost of same per bushel, whether imported or locally prepared, etc.
2. The imports of beer, and whence imported; in bottles or wood, and duties charged thereon; kinds of beer most suitable for local consumption; details concerning prices, wholesale and retail, of foreign and domestic beer, etc.
3. How imported malt and beer are placed upon the market, etc.

The motive of this circular being the enlargement of American trade you will not confine yourselves to the above interrogatories, which are to a large degree suggestive only, but will give as much information as possible concerning every phase of the malt and beer business, so that the maltsters and brewers of the United States may fully understand the requirements necessary to successful trade in each district.

All foreign weights, measures, and money should be stated in American equivalents.

I am, gentlemen, your obedient servant,

WILLIAM F. WHARTON,
Assistant Secretary.

MALT AND BEER IN SPANISH AMERICA.

MEXICO.

REPORT BY CONSUL-GENERAL SUTTON OF NUEVO LAREDO.

MALT.

The imports of malt into Mexico are small and unimportant; nor is it likely that they can be greatly increased under present conditions. I have only been able to identify small importations at Matamoros and here. They are so small and unimportant that they are not specially quoted in the Mexican tariff, and it is not certain that the article called malt is the same at different custom-houses. At Matamoros the so-called import of malt is stated at about 500 bushels per annum, used only by bakers and druggists, and paying duty at the rate of 5 cents per kilogram. At this port what is called malt, that is, barley prepared for making beer, is classed under fecula, and dutiable at 10 cents per kilogram. The imports of fecula of all materials for the six months ending December 31, 1884, the last date published where this article is stated separately, amounted to 4,307 kilograms; United States gold, invoice values, $656; Mexican plaza value in Mexican silver dollars, $1,369; on which $517 duties were paid in Mexican coin.

The special reason why there is not likely to be any increase in the import of malt is because barley is extensively grown, comparatively speaking, in most parts of Mexico. As the local cost of this grain is usually low, it will be cheaper to use the home product than to import. One or two importations of malt made through here sometime since were understood to be for making high-priced English beer in the City of Mexico. As I have been unable to find any recent shipments it was probably not a profitable business.

BEER.

The total imports of beer and cider in bottles for the half year ending December 31, 1884, were as follows:

	Quantity.	Invoice value.*	Plaza values.†	Duties paid.†
All countries:	*Kilos.*			
In bottles	292,701	$89,732	$175,192	$58,540
In barrels	37,863	6,164	11,799	3,786
Total	330,564	95,896	186,991	62,326
From the United States:				
In bottles	143,201	45,448	87,723	28,640
In barrels	36,738	5,914	11,362	3,674
Total	179,939	51,362	99,085	32,314
From Germany:				
In bottles	84,650	26,361	51,199	16,930
In barrels	1,125	250	438	113
Total	85,775	26,611	51,637	17,043
Great Britain:				
In bottles	50,956	14,688	29,214	10,119

* In United States money. † In Mexican money.

These are the latest dates given in Mexican statistics, by which the details of imports as above can be stated. It will be seen that even as far back as that date we sent more than 50 per cent. of all the beer, and our volume and proportion have steadily increased each year since.

For the year ending June 30, 1888, the imports from the United States are stated at—

	Quantity.	Value.
	Kilos.	
Bottles	1,068,266	$232,860
Barrels	160,791	21,191
Total	1,229,057	254,051

For this last date I am not able to give imports from any other country nor am I able to say certainly whether the money stated is in United States gold invoice values or Mexican plaza values.

The import duties on beer are as follows:

Beer or cider:		*Cents.*
In bottles (net weight)	kilo..	20
In barrels (net weight)	do..	10

No allowance for breakage or leakage.

Additional: Liquor tax, 8 per cent. on import duty, and 2 per cent. tax additional on gross for harbor improvements, and 2 per cent. on gross for stamps.

From this it will be seen that the import duties on beer in bottles are very high, about 75 per cent. of the frontier price, and as a result the importation is not large. In the United States and in Europe the larger part of the consumption of beer is by the poor or moderately

well-to-do classes. In Mexico the contrary is true so far as regards foreign beers. Good beer may not cost quite as much here as champagne, but it is nevertheless an aristocratic drink. It will be noted that the great bulk of importation is in bottles. As the import duty on beer imported in bottles is twice that of beer in barrels, it would seem at first sight as though the greater imports would be at the lesser rate. The contrary, however, is the case, and the reasons are more or less as follows:

Beer is not generally used in Mexico. There are several breweries in principal cities, but only one or two of these produce what judges call a good article. As the various beverages made from the maguey (agua miel, pulque, mescal, etc.,) are so cheap and well liked by the great mass of the people but little native beer is used, except in a few cities. The Europeans resident in the country, as also our own countrymen, and such Mexicans as prefer beer, demand a better article than the native beers. They may use less because of the expense, but insist on a good quality. Many of these beer-drinkers use it at meals and on the road and prefer it in bottles. It is more difficult to sell a glass of beer for 15 cents than to sell a pint bottle for 31 cents. This latter is the lowest rate a decent beer can be retailed at in the interior, and anything above this quality sells for 37½ cents for a pint bottle.

In bottles, especially pints, it can be more handily carried on journeys and kept fresh for use as needed. So far as I am aware there are only a few places in all Mexico where beer is kept on draught. I have stated that it might be sold in the interior at from 31 cents to 37½ cents in Mexican money for pint bottles. To show the expenses which bring the cost to this amount I give the items:

One barrel of 10 dozen pints will cost from $8 to $8.50 in St. Louis, Chicago, or Milwaukee. Freight to the border is about $2 more, or, say, $10 United States coin at the frontier. There are small costs for brokerage, permits, etc., from 5 cents to 10 cents per barrel, according to amount of shipment. Ten dollars United States coin may be stated at $13 Mexican coin. On this barrel the duties are 20 cents per kilogram net, without allowance for breakage and by custom-house weights this barrel is held to weigh net, 44 to 45 kilograms, causing a duty of, say, $9. Add to this 8 per cent. on the duty as a liquor tax and two additional duties of 2 per cent., and the total duties are brought up to about $9.75. The freight from here to San Luis Potosí is about $1.70 per barrel, so that the total cost there would be, in round numbers, nearly $25 Mexican coin. One hundred and twenty pint bottles for $25 would be about 21 cents each. The small loss by breakage, with unenumerated incidental charges, may fairly run the price up to 23 cents per pint. Some beer costs more than the $8, and prices and expenses vary so that, speaking generally, the retail price is from 25 cents to 37½ cents for good beer. The figures I have given above are generally for car-load lots. Lesser shipments would usually cost considerably more.

The United States allows a rebate of 37 cents a barrel on beer exported in bond, which, while not a great deal, is still a slight advantage. It tends to encourage purchases from the United States, and if the import duty were lower, would be still more of an encouragement than now.

The consumption of beer is greatest along the United States frontier and in the principal cities. As I have before stated, the national drinks of pulque and mescal are so cheap and so well liked that while the duty on beer is so high the latter loses its standing as a universal and becomes an aristocratic beverage. If the duties were reduced one-half, we could easily send in a million dollars' worth of our beers each year. Even as it is we are gaining steadily, although slowly, and in doing so not only serve an increasing demand from new disciples of Gambrinus, but also displace a limited amount of the abominably cheap wines imported from Europe.

The kinds most suited for sale here are those made by the Schlitz and Anheuser Busch companies of Milwaukee and St. Louis, although there are many other kinds which have very good acceptation. In some places the Pilsener is well liked.

The large German population in Mexico, of course, prefer the beers of their own country, such as Weiner, Münchener, Hofbrau, etc., while considerable quantities of the cheaper grades, Elbschloss, Loewendran, and Stettin, have been imported. Alsop's and Bass' ale are the favorite drinks in this line of the English-speaking Europeans and, in addition to this, a fine and cheap, but rather thin, Swedish beer is much liked by some.

The cheaper grades of European beers are losing ground here, and we are gaining in all except the highest grades.

While the import duty is nearly or quite 90 per cent. of the invoice cost we can not hope to rapidly increase our trade. Our dealers might perhaps secure the privilege, by concessions, of holding beer in kegs in bonded cold storage, but the limited sales, cost of ice and freight transport in refrigerator cars would, at present at least, rather overbalance the saving in duties.

WARNER P. SUTTON,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Nuevo Laredo, February 6, 1890.

LA PAZ.

REPORT BY CONSUL VIOSCA.

MALT.

There being no breweries in this district, there are consequently no importations of malt made, nor is there any locally prepared. The import duties on same are 10 cents per kilogram, or 5 cents per pound net weight.

BEER.

Beer is imported in this district entirely in pint or quart bottles, the weather being too warm to admit of its being kept in barrels. Generally light beer imported from the United States has the most acceptance, principally from St. Louis and California, although English ale and German beer are also imported in small quantities. Black beer, or porter, has no demand whatever, and all attempts to introduce it in this market have failed.

The yearly importations amount to about 2,500 barrels or more of bottled beer, containing each ten dozen pint or five dozen quart bottles, and it would be safe to state that four-fifths of this amount is American beer. Milwaukee beer is also imported, but at a little higher expense.

The import duties on bottled beer are 20 cents per kilogram, or 10 cents per pound net weight—that is the liquid only; but no allowance is made for breakage.

The following will show the relative cost per barrel, say of St. Louis, Mo., beer in bottles:

Description.	Mexican coin.	United States coin.
Cost per wholesale for one barrel	$16.82	$12.74
Do., expense to San Francisco	.67	.51
Freight from San Francisco per steamer	2.64	2.00
Lighterage and drayage	.25	.19
Duties	9.37	7.09
Total	29.75	22.53

The wholesale prices for which it sells here range from $34 to $35 per barrel of ten dozen pints or five dozen quart bottles in Mexican coin, its equivalent being at present 74 cents in American coin. The retail price is $7.50 in Mexican coin per dozen quarts and 75 cents for single quarts.

Inferior or false German brands from different parts sell for about 20 per cent. less than any of the genuine brands.

There are at present no agencies for breweries in this country, and perhaps such means at the command of consumers would naturally favor the American trade.

JAS. VIOSCA,
Consul.

UNITED STATES CONSULATE,
La Paz, March 18, 1890.

MATAMOROS.

REPORT BY VICE-CONSUL VALLS.

MALT.

The imports of malt in this consular district are insignificant, scarcely averaging five hundred bushels annually. It is imported from New Orleans and Galveston. Its use here is confined to bakers and druggists.

The Mexican duty on malt is 5 cents per kilogram. The cost of imported malt in this market is now $1.35, United States currency, per bushel.

BEER.

The imports of beer in this district amount yearly to 1,400 barrels (of ten dozen pints each); of this amount 1,200 barrels come from Milwaukee and 200 from St. Louis. Beer is imported here solely in pint bottles, and the kind most suited for local consumption is the lager beer, known as Pilsener. Shipments are always made in car-load lots, and in bond to obtain the drawback of 37 cents per barrel conceded by the United States Government.

The following are the details concerning prices, duties, expenses, and cost:

Cost in Milwaukee of 1 barrel beer (10 dozen pints) $8 to $8.50		$8.50
Freight by rail from Milwaukee to New Orleans (car-load rates)		.86
Freight per Morgan Steam-ship Line from New Orleans to Brownsville, Tex		1.28
Drayage and ferriage from Brownsville to Matamoros, Mexico		.08
Custom-house entries and broker, Brownsville and Matamoros		.09
(The Mexican Custom-house considers the net weight of one barrel beer—10 dozen pints—as 44 kilograms; duties, 20 cents per kilogram, $8.80.)*		
The Zona libre duty is 3 per centum on $8.80	$0.2640	
The stamp duty is 8 per centum on $8.80	.7040	
	0.9680	
Nine thousand six hundred and eighty ten-thousandths Mexican coin at 75 cents		.73
Cost of one barrel beer in Matamoros (United States currency)		11.54

The American beers have entirely superseded the foreign article. During the past eight years not a bottle of foreign beer has been sold in this market.

Beer is now sold at $16.50, Mexican coin, per barrel; equivalent to $12.38, United States currency.

JOHN F. VALLS,
Vice-Consul.

UNITED STATES CONSULATE,
Matamoros, January 24, 1890.

* Matamoros is in the Zona libre, consequently the beer imported thereinto does not pay this $8.80 per barrel duty.—*Note by Department.*

PASO DEL NORTE.

REPORT BY CONSUL SAMPSON.

MALT.

There is very little malt imported into this district, and but little prepared locally.

BEER.

The imports of beer are from St. Louis and Milwaukee, about 75 per cent., and German beer about 25 per cent. It is imported mostly in bottles, barrels, or boxes, a small per cent. in kegs.

Duties charged: $11.62 (United States currency) per case of six dozen quarts; $9.77 on ten dozen pints; $3.25 per quarter barrel. Prices wholesale, $13 per cask of six dozen bottles. Retail price, 25 cents a bottle.

No domestic; all foreign (United States or German).

A. J. SAMPSON,
Consul.

UNITED STATES CONSULATE,
Paso del Norte, February 20, 1890.

PIEDRAS NEGRAS.

REPORT BY CONSUL FECHÈT.

MALT.

No malt is imported in this consular district, and none locally prepared, and consequently there is no data to determine the cost of malt per bushel.

BEER.

Beer is largely imported from the United States and Germany. Beer from the United States is shipped in kegs and in bottles, quarts and pints, packed in barrels.

German beer is packed in cases or boxes containing two dozen quart bottles.

Import duties are as follows: "In bottles, without allowance for breakage or leakage, net weight, 30 cents per kilogram. In barrels (kegs), without allowance for leakage, 20 cents per kilogram." A light beer is best suited for local consumption.

There are no domestic breweries in this consular district.

United States and German beers retail at same price; quart and pint bottles retail at 50 cents and 25 cents, Mexican silver. Keg beer is sold at 10 cents per glass.

German beers are placed upon this market by direct orders from Mexican commercial houses (generally German).

American beers shipped in bottles follow same course.

In shipping keg beer, refrigerator cars for transporting the beer, and storage rooms or beer warehouses at convenient distributing points are required. At Eagle Pass, several beer warehouses have been established by United States breweries from the East; these warehouses are supplied with ice for cold storage from the local ice factory.

St. Louis, Chicago, and Milwaukee ship beer to this market.

The total value of beer of United States origin arriving at this port, in bond, for fiscal year ending June 30, 1889, is $27,928.40, United States currency.

The consumption of beer is largely increasing in Mexico, and markedly so in the northern States of the Republic.

In the southern portions of Mexico pulque is a universal beverage, and its cheapness will prevent its replacement by beer as the drink of the poorer classes.

In the northern States there is no pulque, and the only native or local drink is the fiery mescal. Foreign beers, in the absence of pulque, supply the need for a mild drink or beverage.

The Mexican people quickly acquire the beer-drinking habit. The only bar to consumption is the cost; beer, to be consumed in large quantities, should be cheap.

The import duties of from 20 cents to 30 cents per kilogram are very high.

EUGENE O. FECHÉT,
Consul.

UNITED STATES CONSULATE,
Piedras Negras, January 30, 1890.

SALTILLO.

REPORT BY CONSUL WOESSNER.

BEER.

Complying with the instructions in the Department's circular of December 15, 1889, I have endeavored to give such facts as I hope may be found useful to the business men of our country who are seeking to extend their trade with a people whom, I believe, are ready to meet them at least half way. The beer imported into my district is of American make, and comes from Milwaukee, St. Louis, New York, New Orleans, and San Antonio, and is of a good quality. It comes in pint bottles, ten dozen in a cask, and usually sells at $28 to $30 per cask, Mexican money (American exchange is worth at present about 32 per cent. premium). The pint bottles formerly retailed at 37½ cents each,

but, on account of competition, have been reduced to 31 cents each, the present price. There is but little beer manufactured here, and this sells at 12 cents per pint bottle, but it can not in any way compare or compete with the American beer, which is of a superior quality. There is not much beer consumed at present in Saltillo, but there is no doubt that if it could be sold cheaper a much larger quantity would be consumed. To secure this result, of course, the import duties must be largely reduced, also the freight rate from Laredo, Tex., on the line of the Mexican National Railway.

The import duty on beer in bottles, without allowance for breakage, or leakage, net weight is 20 cents per kilogram (about $2\frac{1}{5}$ pounds.) In barrels 10 cents per kilogram payable at the port on the frontier where the goods enter this country and on entering this city there is an additional $7\frac{1}{2}$ per cent. to pay on the amount of this duty as an introduction tax, which is figured in this way:

Supposing amount of duties on a lot of beer to be	$200
5 per cent. to the city on $200	$10
20 per cent. school, on $10	2
25 per cent. federal, on $12	3
Total	$15

seven and one-half per cent. on amount of import duties. Beer is generally sold here by wholesale through the agency of established houses and retailed in "cantinas" (saloons), hotels, and grocery stores.

JOHN WOESSNER,
Consul.

UNITED STATES CONSULATE,
Saltillo, Mexico, February 12, 1890.

SONORA.

REPORT BY CONSUL SMITH, OF NOGALES.

MALT.

I have the honor to inclose herewith a statement of beer imported into Mexico from the United States through this port during the year 1889, and to state that neither this consulate nor the Mexican consulate at Nogales, A. T., show any importations of malt, and I am informed that there is no beer manufactured in Sonora.

BEER.

The kind of beer most suitable for local consumption seems to be bottled beer manufactured at St. Louis, Mo. The retail prices are, quarts, 50 cents per bottle, or three bottles for $1, and $12\frac{1}{2}$ cents per glass. The wholesale price per barrel of six dozen quarts ranges from

$18 to $20 per barrel. These selling prices are in Mexican dollars; one dollar equals 73$\frac{9}{10}$ cents American.

Imported beer is placed upon the market in Sonora through actual purchase.

Statement showing the quantities, value, etc., of malt and beer imported from the United States into Nogales during the year 1889.

Whence.	Bottled beer.			United States value.	Per kilo.*	Remarks.
	Cases.	*Barrels.*	*Casks.*		*Cents.*	
Milwaukee	275	232	82	$3,703.45	20	In bottles, net weight.
St. Louis	2,450	130	596	20,446.85	20	Do.
Total	2,725	362	678	24,150.30		

* 1 kilo equals 2$\frac{1}{2}$ pounds.

No malt imported into Sonora, Mexico, in 1889.

DELOS H. SMITH,
Consul.

UNITED STATES CONSULATE,
Nogales, February 3, 1890.

TUXPAN.

REPORT BY CONSUL LRAYTON.

MALT.

I am unable to give any information respecting malt, as the article is not used in this country, that is to say in my consular district. There are no breweries at this place.

BEER.

Beer is imported from the United States only, and as we are in communication with New York and New Orleans, these ports supply the market. The duties on beer in bottles of any size, are 20 cents per kilogram net weight, and for beer in kegs 10 cents per kilogram net weight. The duties are charged on invoiced quantities, no reduction being made for leakage or breakage. No beer in kegs is imported, as it will not keep in this climate, and there being no ice, such trials as have been made to bring it in the above packages have proven failures and abandoned. With very few exceptions the Anheuser-Busch Brewing Company supply this market. The importation amounts yearly to about 500 barrels of bottled beer in pints, or 5,000 dozen, as each package contains 10 dozen pints. Wholesale price in this market is $20 per barrel, and retail per pint bottle, 25 cents, both being in American money.

JOHN DRAYTON,
Consul.

UNITED STATES CONSULATE,
Tuxpan, February 7, 1890.

CENTRAL AMERICA.

COSTA RICA.

REPORT BY CONSUL MACKAY, OF SAN JOSÉ.

MALT.

During the year 1888 the value of malt imported into Costa Rica was $1,088.66 United States currency. A small proportion of this amount was imported from Europe, but the larger part was brought from the United States, principally from San Francisco.

The duty charged upon malt is 2 cents per kilogram in Costa Rica currency, which is usually at a discount of .50 on United States gold.

This malt is usually imported already prepared for use.

Malt can be placed here, duties, freight, etc., paid for $1.65 United, States currency, per bushel.

BEER.

The value of beer imported into Costa Rica in 1888 was $51,031.33 United States currency, the greater part of which came from Germany, although a fair proportion of beer is introduced from the United States.

All beer is imported in bottles. The duty on beer in bottles or kegs is 7 cents per kilogram, Costa Rican currency. The darker and sweeter beers are, I believe, preferred.

Beer is imported in pint bottles, that being found the most salable form. Foreign beer is sold here at from 40 cents to 50 cents per pint coin of the country), and native beer is sold at 10 cents per pint.

I am informed by an importer that the expense of importing beer—duties, freights, commissions, exchange, etc.,—amounts to 300 per cent of the original cost.

Beer is imported here by wholesale dealers, who sell to the retailers, by whom it is placed on the market.

Malt is imported almost wholly by the three breweries of the country, two of which are here, and the other in Cartago.

The consumption of foreign beer is entirely confined to the wealthier classes.

BECKFORD MACKEY,
Consul.

UNITED STATES CONSULATE,
San José, Costa Rica, March 3, 1890.

HONDURAS.

REPORT BY CONSULAR AGENT SEYMOUR, OF PUERTO CORTEZ.

MALT.

There is no malt manufactured or imported into this country, as there are no breweries to consume same; the duties chargeable on same, however, according to the custom-house regulations, is $3.24 per 100 pounds.

BEER.

The beer imported into this district, *i. e.*, through Puerto Cortez, during the fiscal year ending June 30, 1889, amounted to about 5,000 dozen pints. There is no beer imported into this country in the wood.

The duty on one dozen pints of beer in bottles amounts to 60 cents, American money.

Beer by the barrel, *i. e.*, of ten dozen pints, wholesales in this port for from $15 to $17, United States coin.

The importation is increasing yearly, the United States furnishing about one-half, Germany one-third, and English stout and ale perhaps covering the other one-sixth.

German beer by my own personal observation as a merchant will keep better in this climate than any of our American brands, being better corked and with a heavier tin-foil cover over the cork, which, besides being attractive, seems to keep ants and wood lice from eating out the cork, of which they are very fond, and thereby destroying the contents.

The German salso pack their goods in cases, which are more easily handled, and the breakage thereby is *nil*.

The American exporters could improve even on the Germans by packing their products in cases of 100 pounds each.

Goods intended for the interior of this country have to be transported from the coast on mule-back, and as 200 pounds is considered a cargo, it is manifest that two boxes of 100 pounds each would be taken in preference of one of double its weight or a barrel of 250 pounds, which must be repacked here into smaller cases.

The subject of the packing of goods for export from the United States to this country is pertinent to all branches of business, and one of the greatest complaints about American manufactured goods is that "they are not packed to suit."

HENRY SEYMOUR,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Puerto Cortez, February 25, 1890.

NICARAGUA.

MANAGUA.

REPORT BY CONSUL WILLS.

I have to make the following estimated statement, derived from the most reliable sources, in the absence of statistics, of which there are none kept. Each merchant is charged with his gross weight of duties. Much expense and time would be required to overlook each merchant's account at the custom-houses, to ascertain correctly the quantity of beer each imported. All the merchants are importers of beer.

MALT.

There is not a brewery in Nicaragua, consequently malt is not imported or locally prepared.

BEER.

Beer is imported from the United States and Germany only. The imports from the United States are estimated at 1,200 barrels of ten dozen half bottles each, costing from 90 cents to $1.10 a dozen. The gross weight per barrel is 240 pounds; duty, 2 cents per gross pound; making $4.80 per barrel (gold $3.40); per dozen, 48 cents, (gold 34⅓ cents). The imports from Germany are estimated at 5,000 cases of six dozen half bottles each, costing from 75 cents to $1.10 a dozen. The gross weight per case is 160 pounds; duty, 2 cents, making $3.20 per case (gold $2.30); per dozen 53 cents (gold 38 cents).

American beer is proportionately lighter in barrels than the German in cases, consequently the duty is less. Freights are less from Germany than the United States, and the advantage of exchange is in favor of Germany; exchange on Hamburg at sight is 35½ per cent; on New York and San Francisco is 42 per cent. The prices of beer range about the same in both countries—from 75 cents to $1.10 per dozen for export beer, which is the only kind imported, and only in bottles. American beer is sold by the barrel at $27 to $30 (gold $19.28 to $21.42); by the bottle at cantinas (bars) 40 cents (gold 28 cents). German beer is sold by the case at $16 to $18 (gold $11.42 to $12.57), and by the bottle the same as American beer. It is generally preferred in the smaller quantities by families; therefore the German has it in that respect.

I have known some lots of poor beer sent from San Francisco, which gave the American beer a set back.

CHAS. H. WILLS,
Consul.

UNITED STATES CONSULATE,
Managua, February 21, 1890.
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SALVADOR.

REPORT BY CONSUL TUNSTALL, OF SAN SALVADOR.

In volume No. 107, August, 1889, of "Reports of the consuls of the United States," in which is published my annual report of the commerce and industries of Salvador, the fact is stated, under the head "Industrial," there are no breweries, and I have simply to reiterate the statement, as none have been established since the date of that report, and there has been no importation or local preparation of malt in this district.

The department of this Government whose province is the preparation and publication of an annual statement of the imports and exports has not yet issued its report for the year 1889.

I therefore avail myself of the annual report of the preceding year to submit the following tables in reference to the beer trade of Salvador; and additional information derived from other reliable sources enables me to present further interesting details on the subject.

In the year 1888 were imported from—

	Pesos.
Germany, 2,779 boxes, 6 dozen in each	15,737.18
United States, 1,495 barrels, 10 dozen in each	10,271.23
England, 1,031 packages (contents unknown)	5,071.52
Total value	31,079.93

By a discount of 30 per cent. we arrive at the real valuation of these importations in American gold, leaving the net sum of $21,755.96. The foregoing figures demonstrate the fact that Germany does about 50 per cent. of the beer trade, and in the future is likely to control a larger percentage of it, as the importation of English and American beers are sensibly on the decrease, while German beers are growing into favor from day to day. All these beers are imported in pint bottles packed in barrels and boxes and not in bulk.

The tariff is 5 cents per kilogram on the gross weight of the package, and there is a local or municipal duty of 4½ cents per kilogram, making in the aggregate 9½ cents in Central American currency and a duty of about 6¼ cents in our coin on every bottle of beer consumed in this country. The German beer is branded "Spaten bier, Hamburg;" wholesaled at $4 per dozen and retailed at 50 cents per bottle. There are several brands of American beer imported, as follows: Anheuser-Busch Brewing Company, St. Louis, sold at $4 per dozen, retailed at 50 cents per bottle; Fredericksburg Brewing Company, San José, Cal., sold at $3.50 per dozen, retailed at 37½ cents per bottle; Boca Brewing Company, San Francisco, Cal., sold at $3.50 per dozen, retailed at 37½ cents per bottle. A discount of 30 per cent. must be applied to these prices to reduce them to the American standard.

The foregoing facts and particulars of the beer trade of Salvador,

ascertained after diligent inquiry and patient investigation, I respectfully submit to the Department, believing they convey the information sought for by its circular of December 15, 1889.

T. T. TUNSTALL,
Consul.

UNITED STATES CONSULATE,
San Salvador, February 22, 1890.

SOUTH AMERICA.

ARGENTINE REPUBLIC.

REPORT BY CONSUL BAKER, OF BUENOS AYRES.

I am in receipt of the circular of the Department of State, requesting information in reference to the malt and beer business of the Argentine Republic, with a view to its bearing upon the American trade.

THE ARGENTINES NOT ORIGINALLY BEER-DRINKERS.

In reply, I may premise that the Argentines, like the people of the United States, were not primitively drinkers of beer, but have acquired the beer habit rather through their associations with the people of the Old World. Indeed, until within comparatively recent years, they have been noted for their proclivities in favor of wine; and, aside from what the country produced, the quantities, especially of the light table wines, yearly imported from France, Spain, and Italy have been one of the marvels of the Buenos Ayres custom-house.

RECENT CHANGE IN THE DRINKING CUSTOMS.

With the advent, however, of European and especially German immigrants, a change in the drinking habits of the people has been gradually effected, and Argentines now-a-days call for their "schoppe" and drink it with genuine Teutonic *gusto*. Whereas ten or fifteen years ago the importations of malt liquors were so insignificant as to attract no attention, now they figure for quite an item in the custom-house returns. As for manufacturing malts or beers in any systematic or scientific way, until recently they possessed neither the requisite knowledge nor produced the necessary materials. Now, however, breweries of large capacity and the most approved appliances are to be found in different parts of the country.

PRIMITIVE BEERS OF THE COUNTRY.

I do not mean, of course, that heretofore no fermented liquors were made in this country, nor that the natives confined their potations exclusively to wines. Beer-drinking and beer-making, such indeed as

it was, in the Argentine Republic has a history which dates back before the Spanish conquest.

"CHICHA" AND "ALOJA."

From time immemorial, long before the landing of the Spaniards in South America, the native Indians fermented and brewed a beer from maize or Indian corn, which in some parts of the country was called *chicha* and in others *aloja*. In the western portions of Bolivia, and in the provinces of Salta, Jujuy, and Santiago del Estero, this beer is still manufactured, and has a grand reputation with the natives and half-breeds, however repugnant may be its mode of preparation, since spittle or saliva is one of the most important ingredients. The maize, after having been coarsely masticated or chewed, is spit out into a large kettle or boiler, which is filled with water and placed on the fire. A thick skum rises to the top; then, after several hours of boiling, it is taken off and left to ferment. In about forty-eight hours the liquor is decanted and placed in a jar, where it continues to ferment lightly. In this state it is somewhat thick and cloudy, and a sort of yellow oil floats on the top; but at the end of another two days the *chicha* is ready for use. Its taste is rather *winey*, a little sweet, and on the whole not disagreeable. It will intoxicate if too freely taken. Another method consists, where they have the facilities, of breaking the corn in a mortar and then placing it in a kettle, completing the operation as in the former case. While this method is decidedly more cleanly, the product is much more unpleasant to the taste, and the other is greatly preferred by amateurs. In the province of Tucuman they put the maize in the bottom of a jar, pour boiling water over it, and then leave it to ferment. It is called *aloja*, and is very refreshing.

"ALGORROBA" BEER.

In the provinces of Rioja, Santiago del Estero, Cordoba, and Tucuman, beer is likewise made from the fruits of the *Algorroba*, the *Molle*, and the *Chañar* trees. It is prepared by infusing the fruits, sometimes in cold but more frequently in boiling water, and waiting until the alcoholic principle begins to develop itself. The beer thus fabricated is of moderate strength; but its taste, though very satisfactory to those who live in the far interior, is sufficiently repugnant to a traveler. All these *chichas* are very much used by the natives of the country during the fruit season, constituting in those remote regions, in many cases, the principal beverage on festival occasions.

IMPORTATIONS OF BARLEY AND MALT.

In regard to the ordinary malt beers of commerce, it is now some years since establishments for their preparation first began to be operated in this city. They are now also to be found in Montevideo, Ro-

sario, Cordoba, Gualaguichu and other centers of population in the Argentine Republic. In former years these breweries had to depend almost entirely upon foreign countries for the barley they required; but, with the progress of agriculture, no inconsiderable amount of that indispensable grain is now raised here at home. It is evident, however, that not enough is yet produced to meet the demand, as the custom-house returns still show large importations, both of barley and barley-malt. The following table gives the importations of barley for 1887:

Imports of barley for 1887.

Where from.	Amount.	Value.
	Kilograms.	
Germany	54,250	$1,935
France	80,790	4,574
Italy	9,668	3,384
Great Britain	29,044	3,459
Uruguay	211,450	6,343
Other countries	50,500	1,505
Total	435,806	21,205

The importations of barley for the year 1888 were as follows:

Imports of barley for 1888.

Where from.	Quantity.	Value.
	Kilograms.	
Germany	11,240	$1,124
France	349,579	10,801
Great Britain	36,127	3,281
Uruguay	1,021,180	30,638
Total	1,418,126	45,844

IMPORTS OF MALT.

The importations of malt in 1886 were 1,517,290 kilograms, valued at $185,657. In 1887 they were 1,703,421 kilograms, valued at $204,410; and in 1888 they were 2,840,315 kilograms, valued at $284,032, about two-thirds of which is imported through the house of Aischmann & Co. Except a very small proportion, which is credited to Belgium, France, and Great Britain, all the malt brought to the Argentine Republic comes from Germany or Austria.

The customs-house returns for 1889 have not yet been published, so that for the last year I am not able to give the importations either of malt or barley, but they are in excess of those of previous years.

NO HOPS IN THE COUNTRY—THEIR IMPORTATION.

While barley has now become one of the regular crops of the country, and the breadth of land put down in this cereal is every year becoming larger, nothing as yet has been done towards the cultivation of

hops, which are so essential in the preparation of the beers of commerce. In the valleys of the province of Rioja, where the temperature is almost subtropical, there is found a native variety of hops, which has lately attracted some attention; and it is thought that good hops could be cultivated in this part of the Argentine Republic, since great heat, at least in the United States and Europe, is not essential to their proper development. If this should prove to be the case, there would be nothing lacking in the country to make the brewing of beers and ales an industry which would give most satisfactory results. As it is at present, however, all the hops used in the manufacture are imported from Europe, and the demand, of course, is every year increasing. The amount imported in 1889 was 70,000 kilograms—the greater part of which was raised in Bavaria and about three-quarters of which came through the house of L. Aischmann & Co., of this city. The duty on barley is 30 per cent., and on malt and hops 25 per cent.

NUMBER AND CAPACITY OF ARGENTINE BREWERIES.

With these drawbacks, however, brewing on scientific principles is making very commendable progress in the Argentine Republic. At the present time there are in the city of Buenos Ayres no less than eight well appointed brewing establishments, with a total capacity of 128,000 liters daily; in the city of Rosario there are four breweries with a capacity of about 25,000 liters daily; and in all the other important towns of the Republic one or two breweries are now to be found, most of them, of course, with small plants, though that on the Rio Segundo, near the city of Cordoba, called the "Anglo-Argentine Brewery" (Cervecèrià Anglo-Argentina) is famous not only for its perfect equipments, but for the excellence of its product.

ESTABLISHMENTS IN BUENOS AYRES.

Here in Buenos Ayres the breweries are all in the hands of persons who have learned the business in Europe; and in respect to their beers, while all will quite favorably compare with the ordinary lager of the United States, some brands are noted for their excellence. Among these breweries there is one establishment which, for its size, for the extent and solidity of its cellars and buildings, for the amount and completeness of its machinery, for the quantity and quality of its products and for its internal organization, does exceedingly great credit to the Argentine Republic, and compares favorably with the largest and best appointed in the United States. It is called "Beickert's Brewery" (Cervecèrià de Beickert), that being the name of the founder, a German, who has devoted his whole life to the business. Last year it was purchased for account of an English syndicate for $5,000,000, but without any change in the name.

TARIFF ON IMPORTED BEERS.

In order to better protect the brewing industry of the country, the Argentine tariff on imported beers has of late years been considerably increased. Whereas formerly beer in bottles paid a duty of 20 per cent. on a valuation of $2.25 per dozen, and in casks a duty of 20 per cent. on a valuation of 15 cents per liter, now the duty on such beer is 15 cents per liter when it comes in casks, and 15 cents per bottle when it comes in bottles. This decided tariff has had the effect of greatly stimulating the production and the consumption of native fermented liquors.

IMPORTS OF FOREIGN BEERS AND ALES.

Notwithstanding the increased duty, however, and the very considerable quantities of beer now produced here, there is still a large and continuing demand for foreign beers and ales. The following table shows the imports in casks for the years 1887 and 1888:

Imports in wooden casks.

Country.	1887.		1888.	
	Liters.	Value.	Liters.	Value.
Germany	33,811	$5,748	156,631	$26,627
United States	80	14	12,900	2,193
France	4,916	836	26,496	5,404
Great Britain	4,736	805	186,131	31,642
Uruguay	5,495	934	12,960	3,200
Not named	3,774	641	129,674	22,045
Total	52,812	8,978	524,792	90,213

For the same years the amount imported in bottles was as follows:

Imports in bottles.

Country.	1887.		1888.	
	Dozens.	Value.	Dozens.	Value.
Germany	99,702	$232,177	76,066	$177,234
Belgium	38,823	90,458	81,062	188,064
Brazil	10	23	73	170
Spain	103	240	1,222	2,847
United States	4,071	9,485	1,263	2,943
France	2,436	5,816	3,096	7,214
Italy	363	846	.....	.....
Holland	4,312	10,047	1,431	3,334
Great Britain	68,273	159,076	51,152	119,185
Uruguay	15,278	35,598	6,993	16,293
Not named	46,621	110,957	23,901	55,689
Total	280,997	654,723	249,701	581,793

The official returns of beer imports for 1889 have not yet been published by the statistical office, but I think they will be found to be larger than for any previous year.

THE KINDS ON THE MARKET.

From these tables it will be seen that foreign beers, amounting in value in 1887 to $590,771 and in 1888 to $744.936, form no small item of Argentine imports. As will be further seen, the great bulk of the receipts are from Germany and Great Britain. Indeed the United States scarcely figures in them at all.

You may say of the imports of beer to this country just about what may be said of similar imports to the United States—that nearly all varieties known to commerce find, to a more or less extent, a market and have a foothold here. The kinds generally received from Great Britain and Germany, however, owing probably to the fact that they have to make a long sea voyage through and across the tropics are fortified a little heavier with alcohol than the ordinary lager beer manufactured either here or in the United States, and I think this additional alcohol is found to be necessary to their proper preservation. England sends pale ales, porter, and stout, while Germany sends Imperial, Mainz, Culmbacher, Pilsener, etc.

The only varieties of beer I have thus far seen here from the United States were the "export lager" of the Anheuser-Busch Company of St. Louis, and a brand which I do not now remember from New York. I can say this, however, that they are both well received here, though they are perhaps when duties are added too high-priced to compete successfully, even though they may be of a better quality, with the high-class lager which is now turned out from some of the breweries of this city. If the United States brewers are prepared to send here such heavier brands of ales, porters, and stouts as England and Ireland furnish, there might be an opportunity for gaining a foothold, but the latter are too well known to commerce to be readily displaced; while of the light beers the local breweries here, owing to the high tariff which protects them, must continue to have pretty much the monopoly of the trade.

HOW PLACED HERE.

The manner in which foreign beers and ales are placed on the market here is for the most part through local agencies. Each class or brand, whether of English or German make, has a special arrangement with some well known general importing house in Buenos Ayres or in Rosario, which advertises itself as "special" or "sole agent" for the European exporters. The labels or trade-marks on the bottles likewise in all cases have the name of the house through which they are imported, so that it is known where each and every variety can be obtained, and as far as possible to prevent frauds these marks are duly "registered" in the national patent office, the law exacting a penalty from those who attempt to infringe upon them.

IMITATIONS OF FOREIGN BEER.

In spite of these precautions, however, it is known that from the many local liquor manufacturers (*licoristas*) there are surreptitiously put upon the market no inconsiderable quantities of bottled ales, export beers and porters, which are not genuine—most of them, indeed, being mere imitations; though it may be that, in many cases they are put up in legitimate bottles. That is to say, the purchase of beer and other bottles by parties parading the streets and calling out for "empty bottles" (*botellas vacias*), is now a large and well recognized branch of business. With the trade-mark still upon them or a good imitation put in its place, these bottles are refilled with a spurious article, which thus readily deceives those who are not careful where or from whom they purchase.

ADULTERATION OF FERMENTED LIQUORS.

Deceptions, however, are not confined to imported beers. Although the brewing industry here is scarcely yet out of its teens it is intimated to me that even in some well accredited establishments various expedients are not infrequently resorted to to produce taste, strength, or color in the product, and the chemical knowledge which now exists in regard to the artificial production of liquors makes the intimation very plausible. Of course, however, the extent of those adulterations is the secret of the manufacturers and can only be guessed at by outsiders or consumers. And here in the Argentine Republic, where every hop used in the mash must at great expense be imported from abroad, there must be ample occasion for using substitutes. While the importations of hops are given at about 70 tons per annum, the custom-house returns for 1888 show that the imports of quassia, gentian, and wormwood bitter amounted to 649,565 liters. Whether this was made use of as a substitute for hops of course I am not able to affirm, nor would I intimate that ginger and carraway are resorted to to impart pungency; or alum and blue vitrol to enable the beer to keep a frothy head; or *coculus indicus*, *nux vomica*, and tobacco to increase its intoxicating power. But even with these possible ingredients in its production, the criticism of the old toper in regard to whisky, that "it was *all* good," seems to be much more the general decision here in regard to malt liquors.

PRICES, ETC.

Indeed, beer is becoming more and more the popular drink of the Argentine Republic, and every year sees the establishment of new plants in the different provinces and the enlargement of old ones.

As I have already indicated, the variety in general request is the ordinary lager, sold for family use in bottles and to drinking establishments in kegs. The price of this beer is $2.40 per dozen bottles and 15 cents per liter in kegs, in the paper money of the country, which is equal

to about 40 cents to the dollar in United States gold coin. For the bock beer the price is $3 per dozen in bottles and 20 cents per liter in kegs in paper money. Bieckert's brewery also makes an export beer, which is sold to the trade at $4.50 per dozen, in paper money. I do not know that this brand has yet found a market very far outside of the country, but there is no inconsiderable demand for it in the interior.

Of the foreign or imported beers those of English make most commonly seen on the market, such as Bass, Younger, Guinness, Magnolia, Blood, etc., are now selling for $13, in paper, per dozen, in half bottles, equal to about $5 in gold.

Of the German beers such favorite brands as the Imperial, Mainz, Culmbacher, and Pilsener, are selling for from $25 to $30, in paper, per dozen, in quart bottles.

The present price of malt in this market is 12½ cents gold per kilogram.

The price of hops is 40 cents gold per kilogram.

Corks are selling for $2 to $4 gold per thousand, according to size and quality.

E. L. BAKER,
Consul.

UNITED STATES CONSULATE,
Buenos Ayres, April 28, 1890.

BRAZIL.

BAHIA.

REPORT BY CONSUL BURKE.

MALT.

Concerning malt, as referred to in the circular dated December 15, 1889, I have the honor to say but little information can be given, as very little malt is imported. Something more definite might be obtained about it if the importation were made by large dealers, but it is only small dealers that are engaged in the business, if it may be called a business, and these are so scattered, too, it is difficult to ascertain the cost of the article or the quantity brought into the place, even if one should succeed in finding the different small dealers and making inquiries of them on this head. Therefore to ascertain, first, the imports of malt and whence imported, duties charged, I was obliged to go to the custom-house. I there found that for the year 1888 the quantity of malt imported was 3,438 kilograms, or nearly 3½ tons. Of this smal quantity there were imported from Germany 2,724 kilograms and from Portugal 714 kilograms. For the year 1889 the importation of malt to this port was less even than 1888, amounting to only 1,766 kilograms,

or about 1½ tons, and Germany furnished it. Am unable to state the cost per bushel or per kilogram.

As far as I am informed none of the article is here prepared.

The duty on malt is 1,030 reis per kilogram, equivalent to about 57 cents United States money. Why the duty is so high I don't understand, as there is no malt grown here nor anything that is used as a substitute for it.

There are two or three very small manufactories of what is said to be a very inferior quality of beer.

BEER.

Beer is imported from Germany, Austria, Belgium, United States, Great Britain, Portugal, Italy, and France.

During the year 1887 538,451 liters were imported, according to the custom-house figures. Of this quantity Germany sent 231,364 liters; Great Britain, 214,862 liters; Belgium, 87,372 liters; Austria, 3,868 liters; and the United States, 985 liters.

In 1888 the quantity imported was less than that of 1887 by 218,403 liters. Germany during this year furnished 162,151 liters; Great Britain, 151,235; Belgium, 14,604; Austria, 1,094; and the United States, 964 liters.

In 1889 the total importation was less than that of 1888, the different countries furnishing as follows:

	Liters.
Germany	184,622
Great Britain	100,466
United States	4,010
France	3,076
Austria	1,263
Italy	593
Belgium	402

This makes a total of 294,422 liters from the year 1889.

During the years above mentioned the quantities furnished by the different conntries were as follows:

	Liters.
Germany furnished	587,127
Great Britain	466,563
Belgium	102,078
Austria	6,225
United States	5,959
France	3,076
Italy	593

The entire quantity for the three years imported to this city, according to the figures given, was 1,162,621 liters. As one liter is equivalent to about 2.1 American pints, there would be 2,341,504 pint bottles, equivalent to about 65,042 barrels, of beer consumed in Bahia—of imported beer—to say nothing of the quantity manufactured in the place and also consumed.

All beer is now imported in bottles. The pint bottles are preferred, being more salable than those containing a liter.

The duty is 300 reis per liter, equivalent to about 15 cents of our money, with 5 per cent. + 7 per cent.

The most salable are Bass's ale, German beer, and Guinness' stout.

To get at the first cost is not an easy matter. There may be an undervaluation. The invoice value may be too large as well as too small; nothing very accurate can be obtained on this head, the undervaluation or the too great value depending upon many things. I have been informed that English beer ranges in cost from 3½ shillings per dozen for pint bottles to 6¾ shillings per dozen for quart bottles. German beer is said to be below these figures even. To add to the original cost are the following: freight, the duty, custom-house stamps, charges for weighing, warehouse rent, porterage, fees of the dispatcher, insurance, commission, etc., and the entire cost ready for sale is considerable.

The selling price is from 7½ milreis to 9½ milreis per dozen for pint bottles, or from say $3.75 to $4.75.

Quart bottles—German beer— sell from 7 to 9 milreis per dozen bottles; at retail the price is 500 reis, or about 25 cents, for every half bottle, no matter what the quality is. The domestic manufacture is less in price.

German beer is being preferred to the English, because it is a much lighter beverage than the English, and also because it is cheaper. Importers say the reason so little is imported from the United States is because of the greater cost to the purchaser and the higher freight rate for carrying it than is paid on any coming from Europe. And this higher freight rate applies not only to beer, but in general to any article brought to New York. If, say the importers and dealers, the American beer could be sold at as low a price as the German beer, there is no doubt but the United States might furnish the largest share of the beer that is consumed in this place. Until this is done, say they, the United States can not export her beer in any quantity to this place.

There are some well-known houses here that have been for years in the business of importing beer, wines, and liquors, and through these the different kinds of beverage are sold to wholesale or retail dealers, or even to families in many cases. Besides, the different brands now well-known have a tendency to shut out any new brand, unless the new brand is an article that is both superior and cheaper. In view of all this, then, the brewers of the United States, in order to place their beer on this market, will find it necessary to manufacture it more cheaply, get a reduction of freight rates, and then establish an agency here, having employed a man of push and activity who understands the language and can cater to catch the trade.

DAVID N. BURKE,
Consul.

UNITED STATES CONSULATE,
Bahia, March 21, 1890.

PARA.

REPORT BY CONSUL CLAYTON

MALT.

There are no breweries in the States of Para or Amazonas, consequently malt is not imported into this consular district.

BEER.

No statistics can be obtained which will show the exact quantity of beer imported into Pará and the Amazon Valley, but it is estimated that the consumption of the same is between 800 and 1,000 cases or barrels per month.

Beer is imported chiefly from Germany and England, Germany being the largest seller. The importation of American beer is very limited, and can therefore hardly be considered.

It is shipped in pint and quart bottles; a small quantity of English stout comes in stone bottles.

Import duty on all foreign beer is 300 reis (about 15 cents) a liter, with an increase of 5 per cent. for the emancipation of slaves, long ago established, but the tax has never been abolished. A reduction of 5 per cent. on quantity of liters is allowed for breakage. Minor custom-house expenses are not taken into consideration, except storage, which, if beer is not dispatched on vessel, or before taken out of the lighters, it is something like 4 or 5 per cent. of extra duty in the first month, and largely increasing this percentage according to the length of time it is stored.

The greatest demand is for German beer. English ale and stout reach about the tenth part of German beer in consumption. German cheap beer is sent to the interior of the States of Para and Amazonas, while good German beer, and lately especially Bavarian beer, meets with a ready sale in the city. American beer was imported about six or seven years ago in large quantities, but since that time good German beer has come to the front, so that at present American beer has a small demand.

German beer is imported at from $5 to $7 50 a case of seventy-two pint bottles, free on board ship. Price of English beer is about $7 a barrel of seventy-two bottles. After paying import duties, quotations for German beer here are from $12 to $17 a case, and for English beer $15 to $17 a barrel of seventy-two bottles. Five per cent. discount is allowed on the above prices for cash within sixty days. The retail price here is from 25 to 30 cents per pint bottle. All European beer imported into this consular district is bought through foreign commission houses, on credit at from three to six months' time. The little American beer that comes to this market is also bought through New York commission houses, and the receiver here generally has to pay cash for the same.

At present it is very difficult for a new beer to be placed on this market, because the authorities demand an exact analysis of the same. Import of any beer containing salicylic is prohibited.

ROBT. T. CLAYTON,
Consul.

UNITED STATES CONSULATE,
Para, March 20, 1890.

PERNAMBUCO.

Statistics of malt and beer, imported into this State during the first six months of the year 1889, *as given by the collector of customs at this port.*

[The last six months of the year 1889 can not be given, because the accounts are not yet adjusted and made up in the custom-house here.
The custom-house does not discriminate regarding the quality of beer imported; duties on superior and inferior quality are the same for all.]

Importation from—	Quantity.	Price.	Duty.
MALT.			
	Pounds.		
Great Britain	4,238	Malt, white, first quality, $7.26 for 200 pounds.*	On malt 15 reis, or three-quarters of a cent per pound, United States money.
Germany	17,372		
Portugal	2,636	Malt, roasted, first quality, $10.35 for 200 pounds.*	
BEER.			
	Quarts.		
Great Britain	97,296	Foreign beer, 1 box containing 48 bottles, $15, and 1 box containing 96½ bottles, $16. Barreled beer, English (Bass's), 36 gallons; barrel sold at 60,000 reis, or $30 United States money; retailed here at 15 cents a glass; and 1 bottle of beer costs at retail 1,000 reis, or 50 cents.	Beer, 200 reis, or 10 cents per quart when in barrel. Beer, per quart, 300 reis, or 15 cents when in bottles.
France	1,962		
Germany	168,428		
Austria	3,618		

* Both delivered at Pernambuco.

	Quantity per annum.	Price.
	Gallons.	
Native beer brewed in this State by two breweries.	40,000	One barrel, containing 6 dozen bottles, 28,800 reis, or $14.40. One barrel, containing 12 dozen and a half bottles, 30,000 reis, or $15, sold at retail 1 bottle 500 reis, or $1.25, and one-half bottle 300 reis, or 15 cents.
	35,000	
Total	75,000	

NOTE.—Exchange reckoned for the above, one milreis, equal to 50 cents United States money.

H. C. BORSTEL,
Consul.

UNITED STATES CONSULATE,
Pernambuco, February 21, 1890.

RIO DE JANEIRO.

REPORT BY CONSUL-GENERAL DOCKERY.

MALT.

All malt used in the Brazils is imported, and its average sales in Rio de Janeiro alone amount in money value to over $25,000 per month, a large portion of which is for cash. The nature of the business requires a large stock to be kept on hand at all times, and for this purpose there are large warehouses both here and at Santos. There are some fifty small breweries in this city, which buy from day to day just sufficient to meet their requirements and pay for same in cash. Malt is imported almost exclusively from Germany, and is subject to a duty about equal to first cost there, but the prices realized have insured a large profit and the trade is considered valuable. I have had an interview with Mr. Gabel, proprietor of the largest brewery in Brazil. He reports that he is now using about 30,000 pounds of malt per month and 1,000 pounds of hops, producing about 10,000 liters of beer per day, and that it is his intention to double his capacity at once, having already commenced work. He has never used American malt or hops, but is ready and would do so if suitable to his business, and any one who is desirous of opening trade, by sending to him ten barrels of malt and 25 pounds of hops, or either, will, I think, secure an honest trial; and as this is the largest brewery in Brazil, an approval from him would settle the point so far as quality is concerned. I would heartily recommend a trial of this kind, as I can see a fine opportunity to open a profitable trade, with every inclination on the part of the Brazilians to throw it into our hands.

BEER.

A large quantity of beer is imported in pint and quart bottles and sold, at retail, at 50 cents per quart. It is subject to a duty of 200 reis per liter, or about $8\frac{8}{10}$ cents per quart, with 5 per cent. additional on custom bill, and every invoice is subject to and must have a certificate from a government inspector. An order for 150 barrels of beer has recently been placed with the Empire Brewery, of New York City, by Mr. N. H. Schmitz, an American citizen, with the intention of pushing its introduction here, and I see no reason why he should not be successful. Beer manufactured here is of inferior quality, and does not compete with that brought from either the United States or Germany, and from the conditions of the climate it has been clearly proven, after numerous trials, that it can not be made of a quality equal to that made in the colder climates; hence it follows that this will always be a valuable market. At present it is almost entirely controlled by the Germans, who have, by persistent effort, within a few years, about driven the English from the field. With the aid of their government they sought and obtained, through the several consulates, most minute information, and have, by energy and push, obtained the valuable foothold they now

possess, and the success which has rewarded these efforts clearly proves what can be done in this way, and, in my judgment, indicates the course to be pursued by us. I am most anxious to afford all possible information in this and all other matters relating to the development of trade with this country, especially in view of the kind feeling and evident desire of the people to trade with us, and I am ready to do everything I can to promote this end.

O. H. DOCKERY,
Consul-General.

UNITED STATES CONSULATE GENERAL,
Rio de Janeiro, February 17, 1890.

RIO GRANDE DO SUL.

REPORT BY CONSUL BENNINGTON.

MALT.

All malt is imported; the greater part from Bavaria, and costs the brewer $25 per case of 150 kilogram; the duty is a cent and a half per kilogram.

The malt is received here prepared; but as the Brazilian tariff makes no difference so far as duty is concerned between the malted barley and the barley, I am unable to give reliable information as to the amount of malt imported.

Hops are also imported; largely from Bavaria, but some are from Kent, England, and cost here 75 cents a kilogram.

BEER.

Beer is becoming somewhat more popular as a beverage among the native people of this country; but whatsoever increased demand there may be among a certain class of consumers, it is supplied to a certain extent by local breweries.

Imported beer pays a duty of about 10 cents per liter, and retails at from 50 to 60 cents per bottle.

I cannot give the prices that the English and German beer costs the importer in Rio Grande, but am of opinion that the retailer makes a clear profit of 100 per cent.

The following table shows the importation of beer at the port of Rio Grande do Sul for the year 1889, which I estimate to be one-half of the entire importation into this consular district.

Imported from—	Quantity.	Official value.
	Liters.	
Germany	68,729	$17,029.50
Belgium	632	158.00
Uruguay	4,941	1,235.50
France	1,426	356.50
Great Britain	15,370	3,793.00
Italy	2,006	501.50
Total	93,104	23,074.00

There are breweries in each of the three principal cities of this State—Rio Grande, Pelotas, and Porto Alegre—which amply supply the demand for the beer of the country.

Rio Grande has three breweries, with a total capacity of about 1,200,000 bottles per annum. Pelotas six, two or three of which have an annual capacity of 500,000 bottles each, and Porto Alegre nine, two of which have each a capacity of 1,000,000 bottles per annum.

The domestic breweries bottle all their beer; there is nothing in the malt-liquor line handled in wood casks in this country.

The ordinary beer of this country sells at from 90 cents to $1 per dozen, from the brewer to the retailer who sells it to the consumers at from 16 to 20 cents per bottle.

A stronger dark beer sells at from 30 to 50 per cent. higher.

Imported beer is put on the market through certain commercial houses, which will sometimes have the exclusive agency for a large scope of country for the sale of certain brands adopted by bottlers in Europe.

In order to establish any trade in the sale of American beer in this country, I can but reiterate practically what I have written before; it is necessary to establish a house or an agency in the part of the country where trade is desired, which will push its goods, whatever they be, in competition with the importations from Europe.

I have noticed that the competition which is made through patriotic as well as financial motives is the most successful, and it is the only kind that will ever build up a good trade for American products in this country.

German and English houses sell all the foreign beer in this country, and a simple glance at the figures in the table which I have given shows the effect of their influence in pushing the products of their respective countries in foreign markets.

LEBBEUS G. BENNINGTON,
Consul.

UNITED STATES CONSULATE,
Rio Grande do Sul, Brazil, March 7, 1890.

BRITISH GUIANA.

REPORT BY CONSUL WALTHALL, OF DEMERARA.

MALT.

No malt is either made in this colony or imported into it.

BEER.

Malt liquors of various kinds are imported, both in wood and in bottles, chiefly from Great Britain, though to a small extent from Denmark, Holland, and the United States. The duty is $5 per hogshead

on that which comes in wood; 24 cents per dozen in bottled quarts; and 12 cents per dozen in pints. That imported in hogsheads is bottled in the colony before sale. It is not customary to retail it, even in the spirit shops, by the glass, or to keep it "on draught." The wholesale prices are from $14 to $17 per hogshead; $6 to $6.25 per case of four dozen quarts, or about $1.50 to $1.56 per dozen; and $6.50 to $7.25 per case of seven dozen pints, or about 93 cents to $1.04 per dozen. Commissions and other charges amount to 10 or 12½ per cent. of the sales.

The retail price for smaller quantities is more uncertain, but may be stated at 10 to 12 cents per bottle for pints, and 16 to 20 cents for quarts.

Malt liquors are placed on the market by consignment to local dealers. Some small experiments had been made toward the introduction of lager beer of American manufacture, but quite recently the Scotch brewers have begun to make it of a quality considered by many to be superior to that made in the United States, and tending to exclude the latter from the market. The price at which this is sold is somewhat, but not materially, less than that realized for other malt liquors.

It is thought by some that the introduction of lager in small kegs might lead to the sale of it by the glass, as in the United States; but such are the conservative instincts of all classes of the colonial community, even in matters of meat and drink, that the results of such an experiment would be doubtful, unless it were prosecuted persistently and patiently.

W. T. WALTHALL,
Consul.

UNITED STATES CONSUATE,
Demerara, February 20, 1890.

CHILI.

IQUIQUE.

REPORT BY CONSUL MERRIAM.

MALT.

There is no malt imported into this consular district.

BEER.

During the calendar year 1889 there were imported into Iquique, in pipes, native beer from ports between the Serena and Valdivia, 2,836,700 liters, or, say, 638,258 gallons.

During the same period there were imported, in cases of four dozen each, 10,532 dozen bottles of foreign beer, mainly Bavarian and Norwegian, or nearly 32,000 gallons. The amount of English beer consumed in this port is comparatively small, and of American beer much less than of English.

As the figures show, the consumption of native beer is about 95 per cent. of the total amount. The quality of the native beer is very fair, and that of some breweries is really excellent, but it is always inferior to the average American beer.

During the past few years there have been moderate importations of beer from St. Louis, Mo., which has given good satisfaction as to its quality. The difficulty so far in introducing good brands of American beer in bottles, so as to compete successfully with other beer, whether native or foreign, is its price.

The probable cause of the higher price of American beer is the higher rate of freights. The best foreign beer, Bavarian and Norwegian, is sold in the market to-day for $6 per dozen, which is equivalent to $3 American gold.

If as good a quality of American beer could be placed on the same or more favorable terms, I know of no reason why a large trade in beer could not be built up with manufacturers in the United States.

Great care should be given to the packing of the bottles. Complaints of careless packing of all kinds of merchandise, on the part of American exporters, are very common, and so far as my observation goes the complaints are well-founded. The English and the French far excel us in this respect.

Very good brands of Bavarian beer are retailed for the equivalent of 40 cents, gold, per bottle. Other brands of Bavarian and all American beer at 50 cents, gold, per bottle. Half bottles also should be sent.

All foreign beer is imported into this market by about six importing houses, who sell it with general merchandise.

The duties on beer are specific, 12 cents, silver, a liter on beer in the wood, and $1.25 per dozen on beer in bottles, also silver. Local dues amount to about 60 cents on a case of four dozen bottles, in currency, or, say, 30 cents a case in gold.

J. W. MERRIAM,
Consul.

UNITED STATES CONSULATE,
Iquique, May 17, 1890.

TALCAHUANO.

REPORT BY CONSUL VAN INGEN.

MALT.

All malt used here is made by the brewers who use it. The duties are not given in the tariff.

BEER.

There is very little beer imported, as there are a great many German breweries here. It is generally imported in bottles, and duty charged thereon is about 94 cents, United States gold, per dozen bottles.

The beer mostly drank here is sold in bottles of three-fourths liter, which equals 1.3206 imperial pint, at 5 cents, 10 cents, and 20 cents, United States gold, per bottle retail, and wholesale at 50 cents, 62 cents, and 75 cents the dozen bottles.

No malt imported. Beer is imported in very small quantities by foreign houses, which sell to retailers.

Duties on hops imported in cases 8½ cents, United States gold, the kilogram, gross weight, and in sacks or bales 11 cents, United States, gold, per kilogram, gross weight.

In my opinion there is no business to be done in southern Chili in foreign beers, as there are so many brewers who supply this article so cheaply as to shut out all foreign competition, unless admitted free of duty, and then the competition would be doubtful.

JOHN F. VAN INGEN,
Consul.

UNITED STATES CONSULATE,
Talcahuano, March 27, 1890.

ECUADOR.

REPORT BY CONSUL-GENERAL SORSBY, OF GUAYAQUIL.

MALT.

In Ecuador there are several breweries. On the coast there is but one and it is at Guayaquil, the "Guayaquil Lager Beer Brewery Association." In the interior there are two, one at Quito and the other at Ambato. The Guayaquil brewery is the only one importing malt.

Guayaquil.—Heretofore the malt for the Guayaquil brewery has been imported in a prepared state, and via New York from Canada. About 400 bushels per month is imported, costing delivered at Guayaquil, including import duty, $2.50 United States gold per bushel. The import duty on malt is 2 cents, of a sucre per kilogram, plus 20 per cent., or, say, 36 cents United States gold per bushel. It is estimated that malt can be had from Chili at about $2 United States gold per bushel, inclusive of the duty; and its safe to say that in the future Chili will furnish the Guayaquil brewery with all the malt required.

The interior produces all the malt required for its breweries.

BEER.

More than an estimate on the beer imported into the Republic can not be given. The amount imported and consumed per annum is about 300,000 gallons, the greater part of which comes from Germany, but recently English and American beers are curtailing the German exports. The duty on beer is 5 cents per kilogram gross, plus 20 per cent., or, say, 1½ cents United States gold. "Gross" means that the duty is charged on the gross weight of beer, bottles, straw, and boxes. Beers shipped to Ecuador come packed in cases of 4 dozen whole and 6 dozen half

bottles—sometimes in barrels of 6 dozen whole or 10 dozen half bottles. The German beer is transported in sailing vessels at 30 shillings per ton measurement, or $7.50 United States gold. American beer (of New York manufacture) is being introduced and is slowly displacing the German and English make. It is transported to this point via Panama, and the cost of transportation makes its cost here very high. It is sold here at 25 sucres per case of 4 dozen whole bottles, or, say, $16 United States gold; while the German and English beer, coming by sailing vessels, sells here at $12 United States gold for the same quantity. This great difference in price militates against the American brewer, although the American beer is preferred. Light beers are best suited to this market.

All imported beers are in fairly large lots and in consignments. Very little, if any, being bought outright. But it is useless to attempt to surplant the German and English with American beer unless the cost of the latter can be made to compare favorably with the former.

The American beer is transported by steam, the German and English by sail, the difference in the cost of transportation forces the selling price here of the former to $16 United States gold, while the latter can be sold at $12 United States gold per case. The difference in quality is not enough to offset the great difference in cost. If American beer can be laid down at this point at the same cost of the German and English there can be but little doubt that the United States will soon control the market in Ecuador. But the quantity of beer imported will always depend largely upon the quality of the brew by the Guayaquil brewery. When that brewery was first established they had an experienced brewer the result was that the amount of foreign beer consumed was diminished very materially. Later they employed a native brewer and the result was and is, owing to the poor quality of beer brewed, the consumption of foreign beer is again very great.

Quito.—At Quito the malt is raised in Ecuador and prepared by the brewery, costing before prepared 85 cents per bushel; the quantity brewed per day being about 100 dozen bottles.

Ambato.—At Ambato the malt is grown in Ecuador and prepared by the brewery, costing about 85 cents per bushel before prepared; the quantity brewed per day being about 15 dozen bottles.

The price at Quito and Ambato being $1 (sucre), or 70 cents United States gold per dozen for steam, and $2 (sucre), or $1.40 United States gold for lager beer.

The hops used at Guayaquil, Quito, and Ambato is imported from Germany at a cost of about $40 sucres, or $28 United States gold per 100 pounds.

Guayaquil beer is sold at $2, United States gold per dozen by the case, and retails at 20 cents per bottle. The output of the brewery is about 100 dozen bottles per day, in kegs and bottles, but the capacity of the brewery is said to be from 250 to 300 dozen per day.

The Guayaquil brewery manufactures and sells about 10,000 pounds of ice per day, which is sold at 2 cents United States gold per pound, wholesale.

In attempting to establish trade in this country it is well to know and to remember that the trade is controlled in no small degree by trade-marks. An article bearing a certain "trade-mark," when once established, is very hard to displace.

All classes and kinds of goods should be lightly yet securely packed, with the view to obtain the minimum weight, and, at the same time, safe transportation. This point alone is worth especial study; and yet, strange to say, is *ignored* by American shippers.

I desire to repeat that the tariff of Ecuador exacts duty upon the gross weight of the cargo, and when this fact is borne in mind the necessity of making a special study in packing for shipments need not be enlarged upon.

WILLIAM B. SORSBY,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Guayaquil, April 2, 1890.

REPUBLIC OF COLOMBIA.

BARRANQUILLA.

REPORT BY VICE-CONSUL WHELPLEY.

BEER.

The term beer (cerveza) includes all classes of malt liquors, as stout, porter, ale, and lager. Duty, 2½ cents per kilogram.

The well-known brands of Bass, Younger, Guinness, Tennant, the only brands known to commerce twelve or fifteen years ago, have been gradually superseded here by the German brands.

The imperial, Pilsen, Bayrisch, and lager, from Hamburg and Bremen breweries, and one or two brands of Bavarian beer, are in increasing demand, as being not only a lighter beverage and better adapted to the climate than the British, but also cheaper in price, as for example:

Kind.	British one-half pints.		Kind.	German one-half pints.	
	Purchase price.	Selling price.*		Purchase price.	Selling price.*
	Cents.			*Cents.*	
Bass.....per dozen..	95	$2.25	Imperial.....per dozen..	90	$1.80
Younger.....do....	94	2.20	Bayrisch.....do....	80	1.50
Tennant.....do....	94	2.20	Pilsen .....do....	80	1.50
Guinness .....do....	94	2.20	Lager.....do....	80	1.50

* United States currency.

Bavarian, Brussels, and Munich, 10 to 15 per cent. higher than the Hamburg and Bremen beers.

Malt is not imported. An "extract of malt" is sometimes sent to the interior, but it is said that at some small brewing establishment at Bogota they also have a local preparation, but the beverage made is but an inferior imitation of foreign brands.

Packages for local sale of the above-named German beers are put up in 3 dozen to a case, and for interior trade in 5 dozen to a case; average weight 65 kilograms (13 kilograms per dozen).

Cases contain 3 or 5 dozen German beers, imperial one-half pint bottles, sheathed in straw cones. The cases are made of thoroughly-seasoned Norway pine or spruce of five-eighth inch thickness for tops and bottoms, and one-half inch for sides and ends, bound with thin strap iron one-half inch wide. The cases are of the following dimensions:

Inside measurements: 3-dozen case, 11½ inches wide, 10 inches deep, and 20¼ inches long. For 5-dozen case, 13 inches wide, 11½ inches deep, 26¾ inches long.

As the duty is levied on gross weight of package and contents, light material for boxing is a desirable feature. An extra one-eighth of thickness in box material would add a large percentage of unnecessary expense, to an invoice of several hundred cases.

A cask of 10 dozen of lager, from a Milwaukee brewery, has given much satisfaction in style and quality to an importing house here who intend to send a liberal order. The same house imported over 2,000 cases from Hamburg during the past year, but consider, with many of their local consumers, that Milwaukee is the best yet offered as a malt beverage. Price not stated.

For local consumption the packing in casks may be suitable, but it is not good for the interior trade. The German bottler, knowing that the gross weight of package is an important factor in the trade with this country, use bottles as thin as consistent with safety; our brewers seem to think thick concave bottoms necessary, an increase of weight to the bottle and a decrease in its cubic capacity and contents as compared with the German flat bottomed bottle.

A case of 5 dozen sent from Chicago last year weighed 5½ kilograms more than a Bremen case of 5 dozen, and each Chicago bottle contained one-eighth of a pint less than the Bremen bottles. The Chicago case was made of soggy, unseasoned stuff, three-fourths inch in thickness, bound with heavy strap-iron. Each bottle was larger in appearance than the German, with a thick concave bottom, capped with heavy, lead foil, over a needlessly heavy wire. The importer objects to this extra and useless expense; the consumer would like more beer and less glass for his money.

S. M. WHELPLEY,
Vice-Consul.

UNITED STATES CONSULATE,
Barranquilla, February 10, 1890.

Beer imported during years 1888 *and* 1889.

[From custom-house record of Barranquilla. In kilograms, per month.]

1888.

Where from.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.
Antwerp	980	17,950	130	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,060
Bremen	9,056	10,430	5,370	.....	.....	.....	.....	2,108	1,578	18,792	.....	19,399	66,763
Bordeaux	.....	.....	.....	910	.....	.....	.....	.....	.....	.....	.....	.....	910
Curaçao	452	.....	.....	.....	.....	.....	.....	.....	.....	547	.....	2,610	3,609
Grimsby	.....	.....	.....	.....	.....	.....	.....	.....	.....	810	.....	.....	810
Hamburg	6,284	18,530	9,905	21,273	10,605	4,120	.....	5,860	11,915	18,427	6,431	31,453	144,803
London	.....	.....	1,000	482	.....	.....	.....	.....	.....	.....	.....	.....	1,482
Liverpool	790	.....	4,178	9,360	4,374	1,604	.....	.....	.....	11,127	4,000	.....	35,433
Manchester	.....	690	2,460	4,134	4,117	.....	.....	2,310	1,857	.....	3,380	55	19,003
New York	1,522	835	6,918	.....	1,080	5,611	12,950	5,771	475	6,793	1,809	179	43,943
New Orleans	.....	.....	1,300	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,300
Paris	.....	.....	.....	.....	.....	.....	.....	827	.....	2,100	.....	.....	2,927
Southampton	.....	1,875	.....	986	.....	.....	149	.....	.....	810	1,785	.....	4,795
Total	19,114	50,310	31,261	37,145	20,176	11,335	13,099	16,876	15,825	58,596	17,405	53,696	344,838

1889.*

Colon	.....	.....	.....	.....	.....	.....	2,980	.....	360	2,400	.....	.....	5,740
Bremen	.....	19,420	6,758	6,674	59,230	22,322	65,030	17,778	25,915	41,470	.....	.....	264,597
Bordeaux	.....	.....	.....	1,500	.....	25,970	.....	.....	.....	.....	.....	.....	27,470
Curaçao	.....	86	.....	.....	.....	.....	1,552	.....	.....	.....	.....	.....	1,638
Hamburg	11,722	3,260	6,664	40,445	29,281	16,589	61,982	47,347	28,236	52,551	.....	.....	298,127
London	3,041	384	384	3,139	4,596	2,145	10,000	1,212	.....	1,070	.....	.....	25,971
Liverpool	126	.....	.....	5,840	.....	1,940	6,790	295	11,163	9,920	.....	.....	36,074
Manchester	903	2,087	1,130	1,905	7,280	3,010	1,100	4,284	12,945	.....	.....	.....	34,644
New York	3,213	6,016	5,824	3,444	3,080	10,840	.....	.....	7,237	2,589	.....	.....	42,243
Paris	1,313	.....	.....	.....	1,110	.....	685	.....	824	877	.....	.....	4,809
Southampton	.....	.....	.....	.....	1,794	.....	.....	.....	3,720	.....	.....	.....	} 8,068
Port Limon	.....	.....	2,554	.....	.....	.....	.....	.....	.....	.....	.....	.....	}
Total	20,318	30,869	20,760	62,947	106,371	82,816	150,119	70,916	90,400	113,431	.....	.....	783,591

* Books of custom-house not posted for November and December, 1889.

NOTE.—At 13 kilograms to the dozen (one-half pints), 60,276 dozen for 1889, exclusive of November and December.

COLON.

REPORT BY CONSUL VIFQUAIN.

MALT.

1. There is no malt imported into this consular district. There are no breweries, no duties on malts, none on beer.

BEER.

2. The kinds of beer imported here are German, English, and American. In the year 1888, the last good year, the imports of English beer (porter and ale) averaged 1,000 barrels per month; it was used largely by the Jamaicans working on the canal. In the same year the German imports amounted to 1,500 barrels per month, mostly used on the line of the canal, largely by the Chinese. In the same year the American

imports were on an average of 600 barrels per month, chiefly Milwaukee; about one-seventh of it New Orleans beer.

A barrel consists of 10 dozen pint bottles, or 6 dozen quart bottles.

English beer was sold here at $7 per barrel; the German at $6.50 and $9 per barrel; the American beer, Milwaukee, at $12; New Orleans at $10.

Milwaukee is "the beer" mostly used here; retailed at 50 and 60 cents per quart bottle (or 35 and 40 cents American money per bottle). During the year 1889 Milwaukee beer is the only one that increased its imports.

3. The beers are placed upon the market by local firms (wholesale grocers and commission houses) and disposed by those to the multitude of saloons.

In addition to the answers I beg to state that of late the vessels bringing ice here imported, on an average of one per month, some one hundred ten-gallon kegs of regular lager. It is chiefly used in Panama, but it is far from being the lager "on tap" in the States; in other words, it does not improve on the voyage.

In case the canal resumes work it is my opinion that a brewery with beer garden in the mountains, some four or five miles from here, would do an extremely lively business, provided it could import its own ice.

VICTOR VIFQUAIN,
Consul.

UNITED STATES CONSULATE,
Colon, January 31, 1890.

VENEZUELA.

LA GUAYRA.

REPORT BY CONSUL BIRD.

MALT.

The importation of malt at this port is quite small, amounting, as carefully estimated, to about 120 bushels per month of the value at retail of $13.82 per 100 pounds. Importations are of shelled unground grain, and the largest part comes from Hamburg; the rest is contributed by the United States. The duty on unhusked malt is 89 cents per 100 pounds, and 12½ per cent. of total duty added for transit duties. The duty on shelled unground malt, the kind that is usually imported, is $6.66 per 100 pounds and 12½ per cent. of total duty added for transit duties.

BEER.

The importation of beer at this port, which can be approximately stated only, amounts to about 60,000 bottles per month, 75 per cent. of which comes from Germany and the remainder from England and the

United States, our share in this portion being quite small. About all of it comes in bottles or half bottles, that from Germany and England being packed in boxes containing one dozen bottles or two dozen half bottles, while that from the United States is more cheaply packed in barrels containing five dozen bottles or ten dozen half bottles. Duties are paid on the gross weight of packages; hence the lighter the packing is the less will be the cost of the article. The duty on all kinds of beer is $2.22 per 100 pounds, with 12½ per cent. of total duty added for transit duties. Beer is sold in this market at wholesale at prices ranging, according to quality, from $3 to $6 per box, and is retailed at from 20 cents to 35 cents per half bottle. Both white and black beer are consumed in about equal proportions.

Germany sends both the best and worst qualities of beer, thus gratifying the most extravagant and economical tastes; and it is generally asserted that all kinds of German beer are cheaper and better than beers from other countries. It is also stated that some of the best brands of American beer, that were formerly much esteemed here, have latterly greatly deteriorated in quality.

A brewery, upon a small scale, has been lately established in Caracas, and some tentative effort has been made to supply the market with domestic beer. It has not, however, proved a success and it is believed that climatic conditions alone will insure its failure. The beer is of very inferior quality and will not keep for any length of time.

WINFIELD S. BIRD,
Consul.

UNITED STATES CONSULATE,
La Guayra, January 29, 1890.

MARACAIBO.

REPORT BY CONSUL PLUMACHER.

MALT.

In this consular district there are no breweries and malt is not an article of trade, none being imported or prepared locally.

BEER.

The imports of beer into this consular district amount annually to about 35,000 boxes of two dozen pints each. None is introduced in the wood, as the climatic conditions are such as to render its preservation a matter of great difficulty, and consequently beer on draught is unknown.

The total import duties amount to 5⅝ cents per kilogram, gross weight.

By far the greater quantity of beer is of German production, the exports from the United States being comparatively insignificant, although

the American lager introduced here is of excellent quality and appreciated by the public. It would seem that under these circumstances the brewers of the United States should find in this section an extensive market for their products, but it is their method of packing which militates against their interest.

As duties in this country are levied upon the gross weight of all imports the character of the receptacle is an important factor in calculating cost of introduction. The beer shipped from Germany is packed in boxes made of thin boards and fastened with the lightest and least number of nails consistent with safety of transport. The bottles are made of thin, light glass, and the aim of the exporters is, very properly, to reduce as much as possible the weight of their shipments.

The Americans, on the other hand, although this important point has been repeatedly brought to their attention, persist in packing their goods in such a manner as to add enormously to the import duties.

Bottles of unnecessarily heavy glass, thick boards for boxes (some of which are of the extraordinary dimensions of 1½ inches), a multitude of heavy cut nails, and iron bands of considerable weight—all these are used by American exporters of beer, and upon these accessories, which might easily be reduced by more than 50 per cent., the full beer tariff must be paid.

It should not be a matter of wonder that under these circumstances the importers of this district introduce the German article, as the costs of importation are reduced to a minimum.

As far as quality and original price at brewery are concerned, American beer should have a ready sale in this market, as it can be disposed of at retail, notwithstanding the disadvantages of packing, at from 5½ to 6 pesos per box of 24 small bottles of 12 ounces each.

The ordinary German beer comes as a rule in bottles containing 8 ounces, and retails at from 4 to 6 pesos per box of 24 bottles.

There are also special classes of German beer of superior quality, particularly the Dreher beer of Vienna, which is readily sold here at 14 pesos ($10.77 United States gold) per box of 48 bottles (halves).

The original cost of the ordinary grades of German beer is 10.40 marks for 48 bottles, and for the same quantity of the superior quality 21.50 marks (all bottles being halves).

These invoice prices of the German article are subject to a trade discount which is, perhaps, never less than 4 per cent.

The freights also from Europe to this coast are exceedingly low. The beer comes in sailing vessels which are sent to this port to load wood and divi-divi, and the charterers are glad to get any class of freight at reduced terms, especially as these vessels as a rule are not classed sufficiently high to carry valuable or perishable cargo.

There is really no reason why the brewers of the United States should not establish an extensive trade with this country if they would only study and bear in mind the peculiarities of the market.

There are many large houses which could easily afford to send accredited representatives, equipped with a sufficient knowledge of Spanish and prepared to treat with the importing firms of this and other Venezuelan centers.

In my dispatch of January 21, last, referring to commercial matters generally, I laid especial stress upon the necessity of active and aggressive representation on the part of our merchants and manufacturers, and I can think of no branch of business to which this advice is more applicable than that of American beers, wines, and liquors.

Moreover, the direct intervention of the brewers by means of traveling agents would do away with the present necessity of employing commission houses at New York and other exporting points, whose charges are rarely less than 5 per cent. upon invoice value.

This 5 per cent. added to the excessive import duties caused by the peculiarities of the Venezuelan tariff form such a burden that competition with European exporters is almost an impossibility.

The demand in this district for American beer, even when offered at low prices, is but small, as it is light lager which has not the strength suitable to the palates of the people, nor does it keep when stored.

Bad corkage is perhaps responsible to a certain extent for this last drawback.

The experiment of making beer in Venezuela has been tried in Caracas, but the results have not been encouraging.

In Bogota, Colombia, which has an elevation above sea-level of something more than 8,000 feet, an excellent beer is brewed from Indian corn, which has a ready and extensive sale at the rate of 80 cents per dozen.

In Venezuela the beer consumption is very great, and in the most isolated and distant points of the interior it is always to be found. I have no doubt that should our brewers send good beer in casks and have always a constant and sufficient supply of ice for its preservation large quantities could be sold on draught. There is no reason also why a brewery may not be established even in the city of Maracaibo. It is true that the heat is here intense, and, without the means of producing artificial cold, such an enterprise could not for a moment be projected, but as now there are many processes for reducing the temperature of large rooms even to zero at a moderate cost this difficulty might be thus overcome. Beer made from maize has always been well received in these countries and this product is here as a rule exceedingly cheap.

Should the disadvantages of climate be thus obviated Maracaibo would be an exceptionally favorable locality for such an enterprise, as it is the distributing point not only for an immense section of Venezuela, but also for the entire northeast of Colombia.

The preceding remarks contain the answer to this question, and to resume briefly, as far as American beer is concerned, I beg to state—

(*a*) The brewers should send representatives to study the market and treat directly with the importers.

(*b*) Great attention should be given to the packing in order to reduce the weight to a minimum.

(*c*) The American beer received in this district is of good quality and is so recognized, but it is too light for the tastes of the people, who prefer a stronger article.

It is, moreover, a matter of complaint that it deteriorates during storeage.

Should our brewers determine to make an effort to secure a fair proportion of this trade, the foregoing suggestions will, I trust, be of service.

E. H. PLUMACHER,
Consul.

UNITED STATES CONSULATE,
Maracaibo, February 19, 1890.

Statement of the weight of a bottle of beer from various European breweries.

(1) The following breweries whose products are fair, but not of superior quality, send their beer in half bottles, weighing when filled from 17 to 20 ounces each:

(*a*) Ross Company, lager-beer, Teufelsbrucke, Kleinflottbeck, Holstein.
(*b*) Norway Ale Brewery, limited, Christiania.
(*c*) Imperial German Pale Ale, Export Brewery.
(*d*) Export Beer Brewery, Best India Pale Ale.

(2) The following breweries produce a superior quality of beer, as follows:

(*a*) Dreher, of Vienna, half bottle, weighing 28 ounces.
(*b*) Frankenbrau, Bamberg, Bavaria, one-half bottle weighs 27 ounces.
(*c*) Salvator Brauerei, München Schwabing, one-half bottle weighs 26 ounces.
(*d*) Aktien Brauerei, Lowenbrau München, one-half bottle weighs 27 ounces.
(*e*) Aktien Brauerei, Lowenbrau, München, whole bottle weighs 48 ounces.

PUERTO CABELLO.

REPORT BY CONSUL DE BLANC.

MALT.

No malt is imported into this district and none is made therein. A brewery has been lately established at Caracas, in the adjoining consular district, which imports malt for its own use; but to what extent, and whence imported I am not informed.

BEER.

Beer is imported to a large extent from Germany, Austria, and England, and some also from the United States, but in small quantity. Totals of importations can not be given, as statistical notes are not kept. It is imported exclusively in bottles. The duty is 25 centimes of a bolivar per kilo, equal to $2.2115 United States currency per 100

pounds. The cheap German and fine Austrian beers are those most generally consumed.

The price of beer by wholesale in this market ranges from 3½ to 7 pesos ($2.69 to $5.38 American gold) per case of 24 pints. It retails at 25 to 37 centavos per pint (19 to 28 cents American).

Beer is placed upon this market at a profit of 8 to 10 per cent.

American beer is at a disadvantage in this market on account of the bad packing and greater weight of the packages. The breakage on beer coming from the United States is always much more considerable than on English or German beer, amounting in many cases to 20 per cent. In a tariff which is entirely specific and by which duties are levied uniformly on the gross weight of packages, with no deductions for breakage, excess of weight is a serious drawback to the handling of American beer. It is the opinion of several dealers in that article in this district that if these objections could be removed American beer would compete successfully with all other importations.

CHARLES DE BLANC,
Consul.

UNITED STATES CONSULATE,
Puerto Cabello, February 20, 1890.

BRITISH WEST INDIES.

ANTIGUA.

REPORT BY CONSUL JACKSON.

MALT.

Breweries do not obtain in these parts; consequently there is no demand for malt.

BEER.

In connection herewith attention is drawn to a table of statistics which shows the amount of business done in ale and beer during the last decade. It will be noticed that there has been a considerable falling off of imports. The explanation is laid to the increase in the consuption of whisky, which is considered healthier than strong ale and beer.

Complaints are constantly made that "Bass's is too heavy for this climate," meaning that it is clogging to the system.

On the other hand a feeling is growing in the public mind that lager-beer is the proper drink on account of its lightness, and in support of this the statistics show an increase in imports of lager from the United States.

The business in lager-beer is about confined to one New York brewery and one dealer, who sells most of the beer by the dozen and half dozen pints, in bottles, to families.

Beer is not sold on tap, and when imported in wood is drawn off into bottles.

The duty is $2.40 on a cask containing 52 Imperial gallons, or 18 cents per dozen quarts in bottles and pints in proportion.

British beer is packed in barrels of 7 dozen pints or 4 dozen quarts and sells wholesale at about $7.20 per barrel and is retailed at 12 cents per pint or a little less for a quantity.

Wholesale dealers charge 5 per cent. commission for selling and for storage at the rate of 5 cents per barrel for the first month and 2½ cents for each succeeding month. The charges for porterage and cooperage are small.

In case the goods are closed out at auction there is a charge of 5 per cent. for the auctioneer. This is a favorite mode of closing consignments. Shipments should be made in pints.

CHESTER JACKSON,
Consul.

UNITED STATES CONSULATE,
Antigua, April 17, 1890.

Amount and invoice value of ale and beer imported into Antigua from the year 1880 *to* 1890, *inclusive.*

Year.	Ale and beer from Great Britain.				Lager beer from United States.		
	Gallons in wood.	Value.	Quarts in glass.	Value.	Quarts in glass.	Value.	Total value.
			Dozens.		*Dozens.*		
1880	7,882¼	$3,031.00	3,486	$4,879.60	5	$8.40	$7,919.00
1881	9,609⅜	3,796.00	5,653	7,926.24	7	11.76	11,734.00
1882	4,845½	1,864.00	4,363	6,151.32	25	42.00	8,057.32
1883	3,619½	1,392.00	4,549	6,368.88	.....	.....	7,760.88
1884	6,302½	2,424.00	3,959	5,591.04	31	52.08	8,067.12
1885	1,497⅝	561.60	2,680	4,390.38	6	11.76	7,963.74
1886	3,806⅝	1,264.98	3,492	5,803.72	.....	.....	7,068.70
1887	1,725⅝	570.12	3,797	6,300.38	25	42.50	6,870.56
1888	1,591½	584.98	2,362	4,093.96	114	215.30	4,894.24
1889	3,203	1,088.32	2,760	3,920.60	160	301.80	5,310.72

THE BAHAMAS.

REPORT BY CONSUL M'LAIN, OF NASSAU.

MALT.

There is no importation of malt into this colony.

BEER.

There is no manufacture of beer in these islands.

Beer is imported from Great Britain and the United States. That received from Great Britain consists principally of Bass's No. 3 ale, Bass's pale ale, Tenants' pale ale, Guiness' stout, and Barclay & Perkins'

porter. Small quantities of some other make are sometimes received. Importations from the United States are made up of Milwaukee Imperial lager beer, Bavarian lager, Ruppert's lager, and Beadleston & Woerz's beer, with an occasional consignment of some other brand.

The quantity imported in 1888, the last year I have statistics for, is as follows: From the United States, 1,057 dozen quarts, valued at $1,854.18, all in bottles, and 536 gallons in wood, valued at $243.32; from Great Britain, 836 dozen quarts, in bottles, valued at $1,411.34, and 8,667 gallons in wood, valued at $3,615.05.

The duty charged on beer is, in wood, per gallon 12 cents, and in bottles, 24 cents per dozen quarts. The duty is the same, no matter whence the beer is imported.

Bass's No. 3 ale and Barclay & Perkins' stout are generally imported in casks and bottled here, and sold at $1.20 per dozen pints, or retailed in saloons at 12 cents per pint. Bass's and Tenant's pale ales and Guiness' stout are generally imported already bottled, and are sold at $1.68 per dozen pints and retailed at 15 cents per pint. American beer is imported mostly in bottles, the Milwaukee Imperial selling at $1.68 per dozen pints, Bavarian at $1.44, Ruppert's and Beadleston & Woerz's at $1.32 per dozen pints; all retailed at 15 cents per pint.

There is no special method in vogue for placing beer on the market. It is imported and sold same as ordinary merchandise.

The quantity of American beer sold in this colony is gradually increasing, but at a very slow rate, indeed, compared with the increase in many other lines of goods. The two principal drawbacks to its introduction are the price of the beer and the tastes of the consumers. Dealers say they can make a better profit in handling British beer than our American production. They can buy it cheaper to start with, and can sell it for as much when landed. The majority of beer-consumers here prefer the British, as it is stronger and they like its flavor better. They have always been used to it, and do not care to give it up. Even at a greater price most Englishmen would choose the British beer so long as his taste remains unchanged.

The greater portion of the beer sold here is Bass's, imported in casks and bottled here. This is generally sold at $1.20 per dozen pints, and sometimes as low as $1.08 per dozen to retailers; and this is really the beer our brewers must compete with. There is considerable profit in this to dealers. It is asserted by some that the beer is "doctored" here before bottling, but I do not indorse the statement nor vouch for it, although it is evident to any one that when it is imported in casks there is an opportunity for dishonest persons to tamper with it to their own profit. American beer must be sold to importers here at such price as will enable them to sell it at from $1.08 to $1.20 per dozen pints, and make as large a profit on it at that figure as they do on Bass's ale. This has not yet been done, and it is really the first step in the whole business, for I have no idea that the people here will be willing to pay more for American beer than for British.

There then remains the other objection, viz, the beer-consumer's taste. I think that can be reached better through the matter of price than in any other way; for if a beer-drinker can buy his pint of American a trifle cheaper than his pint of British, he will be likely to try it, at all events, and may thus come to like it.

It is a well-known fact that British exporters increase their foreign trade in all lines by finding out just what their customers want as to quality, style, price, etc., and then at once meeting these requirements, and American exporters must do the same if they would succeed. Now, apply this principle to the beer trade. I do not believe that British colonists in these islands, or indeed in any of the West Indies, care very much for American lager beer, and it will take much time, if indeed it can ever be done, to cultivate amongst them a preference for American lager over Bass's ale. Is it indeed worth while to try? Is lager beer the best beer for the tropics? Is it not better adapted to the temperate zone?

Now, would it not be more sensible for our brewers to manufacture for the West Indian trade a kind of beer which their would be customers already like and are ready and anxious to buy? Couldn't this be done more easily than to try to change the tastes of whole communities? It is this principle of manufacturing and exporting goods to suit *prevailing tastes*, instead of attempting to *change* these habits in their customers, that has made British foreign trade so successful the world over.

If our brewers will make a kind of beer that is as strong and that will in other respects resemble Bass ale closely and will furnish the same to Bahama importers as low as they can buy thé British ale, they can soon supply this colony and, I doubt not, the entire West Indies, with all the beer they care to consume.

Permit me to mention an objection urged against our lager now being imported here, which is this, that the metallic capsules over the corks are too thin for hot climates. The British ones are twice as thick. When the covering is so thin roaches, rats, and all sorts of vermin, whose name is legion, will gnaw holes in it to get at the glue or gum that coats the top of the cork. This gives the bottle an unsightly and damaged appearance and dissatisfies a purchaser. The remedy is thicker capsules, which should be attended to.

The favorite drink of the people of these islands—the masses, I mean—is beer, Holland gin, and cheap grades of Jamaica rum. The gin is imported from Great Britain and the rum in schooners directly from Jamaica, which carry thither salt and bring back sugar, coffee, and rum.

I think the above is substantially all the information I can give on this subject which would be of benefit to our brewers.

THOS. J. MCLAIN, JR.,
Consul.

UNITED STATES CONSULATE,
Nassau, January 22, 1890.

BERMUDA.

REPORT BY CONSUL BECKWITH, OF HAMILTON.

MALT.

No malt is imported here for brewing purposes, and no brewing is carried on here, as the climate does not admit of it, the temperature rarely going as low as 50° Fahrenheit.

BEER.

Lager-beer is largely imported here from New York. Bass's ale and Guinness' stout and porter are imported here chiefly from England. These beers and ales are imported both in bottles and in wood. Duties thereon are $4.86 per hogshead in wood, or in bottles 24 cents per dozen quart bottles or 12 cents per dozen pint bottles.

The kinds of beer and ales above mentioned appear to be the most suitable and popular for use here.

The prices are as follows: $26.76 per hogshead, ale or stout, hogshead containing 52 to 54 gallons (Imperial). Beers vary from $1.95, $2.17, $2.29 per dozen quarts bottled according to quality. Pints, bottled, about one-half the above prices.

No malt is imported. Imported ales and beer brought in wood are sold by the wholesale importers to retail dealers, who place them on the market. Beer and ales are placed on the market by the retail dealers. I am informed by the chief dealers that their profit on a hogshead of ale or stout is about $2.43, and that the cause of the very low price of imported ales and beers from Great Britain is that the competition between the brewers who ship here is so great that they are willing to sell for whatever price their product will bring.

HENRY W. BECKWITH,
Consul.

UNITED STATES CONSULATE,
Hamilton, Bermuda, February 6, 1890.

DOMINICA.

REPORT BY COSULAR AGENT STEDMAN.

MALT.

Malt is not imported into Dominica, there being no breweries.

BEER.

The malt liquor consumed is principally imported from Great Britain, but small quantities are also obtained from Germany, France, and the United States.

The following table will show the imports for 1889:

Articles.	Whence imported.	Quantity.	Value.
		Hhds.	£. s.
Beer and ale in casks (54 Imperial gallons)	United Kingdom	52	312 0
	Barbadoes	13	78 0
	French ports	1	6 0
		66	396 0
		Dozen.	
Beer and ale in bottles	United Kingdom	522½	209 0
	Barbadoes	512½	205 0
	Trinidad	126	50 8
	Leeward Islands	19	7 12
	United States	4½	1 16
	French ports	10⅝	4 5
	Danish ports	8	3 4
	Germany	167	66 16
		1,370⅛	548 1

The imports from Barbadoes, Trinidad, and other islands, although classified under those heads, are mostly imported from Great Britain to these places.

The light beers are beginning to be used and are preferred by a great many people. The climate is not suited to the consumption of strong beers.

A small quantity of the Philip Best Brewing Company's Milwaukee export beer has been imported and highly appreciated. It is considered superior to the German lager-beer.

Beer in bulk is the kind mostly imported by liquor dealers, who bottle it for retail purposes. It is sold at from $2.50 to $3 per dozen quarts, according to quality. English bottled beer sells at from $3 to $3.50. There is no wholesale trade in beer.

The duty on beer has lately been increased from 5*d.* to 9*d.* per imperial gallon, which has tended to check the consumption.

WM. STEDMAN,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Dominica, March 18, 1890.

JAMAICA.

REPORT BY CONSUL ALLEN, OF KINGSTON.

MALT.

During the last fiscal year there was no malt imported into the island of Jamaica. This fact is developed by an examination of the records of the custom-house. A small quantity is locally prepared; none, however, is sold, the estimated cost of production being $1.25 per bushel. In this connection I would state that during the same period above

mentioned hops were imported as follows: From the United States, $1,641.71; United Kingdom, $119.10.

BEER.

Under the general heading beer, ale, beer, and porter are embraced, and no records are obtainable showing the amount of each imported.

	Gallons.
United Kingdom	186.537.1
United States	11,082
Other foreign states	229.6
Total	197,848.7

Beer from the United States is imported in pint and quart glass bottles; from the United Kingdom, small importations in casks, the greater portion being, however, in pint and quart glass bottles; other foreign states, in glass pint bottles. Duties, 12 cents per gallon.

The variety known in the United States as lager beer.

Prices as follows: Barrels of 10 dozen pints, $12.50; barrels of 6 dozen quarts, $12. Domestic beer: In casks, 30 cents per gallon; in pints, 35 cents per dozen.

Retail prices foreign beer, as follows: Pints, 12 and 15 cents; quarts, 18 cents; domestic, 9 cents, pints.

Beer from the United Kingdom is usually sold on consignment, while that from the United States, as a rule, is imported direct by the dealers here, either through their agents in the United States or purchased from the brewers themselves, and is sold by merchants to dealers in packages containing 10 dozen each. Packages containing 10 dozen pints are most convenient for this market.

About one year ago an American firm started a beer depot here, importing lager-beer from the United States in pipes of 190 gallons each. This beer was bottled at the depot in this city and sold at the rate of $1 per dozen pints.

The business of this firm was short-lived, owing, I think, to bad management principally. The demand for American lager-beer is steadily increasing throughout the island of Jamaica.

The light and sparkling appearance of the lager without the bitterness, together with the neat appearance of the bottles, makes this beer a general favorite.

Recently a formidable competitor to the American lager-beer has appeared in the market in the firm of Tennant, of England. This company has commenced the brewing of lager-beer and has recently sent a large consignment to this market for trial, which was, in my judgment, inferior to the best American lager in color and quality and is not so pleasing to the taste, but by reason of the reputation of this firm as ale brewers their lager will, at least for a time, find sale. This beer is sold at about the same price as that charged for American lager.

It must be borne in mind that the statistics of importations from the

United States as given above apply exclusively to lager-beer, while those from the United Kingdom refer almost entirely to ale and porter. It will thus be seen that by far the greatest quantity of beer consumed in this island is of American brewing.

In my report to the Department concerning the Jamaica Exhibition it will be noticed that I have recommended that exhibits of lager-beer be made. Such an exhibit will be calculated to materially increase a a demand for American lager.

W. G. ALLEN,
Consul.

UNITED STATES CONSULATE,
Kingston, Jamaica, February 7, 1890.

MONTSERRAT.

REPORT BY CONSULAR AGENT HANNAM.

MALT.

No malt is ever, or, so far as I am able to ascertain, has ever been, imported into this island.

BEER.

I find that the average importation of beer for the past three years has amounted to about 1,000 gallons per annum, all from the United Kingdom, either direct or through one of the neighboring British West India Islands.

Of the above quantity about 220 gallons would be in English reputed quarts, about 360 gallons in reputed pints, and the remaining 420 gallons in bulk, the latter being bottled here before offered for sale.

The duties charged here are 12 cents per dozen quarts, 6 cents per dozen pints, and $2.80 per hogshead of 50 gallons.

The kinds of beer imported are English pale ale and brown beer or stout, in proportions of about two-thirds of the former to one-third of the latter. Some small quantities of lager-beer have been introduced, but this does not find much favor with consumers.

The wholesale cost of beer at port of shipment averages about $1.68 per dozen quarts, $1 per dozen pints, and 40 cents per gallon in bulk, and the retail prices here are from 20 cents to 24 cents per quart and 12 cents per pint bottle.

I am of opinion that the consumption of beer is on the decrease, and this decrease I attribute in a great measure to increase in consumption of cheap wine, as well as to a general feeling that beer is an expensive drink and not well suited to the climatic conditions of health.

RICHARD HANNAM,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Montserrat, March 19, 1890.

NEVIS.

REPORT BY CONSULAR AGENT SIMMONDS.

Malt liquors are not much consumed in this district. The original importation takes place at St. Christopher's (the head of the Presidency) and shipped to this place coastwise in small lots. It is generally imported in hogsheads of 54 Imperial gallons (on which there is an import duty of $2 per hogshead and sold for $20) and in bottles packed in barrels and cases of 4 dozen quarts and 8 dozen pints, on which there is an import duty 12 cents per dozen quarts and sold for $7, subject to a slight fluctuation. English bottled beer has hitherto been most used, though there is sale for foreign lager-beer. German brands of lager-beer have hitherto been most used.

I believe that American brewed beer could be placed on the market in the manner I have already described with successful results.

CHAS. H. SIMMONDS,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Nevis, March 19, 1890.

TRINIDAD.

REPORT BY CONSUL SAWYER.

MALT.

No malt is imported, the climate not permitting brewing.

BEER.

Malt liquors are chiefly imported in barrels and cases, each containing 7 dozen pints and 4 dozen quarts. Lager-beers are rapidly driving the heavy English ales out of the market. Hitherto the German lagers have been monopolizing the Trinidad market, but the English brewers, being fully alive to the situation, are erecting lager-beer factories in England and Scotland, and within the past few months some shipments of English brewed lager from the firm of Messrs. I. & R. Tennant have been received here and the beer, being of A1 quality, has had great success.

Heavy stouts, such as Guinness's Dublin, are found too heavy and also too expensive for the Trinidad trade, but a large business is done in cheaper stouts, brewed chiefly in Scotland.

Consumption of stout in Trinidad is about 2,500 barrels per month and of lager-beer about 1,000 to 1,200 cases. Prices range from $6.50 to $6 per 7 dozen pints, both stout and lager-beer; $6 to $5.50 per 4 dozen quarts lager-beer and stout.

Malt liquor in wood is also imported, but the quantity is small and prices obtained very low and unprofitable. Import duty, 1*s.* per dozen quart bottles, 6*d.* per gallon in wood. Malt liquors are chiefly handled by commission agents, who are paid a percentage on sales made. Sales are made at three months.

Trial imports of lager-beer from the brewery of ———, in the United States, have been made at Trinidad and have proved a failure, in so much that the same had to be sold at the low rate of 80 cents per dozen for barrels containing 10 dozen pints. Small kegs of fresh lager, containing about 6 gallons, are usually imported from Boston by the importers of ice at an average of about 150 kegs per year; value, $6 per keg. These kegs when empty are returned to Boston to be refilled.

MOSES H. SAWYER,
Consul.

UNITED STATES CONSULATE,
Trinidad, January 30, 1890.

DANISH WEST INDIES.

ST. THOMAS.

REPORT OF CONSUL TURNER, OF ST. THOMAS.

BEER.

Beer imported into this colony is brought from Denmark, mostly, as the following, taken from the import statistics for the year ended March 31, 1889, will show: Value of beer imported from Denmark, $11,465; Great Britain, $3,466; Germany, $1,752; United States, $1,138; Canada, $33.

Danish beer sells here for $1.75 per dozen quart bottles, which is a reduction of the former price, and the American beer for $1.87½. The former is strongly impregnated with alcohol, made so for this climate especially, and is of the brand known as Carlsberg. The American article is of a lighter quality.

I am reliably informed that the proprietors of the Carlsberg breweries are ready for a still further reduction in price in order to hold the trade.

The amount imported into Santa Cruz is as follows: From Denmark, $7,751; from the United States and other countries, $717. The duty is 12½ per cent. ad valorem. In that island Carlsberg beer has been universally preferred, but a lighter and cheaper beer, known as Tuborg, is fast becoming a favorite. Carlsberg costs $8.20 per barrel of four dozen quart bottles, and retails at 25 cents per bottle. The American beer imported is of Philadelphia and Milwaukee brands, but very little is brought in. It sells for 25 cents per bottle. Besides the above-men-

tioned there are two cheap brands imported in barrels in bulk from Denmark, viz, Kongun and Aldersro.

MORTIMER A. TURNER,
Consul.

UNITED STATES CONSULATE,
St. Thomas, March 1, 1890.

DUTCH WEST INDIES.

CURAÇOA.

REPORT BY CONSUL SMITH.

Very little malt is imported here. Nearly all the beer used is made in Germany. It is put up in bottles. The quantity of beer imported into Curaçoa can not be ascertained. The import duty is 1¼ per cent. on the invoice value. The average price at which beer is sold is about $1.50 per dozen small bottles.

L. B. SMITH,
Consul.

UNITED STATES CONSULATE,
Curaçoa, January 28, 1890.

FRENCH WEST INDIES.

GUADELOUPE.

REPORT BY CONSUL BARTLETT.

MALT.

There is no beer brewed in Guadeloupe; therefore there is no malt import.

BEER.

There was imported from the United States, in the year ended December 31, 1889, 247 barrels of bottled beer, besides a few small kegs imported in the ice vessel. There was imported from France, also, about the same quantity of bottled beer, put up in baskets of one dozen bottles, each bottle containing one quart.

There was also, from London, one small invoice of bottled beer, in cases of six dozen pint bottles, marked "Tottenham export Pilsener beer," which, I think, does not take here, as the consignee has a large portion of that invoice on hand at present.

The American lager beer has a preference over all others.

The price at wholesale of American lager beer is 60 francs = $11.58 per barrel, and the retail price is 50 centimes = $0.9.65 for a pint, and 1 franc = 19.3 cents for a quart.

The wholesale price of beer from France is from 7 to 8 francs = $1.35 to $1.54 per basket of a dozen quart bottles; the retail price is 1 franc = 19.3 cents per bottle.

The duties on imported beer are 7 francs = $1.35 per hectoliter.

Imported beer is sold by the importers to jobbers and by the jobbers to retailers, but I will observe that the French people of this colony are not great beer drinkers; in consequence the consumption thereof is very small.

CHARLES BARTLETT,
Consul.

UNITED STATES CONSULATE,
Guadeloupe, February 20, 1890.

MARTINIQUE.

REPORT BY CONSUL GARESCHÉ.

I have the honor to report that, after correspondence with the French officials here, it is impossible for me, as yet, to give statistics of the importation of beer to this colony during the year 1889. In a final letter of the 17th of March, Mr. Ch. De Solms regrets his inability to give me, as chief of the custom-house service, the information I have called for, but tells me that in the year 1888 72,379 liters of beer from France and 29,948 liters from other than French countries were imported here.

No records are kept of the countries from which the latter importations are made, but inquiries made by me of the mercantile community justify me in saying that they are almost exclusively American in production, and that all beers are received here in bottles packed in casks or hogsheads, the lighter kinds of beer being most suitable to the Creole palate. Lager beer in kegs pays a duty of 3.20 francs; in bottles a duty of 4.30 francs per hectoliter, equivalent to about 22 gallons.

WM. A. GARESCHÉ,
Consul.

UNITED STATES CONSULATE,
Martinique, March 18, 1890.

SPANISH WEST INDIES.

CUBA.

BARACOA.

REPORT BY COMMERCIAL AGENT PRYOR.

MALT.

There is no malt imported into or used in this district.

BEER.

All of the beer consumed in this district is shipped here from Havana and Santiago de Cuba.

There is but two kinds of beer handled here. Robert Younger's pale ale, in earthen pint bottles, is the only brand that is consumed here to any extent. All brewers and dealers in beer of the United States know the quality of this ale; it is very heavy, and the dealers here say that it is not so well suited to this trade as some of the lighter American beers, but is handled in preference to American beer because it is cheaper; it is delivered at Baracoa for $1.95 per dozen pints, and retails here at 23 cents per pint.

There is a small quantity of German beer consumed here, Salvator Bier, in glass pint bottles. This is lighter and better than the pale ale but is too expensive for this market; it costs, delivered in Baracoa, $2.55 per dozen pints, and retails at 28 cents per pint, but there is so little of this brand used here that it is hardly worth mentioning.

I know of a small shipment of Milwaukee beer that was made to this port several months ago from New York. It cost in Baracoa, duties and freight paid, $2.07 per dozen pints, and was retailed at the same price that the English ale sells for. The dealer did not renew his order on account of the difference in the price of it and the English ale, but says that he would handle it in preference to the English ale if he could get it as cheap.

The duty on beer is 84 cents per dozen pints.

The population of this district is 18,000, the annual consumption of beer is about 18,400 dozen pints.

There are several importers and merchants here who I think would handle American beers on commission if they could get it at prices that would enable them to place it upon the market at the same price or a little cheaper than the English ale is sold for. If this could be done I am sure that the American beer would displace the beer that is now consumed here, and the trade would increase.

HENRY G. PRYOR,
Commercial Agent.

UNITED STATES COMMERCIAL AGENCY,
Baracoa, February 8, 1890.

CIENFUEGOS.

REPORT BY CONSUL EHNINGER.

BEER.

No malt is imported into this consular district.

Imports of beer and whence imported during the year 1888 were as follows:

Month.	Country.	Port.	Liters.	Quarts.
January	United States	New York	90	93
	Great Britain	Liverpool	2,700	2,781
February	Germany	Bremen	750	772
	Great Britain	Glasgow	5,100	5,253
March	Germany	Bremen	360	371
	Great Britain	Glasgow	3,050	3,142
April	do	Liverpool	1,800	1,854
May	Belgium	Antwerp	3,450	3,554
	Great Britain	Glasgow	3,500	3,605
June	Germany	Bremen	1,600	1,648
	Great Britain	Glasgow	7,425	7,648
	United States	New York	135	139
July	Great Britain	Liverpool	17,000	17,510
August	United States	New York	45	46
	Great Britain	Glasgow	18,585	19,142
September	do	Liverpool	6,775	6,978
October	United States	New York	450	463
November	Germany	Bremen	3,360	3,461
	United States	New York	144	148
December	Great Britain	Glasgow	6,300	6,489
	United States	New York	180	185
Total			82,799	85,282

NOTE.—In bottles only; none imported in the wood.

From the foregoing statement it will be seen that 74,402 quarts, or 87 per cent. of the total importation for 1888, came from Great Britian via Glasgow and Liverpool. This was almost entirely from Tennant & Co.'s Well Park Brewery, Glasgow, and is imported in casks of 10 dozen pint bottles, and cost here $4, Spanish money, per dozen quarts. Next in order, constituting 11 per cent. of the importation, is the German product, from the Salvator brewery, located in Bremen. This sells a little higher than the Scotch beer; say $5 Spanish money, per dozen quarts, or two dozen pints. Last of all, and composing 2 per cent. of the importation of 1888, comes the lager beer from the United States, principally from Milwaukee, and the Anheuser-Busch brewery; this retails at about the same price as the Salvator beer.

During the past year I have noted in the coffee-houses lager beer from the the Empire Brewery of New York, which seems to have some sale, although the high price, 30 cents, silver, per pint bottle, makes it rather a costly luxury.

Duties and cost of a cask of 10 dozen pints.

Custom-house duties, $10 Spanish, equivalent to	*$9.32
Freight from New York, per Ward Line steam-ships	1.45
Cartage, etc	.30
Total expenses	11.07

It will thus be seen that the duties are nearly prohibitive.

HENRY A. EHNINGER,
Consul.

UNITED STATES CONSULATE,
Cienfuegos, February 24, 1890.

HAVANA.

REPORT BY CONSUL-GENERAL WILLIAMS.

MALT.

There is but one local brewery in Havana, and its production is estimated at about 3,500 barrels a year. As I am informed, this brewery imports its malt from Liverpool at a cost of about 40*s.* the 336 pounds.

The duties on malt at the custom-house here are $1.05 the 100 kilograms (220 pounds) and 25 per cent. additional. The production of this brewery sells at an average of $10 per barrel.

BEER.

The principal importations of beer are from England, Scotland, Germany, and the United States. It is generally imported bottled, in casks of 7 to 8 dozen pints.

Lager beer, to the extent of about 400 kegs a month, is also imported from New York, and has a ready consumption.

Duties here on ale and porter are, in wooden packages, $3.65 per 100 liters (nearly 26½ gallons); in bottles, $8.35 per 100 liters.

The following are the latest market quotations of price, taken from Spencer's Weekly Report: $4.50 to $4.75 per dozen bottles for Tennant, and $12 to $12.75 per barrel for Globe and Younger marks, in quart bottles.

The same publication gives the following as imports for 1889:

From the United States, 297 boxes; 209 barrels; 2,611 casks.

From Europe, 3,331 boxes; 5,532 barrels; 12,268 casks.

RAMON O. WILLIAMS,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Havana, January 23, 1890.

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*United States currency.

SAGUA LA GRANDE.

REPORT BY COMMERCIAL AGENT MULLEN.

MALT.

No importation of malt of any kind is made, nor is malt of any kind prepared at this port.

BEER.

Direct importation of beer is made from England by but one firm, who imports monthly seventy-five barrels. Other firms bring from Havana some 125 barrels, making a total consumption of about 200 barrels per month, or 16,800 half bottles. All of the aforementioned beer comes in stone bottles from the Well Park Brewery of J. R. Tennant, England. This beer is sold at wholesale at $14. per barrel, Spanish gold, or $12.96 United States currency, and retailed at 25 cents per half bottle, or $21 Spanish gold, or $19.45 United States currency.

For a great number of years this beer was the only one known or used; but of late years American lager beer has found great favor with the public, and is fast taking the place of English beer.

Lager is imported directly from the United States but by one firm, who imports monthly from 20 to 25 barrels, each barrel containing ten dozen half bottles. An additional five barrels are brought from Havana, making a monthly consumption of some thirty barrels, or 3,000 half bottles.

The cost per barrel of ten dozen half-bottles at wholesale is $17 Spanish gold or $15.74 United States currency, and retailed at 20 cents per bottle ($24 Spanish gold per barrel or $22.27 United States currency).

The duties on beer of all kinds is as follows:

If imported in wood, for each hectoliter	$3.65
25 per cent. war tax	.91
Total	4.56
Less 5 per cent	.23
Net total	4.33
A local tax of $2.50 per each hectoliter	2.50
Total (Spanish gold)	6.83
Total (United States currency)	6.32
If imported in glass or stone, for each hectoliter	8.35
25 per cent. war tax	2.09
	10.44
Less 5 per cent	.52
Total	9.92
A local tax of $3.75 per each hectoliter	3.75
Spanish gold	13.67
United States currency	12.65

The approximate duty on one dozen half-bottles is 85 cents United States currency.

CONSUMPTION.

The beer most suitable for local consumption must be of a light amber color; it must also be of light body and bottled in clear glass bottles. The label on the bottle forms a very important feature in its sale.

A label containing some striking feature that takes the eye and is easily remembered becomes popular and is called for by the label, the name of brewer being ignored. Beer of a medium brand bottled as above directed would find a better sale than beer of a first-class quality bottled in dark glass bottles and poorly labeled.

D. M. MULLEN,
Commercial Agent.

UNITED STATES COMMERCIAL AGENCY,
Sagua la Grande February 10, 1890.

SANTIAGO DE CUBA.

REPORT BY CONSUL REIMER.

Until a few years ago, no American beer found a market in this consular district, and even now (and that after considerable trouble) only one firm of manufacturers, Beadleston & Woerz, of New York, sell their beer, Imperial and Culmbacher brands, and beer in kegs, to the largest restaurant here.

To arrive at approximate statistics of the actual consumption of beer in this jurisdiction, the writer has interviewed the importers here, and has also secured statistics of imports from the custom-house of this city.

The custom-house states that during 1889 there were imported from—

	Liters.
New York:	
In pint bottles	5,094
In kegs	892
Total	5,986
Liverpool, in pint bottles	86,280¾
Bremen, in pint bottles	4,353
Havre, in pint bottles	1,650
Total	98,269¾

It is impossible to determine how much of the importation from Liverpool is English ale, and how much is Salvador beer (German), as all beer from Europe is shipped from Liverpool here in Spanish steamers.

The Spanish customs tariff, sections 8 and 9, imposes the following duty on beer:

SEC. 8. Beer and porter in the wood (the capacity of the keg, 51 centimeters high, 31 centimeters in diameter at the heads, even should it contain 31 liters or 32,

is supposed to contain only 29 liters of beer, owing to the fact that space must be left for the expansion of gases) pays per keg: Spanish production, $1.1575; foreign production, $3.3799, United States currency.

SEC. 9. Beer in bottles, glass, or stone (in addition to the number of liters, the number of bottles or half-bottles must be stated in the custom-house entry). Spanish production, per barrel of, say, 10 dozen pints, one-half liters, $2.6854; foreign production, per barrel of, say, 10 dozen pints, one-half liters, $7.7321, United States currency.

To both these sections 25 per cent., less 5 per cent., must be added to the duties and port charges, at the rate of $0.926 United States currency, per 1,000 kilos weight.

Internal-revenue tax amounts to 10½ cents Spanish, or $0.09723 per liter.

Beadleston and Woerz American beer is sold here, retail on draught, at 10 cents a glass, and per bottle at 30 cents Spanish gold.

The consumption amounts to about 20 to 25 kegs, of 8½ gallons, per year, and 100 barrels of bottled beer in pints during the same period.

It is my opinion that great impetus could be given this trade by our manufacturers making small trial shipments free of charge, and advertising extensively through the country and towns. The English bitter beer has the largest sale and is largely consumed. The American beer sells at 30 cents a bottle, the English at 20 cents. As very little ice is consumed in this city and none whatever in the country, the stronger English bitter beer is preferred by the people of this province, both for its cheapness and for the longer time it retains its force. Our beer manufactured at home is greatly superior to English and German brands, and with the enormous advantages we enjoy, our close proximity to these shores, and consequent cheaper ocean freights, there is in the writer's opinion no reason why we can not undersell and drive all other competitors from the field.

As to consumption of beer, importers give the writer the following figures, for whose correctness we can not vouch:

	Liters.
American brands, principally Beadletson and Woerz, and a few cases of Milwaukee beer, say, per annum	6,000
Tennant's and Gounger's English bitter beer, per annum, about	10,800
Salvator Bremen beer (German), per annum, about	6,000
Total	22,800

Selling prices of American brands are about $2.50 Spanish, or $2.315 United States currency, per dozen pints.

Tennant's and Gounger's bitter beer, $20.50 Spanish, or $18.5663 United States currency, per case of 10 dozen pints, one-half liters.

Bremen Salvator beer sells at $18.25 Spanish gold, or $16.8995 United States currency, per case of 8½ dozen pints. Other brands of English ales and beers, such as Tottenham brewery, Adjutant brand, Bull Dog brand, etc., have been received in small consignments, but, owing to their higher prices, have found no sale. It will take a good

deal of advertising and expense to supplant Tennant's bitter beer in this province, which beer is also solely consumed in Guantanamo, Manzanillo, and Santa Cruz.

OTTO E. REIMER,
Consul.

UNITED STATES CONSULATE,
Santiago de Cuba, February 1, 1890.

SAN DOMINGO.

PUERTA PLATA.

REPORT BY CONSUL SIMPSON.

MALT.

No malt is imported into this district, nor is any beer made here.

BEER.

The imports of beer during 1889 were 14,904 dozens half bottles, and the value (custom-house) $10,583.59. The duties amounted to $5,503.16, or 52 per cent. With the exception of some 200 dozens from the United States, and a smaller quantity from Norway, the entire amount was received from Germany.

All beer is imported in cases, generally of 3 dozen half bottles, that from Germany costing about $5.17, Mexican duties paid, per case (depending on exchange) and from the United States 20 cents per dozen half bottles more. It is sold at wholesale from $5.50 to $5.78 per case, and retails for $2 per dozen.

There are a number of different brands imported from Germany, but the one most favorably received is labeled with a long T. Parties who have received the article from the United States complain that in one or two months' time it is entirely unfit for use, while that from Germany keeps for years. This is probably due to the greater amount of alcohol contained in the latter.

Beer, to meet a ready sale in this market, must be strong and well bottled or it will not keep.

The beer manufactured in the United States is undoubtedly superior in quality to any other imported here, but it is useless to expect people to drink an article that they know nothing about, when they are getting one that suits them. I would suggest that if any manufacturers consider the trade of this district worth looking after, that they procure a sample of the kind most in demand, analyze it, and see if it will pay to make.

THOS. SIMPSON,
Consul.

UNITED STATES CONSULATE.
Puerto Plata, March 9, 1890.

SUPPLEMENT.

Statement showing the exports of American beer and hops, by countries, during the year 1889.

Countries to which exported.	Malt liquors.				Hops.	
	In bottles.		Not in bottles.			
	Dozens.	*Dollars.*	*Gallons.*	*Dollars.*	*Pounds.*	*Dollars.*
Argentine Republic	3,244	5,978				
Austria						
Belgium	46	41				
Bolivia						
Brazil	7,443	14,169				
Central American States: Costa Rica	11,392	17,478			10,348	2,158
Guatemala	11,219	13,558			7,962	1,139
Honduras	9,659	14,488			69	9
Nicaragua	13,417	17,847	50	9	100	30
San Salvador	16,037	17,806			740	139
Chili	655	1,314			150	36
China	106	204			1,543	258
Denmark						
Danish West Indies	285	496			100	13
Greenland, Iceland, and Faroe Islands						
Ecuador	345	668			2,665	533
France	784	1,540	1,650	425		
French West Indies	2,952	5,741	3,796	1,071	50	11
French Guiana	685	1,073				
Miquelon, Langley, and Saint Pierre Islands	287	443	3,445	1,136		
French East Indies						
French Possessions in Africa and adjacent isl'ds.	80	88				
French Possessions, all other	2,094	2,339			390	38
Germany	768	1,386	80	20	4,377	1,510
England	690	1,344			11,386,087	2,570,562
Scotland	92	200			469,073	106,854
Ireland						
Gibraltar						
Nova Scotia, N. Brunswick, and Pr. Edward Isl'd	187	347	7,918	1,885	20,047	2,664
Quebec, Ontario, Manitoba, and the N. W. Ter.	6,269	7,470	32,282	6,503	282,076	58,899
British Columbia	7,343	9,013	10,384	3,311	134,746	34,496
Newfoundland and Labrador					8,780	792
British West Indies	6,840	12,666	8,640	3,199	14,165	2,434
British Guiana	210	415				
British Honduras	2,984	4,851			35	6
British East Indies	1,445	2,927			36,639	7,387
Hong-Kong	622	733	75	27	1,872	239
British Possessions in Africa and adjacent isl'ds.	111	218				
British Possessions in Australasia	48,512	84,877			159,744	25,376
British Possessions, all other						
Greece						
Hawaiian Islands	41,457	47,092	21,562	7,162	3,230	399
Hayti	8,660	15,771			512	115
Italy						
Japan	260	371	27	9	18,063	2,721
Liberia	47	95				
Mexico	105,940	165,700	42,688	16,358	6,599	1,222
Dutch West Indies	361	704			40	10
Dutch Guiana	4,710	8,932				
Dutch East Indies	250	527				
Peru	586	971				
Azore, Madeira, and Cape Verde Islands	640	831				
Russia, Asiatic					882	126
San Domingo	4,450	7,493			549	100
Spain	10	23				
Cuba	6,542	11,834	29,959	7,478	2,107	394
Porto Rico	3,586	6,382			2,810	391
Spanish Possessions in Africa and adjac. isl'ds.	536	1,034				
Sweden and Norway	2	5				
United States of Colombia	21,067	34,445	7,503	1,714	6,285	1,347
Uruguay	1,795	3,317				
Venezuela	13,308	23,263			6,202	1,404
All other countries and ports in Africa	54	100				
All other islands and ports	3,995	4,481			160	20
Total	375,059	575,089	170,059	50,307	12,589,262	2,823,822

Statement showing the imports into the United States from the several countries, of beer, malt, and hops, during the year 1890.

Countries from which imported.	Malt liquors.				Hops.		Malt, barley.	
	In bottles or jugs.		Not in bottles or jugs.					
	Gallons.	*Dollars.*	*Gallons.*	*Dollars.*	*Pounds.*	*Dollars.*	*Bush.*	*Dollars.*
Argentine Republic								
Austria-Hungary	320	186	173,427	26,331	274,693	85,718	13,206	10,129
Belgium	18	10			30,025	10,846		
Bolivia								
Brazil								
Central American States:								
Costa Rica								
Guatemala								
Honduras								
Nicaragua								
San Salvador								
Chili								
China								
Denmark	245	108						
Danish West Indies								
Greenland, Iceland, and the Faroe Islands								
Ecuador								
France	365	211						
French West Indies								
French Guiana								
Miquelon, Langley, and Saint Pierre Islands								
French Possessions in Africa and adjacent isl'ds								
French Possessions, all other								
Germany	13,332	6,903	524,963	118,119	3,781,355	1,034,762	271	458
German Possessions in Africa and Australasia								
England	657,144	529,310	610,484	243,001	83,680	22,062	216	199
Scotland	49,391	35,501	11,265	4,624			200	228
Ireland	412,545	370,557	52,962	13,526			33	53
Gibraltar								
Nova Scotia, N. Brunswick, and Pr. Edw. Island	14,863	11,137	104	33				
Quebec, Ontario, Manitoba, and the N. W. Ter	610	521	411	113	1,662	495	136,256	100,314
British Columbia	262	325						
Newfoundland and Labrador	6	6						
British West Indies								
British Guiana								
British Honduras								
British East Indies								
Hong-Kong								
British Possessions in Africa and adjacent islands								
British Possessions in Australasia								
British Possessions, all other								
Hawaiian Islands	10	7						
Italy								
Japan								
Mexico	748	819						
Netherlands	255	162						
Dutch West Indies								
Portugal					15	1		
Azore, Maderia, and Cape Verde Islands					4,728	1,588		
Russia on the Baltic and White Seas								
Russia on the Black Sea								
Cuba	10	8						
Porto Rico								
Sweden and Norway	941	472						
Switzerland								
Turkey in Europe								
Turkey in Asia								
Turkey in Africa								
Total	1,151,065	956,243	1,373,616	405,747	4,176,158	1,155,472	150,182	111,381

SPECIAL CONSULAR REPORTS.

FRUIT CULTURE

IN

FOREIGN COUNTRIES.

REPORTS, FROM THE CONSULS OF THE UNITED STATES, ON FRUIT CULTURE IN THEIR SEVERAL DISTRICTS, IN ANSWER TO A CIRCULAR FROM THE DEPARTMENT OF STATE.

ARRANGEMENT.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

FRUIT CIRCULAR.

DEPARTMENT OF STATE,
Washington, September 28, 1889.

To the Consular Officers of the United States:

GENTLEMEN: At the request of the California State Board of Horticulture, acting through Mr. B. M. Lelong, its secretary, the inclosed series of questions relative to the cultivation of oranges, lemons, figs, and olives is sent to you for reports. You are requested to give such information in response thereto as you can acquire without expense to the Government or to yourselves. But should you find it impracticable to make a satisfactory report without outside aid, you will submit to the Department an estimate of the anticipated cost before you obligate yourself for any specific sum.

I am, gentlemen, your obedient servant,

ALVEY A. ADEE,
Acting Secretary.

QUESTIONS ABOUT ORANGES AND LEMONS.

(1) Name of best variety for profit.
(2) Names of other choice varieties worthy of culture and for profit.
(3) Location—where are the trees grown that produce the varieties named above?
  (*a*) Distance from sea.
  (*b*) Elevation above sea-level.
  (*c*) Exposure to sun.
  (*d*) Hilly, rolling, or level land, and which is best?
  (*e*) Soil formation and character, also subsoil, etc.
(4) Climatic influences.
  (*a*) Temperature—minimum, maximum, and average.
  (*b*) Nights cold or warm, sultry days, moist, ordinary atmosphere.
  (*c*) Rain-fall, in inches, for year.
  (*d*) When rain falls, as to growth of trees and fruit?
(5) Irrigation—when and how?
  (*a*) At what stage of growth of fruit?
  (*b*) How much at a time, and how often, and other particulars?
(6) Cultivation—when and how?
(7) Fertilizers—what, when, and how applied?
(8) Pruning—what stage of growth; high from ground or low, and particulars?
(9) Picking.
  (*a*) When picked.
  (*b*) Stage of ripeness.
  (*c*) How cured.
  (*d*) Packing and shipping.

(10) Distance planted apart.
(11) How are trees propagated?
(12) Are best varieties seedling or budded?
(13) Are orchards large or small?
(14) Age of fruiting; age when largest crops; maturity of trees.
(15) What insect pests, and how treated?
  (*a*) Are there any beneficial insects?
  (*b*) Are there any parasites of the injurious insects?
  (*c*) Name parasites, and tell how they work.
(16) Give particular information as to picking and curing lemons before shipping, season picked, etc.
(17) Send any printed information as to processes; prices or statistics issued by Government or otherwise.

QUESTIONS ABOUT FIGS.

(1) Name of best variety for drying.
(2) Name of best variety for eating when ripe.
(3) Name of other varieties worthy of culture and for profit.
(4) Where are the trees grown that produce the varieties above named?
  (*a*) Distance from sea.
  (*b*) Elevation above sea-level.
  (*c*) Exposure to sun.
  (*d*) Hilly, rolling, or level land, and which is best.
  (*e*) Soil and subsoil character.
(5) Climatic influences.
  (*a*) Temperature—minimum, maximum, and average.
  (*b*) Rain-fall, in inches.
  (*c*) When rain falls, as to growth of trees and fruit, and how much and effects?
(6) Irrigation—method, when and how much, and during what growth of trees and fruit?
(7) Cultivation—when and how?
(8) Fertilizers—what, when, and how?
(9) Pruning—when and how?
(10) Picking.
  (*a*) At what stage of ripeness, time of day, etc.?
  (*b*) Give process, from picking to boxing of figs, minutely.
  (*c*) Are they dipped in some solution; what and how?
(11) Distance planted apart.
(12) How are trees propagated?
(13) Are orchards large or small?
(14) What age do trees attain and how long fruitful?
(15) What insect pests, and how treated?
  (*a*) Are there any beneficial insects?
  (*b*) Are there any parasites of the injurious insects?
  (*c*) Name parasites, and tell how they work.
(16) How are cuttings of best varieties to be secured?
(17) Can you secure any printed matter, such as reports, methods, or statistics issued by Government or otherwise, and send us?

QUESTIONS ABOUT OLIVES.

(1) Name of best variety for pickled olives.
(2) Name for best variety for olive oil?
(3) Names of other choice varieties for pickles (eating) and oil, worthy of culture and for profit.

(4) Where are the trees grown that produce the varieties above?
   (*a*) Distance from sea.
   (*b*) Elevation above sea-level.
   (*c*) Exposure to sun.
   (*d*) Hilly, rolling, or level land, and which is best.
   (*e*) Soil and subsoil character.
(5) Climatic influence.
   (*a*) Temperature—minimum, maximum, and average.
   (*b*) Rain-fall, in inches.
   (*c*) When rain falls, as to growth of trees and fruit, and how much?
(6) Irrigation—method, when and how much, and during what growth of trees and fruit.
(7) Cultivation—when and how?
(8) Pruning—when and how?
(9) Picking.
   (*a*) At what stage of ripeness, both for pickling and oil.
   (*b*) Next step after picking.
   (*c*) Give minutely the process of pickling and making oil until completed ready for market.
(10) At what age do trees commence fruiting?
(11) What is the average yield per tree or acre?
(12) What distance apart planted?
(13) How are trees propagated?
(14) Can you give other information that will help growers of olives in California to succeed?
(15) Can you secure any printed matter, reports, methods, or statistics issued by the Government, agricultural colleges, newspapers, or otherwise?
(16) What insect pests, and how treated?
   (*a*) Are there any beneficial insects?
   (*b*) Are there any parasites of the injurious insects?
   (*c*) Name parasites, and tell how they work.

PART I.

ORANGES AND LEMONS.

FRUIT CULTURE IN FOREIGN COUNTRIES.

ORANGES AND LEMONS.

CONTINENT OF AFRICA.

CAPE COLONY.

REPORT BY CONSUL HOLLIS, OF CAPE TOWN.

The time was, and not so long ago, when the orange crop of this colony meant a good revenue to the farmer. With the advent of the Australian bug, whose scientific name I have forgotten, all this is changed, and in place of trees loaded with luscious fruit now only remain a few blackened stumps to mark where the orchards once stood.

No systematic effort was made to eradicate the pest, A. saying it was useless for him to struggle against the evil while B., whose orchard was close by, gave the bug free license to breed and multiply.

I have just heard of a new method of destroying these insects which may be worth a trial. It is to make a cross incision in the bark L-shaped, and after rolling back the bark dust the wound with flowers of sulphur. Wax and bind up as after budding.

Years ago I found that the juices of the squash vine was a solvent of sulphur and would take it into the circulation of the plant. At all events, it will cost nothing to try, and will do no injury to the tree.

GEO. F. HOLLIS,
Consul.

UNITED STATES CONSULATE,
Cape Town, March 5, 1890.

EGYPT.

In reply to the circular of the Department, dated September 28, 1889, asking certain questions about the cultivation of oranges, lemons, figs, and olives, I have the honor to inform you that these fruits are not cultivated to any extent for commerce in this country, although they are sometimes to be found in private gardens.

EUGENE SCHUYLER.

UNITED STATES CONSULATE-GENERAL,
Cairo, November 22, 1889.

MOROCCO.

REPORT BY CONSUL MATHEWS, OF TANGIERS.

(*Republished from Consular Reports No.* 41½.)

Varieties.—As most of the trees are seedlings, the varieties are numerous; the most valuable are the round, sweet orange, and the small aromatically flavored fruit known as the Mandarin orange. The Mandarin is the most valuable.

Maturity.—Nine years from seed; two years after grafting or budding. Seedlings remain fruitful over a century; grafted or budded, from thirty to forty years.

Propagating.—They are propagated from seeds, inarching, grafting, budding, and by cuttings.

Planting.—Fifteen feet apart, or about 150 trees to the acre, if graftings; seedlings, 20 feet apart, 100 trees to the acre.

Insect pests.—Various vine-fretters and kermes are very troublesome, and cause considerable damage to orange trees. The common remedy to a certain extent is to wash the trunk and main branches with a lotion of lime-water, and by watering the leaves with the hand pump. Trees too closely planted, or placed in damp and shady localities, or even not properly pruned to permit light and air through all their branches, create a parasite or leaf disease known as the "demantium monophyllum" or charcoal, which covers the leaves with a black adhesive dust; also the "lichen auranti," which appears as a crust of a gray whitish color. The bad state of health of the trees creates these parasites and fungus. I have cured these with petroleum, which must be applied in a mixed state by churning milk and petroleum to a consistency of cream, as petroleum mixed with water is often injurious. These liquids are unmixable, and when applied in some parts only the petroleum touches the trunk or leaves, and on the others the water alone, while, if well mixed with milk, the strength of the petroleum is

reduced, the application is uniform, and the results most certain and beneficial to all trees.

Situation.—Orange orchards are planted both inland and on the sea-coast, on valleys, hillsides, and uplands. They yield best results in well-drained low-lying lands sheltered from the cold north winds.

Some are within 200 yards of the sea on the sand.

Irrigation.—They are irrigated artificially, mostly from wells from which the water is drawn by animal power, with very primitive draw-wells.

Cultivation.—The ground is manured and cultivated with a heavy hoe once a year. The yield and proceeds can not be ascertained in Morocco. The cost of cultivation, including manuring, in the best orange orchards is at the rate of 25 cents per tree per annum; laborer's and pruner's wages from 18 to 20 cents per day.

OBSERVATIONS ON ORANGE CULTURE.

In any country where the medium temperature in winter is superior to 40° and in summer rises to 85°, the cultivation of orange orchards can be made lucrative.

Orange trees are not particular with regard to soil; they grow luxuriantly in the sand, and even in strong and very inferior soils, provided they are manured and copiously watered in the summer. There have been empirics who have written on the orange trees and on the manner of composting the soil, recommending all sorts of filthy nostrums and unwholesome composts which nature never designed, and nobody can form an idea of the mischief which such people do. In nine cases out of ten the leading cause of failure, where trees get diseased or where neither fruit nor flowers are had with any certainty, is due to ill-treatment and poisoning of the roots with the obnoxious mixtures.

Seedlings are always preferred, as they stand cold weather and their yield is enormous; besides, the objects to be attained in raising the orange trees from seed, are, first, to procure new varieties, all of which are more or less acceptable as to size, flavor, and shape; secondly, to provide hardy stocks for grafting or budding known fancy varieties, in preference to grafting or budding on stock raised from the cuttings of citrons, or even of orange cuttings, which are more delicate, of less growth, and short life. In recurring to budding, the hardiest stock of all is that of the bitter or sour orange, the most beautiful of the tribe in form, elegance of foliage, and abundance of fruit. When the medium atmospherical temperature of the spring has reached 70° the seed may be sown and watered regularly, and in fifteen days they will come up. If the seeds are from the finest, ripest fruits, there will be no necessity of budding to perfectionate the fruit. The fruits from trees raised from seed are the earliest and stand transportation well; the flowers of these trees stand the cold weather best.

Excessive dampness and humidity in the soil produces the "chlorosis," or yellow of the leaves, which at last ends in destroying the tree.

Excessive aridity of the soil is also another cause of suffering to the orange tree, but does not cause its death.

Strong winds only cause the fall of the fruit before ripening.

The fogs and white frost of spring sometimes cause an alteration in the orange tree, which afterwards is shown in the shape of reddish spots on the exterior part of the skin of the fruit, which renders it unfit for use

VARIETIES CULTIVATED.

The races and varieties known are innumerable, the majority of which are still unclassified. The most interesting are divided in eight groups, namely: (1) sweet orange, (2) sour orange, (3) Mandarin orange, (4) limes, (5) Bermagots, (6) Pampelmuses, (7) lemons, (8) citrons.

(1) *Sweet orange.*—The sweet orange raised from seed in a warm climate is a vigorous tree, which reaches the height of 15 feet; its foliage large and oblong prolongated, of a dark brilliant green. The flowers are hermaphrodite and pure white. The fruit is quite round, with a smooth, yellowish skin. It commences to ripen in the middle of November, and in March arrives at full maturity. Trees from seed without grafting give the largest crops, and it is not unusual for an adult tree to produce from three to four thousand oranges per annum. These trees, if conveniently sheltered from the cold winters, live centuries. Grafted or budded orange trees hardly grow higher than 10 feet in their proper climate, while in others they only reach 6 or 7 feet, and even less, and their life is short. The principal sweet-orange trees which are selected by those engaged in the orange culture are the Bigaradia (*Citrus vulgaris bigaradia*) Imperial, the Royal Bigaradia, the Bigaradia of silvery leaf (*C. vulgaris argentea*), the Bigaradia of spotted leaf (*C. vulgaris variegata*), the Bigaradias of double flower and of violet flower, and the Bigaradias of round fruit, angulated fruit, spotted fruit, and crowned fruit; also the Bigaradia of myrtle leaf and that of double flower, producing cake-shaped fruit; the Balearic or Mallorea orange, large, smooth, thin skin, of vigorous growth; the Portugal or China orange, of less growth than the Balearic, but producing very large fruit; the orange of Nice, highly favored in Provence for its elegance and beautiful fruit. The Maltese or blood orange is very rich, and also an abundant bearer, the fruit having a pulp stained with crimson; the foliage resembles that of the Portugal or China orange. There are numerous other varieties, most of which are more nominal than real, mostly the results of hybridizing, and which are more of a botanical ornament than of profit.

(2) *Sour orange.*—The sour or bitter orange, many of which have curious and very interesting foliage, portly and handsome trees, with gold and silver-striped leaves, myrtle leafed, willow leafed, plain and striped, tricolor striped, and many others very showy. The flowers of these trees bring the highest prices in market. Their fruit is preferred for

confectionery, marmalades, etc. The sour or bitter orange tree is still more rustic and hardier than the sweet orange from seeds, and its growth is more rapid. There is of this tribe the China sour-orange tree, which is dwarf, only growing to about 4 or 5 feet in height the most.

(3) *Mandarin.*—The Mandarin orange, originally from China, propagated also from seed, was introduced in Europe about the middle of the present century; only grow from seed to a height of 12 feet, and to about 6 feet when propagated by grafting or budding. The pulp of the Mandarin orange is almost free from the rind; the latter is very aromatic. The Tangerine orange, recently introduced in Europe, is a variety of the Mandarin; its fruit is less than half the size of the Mandarin, in fact often no larger than a walnut, but exceedingly sweet and perfumed. The Japanese orange is a shrub which the Chinese cultivate on a large scale, and known by the name "Kumkoat;" is almost unknown in Europe; it attains a height of 4 feet, and by pruning it is grown in pots, where it only grows to about 20 inches, covering itself with a fruit no larger than a good-sized cherry. The rind is so thin and smooth that it is eatable. They are preserved whole in sugar. I have four in pots from 15 to 18 inches in height with ripe fruit; they have ripe fruit from December to April; they resist the cold weather better than the hardiest of the orange tribe, but in summer they require hot weather to bring their fruit to maturity. I strongly recommend this interesting and profitable shrub to our California orange-growers. One acre of land will accommodate 500; manure annually, and if possible in summer. An irrigation or two of manure water will bring the fruit to perfection.

(4) *Sweet limes* (*Citrus limeta*).—The sweet-lime tree has the bearing and foliage of the lemon tree; small white flowers; the fruit more or less large or small, according to the varieties; its color is of a pale yellow; the pulp is an insipid sweet, slightly bitter. The varieties known in the south of Spain and in Morocco, where they abound, are the "Roman," the "Melaroce," and "St. Jerome."

(5) *Bergamot orange* (*Citrus bergamia*).—Tall tree; oblong leaves of medium size, of a lively green on the upper surface and paler on the under part than the other varieties of orange; very small flowers and of a particularly mild aroma. The fruit is depressed in shape, smooth, and of a lemon-yellow color; the pulp is slightly sour and of a pronounced aromatic flavor. The chief varieties are the common Bergamot, the orange Bergamot, the sweet lemon Bergamot, and the Adam apple Bergamot, and some others which probably are only monstrosities propagated by grafting. The cultivation of the ordinary Bergamot is very lucrative by the great quantity of volatile oil extracted from the rind of its fruits.

(6) *Pampelmuse.*—Pampelmuse (*Citrus decumana*) probably is a species entirely distinct from the preceding, nevertheless it has certain similarities to the natural ordinary sweet orange from seed; it grows the same height; very few thorns. It differs in foliage—broad leaves and large

flowers of a pure white. The fruit is depressed and of immense size, of a pale yellow, and only matures on the second year; they require shelter and a warm locality. The "Lumias" are a variety of the Pampelmuse.

(7) *Lemons* (*Citrus limonum*).—This species is more a large shrub than a small tree; they require a warmer climate than oranges do; their flowers are white inside and reddish on the outside. There are numerous varieties. They require less irrigation than the orange tree; are easily propagated from cuttings, which the dealers in orange trees use extensively for budding or grafting.

(8) *Citron.*—There are various varieties—the ordinary citron, the lemon citron, the St. Jerome citron of very large fruit, the Florence citron, and the sweet citron; the flowers are reddish, pink, white, and violet. It grows well in narrow valleys where the heat in summer is retained during the evenings; it grows admirably on the shores of the Mediterranean in almost any soil, and is easily multiplied from slips or cuttings, which are also used for budding or grafting by the dealers and venders of orange trees.

For California I would recommend raising sweet oranges from seed or grafting the seedlings or stocks of the sour orange, the hardiest of all for cold winters.

Observations on pruning.—The flower and fruit are produced on the young wood of the current season generally. The pruning has in view three objects: first, to keep the branches from being too numerous, and thereby making the foliage too thick, so as to exclude air and sun to a great part of the head; secondly, to check those branches which grow too vigorously for the rest of the tree; thirdly, to remove old and bare wood and make way for the young. The weakest branches should also be removed, and the pruning should be done on dry days during the months of February and March. No shoots should be allowed to grow below the head, unless left for the purpose of propagation by layering in pots and thus obtaining young additional trees.

The orange tree spreads its roots close to the surface; care should be taken not to disturb them when cultivating the soil around the trees.

Nothing is wasted of the orange tree. The leaves, the flowers, and the fruit are all a source of profit; they all constitute a branch of commerce. On pruning the trees the leaves are gathered from the cut branches, dried, and they sell in the markets of Europe from $2 to $4 per hundred-weight. The flowers are sold for the distillery and other purposes in France at 25 cents per pound. Oranges for exportation are gathered in November when their color begins to change from green to a yellowish; the second gathering for short distances is made in December, and the last for the nearest markets in February and March.

FELIX A. MATHEWS,
Consul.

UNITED STATES CONSULATE,
Tangier, April 2, 1884.

CONTINENT OF AMERICA.

MEXICO.

GUERRERO.

REPORT BY CONSUL SUTTER, OF ACAPULCO.

(Republished from Consular Report No. 41½.)

Varieties.—Sweet and bitter oranges, navel oranges, lemons, limes, shaddocks, citrons.

Limes and sweet oranges are the most valuable. Some 15,000 boxes of limes, representing for the growers a value of about $25,000, are exported annually per steamers of the Pacific Mail Steam-ship Company to San Francisco. Brought to town, selected, and packed for export, this fruit costs, more or less, $3 per box.

Only small quantities of oranges are exported to San Francisco per steamer from December to February, before the crop from the islands in the Pacific overstocks the market.

Oranges are obtained at $5 per thousand, but on account of high rates of freight can not compete in the San Francisco market with the fruit imported from those islands.

Maturity.—Lime trees which are allowed to grow like a bush, with branches rising from the roots, commence to bear at the age of four years, and are in full bearing when eight years old; in good soil and with but very little care the tree will attain the age of fifty years. This tree is indigenous, whilst the other varieties of the citrus family are said to have been imported.

Orange trees commence to bear at the age of five years, are in full bearing at the age of ten, and will remain fruitful fully as long as the lime tree.

Propagation.—All the trees are seedlings.

Insect pests.—Ants are the only insects which are injurious to the trees, much more to the orange than to the lime trees; people protect their trees in various ways from ants with more or less success. The ants are destroyed by digging up their nests, or are kept off the trees with fine sand, fire, water, petroleum, etc. Fungous growth and other parasites are not found in such abundance as to seriously injure the trees.

Planting.—Most of the trees are planted very irregularly, in selected, favorable spots, which may keep moist all the year round. In a few

newly laid out lime-tree plantations the distance between trees is 20 feet in every direction.

Situation.—Anywhere, mostly in moist places along small streamlets or gulches on the hill-sides, in low bottoms along rivers, or near the sea-shore; in sandy black loam they yield the best results; the sweetest and thin-skinned oranges usually grow on hill-sides, whilst the fruit of lowlands is generally thick-skinned.

Some orchards are in close proximity to the sea-shore, in sandy black loam, in some instances with lagoons or brackish water on the side opposite to the sea-shore, and give very excellent results. Thus situated there is one, newly, regularly planted, of 8,000 lime trees and 100 orange trees, with room for many thousands more, and with the advantage of cheap transportation by water to Acapulco, the port of shipping.

Irrigation.—No system of artificial irrigation is in use; the ground between trees is not cultivated, but merely kept free of undergrowth and weeds, lands being as yet of but nominal value.

Yield.—As the orchards are not regularly planted and the trees are scattered here and there without any regard to economy in land occupied, it is utterly impossible to state even only approximately the yield or cost of cultivation of an acre per annum.

One orange tree from the age of eight years up to fifty years of age in ordinarily good conditions will yield on an average 3,000 oranges every year, worth, picked, $4 per thousand. A lime tree from the age of eight years to the age of fifty bears fruit all the year round, and will yield about 8,000 per year, worth on the tree, say, $10.

Land being but of nominal value, no interest on capital invested in the same or any ground rent is to be taken in account; nothing is irrigated, consequently the cost of cultivation is very little, say $150 per annum for an orchard of several hundred trees.

There being no export market for the other varieties of the citrus family, they are of comparatively little value, and only raised for home consumption.

JOHN A. SUTTER, JR.,
Consul.

UNITED STATES CONSULATE,
Acapulco, February 15, 1884.

SONORA.

REPORT BY CONSUL WILLARD, OF GUAYMAS.

On receipt of circular, I addressed letters to several of the orange growers in the interior of Sonora (for at Guaymas but few oranges are grown) and in reply was informed that, as the cultivation of oranges as a business in Sonora dates back only a few years (since the Sonora railway has been in operation, 1882), they did not feel competent in giving a proper report.

I am told that the first plants or cuttings of oranges cultivated in Sonora were brought by the Jesuit fathers ninety years ago from Italy, and planted at the missions of San José de Guaymas and Hermosillo. But little attention was paid to their cultivation excepting for home consumption, as there was no market for them on the coast (as they are grown from Guaymas to Panama), and no quick transportation existed to take them to a market north. After the Sonora Railway was finished it furnished the means of getting them to a market in the United States, and in 1883 a small shipment was made with good results, and since then orchards have been planted and oranges now figure as an article of export to the United States by rail. In 1888, 14,000 boxes of 200 oranges each were shipped. The fruit is sold on the trees at from $6 to $8 per 1,000, being purchased by fruit dealers through their agents, who pick, pack, and ship the fruit.

The Sonora orange commences to ripen in November, and by the end of December the fruit is nearly all harvested.

Orange trees are grown along the sea-coast, and in the interior of the country up to 3,000 feet altitude. Bottom lands have been used for this purpose heretofore, but I am told some orchards have been recently planted near Hermosillo (inland 100 miles from Guaymas,) on rolling lands and hillsides.

The trees are irrigated throughout the year, particularly in the dry season, which commences in October and ends in July.

The trees are raised from the seed of the sour orange and are set out or planted 30, 40, and 60 feet apart; the second year are grafted or budded with the sweet orange. They commence to give a small quantity of fruit the third year after grafting, and are in full bearing condition in the eighth year, yielding, if well grown, from 1,000 to 1,500 oranges per tree.

No insect pests have appeared as yet to destroy the tree or fruit.

Lemons, figs, and olives are cultivated to a limited extent. These fruits from the few trees cultivated are used for home consumption alone, none being exported.

A. WILLARD,
Consul.

UNITED STATES CONSULATE,
Guaymas, Mexico, November 13, 1889.

LOWER CALIFORNIA.

REPORT BY CONSUL VIOSCA, OF LA PAZ.

Varieties.—The Castillian orange (*Naranja de Castilla*) is the best variety known here for profit, supposed to have been introduced by the early Spaniards; of recent years seed and young trees brought by fruit growers from the States of Sinaloa and Sonora have been planted in

different orange orchards, resulting in quite an improvement in the quality and flavor of the fruit over the old orange-producing trees in the country; other varieties are of limited production, such as mandarin, pear and king orange and not of sufficient quantity for export.

The citrus family comprises here six species fruitful and profitable for cultivation. Citron, shaddock (torouja), large lemons, limes (*citrus limetta*) lima, sweet lime, king orange. The *lima chichona*, or sweet teat lime, weighs commonly from 12 to 14 ounces and is very delicious. The king orange is the production of an orange tree, a young shoot grafted into a sweet lime tree and in time from that to a shaddock or torouja, and finally a shoot from this last is again grafted on a common orange tree. Each of the orange fruit weighs from 4 to 5 pounds, and are of very delicate and sweet flavor and also exempt from acid.

Situation.—The locations where the trees grow are San Antonio, San José, and La Paz. San Antonio is 56 miles from the sea; the other places are ports of entry.

Elevation of the first-named town, 1,200 feet; the other two are in a level valley, all fully exposed to the sun.

Level land is best. The soil here is alluvial, sandy, and the subsoil within four feet under is of clay and gravel.

Temperature.—The average temperature is 85°, minimum 60°, maximum 93°, Fahr. During winter nights are lightly cold, never warm, but quite warm during the day. In summer, sultry days very seldom and the atmosphere generally very clear.

Rain commences in July and ends in October, in time to assist the growth progress of fruit.

Irrigation.—Irrigation is practiced all the year round. The citrus family have to be watered every three or four days, and give them as much water as possible.

Cultivation.—Young trees are transplanted in the month of September, and also in February, and the cleaning of trees takes place in December.

Fertilizers.—Cow and other manure is used as fertilizer, but in setting young trees a circular hole is excavated of 4 feet diameter and of 3 or 4 feet depth, and about a 4-inch layer of old cattle bones is put down, and on the top of it another 6 inches of clay, and after another 6 inches of manure, and following common soil. The tree is set on the top of that. The best results have been obtained that way.

Pruning.—First remove the inner superfluous shoots living at the expense of the sap of the tree, and cut all other unnecessary branches to allow circulation of air. It is evidently proved that the tree should be allowed its full growth from ground. It is best either to protect it from hot breezes or from the heat of the soil, and even from frost, as generally the upper part only suffers, and the rest of the tree is fully protected.

Picking.—The picking of oranges takes place early in November,

whence they are just ripe enough for shipping. Oranges are cured by burying them separately under 4 or 6 inches of very dry sand, in a shaded and ventilated place, for a month or two, after that they can be taken out, will look proportionally fresh, and will keep in that condition for six months.

Packing and shipping.—When packed for export the oranges are wrapped in paper and packed in special boxes.

Planting.—Orange trees are planted 20 feet apart, lemons 15 feet, and limes 20 feet. Orange trees are propagated by seed, shoots from roots, and by branch cuttings.

Some orchards are quite large and others are small.

Maturity.—Fruiting begins at five or six years from the time the seed is planted; when the tree is fifteen years old and upwards it produces the largest crop of fruit. The full maturity of the tree is uncertain.

Insect pests.—Trees here are very seldom troubled with insect pests, with the exception of some seasons, by an insect in the shape of a tick, called *manteca*, which is very easily removed; but sometimes worms in the shape of teredo on the roots kill the tree beyond cure.

JAMES VIOSCA, *Consul.*

UNITED STATES CONSULATE,
La Paz, December 21, 1889.

CENTRAL AMERICA.

GUATEMALA.

REPORT OF CONSUL-GENERAL HOSMER.

I have the honor to acknowledge the receipt of the circular submitting a list of questions regarding the cultivation of oranges, lemons, figs, and olives.

In reply, I beg respectfully to state that the fruits referred to are of spontaneous growth in Guatemala, and are not cultivated or exported.

They grow in nearly all parts of the Republic, from the sea-level to an altitude of 5,000 feet above it, and are freely consumed by the population, but without care or effort in their culture.

JAMES R. HOSMER,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Guatemala, December 9, 1889.

SOUTH AMERICA.

BRAZIL

BAHIA.

INTRODUCTORY.

I have the honor to report the following concerning oranges and lemons, as called for in the circular dated September 28, 1889.

As neither figs nor olives are grown here in the State of Bahia, nothing need be said of them. Very little attention is paid even to the cultivation of the orange or the lemon; so little, that all that are grown are used in the place, none being exported even to adjoining States. The supply is so limited as practically to prohibit exportation, on account of the very high price that must necessarily be paid for them.

Should one wish to send a box of selected oranges to a friend in the United States, he must pay for such box of one hundred, packed ready for shipment, 12½ millreis, equivalent to $6.12½, and this in the orange season, too. Therefore, as none are grown except for home consumption, it seems quite useless to answer the questions in the order in which they are submitted.

ORANGES.

Varieties.—The best variety is called *Lavanja de embigo* or navel orange. These oranges are seedless. When properly cultivated they grow to a great size and have a most delicious flavor, being also very juicy. It is not an infrequent thing to find oranges of this class weighing a kilo each, and often a little more, and measuring in circumference from 18 to 20 inches. The orange of this class of ordinary growth measures from 12 to 15 inches in circumference.

The other varieties, not choice, however, are *Lavanja de terra*, or Seville orange, which has rather a bitter taste, with seeds, and not as large, nor of course as fine a flavor, as the *Lavanja de embigo*.

Another kind is the *Laranja de Cravo* or *tangerine*, similar to the tangerine of Florida, with seeds. The fourth and the last class is the *Laranja brabo*, or wild orange, with pips also.

Whatever cultivation is given the navel orange receives, though some attention is being given to the tangerine.

Situation.—Anywhere along the sea-coast. I have been informed they may grow anywhere in fact in the State.

As there is no land in the State that is cultivated that has any great degree of elevation, it may be said they will grow at any elevation.

Soil.—Clayey soil mostly about and in this city. Some sandy. In the interior of the State more of an alluvial nature. The character of

the subsoil is presumably much the same as the soil. In most cases the subsoil has never been turned up. The land is never prepared by plowing it. The grass and weeds, when cut away at all, are cut by large hoes.

Climatic influences.—Along the coast the mercury ranges between 76° and 92° in the shade. In the interior, especially on the higher elevations, the range is greater. Cool nights and very moist atmosphere. Rain-fall in inches, I do not know. Generally the rainy season begins about April 1, continuing to November 1, though there are frequent showers in the dry season from November to April. Consequently, as the fruit is usually picked from May to August, it ripens in the rainy season.

Irrigation.—There is no irrigation.

Cultivation consists simply in cutting the grass and weeds that spring up whenever needed, and is done, as stated, with a large hoe.

In a very few orchards the ground is seeded with grass, which is cut when green, after which the soil is loosened with the hoe, then animal manure is scattered broadcast through the grove.

Pruning.—Pruning is done after the tree reaches its fifth year, or thereabouts, say 4 to 6 feet from the ground. It is then continued every year thereafter, while the tree has growth.

Picking.—This depends on the demand, as they are not shipped. People will buy them only when ripe, consequently they are allowed to remain on the tree till reaching the stage of ripeness.

Were the oranges to be shipped, the picking before being ripe, would, of course, depend upon the length of time occupied by the steamer to the place of destination.

Planting.—The trees are planted from 12 to 16 feet apart, and propagated by cuttings in Bahia. The orchards are very small generally.

Maturity.—The trees commence to bear in about five years. If the trees are properly cared for, largest crops are obtained from the eighth to the twentieth or twenty-fifth year in the life of the tree. Much depends, of course, on the seasons—whether very dry or very wet. They are fruitful for thirty to forty years.

Insect pests.—A sort of white worm, which is destroyed by brushing the trunk of the tree with a mixture of clay and water, or rather painting it with the liquid mixture.

LEMONS.

There are but two varieties of lemons in this State. The one called *Lima doce*, or sweet juice; the other *Limao*, an acid, nearly round lime. This lime is abundant, but is not cultivated to any appreciable extent. It is much more acid than the lemon proper, and is known, I believe, by the scientific name of *Citrus limetta*, the lemon being known as *Citrus limonum.*

As the limes are not shipped there is no curing, no packing. They are picked whenever there is a demand for them and, like oranges, may

be obtained nearly the entire year, though like the oranges they are best in their season, which is the same as the orange season.

There are no statistics issued on the subject from any source. Prices of both oranges and lemons depend on the supply. The lowest price for the best quality of oranges is about 4 vintins, equal to 4 cents. The maximum price is about 8 vintins, say 8 cents. Lemons, or limes, may be bought from ten for 1 cent to one for 3 cents, depending on the supply or scarcity.

D. N. BURKE,
Consul.

UNITED STATES CONSULATE,
Bahia, March 1, 1890.

BRITISH GUIANA.

REPORT BY CONSUL WALTHALL, OF DEMERARA.

ORANGES.

Varieties.—The oranges grown in this colony are known as tangierine, bitter, sweet, and myrtle. Under the term "sweet," several varieties are included, which have no distinctive name.

Situation.—The groves are on the coast lands and banks of the rivers, inland from the sea, varying from a few hundred yards to several or many miles, but scarcely above the sea at all, as the alluvial land lies mainly below the level of spring-tides. The cultivated lands are generally open, with little shade, and almost exclusively level. The soil is alluvial, forming a stiff blue clay, with a superficial covering of "pegass," or vegetable mould.

Climatic influences.—The year consists of two wet and two dry seasons, more or less irregular in duration. December and January are generally rainy; February and March usually dry; April (in whole or in part), May, June, July, and sometimes August, are more or less wet, May and June being generally very rainy; September and October almost invariably very dry, as is sometimes a part or the whole of November. February, April, August, and November are, however, very variable and uncertain.

The temperature is singularly uniform. The extremes on the coast are about 70° and 90°, Fahrenheit. The difference between day and night is more marked than the variations of either the day or the night temperature at the different seasons. The mean maximum temperature of the days is about 87°; mean minimum of the nights, about 75°.

There are not many days that can properly be called sultry, as good breezes generally prevail at all seasons.

The rain-fall is variable, ranging within the last twenty years from 52 to 108 inches, but averaging about 85 or 90 inches.

Irrigation.—None, except what is merely incidental. (See reports of the undersigned, of August 2, 1889, on Irrigation and Drainage, and of November 8, 1889, on Canals, etc., in British Guiana.) There is practically no cultivation in this colony of any fruits except plantains and cocoanuts.

Fertilizers.—No fertilizers are ever used.

Pruning.—No pruning is ever done.

Picking.—Gathered when mature, but while still green. Usually kept dry, but no system of curing followed. None are exported.

Planting.—There are no regular plantations. Therefore there is no system as to distance apart. The trees are propagated exclusively from seed. The trees are usually mixed with other plants, and therefore variable in extent.

Maturity.—The trees begin to bear when from five to seven years old. They mature at the age of from ten to twenty years, which may be regarded as the period of greatest production, although this is largely dependent upon various circumstances.

Insect pests.—Orange scale insects on the coast, and parasol ants in the interior. No treatment adopted as a rule.

LEMONS.

Very few, if any, lemons are grown in this colony. Limes are cheap and abundant but not systematically cultivated, picked, or cured, and none are shipped.

No statistics issued.

Neither figs nor olives are grown in British Guiana.

W. T. WALTHALL,
Consul.

UNITED STATES CONSULATE,
Demerara, February 20, 1890.

ECUADOR.

REPORT BY CONSUL-GENERAL SORSBY OF GUAYAQUIL.

ORANGES.

There is but one variety.

Location.—The distance from the sea depends upon the sea-level. Elevation above the sea-level 1,000 to 1,500 feet. Exposure to the sun continuous.

Level land is best, soil and subsoil formation; lime and sandy.

Climatic influences.—Temperature 50° minimum, 88° maximum, 70° average. Nights warm and moist; sultry days in dry season; atmosphere extremely dry. There are two distinct seasons. In the dry season it is never wet, and in the wet it is never dry, the rain-fall for four

months being very heavy. When rain falls, the growth of the tree and fruit is attained. Irrigation not practiced.

Cultivation.—Plowing during rainy season. No fertilizers used.

Pruning.—Not resorted to.

Picking.—Picked in the dry season, June and July, mainly, and picked half ripe for export, but ripe for home consumption.

Packing and shipping.—Packed loose, and shipped to Peru and Chili exclusively.

Planting.—Distance planted apart 12 feet; propagated by seed; none but seedlings. The orchards are small.

Maturity.—Age of fruiting begin at five years; age of largest crops at ten years; maturity of trees ten years.

Insect pests.—There is an injurious insect pest known as the Pulgon, which kills the tree.

LEMONS.

Picking.—The lemon is small, and is picked green both for home consumption and for export, and ripens after it is gathered. There is no method of curing. They are picked in the dry season, mainly in June and July.

Curing.—There is no particular process; the fruit is handled, both in gathering, stowing, and shipping, by hand.

Yield.—The best information I can get is that the yield of the orange is about 1,500,000 per annum, the price being about 80 cents sucre,* or, say, 60 cents gold, per 100.

It is practically impossible to get the yield of the lemon. There is exported about 60 boxes of 500 each, and the price is about 300 sucre or $2.10 United States gold per box.

WILLIAM B. SORSBY,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Guayaquil, March 10, 1890.

ECUADOR.

REPORT BY CONSUL BEACH, OF GUAYAQUIL.

(Republished from Consular Reports, No. 41½.)

Notwithstanding its very restricted domain, it is probable that no country in the world possesses so great a variation of climate as Ecuador, which ranges from the temperature of perpetual snow to that of perpetual summer, neither essentially changing with the alternations of the seasons. The ice and snow at all times cover the summits of Chimborazo and other mountains of great altitude, while in the lower sections the mercury ranges between 65° and 85°.

* The sucre is the monetary unit of Ecuador.

The soil is less varied than the climate in characteristics, though possessing several elements. The lowlands are either loam unmixed, sandy loam, or clay loam. The surface of the uplands, with scarcely an exception, is of volcanic origin—lava, scoria, porphyry, etc. As in some other part of South America, notably Venezuela, the exposed rocks are undergoing a constant decomposition, producing a soil everywhere in some degree fertile. In Ecuador even the lava has been so disintegrated as to form a soil. Those giving attention to botany understand that each of the vegetable species needs specific elements to promote germination and conduce to development. Some require elements other than a favorable soil or temperature. A portion of the vegetable kingdom matures only after passing through the extremes of heat and cold, and which would not survive under a continuous summer temperature. The cocoanut tree, as an illustration of the special requirements of many species of plants, may have a soil and temperature that are favorable, yet it must "breathe" the salt atmosphere in order to exist and thrive.

Ecuador, though having the wide range of temperature before mentioned, does not have radical changes, and therefore does not sustain all of the vegetation that would appear to have a place somewhere in the wide range of temperature noted. Yet there are few countries, if any, that can sustain a more diversified vegetation than Ecuador. In fruits it produces all that belong to the tropics, usually in great profusion and perfection; and many varieties not considered tropical, as apples, pears, peaches, and strawberries. In no respect have the productive resources of the country been fully developed, and the practices afford a poor instruction for others to follow. A description of the crudities of the practice, and possibilities of the country, may prove of interest in portraying inutilized opportunities, and *how not to do it.*

ORANGES.

There are three varieties of oranges grown in Ecuador, viz, thick skin and thin skin, sweet, and sour. The thin-skin variety is in most demand for domestic use. None are exported further than Peru and Chili. The trees come into bearing at from three to four years of age, and continue to bear until about twenty years old.

The trees are all seedlings; that is, they comeup and grow naturally.

The fruit while ripening is occasionally afflicted with insects, evidently after the sweet juice.

As a rule the trees are not planted, but grow where they by chance come up. If set out in orchards the trees should be placed at least 40 feet apart, as the fruit requires much air and sunlight to mature well.

The fruit does not produce well immediately on the sea-coast, but 5 miles or more in the interior it does well on any kind of soil, though best on a deep, rich loam.

The fruit is not irrigated, and the land is not cultivated, not even by cutting down the brush and weeds with a *machete.*

No expense for cultivation. Trees well matured average a yield of 4,000 oranges per year, which are sold on the tree at $10, but which bring in the Guayaquil market from $3 to $4 per thousand. The home market is usually well supplied, and more luscious fruit is not elsewhere produced.

LEMONS.

The lemon family in Ecuador is of three sorts—large sour, limes, and sweet. The trees come into bearing at from two to three years of age, and continue to bear up to about twenty years of age.

The trees are all seedlings, and come up by chance.

Neither trees nor fruit are troubled with insects.

There are no orchards; but if there were, the trees, to produce well and bear good fruit, should be from 40 to 50 feet apart, for the same reason as given regarding oranges. The trees that come up promiscuously are often transplanted into hedges and set near together, more for the purpose of making a fence than realizing from the fruit, which is of market value.

The trees are not detrimentally affected by sea breezes, and they appear to thrive anywhere.

The trees are not cultivated or irrigated.

It is difficult to say what the yield would be under good treatment, but it certainly would be very large. The price of the fruit is too low to make the business of lemon growing profitable in Ecuador.

HORATIO N. BEACH,
Consul.

UNITED STATES CONSULATE,
Guayaquil, February 24, 1884.

VENEZUELA.

REPORT BY CONSUL BIRD, OF LAGUAYRA.

ORANGES.—From general information and from considerable personal observation, it may be stated that the Valencia orange is the only variety known in Venezuela, the best of which grow in the vicinity of the city of Valencia, Venezuela, 40 miles in the interior and about 1,825 feet above the level of the sea. They seem to thrive best with moderate exposure to the sun on hilly or undulating land, on soil composed of black loam. The average temperature best suited to their growth would appear to be 77° F., with extremes of 85° and 70°. The fruit matures best in a moderate season of rain, but irrigation is never practiced. The cultivation of this fruit is proceeded with after the most primitive fashion, being propagated by grafts on seedling stocks and receiving no fertilizing nor pruning whatever. The orchards are of small extent,

none being raised for exportation. The trees are set 15 feet apart; they suffer little or no injury from insects or fungous growth; they come into bearing after five years from planting, when they begin to bear average crops and are thereafter quite neglected. When planted near the coast the orange does not do well, but those raised in the interior are of good size and fine flavor.

LEMONS.—The lemon is not grown in Venezuela. There is a larger sour-sweet fruit raised here that is, in general appearance, much like the lemon. There is also the smaller fruit called the lime, that is raised in great abundance, but never exported. These are the only fruits propagated here that bear any resemblance to the lemon of commerce.

WINIFELD S. BIRD,
Consul.

UNITED STATES CONSULATE,
Laguayra, November 15, 1889.

MARACAIBO.

Oranges and lemons of many varieties grow wild in abundance on our river bottoms but nobody has ever paid any attention to their cultivation. Figs are also planted, but very few; they bear in great abundance. The same may be said of olives; both figs and olives grow in the hot sandy soil of the coast as well as in the higher parts of the Cordilleras. There is no doubt that if those fruits would receive proper attention and were cultivated on a large scale a great export trade could be established.

E. H. PLUMACHER,
Consul.

UNITED STATES CONSULATE,
Maracaibo, December 14, 1889.

PUERTO CABELLO.

REPORT BY CONSUL DE BLANC.

Relative to the cultivation of oranges, lemons, figs, and olives in this district, I have the honor to report that I have been unable to obtain information of sufficient value to be transmitted to the Department of State. The olive tree is not known in this district; as for oranges, lemons, and figs, they are not cultivated in the proper sense of the term; they grow without any care or attention here and there, and flourish and thrive, or languish and perish, according to circumstances. No lemons, oranges, or figs are exported from this district.

CHARLES DE BLANC,
Consul.

UNITED STATES CONSULATE,
Puerto Cabello, February 20, 1890.

BRITISH WEST INDIES.

BERMUDA.

*REPORT BY CONSUL BECKWITH, OF HAMILTON.**

Varieties.—In Bermuda we have but one variety of sweet orange, which is delicious, large, and juicy. I know of no name for our oranges; they are yellow, somewhat like the Havana and New Orleans oranges, although not oval shape, being round and flat; some measuring 18 inches in circumference. The Mandarin orange and grape fruit are also grown.

Situation.—The trees grow in valleys and are protected by cedar trees and hills. When exposed to the high winds they do not flourish. They are sometimes grown near little bays, and but a few feet from the sea, and very little above sea-level. The trees thrive by exposure to the sun. The valleys are the best where the soil is the deepest, and of a deep-red color.

Soil.—The soil is from 3 to 4 feet in depth, and subsoil is a deep-red clay in these valleys, in some places of the depth of 12 feet, but on the sides of hills not deeper than 6 to 12 inches, and mostly a loamy soil.

Climate—We can grow here all that grows in a tropical climate.

In the summer the average temperature is about 80°, in winter from 65° to 70°. Night and day varies very little. Our changes are seldom more than from 3° to 4°. The sultry days are in August and September. The moist atmosphere occurs after heavy rains, the ground being porous, and the heat of the sun will then produce a heavy atmosphere; ordinarily clear, bright, and beautiful weather.

Trees of all kinds are becoming fewer on the islands, in consequence of which we do not have as much rain as formerly, but when we have frequent rains it adds much to the growth of the fruit and trees.

The seed is planted in boxes; they are also budded on the Seville orange and lemon when the bark can be freely removed from the wood.

Cultivation.—Most of the trees are little cultivated; some are planted in the grounds with the crops, and the only fertilizers are what are used for other crops—sea-weed, stable manure, etc. I find the best fertilizer to be chamber-lye, about 1 gallon to 300 gallons of water, thrown around the roots two or three times a month. Care must be used in not making it too strong, as the albumen forms around the roots and prevents the water penetrating, and in time all the leaves drop, and if the roots are not attended to the tree dies; the remedy is to remove all the soil and use lots of water.

* I have obtained the information herewith given, largely, through Mr. J. B. Heyl, who is one of the oldest and most successful fruit growers here.—H. W. B.

Pruning.—Only the dried branches are cut off fruit-bearing trees, trim while young to a proper shape—then let alone. The height from the ground in some cases is 30 feet, but a good height here is from 20 to 25 feet. They have always to be protected from the wind.

Picking.—The picking is done in December and at any hour of the day. They are picked when fully yellow—if the negroes do not steal them before.

Curing.—In a dry room for two or three days, spread on the floor, numbers too small to ship, home consumption take all.

Planting.—The trees are planted about 20 feet apart, and propagated by transplanting from boxes—budded and grafted. We have good oranges from seedlings, but know what we are getting when we bud. You can never count on a seedling. The orchards are decidedly small.

Maturity.—A budded tree bears in three or four years; a grafted tree in about five years; seedlings seven or eight years, sometimes ten. When the largest crops are produced is owing mostly to favorable seasons. There are trees on the islands over fifty years old still bearing.

Insect pest.—Sometime in the fifties (58 or 59) I think, a vessel was brought in here in distress, with a cargo of oranges; one gentleman who had some fifty or sixty very fine trees bought a few boxes of these oranges to plant the seed. In a few months his flourishing trees were covered with an insect which gave the trees the appearance of being whitewashed. This insect fed on the bark of the tree and extracted the yellow sap from the bark, curling the latter up. Every device thought of was tried, but the Island was cleaned of nearly every tree, lemon, oranges, limes, all shared the same fate. I lost mine as well, with the exception of two lime trees and a few lemons in another part of my grounds which led me to look to the cause of their being healthy. Between the two lime trees grew a pawpaw tree, and on looking at the lemon trees I found three or four pawpaw trees. I then visited all the trees I heard of that were living, and wherever I found a live tree the pawpaw tree was near it. I also found glycerine a first-rate remedy, half glycerine and half water with a little carbolic acid, applied with a paint brush all over the trunk seemed to keep the atmosphere from the insect, which soon dies (or the carbolic acid may kill it), and the first rain washes off the glycerine, which does not destroy the trees as would oil. I have now some healthy trees grown from seed, with fruit on and last year we had a fair crop; another thing to look after is that your trees do not go too much to wood; the woody roots should be cut off 5 or 6 feet around the tree; they are the roots running from the tree which make the branches, and the fine roots that are close to the tree are the fruit roots and the ones to be nourished.

HENRY W. BECKWITH,
Consul.

UNITED STATES CONSULATE,
Hamilton, November 28, 1889.

DOMINICA.

REPORT BY CONSULAR AGENT STEDMAN

The oranges exported from this island are of the common sweet variety. The trees are not cultivated, but grow promiscuously throughout the island, at altitudes varying from 50 to 1,600 feet, and are most plentiful on the leeward side. The fruit begins to ripen early in September, and the crop continues until the end of November—small quantities can be had in December and January.

The Seville sweet orange (which is used principally in making marmalade); the Tangarine and Portugal oranges are also grown to a small extent, but have not been exported.

There are a few lemon trees in the island, mostly of a poor description, but the lime tree is cultivated to a considerable extent and increasing annually. A small quantity of the fresh fruit is exported, but the great bulk of the crop is compressed and the juice exported in a raw and concentrated form, the latter principally to the United States

The trees are grown at various heights, in some places as high as 1,500 feet. The trees are planted at distances of from 14 to 18 feet apart, according to the richness of the soil, and are propagated from seed. The picking begins in July and extends to November, the height of crop being in September. The juice is extracted by passing the fruit through a mill and afterwards concentrating in copper taches.

WM. STEDMAN,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Roseau, Dominica, March 4, 1890.

JAMAICA.

REPORT BY CONSUL HOSKINSON, OF KINGSTON.

(Republished from Consular Reports No. 41½.)

In reference to the fruit circular, I forwarded by last mail a press copy of Dr. Neesh's lecture on orange cultivation. The lecture has since been published in one of the city newspapers, and combines a scientific treatment of the subject with a long practical experience of the writer. Oranges have never been regularly planted out in this island as they are in Florida, all the orange trees having been self-sown, mainly by the seeds being carried by birds into the brush, and when the plant has grown up the thickets have been cleared away, leaving the young orange trees standing in irregular groups. No pains is ever taken to improve the variety, and no particular attention of any kind is given to the trees, the cleared land being the main considera-

tion for cattle grazing. The doctor says of the introduction of the orange:

When the English landed in this island they found here the sweet and bitter orange and the lime. The citron and shaddock are of more recent introduction; and at the present time nearly all the useful kinds of the orange family are either widely disseminated or to be found as growing specimens in our botanical gardens. The *Ægle marmelos*, or Bael fruit, is yet scarce; the Japanese orange, or kumquat, is almost unknown, and some kinds of lemon, notably the bergamot and lime, are still wanting.

After speaking at length of the conspicuous and distinctive characteristics of the orange tree as evidence in the leaf, the flowers, the seeds, and the rind, he says:

The sweet oranges grown in Jamaica have been, up to quite recent years, of no particular or named variety. They have been grown from seed; and it speaks much for the perfect suitability of the soil and climate in most parts of the island that such excellent fruit should have been produced under a plan which embodies none of the teachings of horticultural art, under a plan, in short, which is one of neglect or lucky chance, left to take the place of intelligent guidance. The earliest cultivators of oranges in this island were the enslaved negroes, and the oldest trees yielding the largest crops are only to be found on those parts of estates which were set apart for the cottages and gardens of the slaves. I know of a small sugar estate on which, forty years after emancipation, the fruits of the orange trees planted by the old negroes around their dwellings, were sold to a contractor, without any expense of labor, for £40. This was almost at the commencement of our fruit trade, and the crop (more carefully handled now than then) is worth more than double the money. Our common variety, then, is a mixture of seedlings, some of the fruit being really excellent, of large size, of good flavor, and of qualities which achieve for it a popularity in the American market. Naturally, when the cultivators trust only to seedling trees for their crops, the best fruit will be produced in the most highly-favored localities. The orange tree requires a deep, rich soil, a warm climate, with plenty of sun to ripen and sweeten the fruit, and plenty of moisture to keep up its growth. These conditions of soil and climate obtain in the parish of Manchester, which is famous for its oranges, also in the cooler parts of Clarendon and St. Catherine and in St. Ann's, from all of which parts the best oranges are exported.

Of the methods for propagating desired varieties he says:

We owe the large number of varieties to the tendency which the orange has to "sport," as gardeners term the tendency of seedlings to prove different from the parent plant. Whilst this tendency is of some advantage as affording the chance of improvement, it is a disadvantage, in that it prevents the propagation of the tree by means of seed, for when seeds are sown the resulting tree is much more likely to be inferior to than it is to equal or surpass its parent. Hence the necessity for special means of propagation, as by cuttings, layering, budding, and grafting. The orange tree is not usually propagated by cuttings, but it can be done; nor by layers, and yet, as a matter of fact, a modification of the method of layering, known as layering by elevation, is practiced in the case of the orange. Almost everybody is familiar with the process of laying down the shoot of a grape-vine. The branch of the vine is simply laid in a shallow trench; it is pegged down in its place, or a stone is placed upon it to keep it down. The trench is then filled up with earth, which should be kept moist, when in about three months a copious supply of roots has been thrown out by the branch in the trench, and the shoot may be cut off from the parent vine and be planted in an independent position. Now, in the case of a high-growing tree like the orange, we can not bring the branch down to the ground, but we can carry

up the soil to the branch. It is done in this way: A flower-pot or box is made with a slit in its side, so as to receive a growing branch, which is first of all prepared by wounding or wringing the bark, so as to cause it the more readily to throw out roots. The flower-pots or boxes are then filled with soil and secured in their places by cords or props. The earth in the pots is kept moist by frequent waterings; and the result is that in a short time roots are thrown out, after which the branch may be sawn off below the flower-pot, and it is ready to be planted out. This plan is now greatly resorted to by the Portuguese in the Azores; and I should like to read the following short extract from the account of their method by a visitor to the orange groves of the island of St. Michael. He says:

"The trees are increased in a curious way. The mode of propagation was derived from the Chinese, and has been much in use of late years. A branch of the diameter of 4 or 5 inches is chosen, around which a circular incision is cut. Around this straw matting is wound in the shape of a funnel, and filled with beaten earth from the middle of May to the middle of June. Roots soon begin to push, and by the following winter it is provided with sufficient to support it when detached from the parent stem. The young plant thus obtained often bears fruit at the end of two or three years."

This mode of propagation has simplicity for its recommendation. By its means the possessor of any good kind of orange tree could soon establish a considerable number of the same kind, and without the exercise of any special skill. But it is a slow process of multiplication compared with budding and grafting, which in fact are the modes adopted by nurserymen. For these modes stocks are necessary. Stocks may be raised from seeds, or full-grown bitter-orange trees, or sweet-orange trees of inferior kinds may be cut down to stumps and a bud or graft inserted. For the theory on which budding and grafting depends I must refer you to horticultural works, and also for the details. Let it suffice here to state that the process is by no means difficult, and may be acquired by any persevering grower simply by attending to the directions.

* * * * * * *

To return to the orange tree and the question of pruning. The orange tree differs from coffee trees and most fruit trees in that very little skill or labor in pruning is required. As already stated, the fruit is formed on young shoots of the current year's growth, and consequently pruning this tree can not exert the same influence as in pruning coffee, which requires ripened wood for the bearing shoot. Fertility in the orange is promoted by manuring, and pruning may be simply restricted to cutting out dead wood and misdirected branches, or to giving a desirable shape to young trees. To stimulate a bearing tree to its utmost productiveness, the following plan may be followed: Let a cord be passed loosely round the trunk of the tree, and with the distance of the uttermost branches from the stem for a radius, let a circle be marked on the ground round the entire circumference of the tree. A deep trench, fully a foot wide, should be dug along this line and be filled up with a mixture of bone-dust and well-rotted manure; finally, let the trench be covered by the loosened soil. The effect of this treatment will be to stimulate a growth of young rootlets, which will feed upon the enriched soil of the trench; the result of this will be that a strong growth of young shoots will everywhere take place amongst the branches; and, as a final consequence, the tree will be full of flower and fruit. When the season's growth has taken place, it will be found that the tree has gained in size to the outer dimensions of the trench.

Of the preparation for market he says:

Within the past few years great improvements have taken place in the modes of collecting and packing the fruit. At first, in the early history of our fruit trade, the oranges were rudely knocked down from the trees by means of long sticks, with no more care than a pen-keeper's cattle-man would take in knocking down a lot of bitter oranges as a feed for the pigs. They were carried loose in carts to the port, and at the

port the oranges were shipped in bulk. With all this bruising and want of care it is not surprising that cargoes on arrival at New York were found to be in such a damaged state as to be next to worthless in value. These early shipments indeed seem to have been good for no other effect than to teach the American consignees two things, one of which was the excellence of a Jamaica orange when it happened to reach New York in good condition, the other was the lamentable ignorance of our people of all that pertained to collecting and packing the fruit. American contractors next appeared upon the scene. These agents had been sent out to make purchases of growing crops, and to teach and superintend improved methods of packing. They brought with them hundreds of pairs of small, stout pruning-shears, of no great monetary value, which they gave away to the laborers, whom they taught to cut off the orange fruits by the stem and to deposit them carefully in a basket. They also taught that the oranges should be carefully laid on shelves and floors for one or two days, then to examine them for signs of decay, and to wrap up in paper and pack in barrels only those which were sound. These teachings, wherever they were intelligently followed, had a good effect. The extra value of Manchester "stem-cut" oranges in the New York market soon proved that care meant money, while carelessness signified loss. Our creole middlemen and contractors soon became more exacting as to the careful handling of the oranges they bought from the peasant proprietors, and the upward tendency of local prices has steadily gone on as a consequence. Seven or eight years ago the wholesale price of oranges in the interior towns was sixpence per 100, and their value in New York was a thing not to be foretold from the prices-current, for very often the shipment of such fruit entailed a heavy loss. Nowadays the price of a barrel of wrapped oranges is $3, and the price obtained in New York fluctuates between $5 and $7. Under the improved modes of packing the trade has steadily gone on increasing, until it is now an established and most important industry, representing, according to the latest returns, an export value of £37,567, obtained for 34,000,000 of oranges.

And of the several competitors in the fruit market he says:

For the possession of our actual and possible future markets we have certain competitors. The principal of these is Florida; next comes Cuba, which ships oranges principally from the port of Havana. The island of Porto Rico is rather a formidable competitor. Mayaguez is the principal port of shipment, and the fruit is so fine that it fetches good prices in the American market. Of Jamaica oranges 400 are taken as the average number contained in a barrel, but of the oranges shipped from Porto Rico a barrel contains on the average 350; in other words, seven of such oranges are equal to eight of those sent from Jamaica. They are also said to keep well. The extra size denotes careful cultivation, and the better keeping qualities tell of care in picking and packing. The Bahama Islands usually send oranges to the American markets, but this year the growers have been unfortunate, as the crop is reported to have been entirely destroyed by a succession of heavy gales. The other West India Islands must also be regarded as possible competitors, though up to the present they are not actively competing. British Honduras is also a competitor, both in bananas and oranges, and the opening up of a direct line of railway between Mexico and the American frontier, which has just now occurred, also suggests Mexico as a competitor, if not with Jamaica, at least with Florida. California is even a competitor, but the effect of her competition is simply to supply the markets on the Pacific coast, and even there California has to struggle against the shipment of oranges from Tahiti and other islands in the Pacific. At present the countries bordering the coasts of the Mediterranean are competitors more for the supply of lemons to the United States than of oranges. The Azores have their principal orange trade with England, and only a limited trade with the United States. In the Azores they have great difficulties of climate to contend against. Westerly gales, sweeping over the wide expanse of the Atlantic, are so violent as to be very destructive to the orange crop. To overcome the disadvantage, expensive structures of high-walled inclosures of small area have to be resorted to in order to provide shelter. It need hardly be remarked that all such difficulties and expense are spared in Jamaica,

Let me add, in conclusion, that Jamaica is admirably adapted for orange cultivation. The soil, the climate, the rapidly increasing steam facilities for transportation, and the cheapness of land seem to me to combine to make of this island an especially desirable field. As I have said, the fruit actually grows wild, and without other cultivation than keeping down the bush. If the same intelligent care and attention were given to the growth of the tree and to the proper packing of the fruit for market that obtains with us in the United States, it would prove a most profitable and pleasant occupation to all engaged in it. But the cultivation is regarded as secondary to the use of the land for cattle or sheep pasturage, and the care and handling of the fruit is still, as a rule, of the roughest and most careless description. Nearly 50 per cent. of the fruit, on an average, is either spoiled or seriously damaged before it reaches a market, and the greater portion of this great loss is due to rough and careless handling.

GEO. E. HOSKINSON,
Consul.

UNITED STATES CONSULATE,
Kingston, Jamaica, March 27, 1884.

JAMAICA.

REPORT BY CONSUL HOSKINSON.

(Republished from Consular Reports No. 41½.)

In further continuation of the subject treated of in my dispatch of the 27th of March, I have now the honor to forward, in a connected form, the notes of an experienced observer and cultivator of the orange tree.

GEO. S. HOSKINSON,
Consul.

UNITED STATES CONSULATE,
Kingston, Jamaica, April 14, 1884.

[Inclosure.—Consul Hoskinson's report.]

Varieties.—Of oranges, the varieties principally grown are native seedlings, some of which were prior to the emancipation planted by the slaves near their dwellings and attended to by simple methods of cultivation. Many of the trees now furnishing fruit for export are the remants of those planted by the slaves, such as the irregular groves now to be found on sugar estates and coffee plantations. Some of the trees are native seedlings spontaneously springing up in pastures and guinea-grass pieces. Since emancipation the colored people have planted orange trees in their small freeholds in the mountains. This has been done to a large extent in the parish of Manchester, where sweet oranges of good quality have been long grown, and where the soil and climate conduce to excellence in the quality of the fruit. Besides the native seedlings superior kinds of sweet oranges (of unnamed varieties) have been is-

sued from the Botanic Gardens, also Tangerine oranges of a very fine quality. The trees issued from the gardens are budded and grafted. The Tangerines are mostly grafted. It is difficult to say which are the more valuable. The Tangerine oranges fetch the highest price in the local markets, but they are not exported. Of the native seedlings those produced in Manchester are admitted to be the best in the island on account of size, sweetness, flavor, and for their good keeping qualities. It has also been maintained that they bear handling, packing, and the sea voyage to New York better than varieties grown elsewhere; for example, better than those grown on the north side of the island. Seedling trees begin to bear at eight, nine, and ten years, and are in full bearing at fifteen or twenty years. Grafted or budded trees come into bearing a little earlier from the time of planting out. Nothing definite can be stated as to how long the trees remain fruitful further than it must be a long time, as trees dating from the era of slavery and estimated to be fifty or sixty years and perhaps older are still in full vigor, and the writer has seen such trees without observing about them any signs of decay from old age. The longevity of the orange tree is well known, but in this island it is difficult to ascertain the age of old orange trees, owing to the fact that their planting was the work of slaves in their own time and not plantation work. Records of old plantation work still exist, but not of the planting of orange trees. The foreign market for Jamaica-grown oranges has only been opened up within ten or twelve years past, and it is only in recent years that methodical planting has been resorted to.

Of lemons, the known varieties are only two, viz, an old-established seedling variety, producing very large fruit, and seedlings obtained about five years ago by the importation of Sicilian lemons from New York, with the object of obtaining their seed for planting purposes. The fruit obtained from the trees of the last-named variety are of larger size than the fruits from which their seeds were obtained. The trees referred to have borne good crops this season, the lemon, as is well known, coming earlier into bearing than the orange. There is as yet only a limited production of lemons, and the trade is principally in the hands of two growers, who send their produce to New York. For local use, in the preparation principally of lemonade, and in cookery and domestic uses the lime takes the place of the lemon. The lime grows spontaneously in most parts of the island. It is of the easiest possible culture.

The trees of all these varieties of citrus, orange, lemon, and lime are principally seedlings. It is only latterly, that is, since the development of the export trade, that budding and grafting have been resorted to.

Insect pests.—In Jamaica the orange trees have few insect pests, and there are no complaints of attacks of fungus. It is only where orange trees are attempted to be grown in hot and dry localities, as, for example, in gardens in the city of Kingston, and the rather arid plain of the Liguanea, in the parish of St. Andrews, that they suffer from coccus and ants. In such localities lemons and limes suffer less than orange trees; but in the locality referred to the climate is admitted to be too hot and dry for the orange tribe. On the plains of St. Catherine, in the vicinity of Spanish Town, recent attempts at planting orange trees have been made. This plain is an extension of the Liguanea, but the climate is moist and the lands are capable of irrigation by the Rio Cobre Irrigation Works. These plantations were recently inspected by a Government officer, one of the superintendents of the Botanic Gardens, and in his report he speaks favorably of the appearance of the young trees, without mentioning the ravages of any pest. However, it is known that the coccus has attacked orange trees in another locality in the same parish, but the attacks have been subdued by smearing the trees with a composite lime wash made by boiling together lime, sulphur, and tobacco stems in water. Further in the interior and at a greater elevation the coccus is almost entirely unknown. It has not hitherto been a subject of complaint amongst growers.

Planting.—Most of the trees in pastures and on sugar estates and coffee plantations stand very far apart; indeed, they may be said to be isolated trees. In close planta-

tions the distances are between 20 and 30 feet apart. In the small grounds of the peasantry the trees may be observed so closely planted as to be in contact. Wide planting, however, is preferred by intelligent growers as tending to the best results. Tangerine oranges are planted at 22 feet apart, and larger sweet oranges at 25 to 30 feet apart; lemons, 18 to 22 feet.

Situation.—Plantations of orange trees are made principally at elevations above 1,000 feet. In Manchester the elevations will average 2,000 feet. Undulating valleys are principally selected on account of the greater depth of the soil to be found on such spots, also on account of its greater richness. The soil principally selected is that of the white limestone formation of Jamaica geology, known as "honeycomb rock." The resulting soil is a strong red earth, calcareous and ochery, owing to the presence of red oxide of iron. Orange trees yield the best results on the limestone soils, both on account of constituents promoting fertility and on account of the perfect natural drainage of such soils.

The sea-shore is avoided. The powerful sea-breezes (trade winds) are hurtful to the blossoms and tender branches. At an elevation of 500 feet the sea-breeze ceases to be troublesome. The sea-shore is also too arid, and as a rule the soil of the coast line is sterile and unsuitable.

Irrigation.—Artificial irrigation is only practiced to a limited extent in the plain of St. Catherine, and its application to orange trees must at present be regarded as experimental merely. The principal crop cultivated between orange trees is guinea grass, but some of the best growers prefer to keep up a clean cultivation, the number of such cultivations and cleanings being determined by the growth of weeds. To keep up a clean cultivation in certain low and moist districts would require a cleaning every three weeks; but longer intervals, as of eight or ten weeks, could be taken in drier portions of the year. The general practice, however, is to allow the grass to grow and to keep weeds and shrubby undergrowth cut down by means of a cutlass or bush-knife, which is done three or four times a year. In the grounds of the peasantry the whole list of cultivated crops in the tropics might be enumerated as crops cultivated between orange trees. It may suffice, however, to mention yams (*Dioscorea alata*, *Dioscorea trifida*, etc.), cocoes (*Colocasia esculente*), bananas and plantains (*Musa sapientum* and *Musa paradisiaca*), coffee shrubs (*Caffea arabica*), papaws (*Carica papaya*), annatto (*Bixa orellana*), and small culinary vegetables. The "yard" or "provision ground" of the peasant is generally a perfect medley of vegetable growth, including besides orange trees almost everything else. In such places the cultivation of the orange tree is associated with the stirring and cleaning of the ground necessary for the smaller crop.

Yield.—Owing to imperfect data it is difficult to give particulars as to yield, proceeds, and cost of cultivation. Undoubtedly the yield could be increased by more careful cultivation and judicious manuring. The yield in a tropical climate may be described as more continuous than in a warm temperate or subtropical region. Orange-trees are observed to be in flower and in fruit at the same time. The tendency to continuous flowering is so strong that every copious shower may be said to be followed by a growth of young shoots with their flowers. This tendency greatly prolongs the season of fruit. It is scarcely an exaggeration to say that sweet oranges may be obtained all the year round, but the principal season of fruit is from September to April. This tendency is even stronger in the case of the lime, which is to be had in plenty for ten or eleven months of the year. As to proceeds, it is only when the orange crop is sold in bulk to a contractor that the figures become known. This is the general practice on sugar estates wherever oranges may be growing. The cost of cultivation has a wide range, from nothing at all where it is neglected, as is too often the case, to the heavy expense of maintaining a clean cultivation. In the orange districts nearest Kingston the prices obtained by the peasant proprietors (who sell small lots weekly to carters and dealers) on the spot range from 9*d.* to 1*s.* per 100 hand-picked and with a small portion of the stem remaining. The buyer conveys them to Kingston, wraps them in paper, and packs them in barrels for transit by

steamer to New York, Philadelphia, and Baltimore. At this rate the yield from single trees has been estimated to range from 10*s*. to 20*s*., and even more according to the age and size of the tree. Growers who pack their own oranges usually obtain 12*s*. a barrel in Kingston. Latterly, the tendency of prices has been upwards. Manchester "stem cut" oranges, carefully wrapped and packed, are worth 16*s*. ($4) a barrel in the local export market. In New York they are worth from $5 to $8 per barrel according to fluctuations in the market. A barrel contains from 350 to 400 oranges. Thus it will be seen that the profits of the large grower greatly exceed those of the peasant.

GENERAL REMARKS.

The spontaneous character of orange cultivation in Jamaica is a noticeable feature. It is only during recent years that a new character is being given to the culture by systematic planting and increased attention. The official count of oranges exported in the year ending September 30, 1883, is 34,000,000. Almost all these were wild oranges or spontaneously grown fruits. The climate of Jamaica, in the elevated portions of the interior, is believed to be exceedingly well adapted to the cultivation of the orange, and the soil also. The excellent seedlings spontaneously grown may be adduced in support of this belief. When cultivation is bestowed the first effect is to increase the size of the fruit. Manuring is much neglected, but when manures are applied the increased yield and the more rapid growth of the tree are very noticeable. The tree is a gross feeder, and requires lime, potash, and phosphatic and ammoniacal manures. Cow manure is the compost applied in Jamaica. The orange industry is limited to the export of the fruit to the United States and Canada. No commercial attempts have been made to extract the essential oils for perfumery.

The length of the season of fruiting in this island is also noteworthy. Those who are experimenting with irrigation entertain the idea that the season may be controlled so as to produce fruit at any desired time of the year by its aid. But this may prove a doubtful advantage, as summer-grown oranges would enter into competition with northern fruits in their own markets. For the same season a summer crop of bananas is not so valuable as the crop produced during the absence of northern fruit. The natural close of the orange season in Jamaica is marked by the fruiting of the Star apple, and then all classes prepare for themselves the tropical dainty which the creoles style "matrimony." This is a mixture of fresh orange juice with the pulp of the Star apple, to which various flavors are added according to taste. But the simple admixture is a delicious compound and is universally relished.

TRINIDAD.

REPORT BY CONSUL SAWYER.

Orange and lemon trees are attended with good soil and climate in this colony; but they are mostly in a semi-cultivated condition, as, hitherto, planters have given their attention to the more important industries. The fruit, however, is of good size and quality, a considerable number being shipped to New York by direct line of steamers. Figs and olives are useless in this colony, the former being destroyed by frugivorous bats, and the latter do not bear.

MOSES H. SAWYER,
Consul.

UNITED STATES CONSULATE,
Trinidad, B. W. I., November 22, 1889.

Mr. Hart to Consul Sawyer.

[Inclosure in Consul Sawyer's Report.]

Varieties.—The St. Michael, or ordinary sweet orange. *Citrus aurantium,* or the Mandarin and Sangerine.

Situation.—In sheltered valleys, at elevations from 100 to 1,000 feet above sea-level, and from one-fourth mile inwards. The trees are slightly shaded from the sun. Sheltered valleys are best; soil, loamy, alluvial; subsoil, volcanic (trap).

Temperature.—Mean maximum, 87°.5 Fah. Mean minimum, 69°.7. Mean annual, 78°.6. Maximum, 91°, September mean for month. Minimum, 66°.9, February mean for month. Range of temperature varies from 21° to 30° daily.

Average rain-fall for twenty-five years, 65.49 inches. Growth takes place during rainy season, from July to December. (Driest month, February.)

Irrigation.—No artificial irrigation used.

Cultivation.—Practically the trees grow without attention. (Weed.)

Fertilizers.—No manure used, except near a homestead, when farm-yard manure is very beneficial.

Pruning.—Little or no pruning practiced. Trees would be better for attention in this direction.

Picking.—When commencing to turn yellow, or when "full," to use the local term.

Curing.—Simply dried.

Packing.—Packed in cases containing 2 cubic feet, with one division; wrapped in paper.

Planting.—No regular plantations yet exist. Trees are planted irregularly, and all trees are raised from selected seed at Royal Botanic Gardens and distributed throughout the colony.

Maturity.—Trees begin to bear at five to six years, and reach full maturity at twenty years.

Insect pests.—Insects common: Brown and white scale, cottony scale; sometimes destructive; cleaned with lime wash and soap solutions. I know of no useful insects but the numerous varieties or species of wasps.

No printed matter available.

Cuttings.—Cuttings can be secured through the New York agents of Direct Line Steamers, George Christall & Co.

J. F. HART, F. L. S.,
Government Botanist and Superintendent of the Royal Botanic Garden, Trinidad.

DUTCH WEST INDIES.

REPORT BY CONSUL SMITH, OF CURAÇAO.

In regard to the information relative to the cultivation of oranges, lemons, figs, and olives, requested in circular dated the 28th September, I have to report that said fruits are not cultivated here. In former times, when rains were more regular, a kind of bitter oranges, from the peels of which the Curaçao liqueur is made, was grown here, but is now almost entirely abandoned.

L. B. SMITH,
Consul.

UNITED STATES CONSULATE,
Curaçao, W. I., November 8, 1889.

FRENCH WEST INDIES.

GUADELOUPE.

REPORT PREPARED BY MR. ST. FELIX CALARDEAU, DIRECTOR OF THE BOTANICAL GARDEN AT BASSE-TERRE, FOR CONSUL BARTLETT.

The only variety of lemons raised to any extent in this island is the small lime, which is used in Dominica and Montserrat for making concentrated lime juice. In Guadeloupe thus far it is only used for domestic and culinary purposes, but could be raised as well as in the English islands for making concentrated juice. For many years there has been a disease on the lime trees, but the evil seems now to be passing off.

There are plenty of good oranges in the island; they are mostly used for local purposes. Very little exportation has been tried from here, Guadeloupe being too distant from the United States to export oranges profitably by sailing vessels. Steamers would succeed and perhaps incite the country people to raise fruits for exportation. There are four or five varieties of good oranges in the island.

No regular orchards.—The trees are a few in gardens and on different estates, more or less. No large fields of oranges. Grows more luxuriantly on cool mountain sides. Subject also for many years to a blight, caused by a variety of aphis or louse, which attacks the young twigs of the trees.

No special cultivation.

No fertilizers used.

No pruning.

Oranges are ripe from November to April. Blooms in March.

Trees are propagated from seeds.

Fruit at five or six years from seed. The variety not always the same from seed. No grafting of orange trees. Trees in full bearing at ten years of age from seed. Live a great many years.

No exportation of oranges or lemons from the island.

ST. FELIX CALARDEAU.

BASSE-TERRE, *March* 23, 1890.

SPANISH WEST INDIES.

CUBA.

REPORT BY CONSUL-GENERAL WILLIAMS, OF HAVANA.

No regular system for the cultivation of oranges and lemons for export is followed in this island. The only plantings of these fruits here are made in scattered spots of land about the buildings of small proprietors. The trees seldom receive the care of good husbandry, and whatever surplus arises in this way over local demand is sold to gatherers who ship it to the United States. Therefore regular and well laid out orange groves, as seen in Florida, do not exist here. But the capacity of this island for the production of these two fruits of superior quality is almost unlimited.

RAMON O. WILLIAMS,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Havana, March 24, 1890.

SANTIAGO DE CUBA.

REPORT BY CONSUL REIMER.

ORANGES.

Varieties.—The wild orange found all through the mountainous and wooded districts of this island is no doubt native thereto, as it is found in mountains and wildernesses where no human foot has ever trod before; whereas the sweet orange was brought here last century and even earlier by the French and Spaniards, and also the English, from Trinidad and Martinique. Owing to the lack of transporting facilities the oranges are not at all cultivated and trees here and there on coffee and sugar estates enable the people living in this city to occasionally enjoy the fruit. It is a curious fact that oranges planted in the immediate vicinity of this city and also in the immediate vicinity of the coast, no matter how sweet they originally were, produce crops of sour oranges. This is no doubt owing to the nature of the soil, which is chiefly composed of decomposed coral rock and contains considerable lime. In the rich alluvial soil of the interior oranges suitable for commerce can easily be grown, but, considering the cost of transporting them to the seaboard, their cultivation on a basis sufficiently extensive to warrant a large export is at the present out of the question.

As to the varieties of sweet oranges grown here, I find from personal observation that, whatever its origin, the sweet orange acclimated here takes a good deal of the flavor and character of our Florida oranges, and as no effort is made to scientifically cultivate any particular kind and species, it is impossible to determine the best variety.

Situation.—Trees producing sweet oranges are found here on sugar and coffee estates from 10 to 50 miles from the coast line and distant from shipping ports and harbors.

As to elevation above sea level, sweet oranges can be produced in rich alluvial soil found at various elevations.

Climate.—The temperature of this island varies from 60 minimum to 100 maximum (Fahrenheit) all the year. The nightsin winter are generally cool, especially when the north winds, most common from December to March, prevail. In the mountainous districts of this province the nights are never sultry, although the days very often are very sultry. In the absence of any scientific statistics I calculate from personal observation that the rain-fall is about 45 inches per annum.

LEMONS.

Lemons are not cultivated at all, and in their stead limes, growing wild here and native to this country, are used.

The lack of laboring men, the few necessities of the natives, and the poor transporting facilities render the success of all agricultural industries, except the cultivation of sugar, almost impossible as a commercial investment.

Figs, although easily grown here, are very rarely found. Olives not at all.

OTTO E. REIMER,
Consul.

UNITED STATES CONSULATE,
Santiago de Cuba, January 10, 1890.

PORTO RICO.

REPORT BY CONSUL CONROY, OF SAN JUAN.

(Republished for Consular Reports, No. 41½.)

In answer to the Department's communication, dated December 4, 1883, requesting information with regard to fruit culture and the extent and value of the fruit industry as conducted in this consulate, I have respectfully to state that there are no grape vineyards, olive trees, or figs cultivated in this province.

Orange trees grow all over this island. The Porto Rico orange mostly cultivated averages from 2½ to 4 inches in diameter. The trees average

from 8 to 30 feet in height, according to the attention given to their culture. They commence bearing the fourth year and hold their own for fifty years or even more. Their fruit is very sweet, with a fine delicate acid, thin pulp. When taken medium care of the trees produce abundantly, say 1,000 to 1,500 oranges to each tree. These are planted from seeds, say the pit of the fruit, grafting, or budded, but the seeds give better results. The seed should be dried in the air without exposure to the sun or artificial heat. The trees are very seldom troubled with disease, unless entirely neglected, when they are subjected to a sickness called "piojillo," similar to a white mold dampness, which spreads over the leaves, branches, and trunk of the trees. Whitewash, with lime, and ashes at the roots of the trees produce the desired effect.

The trees are planted about eight yards apart. Any closer the trees are not so productive.

This island being very fertile, orchards are to be found in all parts of it, from close to the sea-shore, say about a mile distant from the coast, up to the interior, and up the mountains as high as 2,500 feet above the level of the sea. It is noticed that all kinds of trees produce well, and are much finer in sandy soils, say about a mile or two from the sea, where the soil consists of black sand, or about three parts of fine sand and one part of black earth, with a bottom of hard clay at from 3 to 4 feet below the surface. Most of the orchards are situated from 2 to 5 miles from the sea-coast.

There is no system of irrigation in use, the periodical rains being quite sufficient. The ground in orchards is often cultivated with rice, corn, beans, etc., but more of them with grass. The trees are poorly attended in this district, and in all the east end of the island, very little fruit being raised for export. In fact, so little attention is given to the culture that it may be considered that the orange as well as other fruits are growing in their wild state.

In the west end of the island, more particularly in the district of Mayaguez, oranges and pineapples are cultivated for exportation to the United States; quite a number of American schooners come out during the months of November and December in ballast from Boston and New York, and load with fruit. I can not state definitely the yield of the trees, but each tree is calculated to give from 1,000 to 1,500 oranges, which sell readily at $3.25 per thousand.

The cost of cultivation is very little. The crop commences in this district in December and lasts until May. When proper care is taken, however, it is most common to have the trees with ripe and green fruit growing at the same time. Oranges are to be had all the year round, but from May to November in less abundance.

As this island is situated between 17° and 18° of latitude north, there is no great change in the temperature. During the winter months it rains almost continually, but the thermometer seldom indicates less than 75° Fahr.; so there is no frost ever feared. The want of roads all over

this province is the great drawback to the cultivation of all fruits that require to be handled with care. The climate is fine and soil very prolific. Even in the highest points of the mountains, among the rocks, the orange trees grow wild. Lemons are abundant the entire year round, but the trees mostly grow without culture; the fruit is small, but very juicy. None are exported.

EDW. CONROY,
Consul.

UNITED STATES CONSULATE,
San Juan, Porto Rico, January 28, 1884.

CONTINENT OF ASIA.

ASIA MINOR.*

REPORT BY CONSUL EMMETT, OF SMYRNA.

Varieties.—The best oranges are the "Parakila," so called from the village of Mitylene Parakila, and the "Kaw" trees, so called from their being blood oranges. As for lemons, the "Chio" are the best; none others are cultivated.

Situation.—Valley, hillside, or table land; distance from sea immaterial; elevation above sea-level from 35 to 2,700 feet; exposure to sun immaterial, as the climate is very mild and agreeable here.

They are grown on all kinds of land, but table land is preferable. The soil is calcareous.

Climatic influences.—The climate has great influence upon the orange and lemon trees, which do not thrive in the open air below 43° latitude and where the temperature is lower than freezing point.

The temperature in minimum is 32°, maximum 95°, average 68° Fahrenheit; the atmosphere is very heavy, but always variable by winds at night.

Rain-fall.—About 25 inches.

Irrigation.—No system of artificial irrigation is in use here. When the fruit has the size of nuts, water is necessary, and in abundance, every week once at least.

Cultivation.—The working of the soil is commenced at the end of March; they dig the soil with a spade to the depth of two to three inches in the clear spots, and only 1 to 1½ inches deep in the vicinity of the trees.

Fertilizers.—At the end of November human manure is largely employed every two years. These manures are buried in the soil at a depth of from 10 to 12 inches round the trees, and remain buried and exposed to the rain until the end of March, when cultivation commences.

Pruning.—They prune once at the end of March with very great attention, and they give to the tree a regular, elegant, and graceful form.

* The information here given was obtained from the consular agent at Mitylene, who is extensively engaged in the cultivation of olives as well as lemons and oranges.

Picking and curing.—They pick two or three days after Christmas, immediately after ripeness, which takes place here during December. They are cured by wrapping in tissue paper. For packing and shipping the fruit is always packed in tissue paper, and in this manner packed in boxes or baskets containing about one hundred each.

Planting and propagating.—The trees are placed at a distance of about 20 feet from each other if the soil be rich, and at only about 17 feet if it be middling.

The orange and lemon trees here are budded or grafted; the best varieties are grafted.

There are small and large orchards here.

Maturity.—The trees come into full bearing the fourth year and they remain fruitful about fifty years, but the best crops are gathered from the fifteenth to the thirtieth year.

Insect pests.—Insect pests do not exist.

W. C. EMMETT,
Consul.

UNITED STATES CONSULATE,
Smyrna, January 18, 1890.

MITYLENE.

REPORT BY CONSULAR AGENT FOTTION.

(Republished from Consular Reports No. 41½.)

Every variety of orange and lemon tree is grown here, but the most valuable are the Parakila orange trees, so called from the village Parakila, and the Kan orange trees, so called from their blood-red color. The Parakila trees are large, and produce very large fruit, while the Kan orange trees are not large, but their fruit is very sweet. The trees come into full bearing the fourth year, and they remain fruitful about fifty years, according to the climate and cultivation. The orange and lemon trees here are budded or grafted. The trees are not troubled with injurious insect pests or fungus growth, but sometimes are injured by the cold, when the temperature is lower than 0° Réaumur. The trees are placed at a distance of about 6 meters from each other if the soil be rich, and at only 5 meters if it be middling. Orchards are found in every place, but they yield best results on the sea-coast. The orchards are found very near to the sea-coast. No system of artificial irrigation is in use here. They prune here at the end of March, with very great attention, and they give to the tree regular, elegant, and graceful forms. As soon as the pruning is finished the working of the soil is commenced, and they dig the soil with a spade to the depth of 25 to 30 millimeters in the clear spots, but only 2 or 3 inches deep in the vicinity of the trees. Later, two or three baskets of manure are distributed

around each tree, and at the end of May the ground is irrigated once in every week or two weeks, according to the season, the position, and quality of the ground in summer. Irrigation is suspended during the autumn and winter. At the end of November manure of human excrement is largely employed every two years. These manures are buried in the soil at a depth of from 25 to 30 centimeters round the trees, and remain buried and exposed to the rain until the end of March, when cultivation begins. The yield proceeds per acre per annum in the best orange orchards is about $80, and the cultivation costs per acre per annum $15. The principal portion of the orange and lemon product is for home consumption; the export is insignificant.

M. M. FOTTION,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Mitylene, March 12, 1884.

PALESTINE.

REPORT BY CONSUL GILLMAN, OF JERUSALEM.

Oranges and lemons in Palestine are grown chiefly along the sea-coast; and the more extensive groves are at Jaffa, which place is now celebrated for the excellence of its fruit. Some groves on a smaller scale are also found at Gaza. The orange is cultivated in other places in the district, and even in and around the city of Jerusalem, but not in sufficient amount to be worthy of special notice; the fruit grown inland being generally inferior.

Varieties.—The two principal varieties of the orange grown at Jaffa are called the Shamudi and the Beladi. The Shamudi is of an oval shape, in this respect somewhat resembling a lemon, and, owing to its large size, fine flavor, and thick skin, is the sort best suited for exportation. The finest of these are considered the largest oranges in the world. The Beladi has a round form, and is smaller in circumference, and, although more juicy than the Shamudi, is not so much in demand for exportation, as its thinner skin does not enable it to stand so well a long voyage. The Sidon orange is a small round fruit, much smaller than the Beladi, than which it is also sweeter and more juicy; while the skin, being still thinner, renders it unsuitable for transportation to any great distance. In flavor it is considered one of the most delicious of its species. Its cultivation is chiefly confined to the place for which it is named. The Tangerine orange, also known as the Mandarin, and resembling the variety of the same name grown in Florida, is also cultivated at Jaffa to a very limited extent; yet it usually brings a higher price than any of the other named varieties. There is still another sort of orange, viz, the ungrafted. This is produced on trees raised directly from the seed, but being of small size and *médiocre* as to quality it can

not compete with the fruit of the budded or grafted trees, and is kept for home consumption.

Of the lemon there are two kinds, the sweet and the sour. The former comes into market in November, and lasts only a short time. Though quite juicy it has but little flavor. The rind abounds with a highly fragrant oil, resembling bergamot in odor. The fruit is much appreciated by the natives; but it is not exported. The sour or acid lemon attains at Jaffa a very large size, while the acid is less sharp and of a more delicate flavor than that of the lemon of other countries. It is more and more extensively grown each year, with the object of exportation, though in the past chiefly produced for the home market.

Situation.—The distance of the orange and lemon gardens at Jaffa from the sea is from one-fourth of a mile to 3 English miles. Here the trees flourish, and find altogether an environment best adapted to their superior development. The elevation above the sea-level is from 50 to 100 feet. The larger part of the environs of Jaffa occupied by these gardens must be considered level, and only a small portion of it can be called slightly rolling land. The trees seem to do best in such a situation, and with sufficient exposure to the sun, which here there is no lack of.

Soil.—The character of the soil in which the trees best succeed is a sandy clay. It is considered that a mixture conducive to the highest results would be 75 per cent. of the beach sand with 25 per cent. of alluvium, and containing a good proportion of alkaline salts. The subsoil is chiefly clay.

Climate.—The average temperature at Jaffa is in the daytime, 70° to 71° Fahr.; and at night, 55° to 56° Fahr. The minimum temperature is 32° Fahr.; the maximum, 107° Fahr. The nights are usually cool, while the days are warm or sultry. The ordinary atmosphere, affected by the sea breezes, is, in general, moist. The rain-fall varies from 17 to 30 inches per annum. The growth of trees and fruits are accelerated during the "rainy season;" but as irrigation is constantly employed here during the "dry season," the difference is not so perceptible as it would be under other conditions.

Irrigation.—Within a circuit of 4 miles around Jaffa, the gardens are irrigated. The water is found at depths of from 20 to 60 feet below the surface, wells being sunk to these depths. The water is raised by water-wheels moved by horse-power. The trees are irrigated during the entire of the "dry season," which generally lasts from May till November. The flowering of the trees usually begins by the middle of March, and continues till the middle of April. The trees are watered once a week, and during the night, to save evaporation; the quantity of water distributed by the drains may be estimated at about 15 cubic meters to the acre, per diem.

Cultivation.—The soil of the gardens is dug at different times; but at least twice a year, generally in the spring and autumn.

Fertilizers.—The fertilizers used are the dung of the horse, and that of the mule and camel, applied mostly in the winter-time.

Pruning.—Little or no pruning of the orange and lemon trees is observed at Jaffa. The trunks are usually left shaded by the lower branches.

Picking.—Oranges as well as lemons are picked from October till May, that is from green to fully ripe. The maturity of the fruit dates from January. After being picked they are left two or three days in store-rooms for the skins to dry. They are then wrapped in tissue-paper, and packed in boxes containing from 140 to 200 pieces. These are delivered in boats to the steamers lying off shore, being always lowered into the holds. To allow for damage, decay, or other loss, 1,500 oranges or lemons are counted to the thousand.

Planting and propagating—The trees are planted at a distance of from 10 to 14 feet apart.

The orange tree is propagated in the following manner: In July and August suckers or cuttings, 18 inches in length by 1 inch in thickness, are made of the sweet lemon tree, and planted in beds which are watered twice a day. The second or third year the cuttings are budded by making a T incision, and inserting a bud from the Shamudi or Beladi orange. When it has taken, the lemon stick is cut off a few inches above the bud, which then grows rapidly, and bears fruit the third or fourth year. Lemon trees are propagated in the same way, using for budding a sour lemon bud on the stem of the sweet lemon.

The best varieties, as already indicated, are budded.

The orchards or gardens vary in size, but usually contain several acres. About 3,000 acres are devoted to this purpose at Jaffa, which are divided into about 600 gardens, all irrigated.

Maturity.—Orange trees continue to bear fruit from the fifth to the twentieth and thirtieth years; lemon trees from the fourth to the twentieth year. Their maturity is from the tenth to the twentieth year, when the finest and largest crops are borne.

Insect Pests.—Until recently, it was supposed the trees were exempt from insect pests, or disease of any description, the soil and other conditions at Jaffa being peculiarly adapted to the production of healthy and vigorous trees; but closer investigation has revealed that, in a good many gardens, there is to be met with some diseased trees, which are injured by a little insect living under the bark. No treatment, whatever, has been adopted to restrain the propagation of this, as yet, nameless enemy, nor is it known to have any parasite. Beneficial insects have not been specially observed.

Miscellaneous.—There is no further particular information as to the picking and curing lemons before shipping than that already given by me.

There are no reports giving information as to processes, prices, or statistics issued by government or otherwise. Oranges, which have

recently been damaged by hail, and will doubtless, therefore, considerably advance in price, are now selling at Jaffa at from $9.50 to $10 per thousand; while lemons bring about half this price. During the month of January last oranges were shipped at the rate of 5,000 boxes per week. The fruit sent abroad is generally of the best, selected quality.

HENRY GILLMAN,
Consul.

UNITED STATES CONSULATE,
Jerusalem, February 10, 1890.

SYRIA.

BEIRUT AND VICINITY.

REPORT BY CONSUL BISSINGER.

ORANGES.

Varieties.—Name of best variety for profit: Belady and Khutmaly. Belady is of two species, rough and smooth. Names of other choice varieties worthy of culture and for profit: Rose or Blood orange, Shammooly, Bizry.

Location.—The trees that produce the varieties named above are grown on the sea-coast, close to the sea; but in some sheltered valleys a few trees are also grown, the lower the better. Exposure to the sun is necessary.

Soil.—Level alluvial land is the best. Red earth somewhat sandy is the best; black loam.

Climate.—Temperature: Highest, 95° Fahr.; lowest, 45° Fahr.; average, 70° Fahr.; nights warm; air without fogs or mist; some dew is beneficial.

Rain-fall.—Average 32 inches. During rainy season fruit grows, but not trees; these latter grow in the fall and in spring.

Irrigation.—After the cessation of rain, according to dryness of soil and generally about June 1. In black loamy soil and red earth mixed with sand every six to eight days; lighter soil every ten to fifteen days. The earth in which the trees are embedded is filled with water.

Cultivation.—Plowing either before the beginning of irrigation or after the first irrigation.

Fertilizers.—Goat manure, the best, applied either in the spring or after first irrigation either at base of tree or mixed with the water.

Pruning.—Only the dead wood is cut off in spring and winter.

Picking.—Picking takes place from November 1 to May 1; the fruit is picked for home consumption when ripe, for export before it is ripe. The oranges are rolled in paper and packed in boxes.

Planting and propagating.—The trees are planted 20 to 22 feet apart, and are propagated either by seeding or budded. Bitter orange stock is

the best when 5 inches in circumference. The best varieties are the budded. The orchards are small.

Maturity—The trees begin bearing three years after budding; twenty years of age, best crop.

Insect pests.—Small scale pest; not treated at all.

LEMONS.

Varieties.—Lemons are of three varieties: (1) Seedlings; (2) grafted; (3) from shoots of a grafted tree put into the ground; the best is the grafted. Whitish, clayey soil is suitable for lemons; it is not the best. There is a variety of lemon called "sweet lemon" which has the color of lemon and the shape of a medium-sized orange, but has a sweet, rather insipid taste. Its cultivation is similar to that of the lemon, except that it grows best in soil free from sand. Lemons are picked during all the months of the year. Packed in paper and put in wooden boxes. No information or statistics published by the Government.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, February 12, 1890.

BEIRUT.

REPORT BY CONSUL ROBESON.

(Republished from Consular Reports No. 41¼.)

There are three kinds of oranges grown in this country: (1) sour oranges; (2) sweet oranges; and (3) Mandarins. The last are the most valuable. These trees are mature in the seventh year, and remain fruitful forty or fifty years. The sour oranges are raised from seedling, while all the other kinds of oranges grow better by grafting. Two kinds of lemons are cultivated near Beirut—the sweet and sour lemons. The best results are obtained from sour lemons when they are grafted on sweet-lemon trees, as the size of the fruit increases with the age of the tree. Lately a sort of fungus has appeared on these trees, and in some places small snails attacked them, but as yet no effectual remedy has been found to prevent or cure the same. The orange and lemon trees are planted about 20 feet apart. It is said that they grow best on the sea-coast. Low sheltered places are, however, to be preferred, as much exposure to the winds proves injurious. Dark or sandy soil suits such trees much better than light. Goats' manure is preferable to any other.

Orange and lemon trees require to be watered during the dry season. The first irrigation is effected in June when the leaves of the trees begin to curl up from the dry heat. The ground of the orange and lemon orchards is cultivated three times a year when the soil is thoroughly dry.

The annual yield of fruit per acre in the best orange orchards is about 30,000 oranges, the average price of which may be estimated at from $130 to $140. The yield and price of lemons are nearly the same. The lemon trees last twenty-five years, while the orange trees, like olives, last for an indefinite period of time. The cost of plowing, irrigating, and manuring per acre may be set down between $15 and $18 per annum. The seeds of oranges and lemons are first sown in a small tract of land. After a year they are removed and replanted in a larger piece, and at the end of the second year they are again transplanted into groves.

JOHN T. ROBESON,
Consul.

UNITED STATES CONSULATE,
Beirut, May 3, 1884.

HAIFA.

REPORT BY CONSULAR AGENT SCHUMACHER.

Horticulture is carried on in my district in the same primitive manner that has been the custom for centuries.

Variety.—Of oranges and lemons there are but a few groves of any account in my district in the neighborhood of Acca, therefore I can only answer the questions in a general way. There is only one kind of orange planted, called, in Arabic, bortogan beeladie.

Situation.—The groves are situated 3 miles from the sea. The elevation above sea-level is from 30 to 40 meters. The trees are exposed to the sun without any protection. The soil is sandy, of reddish color.

Climatic influences.—Temperature: minimum, 2° to 4° + Reaumur; maximum 33° to 35° + Reaumur; average 20 to 25° + R. The nights are generally warm about six months; about three to four months a temperature from 12° to 14° + Reaumur, the remaining two months 2° + (only a few nights) to 20° + R. There are about thirty-five or forty days of extremely dry atmosphere during sirocco. Moist air prevails during the rainy season, from December to April.

Rain-falls.—The rain-fall varies from 1 foot 7½ inches to 3 feet 3 inches per year; by 1 foot 7½ inches we call it a dry year; two feet is about sufficient rain.

Irrigation—Irrigation lasts from May to December. The water is raised by mule-power from wells from 25 to 100 feet deep, and then flows into large reservoirs, from whence it is run out in small channels to the trees. Irrigation lasts from May, at which time the blossom is past, and is carried on until December, when the fruit is about ripe. Each tree receives from 40 to 50 gallons of water, once a week.

Cultivation.—The soil in the groves is thoroughly worked with broad hoes several times a year.

Fertilizers.—Before irrigation commences the soil is well manured with sheep dung. The manure is spread over the whole soil of the groves and then mixed with the soil.

Pruning.—There is but very little pruning done, and not before the tree is four years old.

Picking.—The oranges and lemons are picked from November to April. Stage of ripeness, January, some nearly, some entirely ripe. The fruit in my district is not exported, but consumed by the home trade.

Planting and propagating.—The distance planted apart is from 20 to 25 feet; trees are propagated from the seed and from cuttings. Seedlings which are grafted when two or three years old are preferred. The orchards are various, from 1 to 15 acres.

Maturity.—Age of fruiting the fifth year, the largest crop about in the fifteenth year. Maturity at thirty-five to forty years.

Disease.—Since a few years a disease is spreading in some localities among the orange and lemon trees, similar to the phyloxera in vines, which threatens to destroy the groves, as no remedy has been found yet for this disease, bu tthe gardens near Acca have up to now not suffered from this disease.

JACOB SCHUMACHER,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Acca and Haifa, December 5, 1889.

HAIFA.

REPORT OF CONSULAR AGENT SCHUMACHER.

(Republished from Consular Reports No. 41½.)

Only one variety of oranges is cultivated in my district, and is named, after the city of Acca, "Accawy." It has the form of the round Spanish orange, with reddish-yellowish flesh; it has a fine flavor, and is very juicy. Blood oranges and mandarines are cultivated so little here that there is no rule for their treatment. The orange of my district is about 3½ inches in diameter; the skin is smooth, thin, and contains considerable oil.

Several sizes of lemons grow here; the largest is about 4½ inches long by 3 inches in diameter. The skin of the lemon is thick and contains much oil. At the age of four to five years both orange and lemon trees begin bearing and remain fruitful thirty to forty years.

We have two kinds of lemons, sweet and sour; the sour bear as seedlings; on the sweet the orange is grafted. This manipulation of grafting on sweet lemon trees has lately proved to be the most profitable, as the size of the fruit increases with the age of the tree, while those grafted on sour lemon trees become smaller after fifteen years. The trees are

not troubled with injurious insects, pests, or fungous growth; want of irrigation checks the growth of the trees.

Orchard trees are planted 10 to 12 feet apart in each direction. Both orange and lemon trees are planted as shrubs in such a manner that several stems come out of the ground together, although there are some orchards where the trees have but one stem; those, however, planted as bushes protect the fruit better against the influence of the wind. The orchards are planted, as a custom, along the sea-coast, where they yield most abundantly on level land; inland orchards never do so well. As the orchards require a sandy soil, they are planted as near as one-fourth of a mile up to some miles distance from the sea-shore. Every orange or lemon orchard is cultivated by a system of artificial irrigation, irrigated twice or three times a week (in the evening part of the day). The ground in orchards between trees is cultivated twice a year—in the fall before the rain appears and in spring when the rainy season is over. The value of the yield of an acre per annum of best orchards amounts to from $80 to $100; the cost of cultivation amounts to about $10. The returns would be much larger if the orange were exported to Europe; the above statements therefore relate only to home consumption.

JACOB SCHUMACHER,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Haifa, February 20, 1884.

MERSINA.

REPORT BY CONSULAR AGENT DAWSON.

Varieties.—The best variety for profit is the bitter orange; the next varieties worthy of culture are lemons and oranges. The above three varieties are grown at Adana, Tarsus, and Mersina.

Situation.—Distance from sea: Adana, 13 miles; Tarsus, 15 miles; and Mersina on the sea shore. Elevation above sea-level from 1 to 5 yards; the trees have full exposure to sun; level land is the best.

Soil.—Rich soil 6 feet; subsoil gravel.

Climate.—The frost would destroy the trees, and also the dry winds in summer, if not watered. The trees only fear the frost, and the dryness of soil; the heat does not affect them when watered. Cold nights in winter without frost, moist atmosphere.

Rain-fall.—Rain-fall from 18 to 20 inches; the trees are watered by irrigation in the dry season. Rain falls in November, December, March, April, and May. The trees get watered two or three times a week in June, July, August, and September, and until sufficient rain comes.

Irrigation.—For irrigation the water is taken from the Sarus river which passes through Adana, the Cydnus through Tarsus, and the Mer-

sina river which runs close to the gardens. They irrigate two or three times a week until the wet season comes, at which time the fruit is formed to about twice the size of a walnut. In the dry season they open a space of about 3 feet diameter all around the trunk of every tree and 1 foot deep, so as to allow the water to remain in. At the beginning of the wet season they fill up these holes and cover the trunk with earth up to about a foot from the ground with a slope of 3 to 1.

Pruning.—Very little pruning is required or done here. They generally clean the trunk of all its branches from the surface of the ground up to the height of about 3 feet where the thick branches start.

Picking.—The picking of the fruit begins end of November. About 15th of December, the fruit is nearly all ripe, but they pick it until the end of February, according to the requirements of the market.

Curing.—To get the fruit to last the longest time possible it must be cut with a little stalk attached about 1 inch long.

Shipping.—The bitter oranges are shipped from Mersina to Liverpool, each one wrapped in thin paper, and they are packed in boxes containing 100 each, in two rows, which are separated one from the other by a thin board.

Planting and propagating.—The trees are planted from 12 to 14 feet apart. They graft the young wild trees that come by seed about 3 feet off the ground when they get 1 inch diameter.

The orchards.—The largest orchards here occupy about 20 acres of ground; the smallest 5 acres.

Maturity.—The grafts give fruit the second year, and the older they grow the more fruit they give. There are trees fifty years old, 14 to 20 inches diameter at the trunk.

Insect pests.—A small insect like a black ant, with wings, attacks the young tips of the new branches. They do not know of any remedy against it. The ants destroy the above insect.

Packing.—Lemons are picked in December; packed each in thin paper and shipped in small boxes of 200 each.

Exports.—About 1,000 tons of bitter oranges might be exported from Adana, Tarsus, and Mersina in one season.

No figs are grown in this vilayet for export. There are some olive forests in the vilayet, but in a wild state.

WM. DAWSON,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Mersina, December 7, 1889.

SIDON.

REPORT BY CONSUL BISSINGER, OF BEIRUT.

Varieties.—The oblong, thin-skinned, most delicate, but can not be transported. The other variety is thick-skinned, with flat ends, more hardy.

Situation.—On alluvial sea-coast plain of Syria, within a range of a very few miles, not more than 5 from the sea, and at an elevation up to 200 feet. Constant sunshine, very few clouds, no fogs.

Soil.—Level, flat land; sandy soil, the best and light earth.

Climate.—Even, no sudden changes. Dry and rainy season. Temperature, 40° to 98° Fahr.; average, 69° Fahr. Nights warm. Air without fogs or mist; some dew is beneficial.

Rain-fall.—From 34 to 40 inches the ordinary range. Trees grow in spring and put forth new shoots in fall if watered when thirsty.

Irrigation.—By channels of running water from river. Irrigation is used when after spring rains the leaf shows a need. Different soils require different periods of irrigation. From six to fifteen days; whenever the soil is dry then the trees are irrigated—ground flooded.

Cultivation—Plowed once a year.

Fertilizers.—Best application is to put goat manure into irrigating water.

Pruning.—Varies; low trees preferred; less injury to fruit when it falls; in fall dry wood is pruned.

Picking.—Cheap kinds are allowed to fall for home consumption. The fruit is picked, for a near market, fully ripe; for a distance, while green.

Packing.—Wrapped in paper and put in wooden boxes.

Planting and propagating.—Branches touch and interlock; from 20 to 30 feet; some are propagated, some are seedlings, but the best varieties are budded.

Maturity.—Differs according to land; five to eight years they bear well.

Disease.—Only a small scale like a freckle on fruit, which dries the tree.

Shipping, packing, and canning goes on during all seasons of the year. Every week, wrapped in paper and boxed.

SIDON.

REPORT BY CONSULAR AGENT ABELA.

(Republished from Consular Report No. 41½.)

Varieties.—Oranges are distinguished by their shape and contour. Belady, round, flat ends, very thick peel, hardy; ripens late. Shamouty, long like an egg, thin-skinned; ripens early. Bisry, finest flavor; a

seedling. All these, except the last, are grafted upon the wild or bitter orange, and in two or three years after grafting begin to bear fruit. No limit is recognized to the period of fruit-bearing, but the trees attain a very old age without deteriorating. Only one variety grows directly from the seed; the others are all grafted, which is considered a better method than budding.

Soil.—The order of the soils best adapted to orange culture is as follows: the best being light red earth, then dark loam, then sandy, and finally clayey.

Pests.—Until the past year nothing had troubled the trees except the attacks of moles on the roots of the trees. But now a fungus has appeared, which is spreading rapidly, and seems likely to do great damage. No remedy for it has been discovered as yet.

Position.—All the oranges and lemons of Syria are grown very near the sea-coast, whether at Tripoli, Sidon, or Jaffa; and I know of no extensive successful cultivation more than 4 miles from the sea, and some of the orchards are within 20 rods of salt water. When the trees are set out they are placed 18 feet apart every way when the soil is good, 16 feet when the soil is only average; trees placed behind a shelter, as another line of trees, prosper better than those exposed to severe wind.

Irrigation.—As there is no rain from May 1 till October 1, irrigation is the only means of keeping the trees alive. Each tree is surrounded by a little bank of earth to keep the water about the tree. The trees are left without irrigation till the last of June, till the leaves curl a little, then they are watered three times for periods of seven days, and after this every fifteen days. The irrigation of the river coming from Mount Lebanon is better than that from the wells, as the last has a taste of brackishness.

Yield.—In good orchards it is estimated that the average yield is from 1,500 oranges to 2,000 per tree, and in poor orchards about 600 per tree. The yield is annual, but every other year the crop is lighter.

SHIBLY ABELA,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Sidon, February 21, 1884.

TARSUS.

REPORT BY ACTING CONSULAR AGENT AVANIA.

(Republished from Consular Report No. 41½.)

There are four kinds of trees more or less productive: The sour lemons, the sweet lemons, the sour oranges, and the sweet oranges. The most yielding of these trees are the sweet lemons, but the most valuable are the sour lemon and the sweet orange fruits, the usual value of which

is from 1 to 3 cents each. These trees come generally to their full bearing after the fifth year of their plantation, which is first effected in seeds and replanted the next year at a distance of from 13 to 16 feet between each plant. By grafting, these four kinds of trees can be transformed into one, which succeeds perfectly well. Sour lemons and sweet oranges are most sensitive to a cold temperature, especially the former, which are sometimes completely ruined by cold. Thus the duration of these trees depends on temperature, and might be prolonged to thirty or forty years. In this country such trees are never troubled with any injurious insect, etc.; severe temperature is the only thing that injures them. The orange and lemon groves are generally situated in the interior or on the coast, but always in the vicinity of towns in order to be sheltered from cold. The plain lands are rather suitable for the plantation and conservation of these trees; but the best results are obtained on the coast, where the soil is more or less sandy and light. Even at a distance of a quarter of a mile from the sea these trees prosper quite well. The system of irrigation used in this country is the running water. In those places where such water is lacking wells are dug, the water of which is used for watering the gardens by means of wheels mounted with buckets. In the places where the soil of the groves is cultivated watering is necessary in summer and autumn when rains are late, and this is done repeatedly.

It is commonly calculated that the average yield of these trees is worth from $2.50 to $3 each. In this country no exportation of oranges or lemons is made; on the contrary, large importation is effected annually from the coast of Syria for the local consumption.

ELIE AVANIA,
Acting Consular Agent.

UNITED STATES CONSULAR AGENCY,
Tarsus and Mersine, March 3, 1884.

TRIPOLI AND VICINITY.

REPORT BY CONSUL BISSINGER.

Varieties.—The best varieties are, citron, mandarines, the "belady," (indigenous) and Jaffa oranges, after which come the sour and sweet lemons.

Situation.—From the sea to 10 miles inland, with slight elevations. The trees should be exposed to the sun. Low, level land is best. The best soil is red or black, but sandy.

Climate.—The degree of heat is moderate; from 40° to 90° Fahr. Cold nights destroy the blossoms. In warm days and nights the trees have to be watered; moist and ordinary atmosphere is beneficial.

The rain-fall is 36 inches on an average per year. Abundance of rain is advantageous; frost injures the trees.

Irrigation.—When the soil is dry, during the months of June, July, August, and September, and sometimes October. More or less according to dryness of soil and size of trees—once every eight or ten days.

Cultivation.—In the spring, when the soil gets dry, the ground should be plowed to the depth of 5 or 6 inches; this should be repeated three or four times, *i. e.*, once every eight or ten days; in summer every eight or ten days after each irrigation. This alternate succession of plowing and irrigation should occur between the 15th of June and 15th of September.

Irrigation.—Goat manure is the best, cow dung ranks second, after which, in point of quality, comes horse manure. Half of the quantity is to be used in winter and the other half in summer. The quantity needed is about 84 pounds for each large tree. The first 42 pounds that are to be used in winter should be placed on the surface of the soil, at a distance of about 10 to 12 inches from the foot of the tree, and the other 42 pounds distributed in two or three equal parts, after being mixed with water during the summer. Small trees need only half of this quantity.

Pruning.—Pruning should be confined to the lower branches, but yet sufficiently upward to leave a free passage for a team of oxen when tilling the ground.

Picking.—Citrons, sweet and sour lemons, as well as oranges, must be picked when green, with a yellowish tint, if intended for exportation; if for local consumption, when fully yellow. These fruits fall to the ground as soon as they are perfectly ripe, and should be gathered when dry from dew or moisture. It is of great importance to roll these fruits in thin paper before packing them up in boxes.

Planting and propagating.—The trees are planted from 3 yards 9 inches to 4 yards 12 inches. Citrons are propagated by seedlings; sweet and sour lemons and oranges by grafting. Oranges prosper well when grafted on sweet lemon trees. Sweet lemons can be grafted on sour lemon trees. The best varieties are budded. Orchards are generally small.

Maturity.—Trees begin to bear fruit in the fourth or fifth year after being planted. The largest crops are from the seventh year upward.

Insect pests.—No insects infest this kind of a tree except a scale pest, for which there is no known remedy; but the damage caused by it is slight.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, February 12, 1890.

ADEN.

I have the honor to acknowledge receipt of circular dated 28th September, relative to the cultivation of oranges, lemons, figs, and olives in my district, and in reply I regret to state that owing to the barrenness of Arabian soil, the cultivation of the above-mentioned fruits to any extent would be impossible.

DWIGHT MOORE,
Consul.

CONSULATE OF UNITED STATES,
November 29, 1889.

INDIA.

REPORT, PREPARED FOR VICE CONSUL BODE, OF BOMBAY, BY MR. G. MARSHALL WOODROW, LECTURER IN BOTANY AND AGRICULTURE IN THE COLLEGE OF SCIENCE, POONA.

ORANGES.

Varieties.—The best orange grown in India is the Cintra, a name commonly assumed to be derived from the Portuguese town, but lately declared to be a corruption of a Sanscrit word which should be pronounced Suntura. The tree is of upright habit, rarely exceeding 12 feet in height and 8 feet in expansion of branches. The leaves measure 1½ by ¾ to 2½ by 1¼ inches. The winged joint in the stalk is very slightly developed. The flowers are three-fourths inch in diameter, have five petals, twenty to twenty-four stamens and nine to ten carpels. The fruit is found in two varieties—one having the skin very loose and the other having a smooth, tight-fitting skin, as grown at Nagpur. This fruit has been declared by people who have traveled much, to be the finest orange in the world. The flavor of the two varieties is equal when grown under similar conditions, but the loose-skinned variety has an imposing appearance and is rather more easily peeled, consequently it is the market favorite. The inner skin (endocarp), of both varieties is very delicate and the liths (carpels) cohere so slightly that it is easy to break up for eating. Ordinary market specimens weigh 7 ounces, but examples weighing 10 ounces are common. Well-grown specimens have only two or three seeds, which have several embryos.

The Mozambique orange.—The tree that bears this orange is of a strong growing habit and forms an irregularly globular head. Its leaves measure from 2½ by 1½ to 5½ by 3½ inches, entire, or very slightly and irregularly toothed and the apex pointed or cut out. The leaf stalk is three-fourths inch, the wings on one of the joints attaining one-fourth inch in width—often less, and sometimes wanting. The flowers are 1½ inches in diameter; have five slightly oblique petals which are glandular on the outside, and twenty to twenty-four stamens. Average speci-

mens of the fruit grown in India weigh 8 ounces, but specimens imported from Mozambique 13 ounces in weight are common. In shape it is globular, slightly compressed vertically. The skin is medium in thickness, tight fitting, marked by numerous small vertical furrows and a circular smooth mark about 1 inch in diameter on the upper end. The pulp is usually pale yellow, but when dead ripe becomes of the brownish yellow that may be called the medium tint of orange pulp. In flavor it is sweet, but without the piquancy of the best varieties. The inner skin is tough, so that the orange must be cut up with a knife and is only fit to be sucked. Seeds about twenty, with several embryos in each. Two sorts are known, Khaguzee, thin skinned, and Goradiya, thick skinned. Both sorts keep in good condition about two months, although ripe when gathered. The imported fruit must keep in good condition longer, as it is brought from Mozambique by sailing craft.

Ladoo orange of the Deccan.—The tree that bears this variety produces long, straight branches, apt to spread out considerably as the tree attains size, therefore needing to be planted 18 feet apart. The leaves are from 1½ by ¾ to 2½ by 1¼ with the winged joint of the stalk very slightly developed. The open flowers are three-fourths of an inch in diameter, have five petals, twenty to twenty-four stamens, and nine to ten carpels. The fruit attains 8 ounces in weight, is in shape a much depressed globe with a distinct nipple at the stalk, and, within the skin on the upper end, generally has an extra orange about three-fourths of an inch in diameter with five to seven liths (carpels). The skin is of a dusky yellow color, moderately rough and loose, and of medium thickness, the inner skin very thin and inclosing juicy sweet pulp of piquant flavor and medium tint of color. This is a fine orange for eating, but it does not bring a high price on account of its indifferent appearance.

Lall Ladoo of the Deccan.—This fruit I have identified with the mandarin orange of books. The tree resembles the Ladoo in habit, leaves, flowers, and shape of fruit, but the skin of the fruit is of a deep orange color, smooth and loose, and inclosing eleven liths having a stronger inner skin than the Ladoo and about twenty seeds. It is a very handsome and attractive fruit of good flavor.

Kowla orange.—This is a small-sized, indifferent orange, which becomes yellow on the tree before it is sweet.

The Sylhet orange.—This variety, which is very often to be seen in the Calcutta markets, is grown in the district whose name it bears. It averages 5 ounces in weight, has a light skin and good flavor.

The Malta and St. Michael oranges have been introduced and thrive well, but are not greatly valued where the Cintra can be grown.

Location, etc.—The finest oranges in India and, in the opinion of some—in the world—are grown near Nagpur, which lies in north latitude 21° 9′ and east longitude 79° 11′, about 350 miles from the sea, and at an altitude of 1,025 feet above mean sea-level. The orchards are fully exposed to the sun, and the ground of each orchard nearly level, as they

are dotted about at intervals in a gently rolling country where the fine soil has been collected from the exposed and disintegrated trap rock. This soil forms a stiff loam from 2 to 3 feet in depth, containing about 7 per cent. of lime and 1½ per cent. of vegetable matter. The subsoil is open, nodular limestone mixed with clay, and gives excellent drainage.

Climate.—The climate of Nagpur is shown in the following table, which is compiled from the Government Meteorological Reports. It may be described as comparatively hot and moist from June to September, cool and dry from October to February, hot and dry from March to May.

It must be noted that the temperature given in the following table is taken from a barometer shaded from direct sunshine and from radiation at night. The increase obtained by exposing the barometer to the sun averages 59.8° F., and the decrease from exposing the barometer to the open sky at night varies from 12.8° in January to 2.7° in July.

Table showing the climate of Nagpur, India, where very fine oranges are grown.

Months.	Temperature (degrees F.).			Rain-fall.
	Maximum.	Minimum.	Average.	
				Inches.
January	89	48	68.6	0.61
February	97	50	73.8	0.42
March	105	59	81.9	0.63
April	101	67	88.8	0.45
May	116	72	93.1	0.83
June	108	71	85.7	8.99
July	94	71	79.1	12.94
August	94	72	79.3	8.82
September	92	70	77.2	7.92
October	93	59	70.7	2.15
November	88	50	67.1	0.41
December	83	48	78.7	0.34
During five years	116	47	79.0	44.51

There are two distinct seasons in which the trees will flower and ripen fruit, and to obtain high-class fruit the cultivator must elect which season he will work a particular break or division of the orchard, because the trees will not bear properly at both seasons, and the attempt to make trees bear fruit at both seasons has been the destruction of many plantations in other parts of India. The finest fruit is obtained from flowers that open in June and July. This is on the market from February to May. The other flowering takes place in February and March. This ripens fruit from December to February.

Irrigation.—The trees are kept dry during May or December, according to the season at which fruit is wanted. At other seasons irrigation is carried on sufficient, with the rain-fall, to provide 4 inches of water over the entire surface. The water is drawn from wells 30 feet deep by means of a leathern bucket which contains about 25 gallons, by a pair of oxen that walk down an incline plane, pulling a rope that passes over a pulley. The cost of drawing water by this means is 1

anna (say 3 cents) per 1,000 gallons for 30 feet in depth. The water is led into small surface channels having a slope of 1 in 1,000, and from the channels into beds extending round the tree as far as the expanse of the branches. Into those beds 1½ to 2 inches of water is led once in ten days during the absence of sufficient rains, so the soil is kept moist from the flowering time till the fruit is all gathered.

Cultivation.—The soil is kept clean and open by plowing or digging with a pick, 4 inches deep, twice yearly. For the crop that ripens during February –April water is withheld and the soil opened up during April and May. The soil is at the same time drawn away and the roots exposed during fifteen to twenty days. At this time the greater part of the leaves fall off, then 100 pounds weight per tree of old, moist cow-dung is mixed with the soil and the roots covered up and watered heavily, if rain does not fall soon; this causes the trees to burst into bloom and fresh leaves; thereafter the soil is kept moist till the fruit is gathered. The same operation carried on in December brings ripe fruit during December and February following.

Pruning.—This extends to clearing away suckers from below the graft and cutting out weakly and defective shoots only; excessive pruning must be avoided, as it tends to make the plant run to wood and prevents flowering.

Picking.—The fruit continues to attain full development during a month from each break of trees that has been started into growth together, and is picked over at intervals of a few days. A faint trace of yellow in the skin of the fruit indicates maturity. When fresh from the tree this fruit has a delightful piquancy that is to a great extent lost by the fruit being packed up closely for a few weeks, but the fruit remains in good condition about two months if not closely packed.

Curing.—No special curing is given unless the fruit has been gathered unripe. In that case it is packed with fine hay and kept close in a box for a few days. Such fruit is always inferior.

Packing.—In packing 30 to 40 pounds weight of oranges are placed in very slim baskets, without any packing material, and the lid tied down. None of the fruit is shipped as merchandise, as the demand in the large cities exceeds the supply.

Planting and propagating.—The trees are planted 12 feet apart each way, except for Ladoo, which is given 18 feet apart.

Grafting or seedling.—Seeds of *Citrus medica*, (Jambooree), a large coarse citron of vigorous habit, are sown, and when the stocks are two to three years old are budded. In budding one vertical slit in the bark only is made and the branch bent towards the slit so as to make it gape open; into the gape the bud is inserted and the branch released; it then springs back and closes in the bud which is tied with a strip of fiber. Occasionally the sweet lime (*Citrus limetha*) is used as a stock, and is believed by some to insure more sweetness in the fruit. The best varieties are invariably budded, as seedlings take so long to produce fruit as to be practically useless in fruit growing.

Size of orchards.—From the nature of the soil required and the formation of the country large orchards can not be planted; from 5 to 10 acres is a common size.

Maturity.—The trees begin to bear at three years from the bud, carry the heaviest crop between the sixth and tenth year, and after 15 years decay rapidly.

Insect pests.—An important insect enemy is the caterpillar of Erytheo, which strips the trees of the young foliage during July. Hand picking is the chief remedy employed. An undetermined wood-boring insect attacks the trees as soon as decay sets in, and is commonly supposed to be the cause of decay. Severe pruning and burning the affected branches is the most effectual remedy. It is doubtful whether any insects are beneficial except in distributing the pollen, but the entomology of Indian fruit culture is fragmentary as yet.

LEMONS.

Lemons are not exported. The large coarse citron called Jambooree (*Citrus medica*) can be produced cheaply in large quantities, but except by dyers for the acid it is but little used and brings a very low price.

The sweet lime (*Citrus limetha*) a fruit having a tight, smooth, very thin skin, ultimately of a pale yellow, and eleven to twelve liths, inclosing very pale colored sweet juice without piquant flavor and about ten seeds. The leaves attain 3½ by 2½ inches, slightly toothed, and thorns one-fourth of an inch in length are developed in the axiles. This fruit is widely cultivated, but not to any important extent in one place. It is chiefly grown from seed.

The common sour lime (*Bagdee Limboo*).—A globular, smooth, pale yellow fruit weighing about one-tenth of a pound, having pale greenish yellow acid pulp of pleasant flavor inclosed in 10 by 11 liths and numerous seeds having several embryos.

The tree is of a dense growing, branching, thorny habit, bears leaves from 2 by 1 to 2½ by 1¼ inches, having a stalk one-half inch in length, of which the winged joint is one-quarter of an inch. The flower has four petals, is three-quarters of an inch in diameter, and has twenty-two to twenty-five stamens.

This is the favorite sour lime. It is used by all classes as a condiment and digestive, and is widely produced throughout the country. The trees are raised from seed, and when cared for properly attain at least fifty years of age.

The Pati Limboo, or Karna, is a variety of the above, 3½ ounces in weight, oblong in shape, and bearing nipples at both ends.

The *Popamus* or Pumalo, (*Citrus decumàna*), seedlings of this fruit vary greatly and a large proportion are worthless, but the grand, thin-skinned, and red-fleshed varieties that are cultivated near Bombay are very delicious and wholesome if eaten in the morning with salt or sugar. A well-developed specimen weighs 4 pounds and is 7

inches in diameter. It has fourteen to fifteen liths; seeds few, or sometimes none; embryo one in each seed. The tree thrives in a hot, moist climate and needs the strongest of nitrogenous manures. Near Bombay slaughter-house offal is freely given as manure. Enarching on to a seedling Pumalo is the means employed for propagation, and regular irrigation when the rain-fall is below 4 inches per month is provided.

Publications.—Government of India does not publish prices and statistics of fruit. The Magpur cultivation of the orange, which is by far the most considerable in the country, was initiated by a Scottish gardener named Thompson, who was in the service of the local prince about thirty-five years ago.

G. MARSHALL WOODROW.

POONA, *March* 3, 1890.

PHILIPPINE ISLANDS.

REPORT BY CONSUL WEBB, OF MANILA.

As stated in a previous report, horticulture is in a very backward condition in the Philippine Archipelago, and, while there are five varieties of oranges and four of lemons found here, they are not cultivated to an extent that would create a demand for them for export. The native women, who find the trees growing wild in the jungles or encourage a few to grow around their huts, bring the fruit to the cities and towns, selling it about the streets and markets; but there are no carefully kept orange or lemon groves, as in other orange-producing countries, and no interest whatever is manifested by the Europeans here in the cultivation of the fruit. The results of this indifference and neglect are apparent, as the fruit is of a very inferior quality. I am quite sure there is not a native orange or lemon to be found that would compare at all favorably with the ordinary products of Florida and California. When fit to eat the skin is green and has the appearance of just beginning to ripen, and when it reaches the orange color the pulp is either perfectly dry and tasteless or decayed and unfit to eat. When the pulp is sweet and juicy the skin is usually a deep green.

Varieties.—The following varieties of oranges and lemons are found here:

Citrus Aurantium known to the natives as the "Naranjita." It resembles somewhat the ordinary Japanese orange, but is inferior in flavor; the pulp is of a rich, pinkish color, separates readily, and when ripe is quite juicy. It usually measures at maturity about 2¼ to 2½ inches in diameter and is slightly flattened at the stem and bud ends.

Citrus Aurantium, known to the natives as the "Cajel;" it is the juiciest and most palatable variety found. It has a yellow pulp which clings tenaciously together and is difficult to separate from the skin and the fruit is, therefore, never peeled for the table. The only method

of eating it is to cut away pieces of the pulp with the rind adhering to them, leaving the core with the seeds in it in an oblong square piece. The outside pieces are then taken in the fingers and the juice squeezed into the mouth. As a rule the juice has a watery taste although one is occasionally found that yields rich and deliciously flavored juice.

Citrus Aurantium or "Pisong" resembles in shape and flavor the Mandarin or "Kid-glove" orange of China and Japan, but unlike the latter the skin is always green; it can be easily peeled with the fingers, and the pulp separates freely and without breaking; it grows plentifully and is very cheap.

Citrus Decumana, called by the natives "Lucban," is generally from 4 to 6 inches in diameter, with skin an inch or more in thickness, and closely resembles the "Pomals," brought here from China, except in the color of the skin. The pulp is white and separates readily, and the juice is quite tart.

Citrus Madurensis, called by the natives "Sua," is an exact counterpart of the Lucban except that the pulp is red and the juice sweet, with a suggestion of tartness.

Citrus Medica or "Limon Real" (royal lemon) is shaped like the Messina lemon but is very much smaller and less juicy. The skin is of a yellowish green color when ripe and the juice is very sharply acid. It is excellent fruit for lemonade, for which it is used almost exclusively.

Citrus Medica or "Limon" is seldom more than an inch or an inch and a half in diameter, is nearly round, and its flavor closely resembles that of the lime. The skin is quite green until it begins to decay.

Citrus Medica or "Limoncito" (little lemon) is seldom more than half or three-quarters of an inch in diameter, and, when ripe, has a yellowish green skin. It is slightly sweetish and is used only by the natives in making preserves.

Citrus Medica or "Calamondin," when ripe, is usually about an inch in diameter, almost perfectly round, and has a very thin bright yellow skin, and red pulp. The juice is very sour and is used for flavoring sauces and for lemonade.

Situations.—The orange and lemon trees are seldom found at a distance of less than 100 meters from the sea and they thrive best at about 200 on high ground and in dry, sandy soil. They are most productive on the higher-level lands where they are partially in the shade of larger trees, although they seem to do fairly well even under the blistering rays of the tropical sun.

Climate.—The temperature of the best producing districts varies but little. Last year, which may be taken as a fair average year, the maximum temperature was 765.33, the minimum 755, and the average 759.35.

The average annual rain-fall is about 3,000 millimeters. The greatest rain-fall since 1865 occurred in 1876 when it reached 3,072.8 and the least was in 1885 when 905.5 millimeters fell. In September, 1867, 1,110 millimeters fell in three days, being the heaviest continuous rain-fall ever

known here. The atmosphere is humid at all times and is very moist at night, so much so that in Manila the belief prevails that a foreigner is almost sure to contract rheumatism, neuralgia, or a low type of fever if he sleeps near the earth. Residences for foreigners are, therefore, usually built with the sleeping rooms from 10 to 12 feet above the ground. The nights are damp and cool and the days warm and sultry during the greater part of the year. During January, February, and March rain rarely falls, and frequently December is also a dry month; the rainy season sets in fairly in June, and for six months drizzling rains prevail with occasional drenching showers.

Irrigation.—Irrigation is never necessary except for the rice fields.

The orange and lemon trees develop more rapidly during the rainy than the dry season, and the fruit is gathered eight months in the year. Under proper cultivation oranges and lemons could probably be had the year round.

Propagation.—Nature is generally allowed to take its own course in regard to fruits of all kinds, but occasionally an unusually enterprising native will undertake to propagate a few orange trees from the seeds or by the following method:

A strong hemp cord is wound several times around a flourishing branch, 2 or 3 feet from the end, and a section of bamboo 4 or 5 inches long and about 2 inches in diameter, is split in halves and bound around the branch, the lower end resting on the cord. Into the bamboo cup is placed some moist earth, which is frequently watered, and into which the branch sends small shoots. When these have developed sufficiently the branch is severed from the tree just below the cord, and, after the latter and the bamboo cup have been removed, it is planted in light, sandy earth, which is kept loose and well broken until the tree fairly takes root; after this its owner pays no further attention to it except to gather the fruit. No fertilizing material is used, nor is any regular system of pruning followed. A tree thus propagated will bear fruit the following year, while a tree grown from the seed requires four years or more in which to develop into fruition. When trees are planted they are usually placed about 8 yards apart. There are no insects that are known to either injure or benefit the trees.

CONCLUSION.

The principal orange-producing districts are the provinces of Batangas, Bulacan, and Laguna, on the island of Leuzon, but they are found in almost every province of the archipelago.

One reason why the natives neglect to cultivate the fruit of the islands is that all who are willing to work can find more profitable employment in the cultivation of hemp, sugar cane, and tobacco, and the care of the orange trees and the picking and selling of the fruit are left to the women and children. The foreigners, too, find more profit in hemp, sugar, and tobacco than they could possibly realize from fruit, with a corresponding investment of time and money.

My limited knowledge of horticulture leads me to confidently believe that, under a proper system of grafting, pruning, and fertilizing, the oranges of the Philippine could be made to rival those sent here in large quantities from China and Japan, which command a much higher price and are bought in preference to the native fruit by those who can afford to pay for them.

Neither figs nor olives are found here, but I am told that a few trees of both kinds have been raised in the door-yards of Europeans from the seeds, yielding, however, very inferior fruit.

ALEX. R. WEBB,
Consul.

UNITED STATES CONSULATE,
Manila, December, 23, 1889.

NEW SOUTH WALES.

REPORT BY COMMERCIAL AGENT DAWSON, OF NEWCASTLE.

Referring to circular on the cultivation of oranges, lemons, olives, and figs, I beg to state that I have written to several parties in regard to the matter, but, thus far, I am able to make only a very meager and unsatisfactory report.

In answer to the questions put in the circular, I will take an orangery on the Allyn River as the locality, about 60 miles north of Newcastle. Almost any variety grows well there, and, after deducting expenses, leaves a medium profit in fairly paying seasons. Mandarins, Emperor, thorny, and almost any of the larger sorts are favorites. This is about 6 miles from Vacy, near Patterson, and about 20 or 30 miles from the sea-coast. The elevation is about 100 feet above the sea-level, and the trees are grown in the open hilly country around. But the orangery in question is situated in an elbow of the Ally River, the ground having evidently been formed from time to time by sediment, sand, etc. The country above this point is very ridgy and hilly—the hills, in some instances, being of limestone formation, and probably on this account the orange flourishes, the deposit naturally containing a certain amount of lime subsoil. About 20 feet deeper the soil is of a clayey nature. Other orangeries are in the neighborhood, some of which are on the hills, and all are in a bearing condition; but in the opinion of most people the flavor is not so rich as that of those grown on the alluvial soil, and the rind of the latter is thinner.

The bark disease has lately attacked the trees in this vicinity. The trees grow better in fairly dry seasons with occasional showers, but of course droughts will kill them, or partly so. Very wet weather causes the fruit to drop off or split.

No irrigation is used, and it is questionable if the increase in the yield would compensate for the extra cost. The trees are in all stages

of growth, from one to twenty and thirty years, owing to new trees being planted in the place of old ones which have died from the bark disease. This disease attacks the roots and the foot of the tree. The bark at that place splits and decays, after which the branches die. Trees are plowed between about 3½ inches deep. The trees are not pruned very much. They are merely thinned. When in full bearing the foliage nearly reaches the ground. The oranges are picked about from July to September and sold to dealers from the tree, not cured. The dealers cart them in teams to Maitland, about 20 miles north of here, and then re-sell in smaller quantities.

The trees are planted from 20 to 30 feet apart, from seedlings, bitter orange or lemon butts grafted or budded. There are from 10 to 30 acres to a grove, and the crop generally increases with the age and size of the trees.

This district is free from insect pests. Nut grass, or Townshend's curse, is the greatest nuisance in the flooded and alluvial soil.

THOMAS M. DAWSON,
Commercial Agent.

UNITED STATES COMMERCIAL AGENCY,
Newcastle, N. S. W., March 24, 1890.

AUSTRALASIA.

REPORT BY CONSUL GRIFFIN, OF SYDNEY.

It is perhaps not generally known that citrus fruits, and especially oranges and lemons, will grow to perfection through the whole of the southern part of this great island continent, on the table-lands in the interior and along the sides of the mountain ranges in the far north. In portions of Queensland and of south and western Australia, where the climate resembles that of Spain and Italy, the trees grow luxuriously and bear most delicious fruit. In no portion of Australasia is the cultivation of citrus plants looked upon as a profitable industry, except in the colony of New South Wales, and there only in one or two counties.

The area of orangeries in New South Wales at the end of March, 1889, is given by the Government statistician as 10,857 acres, against 8,875 acres in 1888. The attention given to the export of oranges during the last few years has led to extensive orange-planting. The demand for young trees has been such that it has been found difficult to obtain plants of good varieties, and the price has more than doubled.

AREA OF ORANGERIES AND PRODUCTION.

The only colonies which prepare statistics to show the area of land under cultivation with oranges are New South Wales, Queensland, and Victoria.

The following returns are extracted from the latest Government statistical tables published in those colonies:

Area under crop, gross produce, and average produce per acre of oranges, in New South Wales, Queensland, and Victoria.

NEW SOUTH WALES.

Years.	Area under crop.	Gross produce.	Average produce per acre.
Year ended March 31—	*Acres.*	*Dozen.*	*Dozen.*
1879	4,287	3,398,455	792.73
1880	5,106	2,763,811	541.28
1881	5,939	3,810,356	641.58
1882	6,301	5,164,134	819.59
1883	6,716	4,978,829	741.34
1884	7,268	8,102,658	1,101.08
1885	6,911	4,097,666	592.90
1886	7,733	8,749,256	1,131.50
1887	7,920	6,376,868	805.16
1888	8,875	8,704,677	980.80
1889	10,851	19,693,880	1,722.78

NOTE.—Returns of oranges for years prior to 1889 are understated.

QUEENSLAND.

Year ended December 31—			
1879	219	92,140	420.73
1880	253	199,461	791.51
1881	252	141,910	561.13
1882	383	164,616	429.53
1883	399	489,344	1,227.93
1884	457	141,285	309.16
1885	633	658,549	1,040.36
1886	751	451,777	601.57
1887	992	772,380	778.61
1888	1,068	742,417	695.15

VICTORIA.

Years ended March 31—	Area under crop.		Gross produce.		
	Olives.	Oranges and lemons.	Olives.	Olive oil	Oranges and lemons.
	Acres.	*Acres.*	*Cwt.*	*Gallons.*	*Cases.*
1878	10	.....	.....	.....	.....
1879	20	6	9	.....	.....
1880	10	2	.....	.....	30
1881	17	20	17	15	6
1882	10	5	.....	.....	.....
1883	2	.....	35	.....	.....
1884	15	4	.....	.....	.....
1885	13	2	.....	.....	.....
1886	14	6	.....	.....	.....
1887	1	2	.....	.....	.....
1888	18	34	.....	.....	.....

It is probable that when the returns for 1889 for Victoria are available they will show a very large increase, for since the inauguration of irrigation colonies there, large areas of orangeries have been planted at Mildura and elsewhere. The orange and lemon tree is also being planted on a large scale at the newly established irrigation colonies in South

Australia. Much attention is being paid to citrus culture in New Zealand, where the soil and climate, particularly in the north island, are well adapted to the industry. The oft-repeated statement that only sour oranges mature in that colony is due to the fact that heretofore the oranges were produced from the seedling and that the best grafted varieties have only been recently introduced.

The orange was first planted in New South Wales by Captain Hunter, who accompanied Capt. Arthur Philip and the early settlers to Australia in 1788. The ship which conveyed them, while on the voyage stopped at Rio, where orange plants and seed were obtained. I learn from Captain Hunter's journal of transactions at Port Jackson (Sydney) that some of these plants were taken to Norfolk Island. There is a reference to the latter fact in the journal of Lieutenant King, R. N., who says:

> Two orange trees which I brought with me from Sydney were kept in tubs until I could find a sheltered situation in which I could plant them.

In another part of the same journal it is recorded that "the orange trees were in a thriving state." The fine appearance of the orange groves and the superb flavor of the fruit in new South Wales are frequently mentioned in the early records of the colony.

Flourishing orange groves are, in the present day, to be found almost everywhere within a radius of 50 miles from the city of Sydney, the oldest trees being found about Parramatta, Lane Cove, and Central Cumberland; while in the valleys of the Hunter, the Hawkesbury, Manning, Nepean, Richmond, and Clarence Rivers are flourishing groves. It would be difficult to find in any part of the world groves more beautiful or luxuriant than those around Parramatta. There can be seen trees laden with blossoms and fruit in every stage of growth.

BEST VARIETIES FOR PROFIT.

There are many varieties of oranges and lemons in New South Wales, all of which are more or less profitable. Every grower has his favorite, and it would be difficult to select any particular kind as yielding larger profit than another.

It is probable, however, if a census of opinion were taken that there would be a majority in favor of the Parramatta orange (*citrus aurantium* variety) brought originally from Brazil in the early days of the colony. This kind is met with in the markets more often and in greater number than any other variety of orange. The skin is usually thick, but there is nothing coarse about the fruit. Many of the oranges are said to be fruits of seedlings, and I am informed by Mr. Charles Moore, the director of the Sydney botanic gardens, that, as a rule, seedlings do not produce the same quality of fruit as that from which the seeds were taken; also, that resort must be had to budding, grafting, or layering in order to produce really good fruit.

There is a great deal said about thin-skinned oranges, but in reality the quality of the soil has most to do with the texture of the skin. New land produces coarse fruit, but as the soil becomes somewhat impoverished by the action of the roots the skin becomes finer. Any grower can produce thin-skinned oranges by allowing his land to become exhausted, but he soon finds out that it will not pay to do so. The most experienced growers pursue a medium course. Thick-skinned oranges, being more porous, are not suitable for export.

*The Australian navel or Bahia.**—This is a remarkably fine orange It often measures from 15 to 16 inches in circumference. It is rich, juicy, and delicious; it is seedless, or nearly so, and commands a high, price. The tree is liable to become a shy bearer. It likes a deep, loamy soil, and plenty of water. The best specimens are grown on the Hunter, Manning, and Richmond Rivers. Great care, however, is necessary with its culture. In my report on fruit transmitted in June, 1887, I mentioned that this orange was identical with the Washington Navel in California, and that it came originally from Brazil, and was introduced into California from Australia. Since the publication of my report W. B. M. Lelong, secretary of the State Board of Horticulture, has expressed the opinion that the Australian tree does not resemble the Washington Navel in its habit, and that the resemblance in foliage has led to its mistaken identity. In a work entitled "A Treatise on Citrus Culture in California," published in 1888, Mr. Lelong thus describes the Australian Navel:

The fruit varies greatly in size, all sizes generally being found on the same tree. A very shy bearer; blooms profusely, but very few of the blooms set; often the trees are loaded with fruit, and after having attained the size of marbles drop to the ground without any apparent cause whatever; it also has a tendency to split at the navel. The navel is usually large and prominent, unlike that of the Washington Navel, which is round and generally small. This variety was first introduced into California by the late Lewis Wolfskill. The trees were imported from Australia in 1874.

It is maintained here that the Australian Naval was introduced into California at a much earlier date than 1874. Both the tree and fruit are easily recognized by Mr. Lelong's description, but the difference in the so-called varieties is not so marked as Mr. Lelong states. The truth is the fruit varies greatly even in the same orange groves. Trees planted at the same time and in the same kind of soil often differ materially. Some of these will be prolific, while others will bear scarcely any fruit. This peculiarity has led many to believe that there are two varieties of the Australian Navel, one a prolific and the other a shy bearer. Closer observations on the part of experts to this delicious fruit would soon enable them to settle the question.

According to Mr. H. E. Van Deman, Chief of Division of Pomology, Washington, the trees known as the Washington Navel

were first imported by Mr. William Saunders, of the United States Department of Agriculture, from Bahia, Brazil, in 1870. They were twelve in number, supposed to

* See report of Consul Burke of Bahia relative to this orange.

be all alike, having been propagated and grown in Brazil especially for the Department and under the direction of the Commissioner of Agriculture. They were named by Mr. Saunders Bahia, in honor of the place from which they came. Two trees propagated from these were sent to Mrs. S. C. Tibbetts, of Riverside, Cal., in 1873. When these trees fruited and their superior quality was ascertained they were called by the orange-growers of California the Washington or Riverside Navel, to distinguish the variety from the Australian Navel, then commonly grown.

Mr. Van Deman also mentions that this variety of orange, bearing excellent fruit, has been growing for several years in Florida. He has devoted much study to the origin, manner of introduction etc., of the navel orange, and he states

that most of the oranges named constitute distinct varieties, although some still hold to the opinion that these differences are in a great measure caused by peculiarities of soil, climate, and treatment.

He further says:

After examining specimens of fruit from many places in Florida and California under all of these synonyms and those grown on the original trees here, and having read what has been published in the papers on the subject, I see no reason for believing that all of the twelve trees imported from Brazil are not all of one variety.

M. J. Harold, agricultural and horticultural reporter for the "Sydney Town and Country Journal," who has had much experience with citrus fruits both in California and Australia, is of opinion that the Australian Navel and the Washington or Riverside Navel are essentially the same. In a recent interview with me he said he had compared very carefully the variety grown in each country, and that he was fully satisfied there was no difference between them. In regard to the statements made by certain pomologists that the navel or central depression on the Australian variety was larger and not so round as that on the California orange, he said such statements could only have been made after imperfect observation or from the examination of one or two specimens.

There is no decided difference in the size or shape of the navel, and the difference, if any, is only what might be expected in oranges of different size even off the same tree. The fruit grows alike in both countries and is apt to split in the same way. When the trees are nine or ten years of age the fruit often grows to about the size of a small marble or hickory-nut and then falls off.

Mr. Harrold further said that he would be very glad to know that the California nurserymen possess a new variety of Navel or Bahia orange, but his experience and that of his friends, both in Australia and the United States, will not warrant any such conclusion. No harm, however, can result from experimenting in this direction with the Navel orange.

Mr. J. Beresford Cairnes, vice-president of the Fruit Growers' Union of New South Wales, informs me that he has imported from California a large number of the best varieties of orange trees on account of fruit-growers near Parramatta. The Messrs. Chaffy Brothers have also planted a considerable area with California orange trees at their irriga-

tion colonies on the banks of the Murray River, several hundred miles inland, and all their trees are in a flourishing condition, thus disproving the contention that the orange will not grow away from the influence of the ocean.

Mr. Angus McKay, agricultural and horticultural instructor at the Tecnological College, Sydney, says that the best results are obtained on land from 10 to 20 miles from the coast, and Mr. D. A. Crichton states that the orange thrives and bears excellent fruit in the inland districts. He says in a pamphlet published at Melbourne during the last year:

Having had an extensive experience in the cultivation of citrus fruits in Australia I can say there is no foundation for the belief that the orange will not grow and do well away from the influence of the ocean. I am certain that both the orange and lemon may be grown successfully in many districts north and south of the Murray, provided the trees receive the attention they require. In fact I believe that the cultivation of the citrus fruit will rank among the most profitable of our industries, as there is a rapidly expanding home market for them and any surplus that can be produced can be sold to advantage in other parts of the world.

The Siletto (or cluster orange).—This variety is much liked in Australia and is a great favorite with gro wers. The fruit is fine, large and delicious, and is something like the Mediterranean sweet, but better suited to the soil and climate of Australia than the latter variety. The Siletto as its name implies, grows in clusters and some of the longest and finest I have ever seen may be found in the orange groves of New South Wales.

The St. Michael.—This orange is also a great favorite both with growers and consumers. It is sweet and thin-skinned when grown under proper conditions. It is said, however, not to be a hardy tree and to require very great attention and experience to cultivate it properly. Mr. D. A. Crichton says that it should have a sheltered situation, for, like the Navel, if circumstances are not favorable, it is a shy bearer and the fruit is apt to lose its high character.

The hardier varieties of the orange will ripen at an elevation from 50 to 2,000 feet above the sea, but they must be kept from frost. The Navel, St. Michael, and some other varieties are more easily injured by the hot winds than the Paramatta, Rio, or common orange.

The Seville, or bitter orange (*citrus vulgaris*), is also grown in this colony, but only to a limited extent. It is one of the best varieties for marmalade and for the manufacture of perfume.

The Mandarin orange (*citrus nobilis*).—This forms an interesting group in Australia. The group embraces the Canton, the Emperor of China, the Thorny, and the Kumquat. The first three are valuable, and especially the Canton. The fruit is thin-skinned, sweet, and delicious. The Emperor is equally sweet, juicy, and fine flavored, but smaller in size than the Canton. The Thorny is also a sweet and juicy fruit, but is smaller than the Emperor. Mr. S. W. Pye cultivates with fair success two new varieties, the Capera and the Ruby.

Of the different varieties of the lemon (*Citrus lemonium*) grown in

Australia, the Lisbon is the most popular; but there are several kinds of Lisbons, the best known of which are the variegated and the thornless. The common lemon is also cultivated, but the fruit is small and inferior, when compared with the Lisbon. Mr. George W. Knight, whose testimony was taken by the Royal Commission of Victoria on vegetable products, states that the lemon will not stand the warm, dry climate of the northern part of Victoria and that its leaves do not attain half the ordinary size there.

The lime (*Citrus limetta*) is cultivated more or less in various parts of Australia, and will thrive almost anywhere when the thermometer does not fall lower than 20 degrees above zero. The best kinds are the Lemon lime, the Bergamot, the Mela Rose, and the small Naples lime. All these will grow luxuriantly over a large extent of country. They are found on the Blue Mountains and on the table lands of the New England district in New South Wales. They are not partial to a high temperature and especially where the sun is hot enough to scorch them. They like a little frost and what is called a dormant climate. In Queensland both the orange and lemon trees have an inclination to form into a crown at the surface and branch out in long luxuriant branches like the bamboo.

The largest orange and lemon trees in Australasia are to be found in the county of Cumberland, in Mr. S. N. Pye's grove at Rocky Hall, Paramatta. They are the oldest trees in this part of the world, having been planted nearly a century ago. Some of the trees are over 40 feet in height and have a diameter of 22 inches. They have been mentioned in various reports I have made as yielding as many as 10,000 oranges per tree in a single season.

SOIL FORMATION.

The soil in the orange-growing district about Paramatta consists principally of Wianamatta shales overlying sandstone. The soil around Lane Cove, also in the Paramatta district, has been carefully analyzed by Mr. W. A. Dixon, F. I. C., F. C. S., instructor in chemistry, Sydney Technical College, for Mr. Angus McKay, instructor in agriculture at the same college.

Mr. Dixon remarks with reference to soil analyses:

> It may be said with truth that the greater number by far of the soil analyses which have been published are of little value, for these reasons: (1) Sufficient care has seldom been taken to obtain uniform samples of the soil for analyses; and (2) the analyses have not been conducted with sufficient refinement to secure the object in view The former condition can be easily attained, but the latter can only be secured by years of practice, which is often wanting in those to whom the work is relegated.

I have not been able to obtain analyses of the soils in the different orange-growing parts, but such as I have obtained have been made by Mr. W. A. Dixon, and it is worthy of note to quote his explanation of the manner in which his analyses are made:

> In selecting a sample, it is commonly the practice to dig up some soil in one place and mix up ten or twelve pounds of it for a sample. If we consider that the excrement of a bird containing ten grains of nitrogen mixed with a sample so taken would be

equal to 0.014 per cent. of nitrogen or 1,568 pounds per acre, and that the urine of an animal spent a year before might similarly increase, not only the nitrogen but the phosphates and other ash constituents of plants gathered from far and wide, it is evident that such a mode of sampling is liable to error and stands condemned.

The samples of soil analyzed by Mr. W. A. Dixon were taken as follows:

A piece of sheet iron was bent into a tube, 1½ inches in diameter, leaving a slit one-quarter of an inch wide down one side, and one end of this was fastened to a convenient handle. The ground was gone over at regular intervals of about a chain apart, when the tube or scoop was screwed into the soil, and this being relieved by a spade the section of soil could easily be removed by passing a knife through the slit. The different sections allowed to dry and thoroughly mixed and sifted must give a tolerably average sample of the soil of the area operated on. This may seem a tedious operation, but without this preliminary care the work of analysis is not only useless but often misleading—which is worse.

To arrive at the degree of exactitude which is required in soil analyses to be of value, we should consider the quantities of concentrated manures which are found practically of value in agriculture and determine the quantity of the same constituents in the soil to within such limits at least. If we take the weight of an acre of soil at 1 foot deep as 5,000 tons, it will not be far from the truth as an average, and this depth may be taken as that at which, being subjected to tillage, crops derive the bulk of their nutriment. On this basis 0.001 per cent. of any ingredient would represent 112 pounds per acre. Again, if we take the quantities of concentrated artificial manures which are applied as top dressing and otherwise, we find that a soil analysis requires to be carried to the third place of decimals with certainty to be comparable with practical results, for some substances at all events. For my part I think that this third place is about the limit to which analyses can be carried with any degree of certainty, and to do this it is necessary to carry out to the fourth and take the nearest number in the third, and this requires that large quantities be operated on, which require much care and patience.

The constituents determined are those soluble in cold concentrated hydrochloric acid by agitation during forty-eight hours, and this solution may be fairly assumed to contain all the constituents of the soil at all readily available as plant food. Ordinary commercial hydrochloric acid was used containing already iron and sulphuric acid, and to it were added small quantities of bone ash dissolved in acid sulphate of magnesia and chloride of potassium. A similar quantity of this prepared acid was put through all the processes used in each determination, and the quantities present weighed, so that the numbers obtained for the soil are the differences between it and the hydrochloric acid used. This, to a great extent at all events, eliminates errors due to the solubility of precipitates in water and the re-agents used.

The first soil dealt with was taken from Mr. H. Heard's property, where the agricultural classes had been taken for the purpose of studying how well-ordered orcharding can be carried on with profit.

The soil on Mr. Heard's property is typical of a very large area of the shale series. It is described by Mr. McKay as of a decided red color, due to the presence of iron. It is a good, sound loam, seeming to be more clayey in composition than the analysis actually shows. It is the virgin soil. The geological formation here is Hawkesbury sandstone, under shale beds, which vary in quality.

The following is the first analysis:

No. 1.

Combined water and organic water	13.560
Silica and silicates, etc	79.647
Alumina and oxide of iron	5.393
Lime	0.023
Magnesia	0.012
Potash	0.072
Soda	0.020
Chloride of sodium	0.047
Phosphoric oxide	0.042
Sulphuric oxide	0.024
Moisture	1.160
	100.000

Nitrogen = ammonia 0.163.

Capacity for absorbing and retaining moisture 7

Mr. McKay states that the small proportion of lime in this soil is its greatest defect, and that it would require to be enriched with bone manures.

The next analysis is from the same property, but from garden land, where cultivation has been carried on during many years and which had received careful manuring in a manner suitable for shale soils:

No. 2.

Organic matter and moisture (of the whole bulk)	14.50
Sandy matter or silica (of the whole bulk)	75.00
Clay, or alumina, and iron (of the whole bulk)	6.60
Carbonic acid	Traces.
Lime (of the whole bulk)	0.04
Magnesia	Traces.
Chloride of sodium (of the whole bulk)	0.02
Phosphoric acid (of the whole bulk)	0.01
Sulphuric acid	Traces.
Loss by water, etc., (of the whole bulk)	3.72

Nitrogen = ammonia 0.25.

Capacity for absorbing and retaining water 8

With reference to this analysis Mr. McKay remarks that the soil could be limed heavily, with advantage.

The next analysis is from the old orange country, natural soil formation, from location about 3 miles northerly from the town of Paramatta:

No. 3.

Organic matter and water	14.00
Sand or silica	74.50
Clay, or alumina	10.00
Carbonic acid	Trace.
Lime	Trace.
Magnesia	0.05
Potash	Trace.
Phosphoric oxide	Trace.
*Capacity for absorbing and retaining moisture	6

*All the foregoing soils are absorbent of water and retentive of it, in proportion to the state of cultivation. The cultivated land No. 2 stands best in this respect and is rated as 8, as a standard for the analyses.

Mr. McKay says of this soil:

It is richer in organic matter than No. 1. The formation is the same. It needs lime, or marked falling off in crops must follow as the land is worked.

Mr. S. W. Pye, to whom I sent a series of interrogatories in regard to the soil in the orange districts is of opinion, that a rather poor, loamy, sandy soil is best suited to the citrus fruits, but fully 3 inches of the seed-bed should be very rich in compounds of light nature to prevent the surface becoming compressed by constant watering. The substances most suitable for this purpose are thoroughly decayed bush leaves, especially those of the forests, rotten grass, roots, the surface of virgin soils, and well-rotted manure. Fresh manure is objectionable. If the soil is of virgin nature it should have a dressing of lime, to encourage the decomposition of organic matter in the soil and to destroy all insect life.

The largest orange and lemon grove in Australia is located at Seven Hills, in the county of Cumberland, it being a little over 200 acres in extent. The soil there is of a rich black and brown color, from 12 to 24 inches deep. The subsoil is principally clay. The water in the creeks is slightly brackish. This district produces the finest Navel oranges in Australia.

CLIMATIC INFLUENCES.

The climatic influences are exceedingly favorable to the growth of fruit. The highest range of the thermometer in the Cumberland district is 106° and the lowest is 42°.

The editor of The Year-Book of Australia—a most valuable publication—Mr. Edward Greville, has favored me with the following tables relating to the temperature and rain-fall of the six chief cities in these colonies. It is around these cities that the chief fruit-growing districts are to be found:

SYDNEY, NEW SOUTH WALES.

[146 feet above sea-level.]

Month.	Barometer (reduced to 32° Fah.).			Temperature (in shade).			Rain-fall.			
	Mean.	Highest reading.	Lowest reading.	Mean.	Extremes.		Total fall.	No. of days.	Greatest fall.	Date.
					Max.	Min.				
	Inches.	*Inches.*	*Inches.*	°	°	°	*Inches.*		*Inches.*	
October, 1888	29.931	30.260	29.426	62.6	85.5	49.6	1.613	12	0.815	Oct. 8
November, 1888	29.831	30.276	29.371	69.0	92.9	56.8	0.529	10	0.123	Nov. 29
December, 1888	29.806	30.130	29.270	70.4	85.8	57.8	7.089	18	2.751	Dec. 1
January, 1889	29.802	30.122	29.360	71.9	102.8	58.3	2.098	16	0.556	Jan. 4
February, 1889	29.803	30.145	29.365	71.3	96.6	57.6	2.696	9	2.196	Feb. 8
March, 1889	29.953	30.348	29.413	69.9	91.5	59.2	1.128	17	0.275	Mar. 10
April, 1889	30.012	30.345	29.521	65.4	77.0	53.6	3.578	13	1.487	Apr. 1
May, 1889	29.982	30.454	29.553	61.1	75.8	49.4	20.868	17	8.363	May 28
June, 1889	29.702	30.065	29.160	55.9	68.0	44.1	1.128	12	0.380	June 25
July, 1889	30.070	30.377	29.702	52.5	64.4	41.6	8.914	20	2.237	July 26
August, 1889	29.975	30.488	29.401	54.7	69.7	42.2	4.113	18	0.905	Aug. 6
September, 1889	29.885	30.210	29.410	57.4	83.7	44.1	4.322	19	0.916	Sept. 19
Sums or means	29.896	30.268	29.413	63.5	82.8	51.2	58.081	181	8.363	May 28
Or extremes	.....	30.488	29.160	.....	102.8	41.6	.....	.....	.....	.....

BRISBANE, QUEENSLAND.

Month.	Barometer (reduced and corrected).			Temperature (in shade).			Rain-fall.			
	Mean.	Highest reading.	Lowest reading.	Mean.	Extremes.		Total fall.	No. of days.	Greatest fall.	Date.
					Max.	Min.				
	Inches.	*Inches.*	*Inches.*	°	°	°	*Inches.*		*Inches.*	
October, 1888	30.100	30.335	29.804	69.2	90.4	54.6	0.771	10	0.248	Oct. 17
November, 1888	30.015	30.329	29.713	73.4	99.3	56.9	3.485	9	1.560	Nov. 28
December, 1888	30.001	30.214	29.550	75.3	94.5	59.4	6.008	13	1.482	Dec. 14
January, 1889	29.900	30.255	29.567	76.5	96.0	61.8	1.232	5	0.430	Jan. 21
February, 1889	29.989	30.189	29.624	77.7	94.6	61.8	2.602	8	0.940	Feb. 23
March, 1889	30.065	30.348	29.772	74.6	91.5	61.8	4.288	19	1.113	Mar. 25
April, 1889	30.162	30.349	29.851	69.9	85.9	55.6	6.047	21	2.940	Apr. 17
May, 1889	30.129	30.538	29.714	65.7	82.8	53.0	3.346	17	0.638	May 7
June, 1889	29.983	30.250	29.580	59.1	75.5	41.6	0.717	3	0.498	June 6
July, 1889	30.142	30.383	29.654	58.9	76.0	37.2	8.464	12	3.542	July 16
August, 1889	30.125	30.517	29.623	60.5	78.6	41.5	3.832	12	0.367	Aug. 14
September, 1889	30.060	30.283	29.781	65.1	85.7	45.5	3.307	10	1.603	Sept. 21
Sums, means, or extremes	30.056	30.538	29.550	68.8	99.3	37.2	43.499	139	3.542	July 16

MELBOURNE, VICTORIA.

[91 feet above sea-level.]

Month.	Barometer (reduced to 32° Fah.).			Temperature (in shade).			Rain-fall.			
	Mean.	Highest reading.	Lowest reading.	Mean.	Extremes.		Total fall.	No. of days.	Greatest fall.	Date.
					Max.	Min.				
	Inches.	*Inches.*	*Inches.*	°	°	°	*Inches.*		*Inches.*	
October, 1888	30.046	30.371	29.433	56.1	86.0	35.1	1.35	8	0.54	Oct. 7
November, 1888	29.911	30.349	29.507	62.7	102.0	38.1	0.62	6	0.20	Nov. 12
December, 1888	29.884	30.196	29.374	66.7	96.4	47.2	2.72	9	1.10	Dec. 31
January, 1889	29.862	30.191	29.413	67.7	99.2	49.7	4.22	11	1.80	Jan. 3
February, 1889	29.887	30.237	29.570	65.9	96.0	45.5	1.50	7	0.78	Feb. 6
March, 1889	30.015	30.389	29.439	64.4	96.0	43.0	0.24	5	0.12	Mar. 18
April, 1889	30.042	30.450	29.501	60.5	87.9	37.2	3.60	7	1.63	Apr. 7
May, 1889	30.082	30.540	29.547	55.6	78.1	39.4	0.94	11	0.32	May 13
June, 1889	29.758	30.246	29.218	52.5	66.0	37.6	2.78	16	0.65	June 13
July, 1889	30.158	30.473	29.656	47.8	62.1	31.3	1.64	8	0.52	July 2
August, 1889	30.020	30.582	29.403	50.1	68.0	32.1	2.06	15	0.31	Aug. 31
September, 1889	29.937	30.329	29.461	52.3	74.5	32.1	1.51	14	0.25	Sept. 23
Sums, means, and extremes	29.967	30.582	29.218	58.5	102.0	31.3	23.18	117	1.80	Jan. 3

Average yearly rain-fall for the last thirty-one years, 25.75 inches. Average number of rainy days for the last thirty-one years, 135.

ADELAIDE, SOUTH AUSTRALIA.

[From October 1, 1888, to September 30, 1889.]

Month.	Barometer (reduced to 32° Fah. mean sea-level).			Temperature (in shade).			Rain-fall.			
	Mean.	Highest reading.	Lowest reading.	Mean.	Extremes.		Total fall.	No. of days.	Greatest fall.	Date.
					Max.	Min.				
	Inches.	*Inches.*	*Inches.*	°	°	°	*Inches.*		*Inches.*	
October, 1888	30.181	30.500	29.721	62.8	91.9	41.5	0.306	5	0.229	Oct. 4
November, 1888	30.011	30.352	29.610	71.4	105.8	46.4	0.655	8	0.156	Nov. 13
December, 1888	29.972	30.256	29.615	74.8	107.5	48.9	0.278	8	0.154	Dec. 29
January, 1889	29.984	30.268	29.520	75.2	109.0	54.1	2.984	8	2.299	Jan. 2
February, 1889	30.004	30.365	29.570	73.4	100.4	53.5	0.231	2	0.158	Feb. 2
March, 1889	30.109	30.416	29.640	70.9	102.0	49.6	0.813	8	0.296	Mar. 7
April, 1889	30.144	30.543	29.432	63.0	82.5	49.6	5.654	15	2.207	Apr. 2
May, 1889	30.174	30.610	29.654	57.0	75.5	37.5	4.086	14	1.643	May 20
June, 1889	29.938	30.507	29.387	53.8	68.3	38.5	4.752	22	1.362	June 13
July, 1889	30.274	30.685	29.760	50.5	65.9	36.3	1.211	14	0.210	July 31
August, 1889	30.134	30.662	29.572	53.1	71.3	38.0	3.589	20	0.915	Aug. 7
September, 1889	30.066	30.479	29.560	55.2	76.7	38.5	1.504	16	0.226	Sept. 27
Sums or means	30.083	30.685	29.387	63.4	109.0	36.3	26.063	140	2.299	Jan. 2

Average yearly rain-fall for last thirty two years, 20.083 inches. Average number of rainy days fo ast thirty-two years, 128.

PERTH, WESTERN AUSTRALIA.

[Lat., 31° 57′ 10″ S.; Long., 115° 52′ E. Altitude, 57 feet.]

Month.	Barometer (reduced to 32° Fah.).			Temperature (in shade).			Rain-fall.			
	Mean.	Highest reading.	Lowest reading.	Mean.	Extremes.		Total fall.	No. of days.	Greatest fall.	Date.
					Max.	Min.				
	Inches.	*Inches.*	*Inches.*	°	°	°	*Inches.*		*Inches.*	
October, 1888	30.112	30.438	29.909	64	95	45	3.05	12	0.27	Oct. 3
November, 1888	29.984	30.303	29.725	69	97	46	1.37	10	0.32	Nov. 8
December, 1888	29.990	30.230	29.773	72	102	55	1.11	6	1.72	Dec. 1
January, 1889	29.923	30.205	29.580	73	105	52	0.00	0	0.00	.....
February, 1889	29.991	30.170	29.778	74	101	56	0.01	1	0.01	Feb. 19
March, 1889	30.076	30.319	29.848	76	104	56	0.68	3	0.47	Mar. 23
April, 1889	30.122	30.397	29.825	67	91	47	1.72	10	0.58	Apr. 16
May, 1889	30.110	30.447	29.839	59	79	41	4.02	15	0.81	May 2
June, 1889	30.095	30.426	29.611	57	75	39	4.87	18	0.74	June 27
July, 1889	30.231	30.518	29.812	54	70	38	3.23	17	0.87	July 6
August, 1889	30.191	30.478	29.662	54	73	34	5.69	14	1.69	Aug. 15
September, 1889	30.128	30.572	29.704	58	84	38	2.08	11	0.72	Sept. 16
Sums or means	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Barometer mean for twelve previous years, 30—— inches. Average yearly rain-fall for twelve previous years, —— inches. Average number of rainy days for twelve previous years, —. Average temperature for twelve previous years, —°.

HOBART, TASMANIA.

	Inches.	*Inches.*	*Inches.*	°	°	°	*Inches.*		*Inches.*	
October, 1888	29.965	30.393	29.420	52.7	80.3	34.0	1.59	19	0.28	Oct. 5
November, 1888	29.871	30.441	29.082	57.4	98.0	39.7	2.23	10	0.84	Nov. 15
December, 1888	29.947	30.347	29.458	61.7	91.3	39.0	1.45	6	0.54	Dec. 20
January, 1889	29.875	30.370	29.298	63.3	91.5	44.0	2.36	13	0.75	Jan. 14
February, 1889	29.854	30.340	29.348	62.5	95.0	44.7	1.57	12	0.48	Feb. 5
March, 1889	29.991	30.452	28.960	60.1	89.0	42.2	0.72	12	0.25	Mar. 8
April, 1889	30.043	30.474	29.528	57.3	77.7	36.8	2.78	14	1.57	Apr. 8
May, 1889	30.100	30.630	29.482	52.6	72.0	36.2	0.96	15	0.32	May 22
June, 1889	29.698	30.293	29.107	48.4	60.0	33.8	8.15	21	4.11	June 14
July, 1889	30.136	30.505	29.425	47.3	60.3	33.5	1.99	7	0.93	July 2
August, 1889	29.976	30.716	29.370	48.4	66.8	32.2	0.96	13	0.24	Aug. 13
September, 1889	29.880	30.375	29.264	49.9	70.2	33.7	1.13	16	0.18	Sept. 1
Sums or means	29.942	30.716	28.960	55.13	98.0	32.2	25.89	158	4.11	June 14

Average yearly rain-fall for 47 years, 29.26 inches. Average number of rainy days for 47 years, 162.

PLANTING.

Planting in New South Wales generally takes place between the middle of March and the end of April, although it may be done at other times. It must be remembered that the seasons here are the opposite to those in America. Trees planted early in the Australian autumn (in March) begin quickly to take root, as the ground at that period contains considerable warmth. The plants soon recover from the check caused by removal and are fairly established before the winter sets in. If trees are planted in the Australian winter, say in June and July, the growth is necessarily less active and the plants are liable to suffer from the effects of the winds and frosts, where frost occurs. When it is not convenient to plant in autumn the leading authorities say it is better to wait until spring (September) rather than put the trees in during the winter months. As a rule trees should not be shifted after their spring growth has fairly started or before their summer growth has matured. Mr. D. A. Crichton, in urging this plan, says:

> It must be clearly understood, however, that though I advocate autumn planting where practicable, it is essential that the trees are in a fitting condition for shifting. As a matter of fact the summer growth, very frequently, does not mature early enough for the trees to be shifted in the autumn.

The same authority is very averse to planting trees close together. He says that the intervening space ought to be fully 24 feet from tree to tree, except in the case of the smaller varieties. The Mandarin, being less robust than other kinds, may be planted out at distances from 15 to 18 feet apart, according to growth or variety.

PROPAGATION.

Opinion is divided here as to the best method of propagation, but the most successful growers prefer grafting to budding. Most of the trees sold by nurserymen are raised by grafting, but some cultivators mention that the budding process is the best, as grafted trees go off through the bark, decaying at the place where the scion was united to the tree. As to the best kind of stock, many favor the lemon for the reason that it is not only more vigorous and hardy, but less apt to be injured by removal.

The late James Pye, who had more than fifty years' experience with Citrus fruit cultivation at Paramatta, preferred to graft on the orange stock instead of on lemon stocks. He was also a strong advocate for cultivating seedlings and grafting upon them instead of the lemon stocks. He said:

> I commenced grafting upon the bitter orange stocks about five years ago. I find them free from all insects and looking healthier than any other kind.

Mr. Charles Moore, director of the Botanic Gardens, Sydney, when he visited the orange-growing countries some years ago, observed that

this method was used by the orange growers in Spain to propagate their trees. Mr. James Pye, in connection with this matter, said:

I have no objection to one cross with the common lemon; but if you go on crossing year after year, it deteriorates the quality of the fruit (more particularly the keeping quality) as well as increases the red scale. There is no tree so subject to the red scale as the lemon tree, and there is none of the orange family so free from it as the bitter orange.

IRRIGATION.

Irrigation, for fruit-raising, has not been sufficiently tested in Australia to enable an opinion to be given as to its effect by any well-defined results so far as orangeries are concerned. The truth is, irrigation is not practiced systematically in New South Wales. In Victoria, and South Australia, where irrigation colonies have been started, the trees are too young to bear fruit; but their healthy condition is an evidence of what may be expected in the near future. It is very generally understood by farmers that no other class of fruits require irrigation so much as those of the Citrus family. Crops can not be depended upon during seasons of dry weather unless supplied with water by artificial means. The trees are always in an active state of growth and require a great deal of moisture; therefore this moisture must be supplied from some source or otherwise root-action is interfered with more or less and the trees will suffer. Mr. D. A. Crichton points with pride to what has been done by the irrigationists in Victoria. He does not, however, propose any precise rules to be followed other than not to allow the trees to flag through lack of moisture at the roots. Care must also be taken not to supply water too freely, as that will make the fruit coarse, wanting in flavor, and too tender for packing and keeping. The best land is drained and trenched, and by the time the trees come into bearing, the expenses have often amounted to considerably over £100 ($487) per acre. The fertilization at Paramatta consists principally in the use of nitrogenous substances.

PRUNING.

Many growers recommend great care to be taken in pruning, from the fact that it is often productive of more harm than good. No more cutting ought to be done than circumstances render necessary. In the case of trees which have arrived at full bearing age little is required in the way of pruning. The removal of rank shoots, dead or diseased wood, and the thinning out of branches when overcrowded, so to allow the air to circulate freely, are about all that is necessary. The case is different with young trees, for there the object of the cultivator is the development of a strong growth of wood in a particular direction. The knife in that case must be used pretty freely. Young trees should have sufficient lateral shoots left to balance the plants in each direction and form the heads. Shoots not required for the development of the tree should be cut away. It is better, however, to leave a few more shoots than those which will be ultimately required to form the trees, in order to

afford the stems the necessary protection from the sun, removing them as the trees increase in size. In training trees of the citrus family, it is desirable that the branches hang to within about 2 feet of the ground, so as to protect the trunks from the heat of the sun in summer. It is not an uncommon thing for trees to be trained high, so that horse-power cultivators can be used close to the stem, but Mr. Crichton says the practice is bad, and he is of opinion that the cracking or discoloration of the bark, which is so common in this part of the world in orange and other fruit trees, is caused by the sap fermenting through the action of the sun. By training the head low there will be no trouble caused by the exposure of the trunks. Besides, trees with low heads are less liable to suffer from high winds. It is not advisable to let young orange trees bear too freely. The growth of wood in young trees is the chief consideration. Trees should be five years old before they are allowed to bear heavy crops, as by that time they will have attained a fair amount of growth.

It is said to be highly important that the trees should be placed in a position where their roots will not be subject to extremes of drought or excessive moisture or to sudden changes in temperature. The remedy for this is first by trenching and draining the ground thoroughly so as to secure the most perfect root bed, and then by mulching the surface soil, so as to shelter it from the full power of the sun and drying winds. The temperature in deeply-worked and well-drained land is higher in winter and lower in summer than in shallow or undrained soil. Nor is the land so readily affected by atmospheric changes.

PICKING AND PACKING.

Oranges and lemons are picked from April to November. The plan is to leave them on the trees until they are ripe, or nearly so. The most experienced growers cut them from the stems instead of pulling them, although the latter method is mostly pursued. Care is taken not to pick the fruit in damp or wet weather, and not to put them in boxes until they are free from moisture. The oranges packed by Mr. E. B. Cairnes at Paramatta for the London market turned out very well for trial shipments. The fruit was wrapped in tissue paper, put in boxes of uniform size, and subjected to but little pressure in nailing on the covers.

Mr. Cairnes states that before the export of fruit can prove a profitable industry for long distances better provisions than exist at present will have to be made for the care of the fruit during the voyage. Even temperature is required while in transit, and the fruit ought not to be subjected to either extreme of heat or cold.

CURING.

Very little has been done in the way of curing citrus fruits in Australia. Citron is not put up for sale, and the small quantities made are only for families for their own private use.

SIZE OF ORANGERIES.

The orange groves in Australia vary in size from 1 to 200 acres. Orange and lemon trees are seldom however planted so as to form groves of either of these trees exclusively other fruit trees are interspered, called here "summer fruits," such as peaches, apricots, passion, and other fruits. The average holdings vary from 6 to 20 acres in extent.

AGE OF FRUIT TREES.

It is said orange and lemon trees do not come into full bearing until ten or twelve years after they are planted, although they may commence bearing in the fifth year.

INSECT PESTS.

Mr. Charles Moore, director of the Botanic Gardens, Sydney, informs me "that the insects that attack the orange tree are the common small white scale, the brown scale, and the smooth surface white coccus." These insects have at times made great ravages among the orange groves and orchards. Experienced growers keep their trees comparatively free from these insects. It is very generally believed that the ravages of these pests are due to defective cultivation. Mr. C. Moore states that various remedies have been employed in Australia to get rid of the attacks of insects,

> The principal remedy being *Fishurst's compound,* but the results have not been commensurate with the cost attending the use of such compounds. There is no doubt many of the compounds will destroy the insects, but their use in a large way is impracticable. The best remedy in my opinion is to improve the cultivation, as healthy plants will throw off all pests.

Mr. Crichton recommends that care be exercised in preparing and draining the ground before planting the trees. His experience is that when this is done and the trees are fed well and mulched before dry weather sets in disease, insects, and fungoid pests seldom cause trouble in an orangery. According to the same authority the remedies generally employed for scale are lime, sulphur, soft soap, whale-oil soap, kerosene, tobacco water, and various patent insecticides; also quassia water is safe and good.

He recommends the following remedies as affording better results than any others hitherto tried: (1) Arsenical compounds; (2) petroleum, and (3) pyrethrum, and says:

> The first acts through the stomach, and is effectual chiefly against mandibular insects; the second and third act by contact, and are therefore of more general application.

Mr. Charles Moore does not think that the fluted or cottony cushion scale, which has proved so destructive to orchards in California, has attacked the orange and lemon trees to any great extent in this colony, and this opinion he also expressed in 1886, and which was reported by

me to the Department of State in my dispatch No. 89, of 23d January, 1886. Prof. F. M. Webster and Mr. Albert Koebele, of the Department of Agriculture, Washington, D. C., who visited Australia during the year 1888, are of opinion that the absence of the cottony cushion scale, *Icerya*, is due to the prevalence of the Australian lady-bird, *Vedolia cardinalis*, which not only feeds upon the scale itself, but deposits its eggs beneath them, and the young larvæ of the lady-bird burrow into the egg masses from below and feed upon the eggs of the *Iceryas;* later they attack the *Iceryas* of all sizes.

During the last two years a number of Australian lady-birds have been introduced into infected orchards in California with the most gratifying results. Prof. D. W. Coquillett, of Los Angeles, Cal., has very carefully studied the life-history of the lady-bird, and an account of them is contained in Professor Riley's Annual Report for 1888. In Insect Life, volume 2, No. 3, 1889, page 70, published by authority of the Secretary of Agriculture, Washington, Prof. D. W. Coquillett states that the Australian lady-birds have been distributed through many orchards on the Pacific slope of the United States, and that they have spread very rapidly. Mr. J. R. Dobbin, of St. Gabriel, Cal., stated, in July, 1889, that the Australian lady-bird had multiplied and spread over 3,200 trees in his orchard, and that the cottony cushion scale was rapidly disappearing. He says:

> I made a public statement that my orchard would be free of *Icerya* by the first of November, but the work has gone on with such amazing speed and thoroughness that I am to-day confident that the pest will have been thoroughly exterminated from my trees by the first of August. As the lady-bird has been extensively distributed, I feel positive from my own experience that the entire valley (San Gabriel) will be practically free from the *Icerya* before the advent of the new year.

Citrus trees are affected with what is called the lemon-tree borer, *Æmona hirta*, in both Australia and New Zealand. In some districts the trees are completely riddled by this pest. Mr. A. T. Urquard of the Karaka in New Zealand, forwarded specimens of these insects to Prof. T. Kirk, F. L. S., of New Zealand, in the pupa state, enabling the professor to identify them with the *Æmona hirta* of Captain Brown's "Manual of the New Zealand Coleoptera." Mr. Urquhard stated that he had observed this insect for several years in connection with the fertilization of the Yucca fiber plant, but its identity with the lemon-tree borer has not hitherto been suspected.

Professor Kirk says that the best way to stop the inroads of the borer is to prevent the deposition of eggs; this he says, however, can not be done effectively until its habits are more widely known. He recommends that all wounds should, as far as possible, be covered with tar or some substance calculated to prevent the deposition of eggs; also, probing the galleries with a wire and perforating the larva would be found effective. Soft soap dissolved in boiling water containing a little carbolic acid injected into the galleries by means of a syringe is said to dissolve the larva. Professor Kirk says a weak solution of caustic potash would prove equally effective.

FRUIT TRADE.

The seasons in Australia, as stated before, being directly opposite to those in California, there is of course a strong demand for fruit in one country when most abundant in the other. The want of quick and frequent steam service between the two countries is the principal obstacle in the way of the development of the fruit trade; at least that is the case as far as the imports of American fruits into this country are concerned. There is only one steamer per month plying between the cities of San Francisco and Sydney and there is no direct steam communication between Melbourne and San Francisco, while no steam service exists between these Australian cities and New York or other cities on the Atlantic coast of the United States.

The voyage from San Francisco to Sydney occupies twenty-five days. The revolution which has taken place in steam-ship construction within the last decade has rendered the vessels at present plying between the two ports obsolete, so far as cool storage accommodation is concerned. The owners of the line, Messrs. Spreckels & Co., have, however, expressed their determination to replace the *Alameda*, *Mariposa*, and *Zealandia* by vessels of the most modern build. When this is accomplished, as a natural result the fruit will always be in the best condition when it arrives. The weather, especially when crossing the equator, is extremely hot, and without cool chambers and other modern facilities for properly storing fruit it is hardly to be expected that it could make so long a transit without injury.

At present the trade is small and is confined principally to the imports of fruits from California. The fruit export to San Francisco thus far has been only a few trial shipments. The truth is, the cost of getting the fruit from the country districts to Sydney is too great to induce the farmers even to bring it to market except in small quantities, much less to think of exporting it to America.

The railway freights from the fruit-growing centers to Sydney are from 75 to 100 per cent. higher than in the United States. There is a strong agitation on the part of the public press and people to have these high charges reduced.

G. W. GRIFFIN,
Consul.

UNITED STATES CONSULATE,
Sydney, N. S. W., January 21, 1890.

FIJI.

Very few oranges are grown, and those only by occasional planters, who plant a few trees for their own use; no particular variety is sought after. The tree is grown as much for the shade it affords as for the fruit it bears.

Lemons are not cultivated. There is a lemon or citron that grows wild in the bush, but as yet is not considered of importance enough for export. It is a prolific bearer, and grows abundantly everywhere in this colony. Were it properly developed by scientific cultivation, I think it would prove a valuable addition to the varieties grown in our own country.

ANDREWS A. ST. JOHN,
Commercial Agent.

UNITED STATES COMMERCIAL AGENCY,
Levuka, January 10, 1890.

CONTINENT OF EUROPE.

FRANCE.

REPORT BY CONSUL BRADLEY, OF NICE.

ORANGES AND LEMONS IN THE RIVIERA.

Varieties.—Among the hundred and over varieties of citrus grown on the Riviera, it is impossible to specify any one or two as most profitable. The oranges are not only exported as fruit, but orange-flower water is distilled from large quantities of their flowers (one firm alone using 700,000 pounds of flowers). Tons are candied green. Neroli, so much used by the perfumer, is extracted from other varieties, and from the dried peel curaçoa is manufactured.

From recommendations given I have selected eight varieties of oranges as among the most useful.

ORANGES.

Orange franc (*Citrus aurantium vulgare*).—Stem straight and vigorous, bark gray, head hemispheric, whose branches, numerous and confused, are covered with thorns. The young sprouts are angulous and of tender green color. The lower leaves thick, oval, lightly notched, light green; upper leaves oblong, darker green, glossy, entire, on a long stem, less winged than the under leaves. Flowers axillary and terminal, white petals, ovary often striated at the base. Fruits, average size, rounded, globulous, sometimes slightly concave at top, where the place that the style occupied is always apparent. The stem end frequently shows the striæ noticed in the ovary. Skin golden yellow, slightly rough, and covered with vesicles. The pulp is divided into eight or ten compartments, full of large vesicles nearly as yellow as the skin, which hold a juice abundant, palatable, and sweet. Seeds large, oblong, unequal, each inclosing three or four perfect germs. The tree grows here to be 24 feet high, its head, say, 27 feet in circumference; in warmer climates a little larger. It commences bearing at eighteen or twenty years of age. The fruit grows sweeter as the tree grows older. It ripens early and resists cold better than any other variety; not much cultivated on account of slow growth, and because the fruit is much of it spoiled for transportation by the thorns, but the stocks are much used for grafts of other varieties.

Orange de Nice (*Citrus aurantium nicense*).—Differs but slightly from the above; it is a favorite because of the keeping qualities of the fruit, and the readiness with which a graft from it starts.

Orange de Malte (*Citrus aurantium Melitense*).—Skin dark yellow, shading into red; the pulp may be red in part or wholly. It is considered to be a hybrid between the Franc and some East Indian species.

Orange a pulp rouge (*Citrus aurantium Hierochunticum*).—The skin of this orange is always yellow, never red, but the pulp is dark red. This variety differs little from the preceding in appearance and form.

Mandarin (*Citrus madurensis or Citrus deliciosa*)—Already well known in California. Here it is one of the hardiest varieties.

Orange bigaradier Franc (*Citrus bigaradia*)—Root long, branchy, bearded, light colored outside, yellowish within. Trunk straight, grayish, branches bushy, covered with long greenish thorns. Young sprouts are pale green, angulous, like most of the genus; leaves elliptic or oblong, narrow, acuminate, lightly notched in the upper part, wavy, a fine green, and carried on stems more or less winged. Flowers in clusters, have calix angulous, five petals, taste slightly bitter, from thirty to thirty-five stamens partly adherent at the base. Ovary round or striated, surmounted by a style, terminated by a tuberculous stigma. The fruit is of average size, round or slightly elongated, smooth or sometimes rough, flattened at the end, yellow to reddish orange color. The peel is bitter, very fragrant, clinging to the pulp, which is yellow and divided into twelve or fourteen parts; its juice is not very palatable, bitter acid taste. The seeds are oblong, sharp, and yellow. The tree grows here to the height of about 27 feet; flowers in May and sometimes in autumn; fruit ripens slowly. Neroli is distilled from its flowers, and from its dried peel the liquor curaçoa is made.

Orange de Chine, bigaradier, or Chinois (*Citrus bigaradia sinensis*).—A valuable dwarf variety, about 12 feet high; resists the cold well. The orange is used for preserves or candied fruit and a water is distilled from its flowers.

Bergamotier ordinaire (*Citrus Bergamia vulgaris*).—The bergamotier is naturally lofty, plenty of branches, but the branches are so brittle that the head of the tree is rarely well-filled out or regular. Its leaves are oval, oblong, some pointed, others obtuse, average size, green, the lower surface whiter than any other orange leaf, leaf stems long and winged. Flower white, small, fragrant, scattered or united in clusters, borne on very short stems. Fruit good sized, usually pyramidal, rarely round, yellow, smooth, glossy. It has an agreeable fragrance peculiar to itself, peel thin, pulp yellowish green. This variety is chiefly valuable for the essential oil obtained from its flowers and peel.

LEMONS.

Lemons being generally seedlings, a very large number of varieties are produced, which even proprietors of orchards do not try to distinguish. Twenty or thirty varieties have been classified.

The following are said to be among the most valuable: Lemonier ordinaire (*Citrus limonum*) vulgare; lemonier imperial (*Citrus limonum*) imperial; lemonier bignette (*Citrus limonum*) bignetta; lemonier perette spatafore (*Citrus limonum*) peretta spatafora. This last excellent in damp situations.

The lemons thrive only in the sheltered nooks within a mile or two of the sea, where every deep warm valley has its small orchard ripening, not only from the direct rays of the sun, but from the warmth thrown back by the cliffs around them. The oranges more hardy can be found 10 miles from the coast among the mountains as high as 200 or 300 yards above the sea. Our only level land is in small valleys among the Alpes Maritimes which cover all this district. It is generally noted that this fruit ripens earlier on hill-sides where water can be brought to it.

The soil best adapted to them here is a silico-argilaceous or argilo-calcareous soil, the latter, when not too damp, but any good mixed soil seems to answer, as they are not difficult.

In regard to temperature M. J. Tesseàre gives observations taken by him covering twenty years. The minimum during that time being 26°, maximum 92.5, average 60° Fahrenheit in the shade. These observations were taken three times daily, sunrise, 2 p. m., and at sunset. In the sun at 2 p. m., the thermometer marked minimum 99°, maximum 135°.5, averaging 112.1. Lowest night temperature 26°, highest 79°. There are but few sultry days. During the twenty years there were 4,385 days almost or entirely cloudless, 1,547 cloudy days, 1,348 days more or less rainy, 28 days without observation. This would give in one year 219 sunny days, 77 cloudy, 67 rainy. The hygrometer of Saussure gives minimum of 23, maximum 77, average 61.4.

For the five years 1870–'74, the minimum rain-fall was in 1874, 24.3 inches; the average for the five years was 35.1 inches. The peculiarity of the rain-fall is the tropical intensity of each shower and its short duration; so that while we have actually more rain than London, England, we have very much fewer rainy or cloudy days. During the long summer, from June to September, the trees are irrigated with water brought in canals from mountain streams, which is generally tempered by storing in large private tanks for some time before being applied, which it is at intervals of one or two weeks. This is done in summer, between sunset and sunrise; if necessary in autumn it is done in the morning. Gardeners watch the leaves of the tree for indications of need of water. The orange needs less water than the lemon.

The earth is worked over twice a year. In the spring after pruning, at least a foot deep, again in the autumn not quite so deep. The tool used for this work is always tined, as a blade might injure the smaller deep roots. It is considered desirable to cut away the roots which lie near the surface, as they are injured by becoming too dry and the tree suffers. The deeper growing roots are better for the tree to draw sustenance from, as they keep moist longer.

Fertilizers are used for two definite purposes and at two different

epochs: First, to press the growth of the young tree with manure speedily decomposed, which will furnish strong nutriment at once to the roots, such as oil-meal cakes, guano, dried blood, stable manures. Second, for the support of the mature tree with manures of slower decomposition, such as horn shavings, bones, woolen rags, hair, hide, and even leather. These are placed around the tree as far from the trunk as the roots extend during the autumn, and covered with earth to the depth of a foot.

The object aimed at in pruning is to bring the greatest surface possible of the tree to direct action of air and light. The spherical form is considered best. To keep this form shoots are pinched off in June each year. In the early spring weak and dead wood, forgotten useless shoots, are cut out to let light and air in among the branches; a sharp knife must be used.

Oranges are picked first when just beginning to turn yellow, in October, for distant shipment, next in December for a nearer shipment when half yellow, finally in the spring when fully ripe for home market. They are sold by the thousand, the caisse or patronne. The best are wrapped in gray paper and packed 360 in a box, and called caisses flandrines. The second quality are packed in the same way, 500 to the box, and called simply caisse. The third quality packed the same way is called caisse de Menton. The fourth quality are called Patronnes de Magasin, and the fifth Patronne de barque. These latter are shipped by boat in bulk. Those poorer than the above five qualities have no commercial value, excepting for the peel, which is taken off and dried. Oranges as a rule grow sweeter with the age of the tree.

Lemon trees blossom from the earliest spring to late fall, and even during the winter. From the few fertile flowers of late winter comes a large thick-skinned fruit with but little juice, called Testassa. The early spring flowers from which good fruit ripens in about six months or in October and November are the ones most depended on for a crop. These lemons are called here Primo Fiore or Maraviglia. The next flowers of May and June only ripen their fruit after ten months which are called Secundo Fiore or Granetta. These are generally inferior to the primo but if for any reason those fail, nature tries to make up for it by putting all the good qualities lost with primo into the secundo. The flowers of July and August mature the following April and produce the Verdame which is said to keep well for shipment. After the rain of September and October, a few flowers are fertile and give a coarse fruit called Septembrine.

The fruit, carefully picked, is spread on straw, where the different commercial qualities are selected. They are wrapped in absorbent paper and packed according to size and given the following commercial names: Caisse Flandrine, 400 of the best size in a box; Caisse Lyonnaise, 500 in a box, and Petites Caisses, where three boxes hold 1,000 of the smaller ones. The lemons of the first class in size must be at least 55 millimeters in diameter.

The plants are propagated by seed, grafting, cuttings, and layering, principally by the two first methods. When planted in the orchard the distance apart is modified, first, by the kind of culture whether in large orchards, when other plants are to be cultivated between the rows and nature allowed to take its course, or in small gardens, where a system of forcing is used; second, the quality of the soil, and, finally, the form in which they are to be set out, whether in one row, in squares, etc. In a general way from 15 to 24 feet is near enough for trees of standard size.

The trees begin to bear flowers and fruit at five years, give a reasonable crop at fifteen, but increase in productiveness up to forty years.

INSECT PESTS.

The following insects are hurtful to both orange and lemon trees, but as the lemon tree is always in flower and is more frequently watered, the Lepidoptera in the larva state is more injurious to it than to the orange:

Coccides.—Dactylopius citri (*Bois Duval*).—This insect with soft tegument is very common on both orange and lemon trees of the Riviera. Its body is a red brown; about it are numerous cottony appendices, 17 on each side; at the end of the abdomen are two much longer than the others. The insect is entirely covered with white dust. Its length is 0.^{m}003 to 0.^{m}004, breadth 0.^{m}002. The antennæ of the female are 8-jointed. The tarsis is half the length of the tibia; the thread-like feet are very long. Web pores are plenty; the genito-anal ring large, with 6 bristles; the larva has antennæ 6-jointed; the abdominal web pores are less numerous than in the perfect insect. The male is long, brown on head and thorax, abdomen yellowish; the feet and antennæ darker in color; these latter have 10 articulations. Thorax narrow; elytron very long, grayish white; abdomen very long, with web pores on the edges; sexual organs tuberculous in form, quite large, terminated in a rounded point; feet long; tarsis longer than the thighs.

This insect, a veritable scourge, forms upon the young fruit and leaves cottony and sticky heaps, contrasting strongly by its whiteness with the color of the fruit and the black layer of the "Morphée," which always surrounds them. Breaking off these living heaps, some of the insects will be crushed, yielding a reddish liquid; in them will be found insects in different stages of development, and besides this the larvæ of the coccinella and the caterpillar of a little Lepidoptera, the *Ephestia gnidiella.*

The Dactylopius citri seeks sheltered spots where the trees, too closely planted, lack air and light. It hurts the growth of the trees by stopping the leaf pores. It unites with the Lecanides and the Aphides to propagate "Miellat" and "Morphée."

Aspidiotus limonii (*Signoret*).—This Coccus with hard tegument,

which is found particularly upon the young branches, has, according to M. Signoret, the lobes at the abdominal extremity detached and apparent and the finabriate scales long; the last abdominal segment is elongated. The shell of the adult female is spherical, yellowish white in color, with internal organs yellow, and a large quantity of eggs. The shell of the male is more elongated. Raising the shell of the mother when the little ones are being hatched, numerous small white larvæ running quite fast among the eggs, yet unopened, can be seen. These resemble the Phylloxera, excepting in color. The male is quite common, his head is notched in front, the antennæ are long, thorax rounded and broad.

Lecanium flesperidum (*Auctorum*).—This insect is clothed with a solid cuirass. It is elongated in form; its color a yellow brown. It adheres firmly to the leaves and is difficult to distinguish from them. Its antennæ have six articulations, legs slender, claws very long, genito anal ring surrounded by six bristles. Larvæ long, with six articulations in each of antennæ. The male has not been described. Examinations of the female show embryo but no eggs, which gives rise to suggestion that she may be viviparous.

Lecanium oleæ (*Bernard*).—Brown, with deep body and two raised transverse lines on the back, almost heart-shaped; the antennæ have eight articulations; yellow at first, they become black. The female lays her eggs and shelters them under herself in great quantities.

The methods in use by the best gardeners for the destruction of this form of pest is to powder the tree with a mixture of sulphur and plaster from April, and to brush trunks, branches, and fruit during the winter. Washing with waters, saline, alkaline, or acid, which might harm the plant, are given up; syringing with medicinal liquids is also discouraged. Carbolic acid, turpentine, or petroleum dilutions are preferred for brushing on, the latter as the cheapest with water in proportions of 1 to 30. These should be applied at night in spring. It is also recommended to wash the trunk with lime water and to cut off and burn on the spot at night the small branches too much attacked to be cured. Another author advises the use of nitrobenzine, but the essential things seem to be plenty of light and air through and among the trees, and, above all, protection from wild birds.

Lepidoptera.—Acrolepea citri (*Millere*).—Tincidæ described by Milliere and Rangouet. The female probably lays her eggs, which are round and of a bright yellow color, near the bud. The young larva soon hatches; it is at first to the naked eye a yellowish white, and retains this color some time; at the moment of its final transformation, when it is largest, its body is yellowish green in color, which is particularly noticeable in the hollow of each ring and on the under parts. The head, dark brown, has antennæ, or horns. The eyes are very apparent. A marked distinction between this insect and the Prays-oleellus is that the latter has upon the first thoracic ring two bright black spots, which are

wanting in the *Acrolepea citri*, whose first ring is simply a darker shade. The body of the larva is a yellowish-green color, and has six brown feet armed with little claws darker brown. The false feet to the number of eight are placed under the sixth, seventh, eighth, and ninth ring. They are provided with an apparatus with short filaments, which allows them to adhere or cling strongly to any object. The last abdominal segment is conical and notched at the anal extremity; it is provided with the same apparatus as the false feet, commencing with the first thoracic ring; the covering is delicately marbled with a reddish color. Preserved in alcohol the larva, which has lost its greenish tints, becomes yellow, the back a darker shade, the eyes and mandibles are very black. Very lively, it burrows in the bud whose covering it has pierced, and leaves a round hole very apparent. Once settled in the bud it commences by devouring the base of the stamens, then it attacks the embryo of the fruit. It is found sometimes at the bottom of the calyx enveloping the base of the fruit, still very small, with its rings, trying to get into it; moving from place to place, it emits thread, which binds the stamens together and encloses its excrements. When the flower attacked opens, the stamens are seen to be upset and the young fruit, pierced at several points, soon blackens and dries up, even before it is as large as a grain of wheat. If the larva is disturbed, it quickly leaves the inside of the flower and crawls about the outside of it; then if there seems to be danger it tries to reach another branch or the ground, dropping down by the thread spun from itself, by which it climbs up again when the danger seems past, absorbing the thread into itself as it goes up. The larva being fully developed, it prepares to spin its cocoon in the calyx of the flower.

The cocoon is a gray-brown, meshes so loose that the phases of transformation can be easily followed; once really shut in, the caterpillar shrinks rapidly. Larvæ commencing their cocoons 20th and 21st of September yielded a butterfly the 26th or 27th following. Its sleep then lasts but six or seven days. At first the little chrysalis, in its cocoon, is a greenish color on its under parts, the upper parts, and a line upon its front red. After this the green and red fade and it becomes a light brown, verging toward green, which darkens more and more. At its birth the butterfly is almost black; it is only later that it pales and the varied designs appear upon its dress. It is motionless, antennæ stuck to its body, legs drawn up under it, looking like a small black spindle; when well dried it straightens its antennæ, which it carries pointing forward, and always in motion. It raises its head, stretches out its legs, and makes its toilet; at the slightest alarm it changes its place with a jerky little flight. The designs on the wings of these butterflies vary much and sometimes disappear completely to give place to a general mouse-gray color, more or less silvery.

A general description of a good specimen of this insect would be as follows:

The body mouse-gray, under part silvery; head the same color, eyes are large, the dark antennæ half the length of the body.

Examining with care, a black line forming a half crescent is apparent, at the commencement of the prothorax, near the center of the folded wings, or in the front third; a second black spot appears resembling the letter A, with top flattened and lacking the transverse bar. The top points toward the head of the insect, the sides are on the two wings. Further back is a third black spot similar to the second, but very much fainter, and the final point of the wings, a darker gray than the rest, makes a last noticeable spot. The specks on the wings are too small to be called spots. The three pairs of legs are of different lengths; the second pair has one spur, the third has two. In color they are gray, with black rings.

I have only studied these insects during the blossoming season of August. Professor Penzig, who has made longer studies of them, says that there are three generations in each year; the first in April and May, the second in August, and the third in October and November; according to him the winter is passed as an egg from this last generation. The first generation in the spring from these eggs is not strong or prolific, and not so harmful. The August generation is the most mischievous. They were first noted as hurtful in Corsica, later in Sicily by M. Panizzi. The methods of destruction used against this insect and the next two are to pick up and burn the flowers attacked and to gather all grass and weeds growing near the trees, dry them and burn them in heaps under the trees at night-fall. A great many butterflies attracted by the light are destroyed, besides other forms of insect life, under the burning heaps.

Ephestia guidiella (*Milliere*).—A Phycide described by M. Milliere, of Cannes, who gave it this name because he first found it upon a Daphne gnedium, a shrub quite common on the hills. It seems to be polyphagous, however, as it is found on many plants; besides this they are found under the whitish, sticky, cottony heaps deposited on fruit and leaves by the Dactylopius citri.

It has the form but is a little larger than the Acrolepia. It differs from the latter in color, being blackish, with a band of darker shade on each side, dotted or marbled. The larva is hairy; there are hairs even around its eyes. Its head and first thoracic ring are a brighter color. Placed in alcohol it is a lighter shade, becoming a chestnut, the band on the sides very marked. It is very lively, seems to flee the light and is longer in preparing for its transformation than the Acrolepia. It first makes a loose shelter, in which it spins a cocoon impenetrable and whiter than that of the other, and while longer in preparing the cocoon, it is at the same time longer in changing from chrysalis to butterfly, nine days instead of six. The butterfly is larger and a dark gray. Its wings, instead of being folded in a spindle-shape, are folded more in the shape of an acute-angled triangle. The body is mouse-

gray beneath, a little darker above, the abdomen is well furnished with hairs, the under part of the wings is a brilliant ash-gray. The upper wings are fringed only at their extremity and on the inner side. Their general shade is lees of wine, with metallic luster, two light designs cross them. When its wings are spread this color is brighter, but the design fades and nearly disappears if the insect is long on the wing. The under wings have a darker shade above than below, their fringe is long, especially the outer edge, a dark line separates the fringe from the rest of the wing. The legs are an even gray, something the shade of the under part of body and wings; with wings spread the Ephestia guidiella measures about $0^{m}.015$, while the Acrolepia citri measures but $0^{m}.010$ or $0^{m}.012$. Professor Penzig thinks it has but two generations. The discovery of the larvæ of these insects in the heaps made by the cocci raises the question, yet unsettled, whether they feed upon the latter, and so are not wholly harmful.

Eupithecia pumilata (*H. G.*).—A geometride larger than the Ephestia. As the butterfly varies in its markings so the larvæ of this insect vary so much as to make detailed description difficult Its body is cylindrical; six true legs appear, but these on the tenth ring and on the twelfth and last are false. The body is yellow-green, with black lines on the sides. In the middle of the back a longitudinal line from which, on each ring, a line runs at right angles down the sides; the body is covered with thinly-scattered hairs. The chrysalis, yellow-brown, is quite slender.

The specimens of the butterfly that I have raised are a grey-yellow color, brighter beneath than above. The eyes are large and greenish. The under wings are marbled, with little irregular blackish spots. They are notched in the back part and have a darker line serving as base to the fringe. The upper wings, larger and darker, have the same dark line. On their field there are, besides the spots which the under wing bears, designs lighter and darker.

The diptera are represented by one small fly, in color blue, striped with yellow, which lives in its larva state in the pulps of the oranges. It is the cerutitis hispanica (B). M. Peragallo could find nothing more detailed than this fact noted by Colonel Goureau.

Of coleoptera, the curculio-otior-hynchus meridionalis, which attacks the young shoots of the olive, is equally fond of the orange-tree, and all lemons which fall on the ground in damp places are pretty sure to contain more or less of the dark yellow carpophilus mutilatus, and to show the small, round hole in its skin by which entrance was effected. To obtain a specimen, it is only necessary to squeeze the lemon, and the carpophilus comes out with the juice, but not wet by it.

The Morphèe or Fumagine.—After years of study and discussion of this disease, which gives the leaves of a grove the appearance of being coated with soot, scientists have united in the belief, well founded, that it is due to the liquid excrement of one of the cocci in which germs of

mushrooms find congenial soil for growth and do grow very rapidly. To prove the power of this insect to eject to some distance its excrement, M. Peragallo confined in a glass insect-case several live specimens of the cocus on orange-tree leaves already affected with fumagine. Within twenty-four hours the glass was sprinkled with tiny drops of a viscous liquid, white and transparent, which had evidently been produced by the insects, and which were soon covered with fumagine from germs in the air. For its cure, the abbé Loquez says:

> Have no excess of humidity, plant farther apart, give the trees air, let them grow tall, be moderate with irrigation—water gives fruit but is liable to injure the tree—finally, burn the infected branches.

M. Riviere suggests lime-water washes, fumigating with tobacco, washing and brushing the leaves, branches, and fruit. Dr. Signorel adds hanging wisps of straw soaked in coal-tar under the trees. At Mentone petroleum and vinegar-water are both used as washes.

Two methods are given in the record of the Entomological Society of France for 1883; the first from Greece, the second from Sicily:

(1) Prune well and syringe the trees with the following mixture: Eight parts water with one each of petroleum and quick lime finely powdered.

(2) Powder the trees while damp with dew with fresh or unleached wood ashes.

To sum up, keep the trees healthy, do not plant in low places or where there is much fog, cut off sickly branches, and destroy by hand as many insects as possible.

"Gum" shows great weakness and probable death of the branch on which it appears; it is considered to be a cryptogamic disease. M. Peragallo gives the following insects which seem to be friends of the orange and lemon trees:

Syrphus hyalinatus (*de Fallen*).—From larvæ found at Mentone and Roqueburne, in whose neighborhood were quantities of the larvæ of Acrolepia citri, black and dried, were developed in his breeding cases a diptera already known as destructive to the coccide, identified as the Syrphus by alinatus (de Fallen). This insect is considered by M. Peragallo as one of the most useful parasites of the lemon trees, living as it does on different kinds of insects hurtful to the tree and being quite common in some sections. He has found also in the chrysalides of Microlepidoptera larvæ which gave birth to tiny Hymenoptera as yet unnamed, and in one case records the birth of a Hemerobius chrysops from the chrysalis of a Eupithecia pumilata; these latter cases being more truly in the nature of parasites than the Syrphus hyalinatus.

ACKNOWLEDGMENT.

Besides personal observation I am indebted to the following works for information on the subject. In some cases, particularly concerning the insects, I have made free translations:

Histoire et Culture des Oranges. A. Risso, A. Poiteau, revised by M. A. du Breuil.
Nice pratique, etc., A. La Costa.
Les Primes d'honneur. Ministère de l'Agriculture.
Statistique Agricole. Ministère de l'Agriculture.
Arbres, etc., dans la région comprise entre Cannes et Menton. F. Forckel, head gardner at Monte Carlo.
Etudes sur les Insectes nuisibles à l'Agriculture. M. A. Peragallo.
M. Gos, Chief of the Bureau of Agriculture for the Department.

List of oranges and lemons grown on the Riviera.

Citrus Aurantium—
Vulgare,
Sinense,
Depressum,
Pyramidale,
Ilicifolium,
Crispum,
Piriforme,
Latifolium,
Genuense,
Duplex,
Nicense,
Microcarpum,
Minutissimum,
Gibbosum,
Corniculatum,
Melitanse,
Hierochunticum,
Balearicum,
Sigillatum,
Mammiferum,
Limetiforme,
Oblongum,
Ellipticum,
Olivœforme,
Torulosum,
Carnosum,
Rugosum,
Ruginosum,
Pomum Adami Parisiorum,
Nobile,
Longifolium,
Multiflorum,
Angustifolium,
Tardum,
Aspermum,
Grassense,
Coniferum,
Imbigum,
Lusitanicum,
Otaitense,
Mutabile,
Lunatum,
Loursiro.

Citrus Bigaradia—
Corniculata,
Sulcata,
Fetifera,
Canaliculata,
Cyathifera,
Caliculata,
Crispifolia,
Multiflora,
Violacea,
Duplex,
Spatafora,
Mamillata,
Longifolia,
Volcameriana,
Racemosa,
Neapolitana,
Asperma,
Itan,
Sallesiana,
Macrocarpa,
Hispanica,
Florentina,
Coronata,
Glaberrima,
Dulcis,
Salicifolia,
Simensis,
Myrtifolia,
Fasciata,
Bizarria.

Citrus Bergamia—
Vulgaris,
Torulosa,
Parva,
Mellarosa,
Mellarosa Plena.

Citrus Limetta—
Vulgaris,
Parva,
Acris,
Hispanica,
Romana,
Tuberculosa,
Auraria,
Pomum Adami.

Citrus Pompelmos—
Decumanus,
Vulgaris,
Crispatus,
Chadock,
Ragemosus.

Citrus Lumia—
Dominica.
Rhegina.
Conica.
Ollulæ formis.
Valentina.
Gallitia.
Dulcis.
Saccharina.
Aurantiaca.
Rubescens,
Limeta.

Citrus Limonum—
Sylvaticum,
Incomparabile,
Tenue,
Striatum,
Pusillum.
Calabrinum,
Caly,
Bignetta,
Bignetta magna,
Hardonium,
Rosolinum,
Aspermum,
Ponzinum,
Duplex,
Ligusticum,
Roseum,
Barbadorus,
Neapolitanum,
Globosum,
Parvum,
Hispanicum,
Balotinum,
Mellarosa.
Peretta,
Peretta Spatafora,

List of oranges and lemons grown on the Riviera—Continued.

Citrus Limonum—Continued.
Peretta Striata,
Peretta Florentina,
Peretta Longa,
Vulgaris,
Ceriescum,
Cajetanum,
Fusiforme,
Oblongum,
Canaliculatum,
Imperiale,
Lauræ,
Racemosum,
Rheginum,
Sancti Remi,
Nicense,
Paradisi,
Ferrari,
Amalphitanum,
Chalcedonicum,
Bimamillatum,
Digitatum.

Citrus Medica—
Vulgaris,
Cucurbitina,
Tuberosa,
Maxima,
Cornuta,
Salodiana,
Plena,
Dulcis,
Florentina,
Elongata,
Rugosa,
Romana,
Sulcata,
Costata,
Glabra,
Simoniformis,
Parvra.

WILLIAM HARRISON BRADLEY,
Consul.

UNITED STATES CONSULATE,
Nice, May 5, 1890.

CORSICA.*

REPORT BY CONSULAR AGENT DAMIANI.

Situation.—Trees of the orange species thrive in Corsica if cultivated at an altitude of 200 to 400 meters above the sea-level; below that they are dwarfed in their growth, and above 400 meters they are affected by the cold. The tree requires a deep, fertile, and pervious soil, irrigation during the heat of summer, and shelter from high winds. Damp and compact soil does not suit; but it thrives best in a clayey siliceous clay limestone, or a pervious, siliceous, clayey soil. On a damp soil the roots are soon injured. The ground must not only be wholesome and pervious to water, but it must also be rich in mold.

Cultivation.—Both the orange and lemon trees require much attention if they are to yield abundant fruit every year. If planted on ground exposed to the north wind, they must be sheltered by triple rows of the pyramidal cyprus or the *Eucalyptus globulus*. Twice a year, in spring and autumn, the ground at the foot of the tree is dug up, and in September and October, or in February and March, well manured with all kinds of manure, according to the season; generally, before winter, vegetable manure, more or less decomposed, and the refuse of farms is used.

Pruning.—The cutting or pruning does not differ from that of other fruit trees. It is done at the end of the winter when it is dry; the top is rounded and the inside is carefully exposed to the influences of the sun and air.

Climatic influence.—The orange tree can not support cold beyond 5° or 6° centigrade below zero. The lemon is even more delicate and will only

* Translated at the Marseilles consulate.

thrive in localities where the thermometer does not fall below 2° or 3° centigrade. It must be planted on hills exposed to the south and well sheltered against north and northeast winds by elevations or artificial means. It must be irrigated by running water, by trenches, every fourteen or twenty days and must be placed in holes having 1 meter or 1.30 centimeters square in depth, or the ground must be dug to a depth of 90 centimeters, which is preferable. The trees must be 5 or 7 meters distant from one another, according to the fertility of the soil.

Insect pests.—The lemon is also liable to be injured by winter frosts, by *jaunisse* or *chlorose*, or by excessive humidity. It is also attacked by *kermes* or the white louse (*Dorthesia citris*), the cochineal (*Cocus citris*), and by *fumagine*. The *jaunisse* and decay of the roots is arrested by draining the ground, the multiplication of insects and *fumagine* is stopped by syringing the branches and leaves with hyposulphate of lime in March and April.

Maturity.—The lemon and orange begin to bear fruit the third year after grafting, but do not produce abundantly till the fourth or fifth year. They are generally best from the ninth to the twelfth year and yield on the average 3,000 fruit. The lemon tree yields even more. The fruit is gathered with much care and after the disappearance of the dew. They are packed in cases and in rows, after being wrapped in thin paper. Each case contains about 500 or 380 to 400 oranges.

Varieties.—The kinds cultivated in this locality are—

Oranges: The Sweet Fruit of Brazil (*Brasiliculis*), the Blood Red (*Hiero chuntisum*), the Sweet Portugal (*Lusitanirum*), the Sweet Malta (*Meliteuse*), the Otaite (*Otaiteuse*), and the Mandarins (*Nobilis.*)

Lemons: Bignette of Genoa, the most productive; Bignette of Valence, without pippins (*Citrus aspernum*); Bignette of Spain (*C. hispanium*); Bignette of Malta (*C. melitcuse*); Bignette of Vulgare (*ordinaire*).

SIMON DAMIANI,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Bastia, February 6, 1890.

MARSEILLES.

REPORT BY CONSUL TRAIL.

In this consular district orange and lemon trees are only cultivated to any extent in Corsica.

The climate in the region around Marseilles itself is not temperate enough for these two trees. Up till about thirty years ago there were plantations still in the plains of Toulon and Hyères, but even these have long since been converted into market gardens.

They are now only to be found towards the eastern boundary, and here only chiefly orange trees that are cultivated more for their blossom than for their fruit, orange blossom being used in large quantities in the distilleries in Grasse, Cannes, Nice, and other centers of the perfumery industry.

CHARLES B. TRAIL,
Consul.

MARSEILLES, *April* 30, 1890.

MENTONE.

REPORT BY CONSULAR AGENT CLERICY.

Varieties.—The names of the best qualities are (1) Fleurs, (2) Cériesche, (3) Granetti, (4) Verdame.

Situation.—There is not any special situation for those qualities; they are corresponding to the four blossomings of the tree. Orange and lemon trees grow near the sea as well as upon the hills, but exposition to the sun is to be preferred; so also is hilly ground when there is water, but level ground is good too.

Soil.—Calcareous and permeable soil is best.

Climatic influence.—A mild and temperate climate has a great influence on the growth of the trees.

Temperature.—They grow well in a high temperature, 32° centigrade; they freeze under 3° centigrade. Cold and damp nights are injurious; those warm and with an ordinary atmosphere are favorable.

Rain-fall.—In Mentone the rain is generally calculated at about 85 cubic centimeters per year. Spring and autumn rains are the best.

Irrigation.—One irrigates in summer from June 21 until August 30 with water gathered in the hills and kept for the purpose; after the blossoming and three times during the summer at intervals of a month, 500 liters every time.

Cultivation.—The orchards are plowed twice a year.

Pruning.—The trees must be pruned every year and according to the plantation.

Picking and curing.—Lemons are gathered in Mentone four times a year; oranges twice, January to April. Lemons and oranges must be firm and not too ripe when they have to be exported.

Planting and propagating.—The trees are planted at a distance of 5 or 6 yards to have a regular plantation. Lemon trees are propagated by grafts on bigaradiers or bitter lemon trees. Orange trees from seeds are better but less resistant.

Maturity.—The trees are grafted when four years old; they do not give a very good gathering before being fifteen years old.

Insect pests.—The morphée and the fumèe are the two diseases of the orange and lemon trees; the former is an insect, the latter a mush-

room; no remedy has yet been found. All birds destroy the injurious insects.

Fertilizers.—Farm manure is the best; it lasts two years. Rags, horn scrapings, and sesamum are also used. The manure is placed at the foot of the tree in November; 100 kilos of dung, 30 kilos of rags, 15 kilos of sesamum or horn scrapings; the quantity of manure is according to the strength of the trees.

AUGE CLERICY,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Mentone, May 15, 1890.

ITALY.

CARRARA.

REPORT BY CONSUL RICE.

[From statistics supplied by the consular agent at Carrara.]

ORANGES AND LEMONS IN CARRARA.

Varieties.—There is no special nomenclature for the oranges grown within this district; the only ones differing from the common ones are the red ones called sanguigni. The mandarins and citrons are raised but on a limited scale.

The lemons grown within this district are divided into two classes—the sweet lemons with the thick rind, and the bitter ones with a thin one; the latter are much smaller, but contain more juice and are better for preserving, therefore more in demand.

Situation.—Lemons and oranges are produced, but not extensively; generally cultivated about 4 kilometers from the sea, with about 50 to 100 meters elevation, the most preferable position being one with a southern warm aspect, but bearing in mind that there is always an undersoil of gravel.

Climate.—The maximum temperature is 30 degrees centigrade, minimum, .05. Medium annual fall of rain, 395 millimeters, the greater part of which falls during the months of October, November, December, and January.

Irrigation.—The irrigation is done two or three times a year, from July to September, that is, during the ripening of the first crop of lemons and when the second crop is in blossom.

Fertilizers.—The plants are manured and hoed once a year, usually during the winter. The manures used are generally stable manures, and in the spring they are also enriched with liquid sewage.

Pruning.—The plants are pruned almost to the very top every two years.

Picking.—Lemons are gathered at various turns during the year and

on an average every three months. Oranges are gathered during the months of December and January. After gathering they are placed in baskets and sent to the different markets in Tuscany either by rail or by wagon; none are exported.

Propagation.—Plants are propagated from the seed of the bitter oranges or lemons, and are after grafted by the usual process. For the oranges the sweet seed is preferred, it giving finer plants, bearing better fruit; these, however, bear much later and are more liable to be attacked by the disease called "gommosi" or "gummy."

Maturity.—The plants bear fruit when about seven to ten years old and live for many years—some plants have record of one hundred years.

Insect pests.—The only insect which damages the orange plant is a sort of black ant, which breeds an insect that sucks the juice of the tender sprigs, thereby impoverishing the parent plant.

WILLIAM T. RICE,
Consul.

UNITED STATES CONSULATE,
Leghorn, May 23, 1890.

GENOA.

REPORT BY CONSUL FLETCHER.

[Reprinted from Consular Reports No. 41½.]

ORANGES AND LEMONS.

The genus *Citrus* for economical cultivation is divided into three classes—the orange, citron, and lemon.

Varieties.—The varieties of oranges generally cultivated in this province are:

(1) *Citrus Bigaradia dulcis*, or sweet orange.

(2) The Melangolo of China, or *Citrus Bigarradia cenensis.*

(3) *Citrus deliciosa*, or Mandarin orange, aromatic and saccharine.

Two kinds of citron are cultivated:

A. *Citrus medica rugosa*, wrinkled fruit, very good candied or otherwise preserved.

B. *Citrus medica cedrato*, a very precious and aromatic fruit, the shell of which is also candied.

The following are the varieties of lemon raised here:

A. *Citrus limonum*, a lemon very good for its acid and medicinal virtues.

B. *Citrus limonum tenno*, a lemon of gentle rind, fruit rich in acid, but too tender to stand transportation.

C. *Citrus limonum oblongum*, an oblong lemon, considered very valuable on account of the quantity of acid it contains.

These three varieties are ranked as the best, and therefore are cultivated the most in this vicinity.

Productive age.—*Sharp* fruit trees gives full crops when about, say, from sixteen to twenty years old, and they keep yielding excellent crops

for many years afterwards. It is not often that these varieties become very old, say, not over one hundred years. The foliage expands to a remarkable degree, and an average plant will usually produce 5,000 fruit per annum; especially can this be said of the lemon tree.

Planting.—Before the malady *gomma* (gum) manifested itself it was preferred to multiply the trees by burying the ends of shoots in the ground at proper distance; these shoots soon took root, but now the seed of Melangolo is planted, into which, when grown to a certain size, the qualities desired are grafted. The Melangolo tree up to the present time is in a very healthy state and forms a good trunk in which to graft all varieties required. Sharp fruit trees are planted at a distance of about 17 feet apart on flat land and from 13 to 14 feet apart on hill-sides. The shade of one tree on another is injurious to the blossoming of the latter, therefore care should be taken that fair space be given all the plants in order to have nature do its best for man. The average number of trees in a hectare of land (or 2.471 acres) is 490, and with this number as a basis from which to calculate it gives a space of about 20 square meters for each tree.

Situation of orchards.—Orange and lemon orchards in Liguria are all on the sea-coast. Flat and hilly lands in orchard are alike protected by lofty mountains from northern winds. This state of affairs appears necessary; the temperature must be constant, for even the slightest frost damages the lymph of the plant and juice of the fruit. Orange and lemon groves can be, and are, cultivated inland, but the temperature in such places must not reach higher than 40° centigrade and not lower than 2°, or by Fahrenheit scale, 104° and 32°. Inland orchards usually do well around lakes on account of the constant climate. Groves are also to be seen on table-lands, but always on the south side of mountains; in such localities the temperature is as given above. Sharp fruit trees need a damp soil, and if the land does not contain sufficient moisture it is impossible to obtain a good crop. On naturally dry soil, therefore, water near by is of great value.

Orchards in this province and in all Liguria are near the sea and protected from the cold northern winds by mountains. Many small groves can be seen beside stone walls, to which the branches cling, particularly the lemon. The land throughout this province being so mountainous, it must be taken for granted that but few orchards can be seen on so-called flat lands.

Cultivation.—Orange and lemon groves, on account of the irregular formation of the surrounding country, are necessarily small, and they are owned by about as many people. On account of this natural abruptness and irregularity, added to the fact that the orchards are not large, it is the opinion of the owners that irrigation is too expensive. Further, the soil on which groves are planted is what the Italians term strong, and it is claimed for it that it retains moisture for a long time. Again, an idea prevails among the people that springs are of no great depth here, and consequently the water therefrom courses through the

earth, and at no great distance from the surface, and that such an existence waters the roots without the aid of man. A happy belief! Certain it is, however, that at Nervi, a few miles along the coast from Genoa, orchards thrive with but little irrigation, and this state of affairs is noticed even in the dryest seasons. Unless groves have strong soil, as above mentioned, and are moistened by an unseen water-course, they will prove unprofitable if the owners do not nourish the dry roots as often as, say, once in eight days. In the first four or five years cultivation between the plants is possible, but when the tops of trees reach a certain expansion cultivation would seem impossible, or, at least, improbable.

Produce and expense.—When the tree reaches between the ages of fifteen and twenty years each one is expected to yield abundant fruit, the orange from 400 to 600, and the lemon from 600 to 1,000. On strong soil and with proper care as the orchards advance in years it is said that a lemon tree will yield from 3,000 to 5,000 fruit per year. The ground is manured like unto the olive groves, some kind of compost, etc. The expense is estimated as about the same, namely, $05 per hectare (2.471 acres) per annum.

SUMMARY.

Oranges and lemons are not raised in such quantities in this consular district as to admit of large exportation, but the trade in olive oil is a big item.

The following table is copied from advanced sheets of what is designed as an accurate report of the importation and exportation of olive oil, oranges, and lemons for the year 1883, to be soon issued by the chamber of commerce of this city.

EXPORTS OF LEMONS AND ORANGES.

La Plata States	39,102
France	32,532
England	8,750
Egypt	4,577
Total	84,961

IMPORTS OF LEMONS AND ORANGES.

France	6,878	
Tripoli and other African ports	66,155	
Egypt	1,830	
Total		74,863
Total exports over over imports		10,098

JAMES FLETCHER,
Consul.

UNITED STATES CONSULATE,
Genoa, Italy, May 1, 1884.

MESSINA.

REPORT BY COUNSEL JONES.

ORANGES AND LEMONS.

Varieties.—Best variety for profit, the *citrus lusitanicum* (orange); *citrus lusionium* and *citrus fusiforme* lemon. Other choice varieties worthy of culture and for profit are the *citrus bergamia* (bergamot); *citrus deliciosa* (mandarin); *citrus luiretta.* There are some thirty other varieties of less note.

Location.—The finest lemon-groves are in the neighborhood of Briga, Pezzuolo, Giampilieri, Santo Stefano, Saponara, Rometta. The finest orange groves at Francavilla and Rouella, in the valley of the Alcantara.

Distance from sea.—Lemon trees do better nearer the sea than orange trees; they thrive at from ¼ to 2 miles from the shore; orange trees from 2 to 6 miles.

Elevation.—The greatest elevation at which lemon trees do well is 1,500 feet. Orange trees do well at 2,700 feet above sea-level.

A southern exposure is best; but it requires the most water. A northern exposure is generally too cold. An eastern exposure exposes the trees to April frosts. A western exposure is always damp.

The lemon, like the vine, delights in hill-sides, facing south. Plains, as well as hill-sides, are well suited to the orange.

Soil, etc.—In this district the finest lemon groves are on argillo-calcareous soil of the Tertiary period, and on calcareo-argillaceous soil of the Quaternary period. These two soils are the best for both oranges and lemons. Sandy soil is not well adapted to orange and lemon culture, as it is too thirsty. When grown on sandy soil these trees are small and their late fruit (fruit from the last June blossoms, which at latest must be gathered in February and March) is spongy and unfit for transportation. Oranges do better than lemons on sandy soil.

Climatic Influences.—The climatic influences in this district are seldom injurious to orange and lemon trees. The lemon requires an equable climate to produce perfect fruit. The orange and mandarin are hardier and suffer less from sudden changes of temperature; they do well at a higher elevation than the lemon and at a greater distance from the sea.

Temperature.—The temperature in this orange and lemon district ranges from 34° to 100° Fahr.; should it, however, exceed those limits for a few hours only the trees soon rally. During the winter of 1887 the mercury fell to 22°, and the tender twigs were frozen; these being at once cut away, the trees were none the worse for the cold. During the summers of 1888 and 1889 the mercury rose to 103°; an extra supply of water soon made the trees look as green as ever.

The average temperature is 96° in summer and 42° in winter; mean annual temperature 70°. Nights cold or warm, sultry, moist, ordinary atmosphere.

Spring and autumn the nights are frequently cold, and still always above freezing-point, however, and do no damage.

Warm nights increase the evaporation but do not injure the trees. In March and April the cold at early dawn sometimes blights the blooms, which would otherwise produce the "bastard" or late fruit.

During the summer the atmosphere is seldom if ever dry. In winter the air is dry when the wind is north, which rarely happens. West and northwest winds are damp. The prevailing wind is the sirocco (southeast); it is generally warm and moist.

The average moisture of the atmosphere is 0.025 millimeters; quite inadequate to the successful culture of the orange and lemon. Only groves of the stiffest clay or calcareous soil with a wet subsoil can dispense with irrigation. Oranges stand drought better than lemons.

There are but few sultry days except in the early spring, when the atmosphere is saturated with moisture; at this period rain is not wanted, and often proves destructive to the crops.

The average annual rain-fall is 22 inches. From April to September it seldom rains, but pours in torrents in September and October, causing great damage. The heavy rain during the night of October 1, 1889, destroyed a number of groves. Light, steady, and constant rains occur in March and April.

Rain in May and June damages the blooms. Rain in September helps to develop the bastard fruit. Too much rain causes the trees to become chlorotic, and predisposes them to the "gum;" it also makes the fruit watery and destroys its keeping qualities.

Irrigation.—Generally speaking, throughout Sicily, orange and lemon culture is impracticable without irrigation. There are a few exceptions to this rule, however, in certain favored localities.

The trees are watered for the first time in June, when the fruit from the early blooms is the size of a pea and the trees are still in bloom.

The amount of water required to the acre depends upon the age of the trees, the nature of the soil, altitude, exposure, etc. On an average, each lemon tree, on moderately moist soil, requires 200 liters of water at each watering; 2,000 liters of water a year.

Cultivation.—Vegetables are planted between the rows until the trees are large enough to shade the ground. Young trees are in consequence worked six times a year. When the trees have attained their full growth they are worked but seldom.

The first working of a full-grown grove takes place in October or November, after the autumnal rains have made irrigation unnecessary. A grubbing-hoe is used to stir the soil, cover the weeds, and draw away the earth from the foot of trees. The second working is in March, when the earth is thrown back to the foot of the trees. The third work-

ing is in April, after which the land is trenched and a basin is made around each tree.

Fertilizers.—These groves are badly fertilized, as there are no good fertilizers here. Stable manure is so mismanaged that it furnishes but little plant-food.

Fifty-five pounds of stable manure are applied annually to each young lemon tree. These gardeners are now finding out that this amount is too great, although the manure is of an inferior quality.

Lemon groves in bearing are manured every three or four years; 55 pounds of cow or stable manure to the tree.

Some gardeners put the manure in the irrigation trench, and let the water spread it around the trees; others scatter the manure around the trees, turn it under, and then irrigate. Experiments are being made with sulphate of ammonia.

The best time to fertilize orange and lemon trees is from April to May. To obtain bastard fruit the trees are fertilized in October.

Pruning.—A tree is never pruned until it is four years old; its suckers and badly placed branches only having been cut away up to that time. Trees are generally pruned in March, after the crop has been gathered, but no precise date can be given. These trees are always pruned high from the ground; their lowest branches are at least 7 feet above the soil, except when they are directly exposed to winds from the sea, in which case they are kept low that they may escape, as much as possible, from the salt spray. Pruning should not be practiced in summer, as, at that season, the wounds are hard to heal and are apt to predispose the trees to gangrene and other diseases.

Picking—Lemons are gathered from October to August; oranges from November to April. Lemons are picked whilst immature for foreign markets, and should not weigh less than 80 grams each. Lemon-juice and essence are extracted from inferior lemons. The greatest care is necessary in gathering the fruit not to bruise it. After the stems have been cut close the fruit is wrapped in tissue-paper and carefully packed in boxes containing from 300 to 360 lemons and from 160 to 200, 240, 300, and 360 oranges.

Planting.—One hundred and sixty-two trees are planted to the acre.

Propagating.—The lemon is now budded on the bitter orange stock (*Citrus bigaradia*). Prior to 1870 the seedling only was budded, but this tree having been destroyed by the gum the hardy bitter orange stock has taken its place. The several varieties of oranges grown are also budded on the bitter orange stock.

Varieties.—The best varieties are budded; seedlings never reproduce their own variety.

Orchards.—The orchards are generally small, averaging from five to seven acres. The high prices that ruled a few years ago induced small land-owners to plant out orchards, but prices having fallen and diseases

having made their appearance many of these orchards have been abandoned.

Maturity.—Trees begin to bear at six years of age and are most prolific at twenty. The greatest age of the average tree is fifty years. Orange trees sometimes last eighty years.

Insect pests.—A number of insects attack orange and lemon trees: The *Coccus hesperidum*, *Kermes aurantiis*, ants, *Mytilaspis fulva*, *Secanium hesperidum.*

The most troublesome of the parasites is the coccus, which belongs to the order of the hemiptera and to the suborder of the homoptera, and is vulgarly called the scab. In the spring it propagates rapidly in damp, warm weather. It prefers the lemon to the orange. This is very detrimental to trees that are overshadowed by taller trees or that have not had their heads opened out to let in light and air. Remedy: a solution of lime.

The *Kermes aurantii* is partial to the orange and punctures its leaves Remedies: Solution of lime, solution of sulphate of copper, kerosene, infusion of tobacco.

The best way to get rid of ants is to destroy their hills in February with kerosene; fumigations of sulphur are also resorted to.

The *Mytilaspis fulva;* remedy, solution of phenic acid. The *Secanium hesperidum;* remedy, sulphur fumes.

Beneficial insects.—The coleoptera (of the cochineal family) and the hemiptera, above mentioned, feed on the aphides.

Parasites.—There are no known parasites of the injurious insects. Small birds, if preserved from ruthless sportsmen, would prey upon these destructive insects.

Picking and curing.—The fruit is gathered in baskets, lined with cloth, and piled at the foot of a tree, where expert workmen trim the peduncles close to the fruit and examine each orange and lemon, selecting the choice ones for exportation. This fruit is then carried in large baskets to the warehouse, where, after a second careful inspection, women wrap it in tissue-paper. The fruit contained in each box must be of the same size. These packers are most expert in classifying the fruit. Sight and touch are the only sizers used. If the boxes are kept for any length of time in warehouses, they are opened once every three weeks that their contents may be carefully re-examined, and the damaged fruit removed. Time is the only curing process for both oranges and lemons.

WALLACE S. JONES,
Consul.

UNITED STATES CONSULATE,
Messina, January 27, 1890.

MESSINA.

REPORT OF CONSUL JONES.

[Republished from Consular Report No. 102.]

ORANGES AND LEMONS.

In Sicily lemon culture is 30 per cent. more profitable than orange culture; lemon trees are more prolific than orange trees. Prices for lemons are higher than for oranges. The province of Palermo is the great orange district of Sicily. Throughout the province of Messina the orange was exterminated in 1865–1870 by the "gum," and the lemon budded on the wild orange has taken its place. To defy the ravages of the gum the bud must be put in the wild orange stock at least 3 feet from the ground.

ORANGES.

The bulk of oranges shipped from Messina comes from the province of Reggio on the main-land. In Calabria they begin gathering the orange in October; their fruit is hard, sour, and of a whitish appearance; it is shipped to England. Shipments of oranges to the United States begin in December. They begin gathering oranges in Sicily in November, if we except small shipments to London of unripe and undersized oranges from Milasso, 30 miles to the northwest of Messina. This poor fruit is quoted at about 70 cents a box in October; deducting 20 cents for cost of box, leaves 50 cents for the fruit and handling. These oranges are bought by confectioners.

The climate of southern Italy being warmer in summer than that of Sicily (Sicily, surrounded by the deep waters of the Mediterranean, is cooler in summer and warmer in winter than the province of Reggio), and the oranges being generally grown on a light, sandy soil, account for their maturing earlier in Calabria. As just stated, the first gathering of oranges in Sicily occurs in November, but most of the crop is gathered in December and January. The Sicilian grower prefers running the risk of damage by frost (but two crops have been injured by cold during the last twenty years) to gathering his oranges when they are still too immature. Sicily oranges, which are, of course, not fully ripe when gathered, keep well for forty days. Frequently the fruit when gathered is allowed to sweat in the groves from two to three days, piled on the ground and covered over with tarpaulins; it is then wrapped in tissue paper, boxed up, and sent to the city. Fruit is also sent directly from the groves. All fruit upon reaching the exporters' warehouses is carefully inspected, selected, and wrapped in fresh tissue paper, and repacked. Exporters ship their oranges as soon as packed.

COST OF PACKING—SHIPMENT.

During the shipping season large firms in Messina employ as many as three hundred women and girls, paying them 20 to 25 cents a day—

nine hours' work. The women select and wrap up the fruit. Men are employed to pack the fruit and handle the boxes; they get from 40 to 50 cents a day. The stevedores handle the boxes with great care. The steamers give all possible ventilation to the fruit during the voyage. Fruit possessing the greatest keeping qualities is sent in sailing vessels to the United States. The duties paid on oranges and lemons entering the United States are as follows: On oranges in boxes, capacity not exceeding 2½ cubic feet, 25 cents per box; half-boxes, capacity not exceeding 1¼ cubic feet, 13 cents per half-box; bulk, $1.60 per thousand; barrels, capacity not exceeding that of the 196-pound flour barrel, 55 cents per barrel; packages not especially enumerated or provided for, 20 per cent.; on lemons in boxes, 30 cents per box; on half-boxes, 16 cents; in bulk, $2 per thousand; in packages 20 per cent.

Exporters frequently buy the fruit on the trees. Below is given the cost of preparing and shipping a box of oranges or lemons:

Cutting, selecting, and packing in the groves	$0.15
Box, paper, nails, and hooping	.30
Transportation to Messina (average)	.20
Repacking, shipping charges, store rent, and brokerage	.14
Freight, per box, by steamer to New York	.30
Total	1.09

A few firms export fruit to the United States on joint account. Fruit is generally shipped on consignment. Consignees' commissions and auction fees are 6 per cent.

Years ago oranges were preserved in sand for from four to five months, merely for family use. This practice no longer prevails; it would not pay on a large scale, such enormous warehouses would be required and so great would be the expense of handling the fruit. Preserving oranges in bran has been tried; it proved too heating. I have heard of a successful shipment of oranges packed in beech sawdust. The vessel carrying the cargo left Messina in December and reached St. Petersburg in May. Spanish grapes packed in cork-tree sawdust keep from September to March. Preserving oranges by the fumes of sulphur has never been attempted here, lest the fumes might cause the fruit to dry up.

The maturing of oranges and lemons is affected by the altitude, latitude, excessive heat in certain localities, irregular rain-fall, and the nature of the soil.

Sicily is mountainous in character, and is agronomically divided into three zones:

(1) Marine zone, in which fruit ripens earliest.

(2) Middle zone, extending from 1,500 to 3,000 feet above the sea-level.

(3) Mountain zone, where the temperature is too low and the climate too damp for citrus culture.

The soil has a great influence upon the maturing and keeping qualities of the citri. The fruit ripens earlier on light, sandy soil than on clay soil. Fruit grown on light, sandy soil can not be left long on the trees without its deteriorating in quality—becoming dry and spongy—whereas on stiff clay it can remain with impunity until the end of April. The latest fruit to ripen is that produced on the upper limit of the middle zone—the trees growing in stiff clay soil—which can remain on the trees until the end of June without its drying up or its skin becoming hard and spongy; it must, however, be gathered in July, for should it be left longer on the trees it would injure the new crop.

Fruit grown on a light, sandy soil is small and of a pale yellow, and is of comparatively short keeping. That grown on a clay soil is large; it keeps well and is of a reddish brown. Trees on clay soil resist a drought much better than those on sandy soil. The groves to the southwest of the Palermo district produce much more highly-prized fruit than those on the northwest, the sole difference between them being their clay and sandy soils. As in the neighborhood of Palermo, so in other districts of the province, even where the climatic differences are great.

Fruit in Sicily is known as "mountain fruit" and "sea-coast" fruit. Merchants further classify the fruit according to the soil on which it grows. Fruit grown on a clay soil brings 30 per cent. more than fruit produced on a sandy soil. Mountain fruit is firmer and keeps better; its superiority is attributed to the nature of the soil and not to the influence of the climate. Fruit produced in the plain of Portello, the soil of which is clay, brings the same as that grown on the heights of Monreale.

The fine large oranges that bring a high price in Palermo in summer are allowed to remain on the trees until the end of May, when they are stored in subterranean grottoes. They are produced on clay soil abounding in alkalies and well-decomposed organic matter. In the sides of the mountains, near Palermo, are many grottoes that are cool and well ventilated, in which oranges keep nicely during the summer; they are spread two layers deep upon large mats, placed at convenient distances one above the other. Every day or two the fruit is turned over and all the defective oranges are removed. This fruit finds a home market.

The principal orange and lemon groves are on the northern and eastern coasts. The mountains along these shores rise in bold headlands from the sea, having but a narrow strip of land—the marine zone, of a sandy character—at their base. The soil of the hill-sides—the middle zone—is generally clay. For lack of water for irrigation, oranges and lemons are not grown to any extent on the southern and western shores.

LEMONS.

The well-known variety of lemon called the "lunare"-lunar, or everbearing, produces blossoms and fruit every month in the year. When,

however, during the Indian summer, rainy days are succeeded by dry, clear weather, lemon trees of different varieties immediately put on blooms, and if, owing to the mildness of the season, the fruit sets at the beginning of winter, it will come to maturity in midsummer.

Lemons are divided into two classes, the true lemon and the bastard lemon. The true lemon is produced by the April and May blooms; the bastard by the irregular blooms of February, March, June, and July, which depend upon the rain-fall or regular irrigation and the intensity of the heat during the summer and winter seasons. The true lemon requires nine months to reach maturity, from the bloom in May to the mature fruit in January. There are but three harvests of the true lemon. The first is the November cut, when the lemon is green in appearance and not fully ripe. Lemons of this cut are the most highly prized; they possess remarkable keeping qualities, and are admirably preserved in boxes in warehouses from November until March, and sometimes as late as May, and then shipped. The second cut occurs in December and January. Lemons of the January cut must be shipped three weeks after gathering. At this date the lemon has acquired a yellowish appearance. The third cut occurs in March and April. This fruit is shipped as soon as gathered, spring prices being always high. The uniformity in size of lemons, as we meet them in the trade, is due to the monthly harvestings from October to March. No sizer is used or even known here.

Bastard lemons present well-characterized peculiarities in shape and appearance; their inner skin is fine and adheres tenaciously to the meat; they are hard, rich in acid, and seedless. The bastard lemon, produced from the bloom of June 1, is still green the following April, and ripens only towards the end of July. It remains on the tree over a year, and sells well in summer. Besides the March and June bastards, there are yet others that remain on the trees from twelve to eighteen months. The true lemon can be left on the tree until the end of May or the first week in June, but it interferes with the new crop, drops off from overmaturity, and is liable to be attacked by insects. The bastards, on the contrary, withstand bad weather and parasites, and they mature from June to October. It is estimated that four times more oranges than lemons are lost in the groves and warehouses. Good drainage is, of course, most essential in orange and lemon culture.

Table A shows the mean annual price per box of oranges and lemons at Messina for the years 1870 to 1886, inclusive, the figures being official.

ESSENCES.

With three strokes of his sharp knife the cutter peels the lemon lengthwise and lets the peel fall into a tub under the chopping-block. He then cuts the lemon in two and throws it from his knife into a bucket. He works with wonderful rapidity and fills from ten to twelve tubs with

peel a day and is paid 5 cents a tub, weighing 77 pounds. His left hand and right index are protected with bands of osnaburgs or leather. Decayed fruit is not peeled, as its oil cells, being atrofied, yield no essence.

Fresh peel is soaked in water fifteen minutes before the essence is extracted. Peel that has stood a day or two should remain in soak from thirty to forty minutes, that it may swell and offer a greater resistance against the sponge. The operative holds a small sponge in his left hand against which he presses each piece of peel two or three times, simple pressure followed by rotary pressure. The women employed in this work run a piece of cane through their sponges to enable them to hold them more firmly. The outside of the peel is pressed against the sponge, as the oil glands are in the epicarp. The crushing of the oil-cells liberates the essence therein contained. The sponge, when saturated with the essence, is squeezed into an earthenware vessel the operative holds in his lap. He is expected to press the peel so thoroughly as not to overlook a single cell. This is ascertained by holding the pressed peel to the flame of a candle; should it neither crackle nor diminish the brilliancy of the flame the cells are empty. This process yields besides the essence a small quantity of juice and feccia (dregs). The separation of the essence, juice, and feccia soon takes place if the vessels are not disturbed; the oil floats on the juice and the dregs fall to the bottom. These three products derived from the peel have no affinity with each other. As the essence rises to the surface it is skimmed off, bottled, and left to settle for a few days. It is then drawn off with a glass syphon into copper cans which are hermetically sealed. After the essence has been expressed a small quantity of juice is pressed from the peels, which are then either fed to oxen or goats or thrown on the manure pile and well rotted, or they would make too heating a fertilizer.

The yield of essence is very variable. This industry is carried on five months in the year. Immature fruit contains the most oil. From November to April, in the province of Messina, one thousand lemons yield about 14 ounces of essence and 17 gallons of juice. An operative expresses three baskets of lemon peel (weighing 190 pounds) a day, and is paid 20 cents a basket. The essence is so valuable that the operatives are closely watched; they are most ingenious in secreting it about their persons. Six men work up 8,000 lemons a day; two cut off the peel while four extract the essence, and obtain 136 gallons of lemon-juice and 7 pounds of essence. In the extraction of essence defective fruit—thorn-pricked fruit blown down by the wind or attacked by rust—is used. This fruit is sold by the "thousand," equivalent to 119 kilos or 260 pounds, and thus classified: First, mixed lemons, as they come from the groves during December and January, of good quality but not always marketable, often from top branches; second, lemons from March blooms; third, lemons refused at the packing-houses; fourth, dropped fruit; fifth, shriveled or deformed fruit.

Prices do not depend exclusively upon the classification of the fruit; the locality where it was grown is taken into consideration as well. Lemons grown on clay soil yield more essence and juice than those grown on sandy or rocky soil.

Dealers sometimes adulterate their essence with fixed oils, alcohol, or turpentine. Adulteration by fixed oils is detected by pouring a few drops of essence on a sheet of paper and heating it. Upon the evaporation of the essence a greasy spot will remain. Alcohol is detected by pouring a few drops of the essence into a glass tube in which a small quantity of chloride of lime has been dissolved. The tube is then heated and well shaken, and its contents being allowed to settle the essence will float in the denser liquid. To detect turpentine pour a few drops of essence on writing-paper and a strong smell of turpentine will remain after the essence has evaporated. The essence of sour orange, mixed with the essence of lemon, produces an aroma similar to that of the essences of bergamot; the latter is much used by confectioners in flavoring ice-creams, etc.

Equal parts of lemon essence and spirits of turpentine, well mixed (mixture known as *essenza vestrincutale*), remove stains from linen and silk fabrics.

In a bergamot essence establishment at Reggio, on the main-land, is to be seen in operation a hand machine for extracting essential oil. The skin of the unpeeled bergamot is punctured by a system of revolving knives and then gently pressed. It should be borne in mind that the bergamot is spherical in shape, and this machine could not be used on the lemon on account of its shape. A thermo-pneumatic essence extractor, worked by steam-power, has also been invented, but the old system is still in general use in Sicily on account of abundant and cheap labor. The method employed for the extraction of essential oil from the lemon (as given above) applies as well to the sweet and sour orange, to the bergamot, and to the mandarin. But a very small quantity of essence of mandarin is made, and but slight attention is paid to the extracting of essence from the orange flower. The essence extracted from the flower of the bergamot is called *neroli*, and is worth $35 per pound.

Table B shows the total quantity and value of essences exported from Messina for the last eighteen years—1870 to 1887.

Table C shows the value of the essences exported from Messina to the United States for the last ten years—1878 to 1887.

Table D shows the mean annual price per kilogram at Messina of the essence of bergamot, lemon, and orange for the years 1870 to 1886.

RAW AND CONCENTRATED LEMON-JUICE.

When lemons have been peeled and cut in two, as above stated, they are carried to the press and thrown into large wicker bags, circular in form, made of bulrushes, and are pressed in these bags. If the juice

is to be exported raw only perfectly sound lemons can be used; but if the juice is to be boiled down, one-fifth of the lemons may be of an inferior quality and two-fifths of them pretty well decayed. The juice from sound lemons is yellowish in color, and gives a pleasant aroma; its density decreases with age. With all classes of lemons the yield of juice and its acidity varies considerably from month to month. The amount of juice increases from October to April, its acidity and density decrease, and the same is the case with the density of the essence, owing to the winter rains.

The manufacturing of essential oil and lemon-juice is quite lucrative, but manufacturers, to avoid being taxed on their business, are reticent as to their profits.

An addition of 5 per cent. of alcohol will prevent raw lemon-juice from spoiling. Lemon-juice is adulterated with salt or tartaric acid. Raw and concentrated lemon-juice is exported in casks of 130 gallons capacity. It requires 1,500 lemons to yield 26 gallons (1 hectoliter) of raw juice, while it takes 2,500 to yield the same quantity of concentrated juice, and 200,000, more or less, according to their acidity, to give a cask. Experience has shown that the lemons of the Province of Messina, especially from the eastern shore, contain more acidity than the lemons grown elsewhere in Sicily.

The value of lemon-juice is governed by its acidity. The rule is that concentrated lemon juice shall show 60 degrees of acidity (the juice extracted from the bergamot or the sour orange must show 48 degrees, or one-fifth less than that derived from the lemon; it also sells for one-fifth less than lemon-juice). Formerly a sitrometer, known as Rouchetti's gauge, was used to ascertain the per cent. of acidity; now, however, resort is had to chemical analysis, which is more satisfactory both to seller and buyer.* Lemon-juice is used in the printing of calicoes.

Table E shows the mean annual price of concentrated lemon-juice per cask of 130 gallons, and of raw lemon-juice per hectoliter of 26 gallons, from 1870 to 1886.

Table F shows the export of lemon-juice from Messina from December, 1884, to December, 1887.

Of late years a new article, known as vacuum-pan concentrated natural juice of the lemon, has been manufactured here. The juice concentrated by this method contains 600 grains of crystallizable citric acid for every quart. It is exported in casks containing 112 gallons, in half and quarter casks. It is also shipped in bottles of 500, 300, and 150 grains each. This concentrated juice is as limpid as first-quality oil.

There is an establishment here, probably the only one of its kind in Italy, that prepares crystallized citric acid. It takes from three hundred and forty to three hundred and eighty lemons to make a pound of citric acid, which sells at about 43 cents.

* The last two paragraphs are quoted from my report accompanying dispatch 51, dated April 20, 1888.

FRUIT IN BRINE.

Large quantities of sound but unmarketable lemons and sour oranges are packed in brine. The remarks referring to the shipment of citron in brine, contained in my report published in No. 61, Consular Reports, February, 1886, are equally applicable to the packing in brine of lemons and sour oranges.

A cask of sour oranges in brine is worth here about $10 at this time. Small lemons in brine are worth about $8 per cask, and good-sized ones about $12. While the custom-house keeps a record of the quantity of citron in brine that is annually exported, singularly enough it keeps no record of the large shipments of other fruits in brine. Fresh and salted fruits are included in the same figures.

WALLACE S. JONES,
Consul.

UNITED STATES CONSULATE,
Messina, January 8, 1889.

TABLE A.—*Mean annual prices at Messina per box of lemons and oranges for the years* 1870 *to* 1886, *inclusive.*

Years.	Lemons.	Oranges.	Years.	Lemons.	Oranges.
1870	$2.15	$1.86	1879	$1.93	$1.23
1871	2.25	1.62	1880	2.30	1.30
1872	2.48	1.71	1881	1.94	1.01
1873	2.95	1.41	1882	1.83	1.30
1874	3.26	1.70	1883	1.44	1.10
1875	3.08	1.53	1884	1.22	1.17
1876	2.33	1.36	1885	1.36	1.12
1877	2.19	1.19	1886	2.00	1.14
1878	2.43	1.07			

TABLE B.—*Quantity and value of essences exported from Messina to the whole world during the years* 1870 *to* 1887, *inclusive.*

Years.	Kilograms.	Value.	Years.	Kilograms.	Value.
1870	271,614	$1,310,900	1879	232,738	$806,310
1871	285,091	1,596,500	1880	222,216	1,257,826
1872	303,000	2,424,000	1881	345,923	1,793,675
1873	281,590	1,408,145	1882	367,668	1,387,428
1874	245,031	1,870,190	1883	288,366	1,280,392
1875	283,834	1,368,010	1884	215,910	960,004
1876	326,978	2,604,370	1885	231,427	982,894
1877	306,948	2,313,770	1886	295,036	566,313
1878	252,097	1,624,225	1887	200,000	600,000

TABLE C.—*Value of essences exported from Messina to the United States from* 1878 *to* 1887, *inclusive.*

Years.	Value.	Years.	Value.
1878	$165,345	1883	$231,900
1879	271,768	1884	249,680
1880	263,829	1885	137,375
1881	329,765	1886	211,071
1882	209,933	1887	259,111

TABLE D.—*Mean annual prices of essences at Messina for the years* 1870 *to* 1886, *inclusive.*

Years.	Bergamot.	Lemon.	Orange.	Years.	Bergamot.	Lemon.	Orange.
	Per kilo.	*Per kilo.*	*Per kilo.*		*Per kilo.*	*Per kilo.*	*Per kilo.*
1870	$6.10	$5.14	$2.55	1879	$5.10	$3.86	$3.04
1871	6.35	6.53	3.35	1880	5.52	5.23	4.32
1872	8.10	8.50	5.86	1881	4.10	4.23	3.47
1873	9.61	7.50	3.87	1882	4.22	4.66	3.88
1874	11.52	6.45	2.95	1883	3.59	2.73	2.47
1875	10.00	5.23	2.43	1884	2.78	1.77	1.05
1876	7.56	5.00	3.18	1885	2.51	1.70	1.80
1877	7.16	4.35	3.12	1886	2.00	1.75	1.87
1878	5.83	3.56	3.22				

TABLE E.—*Mean annual prices at Messina for concentrated lemon-juice and raw lemon-juice for the years* 1870 *to* 1886, *inclusive.*

Years.	Concentrated lemon-juice, per cask of 130 gallons.	Raw lemon-juice, per hectoliter of 26 gallons.	Years.	Concentrated lemon-juice, per cask of 130 gallons.	Raw lemon-juice, per hectoliter of 26 gallons.
1870	$133.40	$2.30	1879	$115.00	$1.98
1871	167.10	2.50	1880	161.00	3.00
1872	268.00	3.60	1881	159.50	2.53
1873	332.80	5.33	1882	124.43	2.53
1874	297.30	5.19	1883	101.50	.....
1875	213.33	4.10	1884	84.20	.....
1876	163.10	3.00	1885	98.15	.....
1877	158.15	2.63	1886	143.43	.....
1878	144.72	2.30			

TABLE F.—*Exports of lemon-juice from Messina to the following places during the years* 1885, 1886, *and* 1887.

Places.	Dec. 1, 1884, to Nov. 30, 1885.	Dec. 1, 1885, to Nov. 30, 1886.	Dec. 1, 1886, to Nov. 30, 1887.
	Pipes.	*Pipes.*	*Pipes.*
London	2,687	1,106	2,688
Liverpool	184	280	400
Moscow	8	2	3
United States	241	393	398
Marseilles	164	254	485
Genoa	5	12	14
Trieste	.....	.....	1
Hamburg	107	152	122
Russia	.....	.....	231
Other countries	44	154	96
Total	3,440	2,353	4,438

NAPLES.

REPORT BY CONSUL CAMPHAUSEN.

ORANGES AND LEMONS.

Varieties.—The names of best variety for profit are the Palermo oranges and Sorrento lemons. The other choice varieties worthy of culture and for profit are the Gargaño, Majori, Amalfi, and Sicilian oranges and lemons.

Location.—The trees are planted on rich soil, where the temperature

is not high, and where they are protected from cold winds. Distance from sea, 30 meters (97½ feet); elevation above sea-level, from 25 to 3,000 feet; southern exposure to sun, level land; clayish and damp soil is best.

Climatic influences—Minimum 0, maximum 18° centigrade. The nights are warm, days variable.

Rain-fall from December to February is very beneficial to all fruits, making them grow better, and improving also the growth of the tree The rain-fall in inches can not be ascertained, as there is no record kept by any person as far as I can ascertain. At some of the observatories records are perhaps kept but it is difficult to obtain information from them.

Irrigation.—Irrigating is practiced from May to September, and until the soil is soaked through; in summer every week.

Cultivation.—By stirring the ground every two years and frequently during the season. Fertilizers are not used.

Pruning.—In the month of April, about three feet from the ground, in the usual manner.

Picking.—As soon as they become yellow the oranges and lemons are picked, wrapped in thin paper, put in boxes, and shipped.

Planting and propagating.—The trees are planted 15 feet apart, and propagated by graftings and planting the seeds.

The best varieties are from seedlings—wild oranges grafted into sweet oranges and lemons. Most of the orchards are large.

Maturity.—At the age of four years they begin to bear. The largest crops are obtained when the tree is twenty years old. They mature at from fifty to one hundred years.

Insect pests.—The louse; no remedy has been found or discovered to destroy it. There are no beneficial insects.

EDWARD CAMPHAUSEN,
Consul.

UNITED STATES CONSULATE,
Naples, January 31, 1890.

PALERMO.

REPORT BY CONSUL CARROLL.

Varieties.—The following are the best varieties cultivated in Sicily, viz: *Citrus bigaradia macrocarpa*, Riss; *Citrus bigaradia coronata*, Riss; *Citrus bigaradia glaberrima*, Riss; *Citrus medica glabra*, Riss; *Citrus medica florentina*, Riss; *Citrus bergamia* (variety *Vulgaris*), Riss; *Citrus bergamia* (variety *Mellarosa*), Riss; *Citrus aurantium piriforme*, Riss; *Citrus aurantium precox*, Riss; *Citrus deliciosa*, Ten.; *Citrus limonum fusiforme*, Riss; *Citrus limonum oblongum*, Riss; *Citrus limonum calabricum*, Riss.

The following varieties are also cultivated, each having its special merits, viz:

	Varieties.
Citrus bigaradia	21
Citrus limetta	7
Citrus lumia	1
Citrus medica	8
Citrus bergamia	2
Citrus aurantium	22
Citrus deliciosa	1
Citrus limonum	19

PLANTING AND PROPAGATING.

Orange trees are planted 5 meters apart, and lemon trees from 5 to 6 apart, depending on circumstances.

The old lemon and orange gardens in this vicinage are generally either the result of certain succulent slips, which were cut from the trees and buried or planted two-thirds of their length in moist friable ground, or curving or bending a live branch, without detaching it from the tree, and inserting it to a depth of about 30 centimeters in rich, soft friable soil. At the end of about two years, or when sufficient roots sprouted from the branch thus bended in order to enable it to live without the mother tree, the branch in question was detached therefrom and allowed to proceed, in growth, on its own account.

This method of propagation has become almost extinct. There are certain cases, however, in which it is still resorted to because of the rapidity with which the trees develop and which make it preferable to any other, as well as on account of the abundance of the yield of trees thus propagated. But the fact that such trees are susceptible of attack by male della gomma and readily destroyed thereby in a few years, has convinced even the most steadfast adherent of the method that it should be abandoned and a resort had to propagation through the several varieties of melangoli seed, called here aranci amari (*Citrus bigaradia*) and the trees thus derived grafted with the various varieties, as they resist the malady in question with much more vigor. In fact, the orange and lemon trees of Palermo, which are generally obtained by the seed of the melangoli, have resisted the male della gomma much better than those of Messina which were formed from plants derived from lemon branches. The best varieties are budded.

The orchards in Sicily are very large and are, in view of the great profit ensuing therefrom, increasing rapidly.

Fructification.—They fructify at the age of three years, the yield being largest thereafter, from year to year, up to the twentieth, when they are becoming old and subject to all diseases. At this period they are denuded of their branches and a new graft resorted to.

Insect pests.—The most troublesome insect, and that which injures the orange and lemon trees most, is called *Coccus hesperidum lin* or *Coccus citry.*

The facility with which this insect propagates itself, and the rapid increase consequent thereon, result, in a comparatively short time, in the death or serious injury to the trees. The mode of attack of this insect is by eating a hole in the tree from which soon exudes a profuse flow of juice, resulting in death or serious injury thereof, as stated.

The *coccus citry* lodges in trees having thick leaves, and especially in those shaded by larger trees or plants. In this contingency pruning is resorted to, with a view of letting in light, and thus causes the insect to seek another refuge or die. No specific is known to combat this insect, but the usual mode of relief therefrom is by washing the trees with lime water.

Other very injurious insects abound such as the *Kermes coccineus*, *Kermes hesperidum*, *Kermes aurantii*, *Lecanium hesperidum*, and *Pidocchio*, which prefer the orange to the lemon trees. These, too, are destroyed by lime water, solutions of copper, sulphate thereof, etc., petroleum, snuff, etc.

Beneficial insects.—Terrestrial formicas or ants destroy other destructive insects and their eggs, but in their absence they gnaw the tender branches and leaves, thus causing them to atrophy. Therefore all efforts are made to destroy the ants as in the case of other insects, hoeing the ground in winter being resorted to as a means to that end, thus exposing them to inclement and cold weather, death generally ensuing as a consequence.

Parasites.—The litchens, which attach themselves to old trees, those attached by male della gomma. Shady and moist places favor the development of litchens. Sea water is used as a wash to get rid of this parasite.

The fumagine evoluting from the agglomeration of microscopic plants, technically called capnodium or *Fumago citry.* The fumagine attacks all varieties of oranges and lemons and causes grave damage. The trees attacked suffer greatly, the yield thereof being very small. The fumagine attacks the trunks, branches, leaves, and fruit. Only the epidermis or outsite of the fruit is attacked. This parasite is destroyed by means of pruning and manuring in January.

LEMON AND ORANGE GROVES.

The trees that produce the varieties named at the beginning of this report are grown in Sicily.

Distance from sea.—There is no fixed distance from sea for planting orange and lemon trees. There are many orange and lemon gardens in the vicinity of Palermo, bordering on the sea, some of which prosper better than those situated more inland. This, however, obtains only when the gardeners are skilled men and give particular attention to the ground and adopt proper means with a view of protecting the trees from strong sea-winds.

Elevation above sea-level.—It is impracticable to determine with accuracy the elevation at which orange and lemon trees can be cultivated, the latitude and certain special conditions influencing this. In Sicily, for instance, oranges and lemons are profitably cultivated along the sea-coasts at an altitude of from 100 to 500 meters above sea-level, and often much better crops are obtained where the elevation is from 500 to 1,000 meters.

Exposure to sun.—It is of great advantage when the gardens have a southern exposure, or when the sun beams down upon them from sunrise to sunset. This exposure is recommended by gardeners here.

Position of orchards.—Orange and lemon trees are indifferently planted in the vicinity of Palermo, in hilly, rolling, or level land. The nature of the soil, climate, exposure to sun, attention to the soil, trees, etc., seem to be the principal requisites; elevation, all other things favorable, having little or no influence, save as to quality. Fruits produced on hilly land are more appreciated, and generally command higher prices than those produced on rolling or level land. There are exceptions to this, however. In Palermo, for instance, fruits produced on certain level lands command as high prices as those produced on hilly land; with this exception, however, the land best adapted to the cultivation of oranges and lemons is generally hilly. In fact, the fruit-dealers mark their fruits with an "M," which signifies "Montagna" or "Mountain," which enhances their price, as seen from the following comparison, viz:

Fruits produced on hilly land, 25, 50 lire per thousand; on rolling land, 21, 27 lire per thousand; on level land, 17 lire per thousand.

Soil.—Considerable attention has been given of late years to the character of the soil, subsoil, etc., best adapted to the cultivation of the fruits in question, as well as to the chemical composition of oranges and lemons which has resulted in the belief that calcareous land, containing certain other material necessary to the life of all vegetation, is the best, in order that they may contain the requisite amount of lime, potassa, soda, etc. The soil best adapted to the cultivation of oranges and lemons is at least one meter in depth and devoid of rocks, and accessible to water for irrigation, else the trees die.

Deep, clay land, open and exposed to the rays of the sun, accessible to water, abounding with alkaline salts, minus rocks or stones, little or no grass, not exposed to strong winds, rains, or frosts, etc., is deemed to present the best advantages in all respects.

CLIMATIC INFLUENCES.

Temperature.—The temperature in the adjacent territory of Palermo, in summer, does not ordinarily exceed 35° centigrade, and rarely falls lower than 20°, and in winter the maximum is 23°, and the minimum 10°. Consequently, the average summer temperature is 27½° and that of winter 16½°, the average annual temperature being 22°.

Neither cold nor warm nights, in the territory conterminous to Palermo, seem to wield an influence upon the result of the cultivation of oranges and lemons therein. Sultry days, although frequent in summer, and occasional warm or cold spells, appear to exert no detrimental influence upon either lemons or oranges. For instance, the fruits in question flourish quite well where the thermometer does not fall below +3° centigrade, in winter, nor rise above 34° in summer. It has been observed in Palermo on various occasions that the orange and lemon trees resist a summer sultry temperature of 40° centigrade, and that of — 2° in winter without any apparent detriment, while many other plants or trees were destroyed or damaged.

The atmosphere in and conterminous to Palermo in winter is almost invariably humid or moist, while the climate is mild. In summer the atmosphere is very warm with little moisture, save immediately on the sea-coast, the *scirocco* which often obtains making life of all kinds perilous. During this period irrigation is lavishly resorted to in order to keep the trees alive and preserve the fruit.

Rain-fall.—The conditions of temperature and climate in Sicily are exceptional, compared with other parts of southern Italy. The strong, constant winds which prevail in winter condense and accumulate the vapors, over which they traverse, into a small compass, and as a result the rain-fall is often so copious as to inundate entire localities. Rain commences about the latter part of September and ends in April, 22 inches falling within the interim named.

When rain falls in large quantities the trees are damaged; but in small quantities it is advantageous to them.

Irrigation.—The cultivation of oranges and lemons, in Sicily, generally can not be undertaken, unless the trees are irrigated from spring to autumn, or when the land is not adjacent to springs, the drippings from which serve therefor, or when springs do not exist in the subsoil, the filtration of which sufficing to maintain the ground in a moist state during summer. The custom of opening canals parallel to the rows of orange and lemon trees into which water, accumulated in an elevated reservoir, is allowed to flow, thence into and between the openings or small depressions between the rows of trees, until the ground is thoroughly saturated, the more remote points from the source of the water being irrigated first, until finally the irrigation water and its source coalesce or meet, obtains here.

In the best conducted orange and lemon gardens in the vicinity of Palermo, irrigation is resorted to every eight days during the first year of the growth of the trees; every twelve days during the second and third years; every fifteen days during the years from the fourth to the eighth, inclusive, and from the eighth year forward invariably every twenty-two days.

Orange and lemon gardens require, on an average, 350 cubic meters of water for each irrigation to the space of one hectare of land in good condition.

Great attention is necessary as to the amount of water required. If too much is used the trees are subject to a disease called "male della gomma;" literally translated, "gum disease." If too little, development is delayed and even their death may ensue.

Cultivation.—April and May are the best months in which to cultivate orange and lemon trees, the inclement weather having terminated, thus insuring the safety of the buds.

Oranges and lemons are cultivated from the dry seed, which costs lire 1.80 per kilogram, or from fresh plants containing the seed, the latter requiring more attention than the former.

Planting or sowing, as the case may be, commences in April, as stated, or later, in order to avoid white frosts, the ground being previously prepared.

Trees resulting from dry seed are generally good and strong, and attain a height of at least 1 meter, before being grafted with a view of propagating the various varieties desired.

The gardeners of the Province of Palermo recommend that a distance of about 5 meters should intervene between each orange tree when the ground is level, and about 4 meters in undulating, rolling, or declivitous land. Lemon trees are recommended to be from 5 to 6 meters apart when large trees are expected, or desired, as is the case with all trees derived from "cedrangoli amari," (*Citrus bigaradia*, Riss.)

The best means of planting trees is in placing them in parallel lines from north to south, in order that they may be equally exposed to the sun's rays throughout the entire day, and so placed as to form a series of equilateral triangles, with a tree on each angle, as per drawing herewith. To this method of planting the name Losanga has been given.

It is customary during the early stages of the growth of lemon and orange trees to alternate them with other plants, such as vines, cotton, etc., in order to give them strength and nutrition, as well as to utilize the necessarily large vacant spaces of ground.

At the expiration of ten years, however, or when the orange and lemon trees have become so large and tall as to obscure the plants in question with their branches, etc., they are taken up and utilized in a new field.

Fertilizers.—Alkaline substances are better adapted than any other materials for fertilizing. Gardeners in the vicinity of Palermo formerly used sea-weed, mixed with the excrements of horses and cows or stable accumulations.

Fragments of dressed leather, woolen rags, scrapings from horns, and certain other remains of old or cast-off manufactures, as well as decayed fruits, are regarded as the best admixtures of fertilizers for oranges and lemons. The materials or substances in question are stratified in proper places with a view to their fermentation before being used.

When trees are planted they are abundantly manured, and after one

year the ground around them is cleared away to a depth of 40 centimeters, forming a circular ditch with a diameter of two meters into which two baskets of manure, or about 20 kilograms, are deposited, whereupon the ditch is covered with the earth previously removed, placing it so as to form a shallow ditch around the tree. This operation is resorted to in January and February. Small trees are manured twice a year, for the first five years, viz, in March and August.

Ordinarily, however, when trees prosper, manuring is resorted to only every three years, the quantity used being about 40 kilograms to each tree.

Pruning.—The first pruning is made after the expiration of the third year. The height from the ground depends on the quality of the land in which the trees are planted, as well as the desire for either high or low trees. When the land is exposed to northern and southern winds it is better that the trees should be low, but inversely should this exposure not obtain.

In Palermo, as in all Sicily, the orange and lemon gardens are pruned from December to June, while the trees are devoid of fruit, the process being governed by the gardeners' interests and experience rather than by any theoretical suggestions.

Gardeners take care to clip or clean the trees yearly, cutting off all old and useless branches. Pruning is resorted to every three years.

PICKING AND CURING.*

Oranges are picked from November to March, and lemons from November to August. The first picking is generally made in November, the second in December or January, and the third in March or April. During the summer months, however, such as are verging on maturity are picked from time to time.

Oranges and lemons for export are picked prior to maturity, and thus shipped to ripen on the voyage.

Oranges and lemons for export are not cured, but simply selected with a view to bearing the long voyage. Those not shipped, and for which a sale is not readily found in the markets of Palermo, are preserved from March to August, in well ventilated caves or grottoes, to be sold to ice-cream dealers for the purpose of making ice-cream, jellies, lemonade, etc.

* In a subsequent dispatch Consul Carroll says that, "in connection with preserving oranges and lemons after being taken from the trees, it may be proper to say that this consulate is often applied to for information as to the supposed or alleged means resorted to here for that purpose by California and Florida fruit growers, and to repeat, for the information of fruit growers in the United States, that there is no process resorted to nor known here to preserve the fruits in question other than folding them in fine tissue-paper, which is changed from time to time, and the fruit examined and all contaminated oranges and lemons eliminated from the baskets or boxes in which, for the time being, the fruit may be placed. Precaution is also taken to place or keep the fruit in question in a dry equable temperature.

"Oranges and lemons are generally picked before maturity."

PACKING AND SHIPPING.

When oranges and lemons are picked they are carefully selected and wrapped in tissue-paper, packed in open boxes, and placed in the warehouse. Again, before shipping, they are carefully selected, newly wrapped, and packed.

Generally speaking lemons can be divided into two categories, viz, normal lemons and abnormal or anomalous lemons. The normal are those that bloom in the months of April and May, and the abnormal or anomalous those derived from the blossoms of February, March, June, July, and other successive months, and which depend on waterfalls, to a more or less degree, during warm weather, for irrigation.

The normal lemons arrive at maturity in about nine months—that is, from May to January, inclusive—the picking thereof being commonly made in three successive periods, viz, from November onward. The lemons picked in the first period are green, and those picked in the third period more mature. They are picked according to the requirements of the purchasers. The first and third pickings are more valuable than those of the second, consequent upon fruits being more abundant during the latter period.

The fruit under consideration is believed to be the best, and by gardeners is classified as first-class fruit and sold at very high prices.

The fruit picked at other times is called anomalous.

Lemons are picked by men who, if the trees are too high to permit their doing so from the ground, climb up and detach them, taking care to leave a piece of stem, placing them in baskets lined with linen, on the handle of which is a wooden hook tied in order that the baskets may be hung on the branches. So soon as a basket is full it is lowered from the tree by means of a rope, provided with a knot, and exchanged for an empty one by a boy known as "panieraio," or, literally, "basket-maker," whose duty it is also to empty the baskets in the place designated by the "taglia piedi" (peduncle cutter). This is an expert workman in his line, who performs two offices at the same time, viz, cuts the peduncle of the lemons close to the crown, and afterwards separates the good from the bad lemons, depositing them in two separate heaps. Small lemons, although they may seem to be good, if of less weight than 80 grammes are, as a rule, not exported.

It is estimated that out of the total lemon crop about two-thirds are considered fit for export, the remaining third being utilized in the manufacture of acid, essences, etc.

The "taglia piedi" (peduncle cutter) places the lemons on a straw bed, in order to protect them, during the voyage, from damage.

When lemons are classified, girls place them in baskets lined with linen. Each girl places in her basket 208 lemons, 4 lemons at a time, thus making 52 operations or movements, and when completed places the baskets on her head and conveys it to the warehouse.

In the warehouse good lemons are placed in flat lots 1.30 meters high, where they are allowed to remain from five to eight days, in order to determine their strength, at the end of which any decayed or damaged lemons which may be found are picked out. This is not, however, general, especially when the producer of the fruit is not the shipper and has no interest in the shipment thereof. It is only done in cases where the shipper has purchased the fruit or the producer ships it on his own account.

In the warehouse, near the gardens, the lemons are wrapped with tissue-paper, placed in boxes, the interior of which is lined with paper of the same kind. The boxes so prepared are carried into the city warehouse, where the lemons are taken out of the boxes and a new assortment made, and in order to ship them the above operation is repeated.

Should the boxes not be promptly shipped for any cause, and remain in the warehouse some time, then it is in the interest of the person on whose account the fruit is to be shipped to assort them, in order to ascertain if there are any damaged fruits among them.

The fruit is shipped in boxes of the following dimensions, viz:

	Centimeters.
Breadth	29
Height	42
Length	81

The number of lemons which each box contains depends on their size, and in order to be exact the fruit is divided into four categories, as follows, viz: 200 if of the first category, 240 if of the second category, 360 if of the third category, 420 if of the fourth category.

Boxes are divided into two compartments, each containing half the number stated above, placed as follows, viz:

First category, in 4 strata, 25 per stratum; second category, in 4 strata, 30 per stratum; third category, in 5 strata, 36 per stratum; fourth category, in 5 strata, 42 per stratum.

PHILIP CARROLL,
Consul.

UNITED STATES CONSULATE,
Palermo, March 7, 1890.

SICILY.

REPORT BY CONSUL LAMANTIA, OF CATANIA.

Varieties.—The names of the best varieties of oranges for profit are: The common orange (a round fruit); the calabrese (a long-keeping fruit); the sanguigno (a blood-red orange); the oval (a late, sweet, and good keeping); the mandarino (mandarine, the largest one).

The names of the best varieties of lemons for profit are: *Il limone comune* (common lemon for trade); *Il bergamotto* (for making essences); *Il cedro vero* (citrus medica, for preserving).

Situation.—The same are located in low and high land, as well as all around Mount Ætna, at a distance from 300 to 600 meters from sea, at an elevation from 500 to 600 meters above sea-level, exposed to sun, on level lands, because it is better, and on rich calcareous soil.

Climate influence.—The minimum temperature in January is 5° Centigrade; the maximum is 35° Centigrade in August, and the average 17° in May.

Nights in summer are rather fresh, and cool in winter. Days generally clear, seldom moist, and good atmosphere.

Rain-fall from 25 to 30 inches per year, and rain in proper season helps the growth and the fruits greatly.

Irrigation.—Irrigation is done by spring and stream water, and by well-water elevated by steam or horse power.

The groves with said water are generally irrigated at option, and whenever needed, as lemon trees bear all the year.

Cultivation.—The following information I have been able to gather by personal visits to the owners of the beautiful large groves of orange and lemon trees, the production of which forms one of the principal resources of the country, viz: When it is wished to plant a new lemon grove, the gardener from November to April prepares in the best spot of his garden a well-manured seed-plot of 2 square meters, whereon he sows a quarter of a gallon bitter-orange seed, and covers the same with about 2 inches of fine earth. Two months later you see the young plants out of the ground, and on the coming summer the seed-plot is to be watered at least every four days. After one year the young plants are at a height of 18 inches, and then the gardener prepares a larger seed-plot to plant the same, at a distance of 18 inches apart, where they are left till another year. The new ground is hoed about 2½ feet deep, and divided in square compartments of 1½ feet each side, in the corners of which are located the largest seedlings taken out from the seedling bed, leaving there the smallest ones, to be replanted later on.

This method of planting is called by these gardeners *mettere a casella* (planting in cell). There they are kept for the second year, with good care, the stems being fastened to sticks driven in the ground along-side, in order to grow straight and to protect them from the wind.

On the third year the seedlings are already grown sufficiently to be replanted in another larger place, in order to give them more room. Consequently half the largest ones are again dug up and planted in another prepared bed.

This second method is called planting in *piantonaio*. Here the plants are left until the fourth year. In January or February of the fifth year the grower divides all his ground, already prepared during the previous fall, in square compartments of 14 feet long each side, and in the cor-

ners of each one he digs out round ditches, with some well-manured animal compost, mixed with the earth. It is proper, however, to note that the young trees are always to be kept free from sprouts, and watered and manured diligently. This operation is done as follows:

Every fifteen days the ground is removed from the bottom, and the grower around the tree forms two circles, one of a foot and the other of two feet in diameter. Then he removes the ground from the base of the tree about 5 inches deep and fills it with manure, covered with the same ground. This operation is also recommended for large old trees.

In the fifth year the said trees of bitter-orange seedlings are grafted into lemons, or oranges if desired.

Fertilizing.—A lemon grove must at least be dug three times a year; that is, on the first of January, pretty deeply, and the ground manured, if possible, in all its extension; (2) in the month of April for forming the *conche* (compartments) and gutters for watering in the hot summer; (3) in the middle of June, for weeding. In the fifth year, the young bitter orange trees will be grafted.

Grafting.—Although no inquiry is made about grafting, yet I may give some details of the methods used in Sicily. Grafting is done in *becco di flauto* (beak of flute), by *spacco* (splits), or by *scudo* (shield). This last one is generally practiced in this island, and the proper season is in the month of October or May. The first method is called "*ad occhio dormente*" (sleeping eye), because it is necessary to await the coming spring season to see whether the grafting has turned out well. The second is practiced by smarter agriculturists, and is called *occhio vivente* (living eye), for the reason that should it fail, in the coming fall it is operated again. The shoots are to be chosen from the best and most vigorous adult trees, and so at the end of the seventh year you will have a good producing young lemon grove, fruiting all the year around.

A fifteen-year old tree generally produces 500 lemons, while at twenty it yields over 1,000. Professor Cassella states that he has seen several very large old trees producing as many as 10,000 fruits per year.

Pruning.—Pruning is done according to the growth of the tree. The method used in Sicily is *a tronco rovesciato* (capsized cone.) This form is practiced from the time the tree is young by cutting the main trunk, and letting the lateral branches grow, in order to have free ventilation and free sunlight, and to effect the fruits to maturity.

The height of the trees varies according to locality and usage of the country. In Messina, for instance, they are left pretty high, while in this province they are kept low, on account of strong winds, which sometimes prevail around Mount Etna.

Picking.—The regular season for picking lemons in this district commences from October in low lands, and in November on high lands, up to the end of January. That is called *il primo taglio* (first cut), and the

fruits are considered as the best for quality and long-keeping. The second cut, larger than the first one, begins in March and lasts until the end of April, and the last one, or third cut, known as *verdelli*, from May to the end of September. Finally lemons bear all the year around.

Orange picking commences in low land in November, and on the *montagna* (mountain) from January to April. These are the best fruits, and durable, fit for packing and shipment. The same are always picked a little greenish, and not in full maturity; but they acquire their natural bright color after they are wrapped in tissue paper and boxed for shipping.

Before shipment, however, they are chosen into four different sorts; that is, first and second choice the fruits are thoroughly examined to be entirely free from thorn touch or any disease, and they are shipped for farthest markets. The third choice are sent to near markets, and with the fourth one is made essence and *agro cotto*.

The fruit is gathered with care, the stem is cut with a very sharp round-bladed knife, and left to the eye to prevent decay.

Planting and propagation.—The distance planted apart must not be more than 16 feet, for the reason that if trees are allowed to grow too large they can not stand to support the lateral branches overloaded with fruit, besides preventing free ventilation, without which disease is generated.

As before stated, trees are propagated by seedlings and grafting. The best varieties are of course obtained from seedlings, and then grafted to the desired kind.

The orchards are pretty large in some localities and small in others.

Maturity.—The age of fruiting is at 8 years, giving the largest crop at 20; the maturity of trees is from 70 to 100 years, and according to the soil, exposure, locality, and culture of same.

Insect pests.—The insects damaging this beautiful plant are: *Il pidocchio del limone* (lemon louse) and *Il pidocchio dell'arancio* (orange louse).

The first one is an insect of a whitish color, which attacks both leaves and fruits. It made its first appearance in Sicily in 1862, and notwithstanding the several efforts to destroy it, nothing has as yet been accomplished to succeed.

The second, *pidocchio* (louse) of orange, is another insect of a dark brown color, and a very injurious one to both orange and lemon, by infesting the tree bark, leaves, and fruits.

Another insect, supposed to be the *cossus aurantii* and a *crittogama*, called *nero degli agrumi* (black disease) first of a whitish color and then black. Both of them attack, also, the bark and branches of the tree, propagating on the leaves, blossoms, and fruits, causing the former to stiffen, turn yellow and dry, while the latter grow very little, turning black, and never acquire the natural color of the ripe fruits.

If the parasite develops early in the season the plant will thoroughly

be covered with the disease, the fruit stops growing, gets black, and falls. It is said that petroleum sprinkled on the trunk and on the branches has proved somewhat of a remedy.

The *mosca* (fly) is another pest damaging both kinds of fruit. It generally appears in the beginning of summer, stinging the fruits and depositing therein its eggs, which develop into grubs which destroy the fruit.

The gum disease.—Besides those insects, there is also *il male della gomma* (gum disease), which greatly injures the whole tree, if not prevented in time. It makes its first appearance with a small spot on the trunk gradually enlarging to about one inch wide, and, in the course of four days, causes a crack on the bark, wherefrom a white yellowish liquid, like milk, drops out. Said liquid becomes thick and thicker like small gum drops, and in a few days later they look like transparent yellow pearls.

According to Professor Cassella's experiments in his grove, where he has saved a great number of trees, to destroy and preserve orchards from such a disease, it seems the following methods are highly recommendable, viz:

(1). When a plant has been attacked, all the infested parts of the bark and wood are to be cut out and care taken to destroy all the tissues affected by the disease, then take some quicklime, and while it is still warm rub all the wound and especially the parts mostly infected. This done, cover the same to about one-third of an inch thick with the same lime, *but cold*, and cover the whole with paper or something else. Two months later take everything off and you will find the wood without any alteration.

(2) To preserve the tree from the disease, mix 9 parts of lime and 1 part of ashes, and dissolve the same like whitewash. Then dig a ditch around the tree, about 3 feet in diameter, by unearthing the largest roots of the tree, and pour into the ditch about 30 or 40 liters (7½ or 10 gallons) of the compost stuff, and with such a proportion for large, adult trees, treat the others according to age and size. In conclusion, to avoid such disease, for new groves, bitter-orange seed is recommended for planting, and then grafting at pleasure, as above stated.

Replanting.—On replanting young trees for final stay, as per experience had by several orange and lemon growers in this district, I understand that one of the most interesting points is the secret that when said planting is to be done, it is necessary to cut the end piece off the main root, about 3 inches long, for the reason that, if left on, it would draw all the humor from the ground, and would also prolong the growth and the trees to bear fruits. I may here give the total production of this fruit in the whole Kingdom of Italy. Out of the twelve agrarian regions into which Italy is divided, only in two of them the acid fruit tree is not cultivated, that is, in Piedmont, Emilia, and a part of Lazio.

According to a statistical report in 1880, by Professor Cassella, it seems that the total production of said fruit amounted to as follows, viz:

Regione meridionale Adriatica	85,000,000
Regione meridionale Mediterranea	725,000,000
Regione meridionale Sicilia	1,622,000,000
Total fruits	2,432,000,000

VINCENT LAMANTIA,
Consul.

UNITED STATES CONSULATE,
Catania, January 22, 1890.

SICILY.

REPORT BY CONSUL JONES OF MESSINA.

KEEPING QUALITY OF SICILY LEMONS.

Properly speaking, no process for curing lemons is employed by the fruit-growers of Messina. That lemons grown in the Messina district keep perfectly for months before being put on the market is due to the great care in gathering, handling, and packing the fruit; to their keeping qualities derived from the nature of soil on which they are grown, climate, and variety cultivated.

First. The lemons are gathered with great care, the peduncle being cut (not broken) off smoothly near to the lemon. The fruit is carried to the warehouse in baskets lined with cloth, where it is spread out on the floor (if of wood) or on large mats (if the floor be of stone) and allowed to dry from twenty-four to forty-eight hours—even longer if there is sufficient room in warehouse—but never more than six days. If lemons piled, say, 4 feet deep are left for any length of time, the first layers become greatly heated, and soon spoil. The fruit, having been carefully selected, is next wrapped in tissue-paper and packed in boxes. Upon reaching the city warehouses the exporters, before shipping, have the boxes re-inspected; the least defect in the fruit causes its rejection. When packed for the last time, prior to shipping, care is taken to pack each lemon with its nose down. If the boxes are kept any length of time in warehouses, they are opened every three weeks and each lemon carefully examined. A lemon with a blemish, so slight as to be noticeable but to an expert, is thrown out as unfit for exportation. Lemon-juice and essence are extracted from these rejected lemons. The fruit contained in each box must be of the same size; an easy matter, owing to the monthly harvestings. Sizers are unknown here.

Lemons are gathered from October to August; they should not weigh less than 80 grams each or average more than from 2½ to 3 inches in diameter when gathered.

There are three harvests of the true lemon—the November cut, the December–January cut, the April–May cut. The true lemon is produced from the April–May bloom; the bastard lemon, from the irregular bloom of February, March, June, and July. The true lemon requires nine months to attain maturity. The true lemon keeps much better than the bastard. Lemons gathered in November are of a deep green color; after remaining in boxes from six weeks to two months they turn light yellow. Lemons cut and packed in November show 300 to the box; the same lemons (having shrunk) when repacked in January show 360 to the box; later shrinkage is scarcely noticeable. The November-cut lemon keeps better than that of any other cut; shipments of this lemon are frequently made as late as May to New York. Lemons gathered in January are of a bright yellow color and are not kept more than a month in the warehouses here before shipment.

Second. The soils best adapted to the lemon are the argillo-calcareous and the calcareo-argillaceous. Sandy soil is not well adopted to lemon culture, as it is too thirsty, etc. The lemon requires an equable climate to produce perfect fruit; in this district climatic influences are seldom injurious to the fruit. The lemon does best on hill-sides, facing south. It thrives at from one-fourth to two miles from the sea-shore, and at an elevation of 1,500 feet.

Little or no chemical fertilizers are used in these groves, and stable manure but sparingly. Water is the great fertilizer on this island.

May not our fresh soils and chemical fertilizers affect the keeping qualities of California and Florida fruit?

WALLACE S. JONES,
Consul.

UNITED STATES CONSULATE,
Messina, May 30, 1890.

SICILY.

REPORT BY CONSUL WOODCOCK, OF CATANIA.

(Republished from Consular Report No. 41½.)

ORANGES AND LEMONS IN SICILY.

In answer to the circular of the Department relative to the culture of the orange, lemon, olive, fig, and raisin, I have the honor to report for my district as follows:

The Catania consular district comprises the southeast third of the island of Sicily and lies between 36° and 38° north latitude, and between 11° and 13° east (Greenwich) longitude.

The province of Catania takes in the volcano of Ætna and the rich zone of lava soil that surrounds it. The general trend of the land is from the sea-shore upward to the summit of this mountain, which rises

to an altitude of 10,872 feet, being over two miles high. The soil is composed of disintegrated lava, and is among the richest and most productive of the world. This inclined plane is habitable to within 9¼ miles of the crater, and is densely populated, the population being 1,424 to the square mile, exceeding that of any other part of Italy. The climate is semi-tropical, temperate, or frigid, in accordance with the altitude, the different zones being represented in the vegetable kingdom in the ascent from the sea to the top of Ætna.

The climate is here (Catania) in winter mild and salubrious. I have been here since the 1st of October last. Frost is seldom known in this lower altitude. We had none during the past winter, though the citizens called it a cold winter. I am forcibly impressed with the similarity of this climate to that of Southern California, having passed several months in that part of the State.

From the sea upward to an altitude of from 700 to 1,000 feet the landscape is beautified by groves of orange, lemon, fig, and olive trees, and vineyards of grape, all of luxuriant growth.

Oranges and lemons are here designated as "marina" (sea-coast), growing in the lower altitudes near the sea, and "montano" (of the mountain), growing in the higher altitudes. The "montano," or mountain fruit, is the choicest, and commands the best prices in the market, but the crop is not so sure, owing to the frost. The marina orchards bear more abundantly, and the crop is considered a certainty. Of the fruits there are two kinds, the oval and the round. The trees that bear the oval fruit are preferred. Those trees that blossom several times during the year are a specialty because of their producing fruit at different periods of the season.

Of oranges there are four varieties, the round and oval (as above mentioned) and the mandarin and bitter. Of these the oval is preferred for commerce, being more durable. The round is sweeter and larger. These two kinds are the fruit of export. The mandarin is a small orange of excellent flavor, but being more perishable than the other varieties, it is used more for home consumption than export.

The bitter orange is very hardy, and is adapted to this climate; it is grown for the purpose of propagating the other varieties by budding or grafting them upon its stock. Its fruit is used in the manufacture of preserves. The round orange begins to ripen in December, the oval in January.

Orange and lemon trees begin to bear full crops when they are from ten to fifteen years old. The time of full bearing depends much upon the climate (altitude), cultivation, and fertility of the soil. As to the length of time the trees will remain fruitful, I find a diversity of opinion. Some say that varieties of the orange and lemon budded upon the bitter orange stock will remain fruitful from one to two centuries; others say from forty to a hundred years. When not thus budded upon the bitter orange stock, but raised from the seed, the trees are short-lived. They

become diseased; a gummy substance exudes from them; a disease cankerous in nature attacks the wood and they soon die. The bitter orange tree will, without doubt, continue to bear fruit for two centuries. The budding process is generally in practice. Grafting is but little resorted to.

The process of starting an orange or lemon orchard is as follows:

(1) The seed of the bitter orange is planted. When the young plants are a year old they are transplanted. When they have grown to be about one inch in diameter (three or four years old) they are again transplanted and set in the place in the orchard where they are to remain. The top of the young trees are then cut off about 4 feet above the ground. When they become well rooted and growing, the best varieties of the orange and lemon are budded upon the stalk. Two buds are generally inserted, and upon opposite sides of the plant. From these buds branches shoot out, and when a quarter of an inch in thickness become of a reddish color.

The trees of the orange and lemon are subject to various diseases. A parasitic growth of fungus nature frequently appears upon the bark of the trees. The lemon tree is more subject to this than the orange. This growth after a rain (or being soaked with water) is removed by scraping. An insect of a dark brown color called the orange louse is very injurious to both the orange and lemon by infesting the bark, leaves, and fruit. A similar insect of a whitish color, known as the lemon louse, attacks the leaves and fruit of the lemon, but not the orange. The fruit of both the orange and lemon are sometimes injured by an insect called the fly. This insect makes its appearance in the beginning of summer, and commences its devastation by stinging the fruit and depositing therein its eggs. These eggs develop into grubs, which destroy the fruit. Plenty of sunlight and good ventilation are requisite for all these diseases. Tar-water, and water slightly tinctured with kerosene are used as a wash for the leaves and fruit, being applied with a sponge. Soda-ash is also used. When the fly first appears the fruit must be frequently washed.

These remedies are only of temporary benefit. No remedy has yet been discovered for the permanent destruction of these enemies of the orange and lemon, especially the louse.

The distance between the trees to be maintained in planting in the orchard depends much upon the situation of the ground, the quality of the soil and the climate. The distance varies from 4 to 6 meters (13 to 19½ feet).

When the soil is loose, rich, and easily cultivated the lemon trees should be planted at least 6 meters (19½ feet) apart, because, under these circumstances, the trees grow luxuriantly and become large. When the situation of the ground is such that ventilation will not be good the trees should be 6 meters (19½ feet) apart. Where the soil is poor and the climate cold, so that the trees can not grow large, they may be planted

nearer to each other. The distance to be maintained between orange trees is from 4 to 4½ meters (13 to 14 feet). The distance must vary in accordance with the situation and quality of the soil, as in the case of the lemon.

Orange and lemon trees make beautiful the upland and mountain side with their vivid green. They grow luxuriantly in the valleys, and fringe the sea-coast almost to the water line. Those orchards yield the best results which are most distant from the sea and are not of such an altitude as to be affected by the frost. The rich valleys above the sea-level, where an abundance of water can be had for irrigation, abound in the best orchards. Some orchards here reach down to the sea, within 330 feet of the shore. Such a location is of course not desirable for the culture of this fruit. The trees so near the sea are more liable to disease, and the quality of the fruit is not so good as that of the orchards more distant.

Artificial irrigation is necessary in this climate. Streams that tumble down from Ætna are utilized for this purpose. Where this is impracticable, water is elevated from wells by steam or mule power.

The ground of the orchards between the trees must be cultivated. It is necessary that the ground be kept perfectly clean. The soil should be worked at least five times a year, commencing in March and ending in October. When the trees are young and small it is not customary to work the soil. It is thought that the vegetable growth protects the young plants from the too-powerful rays of the sun.

Many sections raise crops of vegetables between the trees. This practice, however, is condemned by the best fruit culturists.

The cost of cultivation in the best orchards per annum per hectare ($2\frac{471}{1000}$ acres), on the average, is about 650 lire ($125.45); but where extraordinary outlays must be made for streets through the orchards (as is often the case in this lava-covered soil) and steam power for irrigation, the cost per annum per hectare ($2\frac{471}{1000}$ acres) may be 2,000 lire ($386).

On the average a lemon tree here produces 1,000 lemons per annum; an orange tree 600 oranges. There are cases where trees produce ten times this number.

The Sicilians regard the best time for gathering the fruit for export is in the month of November. The fruit is carefully picked from the tree by hand, caution being exercised not to injure the same by the thorns of the tree or rough handling. The fruit is not rudely thrown into a box, but gently placed in a basket lined with cloth. The stem is left on the fruit, cutting it about a quarter of an inch from the surface of the fruit.

Prior to boxing, the fruit is cleaned of insects or other injurious matter. The box used here generally is capable of holding from 250 to 360 of the fruit, there being a partition in the center. It is lined with common silk paper. Each individual fruit is encased in the same kind of

paper prior to boxing. Care is taken that no nail protrudes in the box to injure the fruit prior to placing it therein. The boxes are not made air tight, but interstices are left between the boards for ventilation.

Lemons gathered in the month of November and thus boxed are supposed to keep without spoiling for six months. Oranges will not keep so long. The boxes should be occasionally opened, and any infected ones removed therefrom; especially should this be done just prior to shipment.

During the year 1882 there were exported to the United States from Catania of oranges and lemons 241,107 boxes, of which the invoiced value was $441,227.72.

During the year 1883 there were exported to the United States from Catania 228,857 boxes, invoiced at $324,284.84.

For much of the information relative to the culture of these fruits I acknowledge myself indebted to our worthy vice-consul, Mr. Augustus Peratoner, who owns several fine estates upon which are splendid groves of orange and lemon.

ALBERT WOODCOCK,
Consul.

UNITED STATES CONSULATE,
Catania, May 21, 1884.

VENETIA.

REPORT BY CONSUL NOYES, OF VENICE.

(Reprinted from Consular Report No. 41½.)

LEMON CULTURE IN VENETIA.

Although the principal center of exotic culture is not found within the consular district of Venice, some account of the circumstances and methods connected with its practice in the province of Verona may be of interest to fruit-growers in answer to the inquiries of the Department.

The Lake of Garda, the largest of the Italian lakes, while penetrating with its northern extremity far into the mass of the Great Alps, opens out into the plain to the south with barely the difference of level necessary to contain its waters, and the more completely it allows the warm air of the plain to penetrate into its deeply embedded mountain recesses the more completely is the tepid element sheltered and isolated from the colder currents of the north. Bathed in this genial atmosphere, the precipitous shores form a range of natural espaliers, exposed to the southern sun in all its course and enjoying a climate of their own, on which the cultivation of oranges and lemons has been a profitable

industry for several centuries. It is on the western shore of the lake, in the region of Brescia, that both fruits are produced with success; while to the east, and properly within the Venetian territory, the lemon only, being the more hardy, is cultivated to any extent for commerce, the orange being more rarely planted, except for experiment or ornament; its fruit does not generally come to maturity.

Cultivation.—The lemon is cultivated in the open air and succeeds perfectly, though requiring the nicest care and attention. It demands a soil sufficiently loose and fresh to permit the free passage of solar heat without baking or shrinking, and largely composed of the substances most suitable for the formation of acids, of sweet and aromatic juices, such as the alkalies, and particularly those of potassa and lime.

Analysis.—An analysis of the trunk and fruit of the lemon shows in the fruit the presence of 47.48 per cent. of potassa, 22.82 per cent. of lime, and 11.57 per cent. of phosphoric acid; in the trunk, 55.13 per cent. of lime, 17.09 per cent. of phosphoric acid, and 14.76 per cent. of potassa, with smaller proportions of other substances.

Manures.—The manure should be of a nature to complete the natural resources of the soil, by still further additions of alkaline and azotated substances; stable manure, mixed with leaves and sea-weed, and left to decay together till they form a loam, to which may be added powdered lime or plaster of Paris and night soil; some cultivators use also the refuse of the wine and oil press.

Propagating.—For propagating the plants, a nursery is generally formed in some spot particularly favorable for soil and exposure, and here the plantation may be made in various ways—with the seed simply, with a portion of root which has already given a sprout, with slips buried till they commenced taking root. From the seed sown in spring the plants are more robust, but such plants always require to be grafted later, which is done sometimes in the simple split, but oftener by the insertion of a bud on some thrifty shoot from one of the lower branches.

The young plants remain for six years, more or less, in the nursery, and here, or in the pots or cases to which they are sometimes transferred, they receive the care necessary to bring them to a certain degree of vigor and solidity, as well as the pruning and shaping generally to the form of a sphere or hollow vase.

Transplanting.—When ready for transplanting, the ground is prepared by digging a broad ditch the whole length of the proposed line of trees, taking care to break the earth as deeply and widely as possible to give free passage for warmth and moisture, and clearing of any stones or large pebbles. The plants are removed from the nursery or case, with the mass of earth adhering to their roots, and set in the earth 9 or 10 inches deep. Care should be taken at the same time to separate and spread any roots too closely grouped together, or tending too much inward or downward. In refilling in and around the roots manure should be used liberally, and a slight elevation of earth raised around the spot

to retain water. The plants are sometimes grafted before this transfer, sometimes only a year or two after. Each plant should have about 25 square yards of open ground around it; in these intervening spaces, however, small shoots are sometimes cultivated for sale or transplantation, but in all cases the earth should be well spaded during the first year at least, lopping the roots which come too near the surface. The young trees are sheltered during the winter, and the ration of manure for each is prepared beforehand and placed under cover near it for protection from cold, to be well worked into the ground with the first spading, which takes place at the commencement of vegetation in spring.

At the same time the tree should be pruned of its dried or weakly branches and leaves, which would become points of attack for mildew or insects, as well as to maintain its compact and advantageous form, and this cleansing operation, after being carefully attended as soon as the advancing season offers some security against returns of cold, should be renewed towards the 1st of July, when the first period of vegetation has well marked the relative vigor and promise of the young shoots.

The plants should be watered according to the requirements of the season, using for the purpose water from which the chill has been removed by standing in the sun. This is done here mostly by hand with the simple old-fashioned watering-pot.

Where the plants are kept in pots or cases, here as elsewhere, they are more for ornament than profit, and in this case the filling is entirely of manure, and should be renewed every three years. At a certain stage of growth, also, it is necessary to transfer the plant to a larger recipient, though one change of the kind is generally sufficient, a case of 2 to 2½ feet in diameter being large enough for it at almost any age. The operation should not be executed without due precaution. The plant, enveloped in cloths or rags, and lifted gently by ropes and pulleys, should suffer no violence; while suspended, the smaller and too extended filaments of root trimmed away, and lowered with its mass of earth undisturbed into its new receptacle on a stratum of fine gravel prepared for it, the empty spaces filled as before with manure and loam well worked into the roots. The plant should then stand in the shade for about eight days, guarded, as far as possible, from sudden changes of temperature, and copiously watered, admitting, however, the external air if in the greenhouse, when the weather permits it.

Finally, and to prove that after all Italy is not the natural home for these delicate products, even with all these precautions, the orange and lemon plants, which thrive here in the open air during summer, can not risk the winter without protection, either in the greenhouse or under provisory sheds of light planking, provided with stoves and conducting tubes sufficient to maintain a certain uniformity of temperature in every part of the inclosure. Many cultivators regulate their practice in heating by the simple expedient of placing a vessel of water near the plant, and light their stoves when the water begins to freeze. This,

however, is considered dangerous, as the injury may be already done before the signal is given or observed, and the plant once attacked by frost is beyond remedy. More careful gardeners use the thermometer, and begin heating when it marks 6° or 7° Fahr. above freezing point, particularly if the weather is clear and dry.

With all these risks and precautions the cultivation can not but be regarded as exotic and artificial, and the fruit, though large and handsome, is watery in quality, with much of its substance taken up by the disproportionate thickness of the rind; nor has it the concentrated acid of the lemon produced in more congenial climates. The yield, also, is very precarious, and always liable to be prostrated by any extraordinary severity of the season. It is estimated for the average year at 500,000 lemons of various sizes, with an average value of 15,000 francs ($3,000).

McWALLER B. NOYES,
Consul.

UNITED STATES CONSULATE,
Venice, March 3, 1884.

PORTUGAL.

THE AZORES.

REPORT BY CONSULAR AGENT MOREIRA, OF ST. MICHAEL'S.

Varieties.—The name of best variety for profit is the common orange (*Citrus aurantium*), or China orange, which is the orange exported.

Names of other choice varieties worthy of culture are: the "selecta" (selected) without pips, which never attains a deep color and does not ripen well till March or April; the tangerine, a variety of mandarin, a delicious small orange, but not cultivated to any great extent; a few boxes are shipped, but of the "selecta" hardly a package is exported.

Situation.—The trees that produce the varieties above-named are grown in almost all situations of the island; distance from sea, from one-half up to three miles; elevation above sea-level, from 80 to 400 feet; for exposure to sun eastern aspect desirable; they grow in all lands, but level land is preferable.

Soil.—Light soil and also argillaceous mixed with pumice-stone.

Climate.—Generally moist.

Temperature.—Winter months, minimum, 48°, maximum, 75°; average, 61°. Summer, minimum, 50°, maximum, 82½°; average, 69½°. Nights generally cold in winter but very warm in summer; few sultry days; atmosphere moist.

Rain-fall averages 40 inches per annum on the lower grounds, but on the higher lands probably 60 inches. Our soil is porous, the rain soon sinks into the ground, and the soil soon dries up, therefore genial

showers in summer are very beneficial. In some years there are droughts in summer, and the fruit trees suffer much; consequently the fruit is small and frequently rough.

Irrigation.—Irrigation not required.

Cultivation.—There is no particular method of cultivation.

Fertilizers.—About February lupin is sown broadcast, and when about 2 feet high is dug into the ground; some people (but very few) sometimes use farm-yard manure, and guano has sometimes been applied.

Pruning.—Pruning is not generally practiced before the trees attain an age of seven years, and then at about 4 feet from the ground.

Picking.—Picking begins about the 15th of November and continues up to March; the fruit is not properly ripe until January.

Curing and packing.—There is no system of curing. The fruit is packed in boxes containing from 400 to 500 oranges, according to size of fruit, wrapped in Indian-corn leaves.

Planting and propagating.—Distance from plant to plant, in rows, 15 to 20 feet. If planted closer, which is sometimes done, the trees shoot up too high and the branches touch one another, preventing the sun from shining into the trees as much as desirable. The trees are now mostly propagated by selecting a healthy branch about half an inch in diameter, taking off the bark all round about an inch in height, then putting round it some sifted soil. When it begins to throw out roots it is cut off from the tree and planted out in beds till it attains a height of at least 3 feet, and then it is ready to be transplanted. They are also propagated by layers, that is, by pegging down the lower branches and grafting in the ordinary way. From seedlings the oranges are better than from layers, but they take a long time before they produce any fruit. Sometimes also the trees are budded. The orchards are from one-third of an acre up to 20 acres in size.

Maturity.—The trees will produce in seven years, not however in large quantities, but the largest crops may be expected when they attain the age of twenty years up to forty years, at which latter period they begin to produce less.

There are no insect pests.

Many years ago there was a fair quantity of lemons and some were shipped, but now there are very few. Nobody ever thinks of planting lemon trees except for their own use, or for sale in the market, where sometimes 5 cents are given for one. None are now shipped.

AUGUSTO S. MOREIRA,
Acting Consular Agent.

UNITED STATES CONSULAR AGENCY,
St. Michael's, Azores, December 31, 1889.

THE AZORES.

REPORT BY CONSUL DABNEY, OF FAYAL.

[Republished from Consular Report No. 41½.]

ORANGES AND LEMONS IN THE AZORES.

The lemon, never raised in large quantities in these islands, probably because its quality did not make it a favorite, has become quite extinct as an article of trade in consequence of the liability to disease of the tree roots. The orange of the Azores, the China orange, is a fine fruit, but of so perishable a nature as to be incapable of resisting a long voyage. In Fayal and Terceira it has ceased to be exported, not being able to compete in price with oranges sent from other countries in the markets of England, the only markets really within the reach of so delicate a fruit. At the island of St. Michael, which has always been immensely in advance of the others in point of quantity produced and exported, the trade, for the same reason, although yet an important one, has diminished very seriously. From the United States consular agent at that island I have obtained the most of the following information regarding the orange culture. The varieties preferred are the "selecta" and the "navel" orange, the Latin names of which he could not obtain. The trees come into full bearing at the age of eight or ten years, and continue to bear until forty or upwards—in by-gone times to a much greater age. They are obtained from seedlings, on which at the proper age the best varieties are grafted, and also by the system of layering; the former are naturally longer-lived trees.

The orange tree at St. Michael appears to be subject to a drying up of the branches without any apparent cause and without the presence of any insect or fungus. No remedy has yet been discovered for this, I am told (may it not be from exhaustion of the soil, probably?). It is customary to set out orange trees about twenty-five feet apart. The best orange gardens are some 2 miles from the coast-line. The spaces between the trees are sometimes filled with corn or vegetables, but the more sagacious cultivators abstain from this. Where the garden is devoted exclusively to oranges it is hoed twice a year, but as a rule not manured; never irrigated. The cost of cultivation is estimated at $20 per acre.

An acre yields about 40 boxes of a size to contain some 400 oranges; the value at the present time problematical, as the exportation is done by the garden proprietors banded into large companies. Formerly, when more or less of the fruit was bought by speculators on the trees—all expenses being for this account—it was sold at from $1.50 to $2 the "English box," a package equivalent to three Sicily boxes, or containing from 600 to 900 oranges, according to size of fruit. In a good year as many as 250,000 or 300,000 of such boxes were exported from St.

Michael, conveyed by small fast-sailing schooners, carrying from 600 to 1,200 boxes of that size. Of late years the carrying has been done by steamers.

The Azorean orange has been with few exceptions packed in corn husks, it being found that, liable as it is to decay, the husk, being thicker and firmer than paper, protects the sound ones more effectively from a decayed comrade.

The soil of these islands, though generally thin, is fairly productive if rain does not fail too much during the summer months, and it is observed that the best oranges are raised on rather a sandy soil; those from richer ground being thicker skinned and deficient in flavor. The climate is decidedly a damp one, but equable in temperature. The mean annual temperature, deduced from three daily observations of a Fahrenheit thermometer properly placed in the shade, I found to be 62°; the maximum observed being 80° and the minimum 44°.

S. W. DABNEY,
Consul.

UNITED STATES CONSULATE,
Fayal, April 24, 1884.

SPAIN.

REPORT BY CONSULAR AGENT LOEWENSTEIN, OF GRAO.

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CULTIVATION OF THE ORANGE TREE.

I have the honor to forward to you herewith a report on the cultivation and propagation of the orange tree in this province. It was made out after consulting the most eminent cultivators and authors, and my fervent desire is that this paper may be useful to some of the lesser-instructed cultivators of this tree in the United States.

CLIMATE.

The orange tree does not thrive in the open air except above 43° latitude, and then in sheltered spots, where the earth always preserves a temperature above congealment at a depth of 0.02^{m} to 0.03^{m}. In these cases the sap of the roots, which is always in movement in the trees of permanent leaves even in winter, defends the exposed parts of the tree from congealment. The thermometer has been known as low as 10° Réaumur without the orange trees perishing, because such temperature was not sufficiently continuous to penetrate to any depth in the soil, besides which the thaw that succeeded was accompanied with a cloudy sky. In short, the orange tree can be cultivated with perfect security in the open air where the temperature is not lower than 3°

Réaumur. In the spots most favored this condition is not met with at a greater altitude than that of 400 meters. When the average temperature reaches from 15° to 16° the apparent vegetation of the orange tree commences, which, as a rule, takes place in the month of March. The blossoming requires a mean temperature of 18° centigrade, Réaumur, the first flowers appearing in April and frequently continuing throughout the whole of May. The blossoms are found on the secondary branches, but principally on the tertian ones, or in general those formed during the previous year; but this rule, which is the most regular, is not the same everywhere. Selling the fruit too late, and the consequent working and manuring of the grounds (by reason thereof) out of the proper time for so doing, besides which, in consequence of the scarceness of irrigation in summer for want of water, a great disorder in the natural course of vegetation is occasioned. With reference to the height above sea-level, the majority of the orchards range between 4 and 30 meters. The temperature of this province, Valencia, is very mild, and while it seldom reaches as low as zero, many parts are protected from north winds by different mountains.

The climate of the districts where the orange tree is cultivated in Valencia is, as aforesaid, benign, as is shown by the fact that the orange, lemon, citron, palm, locust bean, and various other trees, as also shrubs, all of which are delicate, thrive freely in the open air. Further, the jujube, fig, pomegranate, almond, and olive trees, the vine, and the sugar cane, also flourish here luxuriantly. The dwarf fan-palm grows spontaneously.

The *résumé* of the meteorological observations made and published during the year from 1st December, 1881, to the 30th of November, 1882, at the Observatory of Valencia, is as follows (barometer being in millimeters and at zero, thermometer of Réaumur, centigrade):

Meteorological observations.

	Millimeters.
Average pressure of barometer	762.97
Maximum pressure of barometer (January 17)	781.01
Minimum pressure of barometer (October 27)	745.94
Oscillation	35.07

	Degrees.
Average temperature	16.2
Maximum temperature in the sun (September 30)	43.0
Maximum temperature in the shade (July 10)	36.0
Minimum temperature in the air (December 27 and January 6)	1.1
Minimum temperature in the reflector (December 27 and January 6)	0.0
Average oscillation of temperature	13.3
Average humidity	61.0
Maximum of humidity (May 17)	94.0
Minimum of humidity (April 25)	20.0
Average tension	11.0
Maximum tension (August 19)	23.9

	Degrees.
Minimum tension (December 24)	3.0
Average evaporation	9.1
Maximum evaporation (July 8)	24.0
Total of evaporation	3,340.9
Rainy days	48
Days of inappreciable rain	22
Stormy days	7
Days of snow	1
Rain-fall during the year	420.5
Rain-fall, maximum (September 7)	92.0

	Kilometers.
Average velocity of wind	283
Maximum velocity of wind (February 26)	962
Minimum velocity of wind (January 1 and August 30)	40

Frequency of the winds. (*Observed twice during the year.*)

North	70
Northeast	134
East	126
Southeast	105
South	11
Southwest	37
West	130
Northwest	117

Atmospheric state.

Clear days	167
Cloudy days	97
Covered days	101
Days of calm	51
Days of breeze	274
Days of wind	39
Days of storm	1

The rain when the weather is not stormy is nearly always accompanied by south or southeast winds, and the rainiest months of the year, or at least those when the rains which are most beneficial for the soil occur, are November, February, and April, although in consequence of the great felling of trees, which has taken place during the present century, as also owing to unknown causes, the rains are much less frequent than they were last century. In this province electricity exists to a very great extent in the atmosphere by reason of the dryness of the climate and the pureness of the sky, especially in the mountainous districts.

SOIL.

The greater portion of the soil in this region is tribasic, cretaceous, and tertiary, and contains a large proportionate admixture of clay, sand, and lime, which is the true reason why the earth in this province is so very fertile, as is proved by the luxuriant vegetation, the

variety of produce, and the richness of this fortune-favored district. The color of the earth in the parts where there is no irrigation is, in general, red, but this changes to gray when irrigation commences and manure is employed. In parts where vegetable refuse and abundance of farm manure form the greater portion of the soil, the color inclines to black.

The soil should be at least one meter in depth and should be subject to irrigation. It should further be of a middle consistence, silicious-argillaceous, or argillaceous-calcareous, rather damp, but without being humid. Chalky soils, more or less pure, those completely silicious, and those which are compact argillaceous, with constant humidity, are useless. In the two first the manures decompose rapidly before being of service to the roots, and they require excessive irrigation, which weakens the soil and exhausts it. In the latter the excessive humidity which is constantly retained deprives the roots of atmospheric influence and causes putrefaction. A soil composed of clayey marl or a light clay mixed with sand is most suitable for the cultivation on a large scale of orange, lemon, and other trees of the same family. The soils where the orange-tree thrives well are of very distinct composition, as there are as many orangeries on sandy as on clayey ones, but those most compact should not contain more than 65 per cent. of fine earth (with less than 0.005 millimeter diameter), and on reaching this limit they should have a sandier earth for subsoil. The same extreme limits which the orange-tree admits in its physical composition are also admitted by the soil with regard to the quantity of lime contained in it, for while in certain districts (Benifayó) the earth contains no carbonate of lime, in other parts 18.29 per cent. is found, and recently a calcareous earth has been examined, the same being of great depth, and has been found to contain 57.22 per cent. of said carbonate; notwithstanding the same, the orange-trees thrive well. These earths are also rich in potash, and contain this matter in an exceedingly large quantity in a form that may be considered as assimilable with the tree, so that in such districts there is no necessity of employing potash for manure. Of the other alimental principles of the plants, there is in general a limited quantity of phosphoric acid, and in some parts an addition of magnesia.

The extraordinary foliage acquired by the orange-tree in a loose soil, which at the same time contains what is necessary for its proper development, may be fully appreciated in the districts of Alcira and Carcagente, in this province, which districts are the center of production, and the soil in which is loose and of great depth. A simple analysis of a sample of earth taken from Carcagente showed that it did not effervesce with acids, whilst a sample from Alcira did, and abundantly. The analysis of 100 grams of earth from Alcira gave, salt of lime (carbonate), 20 per cent.; sand (silicate), 70 per cent.; clay, 10 per cent. This analysis, which was lightly made, is sufficient to give an idea of the soil in which the orange-tree thrives to perfection.

Thus it is that in other parts (Castellon de la Plana), where the soil is most compact, the growth is slower; in years when there is a scarcity of water and the orchards are not irrigated at the proper season, the earth becomes so compact as to prevent the growth of the small life-giving roots, besides depriving them of the beneficial effect of the atmospheric air, and as these roots cannot then properly nourish the trees, the latter, little by little, harden, or, in other words, the trunk and branches lose the green color they should have, which manifests the abundance of sap contained by them, and which is what preserves them tender, a thing so necessary for their growth.

From the preceding it will be seen that it is necessary to well examine the soil (should one have the idea of converting it into an orange garden) before incurring any expense, not only examining the surface, but also the subsoil, as there may be some parts where the soil is loose and of good quality on the surface, but very compact and bad beneath, or *vice versa*. By attending to this the proprietor will know what may be expected from said ground and to what cultivation it would be advisable to dedicate it.

PROPAGATION.

Orange trees may be propagated the same as any other fruit tree, either from seed, whichis the natural way of multiplication, or from cuttings, which is artificial. The first system, viz, from seed, perpetuates the species and gives origin to new descriptions, afterwards improved by cultivation. The second method, either from shoots, cuttings, or grafting, continues the race and at the same time accelerates the fruitage, which is always later with the trees produced by the first-named system, but in exchange the trees raised from seed are more robust and live to a much greater age. The oldest orange trees found in this province clearly demonstrate that the primitive trees were raised from seed. The sweet orange does not thrive well when raised from shoots, and in order to obtain a good result it is necessary to recur to tightly bandaging them so as to favor the accumulation of juices, which contribute to the acceleration of the unfolding of the underground shoots. The bitter orange is more easily cultivated.

The following means have been employed, and are still being used, as by the same frondose trees, bearing a large quantity of fruit, and this of good quality, are obtained. Said means are these: First, a flower-pot is obtained, composed of two pieces, which can be easily fastened together either with wire or strong twine passed round them at the top and also at the bottom. Then some straight branches of about the thickness of two fingers must be selected, and if said branches are very long they should be cut down to the length of $1\frac{1}{2}$ meters; then the part that has to be placed in the center of the flower-pots is barked all round for about $1\frac{1}{2}$ inches, and immediately bound up with esparto-grass cording. As soon as this is done the flower-pots are put together and filled

with earth and stable manure, well mixed together and watered; after this they are watered once a week. At the end of a year the roots that have formed fill nearly the inside of the flower-pots, and then the branches at the lower exterior part of these are sawn off and the new orange trees taken to the spot where they are to be planted. For planting them there is only to cut the wire or string holding the flower-pots together, and if they are well looked after they will commence bearing fruit at the end of two years.

The slips of the sweet-orange tree rarely strike root, or at least such is the experience of farmers here who have tried it.

Till the disease of the orange tree occurred some years back, the propagation was generally effected by grafting the orange on a slip of lemon tree, but since then cultivators have only directed their attention to obtaining vigorous plants from the seed, on which are afterwards grafted cuttings; and the seed most preferred are *Niranjo dulce franco*, *Bigarado franco*, and *Bigarrado Gallesio*; further, should short shoots be required, the trunk should be raised from the seed of the sweet orange. Those raised from the seed of the bitter orange, either *franco* or that called *Gallesio*, are more vigorous, more luxuriant, and of longer duration, besides which they better resist the cold, for which reason they are preferred and chosen for the trunks of the trees of tall growth. The fruit of the first named is considered the best.

The last system of propagation, being that adopted in this province, viz, grafting on a *franco* trunk, a series of operations takes place, such as the establishment of a nursery for raising plants from the seed, a plantation of young trees, grafting, and transplanting.

NURSERIES.

The soil where this is effected must be of good quality, free from creeping herbs or weeds, and it must be in a good position so as to receive the sun in all parts, besides which it must have an abundance of water for irrigation. All seeds are sown in flat plots, and if they are delicate the soil is manured with a small quantity of well-rotted dung finely minced so as to allow of its better distribution and at the same time produce more beneficial effects; the soil is also excavated and loosened so as to give the plant greater freedom for growing. These plots, when prepared, are opened out in parallel rows of about four inches deep and one foot distance between each.

The means generally adopted in this province for the establishment of these nurseries are as follows: The raising from seed, when on a small scale, is done in large boxes, but when on a scale of any importance it is done in the soil. This last is greatly preferred, because the plants have more roots on account of having more space for development. Although the temperature of this zone is very benign, it is nevertheless necessary to select a sheltered spot for the nursery, taking care that the soil be rich, nutritive, of sufficient depth, and possessing

means for irrigation. Having everything prepared, the next thing is to obtain the quantity of seeds required for sowing when the proper time comes around: The general method is to divide the orange with a knife, taking care not to cut it so deeply as to touch the seed, so as to in nowise injure them; these are then picked out and placed in the shade to dry, after which they are preserved, either in paper packets or earthernware pots, in a dry place. Other methods for obtaining seed are adopted, but the preceding is considered as the best. Once the seed is perfectly obtained, should it not be required for use within a short time or period, it should be placed in layers in sand, so as to prevent its getting too dry and opening. A thing of the greatest importance is the selection of the orange from which to obtain the seed. Some nurseries have been planted with seed obtained from the November orange, and but few trees have been obtained, only a small quantity of seed germinating. The seed of more seasoned oranges come up in greater number and with more strength, in addition to which the plants are much more vigorous. Nurseries may be created with the June orange, the fruit at said period being perfectly seasoned, but this is considered too late, and the frost or cold would catch the plants whilst still very tender. The average season for planting the nurseries is from the middle of February till the middle of April, thus conciliating everything: first, because the seed then obtainable is good; and, secondly, there is sufficient time for the young plants to acquire sufficient strength to resist the cold weather ere the winter sets in.

As the time approaches when the seed should be sown, the soil where such is to be effected is properly prepared, being watered and, when in fit condition, well dug up. If the earth is very compact and composed of hard lumps, these are well broken up and smoked, and made up in *hormigueros*, which are heaps of dry vegetable refuse covered over with earth, having a small opening near the ground in which is introduced a wisp of straw. On setting fire to the straw the whole mass gradually consumes itself, forming a small heap of vegetable ashes and earth. The ashes of the *hormigueros* are equally distributed over the surface of the soil, and immediately afterwards this is manured with stable dung, which should have been left to rot in sand, and which must be old and as fine as the sand. This has first to be watered to keep it moist, and when the proper season arrives a good watering has to be given it, after which it is spread over the surface. When the space to be cultivated is limited, the mixture of stable dung and sand is performed with a spade, and the ground is not plowed. The ground has to be divided in long and narrow plots, having small irrigating canals between each, which must be sufficiently deep so as not to allow of the water reaching the superficies of the rows, as should it do so it would have the effect of hardening the earth, which should always be loose, so as to obtain a good result.

The seed should be soaked in water for a couple of days, and after-

wards thickly sown, to provide against the eventuality of some being defective and not germinating.

There are some who immediately cover the seed with a coating of fine manure of about 1½ to 2 inches, while there are others who employ a mixture of river sand and stable dung; but experienced cultivators say that the sand often injures the stalk of the tender shoot. It seems that in order to obtain the most favorable result a covering is made of earth from a pine forest, virgin earth, the greater portion dung. When this is not obtainable, then dry, arable ground which is very loose. Having arrived so far, two things are necessary, viz, that the soil be always damp, and that the earth covering the seed be loose, not offering any opposition to the unfolding and shooting of the tender plant. This is obtained by watering the nursery every two or three days after sunset, and still better by doing so before sunrise, using a watering-pot with a long spout.

When the orange trees are about 2 inches high or more, then irrigation by means of the canals at the sides of the rows will suffice.

The young plants are from four to six weeks before appearing above the surface, and sometimes more, and the plants are kept in the nursery for one or two years, according to the state of their development.

The chief things to be observed with the seedlings are: (1) The earth should always have a certain amount of humidity. (2) The plant should be kept perfectly clean, and should weeds spring up these should be rooted out with a small weeding-hook. (3) When the young plants come up close together they should be separated so as to admit the proper development of those which give promise of thriving, and allow those separated to thrive in other spots where transplanted. (4) If the ground is sufficiently manured the young plants have sufficient nutriment until reaching the height of about 10 inches or even more.

If the soil is not properly manured, then it is necessary to assist the plant by using Peruvian guano, and for doing this various growers dissolve a small quantity of guano with the water in the watering-pot, and thus apply it to the plants; but should the watering take place by means of the small irrigating canals, the guano is placed at the entry of the water into said canals, and is thus conveyed all over the nursery.

Planting.—As soon as the young plants have acquired a certain development in the nursery, which sometimes occurs at the end of one year and sometimes at the expiration of two, the plantation has to be commenced. This generally takes place from the middle of February to the beginning of March, according to the condition of the plants. It is commenced by arranging the soil in the same manner as for the nursery, and when this is done the nursery is well watered, so as to enable the young plants to be rooted out without injuring them.

Some cultivators advise the taking up of the young plants with the earth adhering as thick as mud, while others counsel that they should be transplanted with a ball of earth attached to the roots, although

said ball be of small size, so that the plants should lose less. With a mountain knife, or other similar garden tool, a series of holes are made of superficial depth, to admit the roots of the young plants, which are placed in same conditions as they were in the nursery. The orange trees are planted in the plantation at a distance of from 40 to 50 centimeters apart, if wished to be of short trunk; but should the contrary be desired, they are planted at a greater distance from each other. On transplanting the young trees, a series of light beds are made and the trees are planted at the base of the same and in regular files, but on the opposite side of the beds to that where they are irrigated, thus preventing the water from reaching the young shoots.

Now and then the top soil is loosened with a weeding-hook, and thus the beds gradually get lower, until at last they are level with the surrounding earth at the time when the plants have taken firm root and are flourishing. The plantation is irrigated once in every three weeks in ordinary weather, but oftener should it be very dry; and about at the end of two or three months after transplanting, say in July or August, a small quantity of guano or of rotten dung may be applied. At the expiration of a year in the plantation, the young trees are sufficiently advanced for grafting, should they have been tended with great care and are required for trees of short trunk; but should they be required to be of long trunk, every means should be availed of for favoring the development of the terminal bud. To this end, every year, about June, by means of nipping, the too forward growth of the lateral buds is checked. In April, branches, leaves, and thorns on the lower half of the stem are cut off, as are also the lateral branches above the same which are vigorous.

This same care is bestowed every year until the stem, straight and devoid of knots, reaches a height of from 1½ to 2 meters, when grafting is effected on its upper part. Should any of the plants take a crooked direction, they are cut off in April of the second year at about 10 centimeters from the surface of the soil, when they shoot afresh during the summer, and when the shoots have reached a height of about 20 centimeters the most vigorous are selected and the rest done away with. In this province, trees of short trunk are those invariably grown, consequently this last plan is but little, if at all, availed of.

GRAFTING.

This is one of the most important means for the propagation of the orange tree.

Grafting consists in the insertion of a branch or cutting of one plant into another, which operation has to be carefully done, so that both may unite and ultimately form a single plant growing on the same stem. Grafting is also done on a plant with some of its own shoots.

Grafting is principally performed with the object of procuring flowers, leaves, wood, or fruit of superior quality or more merit than that previously obtained.

Grafting also serves for the propagation of many trees and bushes, both exotic, rare, and delicate, by employing specimens of wild, rustic, and strong plants that may be analogous, or of the same family, so as to improve the budding of the branches of a plant which has become stripped of same (in the regions where the cultivator wishes to augment the growth and reproduce the species), and also to unite on a single branch the male and female flowers of vegetables normally "*diœcians*," which are thus converted into "*monœcians*," and their fertilization vastly improved. The "graft" is the name given to the shoot, or branch, etc., inserted in another, and "parent" is that in which it is grafted; and the plant obtained is called "franco" when both are raised from the same class of seed, and "bastard" when from different species. With all grafting it is necessary to put similar textures in contact, and above all the generating layers or vegetative zones of both parent and graft, and at the same time impede the access of air and light to the uncovered part, or the wound. It is not, as it is generally believed, the joining of the bark which contributes to the perfection of the grafting, but rather of that generative texture or *cambium* which exists between the white wood and the bark, by which is effected the growth in diameter of the *dicotlidonéos*, vegetable substances.

In order to obtain a successful result, the operations should be performed in fine and temperate weather. The parent plants should be carefully selected, not too young, as although the grafting might be successful, they would be long in bearing fruit, notwithstanding that they would be frondose; neither too old, because although giving fruit sooner, they are of little duration; further, those selected must be perfectly sound, well formed, and possessing a clean bark. There are four seasons when the operation of grafting may be performed, viz, at the impulse, at the time of shooting, at the time of vivifying, and when sleeping.

Grafting at the impulse is done when the movement of the sap commences and the buds begin to wake out of the lethargic state in which they had been all the winter, but before they have unfolded. The season for doing this is from the middle of February till the commencing of April, and it is done by grafting twigs of the previous year.

Grafting at time of shooting is when the sap is at its greatest activity and when the shoot has attained half or three-quarters part of its definite growth. This system is generally carried into operation from the commencement of April till end of May, and the ingrafted shoot availed of is a tender shoot of the same vigor as that of the portion of the parent plant where it is to be ingrafted.

Grafting at time of vivifying is so called because it is done at the solstice and when the shoots commence to put forth their second sprouts, which occurs from about the end of May till the end of June. The cuttings for grafting on vivifying are selected from twigs of the same year.

Grafting when sleeping is done at the equinox in September, and only

differs from the previous system in that the graft on vivifying commences immediatly to shoot, whereas that grafted whilst sleeping does not commence to move until the following spring. The system may begin to be adopted from the end of August till about the middle of October.

A successful result greatly depends on the intelligence, skill, and care of the grafter, as also on other conditions that may be possessed by him. The young shoots to be grafted are frequently spoilt by workmen whose hands perspire copiously, and the same also occurs from bad breath either from disordered stomach or smoking to any extent, in the cases where the grafter is accustomed to hold the ingrafted shoots and buds between the teeth whilst preparing the *patron*.

The object of the ligatures is to subject and fasten the graft to the parent tree, and those are best which possess sufficient elasticity not to either tighten or loosen too much, as also suffer but little from atmospheric influences, and further they should be of slight cost and easy acquirement, preference being given to those belonging to the animal kingdom, such as raw and carded wool, worsted, silk, or horse hair. Of the vegetable kingdom the following are best: hemp, flax, esparto, enea, reed-mace, various flexible barks, and the leaves of certain trees possessing the same property.

With the graftings it is necessary that the cuts and wounds in the *patron* should be properly covered and protected with substances suitable for said purpose, and which ought to combine the advantages of slight cost, easy manipulation, shortness in preparation, duration, and perfect protection. The materials most generally employed are the following: Grafter's clay, which is of ancient use, and is composed of two-third parts of clayey soil and one-third of cow dung, well mixed together; and to this are sometimes added dry herbs chopped very fine, and by some a small portion of salt is also employed in the mixture. Softened pitch is also made use of, not alone, as it would dry and peel off, but melted with a corresponding quantity of wax or tallow, or of resin and tallow, to which is added red earth or brick-dust.

A good receipt for this mixture is as follows:

	Kilos.
Resin	1.250
Pitch	0.750
Tallow	0.250
Earth	1.500

This composition should be applied tepid, but not very warm, as in this case it would injure the plant.

When a good variety has been obtained from seed, it is so subject to injury or loss from any casualty that the plants are generally grafted in order to preserve them. When the cultivator wishes robust and bushy trees of long vitality, the grafting is done with trees of the same species, but should he wish to obtain trees less robust and either of medium size or dwarf, he does this (although at the expense of obtaining a tree

of lesser duration) by grafting on analogous parent trees of a distinct species to the grafts, on account of such grafts requiring a greater quantity of sap than can be given them by the respective parent plants, for which reason they remain small, have but few branches and roots, and the buds are of but brief duration.

As a general rule two cuttings are grafted on the same trunk, some times with the object of greater certainty, and sometimes for the purpose of the trees sooner forming their top. With reference to the numerous buds that appear when the graft commences moving, all are suppressed except those nearest to where the grafting was made in order to draw the sap towards said point. Should they develop too much, the points are cut off, which is done when the graft attains a length of $0^{m}.15$.

The universal system employed in this province for grafting of orange trees is the following: If the nursery has been well cared for, at the end of a year the small free orange trees are grafted, whilst those which from some special circumstances have not sufficiently developed are left for the following year, and it is recommended that the grafting should be done in that part of the nursery where the plants are thickest, as being very close together impedes the moisture from disappearing from the soil, the sun not being able to penetrate through the plants to evaporate the dampness, as it can when the plants are scattered or isolated. This should be greatly studied in those parts where water is scarce in summer, and it is the plan followed by the majority of cultivators who have nurseries.

Nearly all systems of grafting may be employed with orange trees, but in this province the only one now universally adopted is that of the grafting of a bud, which gives excellent results, giving preference either to the method of *jouette* (*á ojo velando*) or to that of *vidry* (*de ojo dormido*), according to the season when the grafting is effected, viz, the first from April till end of June and the second from August to October. One of the most intelligent cultivators of orange trees in this province grafts when the sap is moving, doing so from the time it commences to move until St. Peter's day (end of June), and also when the sap is dormant, which is from August till October, cutting the shoot in February. The buds for grafting are taken from the center of the tree, as it has been found that if taken from the lower part the branches of the tree produced always incline towards the earth, and young twigs are not liked, as they produce large trees bearing but little fruit. The buds for grafting are selected from those of the previous year and of the June shooting, and, according to the size of the parent stem, one, two, four, etc., are placed, for should the parent stem be thick and have only one bud grafted on it the excess of sap would suffocate it. On placing the buds, the parent stem is probed and they are applied to the most salient parts which this may present, because it is considered that it is here where there is the greatest quantity of sap, and it should be done when possible in the part facing the north, so as to suffer less from

the heat of the sun, besides which one can work better. The grafts should be tied with esparto grass, this being found much better than other strings or cords by reason of the less damage it causes to the bark, besides which it better protects it. It remains in this state for twenty-one days, and if at the end of this time the bud continues green the grafting is correct, in which case the shoot is cut off about four inches above, and it at once moves if it has dried. Sometimes it commences moving before the grafting has thoroughly taken place, in which case it is immediately cut, although the twenty-one days may not have expired. As soon as the shooting commences, cut the esparto on the opposite side if there is only one bud, or at the sides if there are two, but do not take it off. It is calculated that about three hundred can be grafted daily, and when the grafting is done in fine weather it is much better, but it does not matter if done when raining, as neither through rains nor irrigation have the grafts been lost, although there are some who do not irrigate until at least twelve days after grafting. The four inches of stem which remain above the graft, and which served as a support for the growing shoot, are cut off at the end of a year and before removing the plants from the nursery.

The proprietors taking but little care in providing themselves with good seed on grafting, and the grafter, whose only aspiration is to obtain his day's pay, taking everything that comes nearest to hand and costs him least trouble, it frequently happens that fatal results are the consequence. The same recklessness is noted with those who purchase orange trees already grafted and who take no trouble to ascertain their origin, etc. For the preceding reasons it is not surprising to see sickly orange trees in all directions, and others, although sound, producing but little fruit and this of bad quality, thus occasioning a heavy loss to the imprudent and careless proprietors, which they could have easily prevented if they had not overlooked that the grafts inherit the good and bad qualities of the tree which produced them, as also of its state of sickness or disease as also of its healthy condition; thus it happens that in a small field of only six hanegadas of loose earth, and the whole subject to the same cultivation, in which, by reason of the carelessness of the owner, there are three descriptions of orange trees, each of different merit, there are some that give a flat fruit with a fine skin or peel; others that are round and with a finer peel than the preceding, with abundant flesh and as juicy as the former but sweeter; and, lastly, there are others the oranges of which are very coarse and less esteemed by exporters.

TRANSPLANTING.

The tree lives, strikes root or the contrary, is more or less well formed, gives better or worse fruit, according to how the plantation may have been more or less carefully attended to, the health and duration of the plant being also subordinate to this operation. The

outcome of the plantation does not only depend on the nature of the soil, but also on the age of the trees transplanted, as the younger they are there is much greater probability of their taking root. A soil well broken up is better for a plantation of trees than any other; but very few persons take this trouble, contenting themselves with opening holes at regular intervals in a slightly worked soil. The trees with horizontal branches, or curved at the tip, give fruit sooner than those that have vertical or nearly vertical ones. As a general rule the holes made in virgin earth and of the best soil are about a meter in diameter by one in depth, but in dry and hot soils they should be two meters in diameter by 1.30 in depth. These are made the winter previous to planting, in order that the earth extended and deposited round the edges, as also the sides of the holes, may improve from the action of the air; and in the neighborhood of each hole is placed about a cubic decimeter of well-rotted manure, or, should this not be obtainable, it may be substituted by 4 pounds of dried and pulverized blood or 6 pounds of guano. Should the soil where the planting is to be effected be of bad quality, the half of the earth extracted from the hole is replaced with a similar quantity of clayey silicious or chalky clay soil. The manure must be perfectly mixed with the half of the best earth extracted from the holes, and the half of this is deposited at the bottom of the hole in the form of a spreading cone. The tree is then placed on said cone in such a manner that the neck of the root when the hole is filled in will not be deeper than it was in the nursery, as should that limit be surpassed the root, being deprived of the action of the air, would only work imperfectly. The only exceptions to this rule are the transplantations to dry, arable ground, and in this case the neck of the root is placed at about 5 centimeters below the surface. Being thus placed, the roots are covered with the remaining earth that had been extracted, and the holes should be so filled up that the soil thrown in them should reach the height of six or eight centimeters above that of the surrounding surface, so that on settling down and becoming firm there should be no profundity at the foot of each tree, and the earth thus raised is arranged in a hollow. When the plantation is thus made it should be immediately irrigated, so that the earth should remain in immediate contact with the whole of the roots, and this irrigation should be several times repeated during the months of April and May, conformably as the weather may be more or less dry.

In this province the custom is to make the holes at the time of transplanting, there being few that anticipate this operation, and then the holes are only made of sufficient size to conveniently plant the young trees, for, the soil not being virgin, it is neither necessary to work it so much nor for the soil or hole to receive the beneficial effect of atmospheric influence, as in the first case, which is indispensable. According to experts, orange trees do not require very deep holes, it being preferable for their roots to be near the surface. Plantations of little

depth thrive better; they give more fruit and are healthier; thus, placing the young trees the same as when in the nursery, and taking care that the grafts are from about 4 to 6 inches above the surface, the planting is well done. After having completed everything necessary for the transplantation, the nursery is well watered and the young trees are dug out with a large spade, with a good quantity of earth adhering to the roots, which earth is surrounded with rotten or dried leaves and tied round with cords; and it may be mentioned, the speculating dealers take as little earth as possible from the nursery, so as not to impoverish the soil. When the orange trees are conveyed to the spot for planting the first thing done is to line the bottom of the holes with the earth first taken out until it is calculated that on planting the young tree it will be, after irrigating the soil, at about the same depth as when in the nursery, and as soon as the tree is placed in position the virgin earth remaining around the sides of the hole is thrown in. There are some who throw in a basketful of burnt earth and vegetables, taking care that the same does not come in contact with the capillary roots, which form what are vulgarly called *cabellera ó barbada* (false hair, or bearded). If the planting is done in November, there is no necessity for employing more manure, that already made use of being sufficient; but in February, when the time for budding or sprouting approaches, a certain quantity of manure is mixed with the soil at a little distance from said capillary roots to oblige them to go in search of it, by which means they enlarge and gain strength. Before closing up the hole about twenty liters of water should be thrown into it if there is a probability of irrigating the orchard within a few days; but should the contrary be the case, a small quantity of earth is thrown on top of the twenty liters of water, after which a similar quantity of water is added. It is a matter of importance that the proprietor should be present when this is done, as it frequently happens that the water is thrown in so hurriedly that it does not reach the bottom of the hole, thus the roots of the orange tree do not come into contact with it and are consequently either longer in developing or else dry up and die. On planting it is absolutely necessary that the earth around the roots should be like mud, so as to prevent any *contretemps*, and later on, when the time for irrigation arrives, the whole surface is watered and now and then is dug up, the condition of the soil being improved little by little by fresh tillage, the ground around the trees being kept well free from weeds. The soil should be kept sufficiently damp, and the orchard should be irrigated at least twice a month should the weather be dry. There are some who plant the young trees just the same as when taken from the nursery, while there are others who lop off the branches and cut off about 9 inches of the tree in order that it may sooner commence budding; but this it is not always necessary to do. If on rooting up the young trees some of the roots are injured and have to be cut off, if there are many some of the branches should also be done away with, there being an intimate rela-

tionship between the roots and branches; hence it is easy to understand that if on transplanting a young tree the roots are nearly intact there is scarcely any necessity for cutting off or reducing the branches, while, on the contrary, if a portion of the roots has to be cut off, the branches should be proportionately reduced.

CULTIVATION.

The orange, the same as all other fruit trees, may be submitted to two different systems of cultivation; *extensive* or large cultivation, which means planting the trees at a good distance from each other, and availing of the intermediate soil for other crops, and *intense*, which is the cultivation in gardens, where the trees of short stems are planted close to each other and subjected to very careful operations. This latter system of cultivation is more costly than the former, but the results obtained are more certain, better, and more abundant. For extensive cultivation, plants of about the height of from 1 meter 50 centimeters to 2 meters, and a diameter of about 3 centimeters at a distance of a meter from the surface, are selected, and if only a single row is to be cultivated there is no need to trouble about how the trees are planted. Should the plantation consist of various rows close together, either the threefold system is adopted, each three trees forming an equilateral triangle, or else that called *marco real*, which is when each four trees form a perfect square. Employing the first system, more trees can be planted per hectare, and the soil can be tilled in three different directions, while in the second case it can only be tilled in two. When only one row is planted, the trees are placed at a distance of about 6 meters from each other if the soil be rich, and at only 5 meters if it be middling. Should intense cultivation be adopted, the trees are planted at a distance of from 3 to 5 meters from each other. In many parts of the province of Valencia the *marco real* of 6 meters is adopted, 276 trees being planted per hectare.

Cultivation during the first years.—As soon as the transplanting has been effected, which generally occurs during February and March, the formation of a garden should be attended to without delay, so as to have the plants in a productive state. The rule observed by cultivators in this country is so notably different as to confound the most practical gardener, but that which has been adopted by various intelligent cultivators and which has obtained the best results, is the following:

First year.—Ridges are formed at the sides of the rows of orange trees at about the distance of 75 centimeters from the trees. In the month of April the trees are each manured with one or two pounds of guano, or else with stable dung, or sewage, at the distance of about 50 centimeters from the trunk, to which a trench is dug around it, in which the manure is placed and afterwards covered over. The orange tree thus receives the irrigation from the space between the ridges, the rest of the earth remaining intact; thus the trees are prevented from

getting dirty, and both work and money are economized. When the season for irrigation arrives a thorough weeding takes place; thus the soil is cleared and continues clean. The irrigation is continued at its proper time, in order that the trees may not suffer, after which the corresponding weeding is effected.

Second year.—In February, previous to the moving of the trees, two or three pounds of guano, or stable dung, is given to each tree as aforesaid, but placed at the distance of 75 centimeters from it, or, in other words, at the edge of the ridges. Later, one or two baskets of any kind of manure are distributed around each tree; this may be done in April, which is the best month for doing it, but at any other time it may also be effected. The necessary irrigation and weeding must be strictly attended to, so as to preserve the orangery in good condition, and should any tree bear fruit, this should be plucked.

Third year.—In this year the young roots of the orange trees have reached as far as the ridges and the trees commence bearing fruit, which should be plucked as soon as salable, before Christmas, if possible, so as to be able to work the soil in February. There are some who counsel the plucking of the fruit as soon as it appears on the trees, without waiting to derive pecuniary advantage from it, leaving this for the following year. The ridges are now broken down, the whole superficies irrigated, and *hormigueros* are made. At a distance of a meter from the trunk of each tree small holes are dug with a spade, and after placing 2 or 3 pounds of guano in each they are covered up. After doing this the *hormigueros* are spread over the surface, the soil is irrigated, and at the opportune moment the ground half way between the trees is plowed, great care being taken that the plow does not touch the roots; the earth all round the tree must be well weeded and loosened to about the depth of 2 inches. Watering, plowing, and weeding throughout the year.

Fourth year.—From the previous year, the cultivation to be given to the orange tree when in a state of production has already commenced. The fruit is plucked as soon as possible. *Hormigueros* are not made this year. The soil is dug up or plowed from twice to four times, and is manured. The principal manure employed is guano, of which about 36 kilograms per hanegada are used. But should stable dung be employed, about six basketfuls are given to each tree, and it may be mentioned that there are some cultivators who use more manure during these first years. Pruning the orange trees is now commenced, the same being confined to a cleaning, and this should be effected between February and May, preference being given to the earlier months of this period. This is henceforward repeated every year, and, in order that the wounds occasioned to the tree may be of easy healing, the branches or shoots pruned off are always the thinnest or most delicate. Should the trees be required to be low and wide, the cultivator limits himself to checking their upward growth and favoring their spreading.

Certain intelligent observers maintain that it does not in any way prejudice the tree to lop off all the lower branches, which there is a certainty that if allowed to grow will rest on the ground as soon as they commence bearing fruit, thus impeding the necessary tillage. With reference to the remainder, it is prudent that they should be respected, and even the whole of them left untouched should it be noted that the tree does not suffer in its growth from an excess of branches, as said branches will later on distribute themselves, being obliged to do so from the weight of the fruit on them, and then a fitter pruning can be effected and the trees left in the condition in which they ought to be, the branches prejudicial either to the tree or its development being easily removed. The want of attention to this is the cause of various pruners finding their trees when least expected with fewer branches than the trunk could nourish, and consequently yielding less fruit than they ought to do.

The pruning is another of the most important operations of arboriculture, and very important in the cultivation of orange trees, for the following reasons, which it has for object, viz:

(1) To give the tree a regular, elegant, and graceful form, with relation to the spot where planted and the space occupied by it.

(2) To obtain from the whole of the principal branches a series of smaller secondary ones, bearing floral or fruitful buds.

(3) To make the fruitage more equal and at the same time proportionate to the strength of the tree, care being taken to avoid intermission.

(4) To augment the bulk of the fruit and contribute towards the same being more savory, on account of its juices being obtained with greater care and more completely.

Cultivation when in full production.—As has been seen, little by little many modifications have been introduced in the cultivation of this tree as it goes on developing. When the tree is in full production the cultivation is as follows: If the orchard is small, *hormigueros* are made one year, and the following one manure is employed; but should it be large, *hormigueros* are made in one half and the other half is manured. The following year the part where the *hormigueros* were made is manured, and in the other part where the manuring was effected *hormigueros* are made, and this system is successively continued alternately. Should the fruit be sold at Christmas, the soil is worked in February and March; but should the fruit not be sold at said period, the only thing to be done is to wait till it is plucked and then work the soil when possible. As soon as the tree is bare of fruit, the pruner commences his work, the best time for this being the end of February and during the whole of March. All dry branches are cut off, as are also all rickety shoots and the crooked branches which cross one another, and some of those from the center, when there are many close together; in short, all those branches that are calculated to prejudice the tree. The orange

trees must have sufficient space between each to allow of good ventilation, and they must be properly protected to enable them to resist the abrupt changes of temperature and at the same time give the full quantity of fruit they ought to yield. An excess of wood is prejudicial to the luxuriance of the trees, as likewise to their production, for which reason cultivators endeavor by pruning to widen the scroun of the tree, and check its growth in height. In September, before the trees begin to bud, they should all be well examined to remove all the young twigs that may have formed, only leaving such buds as are well placed for forming branches in the empty spaces there may be. This custom is very much neglected, for which reason trees are very frequently seen with twigs which have rendered useless the principal branches, thus disarranging the good order these should have in their proper distribution. One thing the pruner of orange trees must bear in mind is the following, viz, that the branches of these trees bear a heavy fruit, which makes them incline to either side; but there are some who do not take this into account and prune some of the branches that ought not to be touched, only fixing their attention on the place they occupied at the time of pruning, which was different to that where they previously were. Those who are not partisans of low trees, like the cultivators here, allow the orange trees a greater development and do not punish them so much in the pruning.

As soon as the pruning is finished the working of the soil is commenced. This is watered and dug up, and *hormigueros* made where they correspond, which last work should be carefully attended to, otherwise the farmer will spend both time and money uselessly. The *hormigueros* give very good results in strong and damp soils, but they are of little use in those that are sandy and dry A sufficient quantity of combustible should be employed and the earth so burned as to be neither too much nor too little so, but at the same time be blackish. This operation must be effected slowly and with great care. In the orchards where guano is employed, which is thrown round about the trunk, the *hormigueros* are made in the parts where said manure has not been used, so that the same may benefit thereby.

In the orchards manured with stable dung, which manure cultivators are accustomed to throw down in every row between each orange tree, the *hormigueros* are made in the clear spots that have not been manured. The part of the orangery that is manured is worked as follows: Some farmers irrigate the ground and when the proper season arrives throw down the manure, digging up the soil with a spade to the depth of 25 to 30 millimeters in the clear spots, and only 2 or 3 inches deep in the vicinity of the trees. As this is being done, men go behind and level the surface with a species of narrow hoe, in order that the earth may be more united and better preserve its seasoning. Other cultivators commence by making a string of ridges from one to the other side of each row of orange trees at the distance of the extremity of the branches,

and when this is done they throw down the manure, which, if in small quantity, is spread from the outside towards the trunk, or, if in large quantity, all over the space between the ridges. As soon as the manure is properly distributed the ground is irrigated, care being taken that the water enter gradually and equally, so as not to wash or carry away the manure, but let it remain where put. At the proper season the earth is burned over, and all thus mixed together. This latter system is preferable to the former, inasmuch as the water commences to dissolve the soluble portion of the manure, which thus at once penetrates the soil, and, the insoluble part being well soaked, is better mixed afterwards with the earth.

With reference to the first system, it frequently happens that the manure is spread over spots not yet properly seasoned, and in this case the surface manure or that at a small distance from the superficies is destroyed by the rays of the sun, a loss which is avoided by employing the second method.

At the expiration of a month or month and a half, should it not have rained and the weather continue fine, the orangery is again irrigated. After watering at the proper season, two plowings are given to the soil between the extremities of the branches of one tree and another, care being taken that the plow does not touch or injure the branches, and a good weeding is given to the ground round the trunk and under the branches. There are some orangeries where the plow can not be used on account of the trees being so thickly planted, the branches of one tree almost touching those of its neighbor. In these cases the soil is slightly dug up with a spade. This cultivation is continued throughout the year till the month of October, when the orange (fruit) begins to turn yellow, and then the plowing work is suppressed by many, who only keep on weeding to keep the surface clean. At this period of the year great care should be taken of the capillary roots, for if cut, the tree suffers and the fruit falls off.

The person who has to direct the cultivation of an orangery must always be on the watch, both as regards the weather and the state of seasoning of the soil. Should the earth be sufficiently moist, and there be signs of wet weather, or it be thought that the ground can pass some time longer without irrigating, this is not effected, and thus the cultivator economizes the cost of the labor necessarily attendant after each irrigation. Should the weather be cold the orchard is irrigated if possible, and thus the trees do not suffer so much from it. Should a period of dry weather be followed by a lowering of the temperature at the time when the orange trees are not fully seasoned, the fruit is likely to get frozen, and, to however little an extent this may occur, the orange is useless for shipment. It is always advisable for the proprietor of an orangery to have the irrigation done by a person that thoroughly understands it, so that the water may only enter the field with the required current, in order to prevent any of the surface soil being swept away,

as also to avoid the formation of any pools, especially about the foot of the orange trees or in close vicinity to them, the same being exceedingly prejudicial. According to the opinion of many experienced cultivators the orchards about Valencia may pass from four to five weeks during the summer season without being irrigated, but this should not be delayed longer, as it would only redound to the detriment of the fruit, which would not thrive as it should do. In the winter the gardens can be well left for eight or nine weeks without irrigating.

Water is so scarce in some parts in summer that frequently two months or even more pass without it being possible to irrigate the orangery, in which case the orange trees suffer a great deal and the fruit is small, thus causing a loss of importance to the grower. By giving a much deeper tillage the evil is in great part avoided, but exceeding care must be taken not to cut any of the roots, or should such occur that it should not be to the extent of causing the trees to suffer therefrom, for which reason it is best to perform the tillage gradually and by piecemeal. There are some plantations so exceedingly superficial as not to admit of deep tillage; thus the seasoning only produces effects of short duration, and when it rains said plantations scarcely benefit from the nutritive elements washed down and deposited by the rains on the surface, for as soon as the sun shines the greater portion are rapidly evaporated, having penetrated but such a short depth into the soil. These do not admit of any improvement; but it must be borne well in mind that the greater the quantity of earth turned over on planting, the tree to be cultivated has more nutritive elements, and, at the same time, requires less water for thriving.

Although all the trees of this species greatly love water, so much so that without it they can not live, still great care must be taken not to let them have too much, as, unless graduated with the greatest rigor, it does them harm; consequently it has to be arranged according to the season and the position and quality of the earth, so that on an average and reckoning on soil suitable for the vegetation of these trees it will be sufficient to irrigate the gardens once in every twenty days in summer and suspend it during the autumn and winter. Should the earth be at all compact it is only irrigated occasionally, but should it be loose it requires it oftener. In general, the degree of watering given to the soil should be sufficient to maintain the leaves smooth and straight without being twisted; should the irrigation be carried beyond prudent limits it is detrimental to the tree, and it may be easily known when the waterings are too frequent or exceed the necessities of the tree, as the leaves commence turning yellow.

Hormigueros.—All cultivators are unanimous in agreeing that the *hormigueros* give excellent results in the cultivation of the orange tree in this zone. The orange tree itself shows by its wider and deeper colored leaf how much it benefits from the *hormigueros*, and there are many who believe they contribute in giving consistence to the fruit.

For the preceding reason the owners of vineyards preserve the cuttings of their vines, preferring the ashes of these to those of other vegetables. By these means the physical properties of the earth are greatly and favorably improved, and in addition to the seeds and roots of weeds being destroyed so are also various insects and their grubs, besides which a quantity of vegetable ash is obtained, the use of which has always been greatly recommended, as amongst other elements the earth receives a quantity of potash, which is of great importance to plants. Notwithstanding the preceding the system of *hormigueros* is not suitable for all classes of soils, but it is to be preferred for those which are argillaceous, and the result will be much better with those which are red and humid.

The application of *hormigueros* to light, sandy soils, which are naturally acrid and poor in organic substances, always produces fatal results; but, nevertheless, there is an exception to this general rule, for chalky soils may be improved by the use of *hormigueros* when done with prudence, as by the action of combustion a portion of the chalk is converted into quicklime, and the same result is obtained as if the earth had been calcined, but in this case it is necessary that the manure should be applied previous to the *hormigueros*, which is the method adopted in various parts of this country.

FERTILIZERS.

This manure is largely employed, as by the use of it the development of the orange trees is advanced, and they give a larger yield. Its use gives excellent results in the young gardens where the trees are weakly, but in the orangeries where the ground is in itself rich it contributes towards the fruit being swollen or blown. The quantity of guano employed varies according to the state of the orchard. In general, a bag containing from 60 to 70 kilograms is used per fanega, but there are some cultivators who use double this quantity. The number of trees planted per hanegada varying so much, some growers have adopted the rule of putting about 4½ kilograms to each tree; thus the manure of each costs about 5 or 6 reals. If the guano is thrown down dry, small trenches are dug round about each tree, in which the guano is placed and afterwards covered over, but should there be a good supply of water at hand the guano is strewn over the earth under and round about the tree, and the garden is immediately irrigated.

The composition of the principal guanos may be, on an average, represented as follows:

Guano.	Ammonia.	Phosphates.	Azoe.	Nitrates.
				Per cent.
Chincha Islands	17 to 18	24 to 26	15 to 16	4.70
Tchabo Islands	7 to 8	30 to 32	8 to 10	4.70
Chilian	5 to 8	37 to 40	6 to 8	6
Patagonian	2 to 3	44 to 46	6 to 8	6
Baker's Islands (Pacific)	.....	78 to 85	0.3 to 1.2	3.5

It will be seen from the preceding there are some guanos which are very rich in phosphoric acid and contain but little ammonia, whilst in others the ammonia predominates, and the phosphoric acid is much less. Potash is found in but very limited quantity, and in some guanos there are no traces of it, as happens with the guano from the Lobos Islands. Magnesia is also met with, but in small quantity.

The organic substances are of easy decomposition, and cause the formation of carbolic acid, which, decomposing the silica of potash in the soil, liberates both the silica and the potash. Should the soil be poor in potash and magnesia, it soon becomes barren, although the quantity of guano may be increased. This should be well borne in mind in the cultivation of orange trees, rice, and sugar-cane.

Guano can not by any means replace good stable manure, but it is one of its best complements, its action being immediate, due to the great solubility of its principal fertilizing elements. Owing to the preceding the action of guano is of but short duration, and unless alternated with other manures, such as vegetable ashes, phosphates, stable dung, etc., the soil soon becomes exhausted. It is a very good custom to mix the guano with stable manure, as, in addition to economy and the facility and equality with which it can be spread in this manner, the results obtained are more beneficial, because, without lessening its efficacy, it neither burns nor destroys the young plants, although these might come in contact with it. By means of practical trials it has been found out that 10,000 or 14,000 kilograms of stable dung mixed with 150 or 200 kilograms of guano produce much more satisfactory results than 30,000 or 40,000 kilograms of stable dung used alone, and that the earth afterwards remain in a better condition for later culture. It has been proved that a ton of guano (1,000 kilograms) is equal in fertilizing effects to 33½ tons of stable manure, to 21 tons of horse dung, to 33½ of cow dung, and to 14½ tons of human excrement mixed.

One of the most perfect known manures is human excrement. In this is found all the elements required by vegetables, and in such a state that their assimilation takes place with rapidity, their effects being equal. Fecal matters are required as much for strong as for light soils, but nevertheless a distinction should be made, viz, when the excrement is in a desiccated state it is applied to argillaceous soils, and when fresh the preference is given to light ones. The fecal matters are very energetic, and their action on the vegetation is rapid, brisk, and of short duration, but whilst contributing powerfully to the first development of the plants they weaken the strength of them during their latter period. In short, it is a manure which quickly gives what it has to give, leaving little or nothing behind it. That human excrement is one of the most perfect manures is proved by its composition. According to Boussingault, 100 kilograms of human excrement in an ordinary condition contain 75 kilograms of water and 24.90 kilograms of dry matters, the principal elements being:

Oxygen, hydrogen, and carbon	20.10
Azoe	0.40
Phosphoric acid	0.20
Potash and soda	1.50
Lime and magnesia	0.70
Silica and other substances	2.00

On evaporation of the water, an inert matter of which it is despoiled as soon as possible, and considering only the dry matter contained in it, its composition is as follows:

Organic matter per 100 kilograms	80.14
Mineral matter per 100 kilograms	19.85
Lost	0.01

The organic matter contains 78.66 carbon, oxygen, and hydrogen, and 1.48 azoe. The mineral matter contains 0.82 phosphoric acid, 11.00 alkaline salts, potash, soda, and lime, and 8.04 of silica and loss—in short, all the substances that enter into the composition of vegetables; above all, the azoes, soluble phosphates, and alkalies, especially potash.

According to the experiences of Hermsbtael and Schubler, it has been proved that the soil without manuring of any description can produce the seed 3 times, but if manured with vegetable manure, 5 times, and if manured with common stable manure, 7 times, and if manured with pigeon dung, 9 times, and if manured with horse dung, 10 times, and if manured with human urine, 12 times, and if manured with solid excrement, 14 times.

The employment of manures is indispensable for activating the development of the orange tree and maintaining its fertility. Without them its growth would be slow, and it would soon be loaded with fruit of small size, which would exhaust the tree by reason of its abundance, and cause it to succumb long before giving its maximum produce.

The orange tree requires to be manured at two periods of its existence. During its first development it should receive it in abundance, so as to activate as much as possible the formation of its branches and at the same time obtain its maximum production. Afterwards, during the remainder of its existence, only the necessary quantity for its proper preservation and nourishment should be given it, its state of vegetation indicating the frequency with which it should be manured and the quantity to be given it. In the first period of vegetation of the orange trees manures of rapid decomposition should be employed, so that they may immediately proportion to the roots, and in abundance, the nutritive elements required by them. Such manures are the following, viz, well-prepared dungs, pigeon manure, the skins and refuse of oily seeds, guano, desiccated blood, and fecal matters. In the second period the manures of slower decomposition should have the preference, and these are horn raspings or scrapings, crushed bones, old woolen rags, horse hair, and the hair, tendons, and waste of tanning factories. The effect of these last manures endures for from five to eight years. Both classes of manure are distributed over the surface soil supposed to have roots

underneath, and particularly over the parts reached by the radical extremities, which is to say within the circumference covered by the branches of the trees. These manures are buried in the soil, about the end of October, at a depth of from 25 to 30 centimeters. Liquid manures are also sometimes employed, such as fecal matters, skins, and refuse of oily seeds, and guano, the whole mixed together with a sufficient quantity of water, but the effect produced is immediate and of short duration. These should not be made use of except during the heat of the summer and at the moment when the vegetation is most active, for if applied during the winter they might lead to the putrefaction of the roots. In general, they are not resorted to except for such trees as appear languid and seem diseased, and a trench of about the depth of 5 centimeters is dug around the spot where this liquid manure is to be placed, which is afterwards covered over. In order that the earth may be fertile, it should contain all the necessary elements required for obtaining the proper development of the plant that has to be cultivated in it, and these must be in a perfect state of assimilation, but compost and vegetable and animal remains that may be added to the earth in the shape of manures do not return to it the principles lost by it yearly with the crops raised; and Liebig, seeing that in all countries the agricultural production was diminishing, commenced a series of studies to ascertain the cause thereof, the result being such as to clearly demonstrate what was taking place. He found out that all plants required to assimilate a greater quantity of phosphoric acid than that contained in compost, and consequently proposed the employment of bones and natural phosphates, as also mineral phosphates, coprolites, etc. Hence the necessity of mixing or alternating complete with incomplete manures, so that the earth may always retain its fertilizing properties.

The method for calculating the substances which in the shape of manure should be given to the soil as a necessity, after the collection of each crop, is as follows:

1. The cultivator should avail of all the vegetable manure obtainable from the refuse of each crop, to which should only be added the fixed principles of the fruit, the nitrogen required by it being supplied by the ammonia in the air, as also that remaining on the surface soil after being washed there by the rains. To ascertain, in this case, the quantity of nutritive principles required to be incorporated with the soil, the probable average weight of the fruit to be produced each year should be calculated, having ascertained which, and taking into account the weight of ashes, this problem is easily solved. Knowing the weight of the ashes of 100 parts of the fruit, a proportion is established which will give the required result.

2. Should the cultivator not wish to avail of the vegetable refuse of each crop, he should add, first, the fixed principles of the fruit, and, secondly, the fixed principles of the branches and leaves. An analogous calculation to the preceding will give the sum of nutritive principles to be added to the soil in the shape of manures.

3. The case where the cultivator only utilizes a portion of the vegetable refuse. Knowing the total quantity of leaf and branches obtained with each crop, by difference may be ascertained the quantity of leaf and vegetable refuse that is not returned to the soil, and with this datum may also be calculated the nutritive principles that should be administered, which will be:

(1) The fixed principles of the fruit.

(2) The fixed principles of that part of the leaves and branches that are not utilized as manure.

(3) The quantity of nitrogen contained in the leaves and branches which is not availed of for manure.

The study of the orange tree has determined by analysis that its ashes give the following results per cent., viz:

Composition of the ashes of the fruit.

Constituents.	Mineral manure.	Compost.
	Per cent.	*Per cent.*
Potash	20.15	15.28
Soda	10.22	12.14
Lime	30.12	30.24
Magnesia	9.62	8.10
Phosphoric acid	20.04	18.24
Sulphuric acid	1.08	4.14
Silicic acid	4.50	5.82
Oxide of iron	4.25	4.75
Loss	0.62	1.29
	100.00	100.00
Ashes of the fruit ..... per 100	3.57	3.48

Composition of the trunk, branches, and leaves.

Constituents.	Trunk and branches.	Leaves.
	Per cent.	*Per cent.*
Potash	14.15	10.18
Soda	10.67	10.82
Lime	31.57	41.22
Magnesia	10.64	6.54
Phosphoric acid	18.82	19.47
Sulphuric acid	4.89	4.53
Silicic acid	2.82	5.48
Iron and loss	6.44	1.76
	100.00	100.00
Azoe of the leaves ..... per 100	1.57	1.60
Ashes of the leaves ..... do	6.32	6.20

The orange trees analyzed were from Alcira (Valencia); some manured with compost and others with mineral manure. The proportional difference noted between the assimilative nutritive principles is not to be wondered at, for, as has been observed, this varies with the same plant according to the nature of the soil and the manure employed.

DISEASES.

The development of disease in the orange trees is greatly contributed to by atmospherical phenomena, various insects, and parasitical plants, as also the neglect or limited knowledge of the cultivators..

The effects of cold, snow, humidity, dews, frosts, hail, wind, burning rust, chlorosis or yellowing of the leaves, and withering are as follows:

Cold.—This commences by destroying the tender shoots of the trees, followed by the drying up of the blossoms, after which takes place the disorganization of the fruit and afterward that of the leaves, branches, trunk, and finally roots; crevices open in the branches, which bend and turn black, the leaves wrinkle, roll up, and die; the flowers become blackened and disorganized; the fruit loses its brilliancy, dissipates its odorous principles, loses its juice, and becomes bitter, falls off the tree and rots; or, if the cold has not been very intense, the fruit is half frozen and remains on the tree till the following spring.

Snow.—This injures the trees both from cold and its weight. Should the storm be heavy and the fall great, this bears down the branches and in many cases breaks some. As regards the cold occasioned by it, this does not always do harm, but when it does do so it is very frequently confined to the young shoots. Should the weather be fine both before and after a snow-storm, the cold water produced on thawing produces its effects on the young branches, for which reason no time should be lost in shaking all the snow off them before nightfall, for should it be condensed on them the harm occasioned would be of much greater importance. The system of placing heaps of damp straw at fixed distances between the trees, so that on setting said heaps on fire in order to obtain a smoke between the sun's rays and the trees has produced a magnificent result. If after snowing the weather continues threatening, or there be heavy clouds floating about, neither the trees nor the fruit will suffer any harm, although the thermometer might be below zero.

Humidity, dews, and frost.—An excess of humidity in the atmosphere during the fecundation of the blossom generally produces bad results, especially in such places where the ventilation is limited, should the temperature at night decline to any extent. Frost with an east wind occasions a deal of harm, but should the wind be from the north it is not so bad. Little that is economical can be availed of in large orchards, but in reduced ones the harm is lightened at small cost by availing of certain materials for shelter, of little value, which in certain districts are plentiful.

Hail.—This causes a deal of damage to the fruit. Should the storm be of short duration and the wounds occasioned by it be of slight profundity, these will soon heal up and everything continue well, but certain black stains will remain, which reduce the value of the fruit. Should the storm be heavy, it completely destroys the orange, which quickly enters into a state of putrefaction.

Wind.—This exercises its influence on the orange trees in two differ-

ent ways, viz, by its force and by its temperature, the injury caused being greater or less according to the position in which the orchards may lie. North, northwest, and west-northwest winds are the most dangerous in certain places on account of their temperature, for as a rule they dry up the extremes of the branches exposed to their influence, besides which the shoots of certain species become unsound. Those that cause most harm in the south of Europe, by reason of their impetuosity, are the south, south-southwest, and south-southeast, according to the position of the valleys. All these winds come with puffs of extraordinary strength and destroy the branches unable to resist them. The only remedy in these important occasions is to cut off everything that has been destroyed and dried up. With the object of partially avoiding these misfortunes, the custom of producing trees of shortened growth has of late years vastly extended.

The burning and rust.—The disease known as burning is due in great part to the too abundant dews that fall here, which are evaporated with an excessive rapidity by a burning sun. To the same cause may be traced the disease vulgarly called "rust," or a class of mildew on the leaves of the orange trees. This manifests itself on the fruit by a red stain, which as it increases becomes much darker, and finishes by disorganizing the pulp and rotting the fruit. The cleaning and pruning of the trees is the best known method against this evil.

Chlorosis.—The chlorosis or yellowing of the leaves, and also the withering, are generally attributed either to the superabundance of humidity in the soil, to an excessive quantity of branches having but little ventilation, to the want of iron in the earth, to a species of torpor in the absorption of the mineral matters existing in them, and to the alteration of the roots if old. The remedy to be employed to combat this evil is distinct according to the cause by which it is produced.

INSECT PESTS.

These attack the roots, trunks, blossoms, and fruit, consequently they are organical beings most pernicious to the trees, frequently causing exceeding harm on account of their extraordinary multiplication. Of this numerous class of insects, the only descriptions which up to date have proved enemies to orange trees, lemon trees, and others of the *Auranciacea* family, which are cultivated here, are the coleopteral, hemipteral, and dipteral.

Coleopteral.—This description contains more than fifty thousand species, and only one is injurious to the orange tree, the same being called *Othiorhynchus meridionalis.* This devours the leaves and tender shoots of the orange tree, and is a class of beetle or winged insect. The young insect is sufficiently perceptible, being about a centimeter long, of reddish-black color, and with grooves on the elytron. During the daytime it hides itself in the earth, where it should be hunted and de-

stroyed, and at night it climbs the trunks, crawling up to the extreme height of the trees in search of the young leaves and tender shoots, which it devours. In general, it is not one of the most terrible enemies, on account of the facility with which it can be found out at the foot of the trees and exterminated.

Hemipteral.—Of this numerous family there are six which are enemies of the orange tree, namely, *Aphis auranti*, *Chermes hesperidum*, *Chermes oleæ*, *Chermes aurantii*, *Chermes coccineus*, *Coccus citri.*

Aphis auranti.—A kind of small vine-grub of green color varied by black, and with long feelers, and small green horns black at their points. It is generally seen in the orange trees in the month of September, and when the trees commence to bud it usually fixes at the extremities of the young shoots a quantity of black puceron, which occasions a vast deal of damage to them, inasmuch as by reason of rendering them useless their growth is greatly retarded. By applying sulphur to the shoots with great promptness the evil is soon and perfectly overcome.

Chermes hesperidum.—This gall-insect, called by gardeners the louse of the orange tree, is not confined to the same, being also found on other trees, such as the laurel, myrtle, pomegranate, and others. It is found in the shape of an oval body nearly hemispherical, of brown color, somewhat lucent. It prefers the under part of the leaves, but is frequently found on top of them in a line along the center nerve or stalk, being met in great number on the young branches, and when numerous they occasion the loss of a large quantity of sap, which exhausts the trees already languid from any other cause. Fumigations of sulphur or tobacco are not at all efficacious with these insects; the only true means for diminishing the quantity of kermes consists in simply cleaning the plants with a brush or horse-hair glove, for once that the insects are separated from the branches or leaves, they do not climb up again, and shortly die. In the orchards carelessly cultivated, as also the spots having but little ventilation in which the orange trees are thickly planted and where the sun scarcely penetrates, is where this insect is principally found.

Chermes oleæ.—This insect, although more natural to the olive tree, is also found attacking the orange tree. The small shell of the female is semiglobose and of a grayish-brown, more or less dark in color. The superficies is marked with two thick transverse corrugations, which make it seem rough.

Chermes aurantii is big, oval, very long, and of a blackish-brown color.

Chermes coccineus.—This is called the red kermes, its body being round and of a bright red color. It has two long feelers, very movable, and six white feet. This gall-insect lives on top of the leaves, where it deposits from ten to fifteen eggs, producing a corresponding number of young insects of pearly-white color, which insects on growing to the length of half a millimeter turn red. The existence of this insect is indicated by the appearance on the under part of the leaves of the orange

trees of some yellowish and concave spots, in which concavities they are found, and should they be allowed to spread much the tree greatly suffers from loss of sap.

Coccus citri (orange cochineal insect).—This is an hemipterous homopterous with an oval-oblong body, convex on the top and slightly swollen underneath. The color is an ashy gray approaching a pale yellow, and it is covered with a cotton-white powder; at the sides are some appendices, and the hind legs are longer than the front ones. The great fecundity of these insects causes the damage occasioned by them to be very considerable, on account of the infinity of their bites, which accelerates the perspiration of the trees. Amongst the various methods employed for its extermination, the only one which, up to date, has given good results has been the employment of slaked lime squirted over the branches and leaves by means of a gardener's syringe or small hand pump, taking care that all parts infected are touched. This operation is effected when the vegetation commences, which is when the insect takes up its berth. The trees attacked should be immediately pruned and cleared so as to augment the ventilation and allow the sun to penetrate in every direction.

Diptera.—There is also a dipteran which is an enemy of the orange trees, known by the name of *Ceratitis hispanica*, or orange fly. This insect in grub state lives in the pulp of the fruit, which it alters profoundly, and causes the same to fall off from the tree before its maturity. The insect is one-half of a centimeter long; of a black color in the ground, although with some yellow-whitish spots and lines; the wings are transparent and crossed by four yellow and black ribbons; the belly peduncular and round behind. The female possesses a borer with which it pierces the skin of the fruit to place an egg in the hole thus prepared. This egg produces a grub which disorganizes the pulp of the fruit and makes it fall to the ground, where it suffers its last metamorphosis. The female deposits her egg when the oranges are still small. By the time the putrid orange falls down, the grub has already arrived at its complete development, and left the same, penetrating in the earth to proceed to its transformation. This winged insect appears in the beginning of the spring. The grub does much harm to the orangeries of the South.

Ants and spiders.—Ants not only injure the fruit but impart to it a somewhat disagreeable smell and flavor; they frequently establish themselves at the foot of the trees and form galleries in all directions amongst the roots, causing such trees as are attacked to languish and ofttimes to perish from the formic acid spread around them, which acid burns the young roots. In this case it may occasion damage to the trees. When an ant-hill is found in the neighborhood of a tree, the following is recommended as an excellent remedy, viz, to take a flower pot, closing the hole in its bottom, and placing it upside down at the side of the hill. The ground is then well watered, and the ants, finding

this convenient shelter, shortly shift their quarters there, taking with them their wives and grubs, so as to keep them warmer. By repeating this operation two or three times they disappear.

Spiders are carnivorous and feed on the blood of the insects they may catch, for which reason they occasion little or no damage to the orange tree.

PARASITIC PLANTS.

(1) *Demathium monophyllum* or *Carbon.* This is the most common, and, at the same time, most dangerous. The unseen stamens and pistils of these plants, although but slightly adherent to the vital parts of the orange tree, multiply with an inconceivable facility. Some call it *fumago citri* on account of the smoky appearance presented by the shoots attacked by the disease. Its appearance is that of a black powder, the congregated particles of which extend sidewise and form a species of very thin crust, which finishes by covering the trunk and branches. An infinity of small and fine peduncles grow out of said crust, bearing on their apex a cellule or black spongy substance, which contains the spores or seed. It is a true arthrosporic excrescence, in which the reproductive organs appear in abundance and confounded with those of the vegetation of the cryptogamia. This fabulous quantity of germs naturally causes the reproduction of the parasite to be exceedingly rapid, especially in damp and shady spots, but it must be borne in mind that it but slightly adheres to the sides of the orange tree. The aspect of an orchard infested by this parasite is sad and disconsolate; the bright and cheerful verdure of the brilliant leaves of the orange trees completely disappears; the branches and foliage acquire a blackish and dark shade, and the fruit loses its yellow or golden color, being also covered with a dark incrustation, or black smut, and falling off the trees entirely altered.

(2) *Lichen aurantii.* This is the other cryptogamia, equally parasitic, and likewise occasions much damage to the orange tree. It presents itself in the form of a thin substance, not thick in growth, and of a whitish gray color, covered with small protuberances, which have the appearance of organs of fructification. This plant is really more detrimental and dangerous than the other, in consequence of the tenacity with which it fastens itself on the different parts of the orange trees, but it is fortunately rarer, and the late years of dry weather have caused it to disappear from various gardens of the Mediterranean littoral, which were infested with it.

For the destruction of both parasites, slaked lime is recommended, but the better system for destroying not only these but also all other lichens, existing like parasites, which fix themselves on the trunks and branches of trees, paralyzing the functions of same and rendering them unfit to produce an ordinary crop, is to well prune the trees, so that the air, wind, light, and solar rays may thoroughly penetrate them. In such

gardens, where the trees are very numerous and where the trunks are very close together—above all in such spots as the hollows of valleys or humid plains—the trees should be thinned out in such a manner that the branches of the trees can not interlace, and that the atmospheric fluids may have free access on all sides.

Ulcers.—When a tree receives a wound penetrating to the ligneous part and leaving the same exposed to the air, atmospherical humidity, and rain-water, it alters the exterior coats of whiteness and promotes the spilling or wasting of a dark liquid of much acridity. This spilling or wasting impedes the formation of small excrescences on the edges of the wound, which are the commencement of its cicatrization, so that instead of the wound closing up, it continues opening more, little by little, gradually changing the bark around it and the ligneous part of the tree. Such a wound may cause the death of the tree. This disease is known by the name of "Ulcer" or "Gutter." The ulcers are produced with much greater facility when the wounds present a less united superficies and are more separated from the vertical, as in such cases the rain-water is better retained in them. The most efficacious remedy to be employed in such cases is as follows: Commence by removing all the altered part until a perfectly clean wound is presented, which should be left in this state and in contact with the air for one or two days to dry it up, after which it should be completely anointed with ointment. Several ointments have been proposed as effective, viz, first, the "Ointment of San Fiacre," composed of clayey soil, cow dung and goats' hair or wool, and afterwards a grafting mastic, which should be composed of substances not liable either to melt under the influence of the sun, or crack from frost. One of the best compositions is the following:

	Per cent. of weight.
Resin	28
Burgundy pitch	28
Yellow wax	16
Tallow	14
Sifted ashes or ocher	14
	100

This mixture should be applied sufficiently warm as to be in a liquid state, but not so much so as to effect the texture of the trees, applying it with a brush. This ointment should be preferred to those which become defective through heat and are washed off by rains.

The disease of the orange tree, known by the name of *Mal de Goma*, is the most to be feared, as it causes such immense losses to cultivators. This disease consists of a gummy oozing, generally occurring either in the spring or in the autumn. It attacks either the trunks of the trees just above the surface of the soil, or else the roots themselves. This disease commences to show itself by some drops of gum appearing on the trunk, which still appears sound, but this spilling continues increasing, the bark is perforated, and the flow of gum augments, being fluid,

turbid, grayish in color, and of bad smell; the bark then raises, drying or rotting on the roots, and the plant, which commences turning yellow, weakens and dies.

Recent studies of this disease have proved that its existence is to be attributed to a microscopic fungus belonging to the group of spheroids. Where this fungus does not exist there is no disease; where the germs of it do not reach the disease can not unfold itself; and where the conditions of life are wanting for this small vegetable, whether proceeding from nature or occasioned artificially, the fungus dies and the disease is extirpated. The fruit of this fungus forms itself about the end of July or August, being preserved during the winter for propagating its spores in the spring.

The best remedy against this disease, and which from experience has given the best result, is sulphurous acid, mixing 15 bulks of sulphurous acid, concentrated at 66° Baumé, with 100 liters of water.

Method of application.—Remove the earth round about the tree for the circumference of a meter or so, until no diseased roots are met with. The hole should then be dug deeper, but with great care, so as not to injure the sound roots near the trunk, to about the depth of half a meter if possible. The earth extracted should be piled up to burn it in a *hormiguero*. All the roots that have completely lost their bark should be cut off, as also those which are in a state of putrefaction, and these roots should be burned. Afterwards all the sickly portions of the trunk, until the bark is saturated, are well moistened with the prepared liquid, as are likewise the diseased parts of the roots that may be met with in such condition. It is estimated that about five liters are sufficient, and another five liters for irrigating in the vicinity of the tree. The hole is then filled up either with the burned earth or with new soil, and afterwards watered lightly.

Ten liters of this water saturated with sulphurous acid are more than sufficient for a tree somewhat grown, but practice will teach the greater or less quantity that should be employed.

RICHARD LOWENSTEIN,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Grao of Valencia, June 30, 1883.

WESTERN ANDALUSIA.

REPORT BY CONSUL OPPENHEIM, OF CADIZ.

(Republished for Consular Reports, No. 41½.)

ORANGE CULTURE IN WESTERN ANDALUSIA.

In pursuance of instructions contained in Department circulars, dated Washington, December 4, 1883, I have the honor to inclose herewith

a report upon orange culture in this district. I have also prepared a report on olive culture. Raisins are not prepared within my consular jurisdiction, this branch of fruit culture being localized on the Mediterranean coast of Spain, and I have therefore omitted that subject. The same will apply to dried figs, which are not produced here. Though the fruit is raised largely in Cadiz and neighboring provinces, it is generally eaten fresh, and the very small percentage which is dried turns out very mediocre in quality, and hardly enters into commerce at all.

Varieties and maturity.—The leading varieties of oranges produced in Western Andalusia are: 1st, the Chinese orange (*Naranja china legitimas*), of which the pulp is very sweet and juicy, with thin and smooth rind; this variety is the most highly prized; 2d, the common orange (*Naranja comun*), having sweet but not very juicy pulp, the rind rugose, very thick, and easily detached; 3d, seedless oranges, of excellent quality, first cultivated by Carthusian monks at Seville; 4th, the sour orange (*Naranja agria*), having a somewhat bitterish acid flavor; 5th, the sour-sweet orange; 6th, the Mandarine orange, a very small fruit of reddish pulp and exquisite taste and flavor; the last is not extensively cultivated.

The orange tree, when raised from a cutting (which is the most usual mode), comes into bearing five years after planting, though the acme of productivity is not reached with most varieties before some ten or twelve years more. How long they remain fruitful is an undetermined question; that is to say, when the trees are in favorable environment and well cared for. There are in the garden of the Alcazar, at Seville, several orange trees yet in bearing to which very old age is attributed, one being said to have been planted at the time of King Pedro I, about 1350 to 1366; several others dating from the time of Charles I are in a better state still, and, although the trunks are hollow, the foilage is luxuriant, and they rise to a height of from 13 to 15 meters. Their trunks measure from 1.24 meters to 1.40 meters in circumference, and the age ascribed to them is about three hundred and forty years.

Planting.—The trees are occasionally raised from seed, but this mode although practiced by careful growers is not generally resorted to in this district, on account of the longer time required in bringing the orchards into bearing. The best time for putting the seed into the ground is the month of April, when the mean temperature is about 18° centigrade. With this temperature and the proper conditions of humidity the orange seeds germinate in less than a fortnight. In Seville and adjacent provinces the seed of the sour orange is preferred to all others, as it appears to develop more rapidly, the trees thus raised being later on grafted with any variety desired. Some experts (Riso) hold, however, that the plants raised from the seed of the Chinese variety, although of slow growth, are of a more robust habit and withstand cold weather more successfully. When raised from seed, the usual mode is to keep the shoots in the seed-boxes or hot-beds from four to five years,

when the grafts are inserted; the plants are then kept four to five years longer in the nursery, thus taking from eight to ten years before the tree is permanently located in the orchard.

The general mode of propagation is by cutting. Large fine twigs of last summer's growth are planted, either in November or in February. In Western Andalusia the cutting is originally chosen from the variety which it is desired to reproduce, and of course no further operation is necessary. In Valencia, however, and adjacent districts, the cuttings are chosen in reference to other points (they are often taken from the lemon tree), and then grafting or budding is resorted to, the graft or bud being of the variety it is desired to raise. The operation is usually performed during the winter of the following year, and the grafts are inserted at a height of about 10 centimeters above ground.

Insect pests and fungous growth.—Orange trees are exposed to the attacks of both insects and of parasitic growths. The latter are, in this section at least, considered as by far the most formidable, and will therefore claim our first attention. These parasitic growths are all low cryptogamic plants, and may be roughly divided into two classes, viz, those attacking the roots, and such as confine their action to the exposed parts of the tree.

Among this class the most frequent is a species of white mold, belonging to the genus *Byssus*, which surrounds the roots of the tree with its mycelium. The white filaments of which it is composed form a dense network around the roots, and have given it its popular name of *blanco de las raices* (*Anglice*, "white of the roots"). A well-known Spanish carpologist writes about this pest in the following terms:

> This parasite surrounds, exhausts, and dries up the roots of the tree, which, however, does not greatly alter in appearance during the wet season, but when the rising of the sap takes place in the spring (and in a few cases somewhat later) the affected trees quickly succumb. Indications of the evil are a certain backwardness in budding and blossoming, accompanied by pallor of the leaves and general vegetative weakness. This shows that the *Byssus* has attacked the roots. In order to counteract its effects it is necessary to completely expose the roots of the affected tree, remove the filaments of the fungus, and cover the roots with fresh soil. A hole should be dug around the tree until the roots are laid bare; the moldy surfaces should then be carefully and thoroughly scraped, and such parts as show deep injury or have begun to putrefy are to be cut off. The usual practice has been to wash or bathe the cleansed roots in water strongly charged with cow-dung, but in Valencia excellent results have been obtained from the use of hydrosulphide of lime, of a solution of sulphide of copper, and also of protoxide of iron. When refilling the cavity around the tree the fresh soil should be carefully screened, in order to eliminate all fragments of dead roots or of rotten wood, as it is upon such matter that the *Byssus* develops most readily. It is further advised to place upon the roots thus cleansed and treated a small quantity of well-rotted cow-manure, and above this fresh earth, mixed with salt, lixiviated ashes, and pulverized bones.

There are undoubtedly a number of the noxious fungoid growths to the attacks of which the roots are exposed, but the general features, both of the development of the parasites and of the approved mode of combating them, are, in the main, as described above. One of them,

however, deserves special mention, as it proved extremely destructive in the Spanish provinces of Valencia and Castellon (in 1867–'69), and is believed to be identical with the parasite that destroyed nearly half the orange trees on the Hyères Islands in 1849–'51. This parasite is now known as the *Sphœrium Wolffensteiniani*, in honor of a distinguished mycologist who published an exhaustive monograph on the subject in 1878. At the time of the first appearance of this parasite—or orange disease, as it was then called—in the Peninsula, the Spanish Government appointed a commission to investigate the disorder. The recommendations embodied in the report of said commission were, in the main, similar to those mentioned above. The roots are to be uncovered, all the attacked parts removed and buried; copious irrigation is to be avoided, as also the use of all manure not thoroughly rotted, and especially its application close to the roots. If the soil is humid—and this seems a strongly predisposing cause—thorough draining is necessary. As efficacious remedies are mentioned tar, soot, and protosulphate of iron, which act as antiseptics; also, powdered lime and sulphate of copper. Otto Wolffenstein, the mycologist above referred to, gives it as his opinion that the most efficient curative agent is a solution of hydrated sulphuric acid, which, according to said writer, unites the following desiderata: First, it kills all the spores; second, it penetrates the soil to a sufficient depth without oxidizing; and third, it does no injury whatever to the roots. Ten liters of the solution is stated to be sufficient for a tree of a fair size; the solution to be applied in the month of November, as this is the time when the spores are most easily stamped out.

There does not appear to be any consensus of opinion as to the greater or lesser liability of the different varieties to the attacks of these parasitic pests, nor does such consensus exist upon the comparative resistance of seedlings and the grafted or budded trees. It is, however, conclusively established that low ground, lack of proper drainage, and insufficient cultivation are the most favorable conditions for the development of the fungous parasites of this class.

The most widely spread and probably also the most damaging parasite of this class is the *Demathium monophyllum*, believed to belong to the genus *Torula* (Person), and commonly called *tizne* (*Anglice*, smut) in Spain. It looks somewhat like black dust or soot, extending in parallel lines and forming a thin crust or coating over the stems and branches. From this crust soon arise an incalculable number of minute pedicles, each one bearing its black *sporangium* filled with seed-spores. The reproduction of this parasite is incredibly rapid and vigorous, but fortunately it does not adhere strongly to the tree, hence its removal is not attended with great difficulty; the important thing is not to allow it to get too much headway. The treatment after the removal of the mold is to cover the affected parts with a solution of lime, which may best be applied with a brush. Another cryptogam, called by Du Breuil *Lichen*

aurantii, attaches itself chiefly to the trunk and larger branches. It forms a thin coating, grayish or yellowish-white in color, with numerous small protuberances that appear to be the reproductive organs of the plant. This parasite is not common, but it is considered very damaging on account of the great tenacity with which it adheres to the trees. There are, however, a number of lichens which attach themselves to the trunks and limbs of the orange tree without causing any apparent injury to its growth or to its bearing power.

Great humidity of the atmosphere, want of light and of ventilation, are known to favor the development of all these cryptogamic forms, and orchards most affected by them are such as occupy low, close situations, and do not have the trees placed at sufficiently large intervals. A sufficiency of space for the free circulation of air and the free admission of sunlight is, therefore, along with proper cultivation, the best preventive.

A species of phylloxera, first observed on the islands of Naxos and Paros, is known to attack the roots of the orange tree, but this pest has not up to now made its appearance in the Spanish orchards. Landerer, the writer who first described this microscopic parasite, recommends the use of a solution of carbolic acid, and of a mixture of sulphur and lime, the latter to be spread around the tree.

The insects causing most damage to orange orchards are several Hemiptera, one of the Diptera, and a few Coleoptera.

Among the Hemiptera the chief varieties are the following:

Chermes hesperidum (Linn.). This insect is oval in shape, with hemispherical back, and is of a glossy brownish hue. In the spring the shell of the female contains a large number of eggs resting upon a layer of whitish downy matter. The eggs hatch rapidly, and the small larvæ are turned loose upon the twigs, leaves, and buds, feeding upon the juices of the tree. They finally attach themselves permanently (usually to the lower surface of the leaves), remaining there until the following spring, when a new generation is produced.

Chermes oleæ (Ber.). This species is found upon the orange tree, although its more usual habitat is the olive. The shell of the female is hemispherical, of a grayish brown, and has two deep transversal furrows, giving it a roughened appearance.

Chermes aurantii (Du Breuil). Has been chiefly noticed in Southern France and in Algeria. It is a large insect, in the shape of an oval, and of a brownish-black hue.

Chermes coccineus (Du Breuil) is hemispherical in shape, of a vivid red color, has two largish antennæ of great mobility, and six white legs. This insect confines itself to the leaves, upon which it lays from 10 to 15 small eggs, that produce an equal number of small larvæ of a pearly-whitish color. When they have reached a length of about half a millimeter, the insects assume the red coloring; they are frequently moving about with great rapidity in the vicinity of their meeting places, and are usually found in small swarms or colonies.

For the destruction of all the above-mentioned insect pests the liberal application of powdered sulphur is recommended, such application being probably most thoroughly affected by using bellows. In many districts, however, the method usually followed is to thoroughly scrape and cleanse the attacked branches, removing the badly-damaged parts, and thereafter applying to the affected surfaces a solution of lime (as advocated by Du Breuil) or strong vinegar (according to M. Goreau), using a brush for such applications.

Aphis aurantii (Blanchère) and *Aphis citris* (Du Breuil) are by some thought to be identical. This is a very large group, and exact scientific identification is therefore difficult. The most common variety encountered here is the *pulgon del naranjo* (*Anglice*, flea of the orange tree), which is a small insect, green in color, with black stripes, having large antennæ and black extremities. They are most plentiful in September. During spring and summer they multiply rapidly, usually taking their stand upon the distal ends of tender shoots, where a certain number remain during winter in a lethargic state.

For the destruction of the *Aphis*, Du Breuil strongly urges fumigation with tobacco, for which the bellows may be used with advantage. One thorough fumigation ought generally to be sufficient, but if this is not found to be the case the process may be repeated until the insect is extirpated.

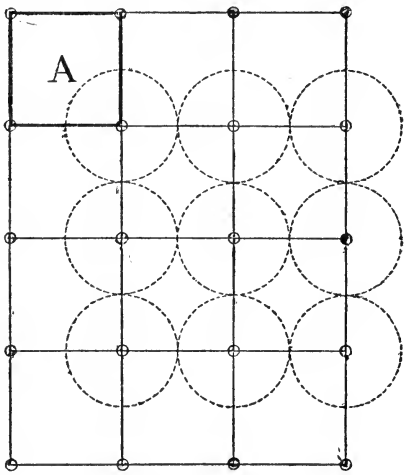
Amongst the noxious Coleoptera the most generally known is the *Othiorhynchus meridionalis* (Schoeul). This insect is about one centimeter in length, of a reddish-black hue, and has striated elytra. During the day it hides on the ground near the trees, where it is most easily pursued and destroyed; at night it climbs upon the tree and ascends to the highest parts, usually seeking for the most tender buds and leaves.

All of the above-mentioned species limit their ravages to the branches, leaves, and buds. There are, however, some insects not less noxious which chiefly attack the fruit of the orange tree. The most dreaded of this class is the cochineal bug (*Coccus citri*). This insect is of a lengthened oval shape, with convex back and somewhat rounded abdomen; its color varies from an ashy grey to a pale yellow, and at certain times it is covered with a white, fluffy dust; it has peculiar prolongations or processes on the sides, and the posterior extremities are longer than the others. The male differs from the female in having two large transparent wings. The female secretes a whitish, cottony down, wherein yellowish eggs, varying in number from 150 to 400, are deposited. When the larvæ are liberated they attach themselves to the tenderest buds and shoots. There does not seem to be a fixed season for the liberation of the larvæ, further than that the hatching process is most abundant during periods of high temperature. The damage caused by this insect is noticed more especially by the great loss of fruit, amounting in some cases to half or even two-thirds of the usual harvest. In the French departments of the Var and Alpes Maritimes, as well as in Mentone,

this pest has been especially severe. A French entomologist, M. de la Blanchère, has observed that this cochineal bug has itself an enemy or parasite in a species of *Syrphus*, which places its larvæ near the undeveloped bugs, upon which the larvæ feed. To this valuable auxiliary the same author attributes the disappearance of this pest from certain parts of the Mediterranean coast. De Breuil recommends sprinkling the trees attacked by the cochineal bug and larvæ with a solution of lime.

Among the Diptera the only known dangerous enemy of the orange grower is the *Ceratitis Hispanica*, commonly called *mosca del naranjo* (*Anglice*, fly of the orange tree). This fly deposits it larvæ in the pulp of the fruit, which is thereby prevented from developing, and generally drops from the tree in an immature state. The full-grown insect is about one-half centimeter in length; it is black in color, having, however, yellowish-white spots and striæ; its wings are transparent and crossed transversely by four yellow and black bands; the abdomen is pedunculated and spherical at the posterior end. The female is provided with a "borer," with which it pierces the rind of the fruit, in order to deposit its ova therein; the larvæ feed upon the pulp, and cause the fruit to fall off and decay. The orange grower can only protect himself against this insect by great watchfulness in at once removing all the attacked fruit, and thereby preventing excessive propagation of the pest.

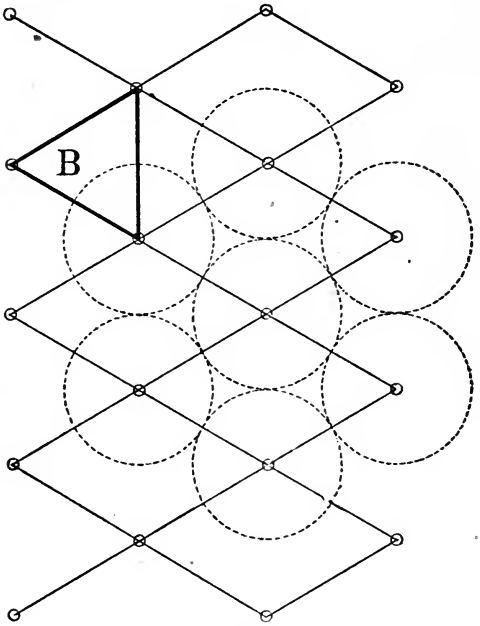
Laying out the orchards.—In the province of Seville, and Western Andalusia generally, the usual distance between the trees is 8 meters. In localities where the trees reach a good size it is advised to enlarge the distance to 9, and even to 10 meters. Of course, with small or dwarf



Marco real.

varieties the intervals may be decreased. In Valencia and Castellon 6 meters is the usual distance. At intervals of 8 meters there will be 156

trees per hectare (1 hectare=2.4711 acres), and allowing only 6 meters the number will be 276. The mode of planting usually resorted to is in parallel lines (here called "marco real"), the distance between such lines being equal to the interval between the trees, thus causing each four trees to occupy the four angles of a perfect square, A, as shown in the diagram. The objection to this mode is, that supposing the roots to extend in circles, it leaves between each such four circles a large space unutilized save by roots of a length greater than the radius of the circle. In order to reduce this loss the "diamond" plan is resorted to (*tres bolillo*), which the second diagram illustrates. The equilateral



Tresbolillo.

triangle B serves as a basis in this plan, and it is evident that the spaces between the circles are considerably reduced, as compared with the arrangement in squares.

Sites and soils.—The orange tree, which in the interior of Andalusia is hardly found beyond latitude 37° 30′, thrives on the Mediterranean coast of Spain up to 42°. This is explained by the well-known moderating influence which the vicinity of large bodies of water has upon the climate. It is generally admitted that orange culture can not well be carried on where the mean winter temperature is much below 9° to 10° centigrade, or where a fall below —4° centigrade is experienced. The trees are injured by lengthened periods of cold weather, especially when accompanied by frost and snow. These facts would of themselves afford the grower some guidance in the selection of a proper situation. There

are some very fine prolific orchards in the rear of Tarifa, on the Straits of Gibraltar, as well as on the delta and the lower reaches of the Guadalquivir. On hillsides or uplands the trees thrive well, provided the altitude is not such as to act virtually in the sense of latitude. It is not common, I believe, to find productive orchards in this section at an altitude exceeding 250 meters above sea-level. It is also considered desirable to have the trees sheltered from very strong winds from any quarter. In Andalusia winds from the north and east are the most prejudicial, the first as being cold and raw, and the east wind as having a desiccating, withering effect. Very steep hillsides are an undesirable location on account of the insufficient retention of moisture; very low grounds are open to the contrary objection, and though large yields are frequently made in such localities, the trees are liable to suffer in wet seasons, and expensive drainage is usually imperative. Of more importance far than the merely topographical features of the soil is its composition, which will be treated further on, as also its stratification. It should be borne in mind that the orange tree extends its roots primarily in a vertical direction, thus requiring a permeable subsoil. Whenever an impervious stratum is reached whilst this vertical development of the roots is still going on, the trees suffer, and in many cases perish. Fine orchards, composed of trees of from thirty to forty years of age, have been known thus to waste away.

These few remarks are sufficient to show that categorical information as to the influence of topography upon yields is most difficult to give. Vicinity to the sea seems to be anything but injurious, though I do not recollect ever having seen orchards in immediate proximity to the sea without some natural or artificial shelter. In the valley of the Guadalquivir, both above and below Seville, very fine orange crops are raised, the altitude probably not exceeding 80 meters above sea-level. The soil of one of the best orchards of that section, on being subjected to levigation, was found to be composed as follows:

	Per cent.
Sand	43
Clay	31
Calcareous salts	15
Organic matter	11
	100

Soil of this character, or of somewhat similar type, when accompanied by permeability of the subsoil, may be looked upon as well adapted to orange culture. Soils having impervious subsoil, or such as are water-soaked or difficult to drain, are especially to be avoided; in such situations the upper layer of soil is frequently very rich, and on that account an orchard may appear to thrive luxuriantly at first, but as soon as the roots strike deeply, disaster will overtake the trees.

Irrigation and cultivation.—Orange groves in Western Andalusia require irrigation during the hot season at intervals varying from ten to

fifteen days, according to the greater or lesser porosity of the soil. The first irrigation commonly takes place after the dropping of the blossoms, though many practical growers recommend not to begin before July, alleging that irrigation before that period is generally hurtful. It seems, however, a fair presumption that the conditions of humidity prevailing during the previous spring are a factor to be considered in this respect. Irrigation is to be discontinued in October. The system most in vogue is to have circular excavations surrounding each tree, said excavations being connected by small gutters or canals, into which the water is allowed to flow. This is the most economical method, and that is its strong point in a country like this, where the rain-fall is light. Some of the more careful orchardists are, however, opposed to this mode, urging that the practice supplies an excess of water to the main roots (which leads to asphyxia), whilst the eccentric rootlets are insufficiently, or rather, not supplied at all. Where there is no scarcity of water it would certainly be rational to experiment upon the effects of irrigation upon the entire surface of the orchard, thus supplying the outlying rootlets with the needful humidity.

March is the month when plowing is first applied to the orchards, at which time the irrigating ditches are restored or renewed. This is also the proper time for putting on manure, which should be placed around the trees, in zones of 1 to 2 meters in radius, this being done before plowing has begun. Where the trees are planted in squares (*marco real*) cross-plowing at right angles is in order; where the "diamond" (*tres bolilla*) plan is adopted, the first furrows may be crossed and recrossed with advantage. The second plowing takes place at the end of May. A plow making a furrow of from 20 to 30 centimeters in depth is generally used. In August the soil should be hoed thoroughly; this process to be repeated in September or October. The best growers affect the use of the harrow after each plowing, as it leaves the soil in a mellower condition, breaks up the clods, and destroys the weeds.

Before the orange trees have attained their full size (usually for five or six years after placing them in the orchard) it is not uncommon to raise some leguminous or root crop on the land, taking care, however, to leave a circle of one meter in radius around each tree unoccupied.

Fertilizers.—The raising of successive orange crops year after year must necessarily end in withdrawing from the soil all available material for such culture, hence the attention of agronomists has been long devoted to devising means for ascertaining the exact nature of the constituents withdrawn, as well as the best mode of resupplying the soil with such constituents or their equivalents in an assimilable form. The following analyses taken from a recent treatise by a well-known Spanish agronomist,* show what these constituents are and their relative quantitative proportions:

* Don Luis Maria Utor, "La Agricultura moderna."

Composition of the ashes of the fruit of the orange tree.

Constituents.	Analysis No. 1.	Analysis No. 2.
Potash	20.15	15.28
Soda	10.22	12.14
Lime	30.12	30.24
Magnesia	9.02	8.10
Phosphoric acid	20.04	18.24
Sulphuric acid	1.08	4.14
Siliceous acid	4.50	5.82
Oxide of iron	4.25	4.75
Residue unaccounted for	0.62	1.29
	100.00	100.00

Weight of the ashes of 100 kilograms of fruit: Analysis No. 1, 3.57 kilograms; analysis No. 2, 3.48 kilograms.

Composition of the ashes of the trunk, branches, and leaves of the orange tree.

Constituents.	Analysis No. 3.—Trunk and branches.	Analysis No. 4.—Leaves.
Potash	14.15	10.18
Soda	16.67	10.82
Lime	31.57	41.22
Magnesia	10.64	6.54
Phosphoric acid	18.82	19.47
Sulphuric acid	4.89	4.53
Siliceous acid	2.82	5.48
Iron and unaccounted residue	0.44	1.76
	100.00	100.00

Weight of ashes per 100 kilograms: Analysis No. 3, 6.32 kilograms; analysis No. 4, 6.20 kilograms. Nitrogen: Analysis No. 3, 1.57 per cent.; analysis No. 4, 1.60 per cent.

Leaving out of account the material required for the yearly production of leaves and buds, as to which precise data are wanting, and taking analysis No. 1 as a basis, the cropping of 16,000 kilograms of fruit from one hectare will withdraw from the soil 571 kilograms of mineral constituents, in the following proportions:

	Kilograms
Potash	115.06
Soda	58.36
Lime	171.99
Magnesia	51.50
Phosphoric acid	114.43
Sulphuric acid	6.17
Siliceous acid	25.69
Oxide of iron (and residue)	27.80
Total	571.00

Nitrogen,* 0.85 per cent. of 16,000 kilograms.

The absolute and proportional percentage of the mineral constituents of stable manure is of course extremely variable. The following figures

* Gasparin, an eminent French writer on orange culture, allows 1.19 kilograms of nitrogen per 1,000 oranges. Taking the average weight per thousand at 140 kilograms, a crop of 16,000 kilograms of fruit will require 136 kilograms of nitrogen, equal to about 0.85 per cent of the weight of crop.

are given as the quantity of such constituents usually contained in 30,000 kilograms of what may be called stable manure of the normal type:

	Kilograms.
Potash	121
Soda	8
Lime	144
Magnesia	60
Phosphoric acid	51
Sulphuric acid	30
Siliceous acid	150
Oxide of iron	102
Hydrochloric acid	9
Total	675

The general composition of these 30,000 kilograms of stable manure may be summed up thus:

	Kilograms.
Mineral constituents	675
Nitrogen	120
Carbon, hydrogen, and oxygen	5,205
Moisture	24,000
	30,000

Suppose 30,000 kilograms of such manure to have been applied to one hectare of ground from which a crop of 16,000 kilograms of fruit has been raised, let us see what mineral constituents have been replaced and what proportion is still wanting.

Constituents.	Contained in crop.	Supplied by manure.	Deficiency.
	Kilograms.	*Kilograms.*	*Kilograms.*
Potash	115.06	121	Excess.
Soda	58.36	8	50.36
Lime	171.99	144	27.99
Magnesia	51.50	60	Excess.
Phosphoric acid	114.43	51	63.43
Sulphuric acid	6.17	30	Excess.
Siliceous acid	25.69	150	Excess.
Oxide of iron	27.80	102	Excess.
Hydrochloric acid		9	Excess.

The deficiency of lime may be left out of consideration here, as there is generally a very large amount of this constituent stored up in the soil; there remains, therefore, to be dealt with the deficiency of soda and of phosphoric acid. The first may be met by the addition of common sea-salt to the extent of 300 kilograms. The 63 to 64 kilograms of phosphoric acid may be supplied by adding either 1,000 kilograms of fowl manure, 400 kilograms of guano, or 300 kilograms of ground bones.

The nitrogen withdrawn by a crop of 16,000 kilograms weighs 136 kilograms; supplied in 30,000 kilograms of manure, 120 kilograms—showing a deficiency of 16 kilograms, for the supply of which may be added either ordinary stable manure, 4,000 kilograms; *fenta desecada*

(dry cow-dung), 1,000 kilograms; or pigeon-dung, guano, or bones, 300 kilograms.

From the above data it appears that the following mixture may advantageously be applied to each hectare thus cropped:

	Kilograms.
Manure	30,000
Ground bones	600
Seasalt	300

Yield and cost.—The yield of the orange tree, admitting all other conditions to be equal, must necessarily vary according to age and species. In Castellon the product is stated at from 400 to 500 oranges per tree at ten years old, but full productivity is not reached before from sixteen to twenty years. In Valencia the product per hectare is given at 15,000 kilograms, equivalent to about 107,000 oranges, allowing about 140 kilograms per 1,000. Very large single trees, of course, give occasionally extraordinary yields. There are in Mairena del Alcon (province of Seville) two colossal trees known as "Los Migueletes," of which each has been known to yield up to 38,000 oranges in one year. Large and robust trees having attained their full growth frequently yield from 2,000 to 5,000 each, but in planting on a large scale, from 800 to 1,000 per tree is all that can be assumed as a fair average yield. In the district of Seville the product of an orchard of full-grown trees is reckoned at 180 cases, worth on the ground about 10 pesos ($1.93) per case. The cost of exploitation is summed up approximately as follows:

	Pesos per hectare.
Rent of ground; also interest and amortization of working capital invested	500
Irrigation (raising water, usually by animal-power)	80
Manure (34,000 kilograms)	272
Hoeing, weeding, pruning, and harvesting	250
Plowing (with oxen usually)	90
Proportion of cost of keeping one horse or mule for hauling	70
Sundries and unforeseen expenses	60
Total expenses annually	1,322
Taking gross product as above at	1,800
Leaving net profit	478

From which, however, an impost of 20 per cent. must be deducted, leaving the grower, therefore, 382.40 pesos per hectare (equal to $29.87 per acre) as final net income. Calculating the total annual cost of cultivation at 1,500 pesos per hectare, this represents a return of something over 25 per cent. on the rolling capital thus employed. The total yield of the orange and lemon orchards in Spain was (in 1879) estimated at 119,437,439 kilograms, which, at the rate of 12 pesos per 100 kilograms, gives a total value of 14,332,492 pesos, and the area cultivated was given as 8,362 hectares. The rate of 12 pesos per 100 kilograms is a low one, and is, moreover, only applicable to the fruit in the orchards, before packing and transportation expenses have been incurred. There seems

good reason also to believe that the quantity of the crop was underestimated, as by deducting the quantity exported in that year the remainder for home consumption would be demonstrably below even a very moderate estimate.

Exports.—The following are the latest official figures showing the total exports of oranges and lemons from Spain:

ORANGES.

Years.	Quantity.	Value.
		Pesos.
Average of 5 years, from 1877–'81.....M..	673,199	10,366,003
Calendar year 1881.....M..	599,562	8,993,430
Calendar year 1882.....kilograms..	116,667,600	29,166,900

LEMONS.

Average of 5 years, from 1877–'81.....kilograms..	4,971,089	894,796
Calendar year 1881.....do....	5,392,916	970,725
Calendar year 1882.....do....	5,415,503	974,791

The destination of these exports for the year 1882 is given as follows:

Countries.	Oranges.	Lemons.
	Kilograms.	*Kilograms.*
Germany	81,760	929,952
Algeria	17,500	8,550
Belgium	817,880	69,175
France	19,448,660	1,094,568
Holland	203,840	248,019
Great Britain	87,131,800	1,229,033
Italy	2,240	16,358
Sweden	4,060	29,644
United States	8,843,240	1,695,302
Porto Rico	116,620	.....
Russia	.....	27,525
Portugal	.....	2,000
Denmark	.....	53,125
Gibraltar	.....	4,180
Morocco	.....	392
Dominion of Canada	.....	7,680
Total	116,667,600	5,415,503

NOTE.—Up to 1881, inclusive, the orange exports were entered in thousands.

ERNEST L. OPPENHEIM,
Consul.

UNITED STATES CONSULATE,
Cadiz, February 29, 1884.

BARCELONA.

REPORT BY CONSUL SCHEUCH.

ORANGES.

Varieties.—Not all the varieties of orange trees are known to us, for being indigenous to the tropical regions of Asia, not all were brought over to Europe where about one hundred and seventy species have been

described by botanists; but seventy-seven kinds are particularly known and divided into thirty-two of sour and forty-five of sweet oranges. Of the latter only the ten species mentioned in my report of 1874 are cultivated for their commercial importance, in this province; of these the most valuable is the common, middle-sized orange, heavy in hand, of very fine peel, aromatic smell, and containing a great amount of juice of great sweetness, spiced by an agreeable dash of sourness. Although there is also another very sweet orange called Imperial and Orange of the Queen, this early orange makes its appearance in the market at the end of October, when the same is exported to France and Algiers, and consumed in Spain. None of these oranges are exported to the United States nor to England, where they are not liked, for they are of too great a sweetness, without tartness, and found unpalatable, therefore of a limited cultivation.

The best results in this country are yielded by the open orchards in the districts of Alcira, Carcajente, and of Gandia, in the valley between the city of Valencia and the mountain chain which limits the province, facing the south and being sheltered from the north winds by said mountains; these orchards produce the finest and sweetest oranges, enjoying higher prices in the market than those of the district of Castellon, less shielded from the north winds, and producing oranges of a more inferior quality and prices; they also ripen later than the first.

Situation.—Some years ago a Frenchman founded in this port an important agricultural establishment called "La Malvarosa," situated about half a mile from the very sea-shore where he cultivates with excellent results oranges on a large scale. Notwithstanding, on the road from this port (Grao) to Valencia, distant about 3 miles, and in the public gardens in and round this city, they grow very poorly, yielding only a few small and sour fruits, while in the botanical garden on the west end of the city they grow with satisfactory results.

The soil of this locality is very sandy, and the subsoil may want certain elements and proper consistency in order to form a soil able to produce oranges in perfection. Before risking his capital the owner of the land should examine its topographic situation, analyze the surface and subsoil to the depth of 1½ to 2 meters, and consider the possibility of irrigation.

The best soil of Alcira, Carcajente, and Gandia analyzed, gave: Sand (silicate), 70 per cent.; clay, 10 per cent., and salt of lime (carbonate), 20 per cent.

Cultivation.—Excepting some rare cases, such ground is not cultivated, and when so, then the distance between the rows of the trees, which generally is from 3 to 5 meters, must be from 6 to 7 meters, and consequently at the expense of a certain number of trees planted less in a given space.

An intelligent orange-grower never cultivates the ground between the trees, as such would make difficult the free access of airing the same, and tilling of the ground round each tree in a space of 3 meters in diame

ter, the irrigation of trees from the top by pumps, and examines the roots in case of certain diseases. Moreover, the plants cultivated between the trees would act as parasites, exercising a pernicious influence upon the trees and fruits, which become less in quality, quantity, and size, and are more exposed to diseases. This is also the reason why the oranges grown in closed gardens, where the ground between the trees is often cultivated, are less valuable than those grown in orchards with free ground.

Yield.—The creation of an orchard should always be executed by the owner of the land and not by a farmer, because then all will be done in due order; he will select a good plantation and prepare the ground conveniently; he will not cultivate the ground between the trees; all the labor can take place in due time and the unfolding of the trees will progress more uniformly and better. At the end of ten years he will have recouped himself; moreover the benefit and the orangery will be in a better shape of production, duplicated or triplicated the value of the land and consequently also the rent and assured the progressive augmentation of production after the end of the first ten years.

It is very difficult to give with exactness a valuation of the yield and cost of an orchard, which may vary according to circumstances, but all circumstances being equal, the production must be by far greater in the vigorous and virgin soil of America than in that exhausted of Europe.

The following is the average yield and cost of the creation and cultivation of an orange orchard in a field of 8 hanegadas, distant 2 miles from a town, with high road and natural irrigation by a canal.

One hanegada valenciana, equal to 831.10 square meters, or the $\frac{4}{5}$ of 1 acre.
One arroba valenciana, equal to 12.888 kilograms.
One real, equal to 5 cents American money.

Cost during the first ten years.

FIRST YEAR.

		Reals.
Two hundred and eight young orange trees from the nursery at 26 per hanegada, at 5 reals		1,040
Their carriage to the place		30
Four men to plant, at 8 reals		32
Ten arrobas (128.880 kilograms) guano, at 18 reals per arroba		180
Collocation of same		10
Made the plantation, digging and cost		220
Improvement of the conditions of the soil and hormigueros in May:		
Journey work	120	
Wood	200	
		320
Six irrigations paying 1 real per hanegada		48
Six weeding under the trees		72
Contribution of the field		182
Perceiving rent		1,080
		3,214

SECOND YEAR.

Manuring with two baskets of manure for each tree, being 42 loads, at 5 reals	210
Carriage of the manure	60
Collocation of same	16
Four arations, at 15 reals each	60
Irrigations	48
Weedings	72
Contribution	182
Rent	1,080
	1,728

THIRD YEAR.

Eighty loads of manure	400
Carriage	120
Scattering	16
Two arations	30
Irrigations	48
Weedings	72
Contribution	182
Rent	1.080
	1,948

FOURTH YEAR.

Two arations and made hormigueros, all cost	350
To impulse the plantation, adding guano for	480
Collocation	10
Irrigations	48
Weedings	72
Contribution	182
Rent	1,080
	2,222

FIFTH YEAR.

Manuring this year with 160 loads of manure, at 5 reals	800
Carriage and collocation	200
To conserve the maturity, for want of water, did order during the summer aration after each irrigation, and expended	100
Irrigations	48
Weedings	72
Contribution	182
Rent	1.080
	2,482
Calculating now at the rate of 200 reals per hanegada during the following five years, the orchard being near the town, would result	8,000
Contribution	910
Rent	5,400
	14,310
Total	25,904

Yield during the first ten years.—First year, nothing; second year, took off the fruit; third year, collecting 8,000, sold at 60 reals per 1,000; fourth year, collecting 31,000, sold at 60 reals per 1,000; fifth year, collecting 42,000, sold at 60 reals per 1,000.

The practical farmer calculates that, considering the good state of the orchard, after the first ten years the oranges collected will result at the rate of 6,000 per hanegada. If so, 8 hanegadas at 6,000, 48 by 10=480 thousands, which sold at 60 reals would give 28,800 reals.

	Reals.
Yield in ten years	28,800
Cost of cultivation, etc	25,904
Benefit	2,896

Maturity.—The orange trees come into full bearing after ten years, and, according to their health and strength, augment and remain bearing for many years. In this province (Valencia) exists a sweet orange tree called the arriero, of forty-four years, whose yield arrived to be of 8,000 and 10,000 oranges. There exists another of the age of fifty years having produced 14,000 oranges. They attain a very high age. Some authors assure that some did arrive to the age of over five hundred years. In the neighboring province of Murcia exist several trees of the age of two hundred years, each yielding nearly 8,000 oranges.

In Nice existed an orange tree of an unknown high age, whose trunk wanted two men to embrace; about 50 feet high; its branches covered a table of forty covers. One half of the tree yielded every year from 5,000 to 6,000 oranges, whilst the other half reposed, giving only a few hundreds; in the next year this half yielded the 5,000 or 6,000 oranges, and the other reposed, and thus successively.

LEMONS.

Lemon trees are cultivated in the same manner as the orange trees, belonging to the same family of the *Citrus;* those grown up direct from the seed are generally the healthiest and yielding more and better fruits than the ingrafted. The export and cultivation of lemons is very limited in this province (Valencia). Some trials to export them to the United States were without success, because of their short durability and interior quality; those of Malaga are better, but the best in quality and durability are those of Italy; it is therefore from Italy whence those who intend to create a lemon orchard should procure a selected seed.

FREDK. H. SCHEUCH,
Consul.

UNITED STATES CONSULATE,
Barcelona, February 15, 1890.

MALAGA.

REPORT BY CONSUL MARSTON.

Varieties.—The names of best varieties for profit are "China" oranges and the "Castillian" lemons. There is another kind of lemon called the "Reales," which is large and long, but the Castillians are more productive.

Location.—The trees that produce the varieties named above are grown in all parts of the province of Malaga where there is water, and generally by the side of small rivers and streams.

The distance from the sea is about 2 kilometers, and the elevation above sea-level 100 feet. Any elevation with water and sun will answer. The more sun the better. Level land; sandy subsoil is the best.

Climatic.—Temperature 45° to 90° Fahrenheit; average, about 78°. Nights immaterial; for both oranges and lemons moist days, or ordinary atmosphere, are most beneficial.

No record of rain-fall is kept in Malaga. Rain-fall is always good for both trees and fruit.

Irrigation.—In summer only, three times a week, at any stage of growth and as much as possible; never water for ten or fifteen days before picking fruit.

Cultivation.—Twice a year by plowing or digging around the roots.

Fertilizers.—Stable manure, placed around the trees to the depth of 18 inches or 2 feet, in the month of January.

Pruning.—After four years old begin to prune; height immaterial; if plowed with horses or oxen, then prune off lower branches; if you dig around the roots by hand with spade it is immaterial.

Picking.—Picked when nearly ripe, for exportation; while they are green and before they turn yellow; nothing done to cure them here.

Packing and shipping.—Packed in tissue-paper first and placed in cases one-eighth, one-fourth, and one-third, and sometimes one-half chests for shipment.

Planting and Propagating.—The distance the trees are planted apart is 12 yards; they are propagated from seed of bitter oranges, and grafted. The best varieties are seedling.

The orchards are large and small.

Maturity.—Begin fruiting at four years of age; largest crop at about fifteen years; twenty-five years full maturity.

Insect pests.—Both lemon and orange trees, in certain locations, have been attacked by some kind of insect, but growers here are ignorant as to its name or nature.

There are parasites, but their names are not known; they injure the fruit by eating the buds.

Packing and curing.—Never pick either oranges or lemons while wet

or immediately after rain; let them be perfectly dry. They are both hard and green when picked for exportation and taken to the place of packing, and there assorted as to sizes. The United States prefer the small, England and France the large, and North of Europe the medium sizes. They are then wrapped in fine tissue-paper of different colors and placed in rows in the case or box by women and girls, who are remarkably adept at the work. The package is then taken by men, the lids nailed on and strapped with the ordinary wooden hoop-pole split in two pieces, branded, and then they are ready for shipment. The season for picking lemons is September and October, and for oranges November and December each year.

H. C. MARSTON,
Consul.

UNITED STATES CONSULATE,
Malaga, December 6, 1889.

TURKEY.

REPORT BY CONSUL-GENERAL HEAP, OF CONSTANTINOPLE.

(Republished from Consular Reports No. 41½.)

Varieties.—Although there are other kinds in the Levant, only three varieties of oranges and four of lemons are commonly grown, of which the oranges known as "Candian," "Syrian," and "Mandarinian," and the lemons as "Candian," "Chio," "Paros," and "Messina," are considered the best. There is, however, a variety of lemon (the *Citrus lumia*) called the "sweet lemon," of which the juice is sweet. This is much used by calico printers in patterns with dyes containing iron, to produce greater clearness in the white parts.

Propagating.—The trees are grown both from seedlings and from grafts. Lemons are generally propagated first from the seeds of the wild orange, as it has been found that the wild fruit tree bears the cold better. When three years old the plants from these seeds are taken up and replanted in other places, and the year following the lemon plants proper are grafted upon them. Five years afterwards they begin to bear fruit, and at fifteen years they reach maturity. When great care is bestowed, inarching is practiced, but growers generally prefer to propagate by grafting, while always rearing a portion of the trees from seedlings and from cuttings, especially the latter.

Insect pests.—Unless carefully tended, both orange and lemon trees are frequently injured by small canker-worms and moths, which eat the leaves, etc. Powdered charcoal ash is placed on and around the trees, which destroys the eggs of the worms, etc. Sometimes a mixture of charcoal, soot, and strong vinegar is sprinkled on the tree once or twice, as may be deemed necessary.

Disease.—Unlike the orange, which presents a fine, close head of deep-green foliage, the lemon forms a straggling bush or small tree 10 or 12 feet high, with paler, more scattered leaves, and short, angular branches, with sharp spines in the axils.

In damp valleys the lemon is liable to be attacked by a fungus (the *Dematium monophylium*), which covers the stem, leaves, and fruit with a black dust. Trees grown in the shade and not properly exposed to the sunlight suffer most severely from this cause. Syringing with milk of lime when the young insects are hatched, and before they have fixed themselves on the plants, is found to be the most effectual remedy known for these pests.

Planting.—In some places 7 to 8 paces, say 18 feet, is considered a sufficient distance between both kind of trees, but generally there is no strict rule for either.

Situation.—Orchards and orange gardens are to be found thriving in almost every situation suitable for the cultivation of the grape, but they give the best results when situated on hill-sides or gentle slopes, where, together with a good supply of moisture under ground, they are exposed to a gentle heat by day, and fresh, cool breezes by night. As before mentioned, they suffer and fade when deprived of light as well as warmth, and they never prove successful when the ground is damp for long in summer or is not properly drained. Both oranges and lemons thrive in a rich soil, and succeed well in good, strong clay with moder ate care and attention.

Although it is not the best situation for them, both lemons and oranges can be grown close to the sea-coast, especially lemons, which are more hardy than oranges.

They are strongest in the Archipelago, and on some of the islands they flourish almost anywhere as long as their roots do not come in contact with salt water.

Irrigation.—When the trees are young they are generally well watered by hand during the summer, but there is no system of artificial irrigation in general use, and the ground receives a similar treatment to that bestowed on the vineyards cultivated by the natives, as before mentioned.

Yield.—Oranges, when gathered for export, should be quite ripe. Those fully formed and with the color just turning from green to yellow are chosen. They are wrapped in fine paper or in the husk of Indian corn. A tree 20 feet in height and occupying a space of about 20 feet in diameter will frequently yield from 3,000 to 4,000 oranges in the course of the year. Many trees live from one hundred to one hundred and fifty years. As lemons are more profitable to grow than oranges on account of their keeping qualities and their being less liable to injury during voyages, their cultivation is preferred in many parts of the Levant. The lemons are gathered green; the finest are picked out and packed in cases containing about 420 fruits; also in boxes, three of

which are equal to two cases, each lemon being separately wrapped in paper.

Habitat.—The little island of Andros produces 10,000,000 lemons annually; they are exported to Constantinople, the ports of the Black Sea, and those of the Danube, realizing an average price of $4.80 to $5.75 per 1,000. A similar quantity of excellent quality is exported from the larger island of Chio, where they are gathered in May, and a second crop in November and December.

Great numbers of "sweet lemons" are grown in the islands of the Archipelago and the districts around Smyrna.

The greater part of the oranges are grown in Candia and in Syria, especially in the neighborhood of Jaffa. In Paros, Mitylene, Tenedos, and Samos both oranges and lemons are largely cultivated for exportation. The dried and candied rind of the bitter orange, known as "orange peel," is largely used in flavoring confectionery.

C. H. HEAP,
Consul-General.

UNITED STATES CONSULATE GENERAL,
Constantinople, April 10, 1884.

PART 2.

OLIVES.

CONTINENT OF AFRICA.

MOROCCO.

REPORT BY CONSUL MATHEWS, OF TANGIER.

(Republished from Consular Reports, No. 41½.)

THE OLIVE.

Varieties.—Several varieties are grown, wild and domestic. It is impossible to proclaim in an absolute manner which variety produces the best results, as in every country one is preferred which suits best the locality and climate; and it happens that a variety which prospers in a certain climate in others fails to produce the same results; therefore it must be ascertained by trials of the best and hardiest varieties.

The varieties which will stand the severest cold weather are those nearest to the wild, such as the Odessa and the Beaked olive (*Olea Europea rostrata*, Clem.); the olives of these trees are not large, but of a medium size.

There are nineteen defined varieties of olives; the principal ones are, the Royal Seville, of large fruit, which is gathered in a green state for pickling; the Queen of Commerce, of very large fruits, with small, white spots, also gathered while green, for pickling; the Eicholine, of long, oval shape. The Empeltre olive tree produces a small olive, oval-shaped, bearing abundantly on the sixth year of its plantation, and increasing every successive year; the fruits ripen very early and yield abundant oil and of a superior quality; is a variety greatly cultivated in Aragon, Spain; a similar variety, but neglected, grows near Mequenez, in this country.

The province of Soos, south of Morocco, produces great abundance of oil. The plantations of olive trees in this province are very numerous; many of the trees are of great size and beauty, and are planted in a very whimsical and peculiar manner in the neighborhood of Messa, the cause of which I learned from Governor Gilali Benhamos: that one of the emperors being on his journey to Soudan encamped here with his army, that the pegs with which the cavalry picketed their horses were cut from the olive trees in the neighborhood, and that these pegs being left in the ground on account of the sudden departure of the army, the olive trees in question sprung up from them. I have seen the Moors in the province of Angera, between Tangier and Ceuta, planting olive, pomegranate, and quince trees by cutting bits of wood of these trees,

from 18 to 20 inches in length and 3 in circumference, which they knocked into the ground with a large stone while the ground was soft after a rain; two years after I saw these pegs, most of which had taken root and were in a fair way of becoming good trees.

The province of Soos produces abundant oil, which is brought to Mogador and shipped to England and France. The people of Ras-el-Wad make two sorts, Tabaluht and Zit-el-aud. The former is made from the olives when green and nearly ripe, with which they frequently grind limes or wild thyme. This oil is very rich and white, and not inferior to the best Florence or Lucca oil. The Zit-el-aud is made from the olives when they are quite ripe and black, and after they had laid on the ground some time. In this state they yield the greatest quantity of oil, but it has a strong taste, which is not disliked by the natives. It is used in Europe in the woolen and soap manufactories.

Cultivation.—In the countries where the olive tree is cultivated they generally plant it on the worst soils on the hillsides; they are raised from seed, stakes, slips, cuttings, from young shoots, layers, and by grafting or budding.

Vegetables, such as beans, peas, etc., can be cultivated between the rows of olive trees, provided the stubble, stalks, leaves, etc., while still green, are returned to the soil and worked in around the trees.

Propagation.—Propagation from seed, owing to the oily nature of the pulp attached to the olive seed, is tardy, unless these are placed in lye-water made of potash or ashes for three days, which will remove the greasy substance and allow the water when sown to penetrate into the small kernel inside. The soil should be light, well manured, and worked deep; the beds laid out in an open, warm situation. The seeds should be sown a foot apart in drills. The best time for sowing is early in the autumn and watered. The plants will come up the following year, and the earth may be stirred between them while the weeds are being removed. The second season, when the plants are a year old, they should be budded with known varieties—with those producing the largest fruit, if intended for preserving and speculating with the olives, or with varieties rich in oleous properties, if chiefly desired for the extraction of oil. A year after budding they may be planted in rows 3 feet apart, and the plants 2 feet from one another, in case their final spot is not ready to receive them, or else they may at once be transplanted in the place where they are to remain. In all this lifting and transplanting much care is necessary lest the roots should suffer any mutilation or injury. Thus followed the young tree will commence to bear olives on the third year, and be in full bearing in its tenth year.

The propagation by slips or stakes does not require budding nor grafting, and they make the best olive orchards; all the orchards and groves in Morocco, and in Andalusia, Spain, where we see some of the finest trees in the world, are from slips or stakes. These should be chosen from the knottiest parts of the branches of the olive; they must be four

or six verdures old, at least, in rows where the soil has been worked and mixed with well-rotted animal manure, and so placed as to admit irrigation. The slips or stakes should be planted half a yard apart, and one yard at least from each row. In cutting the slips or stakes the top part exposed to the air and sun should be at once covered with the varnish used by grafters to prevent cracking or decay by the rains. There should be no less than two-thirds of the length buried in the ground when they are 2 or 3 feet in length. There are several other modes of propagation from the protuberances of the roots cut in pieces, and planted in rows 18 inches apart, and watered until the shoots are 3 feet high, when they are again separated and transplanted; also by layers, and from suckers, etc. The time for these operations is from the middle of autumn to the first of March. In plowing the ground care should be taken not to go near the tree and injure the roots; the ground around the tree must be worked lightly with a dented hoe; the vegetable and animal manure must be buried in a ditch dug around each tree, but distant from it from 3 to 8 feet, according to its age and size, in order not to disturb the roots.

Queen olives.—There are two varieties of trees which produce the large olives of commerce:

(1) The Royal or Queen, Sevillian, known as *Olea regia* Boz., and *Olea regalis* Clem. The wood of this tree is less hard and lighter in color than that of the wild olive. The branches are tall and straight, the leaves long, and the fruit plum-shaped, its pulp adhering tenaciously to the stone, tardy in maturing, and is gathered green for pickling. When ripe the fruit is of dark violet color. It ripens with difficulty, producing a clear oil of sweet flavor.

(2) The Sardal Sevillian olive (*Olea Hispalensis* Clem.), (*Olea Hispanica*). The branches are less vertical than the former variety, the leaves are larger, the fruit is walnut-shaped and aromatic. It is very common in Seville, Vera, and other parts of Andalusia. I have seen a few trees of these two varieties prospering in private gardens near Tangier, reared from slips brought from Seville, the fruit retaining its original quality. The queen olives of commerce are not the selected fruit of the common olive, but a particular species of itself, as above described.

Maturity.—In warm climates, and on its favorite soil, the olive tree comes into full bearing on the tenth year from its grafting, or from the plants of slips, cuttings, or stakes. In colder climates they come into full bearing some years later. The olive tree remains fruitful for centuries. There is an olive between Villefranche and Nice which was famous for its old age in the year 1515. It measures at its base 42 feet in circumference; its average yield of oil per year amounts to 150 kilograms. (A kilogram has 34 ounces.) In Spain and in the island of Mallorca there are olive trees which were old at the time of the Moorish occupation, and which at present continue to produce enormous crops of fine olives.

Yield.—The acre is not known in the olive countries; lands are measured by the hectare. A secular olive tree of great size, occupying 100 square yards of land, will yield on an average 40 gallons of olives, which is not at all exaggerated, as there are many which yield 100 and even 120 gallons of olives.

The adult field olives of moderate size yield from 20 to 40 gallons of olives. Short olive trees, occupying only 25 square yards of ground, yield on an average about 20 gallons of olives.

In the orange region a mature olive tree, well cultivated, will produce 15 gallons of oil. If the trees stand at a distance of 30 feet from each other, or at about the rate of 75 trees to the acre, there will be a yield of 1,125 gallons of oil per acre.

In Spain they calculate on an average yield of 140 hectoliters (1 hectoliter measures 20 gallons) of olives per hectare of ground every two years, yielding 1,750 liters oil in this form:

	Pesetas.
1,000 liters of refined oil at a medium price of 1 peseta and 25 centimes	1,250
750 liters of inferior oil, at 75 centimes	526
Total	1,775

(A peseta is equal to 20 cents; 5 pesetas to a dollar; 100 centimes to a peseta. Deducting 700 pesetas as cost of cultivation leaves a net product of 1,561 pesetas every two years.)

When the trees are at a distance of 10 meters from each other they yield, on an average, 6,000 kilograms of oil per hectare, of the value of 12,000 pesetas.

Planting.—The trees are planted from 30 to 40 feet apart.

Picking.—They are picked one month before the olives are quite ripe, when they are of a yellow-green color, for oil, and in the month of November, when the olive changes its color from violet to black, when intended for pickles.

Pickling.—The olives are kept in water until their bitter taste is entirely removed. The water must be changed occasionally. Then they are ready for pickling either in salt and water or with sweet herbs, such as thyme, slices of lemon, etc. The Moors bruise first the olives, and afterwards pack them with salt.

Oil.—The process for extracting oil consists, first of all, in gathering the olives when they turn black, about the month of November, on a fair day, separating those found under the tree on the ground, and all discolored ones, with which the second quality of oil is made; they must be cleaned of all foreign matters, such as leaves, etc.; in gathering the olives must not be beaten, but picked by hand or with a hook made on purpose. The olives are spread in a hall, the floor of which is of glazed tiles and having a slope in order to allow the water which oozes out of the olives to run out. The olives are turned over several times, taking care not to allow them to ferment, as it would produce a rancid, inferior oil, and in this care lies the secret of success in obtaining a superior sweet oil. It is recommended when pressing the olives

not to break the stone, as it contains a small almond which neutralizes the flavor of the first-class oil. In the second process in pressing the stones should be crushed in order to obtain the oil still left adherent to the stone and on the kernal or almond, which will be a secondary class of oil. Every utensil in the mill must be perfectly clean. It is essential that the entablature where the olives are pressed and ground, the baskets where the paste is placed for pressing, the receivers of the oil, etc., should not have been used in preparing rancid oils or of bad flavor. The virgin oil of first pressure must be extracted without the addition of the boiling water, which always alters its quality. With these cares a very superior first-class oil will be obtained from the first pressing.

On the second operation, the paste still contains a good deal of oil which the press by itself is not sufficient to extract, but with the assistance of boiling water, and a more efficacious pressure, an oil is obtained very good for kitchen purposes, and which unscrupulous merchants mix with cotton or other tasteless oils and sell in bottles as "*huile surperfine d'olive.*" After the second pressure, the mass of skin, stone, etc., is boiled and repressed with more force and through a peculiar process, obtaining an oil that is very much in demand for the manufacture of castile and other soaps. Thus three qualities of oil is obtained: the fine virgin oil for table use; the ordinary oil obtained with the boiling water and employed in the kitchen; and last, the gross oil of inferior quality used for industrial purposes.

The American inventive genius will produce not only superior mills and presses more active and economical than those now used in Europe, but also pulping machines to separate the pulp of the olive from the stone, so soon as we have in the country forests of the truly surface gold mines, olive orchards.

Situation.—Best results are obtained on gentle slopes and hillsides; good results may be obtained in table-lands, provided the soil is not adobe or compact, and having good drainage. The orchards are in some places only a distance of 200 or 300 yards from the sea.

Soil.—The olive tree will thrive in all soils excepting low, damp grounds. It will prosper and yield abundantly on the top and side of mountains, amongst rocks—matters not the shallowness of the soil—in gravelly and stony ground where neither wheat, barley, nor oats will grow.

On calcareous and volcanic grounds the olive produces the finest quality of oil; all those precipitous side-hills and cañons, so numerous in some of the counties of California, all along the Coast Range eastward of San Diego, following up San Bernardino, Santa Barbara, Los Angeles, San Luis Obispo, San Juan, Contra Costa; all the sides of Mount Diablo, up north to the mountains siding the Klamath River, 42 degrees north latitude. North of this the olive will grow and flower, but will not mature the fruit, even if raised from seed.

The great value and importance of the olive tree is that it will thrive and prosper in soils where nothing else of value would grow. Those dry soils of arid aspect in many parts of California are the genuine lands for raising the most productive forests of olives, worth, in due time and at not distant period, millions of money. In Africa, in Greece, and in some parts of Spain lands once abandoned for their sterility are now the source of wealth and revenue to communities and to the Government.

Irrigation.—None. The olive trees require no irrigation. They are only watered when transplanted until secured.

Rainfalls.—Thirty inches is the average. The rain-fall in the year 1881–'82 was 52 inches.

Pruning.—Of all the questions raised and argued with regard to the culture of the olive tree, none has been more debated than the pruning; not only every country has its ways of pruning, but every district has its manners and notions. On the other hand there are parts where the olive is never pruned.

The olive tree must undergo a certain amount of pruning, not to the extent of the orange; the old and bare wood must be removed; the branches must be kept in such a trim so as not to exclude altogether the sun and air from the head; suckers must be avoided and those only left required to fill a clear place of the head; the foliage of the head must be kept equally balanced. The olive produces flowers on the branches and wood of the preceding year. It is rarely necessary to cut large branches; some branches which have produced fruit for several years in succession and at last present an appearance of dryness about them, must be removed. By so doing, towards the end of winter it will soon produce new shoots, which on the following year will bring forth flowers. Olives must be thus pruned only every other two years. Following this practice from the beginning on young trees, the pruning will be but slight and easy to perform.

On pruning it is well to cover up at once the wounds on the tree with a mixture of earth and fresh cow's dung well mixed, which is just as good for the purpose and more economical than the varnish used by grafters.

The branches, leaves, etc., from pruning, which in some countries are given to the cows and goats, are the proper manure for olive trees, and it should be buried while green around the trees, as well as all the oily waters and residue of the mills where the oil is made; these wastes are great fertilizers.

Besides the frosts and excessive cold, the olive has other enemies in the shape of insects, to combat which washes of vinegar or lime-water and whitewashing the trees are necessary. It is highly beneficial to keep the trees clear of moss and parasite vegetation.

FELIX A. MATHEWS,

UNITED STATES CONSULATE, *Consul.*

Tangier, April 2, 1884.

CONTINENT OF AMERICA.

MEXICO.

LOWER CALIFORNIA.

REPORT OF CONSUL VIOSCA, OF LA PAZ.

Varieties.—The Andalusia or Sevilla variety of culture of olives composes the best quality for pickling in the District of Mulege, a country and town bordering the gulf side of Lower California, and in latitude 26°, 45′ north, which place supplies pickled olives in barrels to the state of Sonora, Sinaloa, and this portion of the territory.

From time immemorial a kind of an olive tree of the native genus has been in cultivation in the towns and valleys of Mulege, San Ignasio, Purising, and Comondu, bearing very small but oily olives in abundance. It is considered the best oil and the tree of more productiveness; nevertheless, for some reason or other, the oil made in this country is very insignificant in quantity.

Situation.—The towns in the valleys above described contain the principal olive-grove trees in the peninsula, the first bordering the sea gulf, and the others located on an average of 50 miles from sea. Hilly or level land is immaterial for its growth, but the exposure to the sun is necessary.

Climate.—Rain-fall is an assistance, although their dependence has to be entirely on irrigation. In watering the olive trees, the water is made to run and form a pool around within 3 feet from the tree and never to touch the stem.

Pruning.—Pruning takes place in October, and picking in the beginning of September, that is for pickling, and for oil in the latter part of October, when the fruit is ripe.

Maturity.—The trees commence fruiting after seven years old.

Planting.—Distance apart planted, 25 feet or more. Olive trees are generally propagated by cuttings over a year old.

Insect pests.—A very injurious worm sometimes causes great detriment to the tree, but it is destroyed by the use of a solution of ashes mixed with lime. When the skin of the tree becomes very tight to the principal stem, a few slashes or perpendicular cuts of the skin with a sharp knife will enhance the tree's growth and make it prolific in fruit bearing.

Soil.—The soil selected for olives is light, loamy, and limish, requiring water every second day when first set on the ground, and no manure until after the tree is three years old.

I am sorry to say that there is no printed matter or statistical reports on horticulture in existence here, and the above is the best information obtainable on the treated subject.

JAS. VIOSCA,
Consul.

UNITED STATES CONSULATE,
La Paz, December 21, 1889.

ECUADOR.

There appears to be no reason for doubting that in portions of Ecuador olives might be grown in perfection, for similar conditions of climate and soil exist to that of France along the shores of the Mediterranean Sea, where the best olives in the world are produced. So far as can be ascertained, growing olives in Ecuador has never been tried.

HORATIO N. BEACH,
Consul.

GUAYAQUIL, 1884.

VENEZUELA.

The cultivation of the olive is unknown here, owing doubtless to the fact that the climate is too hot and the season too dry.

Whatever of care or attention for fruits that the people are inclined to bestow is devoted to the orange and banana, though neither these nor any other orchard fruits are exported, and only enough are raised to satisfy the domestic demand; yet, in view of the favorable character of the soil and climate, it is doubtless true that, with a good foreign demand and speedy transportation, the growth of tropical fruits here might assume important proportions and prove amply remunerative.

WINFIELD S. BIRD,
Consul.

UNITED STATES CONSULATE,
La Guayra, November 15, 1889.

WEST INDIES.

BERMUDA.

Mr. Heyl, fruit-grower, of Hamilton, to Consul Beckwith.

At one time olive plants were imported here by the country, but as no care was given them, they have since dwindled away, only a few trees here and there remaining, but the fruit is put to no use. A little

more energy and enterprise are needed in the island to advance various branches of agriculture and fruit culture, which at present, being carried on in a shiftless manner, bring no profit.

TRINIDAD.

Mr. J. H. Hart, government botanist, to Consul Sawyer.

Trees grow rapidly and exist for years, but have never been known to produce fruit.

CUBA.

REPORT BY CONSUL-GENERAL WILLIAMS, OF HAVANA.

With respect to olives, I have to say that a few experiments have been made by the florists in the suburbs of Havana to cultivate this tree, but so far as I can learn, it has not borne fruit.

RAMON O. WILLIAMS,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Havana, November 24, 1889.

GUADALOUPE.

Director of Botanical Garden at Basse-terre, to Consul Bartlett.

Olive trees are very scarce, perhaps not a dozen of them in the island. Olives are not grown for exportation.

ST. FELIX CLARDEAU.

CONTINENT OF ASIA.

ASIA MINOR.*

REPORT BY CONSUL EMMETT, OF SMYRNA.

Varieties.—The best variety for pickling is the round olive; the best variety for olive oil is the "coloves" (stemless). The other choice varieties for pickles (eating) and oil, worthy of culture and for profit, are the "Adramitti" olives.

Situation.—The trees that produce the varieties above given are grown in valley, hillside, table land, and plain, and near the sea and many days from it; elevation above sea-level is 3 to 6,500 feet; exposure to sun is immaterial, as the climate here is mild and agreeable.

The trees are grown in every soil, and good results are obtained on valley, hill-side, or table-land, except where the soil is marshy. The character of the soil and subsoil is calcareous.

Climatic influence.—The olive tree does not thrive in the open air except in latitude 43°, and where the temperature is not lower than 15° to 20° Fahrenheit.

Temperature.—Minimum, 32°; maximum, 95°; average, 68° Fahrenheit.

Rain-fall.—The annual rain-fall at Mitylene is about 25 inches. Rain is always very good, but after September. If it rains during the flowering of olive trees—April and May—and when the fruit is very small—June, July, and August—the crop is not likely to be good, as it falls off prematurely.

Irrigation.—When a plantation of olive trees is made it should be immediately irrigated and the irrigation is to be repeated every two weeks for three years, during the months of April, May, June, July, and August, according as the weather may be more or less dry; but after three years no irrigation of any kind is needed here.

Cultivation.—Olive groves are ploughed in the spring to the depth of 1 inch in the clear spots, and 2 to 3 inches deep in the vicinity of the trees; but after the ploughing is over they always dig the soil round the trees with a spade.

Pruning.—At Mitylene we prune the olive trees every year after the crop with great attention, removing the dried and high branches, because it is not necessary that the olive tree should be higher than 20 feet.

* From information supplied by the United States consular agent at Mitylene, an extensive olive cultivator.

Picking.—About the end of November the harvest begins.

Pickling.—The best time for pickling green olives is the end of September, always after the first rain; and the best time for pickling ripe black olives is the end of November, during the harvest.

Oil manufacture.—Next step, after picking, the olives are sent to the mills for grinding as soon as possible.

The Mitylenists put the green olives in fresh water for five or six days and change it every day; after that they cork the olives in jars with pickle. They prepare black olives for table use in the common manner, in pickle.

The process for extracting oil is as follows: After the olives become pulverized by grinding under millstones they are put in goat's-hair bags and pressed in either iron or wooden presses, and the oil is put into large earthen jars, barrels, or skins, for sale.

Maturity.—The trees commence fruiting the fifth year after planting.

Yield.—The average yield per acre per annum of mature trees is $25 to $30.

Planting and propagating.—The trees are planted at a distance of 25 feet from each other, and are propagated by the planting of branches or striking from branches; by the planting of pieces of root; by the cultivation of wild olive trees and transplanting to the field, and from seed.

Insect pests.—Insect pests do not exist.

W. C. EMMETT,
Consul.

UNITED STATES CONSULATE,
Smyrna, January 15, 1890.

ASIA MINOR.

REPORT BY CONSUL STEVENS, OF SMYRNA.

[Republished from Consular Reports No. 41½.]

Situation.—The olive is not as extensively cultivated here as in the islands of the Archipelago and Mediterranean—the Sporades, Cyclades, and Ionian Islands. The reason for this is easily understood. The olive tree will not thrive inland; it must be planted near the sea-coast. Plantations are prepared in this manner: Vigorous young trees, which grow wild upon the sides of the neighboring mountains, are taken up and transplanted in the plain or hill-side. After remaining two years in the field they are grafted. Seven or eight years after the grafting process they begin to bear, reaching the maximum of productiveness from the eighteenth to the twenty-fifth year. They yield every other year. When

transplanted the young trees must be watered once a fortnight during summer until they reach their fourth year. If well protected they will continue fruitful for two hundred years or longer. Trees planted on stony hill-sides yield more abundantly and of a better quality than trees planted on plain land. They should be planted about 36 feet apart.

Cultivation—The manner of cultivating olive trees is to plow or dig over the ground every year about a foot in depth, adding manure every third year at the foot of each tree and covering it up with earth. The mature tree will yield about 580 pounds of olives yearly.

Varieties.—The varieties which give the best results are known as "Thrillies" and "Adramitis," after the localities where they are grown. The "queen olives of commerce" are produced from an improved tree grown at Adramitis.

There are two species of olives, and these are, when ripe, green and black, respectively. Those intended for pickling for table use are gathered green-ripe; they are put in salted water and allowed to remain until ready for use. These are of the black variety. Green olives also yield good oil for table use, but in much smaller quantity.

The most productive olive orchards in this province are at a distance of 1 to 3 miles from the sea-coast.

Picking and expressing oil.—A description of the manner of gathering this fruit and expressing and preparing the oil may prove interesting.

During the season of the crop the fruit is collected and salted, then stored away from one to three months. At Mytilene and Aïvali the olives are kept even during five or six months before the oil is abstracted. It is claimed that the larger the quantity of salt used in this process the finer the quality of oil obtained. The fruit, packed in baskets containing 50 pounds each, is put into boilers and boiled for half an hour; then it is withdrawn and spread on a circular surface, where it is ground under a large millstone driven by horse-power. The horse is always followed by a workman whose care is to throw the olives under the stone with a shovel. The olives, first coarsely ground and then carefully pounded, are placed in bags made with goats' hair, which are put, from 20 to 24 at a time, under a powerful press, operated by two workmen, and then squeezed until no oil flows out; $6\frac{3}{4}$ pounds of good olives give $2\frac{1}{2}$ pounds of oil. The oil gathers in a trough placed under the press, and is then withdrawn and poured into casks. The olives intended to be used at table are put into stone jugs or barrels, after having been carefully washed, and are covered over with strong brine. In this condition they will keep good for a whole year.

W. E. STEVENS,
Consul.

UNITED STATES CONSULATE,
Smyrna, February 28, 1884.

PALESTINE.

REPORT BY CONSUL GILLMAN, OF JERUSALEM.

Varieties.—The finest olives of this country grow on Mount Lebanon and in the hill country of Judæa. Those near the sea-coast are inferior. Five kinds or varieties of olives are generally distinguished here: the white; the large black, known as Bakkar (fat), good for pickling, as is the preceding, but not good for oil; the small black, Zmehri, which is good for oil; the large green, called Sourri (navel), from its resemblance to that part of the human body, and which is used for pickling, and the small green, named also Sourri, and which is of like use to the large variety. There is also the wild or ungrafted olive called Barri (wild), the fruit of which is not used either for oil or pickles. The best variety for pickled olives is the large black (Bakkar). That best for olive-oil is the small black (Zmehri). All the varieties mentioned grow throughout Palestine, and are found from the sea-coast, and the plains, only a few feet above the level of the sea, to the elevation of 3,000 feet or more. The trees have usually a full exposure to the sun, and hilly or even mountainous country seems best adapted to them. The poorest olives, for instance, are found at Jaffa, where their cultivation is being gradually superseded by that of the orange, lemon, and grape. The soil which prevails over the greater part of this country is a stiff red clay, with a small proportion of sand occasionally, and in this the olive flourishes. The subsoil is also clay, with rock frequently underlying.

Climate.—As to the temperature and rain-fall the remarks made in connection with the orange, lemon, and fig apply equally here. It is, however, said that in dry seasons the olive produces more abundantly and better fruit. The trees bear a full crop only every second year. This is attributed to the fact that in securing the fruit the trees are beaten and roughly handled, breaking off the small fruit-bearing shoots, and so preventing an abundant production in the succeeding year, which is known as the "off year," when but a small crop is secured. The *fellaheen* (peasants) also say that in those years the grape produces abundantly, the olive-tree yields but a poor crop, and *vice versa.*

Irrigation.—Irrigation is never used in connection with the culture of the tree except when young and first planted.

Cultivation.—A plowing once a year, in the autumn, is considered sufficient culture; but as frequently other crops are planted between the trees they thus receive more care and attention than they would otherwise get. In exposed places, where the rains have washed away the soil from the roots of the trees, small fences of stone are built to protect them. These, surrounding the trunks, are filled with earth, and are of good service in shielding them from the summer sun. Also, where a tree is partially hollow with decay, it is the habit to build up the aperture with stones, the object being to arrest the rot.

Pruning.—Pruning is only practiced to the extent of removing the dead or dying timber.

Picking.—Olives designed for pickling are gathered a short time before ripening, lest they should be too soft for the purpose.

Pickling.—On being placed in baskets (the flexible basket in general use being employed) the olives are salted and then receive a gentle pressure. After three or four days they are removed from the baskets, and, without any other preparation or process, are simply placed in jars or barrels. This is all that is required, and for common use no other care is given the olive, which will keep in this way for two or three years, or perhaps even longer where greater care is observed. In towns the fruit is often pickled in vinegar; but in the country this is unknown to be followed.

Oil making.—Where the olives are required for making oil they are allowed to remain on the trees till quite ripe, when they are picked or beaten with long poles from the branches. Allowed to lie in heaps for a period extending from twenty to twenty-five days, at the end of which time they are usually quite soft, they next are crushed in the rude stone mills common in the country—the oil-mills of Palestine, which probably date back to biblical times. They are, however, first placed in the large flexible baskets already described. Heavy pressure being applied, the oil strains through the baskets into the trough placed to receive it. The oil obtained from this first pressure is the best, or of first quality, and will bring in the market as high as $4 per gallon. Two subsequent pressures complete the extraction of the oil. It is all one of the most simple of processes. The oil of the second pressing is considered good, and may be sold for $3 per gallon, but that of the third and last pressing is invariably poor or bad, and is only used for burning in lamps or making soap. The oil of the first and second grades is often mixed, and the result disposed of to the dealer. In fact this is a common practice, of course deteriorating the oil of the first quality, which it is often sold for. The expressed oil, without further manipulation or other process, is emptied from the trough into skins, and so conveyed to the oil merchant, that intended for export finally being transported to Jaffa. Here it is stored in great cemented cisterns, which are specially prepared for the purpose, from which it is emptied into barrels or casks when required for shipment. The greater portion of the oil is exported to France, where, having undergone the mysterious mixings and adulterations known only to the dealer, it is placed upon the market, and reaches the public at large labeled pure French olive-oil. The oil produced from olives grown on the mountains is far superior in flavor and quality to that made from fruit grown on the low-lying plains. The oil-cake or refuse remaining after the extraction of the oil is not thrown away, but carefully preserved, it bringing a high price for fuel, being specially adapted for certain uses. For example, the bakers of Jerusalem prefer it, and consume large quantities of it in heating their ovens.

Maturity.—Trees commence fruiting from the tenth to the fourteenth year. This includes the time from the first starting of the young wild olive trees. Where a very young wild tree is grafted, fruit may be produced in six years; but this is exceptional.

Yield.—It is difficult to arrive at the average yield per tree or acre. A very small tree may produce about two measures of olives, or nearly 48 pounds, while a large tree in full bearing yields a crop of as many as twelve measures. An average yield for a medium-sized tree, under fair conditions, ought to reach from five to eight measures, or from about 120 to 190 pounds. It is computed that it takes a measure of olives, or nearly 24 pounds of the fruit to produce three quarts of oil. The yield per acre, depending on so many variable conditions, such as the age of the trees, their distance planted apart, the nature of the soil, the culture bestowed, etc., can not be given with any certainty, especially as no statistics are kept here.

Planting.—The usual distance apart at which trees are planted is 30 feet; but this varies. Often very old trees are seen within 4 or 5 feet of each other, and even closer, in groups of from three to five individuals. These would seem to be the descendants of one original tree, the trunk of which, having reached extraordinary dimensions, has decayed at the center, leaving those outstanding parts of the circumference separated, and finally forming several trees out of one. In fact, unless utterly rooted out an olive tree appears to be indestructible and may live to an indefinite age, and when cared for will continue bearing to the last. Tradition says that some of the older trees of Palestine date back to the time of the Romans. The very old trees in the Garden of Gethsemane are supposed to be of the time of Christ. They are unquestionably of extreme age, and the oldest olive trees I have ever seen, yet those venerable trees bear annually a crop of fruit.

Propagating.—The olive tree is propagated by being grafted on young trees of the wild olive, which are grown for the purpose. The young wild trees, being planted at a distance apart of about 30 feet and at sufficient depth to prevent the disturbance of their roots by the plow, for other crops are always grown between the trees, are generally watered to insure their taking and more rapid growth. But irrigation is not absolutely necessary even at this stage, and where there is difficulty in procuring water, or expense attending it, it is omitted. Irrigation, however, unquestionably produces a more luxuriant and satisfactory growth. At the age of from eight to ten years the young trees are grafted with whatever varieties it is desired to propagate, and they commence bearing in from three to four years.

Where trees are totally neglected they frequently cease bearing, but it is astonishing how quickly they recover from the most shameful usage, immediately responding with a crop to kindly treatment.

There are no printed reports, information, or statistics issued by the Government or otherwise.

Insect pests.—Insects injurious to the olive are unknown in Palestine nor have any special observations been made of insects beneficial to the tree; in fact we are remarkably free from all trouble on the score of insect pests, consequently little or no attention has been called to the subject.

HENRY GILLMAN,
Consul.

UNITED STATES CONSULATE,
Jerusalem, February 10, 1890.

SYRIA.

ALEPPO.

REPORT BY CONSULAR AGENT POCHE.

[Republished from Consular Report No. 41½.]

In reply to the circular which you did me the honor to address me under date of February 12, I make it my duty to bring to your notice that oranges and lemons are not cultivated in Aleppo owing to the severely cold weather here in winter, which is so injurious to these trees.

OLIVES.

Varieties.—Four varieties are cultivated in this district:

(1) *Khul-khali*, which is only used for pickles or preserved in vinegar. This variety, which is the best for eating, is included in the category of ordinary olives. It is sweetened by being immersed in spring water, in which 11 to 12 American pounds of natural soda have been saturated, with 3 pounds of lime for about 150 pounds of olives. This immersion is made when the water, mixed with these matters, has become cold. The olive berries, after being deposited in that water, should be removed without disturbance, and they lose their bitterness in from sixteen to twenty-four hours. This result being obtained, the olives are immediately placed into another tub of well or spring water, which must be occasionally renewed till the taste of the lime is removed. After this operation the olives are placed in pure, fresh water, sufficient to cover them, and the tub is then covered with a lid. They are then left twenty-four hours, after which they are pickled, and thus the operation is completed. Olives can also be sweetened by being bruised and placed in pure water, which is repeatedly changed till the fruit loses all its bitterness. When thus prepared, the olives are generally eaten in salad or in stew.

(2) *Shami.*—This variety is only gathered when the fruit has become of a dark color and thoroughly ripe. When pressed till quite dry the olives are salted and preserved to be eaten with salad.

(3) *Zeiti.*

(4) *Huzromi Nizibli.*

These two varieties, although smaller than the two others, are used for oil, which is obtained by means of a lever or screw press, and they are gathered when the fruit has become reddish and ripe. The sweet oil is obtained by a cold extraction. The olives after being crushed in a mill are placed in bags and put under press. The lamp-oil and that used for the manufacturing of soap is obtained by the hot system; that is to say, after the first pressure the bags containing the olives are submerged in boiling water and pressed out again. The best oil is obtained from olives before they are fully ripe. A shumbul, equal to about 147 to 150 pounds, gives 12 to 14 pounds of oil in the vicinity of Aleppo, while here this quantity is reduced to one-half.

Cultivation.—The olive tree is reproduced by burying a piece of root, having many slips, in a rut one yard deep. When these slips shoot forth one of them is cared for without irrigation, while the others are destroyed. At the end of ten years this tree begins to give fruit in small quantities, but when it reaches its fourteenth year it gives every other year from 35 to 38 American pounds. The soil best suited for the growing of these trees is the reddish or light yellow one; the latter is, however, preferable. The plantation is made without irrigation or manure; a space of about 20 feet is left between each tree; the soil is plowed two or three times a year. The ground around the tree should also be dug and turned over, and the root, as well as a part of the trunk, covered with earth in the form of a mound. The tree, however, should be regularly pruned of the dry twigs every year.

F. POCHE,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Aleppo, April 16, 1884.

BEIRUT.*

REPORT BY CONSUL BISSINGER.

Varieties.—The varieties of olives in this country are the Balady, the Somukmoky and the Soory; but the best of these for pickling and oil is the Balady. The trees grow in the littoral and middling high lands.

Climate.—A cold climate does not suit olive trees.

Irrigation.—Olive trees planted in soil suitable for irrigation are watered twice, when necessary.

Cultivation.—The land should be plowed four times in the year. Once in the beginning of winter in order that the rains may be absorbed by the soil, and three times in the spring.

* The several reports, herewith from Syria, with the exception of the report from Damascus, were forwarded by Consul Bissinger, being prepared for him by parties in the districts represented.

Pruning.—Dry branches are cut away only.

Picking and curing.—Olives begin to fall from the trees in October, and those that do not fall are gathered up to the 1st of January. Olives for pickling should be picked when green.

Maturity.—Olive trees commence fruiting, in some localities, ten years after having been planted, in others later.

Yield.—Each olive tree yields from 28 pounds to 112 pounds, in proportion to its growth and size.

Planting and propagating.—The distance planted apart is about 18 feet. Olive trees are propagated by planting small trees in March and April, which must be grafted as soon as they can sustain the operation.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, February 12, 1890.

BEIRUT.

REPORT BY CONSUL ROBESON.

[Republished from Consular Report No. 41½.]

There are two varieties of olives cultivated in this district called, 1st, the smue-mucky; 2d, the soury (Tyrian). The fruits of the first variety are poor and small, while the soury are of a larger size, thicker flesh, and richer sap. The best results are obtained during the twentieth or thirtieth year after the wild olive tree has been grafted. There are two methods adopted in the cultivation of olives in this district. The first is to transplant the wild olive shoots from their native soil into the olive groves and to graft them on the fourth year with grafts taken from a cultivated tree. Although this method of cultivation does not procure early crops, yet it is preferable to the second method in use, which is to graft the wild tree as soon as it is transplanted, because the former proves more productive.

The land where olive trees are planted must be plowed four or five times a year. Generally in this district where the soil is sandy a stone bench about 15 inches high is erected around the trunk of each olive tree and filled with clay to keep the soil near the tree somewhat cool and damp. The queen olives of commerce are unknown in this country. However, the olives exported from this port to Egypt and other places are selected from the Soury variety. Olive trees come into full bearing five or six years after they are grafted, and remain fruitful for a great number of years. The average yield per acre of mature trees is about 200 Turkish bushels (8,250 pounds). Five gallons of olives produce one gallon of oil. Olive trees are commonly planted 30 feet apart. Olives intended for pickling are gathered about the end of November, then lightly bruised, and after being spread on mats to dry in

the air for a few days, they are placed in earthen or glass vases with a sufficient quantity of salt in them to pickle.

Olives for oil are picked as they ripen until the end of December. The best results are obtained on table-land protected from high winds. The soil best adapted to the cultivation of olive trees is a reddish porous land or dark-brown rich soil. There is not any system of artificial irrigation in use for olive culture. Olive trees are never watered. In regard to the yield and proceeds they are as stated above. The cost of cultivation per acre per annum may be set down at $10.50, not including the Government taxes. The nearest olive orchards to the coast are situated at about 1 mile from the sea-side, and extend from that distance to places 2,000 feet above the level of the sea. However, those planted in the high mountains, where cold is intense and snow falls annually do not succeed as elsewhere.

The average annual rain-fall in this district is 38 inches, but the necessary rain for the growing of olives is 30 inches, which is quite enough. Olive trees in this country bear good crops only every other year.

JOHN T. ROBESON,
Consul.

UNITED STATES CONSULATE,
Beirut, May 3, 1884.

DAMASCUS.

REPORT BY CONSULAR AGENT MESHAKA.

Varieties.—The names of the best varieties for pickled olives are the "Masaabee" and the "Julut" olives, and the name of the best variety for olive oil is the "Dan" olives. The other choice varieties for pickles (eating), and oil, worthy of culture and for profit, are the "Sassafi" and "Maulee" olives.

The trees that produce the varieties here given are grown in the neighboring villages of Damascus.

Situation.—They are located at a distance of 70 to 80 miles from the sea, and about 2,300 feet above sea-level.

Olive trees are well exposed to the sun, and grow upon hilly, rolling, and level land, but the latter soil is the best.

Climatic influence.—Olive trees are not affected by the heat or cold.

It is impracticable to tell about the temperature in villages, agriculturists not having a thermometer. Damascus temperature in winter in Fahrenheit is not lower than 22° and in summer is not beyond 95° in the shade.

Rain-fall.—There is no rain-gauge.

The rain-fall, in December and January, agrees with the growth of trees and fruits. The quantity of rain can not be stated for the reason above mentioned.

Irrigation.—Olive trees when planted are irrigated once a fortnight for the first year, excepting February. In subsequent years they are irrigated twice per annum, once during the first forty days of the winter season, and the second time during the same period of the summer season.

Cultivation.—Lands of olive trees are cultivated twice a year, once in December and another time in March.

Pruning.—Olive trees are only pruned after the third year of their planting by taking away what may be growing around their trunk.

Picking.—Olive fruits are picked green in October and ripe in December and January. The fruits are picked green for pickling and ripe for pickling and making oil.

Curing.—The next step, after picking the green olives, is to prepare them for pickling, and the ripe olives to extract their oil and to prepare them for pickling also. The process of pickling the ripe olives is to press them in a basket several days until the bitterness disappears, then they are washed with water, dried a little, salted, and put in oil for use.

The green olive (the Masaabee) is commonly used and prepared in the following manner: One-half pound of alkali and one-quarter pound of lime, both dissolved in water and put with $5\frac{3}{4}$ pounds of green olives in a vessel for a period of about a week, with a little shaking every day until the bitterness disappears, when they are washed and put in salt water for use; or green olives are put in salt water several months until the bitterness disappears, then bruised gently and placed in oil for use.

The process of extracting oil is as follows: Ripe olives are placed in a warm place for about four days, then crushed by a heavy roller and put in baskets under pressure by side of a vat until the juice flows into it. There the oil is gathered from the surface of the water, ready for market.

Maturity.—Olive trees commence fruiting at three years of age after planting and are in full bearing at about twenty.

Yield.—The average yield of a mature olive tree is about 430 pounds of olives, according to the fertility of the soil; but olive trees bear only every other year.

Planting and propagating.—Olive trees are planted at 17 to 20 feet apart, and propagated from young olive plants springing up around a mature olive tree; they are disjointed with a piece from the old tree to serve as a root. If the soil where they are to be transplanted is not stony a few stones are placed under them; most of their trunks are wrapped in straw and some clay is put upon the top of these plants for their protection from the sun and birds during the first year's growth.

Insect pests.—When hail falls upon the olive fruits a small worm infests them, but there is no treatment therefor.

NASIF MESHAKA,
UNITED STATES CONSULAR AGENCY, *Consular Agent.*
Damascus, January 10, 1890.

HAIFA.

REPORT BY CONSULAR AGENT SCHUMACHER.

Varieties.—The best variety for pickling is the "Irrsezy" (Arabic name), a pale green olive, with a thin skin. The best variety for oil is the "Melisey," and "Syrian," a dark brown olive.

There are two distinct varieties grown in this district; the one is called the summer, the other the winter olive; the first produces a better oil than the latter. Both kinds are pickled, but the white olives are preferred. The summer olives are the most profitable, and can be recommended for culture, as they are the best for producing the finest oil and equally good for eating.

Situation.—The natives claim that trees planted on hill-sides produce a finer oil than those in the plain. The distances from sea are quite different, as the olive trees are spread over the whole country, say from 2 to 100 miles. The trees are planted from 10 to 500 meters apart, and are exposed to the sun without injury even in the hottest weather. The olive trees in my district are mostly planted on hilly land in sandy black soil. But they grow also well in rolling and level land, only not so luxuriant as in the above-named soil.

Climatic influence.—The climate of Syria is good for the culture of olive trees, as frosts hardly ever occur. Temperature, minimum 2° + R.; maximum 33° to 35° + R.; average 20° to 25° + R.

Rain-fall from 1 foot 7½ inches to 3 feet 3 inches all year. If rain falls after the summer olives are ripe it is disastrous for the fruit. The olives become bloated and filled with water, and the oil in them goes back and is lost.

Irrigation.—The olive tree is irrigated only for the first two or three years, but not more; say once a week; after that no irrigation takes place.

Cultivation.—The best time for cultivation is early in the rainy season; say after the first rain has fallen in November or December.

Pruning.—The trees are pruned in the fall; the foliage must not be abundant. The natives say the tree must be pruned so that one can see through the foliage.

Picking.—The fruit is picked or gathered when nearly ripe, both for pickling and oil. Olives are not pickled here for the market; for home use they are put in fresh water for a day or two, and then put into stone jars containing salt brine and well covered.

Oil.—The natives make no good oil here; they take large heaps of the olives and then grind them under large upright circular stones, which revolve on a circular base. The pulp is then put in round press baskets, made of cane fibers, and pressed. The bulk of the oil produced by the natives is not fit for table use; it is mostly exported to France for illuminating and lubricating purposes.

Maturity.—The trees begin to bear after seven or eight years.

Yield.—The average yield of a tree is 100 to 150 kilograms.

Planting and propagating.—They are planted about 25 to 30 feet apart, in regular rows. They are planted as wild saplings, which grow abundantly on the mountains; after a year or two they are grafted.

The Government makes no statistics, neither are there any issued by dealers or producers.

Insect pests.—There are no insect pests here that injure the trees. The greatest danger to olives is the hot wind (sirocco), which occurs sometimes during and after blossoming, which causes the blossom on the young fruit to fall off, so that some years the entire crop is lost thereby.

JACOB SCHUMACHER,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Acca and Haifa, December 5, 1889.

SHWAYFAT.*

Varieties.—The best olives for pickling are the black olive, called Shatawy, and the green, called Sourri; the best for oil are the black, of the Shatawy kind, which have small pits and thick flesh if sufficient rain-fall takes place, while the Sourri green olives are good for oil, with or without sufficient rain. Other choice varieties are the Damascus and Egypt olives, both of large and small size.

Situation.—They grow in the littoral in general and in high places up to an altitude of 3,000 feet and even higher. The particular region in the vicinity of Beirut, where olive trees grow, is the village of Shwayfat, in the "Shoof" district, as well as in the neighborhood of Tripoli, the southern part of the Lebanon, and in the interior. The exposure to the sun is of vital importance. Hilly, rolling, and level, but the latter is the best.

Soil.—Olive trees grow in all kinds of soil, but the red is preferable.

Climate.—Such as the degrees of heat which prevail in Beirut 40° to 90° Fahr., and in the mountains 30° to 88° Fahr.

Rain-fall from 30 to 40 inches is needed; less than 30 would injuriously affect olive trees, especially in the littoral. Rain-fall influences the growth of the tree and its production; as to quantity of the same it is stated above. The October rains benefit the fruit, and the rains in December and January benefit the trees.

Irrigation.—Olive trees prosper best with rain-water; irrigation diminishes the quantity of oil in the fruit, while it increases the growth of the tree.

* This report was prepared by the proprietor of an olive grove at Shwayfat, near Beirut, for Consul Bissinger.

Cultivation.—Plowing must be done early in the spring, not less than four times; five times is still better. Plowing is still done by means of the old primitive implement.

Pruning.—Olive trees are not pruned; the dead branches only should be removed before the tree is in blossom in the spring.

Picking.—When fully ripe and turning black; the green in September and October and the black after this date. Olives can be preserved when green, *i. e.*, before they get black.

Curing.—After picking the olives, heaping together should be avoided in order to keep them cool and prevent fermentation.

Oil.—Olives are first crushed under a cylindric millstone, then placed in bags made of goats' skin and pressed with a hydraulic press. In this way oil is extracted from olives. Sweet oil is obtained from olives that are fully ripe. Bitter oil is produced either from dried olives or from olives that have been left for some time heaped up together, or by the residue of olives that had been pressed. This residue, after being placed in large boilers over the fire until it is heated, is sprinkled with water and pressed again with hydraulic presses.

Pickling.—The process of pickling olives is as follows: Olives are gathered before they turn black; *i. e.*, when they are yet green, and after removing all the dry and decayed or spoiled olives they are placed in water salted to a degree which would cause an egg to float thereon. The spoiled olives, and even the good ones, are sometimes bruised and pickled in salted water; in this way olives get sweet quicker than when not bruised. The process of pickling black olives is to place them in a shallow receptacle for seven days, during which they are every day sprinkled with salt in proportion of 10 ounces to 6 pounds and stirred up so as to be well soaked with salt, after which they can be either pickled by being placed in vases containing the salt-water that remains in the receptacle or in one containing some sweet oil. After olives are pickled, as above stated, it is always well to sprinkle some salt and spread olive leaves on the surface. Pickling the Damascus green olives is effected by placing them in water in which alkali (in the proportion of 2 ounces to the 6 pounds) and lime (in the proportion of 1 ounce to the 6 pounds) have been dissolved for twenty-four hours. After which a bath of sweet water is to be applied and renewed for three or four days until the taste of the alkali and lime has disappeared; they are then pickled and placed in vases filled with salt water. Black Damascus olives are pickled as follows: Stir them for a week in salt, then spread them in the sun for one day to dry, then put them in oil.

Maturity.—Olive trees begin fruiting when they are fifteen years old; in a good soil, from the eighth year.

Yield.—The average annual production of an olive tree is valued at from 25 to 30 piasters (89 cents to $1.07). In the year of fertility (olive trees produce every other year only), it is estimated to be double that amount.

Planting and propagating.—Distance planted apart, from 21 to 30 feet. Olive trees are propagated by planting, in January or February, to the depth of 2 feet, the suckers that grow at the foot of the mother tree or by planting, like the last, wild shrubs and grafting them.

Insect pests.—No insects infest olive trees. A small kind of worm is sometimes found in the fruit, but no special process of treatment is adopted or known.

SIDON.

Varieties.—"Belady" for pickling, also "Smukmuky" for oil. Other kinds cultivated are the "Kolb-el-Tayar" and "Korka-wa-Sisan."

Situation.—Both in the plains and in the mountains near the coast, and up to about 3,000 feet; sloping and hilly land, red and white clayey soil are best.

Climate.—Bountiful rains benefit olives.

Irrigation.—Not needed.

Cultivation.—Plowing necessary three times in the spring.

Pruning.—Pruning not necessary.

Picking and curing.—For pickling the fruit is picked while yet unripe; for oil when fully ripe. For pickling put in salt and water. Olives are crushed by large rolling stones, then put either under heavy pressure or into hot water and the oil skimmed off the surface.

Maturity.—From the sixth year upward.

Yield.—Exact yield unknown.

Planting.—About 20 feet, and propagated by budding or grafting.

Insects.—No insect pests.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, February 12, 1890.

SIDON.

REPORT BY CONSULAR AGENT ABELA.

[Republished from Consular Reports, No. 41½.]

Varieties.—*Smuc-muky*, small berry, little meat, but full of oil. *Belady*, larger and more meat, and is the best variety.

Cultivation.—Wild olive shoots are planted and then grafted, after which the only care they receive is an occasional plowing, except that the earth is often banked about the trunk to the depth of 10 inches. The young trees are set out at a distance of 20 feet apart. No irrigation whatever allowed.

Bearing.—After being planted and grafted the trees soon begin to bear berries, but the growth is very slow and the increase in the amount of fruit very gradual.

Oil.—As nearly as can be estimated the average yield per acre is about 40 bushels of berries for mature trees. As the liquid measure of this land is based on the weight of the articles measured, it is customary to estimate that a bushel of berries will produce about 12 pounds of oil; but the relation of the yield of berries to the amount of oil is a very varying one, differing according to the season and the rude methods used for extracting oil. After the olive has been crushed or bruised the pulp is treated either by being put into water and the oil is skimmed from the top, or else the pulp is pressed under a lever with weights at the end or by a screw-press. All these appliances are of the most clumsy pattern. Two methods are used in preparing olives for table food, according as green or black olives are required. For green olives the fruit is picked before ripening, and only those berries are selected which are wholly free from any bruises. The fruit is placed in salt and water, and takes some time in curing. The black, ripe berry is very soon prepared for the table by being artificially crushed and then cured with salt.

Location.—The olive tree is very hardy, and thrives both near the coast and in the mountains, where it is found at an elevation of 3,000 feet, but the weight of snow does great damage by breaking down the little branches. The best soil is the red porous soil of the hills and stony, rocky ground. The annual rain-fall of this land is about 32 inches. As most of this falls in half the year, the olive thrives best when planted on slopes where the rain soon drains off.

SHIBLY ABELA,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Sidon, February 21, 1884.

TRIPOLI.

REPORT BY CONSUL BISSINGER, OF BEIRUT.

Varieties.—The best variety for pickling for olive oil and profit is the "Sourri" olive.

Soil.—Red richly manured soil is best.

Manure.—Manure is to be used in winter, and every tree needs about 112 pounds.

Situation.—Distance from the sea is immaterial. The position should be low, protected from the wind, but exposed to the sun.

Rains.—Plentiful rains benefit the fruit. Early rains, *i. e.*, from September and on, are preferable.

Irrigation.—Olive trees need not be irrigated.

Cultivation.—Plowing is necessary three times in the spring, *i. e.*, once every fortnight.

Pruning.—Dry branches only are pruned.

Pickling.—For pickling, olives must be picked while yet unripe and before they get black. For oil, whenever olives drop from the tree. The fruit that remains on the tree is picked early in December.

Oil.—For the extraction of oil, olives must be spread ten or twelve days after being gathered, then pressed.

Maturity.—At the age of from seven to eight years.

Yield.—The yield is proportional to the growth of the trees.

Planting and propagating.—The trees are planted about 5 yards apart, and propagated by budding or grafting.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, February 12, 1890.

TRIPOLI.

REPORT BY ACTING CONSULAR AGENT YANNI.

[Republished from Consular Reports, No. 41½.]

Varieties.—All the olives of this district are of one kind, known as the *Olea vulgaris.*

Orchards.—Olive trees are planted in two ways. The first is transplanting, the ground is prepared by digging large trenches 3 or more feet deep in which old domesticated or wild olive trees are planted. The land is plowed four or five times a year. The wild olive is grafted in the fourth year after transplanting. This method delays the crop, but is more successful than that employed in Lattakia, where the wild olive is grafted at the time of its transplanting, in order to hasten the crop. The loss in death of the trees is very heavy in consequence. The second method, which is good and less expensive, is to plant the shoots or suckers grown on the trunks of old trees. In most of the new plantations the mulberry is planted at the same time and place with the olive shoot. The mulberry grows rapidly, supports the olive plant, and gives good crops of leaves for the culture of silk, till the olive tree, which is of slow growth, begins to bear fruit, by which time the mulberry dies. These young olive trees require constant care to hasten their growth. Neglect in cultivating does not seem to greatly affect the product of old trees. To keep olive trees in good condition they require either fertilizers or a change of earth about the roots of the trees. The latter method is usually employed.

I am unable to give any information concerning the queen olives of commerce, since this sort is not found in the districts around Tripoli.

Maturity.—Transplanted trees come into full bearing after their tenth year, while plantations of shoots do not attain their maturity before their twentieth year. As to the age these trees can live, it is not known, but it is estimated that the groves around Tripoli are of great antiquity.

Yield.—If we suppose an acre of land to contain fifty mature trees, well cared for, they will yield about 1,800 pounds of olives, worth about $25; the cost of cultivation should not exceed $2.

If the olives are of good quality, 1,800 pounds will yield from 500 to 550 pounds of oil.

Planting.—In the old plantations no rule is observed, but in the new ones a space of 30 or 40 feet is left between the trees.

Picking.—Olives are gathered green for pickling. Olives are gathered for their oil when ripe, and the longer they remain on the tree the greater the amount of oil.

Olives are prepared for the table in two ways: The first is to break the fruit by a slight blow of a hammer, after which it is abundantly sprinkled with salt, in which it remains two or three days, when it is put in pickle. This method gives a speedy result. The second method is to take chosen green olives and put them in pickle. This pickle is tested by the people as follows: an egg is put into it and the brine is strengthened till the egg floats. Olives prepared in this way remain sound and good for a long time. They even preserve their green color for three or four years.

Oil.—As to the manner of extracting the oil the people employ one of three methods:

The presses or maassirs. In the middle of a large room is a circular stone about 5 feet in diameter, with a large hollow in the top. Within this hollow a millstone is made to revolve on its edge by means of a shaft and an upright post. The millstone is driven round and round either by men or horse-power, crushing the olives into a pulpy mass. The press consists of the trunk of a tree, which has been hollowed out by a mortise some 5 or 6 feet long. This log stands upright over a large jar or cistern. The olive pulp is put into small hay baskets, which are piled in the hollow log, and over the top of them passes a long, heavy bar, which presses down upon these baskets, the pressure being increased by heavy weights suspended at the end of the bar. The oil descends into the vessel below, which is partially filled with water, and the workmen use their hands for dipping the oil from the surface of the water.

These mills are the same as those for grinding wheat. The only respect in which they differ from the preceding process is the using of revolving knives, which cut the pulp from the olive seed instead of crushing the entire berry.

In the northern districts of Lafita and Akkar the people employ a ruder method for pressing the crushed olives. They put the pulp into vessels of water and press it with their hands, and finally skim the oil from the surface with their hands.

Soil.—The best soil for the olive tree is the alluvial. In limestone and chalky soils the trees grow more rapidly, and become strong, but are less fruitful. The quantity of oil yielded by their berries is much less than the average product of others.

Irrigation.—Olive trees are not irrigated.

Situation.—At Kalmun the orchards are very near the sea, with a northwestern exposure.

Rain-fall.—Though we have no meteorological observatory in Tripoli, still we consider the rain-fall in the city a little more than that of Beirut, say about 40 to 42 inches per annum.

G. YANNI,
Acting Consular Agent.

UNITED STATES CONSULAR AGENCY,
Tripoli, March 18, 1884.

AUSTRALASIA.

REPORT BY CONSUL GRIFFIN, OF SYDNEY.

Mr. J. H. Maiden, F. R. G. S., curator of the technological museum, Sydney, and author of an interesting and valuable paper on olives and olive-oil, mentions two species of oleas, *Olea paniculata* and *Olea apetala* as indigenous in New South Wales. This fact he thinks shows that the climate here will be found suitable for olives generally. It is certain that many varieties of the olive tree producing fruit that have been planted here and in other parts of Australasia have done exceedingly well, but the fact nevertheless remains that olive culture has not yet proved to be of any commercial or economic value, except, perhaps, in the neighborhood of Adelaide, in South Australia, and even there it is not regarded as of sufficient importance to be included in the statistical returns of the government relating to area under crop, but the returns of exports show that, in 1887, 517 gallons of olive-oil, the produce of the colony, were exported, and in 1888 419 gallons.

Sir Samuel Davenport, who is an authority on olive growing in Australia, informs me that his plantation, which is the largest in Australasia, contains about 1,500 trees,

placed as boundary lines inside vineyards and in occasional odd corner lands. Although you may meet with a few olive trees in public and private grounds, where the climate is adapted for their growth, there are only a few individuals who pay the cultivation any attention. Beyond my own fruit, I usually buy olives off trees in my neighborhood, so that annually I make from 1,200 to 1,500 gallons of oil. A few other persons make a little but the whole production is relatively insignificant, nor can be worthy of notice until our people wake up to the fact that the olive tree is one that they should, in their own interests, largely grow.

Among the varieties cultivated by Sir Samuel for oil are the French Blanquette, Blanquettier, Verdale, Pendulier, Italian—that of Lucca; Spanish, a few kinds, whose names he has not given me. He has nearly all the best known varieties used for oil and several that are used for pickling, such as the big Spanish, which, however, gives but little oil.

Sir Samuel Davenport occasionally supplies truncheons for starting plantations. Several thousand of these were sent to other parts of Australia last year for this purpose, the truncheon being the quickest and surest way of propagating the olive. The trees begin to bear at seven years of age and give about one gallon of oil from each tree. The fruit ripens in June and picking is continued through July and August. There is a plantation of 100 acres at a place called Stony Field, not far from Sir Samuel Davenport's property. The land is, however, very poor, and it is said will not grow anything but olives. A calcareous soil appears to be the best suited for olive culture. Sir Samuel Davenport says:

> The calcareous nature of the soil around Adelaide and the warm and dry climate assist in bringing the olive as well as the vine to perfection.

He adds:

> It is fortunate for the laborers as well as for the farmers that the olive harvest follows on the vintage, as the vintage follows on the harvest times of wheat and other grain.

Sir Samuel, when examined by the Victorian Royal Commission on Vegetable Products, stated:

> In Adelaide, and from 100 to 200 miles from that city, there is a very sunny entrance to summer, and the summer itself is also warm enough. The characteristics of a cultivation to suit a dry soil consist very much of plants which have a woody character and consequently are better able to resist the effects of long heats, and for that purpose all the South Australian soil, he thought, should be worked to a great depth. The olive tree is delicate when flowering and will not fructify if much moisture is used.

There is attached to the Aadelaide gaol an olive plantation of about 50 acres. Some of the trees are very valuable. The soil consists of chocolate loam. It is well manured and irrigated. The yield of fruit is something enormous. The branches are often so heavily laden that they have to be propped up in order to sustain the fruit. Two hundred and fifty of the best trees were imported from the grove of Count Spada by Mr. W. R. Boothby, formerly mayor of Adelaide, and the trees in the plantation are usually worked from the same stock.

The olive groves of South Australia are located from about 10 to 50 miles from the sea-coast and at an elevation of from 150 feet to 200 feet above sea-level. The average rain-fall for a term of years is about 22 inches, although in some years it falls as low as 13 inches. The average reading of the barometer is 30.652 inches, and the average temperature 62° above zero. The maximum 110°, and the minimum 36°.

MANUFACTURE OF OIL.

The method pursued by Sir Samuel Davenport is to take the ripe fruit and crush it into pulp in mill on the Chilian mill principle. This mill consists of two granite wheels, each weighing 7 tons, revolving in a

circular granite receptacle, worked by horse-power like a pudding-mill. About 100 pounds of fruit are pulped at one crushing. The time occupied is usually about twenty minutes. The pulp is then placed in an oval rice sack and the oil pressed out in a press of rather peculiar construction.

The sacks are placed one on top of another inclosed in a strong iron-bound frame, resting on a cemented bottom with a false bottom grooved, so as to allow the oil to run away. Pressure is applied with a piece of wood, called a tongue, which is attached to a heavy beam or lever.

It appears that this kind of pressure, which is perpendicular, has been found by experience to extract the oil better than a screw press, which it is said confines the oil in the pulp, while the slow, steady pressure of the lever causes it to trickle through the bags. The oil of the first pressure is called "virgin oil," and the report on some sent by Sir Samuel Davenport to Italy was, "that it resembles the 'sublime' oil more than the oil of commerce." The oil of the second pressure is of inferior quality and is run into slate cisterns kept specially for its reception. This quality of oil is used by manufacturers and sold at a lower price than virgin oil. The utmost cleanliness is practiced in the process throughout, the mills and presses being washed every day with hot water and soda. The South Australian oil commands a higher price than the imported oil and carried off the first prize at the Vienna International Exhibition. The oil made at the Adelaide gaol is also of very superior quality, and the process is said to be more economical than that employed by Sir Samuel Davenport. A press with hydraulic power is used at the gaol.

Samples of the Australian oil were sent to the Colonial and Indian Exhibition in London, in 1886. It was so highly refined and the cost of production so heavy that it was necessary to exclude it from the manufacturer's schedule, namely, 2*s.* (49 cents) per pound quoted. That exhibited by Sir Samuel Davenport was described as being equal to the finest Lucca brands.

G. W. GRIFFIN,
Consul.

UNITED STATES CONSULATE,
Sydney, January 21, 1890.

FIJI.

Whether olives have been experimented with or not, I am unable to say, but I think not. That they are not grown here I know.

The only fruit grown here for export is bananas and pines, both of which are quite extensively grown.

ANDREWS A. ST. JOHN,
Commercial Agent.

UNITED STATES COMMERCIAL AGENCY,
Levuka, January 11, 1890.

CONTINENT OF EUROPE.

FRANCE

REPORT BY CONSUL TRAIL, OF MARSEILLES.

THE OLIVE TREE IN THE SOUTH OF FRANCE.

The olive tree (*Olea europea*) is common to the whole of the south of France, and when nearing the south by rail the traveler can at once detect its familiar green color and its regular shape. For miles it can be seen on either side, sometimes in an uncared for, almost wild state, and sometimes in well-cared for, well-cultivated, regular plantations. It grows in almost any soil, in rocky or stony ground, and even without attention produces fruit that is a small, though uncertain, source of income to the poor peasant, but when well cultivated and attended to becomes a certain revenue to any farmer who takes the necessary care and trouble.

The olive tree is essentially the tree of warm climates (it is said to originate from Egypt), but not of tropical heat, therefore the Mediterranean district suits it admirably. It succeeds well in places where the mean temperature of the year is from 59° to 61° Fahrenheit. It does not support heat above 104° nor cold below about 15°. Frost below the latter freezes and kills all the branches, and one is obliged to cut the whole tree down to the ground and wait till it has grown again. It is the greatest calamity that can befall an olive tree, for it takes about ten years to regain its former position, and even then it is often far from being as good. In 1820 almost all the olive trees in this consular district were killed by frost, which was ruin to thousands, oil being then twice the value of to-day.

The olive tree is also essentially the tree of dry, stony, hilly, and undulating ground. Some of the hills and mountains along the coast are covered with olive trees, and inland plains are also planted with them; but the fact must be mentioned too that in some districts, notably around Toulon and Hyères, olives are being rooted out of the plains and vines planted in their place. Calcareous ground is favorable to olives for fine oil; sandstone, schist, and granite soils are less favorable. When the soil is rich the tree itself prospers and grows to a great size, but the fruit is less abundant and inferior.

The best is a mixed, fairly dry, red or calcareous soil, with exposure to the south. The ground must not be too dry nor too moist. Of the

two evils a too dry soil is to be avoided most. Drought is unfavorable to olive trees, as the olives dry and fall off before they have attained maturity; but a good rainy winter or spring suffices to give enough moisture for the following summer. After a very rainy winter season an olive tree will stand excessive heat much better than after a dry one.

Now olive trees uncared for and left to themselves produce, under favorable circumstances, a light crop about every two years, sometimes oftener even, and sometimes under unfavorable circumstances, less frequent; but cultivated and well cared for it becomes an interesting, important, and highly profitable branch of agriculture; one can count upon fairly regular annual crops, and the result is generally satisfactory. The importance of olive-growing in countries that suit it can not be overestimated.

In the south of France, and all around the Mediterranean, the olive plays a part in domestic economy of which little is known in other countries. It can be seen on the rich man's table as a relish, or its product, in the form of salad oil or frying oil, is used daily in his kitchen, and a handful of plain olives form at certain times the daily meal of many a poor peasant and farm laborer. In countries and districts where butter is scarce and dear, olive-oil, in some form or other, is used in almost every dish that comes upon the table, and a fact that is not generally known is that, in the south of France, olive oil is even preferred to butter for frying purposes.

VARIETIES.

There are many varieties of olive trees and many that have simply changed through change of climate, soil, or care, but the chief ones cultivated in this district are these:

(1) The Brown olive tree, a slow growing, hardy tree (especially against cold), that gives few crops but usually abundant ones. The olives are of a darkish hue, fairly good for pickling, but not so good for oil. This variety used to be grown very much but is less cultivated now.

(2) The "Cayon" or white olive tree, a quick growing, small tree, with low branches; is sensitive to cold but grows again quickly after a frost. It produces olives in its third or fourth year, and gives a crop pretty regularly every two years. Its olives are reddish, produce good oil that retains the taste of the olive, a fact that is appreciated in these districts. It is largely cultivated around Marseilles and Toulon.

(3) The "Pendoulier" or high-growing olive tree, a good sized tree with large branches that frequently hang down. It produces a good crop, rather late in the season, pretty regularly every two years. Its olives are of a dark hue, and produce very fine, tasteless oil that is much appreciated for export, and which is almost exclusively used in the perfumery trade. This variety is largely cultivated in the Grasse and Nice district.

The two latter kinds are excellent varieties for profit, and are recommended for general purposes. In many respects the Cayon is preferable, chiefly because, being a lower and smaller tree, it requires less room and is easier to attend to. Its height is usually from 12 to 16 feet. They can be planted at a distance of, say, 15 or 16 feet apart each way; thus, from 150 to 160 would go on an acre. The Pendoulier, being a much larger tree, requires about 30 feet square to itself in order to develop fully; thus, about 40 would go on an acre.

CULTIVATION.

The cultivation of the olive tree is very simple, and it is this that makes it pay. The chief points are digging, fertilizing, pruning. The ground ought to be well dug up around the tree to at least 6 feet from the stem, and if possible kept loose throughout the rainy season. A good plan is to dig a trench around the tree and on sloping ground to connect these trenches one to the other by ditches, all to be closed up when the wet season is over. No irrigation is then necessary Artificial watering would only be called for in spring if the whole winter had passed without any rain at all, a circumstance that rarely, if ever, happens.

FERTILIZING.

Fertilizing ought to be done at the same time as digging, that is, during winter and spring. In places and farms where stable manure is obtainable at a reasonable price it can be used to considerable advantage; in towns and in the proximity of oil-mills the refuse of these mills is a good fertilizer, and the dirty water that comes from the mills can be used, mixed or diluted with pure water. Powdered oil-cake is an excellent stimulant, and ought to be well mixed with the earth. Finally, the dead leaves that fall from the olive tree itself and the small branches cut off when pruning, well dug into the ground, are largely used as fertilizers, and are by no means to be despised. Strong fertilizers must not be used too frequently.

Pruning.—The question of pruning is one that requires study, as it depends a great deal upon circumstances. An olive tree usually gives a crop every second year, therefore it ought to be pruned every second year, and then, of course, shortly after the gathering of the crop, say during January and February. But as cultivation in many cases makes the tree produce a crop every year, it is right in this case to prune the tree slightly every year. When the trees are pruned every year it must be done carefully and lightly; in fact it must only consist of a slight thinning out. The chief thing to be borne in mind when pruning is, that those twigs that have blossomed and produced fruit once never do again, therefore that pruning must consist in cutting away useless twigs and branches to give light and air and make room for fresh and fruitful twigs and shoots.

Pruning depends in a great measure, too, on the position and exposure of the trees. Olive trees exposed to high winds ought to be kept low and rather compact, but those in favorable positions, on sheltered hill-sides, for instance, can be allowed to grow larger. Thus it will be found that olive trees along the shores of the Rhone, and indeed in all the Rhone valley exposed to the pernicious mistral, are little more than bushes and are kept as such, whereas towards Toulon and further on, also in Tunis and other parts, the olive tree grows to a great height and size, and is pruned accordingly.

PICKING AND CURING.

The blossoming of the olive tree takes place in April and May, and if the rains have been favorable and no frost occurs the crop may be considered sure.

The gathering of green olives for pickling is done from about the 20th of September to about the 10th of October and must be done by hand. The date of gathering depends, of course, upon the stage of the fruit, as it ought to be done just when the olive has reached its full size and before it begins to turn black. Green olives can not be eaten as they come off the tree, because they are too bitter, but are pickled by the very simple process of soaking them in brine or very salt water. Sometimes ashes are used as well as salt. As soon as they have almost lost their bitter taste they must be taken out of the brine and put into clear water, if possible running water, and washed.* They are then ready to be packed in kegs, barrels, bottles, or jars, but with a little salt water or water highly seasoned or aromatized, and are fit for export, for storing, or for immediate use.

Black olives for pickling are gathered, as their name indicates, when they are black, say during November. The pickling process of these is left to nature, *i. e.*, they can be simply spread out on wicker-work hurdles or basket-boards exposed to sun and wind till their natural water has evaporated and with it their bitter taste. They can then be eaten in their natural state, but are more palatable well seasoned with salt, pepper, and oil.

The gathering of olives for the manufacture of oil must take place when they are black and quite ripe, generally from the end of November till the end of January. They can even be left to fall to the ground and then gathered up, but as they do not all fall off together, it often takes a long time to gather in the complete crop. Care must be taken not to let them rot on the ground, as such olives would spoil the oil for table purposes. A good plan is to wait till the first good fall has taken

* The usual way in which green olives are pickled in this district is as follows: They are soaked in a solution of potash and water (1 pound to 1½ pounds of potash to a gallon of water) for about two hours, then put into clean water, which is changed once or twice a day until the water remains clear. After this the olives are ready to pack in salt water for keeping.

place and then to set about gathering in the whole crop either by shaking or picking off all the rest. Care and attention must be exercised when gathering in the crop for oil-pressing in not picking them before they are perfectly ripe, and also in not breaking off the young branches that will produce fruit the next year. In positions favorable to the ripening of the olives, that is, where the olives on any one tree ripen almost simultaneously, the trouble of gathering in the crop is rendered easier by stretching out coarse sheets or cloths under the trees and simply shaking or pulling the fruit off the branches into them.

Now in order to obtain olive oil of superior quality there are several primary conditions to be observed. Care should be taken in selecting only sound olives and picking out all bad ones and foreign substances, such as stones, dirt, leaves, or anything that may have been gathered along with the olives. For superfine oils it is therefore advisable to press olives that have been gathered by hand only, or at least shaken into cloths.

Once gathered, the olives should be looked over, selected and separated, and taken to the mills with as little delay as possible. They should not be left in heaps or in baskets for any length of time, as they are liable to ferment, which is detrimental to the obtaining of really fine oil. In some old-fashioned places peasants pretend that this fermentation facilitates the pressing out of the oil and even increases the quantity; but this idea is not to be recommended, as the slight gain, if gain there be, in quantity is more than counterbalanced by the difference in quality.*

Cleanliness in the mills is a great point. It is essential that all presses, millstones, casings, recipients be perfectly clean, so that no bad taste nor color can possibly be given to the oil during the process of manufacture.

The simplest and the primitive way of manufacturing oil consists solely in placing the olives in a mill in which one or two millstones are revolved either by hand, by oxen, or by horses, until all the oil is crushed out. But this altogether primitive and imperfect mode can only be seen now in country places at great distances from cities and villages in Algeria, Tunis, and in some parts of France. It has long since been supplemented and superseded by other more perfect and complete processes.

It is, however, seldom that a farmer or olive grower presses his own olives. In centers and districts of olive cultivation there are generally one or more oil-mills to be found. Proprietors of oil-mills can be divided into two classes, viz, those that are simply oil-crushers, who crush the olives and make the oil for the cultivator who brings his crop to them; and these are paid in kind, *i. e.*, they are not paid in

* This custom of allowing the olives to ferment before putting them into the oil presses is still observed in many parts of Spain, and for this reason Spanish olive-oil is generally of an unpleasantly strong taste.

money, but by agreement retain a certain percentage of the olives brought to them. This system often gives rise to certain abuses that are difficult to suppress, and the poor peasant frequently finds that he has been very far out in his calculation of the quantity of oil that his crop ought to have produced. The other class of oil-mill proprietors is composed of those that may be called merchant-crushers. These buy olives in large quantities from the growers and dealers, manufacture the oil, and sell it themselves. There are several large manufacturers in the city of Marseilles who possess mills in several different centers of olive cultivation in this district and in Algeria and Tunis. These firms have very naturally acquired a certain reputation for their several marks, and many can command higher prices in the market on the strength of their reputation. Each manufacturer professes to have a special method of his own, but the basis is the same for everybody. The only difference that can exist is in the way of filtering and refining or clarifying the oil before it is finally casked or bottled.

OLIVE-OIL MANUFACTURE.

The process of manufacture is as follows: The olives ready to be pressed are first put into a mill, similar to those formerly used for the whole operation, but the olives are only half crushed, and no oil is crushed out, so that they form a shapeless mass. This mass is then distributed into round flexible kinds of baskets (French name "scourtins") made of sparto grass and horse-hair, something in the shape of shortsacks with mouths only half closed, containing about 15 pounds of the crushed olive mass. From ten to twelve of these bags are then placed, one above the other, in a pile under the regular oil-press and in such a way that the base of one bag rests on the open mouth of the one below. The mouth of the bag being smaller than the circumference of the bag, the mere fact of placing one above the other closes them. At the base of the press there is a ledge with an opening on one side, below which the receptacle for the oil is placed. When all is in its place the press is set in motion, in small mills by hand, in large ones by steam, and the oil gradually oozes out from all sides of the baskets and flows into the vessel below.

The oil that flows from this first pressing is the best, and is called virgin oil (*Huile vierge*).

When no more oil flows through the baskets the press is reversed and the crushed and hard mass of olives is taken out. This hard and apparently dry mass still contains a good quantity of oil of good ordinary quality for kitchen purposes, and in order to obtain it the mass must be broken up and mixed with boiling water. The warm mass or pulp is then placed a second time into the baskets and the whole is pressed in the same way as the first lot, only, during the operation of pressing, boiling water is frequently thrown over it. The oil and water that flow from this

pressing are received and left to stand in large stone vessels or metal tanks, and the oil that gradually mounts to the surface is the second quality oil.

Now, the mass that is found in the baskets after the second press is either stored to dry and sold as oil-cake, or is sold to special mills that extract a third quality of oil by means of acids and other agents. But this quality can not be used for table purposes; it is, however, very good for the manufacture of soap, and is largely used in this and other industries.

The oil that comes from the first and second presses is not generally sold in its primitive state, but is refined and filtered, and it is in this process that some manufacturers excel others. The principle of refining and filtering consists in letting the oil remain for a few weeks in tanks or immense jars, during which period a sediment gradually deposits itself at the bottom, and then passing the oil minus the deposit through filtering papers specially prepared and sold for the purpose. Some manufacturers even pass their superfine oil through specially prepared cotton-wool, which is certainly an expensive process.

After being filtered the oil is ready to be casked or bottled for consumption.

PRICES OF OIL.

Concerning the prices of oil it is difficult to give any good idea, as so much depends on freight and charges on the oil from the time it leaves the mill till it reaches the consumer. Really good oil in the mills in this district brings from 100 to 120 francs per 100 kilograms ($8.75 to $10.50 per 100 pounds), but prices of olive-oil in the Marseilles market vary from 95 francs for common kitchen oil up to 200 francs for the finest possible salad oil ($8.30 to $21 per 100 pounds), all according to quality and mark. Oil for manufacturing purposes is worth from 80 to 90 francs ($7 to $7.90 per 100 pounds).

ADULTERATION.

In many places adulteration is carried on to a great extent and refined cotton oil is largely used to mix with olive oil. Cotton oil being from 20 to 30 per cent. cheaper, and being tasteless, lends itself very advantageously to the adulteration of olive oil. It is an open secret, too, that vast quantities of pure cotton oil are shipped and sold as olive oil to those markets that prefer tasteless oil. Cotton oil is, however, used under its own name by many people who prefer a tasteless oil for frying purposes.

RÉSUMÉ.

From the foregoing, it will be readily understood that olive-growing and oil-pressing are two distinct professions and that they are better if

kept separate. This explains the existence of professional oil-crushers who do nothing but press oil for the growers; otherwise, unless a grower had a large amount of capital at his disposal wherewith to work a mill and pay the necessary staff, he would never be able to attend to the digging, fertilizing, and pruning of his olive trees with due care, as this ought to be done just at the same time of the year as the all-important first-oil pressing.

The olive-grower, if he attends to his task properly, has plenty of work to do and the more he does the better he is repaid. As already mentioned, an olive tree left to itself will produce fruit, but one well cultivated will repay its owner tenfold. Though it does not pay to be too lavish in expenditure, yet an outlay of about $50 per acre per year is considered a sound investment in these regions. Considerably less is spent by many a grower, but if one has the courage to lay out about the sum mentioned one can generally depend upon being well repaid.

A full-grown Pendoulier well fertilized and cared for will produce about 30 gallons of olives in a crop; very large and fruitful trees have been known to produce up to 100 gallons even. A full-grown Cayon under the same circumstances will produce from 7 to 8 gallons in a crop, and there are many that can produce 20 gallons.

The value of olives varies according to crop and quality, but roughly speaking about $1 per gallon is the average price.

The out-turn of oil varies according to the quality and condition of the olives, but the average yield is 14 per cent. by the two pressings plus 10 per cent. by acids, say a total rough average of 24 per cent.

The olive-tree, well cared for, is almost always free from disease and parasites, but it is well to be on the look-out for any possible enemies. The branches are sometimes covered with a kind of yellow moss, produced in some instances by too much dampness or moisture and in others by weakness of the tree. In the first case the ground must be immediately drained, and in the second it must be manured. In both cases it is well to cut off the branches so covered. Sometimes there is no remedy, and the trees must be rooted out, and the ground used for other purposes.

Sometimes a sort of a cochineal, the *Coccus*, attacks olive trees, and in this case a hard brush, dipped in vinegar, is the best remedy.

The *Tinea oleolla* occasionally attacks the leaves and the *Hylerinus oleæ* occasionally kills the buds, but these are not serious foes. Of all insects, that most to be feared is a fly that deposits its eggs in the wood of the olive; it is the *Dacus oleæ*. The larvæ of this fly eat away and destroy whole branches, and it is extremely difficult to exterminate them. The best way to destroy them is to scrape the branches and apply boiling water or a solution of lime, but even these are not always effectual. Nature, however, sometimes helps herself, and not unfrequently another insect, the "*Cynips*," deposits an egg in the hole bored by the Dacus and the larva of the Cynips kills and feeds on that of the Dacus, thus saving the tree.

The olive is a tree that attains a great age, and that, with care, is said never to die. It can, however, be reproduced by cuttings and by seedlings that must be grafted the second year.

CHAS. B. TRAIL,
Consul.

UNITED STATES CONSULATE,
Marseilles, April 30, 1890.

THE OLIVE TREE IN SOUTHERN FRANCE.

REPORT BY VICE-CONSUL MARTIN, JR., OF MARSEILLES.

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Varieties.—The olive tree is only cultivated in France in the departments bordering upon the Mediterranean. From the remotest antiquity it has been a source of great riches to this part of the country, as it thrives on land where no other culture could be attemped, and is productive for centuries.

The varieties are almost numberless, as the tree takes a different name in almost every district where it is cultivated, and are distinguishable by the fruit only, as the appearance of the tree is nearly the same for all the varieties. The best-known varieties cultivated in view of the fruit are the "Espanenque," "Prunaou," "Triparde," "Picholine," "Bouteillan," "Verdale," etc. Those that produce the best oil are the "Aglandaon" of Aix, the "Soloumen" of Salon, the "Amelon" in the departments of Hérault and Bouches du Rhône, the "Brun" and "Cayon" in that of Var, and "Aubanenque," "Saurin," "Rougette," etc.

Soil.—The nature of the ground appears to have but little influence with the yield of the olive tree; still a stony soil, with a rocky substratum, a mixture of clay and sand, or calcareous and gravelly earth with a little humus, appears to be more favorable than marly, granite, or schistic soil.

Situation.—As to the situation, hill-sides or table-lands sheltered from high winds, with an easterly or southerly exposure, give the best results. The proximity to the sea must be rather beneficial than otherwise, as many orchards are planted on the very shore, and those that are at the greatest distance from it are as a rule the most sensitive to cold weather. In fact, there are none to be found far off from the coast.

Cultivation.—The process of cultivation is of the most simple description. As a matter of fact, many orchards that are not cultivated produce the most esteemed oil, although in smaller quantities. In many others one hoeing in the year is deemed sufficient. In a few, where the trees are planted in quincunx at a distance (which is generally adopted) of 10 meters or 33 feet from each other, the alleys formed between them are tilled with the plow, great care being taken not to hurt either the

roots below or the branches above. There is in this way left around each tree a square space, which is then hoed by hand. The same operation is repeated in the course of spring, and again in summer.

Pruning.—Pruning is generally considered as unnecessary, and must be conducted with great care, as the tree is liable to suffer by injudicious or excessive lopping. It is only applied once in three or four years, and confined to the suckers and the withered or entangled branches.

Fertilizers.—Fertilizes should also be applied with a great deal of precaution. The best manure is that consisting of a mixture of animal and vegetable matter. It is placed once in four years a little beneath the surface of the ground. Close contact with the roots should be avoided. Many cultivators prefer to dig out the earth from around the foot of the tree and fill up the hole with fresh mold. An excess of manure has the same effect on the tree as an excess of water. It rots the roots, and in all cases produces an abundance of aqueous sap. As the olive tree vegetates all the year round, this abundance of sap makes it more liable to the effects of frost and cold. It also rends frequently the bark of the boughs, and flows out through these fissures with considerable detriment to the tree.

Irrigation.—On the other hand, irrigation, while impairing the quality of the oil, produces much larger quantities of fruit that is also larger in size, and in many districts where fruit forms the object of culture the orchards are frequently watered by hand, with watering pots, or, when the water supply is at hand, irrigated after the manner that meadows are.

Planting.—The olive tree can stand any degree of drought, but a temperature of from 10° to 14° above 0, Fahr., accompanied with snow, kills the boughs and trunk. There is then no remedy left but to cut the tree on a level with the ground, and allow the roots to grow new shoots, or to root it entirely and replace it by new plants. The olive tree is remarkably reproductive, and any part of a twig would, in course of time, take root and give birth to a tree. A shoot from the old roots about 2 inches in diameter is generally selected for reproduction; it is taken off from the roots with care, so as not to hurt either the scion or the roots, and planted in a square hole 6 feet on each side of the surface, and 3 feet deep. The hole is usually filled with other earth than that which has been taken out of it. The young tree, when planted, should not be more than 4 feet above the level of the ground, and frequently bears fruit after five or six years. Trees grown from the kernel of the fruit do not begin to be fruitful until the age of fifteen or eighteen. For this reason, this mode of reprodution is only practiced in nurseries, where young trees are also raised from wild scions and slips, and sold at the rate of 1 franc or 1.25 francs. These are in many cases preferred to the trees grown from old roots, and when properly packed can be transported to long distances.

The yield, proceeds, and cost of cultivation must necessarily vary widely according to the manner in which orchards are cultivated. The cost may amount to any sum between $5 and $20 per acre.

As to the yield, it is even more variable; each tree may pay from 50 centimes to 3 francs. As a rule, an olive tree is only productive every other year; some varieties, when placed under the most favorable conditions of soil and weather, produce two years in three, but in no case is the yield constant. It varies from 60 to 535 gallons of fruit per acre. The average price of the fruit ranges from 12 to 22 francs per hectoliter (9 to 17 cents per. gallon). The quantity of fruit turned into oil is not the same in all districts, some of which prepare a much larger quantity for table use than others. On an average little over two-thirds of the whole crop is sent to the mill.

Preparation.—Olives intended for table use must be perfectly sound, and of course are picked among the largest on the tree. There are two modes of preserving olives, in pickle and in oil. Those that are to be preserved in oil are picked when perfectly ripe, that is, black. They are, without any further preparation, steeped and kept in olive oil with some fennel, coriander, salt, and pepper. The pickled olives are picked before they arrive at maturity, and as soon as they have acquired a bright green color. They are pricked and rolled into wood ashes to set free all the oil they may already contain. After being washed they are placed in the pickle, where they remain until consumed. The "Picholine" and "Verdale" are the varieties mostly prepared in pickle here. The "queen olives" are the produce of a variety of tree that is not grown in this country. They are imported at this port from Spain.

Nearly all the production of preserved olives is consumed in France. The exportation is exceedingly small, and does not amount to more than a few thousand kilograms, that are mostly sent to Algeria. The extraction of oil is made in special mills where the farmers bring their crops by quantities of 400 liters (about 106 gallons). For this quantity, called "molte" in the country, the mill-owner generally returns 40 liters or 10 per cent. of oil. The olives are thrown into a recipient, where they are crushed under the action of two wheels measuring two and a half feet in diameter and worked by water or steam power. After two hours the olives are reduced to a sort of a paste, which is placed in a number of grass bags and pressed. The oil thus expressed is called "virgin oil," the quantity being about one-half of the whole produce. The paste is then taken out of the bags, spread out on a cloth, broken up, and replaced in the bags. Each bag is drenched with about five gallons of boiled water and placed again in the press. The mixture of oil and water thus obtained is left for a day in the receivers. The oil comes to the surface, is skimmed off, and in most cases mixed with the virgin oil first extracted. The mill-owner charges 3 francs for each "molte" and keeps the residues, from which he again extracts, on his own account, by a supplementary and more abundant addition of boiling water, an inferior grade of oil called "ressence." There is still left in the residue after this operation a small quantity of oil that is extracted, in special factories, by means of sulphide of carbon.

Diseases.—The diseases of the olive tree are few in number and seldom fatal to the tree. The most common are: The "mofée" or "noir," which covers the bark and leaves with a sort of black matter that is sometimes friable, sometimes compact. The origin and causes of the disease are not well known. It is counteracted by a sprinkling of lime and water and by a pruning, more extensive than usual, so as to let the black deposit be freely swept off by the wind. The "mouffe" is produced by an excess of wetness, that decays the sap. When the vegetation is staid and the leaves turn yellow, the roots and branches attacked must be cut off, as also those parts of the stem where the rotten sap, known by its stench and black color, has found its way, and draining trenches should be established without delay.

Insect pests.—Olive trees planted near the sea-shore are sometimes covered with a coat of green moss, that is not in itself injurious to the tree. Large numbers of microscopic insects live in that moss, but do not seem to hurt the tree; so that nothing is done to remove them.

Cochineals are, among the parasitic insects that live on the sap of the olive tree, the most common and most dangerous; they are driven away by rubbing the boughs and branches with a piece of cloth soaked in vinegar or whiting.

No remedy has yet been found to protect the olive orchards against their worst enemy, an insect called the *Dacus olea.* It is a species of fly that deposits its eggs in the fruit. The larvæ feed on the pulp of the olive before it comes to maturity; when they make their exit they frequently cut the peduncle of the fruit, which falls to the ground. When the olive remains on the tree the produce in oil is considerably impaired both in quality and quantity. The damage made by the "ver" (worm), as the *Dacus olea* is commonly called, has been particularly great in the last two or three years.

J. S. MARTIN, JR.,
Vice-Consul.

UNITED STATES CONSULATE,
Marseilles, March 11, 1884.

NICE.

(REPORT BY CONSUL HATHAWAY, OF NICE.)

Introductory.—I have the honor to submit the following report on the olive, as it has come under my observation within the district of this consulate, accompanied by some statistical data relating to its products, and accurate directions, obtained by diligent inquiry from reliable sources, for its successful cultivation.

This tree, of the family *Oleaceæ*, which is a feature of the remotest historic landscapes, finds its natural home in the portions of southern Europe bordering immediately upon the Mediterranean basin. Here, restrained only by the choice of man and the limitations of soil and

altitude, it covers the slopes, hill-sides, and valleys by millions. The general configuration of the coasts, the mountain barriers, sheltering against northern winds, and the proximity of the sea itself, which serves, as a vast reflector of the sunbeams, are explanatory of this result.

It attains to a height usually of 20 feet, and even to 50 feet in some localities, and commonly to an age that appears almost fabulous. One of this species—a wonder of its neighborhood—lately carelessly destroyed at Beaulieu, in this vicinity, had a positive record of five centuries, and measured 36 feet in circumference when it fell. It has entire evergreen, lanceolate leaves, gray underneath, and its flowers, which appear in June, are white, and disposed in axillary branches, and resemble the blossoms of the elder. Its fruit, named olive, is exceedingly prolific under culture, and is oval in shape, with a ligneous kernal inclosing a seed in form like the almond. The flesh of the fruit yields about 70 per cent. of its weight in oil, and is firm and covered with a soft skin, green colored before maturity, becoming an intense violet black when ripe.

Varieties.—Among the varieties of olives here I note the following:

(1) The black point, called in the dialect of Nice "Prince Neri." This is the best quality of the fruit known in this district, and is grown at Beaulieu and at the promontory of St. Jean. These olives are gathered when entirely ripe, are then dried in the sun, and are excellent for the table.

(2) The "Pitcholine" and the "Caillette" (so called), both of which are esteemed best for preserving when gathered green.

(3) The "Blanquette" (light of color), the "Sauvagette" (wild olive), and the "Nostrala" (proper olive of Nice), all especially useful in production of oil.

Yield of oil.—It is computed that the amount of oil produced in Italy is 33,000,000 and in France 7,000,000 gallons annually. The amount of production in this department, although no statistics thereof are published, may be safely estimated at from 50,000,000 to 60,000,000 pounds biennially. This estimate does not include the very considerable quantity arriving here from Tuscany and Naples, nor the increasing importations to this port from Corsica, all adding to the immense stock of the refiners here, and from hence, in the distributions of commerce, sold in Europe and America under the name of "Olive Oil of Nice."

Situation.—The tree does not vegetate readily beyond 2,000 feet above sea-level or 45° in latitude. The department of Alpes Maritimes, situated 43° 42′ north latitude and 4° 56′ longitude east from the meridian of Paris, is most favorably adapted to its growth. The said department has an extent of 46,850 hectares of land (115,770 acres), more or less wooded with the olive, of which 12,000 hectares (29,650 acres) are exclusively planted with olive trees. From the River Var up to the River Roya the hill-sides and valleys surrounding this region are sheltered against northern winds by the "contreforts" of the Alps.

The coasts facing the sun, the immense mirror of the Mediterranean reflecting back the sunbeams and the triple girdle of mountains, gradually

sloping into hills toward the sea and protecting the country from frost, are the unsurpassed conditions, with the temperature, for the nurture of the olive and the maturity of its fruit. Nowhere is the earth blessed with a continuance of more polarized light. The temperature during the winter months, in which the olive ripens, is like that of spring in middle France. The winter is deemed exceedingly rigorous when the thermometer falls below 32° Fahr. Thirty years of accurate observation have proved that of the fifty-six days of rain during the year forty-two were in autumn. October and November are the months in which the psychrometer gives the highest average. In May the temperature averages 64°, in June 70°, and the strong heats of July and August 78° Fahr.

During six months, viz: from the close of May to the end of November, more than one hundred days are enjoyed without clouds. The winter temperature on the whole, in the shade, averages 52°. The years when it falls below 32° are rare but ruinous. Such an exceptional climate generally allows the fruit in winter to reach its full maturity. The tree grows everywhere here, except in marl or clay or other moist conditions, but best in a dry soil, on slopes toward the sun, sufficiently sheltered. On steep declivities, where quantity and quality of oil are only aimed at, no crop of any kind allowed beneath its foliage, but elsewhere and in plains a mixed cultivation is profitably employed. In prosperous seasons the olive is more remunerative than corn or the vine.

Picking.—The gathering of the crop begins in November and continues until May. The harvest is divided into three periods of two months each. From the first is produced an oil high-colored and called "fine," the second produces a straw-colored oil called "superfine," the last a pale-colored oil called "extra superfine." The product of the first period is most dense and has a strong flavor of the fruit, and can be longest preserved. But the best quality of the oil is that from the last gatherings of April and May, when the fruit has become fully ripened. This, although less flavored than the others mentioned, has more sweetness and limpidity, and is in great demand in the home markets and not always easily procured for export in its finest grades.

Oil manufacture.—To express the oil from ripe fruit freshly gathered and unmixed with that which is immature or otherwise of bad condition is an essential rule, and to this method the reputation of the oil of Nice is mainly due. The olive is gathered from small trees by hand, and from large ones it is knocked off with poles. The first manner is preferable, as the fruit thus escapes being bruised and as any lengthy contact with the soil affects its flavor. But this can not so readily be practiced either on large trees or slopes or fields of large extent. Women and boys are employed for the purpose, for which as wages they receive 77 cents for every 20 liters.

The mills for grinding the olives are located on the little watercourses of the region, and a stone wheeling around on its axle triturates the fruit and reduces it to a paste. The latter is then placed in bags of esparto and squeezed under a press in the mill. The olive oil then

escapes through the texture of the bags and runs into a receptacle underneath. It is this first pressure which produces that which is styled "virgin oil." Afterwards the bags of said paste are removed and soaked in boiling water and placed a second time under the press. The same operation is a third time renewed, when all the oil is extracted. The second pressing yields the ordinary oil of commerce, and the third that used for illuminating purposes, and generally consumed here in preference to all other oils. It is styled "huile de colza."

The farmers bring their oil to market in barrels of about 200 pounds weight, or retain it in their cellars in earthen jars, glazed within, and guarded from dust by wooden covers. Merchants keep it in large, deep, cemented tanks, over which their warehouses are built, thus providing an even temperature.

From these tanks the oil is drawn by pumps for the process of filtration and bottling for sale. The filter consists of a series of boxes, one above the other, with perforated bottoms, and lined with layers, about an inch in thickness, of white cotton-wool.

Adulteration of oil.—That the adulteration of the olive oil, notwithstanding the severe penalties of the law therefor, is to some extent practiced is undoubted. The fraud is accomplished by mixing with the genuine the oil of the oleaginous seeds of cotton, sesamum, and others. Immediate discovery of the imposition appears impossible, although much study has been given to the matter. Densities, degree of congelation, refraction, specific weight, and all other chemical properties must be taken into consideration, which is a labor of hours. The following process of detection is generally used: In the trial tube is placed 0.3086 grains of dried albumen, to which is added 30.864 grains of nitric acid, and an equal weight of oil. The tube is then heated over an alcohol lamp and its contents mixed by ebullition. The operation affords the following tests: (1) If the oil be genuine olive the color will be of a yellow feebly greenish tint; (2) if the olive has been mixed with 5 per cent. of seed-oil the color will be of an amber yellow tint; (3) the tint of the mixture will deepen down to a deep orange in proportion to the amount of the foreign oil.

Insect pests.—The special dangers to which the olive trees are exposed are frost, wind, hail, and the "dacus." When a tree has been caught by too low a temperature it seldom resists the frost. The loss in Provence from this cause, in the year 1830, was ruinous to many proprietors, and amounted to 4,000,000 francs. When the tree is but partially frozen it can be saved by pruning, but when leaves and branches are entirely frozen there is no remedy. A violent wind brings down the fruit pell-mell, ripe or green, according to the season. The hail cuts and bruises it as well as beats it from the branches. Such fruit becomes mingled with the soil and more or less decayed, and produces an oil moldy in savor, disagreeable to the taste, and improper to trade. The dacus, the chief enemy of the olive, appears in the month of August, as soon as the fruit begins to ripen. The little insect destroys

annually more than 3,000,000 francs' worth of olives. Its larva, introduced into the flower of the fruit in the form of an almost imperceptible egg, hatches in the fruit, and is nourished by its substance. In September the larva, becoming a perfect insect, issues from the olive, cutting and weakening the little stem which joins the fruit to the branch. The fruit, when this happens, soon falls in a spoiled and unripe condition, and the oil it produces is rancid to the taste, and only valuable for the lamp.

Diseases.—The olive tree does not escape from vegetable parasites. A tree infected with morplua or fumago becomes all black—trunk, branches, and leaves. If it produces fruit, which rarely occurs, such contain no oil. This disease once fastened, lasts about ten years, and it is without a known remedy. Severe pruning in such cases is sometimes practiced, but it is usual to leave recovery to the operation of time. Twenty years ago, this disease wasted many groves in the environs of Grasse and at Beaulieu, but finally disappeared. Recently the environs of Cette have been afflicted with that sickness. Some proprietors said it resulted from the fog, others ascribed it to emanations of the soil, and others to the wind from the sea. M. Aug. Riviére, an expert in such matters, is of opinion that the disease develops from the honey matter deposited under the leaves by the insects *Aphis coccus* or *Kermes*. Among the numerous remedies for the scourge have been hyposulphite of lime, petroleum, and fumigations of tar, all of which, however, have been found useless. The same disease occurs among the trees in Spain, under the name of *negruro*.

Secondly, the decay of the olive. Among trees not too thickly planted and on lean, dry soils this seldom occurs, but elsewhere is quite noticeable. The decay arises, for the most part, from the cuttings, the breakings, and the bruises to which the tree is subjected. The wounds thus made, unless protected from the air, cause the ligneous substance to become rotten. This disease proceeds, undoubtedly, to a large extent from the method in which many of the young plants are obtained. These, when extracted with a few horizontal roots from the foot of the parent tree, leave injuries inviting decay. The treatment for the trouble consists in removing the decayed portions as much as possible, and closing the cavities with mortar of sand and lime.

Cost and profits.—On slopes or undulating fields 1 hectare of land (2.47 acres) usually contains about 200 olive trees; on plains about 150. To calculate as exactly as possible both the expense and yield in this district, I will make an average of both situations, observing, at the outset, that the crop is biennial, and that in the estimates of expenses, therefore, only one-half is to be taken.

To cultivate a hectare on plains it is necessary to dig and loosen the soil, a labor of fifty days at 48 cents per day, one-half of which sum is $12.06; to manure the same (150 trees at 14.4 cents each), $21.71; to prune the same, at 19.3 cents per tree (the half), $14.48. Each tree gives, on an average, three double decaliters of fruit, equal to 13⅕ gal-

lons; for the gathering of each double decaliter 77 cents is paid; one-half of this expense for the 150 trees equals $17.37. The entire expense per hectare thus equals $65.62.

One hectare of olive trees under good conditions produces every two years 450 double decaliters of olives, which, at the normal price of 3 francs each (58 cents), are of the value of $260.35. One-half of said sum being regarded as the product of one year, the proprietor thus obtains 675 francs, equal to $130.17½ from each hectare. Deducting the above expenses therefrom leaves him a net profit of $64.65 per hectare. On slopes, with 200 trees per hectare, $90.44 of value would be the annual product. An average of $77.55 is the net profit annually per hectare for both locations. Thus, the 46,850 hectares of olive lands in this department, of which about 31,000, it is calculated, are planted in slopes, may produce the important sum of $3,830,000 yearly.

Among the principal oil merchants at Nice are "Société des huiles d'olive," Stable & Cie., and Joseph Mayrarque. Prices for table oil range from 2.50 francs to 1.90 francs, and illuminating oil from 1.10 francs to .80 francs per liter (2.113 pints.)

Cultivation.—The "Oleaster" (wild olive) and "Olea Europæa" (common olive) grow without cultivation, but the quantity and quality of their fruits are to a great extent the result of care and labor. When totally neglected the tree does not entirely fail, but, like the vine under the same conditions, brings some small profit to the owner, but the product always increases in proportion to the amount expended in its judicious care.

One of the primary essentials, as considered by the best cultivators here, is that the ground under its shadow be plowed, dug, or otherwise loosened thrice every year, great care being taken lest the roots are wounded. A breaking of the soil to a depth of ten inches is thought sufficient. On the plains they use the plow, but upon the declivities the spade only is practicable.

Soil.—It is generally allowed that a soil in which more or less lime, alumina, magnesia, silica, and some alkaline salts exist is especially favorable to this tree. Volcanic soils are also considered excellent, but neither of the above, though preferable here, excludes all other soils, except those which are mortal to the olive, viz, fat and very moist lands and sandy and very dry ones. Excessive moisture and excessive dryness are its enemies. Soils entirely of clay or sand are excluded from its culture, but the sandy clayey ones, the calcareous, the rocky or pebble-covered, and even the calcareous rocks themselves, where the roots can penetrate between them and find water to successfully nourish the tree are adapted to its culture. A soil not too dry, the bottom of which is gravel, provided clay is found over it mixed with sand, is preferable. A clayey soil is bad on account of the moisture with which it is filled in winter, and which causes the roots to decay.

Situation.—The proper situation of the tree is a question simply of temperature. Much attention must be directed in various ways to sit-

uation, as it involves a careful consideration of climates, altitudes, declivity, and the direction of predominant winds. Many different conditions thus present themselves, which may be summed up as follows: Give the tree the maximum of temperature which its nature requires, avoiding places of excessive cold as well as those of burning heat. For this end, in cold localities the trees should be placed on meridianal hills and on septentrional ones in very hot localities. Further, light slopes are always preferable to high hills or the valleys.

Propagating.—The methods for the reproduction of the olives are numerous, but may be treated as under two distinct classes, viz, the natural and the artificial. The best natural way of reproducing the tree is from the seedling. The seed requires two years for germination when sowed in its hard kernel. The latter should always be crushed, therefore, but without injury to the seed, which will then follow the ordinary rule of development. Some cultivators, after removing the kernel, soak the seed in a mixture of manure and clay. When planted the best dry soil should be selected and the seed covered to a depth of 2 inches. If sowed in April, the young plant will emerge the same year, and in six or seven years bear fruit. In its first stages it should be protected by straw or leaves against the cold, and its lateral branches pruned away and its stems guarded by an inclosing support.

Among the artificial means of reproduction are the following: The planting of shoots, multiplication by protuberances bearing buds, and multiplication by cuttings and grafting of the stumps. The artificial methods, however, do not afford the special advantages of the seedling process, which are: A more vigorous tree, producing longer and more regularly; one of more hardihood, more readily existing on moist, arid, or rocky soils; a tree with more abundant roots, by which it can offer greater resistance to wind and cold, as well as obtain more nourishment; a better form of tree than simply portions of others, the wounds of which heal with difficulty and are frequently the source of decay. The seedling process is, therefore, most advised and most adopted.

The nursery.—The formation of the nursery for the young olive is of great importance, and is a special and very profitable industry. The soil for this purpose should not be either too clayey or too silicious, too dry or moist, should be well mellowed and on a slope of southern inclination. The land selected is here plowed or dug to a depth of 2 feet in November or December, and thus left until spring to the operation of rain and frost. A second breaking of the soil by spading, less deep than the preceding, in April, completes the dispositions required for the reception of the seedlings, the young wild olives, the rooted cuttings, and the shoots.

Inasmuch as these plants when placed are intended to remain at least seven years, they are generally planted a distance of 3 feet apart. The first care taken, after the roots are developed, is to form the trunk of the future tree by careful lopping of the plant's lateral branches. This process is continued for about five years. At the end of the fifth

year is the period to determine the height desirable for the tree to attain. The height preferred depends upon the species, but more upon the locality and nature of the soil to which it is to be transplanted. If destined to deep and rich soils, a trunk of 4 to 5 feet in height is best; but if for a lean soil, or a place exposed to winds, then 3 to 4 feet is sufficient. Soon after its fifth year comes the time for forming the head of the tree, to which is given sometimes the form of a truncated cone, of a vase, of a fan, a sphere, or pyramid, the object being always to allow it to present as much surface to the sun as possible. The result is reached only by the labor of years.

Transplanting.—In the transplantation the plants are placed about 4 inches deeper than in the nursery, and in lines from north to south, with a space between each tree of from 25 to 30 feet, as the tree will not be fruitful unless well exposed to the sun. The rule in that regard here is as follows: Plant the trees on right lines from north to south, with such a distance in the alleys between them that the tree to the south shall not cast its shadow on its neighbor to the north on the day of the equinox, the 22d day of March, at noon.

When the soil is dry the plants are transplanted in the autumn, and in moist soils in the spring, care then being taken that they be placed in the same position toward the sun as they had in the nursery. A bed of straw is provided at the foot and a circular gutter to retain the rain in summer. The soil covering the roots contains some fertilizer, such as pulverized bones or ordinary dung.

Pruning.—It is an ancient saying here that by planting the olive you pray it to give you fruit; if you manure it, you not only pray it but you entreat it; but by pruning you compel it to do so. To this end all dead wood is cut out, and those branches which prevent air and light reaching the center of the tree. The height is also thus reduced when detracting from the vigor of the lower branches, and rendering at the same time more difficult the gathering of the fruit. A regular pruning of young plants, however, should not commence until the fifth or sixth year after transplantation.

At Nice the trees are pruned every two years, in the spring. In autumn the wounds have no time to heal before cold weather, but in the first case there is also danger—loss of sap. On examining more closely the rules for olive pruning it should be remarked that these should correspond to the mode of growth of the tree itself. Young branches present themselves opposite each other on the most vigorous branches, and are only productive of wood; other produce knobs for flowers all along their length, which expand in branches in the spring of the second year. Each of these small branches develop two lateral shoots; these new shoots fructify in the following spring, and so on. It will be remembered that the olive fruit grows only on the branches which are two years old.

If the new shoots were developed yearly without accident, the tree would annually produce its fruit, but in the years of abundance the sap

is drawn to the nourishment of the fruit, and hence the number of young sprouts is restricted and the ability of fructification for the following year. Hence, also, it will be understood that one object of pruning must be to favor the birth of the young lateral shoots, either by arresting the terminal development or suppressing the smaller branches. The small and more perpendicular branches are more abundant, but the horizontal or hanging ones are the most productive. The skilled cultivator directs the pruning of his plantation in such a manner that one-half of it fructifies one year and the other half the next year.

The height of the tree here averages about 21 feet, yet there are trees in the neighborhood 56 feet in height and at the base 22 feet in circumference. Neither Greece nor Palestine could boast such trees.

Fertilizers.—The fertilizers devoted to this tree are numerous. These may consist of its leaves, unutilized otherwise, residues of its oil, oil-cakes, and the refuse of animals, the refuse of skins, horns, feathers, woolen rags, and guano. Those decomposing slowly, as horns, rags, etc., are applied in autumn, in the spring those dissolving less slowly. At the period of fruitage strong manures are used which act immediately. The manure is placed away from the trunk and over the absorbent mouths of the extremities of the roots. It is usually disposed here in a ditch about 2 feet deep, encompassing the tree, and then buried. Slight but frequent applications are best, but it is usually practiced only once a year.

Grafting.—The usual methods of grafting can be applied to the olive. The following, however, are used in this district: (1) The "eye-bud" or "ring" graft, the latter being a variety of the former; (2) the cleft graft, preferred in Nice.

In nurseries the eye-bud is practiced, but the cleft only on older trees in the field. Cultivated and wild olives both are grafted.

To make an eye-bud graft, a furrow in the form of a T is cut through the bark of the trunk to be grafted, and in this a bud from a cultivated olive is inserted by raising the corners of the middle of said T; the graft is then plastered with mud and covered with a rag, fastened with twine.

The cleft graft is formed from shoots or cuttings instead of buds. The branch to be grafted is cut squarely off and the stump split by the knife. Into the cleft one or more shoots, previously sharpened in wedge shape, are then inserted, care being taken that the bark of each shoot adheres to the incision; the interstices are then filled with paper or fine straw, and the place grafted is covered with moist clay and bound with a bit of cloth.

The grafts will not produce the olive until three years, and do not attain their full yield until nine years after grafting. From said period a tree 1 foot in diameter will produce, on an average, 34 pounds; a tree of 2 feet, 112 pounds; and one of 3 feet, 200 pounds of olives per annum.

ALBERT N. HATHAWAY,

UNITED STATES CONSULATE, *Consul.*

Nice, March 25, 1889.

ITALY.

INFORMATION FOR AMERICAN OLIVE-GROWERS.

REPORT BY CONSUL LAMANTIA, OF CATANIA.

Variety.—The common olive tree in Europe has oblong leaves, and is the kind which was first imported, and from the wild state reproduced in varieties, and grafted, offers so many varieties too difficult to mention. In fact, the Indians knew but one kind; the Egyptians only 3, and the Hebrews and Greeks 5. The Romans, as to Virgilius's statement, knew but 3 varieties; Cato says 10; Columella stated 12; Macrobio reported 14, and Pliny declared 15 varieties. In other times the Botanic Tournefort classified them to 17 varieties.

By an interesting report, however, published in 1871, by the *Ministro d'Agricultura, Industria, e Commercio*, it seems that there were registered 300 varieties actually cultivated in the several regions of Italy, viz: Lombardy, 23 varieties; Venetia, 21; Liguria, 24; Emilia, 10; Marches, 63; Tuscany, 30; Lazio, 27; Adriatic coast, 67, and Sicily, 21 varieties. The olive tree in Sicily blossoms from the month of April to June, and experience has proved that when it happens in April yields a full crop, while blossoming in May or June gives a scanty one.

The flowers on the bunches develop very slowly, but as soon as they fade the fruit sets on and is formed in a few days. Ten or fifteen flowers compose the bunch, but only a few of them set on, and many of them fall down.

Bunches with three or four fruits stand well, and the fruits so formed come to perfect maturity from the month of October up to the end of March (see Fig. 3, with bud, blossom, fruit, and stone open in two). The olive tree, when it is located in favorable conditions and cultivated properly, grows to an extraordinary size, very high, and lives very long. In fact, Pliny says, that in his time at Luiterno, a city near Rome, were seen trees which had been planted two hundred and fifty years before by Scipio Africanus. Gasparin writes to have seen at Rogliano, in the Island of Corsica, olive trees from 17 to 18 meters high.

Extraordinarily large are also several Saracene olive trees in Sicily, some of which Professor Alvi says yield as much as 10 hectoliters of fruit. One of them, near Girgenti, which he himself measured, has a circumference of 8.20 meters (25 feet) at 6 feet from the ground. Their age, he further states, is from one hundred to one hundred and fifty years, while other authors agree it to be from five hundred to six hundred years.

In some counties in the province of Cosenza (Calabria) there are

some olive trees, visited by Professor Alvi, which he judges to be of a very ancient date, and some people of that country even pretend the said trees to have been from the time of Luigi D'Angio, who was sent there in a manner of banishment and to govern in the same time that country.

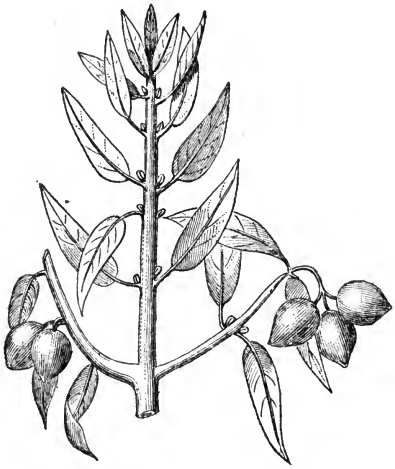
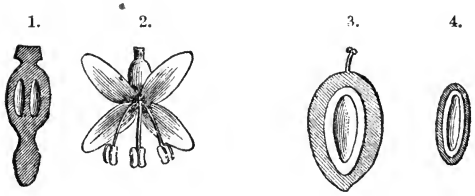


FIG. 3.—Albero con frutt.



Vegetation.—In many parts of Italy this plant grows spontaneously, and principally derived from seeds deposited by some large bird's excrements, which are in a condition of sprouting. But the plant left to itself grows and rises slowly from the ground, the branches furnish a few and small leaves, bearing very late, and the fruit yields but a little oil.

The olive tree propagated by seeds and subjected to grafting, when located on open air and on well adapted land, throws towards the ground a good main root, from which many others grow down deep, and the tree from its base acquires a majestic appearance. On points where the trunk joins the roots on the largest of them develop certain swellings called *ovoli* (springs), which are used for propagating the culture. If the plant be destroyed by storm or killed by frost from its base, yet many shoots will come out, although less than when it is in the regular course of vegetation; these springs repeat their growing from the original roots.

The olive leaves last from two to three years, and grow matched on the branches one against the other, as Fig. 1.

FIG. 1.

Climate.—The olive plant is one of those generally liking warm climates, and in a changeable temperature it grows well, and fructifies even exposed to any direction. The extreme limit of its vegetation is marked about the 45 north latitude. Excessive heat and intensely cold weather are injurious to its culture. In fact, beyond the African Atlantic the olive plant is seen no more. As Humboldt remarked, in his voyages in the several parts of South America, and as Poiteaux observed at Cajenna and St. Domingo, that if the plant could vegetate in those regions, it would never bear fruit. Some writers have asserted that the olive plant wants to grow near sea, and they have even established the extreme limit, beyond which, under this respect, the plant does not find the necessary conditions for its vegetation. This opinion has, however, been contradicted and proved by the fact that many olive trees are seen growing and producing well in the interior of continents and very far from sea-shores. If the olive plant shows its preference near sea it is because there the temperature is more suitable to its vegetation. The olive tree commences to vegetate when the temperature is at 12 centigrades above zero, and blossoms at 18 or 19 centigrades. A temperature of 5 below zero, followed by a sudden thaw,

operated by the sun's rays, is sufficient to kill it totally at the base. With a lower temperature, not followed by sunny days, the plant does not suffer as much, as it can stand to a cold of 10 centigrades below zero. It is not so much the cold weather that injures the olive growth as it is the frequent change of cold weather to warm, and the often melting of ice.

One of the greatest enemies of the plant is frosty weather, especially when the snow fallen on the branches dissolves by the sun's rays and congeals again during the coming night; at 12 below zero it not only kills all the leaves, but even the trunk and its roots to the ground.

A cold of equal intensity is more fatal during the spring season than it is in winter, for the reason that the plants are then in a state of vegetation, and consequently the new sprouts are ruined and destroyed.

A cold in a vaporous atmosphere hurts more than in a dry one, and it is for that reason that with the same degree of cold the olive plants on plain lands, because in a vaporous atmosphere, become more damaged than those located on hills. The altitude which the olive tree can attain varies according to the several regions in which it is cultivated. In central north Italy, for instance, it ordinarily trespasses 500 meters above sea-level, while in Sicily it goes over 700 meters. But Professor Alvi assures me that he has seen olive trees in this island at 800 meters. It is proper, however, to note that if at the extreme limit of altitude the olive tree can vegetate, it is impossible there to bear fruit. Hence, planting in such localities does not pay. I may here give the agrarian climatic temperature in Sicily, which is divided in three different zones, viz, the marine or warm climate, the medium or hilly temperate, and the mountainous cold one. The height of the first is considered to be from 0 to 600 meters above sea-level; the second from 600 to 1,100, and the third 1,100 to 1,800.

The following table shows the several principal products cultivated and grown in same:

[Agrarian climatic zone in Sicily.]

First zone (low land, warm climate, from 0 to 600 meters).	Second zone (hilly land, temperate climate, from 600 to 1,100 meters).	Third zone (mountainous cold climate from 1,100 to 1,800 meters)
Olive trees.	Corn.	Prairies.
Vineyard.	Wheat.	Chestnut.
Sumac.	Horse beans.	Oak trees.
Fig trees.	Pistacchio trees.	Ilex.
Prickly pears.	Rye.	Pine trees.
Almond trees.	Barley.	Beech trees.
Oranges and lemons.	Chestnut trees.	
Cereals.	Filbert trees.	

Situation.—The success of olive culture greatly depends on situation and soil. Calculating the method of vegetation of this plant, it may be determined that in warm climates situations facing from east to north are to be preferred, so that the plant will not suffer from the summer heat. In climates less warm, however, an eastern exposure is best, and in climates of the last zone a southern exposure is best. As above stated, in climates less warm the expositions to east are to be preferred, but if the locality is subject to frequent white frosts, then it is better to cultivate it in expositions facing west and north, for the reason that exposed to east the plants covered with white frost, and quickly touched by the morning sun, the sudden change from one temperature to another, they run the risk of getting dried.

As far as inclinations are concerned, those of hilly and rolling ones are to be preferred, for the reason that olive plants cultivated on flat land, although they present a flourishing vegetation, yield fruit too rich in oil, while those situated on hilly and rolling land give best results. The same may be said of the trees planted in a mild temperature.

In flat land the fruit sets badly, becomes watery, yields less oil, and more dregs, is subject to fall before maturity, and is easily assailed by insects and disease. The trees on the highest zone of temperature suffer from the cold, and have of course less duration. It is, therefore, wise that in planting an olive grove preference must be given to middle altitude of hilly and rolling lands without calculating the majestic aspect the trees may show on flat soils, for their fruit yields but a little oil.

Soil.—The olive tree is a plant which adapts itself to any soil, even to the most sterile one; but it does not give everywhere the same quantity of fruit. In the soil it likes a certain coolness, but not exceedingly, for the reason that too much dampness, stagnated in the ground, renders it too hard, thus causing damage both to roots and trees.

The best soil for olive culture is the calcareous siliceous-argellaceous, rather deep and permeable. A stony soil, covered with a little ground sufficient to let the young trees vegetate, may be adapted for the olive culture. The proofs thereof are the trees grown on the hills around Messina and on Mount Etna, which are covered with but a few centimeters of ground. In compact soil and those on impermeable subsoil, the olive plant dies.

Fertilizing.—The manure adapted for fertilizing the olive tree must be subordinate to its composition.

From the analysis made by Duracher and Malagati, the following has been obtained, viz:

Description.	Potash.	Soda.	Magnesia.	Lime.	Phosphoric acid.	Sulphuric acid.	Flint-stone.	Iron and magnesia oxide.	Chloride of soda.	Chloride of potash.
In the wood	25.54	.....	7.23	20.12	10.15	3.43	13.75	4.43	12.16	1.26
In the leaves	26.67	.....	7.31	21.93	7.98	1.64	20.88	6.11	5.39	2.37
In the fruit	7.13	20.51	10.25	22.91	10.53	4.60	12.41	2.59	7.92	.....
Total	59.34	20.51	24.79	64.96	28.66	9.67	47.04	13.13	25.47	3.63

From the above table it seems that the olive tree contains mostly all the materials generally needed by other plants, and that lime, flint, and phosphoric acid are the most in proportion of other materials. Consequently in manuring said plant, the compost is to be made accordingly, in respect to others shown on the table. But many of said materials are contained in the soil, and in such cases it would be superfluous to add others. Therefore, it is necessary to learn the composition of the soil in order to know and to be sure how to properly manure the plants. Besides the above materials, well-decomposed excrements of any animals, as well as wood-ashes, etc., make also a good compost for manuring, and the proper time to do it is after the winter season, when through the watering vehicle the materials are absorbed in the ground. At last, in manuring the plants the material shown on the table must not be neglected, and of which potash, soda, magnesia, lime, silices and phosphoric acid must be more in proportion, as such composts greatly benefit the olive culture. The quantity of manure to be given to each tree varies according to its size, quality, and composition of ground; and it is therefore impossible to establish a certain quantity, and the best thing to do is to manure annually with a little compost, except in cases where a plant shows dullness, when a good dose of manure could be given in order to make it revive again.

Propagation.—The olive culture can be propagated by (1) semi (seeds); (2) ovoli (springs); (3) talee (stocks); (4) polloni (sprouts); (5) tronco vecchio (old trunk); (6) olivastrelli (olivasters).

All the plants derived from any of those propagated must be grafted, as they generally grow from a wild state. Exception, however, is to be made in the case of young trees derived from stalks taken from the upper grafted trees, or from plants which needed no grafting, and those which are obtained from springs, sprouts, and old trunks.

Propagating by seed.—This system, although requiring more time for growing and fruiting, as a method of propagation deserves to be appreciated, for the reason that plants originating from seeds are of longer duration, become larger, and better withstand cold weather, insects, and diseases.

To carry out propagation by seeds it is necessary first to prepare a good sized seed-plot, enough to contain all the young plants developing therefrom, and there to remain for three years, after which time they are to be planted in a reservoir for replanting. The seed-plot must not be exposed to the north, and the ground must be clear of roots and flint-stones. In winter it must be richly manured with animal excrements, not quite decomposed, the ground deeply dug up, and always kept free of grass. During the spring and summer seasons it is necessary to keep it fresh and water it whenever necessary to help the seedling to sprout. In July the young plants are out of the ground, and in November they are 4 or 5 inches high. During the second year the seed-plot is to be worked the same as the first year, and in October, or in the coming spring season of the third year, the young plants are large enough to be transferred to the reservoir by taking off all the little branches therefrom.

Propagating by ovoli.—The *ovoli* (spring) is a bud found on rooty stumps and on the larger roots. It has the shape and the size of a goose's egg and shows out from the bark of trees. From each adult plant no more than three or four *ovoli* are to be taken off, otherwise you hurt the tree. To obtain *ovoli* or *talee* instead of ruining many plants it is better to cut down one or two trees, from which a few hundred of them can be obtained for propagation. The said trees, however, must be of a good quality, apt to produce fruit of a white and juicy wood, and not reddish or veined. The springs on the roots are to be preferred to those located on the stumps of the trees, for the reason that the former are always more tender and juicy; hence better adapted for budding.

FIG. 4.

Propagating by talee (stocks).—This is simply done by cutting off from the best fruiting plants a bit of branch about 1½ feet long (Fig. 4), which is laid in the ground by the largest end deeper down. The trees of the said stocks must be vegetating and of a large size, with thick bark, and well furnished with gems, wherefrom it is easy for rooting and budding. In order to succeed, however, it is necessary to lay it horizontally in a reservoir facing the same direction of its plant. Besides single talee propagation can also be done by talee composta (composed stock, Fig. 5), which beforehand needs to be placed in a temporary reservoir, and only when supplied with roots and buds is planted in another one. This method of propagating requires the identical work like the single talee, by placing it horizontally in the ground, the largest end deeper down, as Fig. 6.

After one year the young branches will provide themselves with

leaves and roots, when the stock will be cut in pieces and each piece planted in the reservoir. (Fig. 7.)

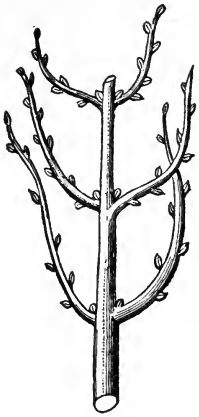


FIG. 5.

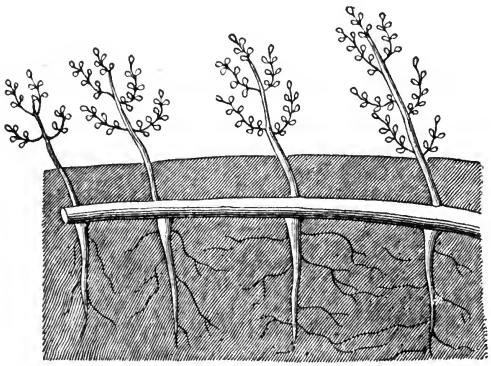


FIG. 6.

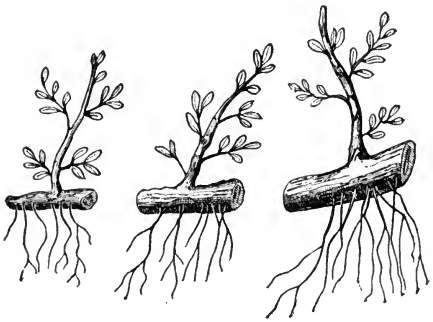


FIG. 7.

Propagation by polloni (sprouts).—Between the intersection of roots with the trunk of the largest roots on the base of trees sprouts generally grow up, the same as in other plants, from which good advan-

tage can be obtained in propagating the olive growth, as this is the quickest mode of all. Very often it seems sprouts are provided with roots, and if they spring up in great number from the plant some are dug up, leaving the largest and most vigorous ones and covering their bases with earth.

Propagating by tronchi vecchi (old trunks).—Advantage can also be derived from old trunks in the propagation of olive trees.

When a plant dies and contains living roots you see a great number of sprouts growing therefrom, which are also useful for propagation, and for which use those most vigorous and largest are left on the mother plant well covered with earth, and the smallest ones are taken out to let the former have more space. In this state of growing they are left until their young trunks grow as thick as 1½ inches in diameter, after which they are hoed up and detached from the mother plant, transported to the reservoir, and planted at the distance of 2 feet from each other. Where the sprouts of the dead plant are not many, then it is better to leave them attached to the same.

Propagation by olivastrelli (*olivasters*).—Where the olive tree grows spontaneously in a wild state, and is not touched by animals' teeth, care can be taken of it until it grows to a proper size, when it is transported to final position, or planted in the reservoir, at a distance of 2 feet each side.

It is, however, worthy of note, that of all these methods of propagation, the one operated by seeds is the best, for the reason, as above stated, that plants so propagated live longer, and better resist the cold weather. In propagating by stocks the character of the tree wherefrom stocks were derived is perpetuated.*

Grafting.—Following the propagation, I ought to proceed with the reservoirs, but as the small plants propagated by the methods above stated, must be, in most cases, grafted, which can be done in the reservoir as well as in final stay, I proceed about the grafting in reservoir. Plants propagated by seeds, springs and sprouts derived from grafting, as well as those from roots of trees already grafted, and those spontaneously grown by seeds in a wild state, need, of course to be grafted.

The olive tree can be grafted by several methods, and they are as follows, to wit: (1) *A scudetto* (shield), Figs. 9, 10, 11; (2) *An anello* (ring); (3) *A corona* (crown).

The first method is mostly used in Sicily, on account of its simplicity and certainty; the second one is seldom used, because it is difficult and it is operated late in the spring. The third one, Figs. 14, 16, 17, is practiced for adult plants, and likewise in the late spring season, when the plants are in a state of anger. Here I do not proceed minutely in de-

*Prof. A. Alvi's report.

scribing the several methods, as grafting is well known by every agriculturist in the United States.

FIG. 10.

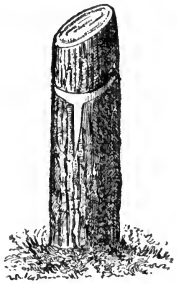


FIG. 9.

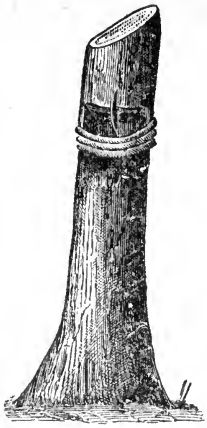


FIG. 11.

Treating plants in the reservoir.—While the plants develop in the reservoir, it is necessary to predicate all the possible intelligent care, for the

FIG. 16.

FIG. 17.

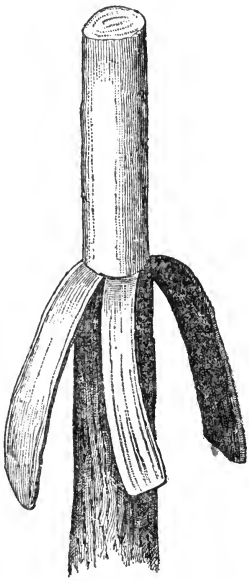


FIG. 14.

reason that if they are negiected, they will be of poor fruiting production.

As to the length of time to keep them in the reservoir, several eminent agriculturists differ in their opinion, to wit: some propose five years, while others advocate fourteen. Practical observations, however, have proved that allowing plants five years in the reservoir, they can never acquire sufficient roots to be transplanted for final stay. On the other hand, if left for fourteen years, on the seventh or eighth year one half of them, the odd ones, are to be transferred in another reservoir, as the one would not be large enough to contain all the young plants located therein at a distance of 2 feet apart as above stated. It is therefore advisable, in Professor Alvi's practical experience, that the proper time of allowing young plants in the reservoir is from seven to eight years, counting the time of the seed plot.

For the first two years, keep the young plants clear of little lateral branches, but leave the leaves remaining on the arm pits. Fasten the little stocks on sticks placed alongside of them in order to protect them from strong wind or stormy weather. Water the reservoir in case of long drought and fence it to prevent animals from destroying it, and always keep the ground clear of grass.

From the second to the fifth year treat the plants as above stated; only on the fourth year change the sticks for larger ones in order to better sustain the growing plants. On the sixth year they are in a state of designating the shape you want them to grow.

The height of the trunks principally varies according to the situation of the ground wherein the plants are to be located for final stay. If the soil is fertile and fresh, they (trunks) can be left at about 6 feet high from the base, and if it is arid at about 4 feet. The reason for this is, that the shorter the plant the more vigorous they grow. And as Columella said on this subject: "*Lactius enim frondat. Exiguus admodum supra scrobum emineat.*"

Having thus fixed the height of the trunks all the young branches grown under them are to be taken off, and to the main sprout growing high must be done the same, and by leaving on its upper end about from five to eight branches well distributed around the same, in order to form the head of the trees.

Another method in fixing the height of them is by cutting all the branches of the plant to the fixed point of height, in order to permit its roots to develop and to incorporate themselves in the soil before the plant requires nourishment, and at the same time sprouts will grow to the desired height.

Transplanting for final stay.—We have learned up to this the sort of land and the exposition better adapted for the olive culture, as well as the several methods of propagation and the treatment to be given young trees in the reservoir. I now deem it proper to treat about the system of removing them therefrom, and the distance apart to be left between them. Further, I will proceed with pruning, and of the several insect pests and diseases afflicting the precious Minerva's plant.

When a grower is to transplant young trees from the reservoir to final stay it is necessary for him to establish a plan, and decide whether he wants to exclusively form an olive grove or together with plants of other fruits.

The disposing of planting in different manners is subordinated more to the inclination of the land than to the grower's faculty. The land may be too hilly or too flat. In the first case, it is better to plant all the land exclusively in olive groves, and in rows for the reason that disposing them with plants of other fruits between they would yield less fruit, besides rain-fall on hilly soil washes out the necessary elements of their growth, and the roots of the other plants would always be exposed.

The several dispositions to be given to olive trees, and the inclination of the land, determine the distance apart between the trees. If a certain area of land is desired to be exclusively cultivated in an olive grove, the distance apart between the plants is to be such that, in the spring equinox, a plant must not shade the one standing by in the direction from south to north. For that purpose a distance of 16 feet apart is sufficient. In a very rich soil, however, where the plant can grow very large, this distance must be doubled, 32 feet.

The inclination of the land for the grove properly adapted to the cultivation must be running from north to south, for the reason that if exposed to north entirely the culture would be retarded by cold weather.

Disposing the plants in rows, however, with the object of locating plants of other fruits between, the distance amongst rows must be 32 feet and 22 feet between plants of the same row.

The best disposition to be given trees is the *hexagonal* one, as shown in Fig. 25, for the reason that if it runs from south to east the plants will be in a position quite open to the sun and will vegetate and grow well.

The proper time of transplanting from the reservoir to final location is the month of July or August, when ditches, either round or square, of 4 feet wide by 3 deep, will be dug for planting the young trees taken from the reservoir on hilly or rolling land. If the ground is flat, the ditches must be no deeper than 8 inches, and if on inclining soil 16 inches deep. This done, throw therein some filling of old plaster or old mortar with some stratum of good earth, wherein place the tree with the roots well scattered around the base; cover the same with some earth again, manure over it, and some wheat husk or hashed straw to keep the soil fresh during the summer and to nourish at the same time the tender roots. Shake the trunk a little, so as to allow the ground to be well settled between the roots so that they will be easily rooting. After this operation has been done, cover carefully the ditches with the same ground removed therefrom. On the upper side near the plant form a sort of a little basin, so as to hold the rain-water to water the same.

In the summer, if a long drought should prevail, they must be irrigated.

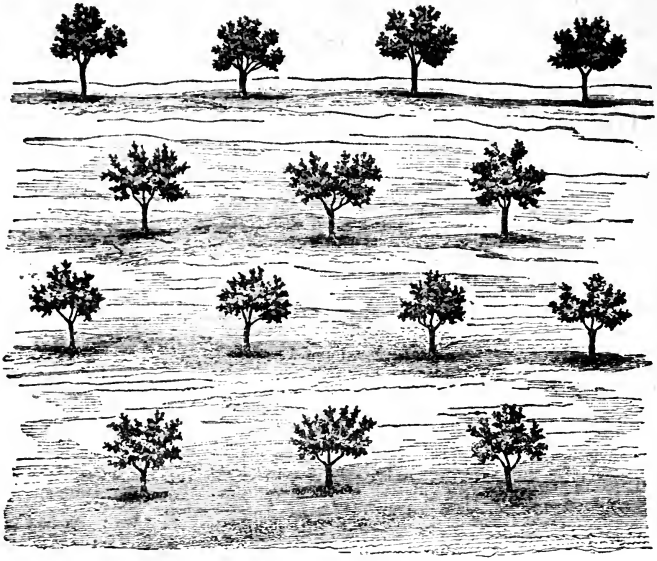


FIG. 25.

Pruning.—An old motto in Sicily says: "He, who works a growth demands the fruit; who manures it obtains the fruit; and who prunes the tree forces the growth."

The principal forms to which olive trees can be reduced are four, to wit: *Al albero* (shape of a tree), *al pino*, (shape of a pine), *al paniere* (shape of a basket), *al umbrella* (shape of an umbrella).

The first form is mostly used in Sicily, in Calabria, and in some parts of the Roman and Tuscan provinces. It consists in leaving the tree taking its natural habit, the pruning being limited by cutting now and then all the dried and broken branches and all those deviating the humor from the central trunk. The form *al pino* called also "cone," is more correct than the former, and consists in allowing the branches to be disposed in a shape without hurting one another, thus forming a good exterior without exceeding leaves.

Pruning *al Paniere*, called also *vaso* (vase) consists in taking off the main trunk all the disfiguring branches to make a tree look in the shape of a vase. The olive plant so pruned appears with all the branches well ventilated, and, therefore, besides producing the great quantity of fruit, it furnishes them completely matured. For this reason pruning *al paniere* is considered as the most advantageous one, and the same is generally used in this island. Finally, a good pruning must be based upon the following principles, viz:

(1) An olive plant produces no fruit on new sprouts before two

years' time, for the reason that said sprouts in the first year bear no fruit but simply develop and bud fruiting gems, in the second year, when they will grow larger for blossoming, setting, and fruiting.

(2) The blossoms do not set neither produce fruit if not exposed to the sun rays during the longest part of the day. This fact must not be neglected by the pruner when he applies his pruning-knife, if he wants to gather the fruit. He must always prune so as to let the fruiting branches be exposed to the sun so that its rays will penetrate through the plants, as those thickly loaded with branches and leaves not pruned as above stated, bear less fruit than the former.

It is necessary for growers to keep those facts in mind, if they would succeed in this culture.

(3) The horizontal and bending down branches produce a great many fruit, while the vertical ones bear none. The pruner must consequently turn his attention to raise the plants as above stated, and not in a vertical shape.

(4) When a plant has a great number of bearing branches, the fruit will naturally be small, yield less oil, and the crops will be biennial. To avoid this the smart pruner should simply leave a certain number of the most vigorous branches sufficient enough so as not to force the plants, for by so doing they will render larger olives and more oil every year.

(5) The olive trees being of so many varieties they consequently require different treatment. To keep in mind the several varieties of olive plants while the pruning is going on, it must be indispensable for the pruner to know that there are some branches tending to grow up straight, while others incline downward.

In the first case the former are not to be forced to grow low in a close shape, but simply prune them yearly, and try to prevent them from growing too high, and allow them to retain all the lateral branches except the dried and faded ones.

(6) The olive plant, according to the ground, its exposure, and the height where it is located, vegetates and bears fruit differently. The quality of the soil has a certain noted influence on the vegetation of the olive tree. If the soil is argillaceous and too rich of vegetal and fertilizing matter, then little pruning is to be done, for the reason that the quantity of strength the plant draws therefrom permits it to maintain a large number of branches. If, on the other hand, the soil is poor, that is loose siliceous-calcareous, then it is necessary to cut many branches off, for the reason that the little sap the plant draws from the soil is not sufficient to nourish many of them.

(7) The plants must be divided into three categories, according to where they are located: (*a*) All the plants on argillaceous rich soil of the warm zone; (*b*) all the plants on calcareous soil of the middle temperate zone; (*c*) all the plants on the poor siliceous soil of the high cold zone.

In conclusion a good pruning consists of (*a*) suppressing all branches tending to grow up straight, as they are very exhaustive; (*b*) cutting down all the parts from the plant, all the dead branches as well as those broken by the wind, and those growing longer than others; (*c*) suppressing all the sprouts developed in the plant during the year, leaving only some terminal ones, and some others grown near those having the force to bear. If many new sprouts were left on the branches, the majority of them would fail to bear, because the sap the branches draw could not nourish them all. Pruning in such a manner that the plants would grow in proper form, the branches should be well disposed without confusion, and the lower ones bending down would cover a part of the trunk. Another operation essential for the pruner to know is that if the trunk contains dried bark, knotty and partly detached from the wood, he should cut it off with a well sharpened tool, for the reason that in so doing he cleans the trunk from insects wherein they lay their eggs. Another advice to the pruner is that, following the years in which the plants bear much fruit, it is always better to shorten them a little, as it is proper to leave others longer, which during the years produced less.

In conclusion, following the rules above stated, the pruner can be sure of his success, provided, however, he will, with sharp eye, carry them on in accordance with the above instructions, always taking into account the local climate and condition of the soil. These rules and modifications are the results of long experience.

Insect pests.—The olive has the most fearful enemies which attack it in every way most terribly; in fact, insects, diseases, and inimical causes, more or less, make a slaughter of it.

Arrayed in first line are the insect pests attacking the fruit, while others attack the wood and the leaves, thus hurting it in every way. The most terrible is the *mosca dell' olivo* (olive fly), or *Daco delle ulive*, known as *Musca oleæ*, *Dacus oleæ*, *Cynips oleæ*, *Stornomus keironi*.

The dacus is a small fly, about half the size of our common fly, and precisely as seen, greatly enlarged, in Fig. 27. It is an insect with orange yellowish colored head, green eyes, yellow breast, with two black points. The female Dacus has on the extremity of its abdomen a sheath of black color, wherefrom it throws an arrow, piercing the fruit, wherein it deposits its eggs. This insect is so pernicious to the olive culture as to shorten two crops out of three. It works as follows:

As soon as the olives are formed the female Dacus throws its arrow, pierces the olive skin, shakes its wings, and into the pulp lays one egg, (Fig. 28). This done, the insect takes rest by cleaning its body as a sign of satisfaction, and then flies away to other olives to perform the same operation until it deposits from 300 to 400 eggs into as many olives. From the egg, in a short time, you see a certain soft whitish larva with-

out feet (Fig. 29), which, staying fifteen days in the pulp, digs a vertical gallery through till it reaches the stone and diverging thereby.

Fig. 27.

As soon as the larva is fully grown it gets near to the out fruit by enlarging the canal made by its mother on depositing the egg, so as to let the grown insect come out.

Fig. 28 – Olive intaccate dal Daco per deporvi le uova.

Twelve days from the time the larva is transformed in nymph grows the fly, and the insect is formed in twenty eight days, counting the time from depositing its egg.

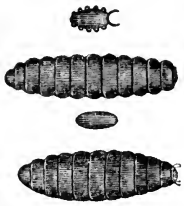


Fig. 29.—Larva e ninfa del Daco.

The *Cocciniglia* (female Coccus) is another insect damaging the olive tree, which stays for several months immovably attached on the branches

and on the leaves. When in a state of reproduction it lays thousands of eggs, seeming as excrescences of the trees. The male Coccus looks different from the female, as shown in (Fig. 31), enlarged.

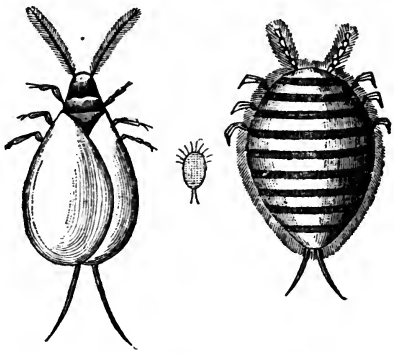


FIG. 31.—Coccinigliе maschio e femina ingrandite.

In the month of May the female lays about 1,000 eggs, which it covers and then dies, thus protecting the future progeny with its corpse.

The eggs under such protection open one month later and precisely in June, giving life to larvæ which develop in the bed formed by the mother skeleton.

The Coccus, attached to the branches and leaves of the tree not only sucks its juice, but prepares the tree for conditions favorable to the development of a fungus called "antennaria olæophila," "cladosporium fumago," or "torula oleæ," which darkens all the plants with black, and makes it look lurid-like.

In Sicily the olive plants are often invaded by the Coccus, and more especially on coasts fronting the African Sea.

According to the Gasparin and Roches method of destroying the insects, it seems that sulphur sprinkled on the attached plants, as it is done on the vines for the *crittogama*, is a good remedy.

La Tignuola (Tinea oleæ) is also an enemy to the olive plant. This belongs to the *Lepidotteri* family. Its butterflies are very small, with grayish wings and mostly marked with whitish spots—(Fig. 32, enlarged.)

FIG. 32.

The evening moths, which ordinarily come to our house to die, burned at the candle-flame, are "Tignole." The grubs are very small, voracious, and cause immense damage. Their generation is as follows: In the spring

seasons these insects, derived from the first generation, produce eggs; wherefrom grow larvæ, which voraciously devour the branches and sprouts of the olive tree. When it commences fruiting, the tignuole reproduce for the third time, after which they deposit their eggs at the base of the fruit, wherefrom new larvæ come out, and stay there until they are in metamorphosis, and as long as the fruit remains on the tree.

To destroy said insects, Prof. Achille Costa published the *bibiologia della tignuola*, a copy of which I could not find in this city. The *Punteruolo* is a "coleottero" belonging to the section of *Xilofagi*, and its botanic name is *Philojotribus oleæ*. It also causes much damage to the olive tree. For its treatment the same Professor Costa published a report on the *Agricoltura Meridionale* (anno III, No. 13, 1880) and of which I could not procure a copy in this place.

Another small colleottero, *Rosicante dell olivo* (olive-eater), is the so-called Hylesinus oleiperda, a dark-colored insect covered with hair. The larva is white and nests under the bark of the tree, and sucks the life of the sap branches in the cell which it digs, accomplishes its transformation, and flies away when perfected, about the month of May. It then joins the female, which, having been impregnated, goes upon the branches, which it wounds to deposit an egg, which forms a larva, as above stated. To destroy the said insect some people propose to cut off the perforated branches from the tree, while others recommend, as soon as the insect attacks the plant and weakens it, to manure it, plow and water the same so as to make it revive again.

La Cantaride (*Cantharide vescicantoria*) is another insect belonging to the coleottero order, tribic of the *coleotteri vescicanti*. From the deposition of the egg and its transformation into a perfect insect it undergoes five stages, but only when it is perfected does it damage the olive tree.

La cantarides appear in the month of June in extraordinary number, when they dart in flight on the olive trees, feeding on the tender sprouts and blossoms, and thus not only destroy the present crop, but even the one of the succeeding year. The cantharides are very common in continental Italy but not so numerous, while here in Sicily they cause heavy damages. These agriculturists, however, perform an efficacious method, as the only one to destroy the terrible coleottero. It consists in shaking the branches early in the morning, and precisely when they they are asleep, to make them fall on sheets expressly placed under the trees. Thus gathered they are then sold to apothecaries for making blistering plasters.

La Psilla dell'Olivo (*Psylla olivina*) as well as l'Afide (*Aphis adonis*) form a sort of a white down under the arm-pits of the branches and leaves. The *Aphis abide* under the same, feeding on the humor of the trees, which become sickly and sometimes die if the infected branches are not cut off at once. The said aphis, well known in the United States—for I remember my boys used to catch them on trees on Canal

street at New Orleans—is also another dangerous insect to the precious plant. The same shown enlarged in Fig. 33 is destroyed with lye of lime.

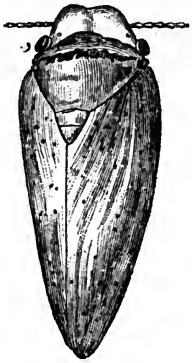


FIG. 33.

The Psylla, when in the state of larva, encircles itself in a sticky whitish matter, and causes the plant to droop.

This disease is generally called here *malattia del cottone* (cotton disease), and the most energetic remedy is to treat the plant by cutting off all the infected branches.

Finally, the Cosso perdilegno (Cossus legniperda) is the most terrible insect, damaging the wood. The cossus when in a grub state is bloodish-red on top and white-yellowish under. The butterfly deposits an egg in the bark, wherefrom grows a grub, which bores into the tree—into the heart of the tree—killing it at once; if the tree is young, the cossus is assisted in its work of destruction by a special liquor of a strong odor secreted by the insect itself, which softens the wood fiber. This terrible insect is difficult to be destroyed. It lives three years in a state of larva, and the butterfly is found in the spring and summer; consequently at such a time it is necessary to use a certain activity to destroy it. The naturalist Professor Boisduval advised the municipal authorities of the infected places to "offer one lira of reward for every cossus caught as a good remedy to destroy the same."

Diseases.—Besides the said insects there are also diseases to which the olive plant is subject, such as (1) *Il Chiodo o Rogna* (the nail or scab) the cause of which is by some growers attributed to insect punctures, and by others to the imperfect assimiliation of the juices, which instead of alimenting the plant, accumulate at certain points, producing deformed excrescences, as in Fig. 34, *a*, *a*, *a*, *a*.

Il Chiodo (nail) generally dilates in olive groves propagated by *ovoli* (springs), and greatly prevails where the forced method of propagation has been practiced. The extravasation may be caused by wounds produced by hail, or by the bark cracking while the plants are in active vegetation, or by the ill-treatment to the bark while gathering the crop. The cause most common, however, is excessive pruning.

(2) There is *La Fungositá vascolare* (vascular fungus).

(3) *La Lupa* (she wolf), is a very cancer to the plant, which, although its exterior is sound it is rotten within, permitting the rain to enter and lodge in the interior.

The lupa may be apparent or not. It is necessary to extract it and thoroughly cleanse the infected part with a sponge saturated with a wash of ointment San Fiacre.

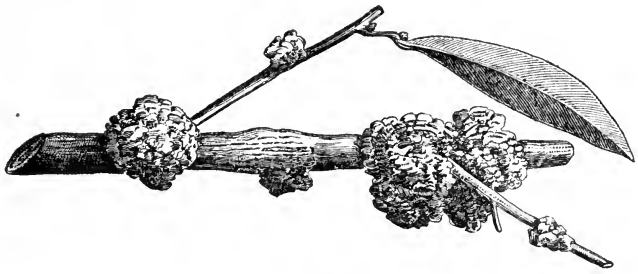


FIG. 34.

(4) *Lo Screpolo* (gap) is caused by excessive heat or cold. The gaps caused by the former are superficials, and are also cured with the same salve—San Fiacre.

Among the parasite plants hurtful to the olives are noted the Muschi (musks), the Licheni (lichen), and the Borracina, which establish themselves in the bark of trees, on which they live in part.

The production of musks and lichens is due to the dampness abounding in some olive groves, or on account of the quality of the soil or little ventilation. To free the plants therefore from it it is necessary to scrape them with a well-sharpened spatula, and brush the infected part with whitewash on a winter day, but not cold or rainy.

Besides those there is also *Il Male nero* (black disease), which is produced by a fungus, botanically known as *Antenaria olacophila, Chadosporium funago*, which sometimes causes the plant to sicken and die. Its multiplication is due to presence of the *Cocciniglia;* hence by destroying the coccus you free the plant from the black disease.

Frost and strong winds are also enemies to the plant, and the damage which the former causes may be known only in the month of April or May, just at the time when it can be partly remedied. Sometimes it happens that through intense cold the plant dies at the base. In that case, if it is over thirty years old, the plant must be cut off near the ground so that new springs will grow therefrom, some of which will take the place of the dead plant. A long drought is also hurtful to the olive culture, for the reason that the plant loses its leaves, its vegetation is checked, and it yields no fruit.

Strong winds may also ruin the plants by breaking the branches or dislocating them. Finally, were I to mention other insects, diseases, etc., it might have a depressing effect on the California growers. Con-

sequently, I deem it proper to remind them that notwithstanding all the said insects, contrarieties, etc., in this island of Sicily, in an area of 104,585 hectares of olive cultivated land, it yields an annual production of 730,238 hectoliters of oil, at the rate of 7 hectoliters per hectare, a good paying industry, besides many quintals of pickled and dried olives for home consumption and for foreign markets.

Therefore I exhort the California agriculturists to go to work and dedicate themselves earnestly to the culture of that most precious plant, the olive tree, by repeating to them the celebrated Columella's motto, *Olea prima omnium arborum est.*

VINCENT LAMANTIA,
Consul.

UNITED STATES CONSULATE,
Catania, January 22, 1890.

ITALY.

REPORT BY CONSUL-GENERAL RICHMOND, OF ROME.

[Republished from consular reports No. 41½.]

Only one species of olive is cultivated in Italy, *Olea* Europea L.

Varieties.—The widest spread varieties are the following: In Liguria, the *Laggiasca* and the *pignole.*

In Puglia, the *pasole*, the *ogliarola*, the *leccese*, and the *siracusana.*

In Tuscany, the *morinelle*, the *morajole*, the *correggiole*, the *razze*, the *grosse*, and the *infrantoie.*

In Sicily, the *ogliaja*, the *biancolilla*, the *calmignana*, the *caltabellotese*, the *cerasola*, the *calabrese*, the *patornese*, and the *giarraffa.*

Maturity.—After the tenth year the olive commences to bear some fruit, and reaches its full maturity of fruitfulness at the age of forty years.

Green olives.—For green olives the fruit is used of the *Cucca* or *Pesaro* in Tuscany, of the *Orfana* in Romagna, of the *Morellara* and the *Giarraffa* in Sicily, and of the *white olive* in Ascoli. Of all these varieties the fruit is large and less saturated with oil than any others.

Dried olives.—For dried olives the fruit of the common trees is best adapted.

Yield.—In Calci a hectare of olive trees yields in abundant years 6.50 hectoliters, or an average of 3.25 hectoliters. The expense of the first planting of a hectare of olive trees amounts to 3,292 lire; annual expenses 250 lire until the tenth year. In the eleventh year the trees begin to bear and reach the climax of their fruitfulness, as has already been stated, at the age of forty years. In the forty-first year the expenses of the hectare of olive trees have been 9,689 lire, and the average yield of oil per annum 3.25 hectoliters. The olives yield *in weight* from

14 to 20 per cent. of oil, and in volume from 20 to 24 per cent., according to the variety, the point of maturity reached, and the manner of extracting the oil.

Planting.—The trees are planted from 12 to 18 meters apart, if they are of a very large and ligneous variety, or if vines or other plants are grown together with them. For short-stemmed trees the distance is shortened to from 5 to 8 meters. On hillsides the distance between the trees is reduced somewhat.

Preserving.—Olives that are put in salted water, or in any other way preserved fresh and sweet, are gathered green; those that are to be dried are gathered ripe. Olives from which oil is to be extracted should be gathered when just ripe; unripe olives give but little oil, and that of a grassy flavor, while those over-ripe yield abundantly, but the oil is coarse and rank. The time for reaching the proper point of maturity depends on the locality, the variety of olive, and upon the season; but when the first fruit drops spontaneously to the ground it may be taken as a sign that the crop is ready for gathering. Generally this takes place through December and January.

The olives that are to be preserved fresh are first soaked in a strong lye, then, after having been put through several washings in clear water, they are placed in salted water, together with wild fennel. Finally they are put into water slightly salted, which must be renewed at least once a month.

Olives that are preserved dried are spread out in the open air, in some place exposed to the *tramontana* (wind), or else they may be dried in ovens.

Extracting the oil.—To extract the oil the olives are placed in a crushing machine, where they are reduced to a paste, which is then subjected to a pressure sufficient to express the oil.

Soil and climate.—The olive grows best on slopes, well sunned, but not too dry, and trees grown in such localities produce a very superior oil. In fertile plains and valleys a large quantity of oil is obtained, but the quality is inferior to that obtained from the hillsides.

The soils best adapted to the growth of the olive are porous and rather moist; such are many chalky and argillaceous soils, also a yellow, sandy soil over argillaceous strata.

Irrigation is not necessary in olive culture.

Locality.—Olive groves are planted sometimes very near the sea, in places least exposed to the wind.

LEWIS RICHMOND,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Rome, April 1, 1884.

ITALY.

REPORT BY CONSUL CRAIN, OF MILAN.

[Republished from Consular Reports, No. 41½.]

The superficies devoted to olive culture in Italy is approximately 900,311 hectares (equal to 2,224,668 acres), and the total production of olive oil about 3,385,591 hectoliters (or 89,437,157 gallons), distributed as follows:

Districts.	Area of cultivation.	Total production of olive oil.
	Hectares.	*Hectoliters.*
Lombardy	4,591	6,381
Venice	3,536	9,321
Liguria	84,931	343,264
Emilia	4,694	14,757
Marches and Umbria	76,271	195,659
Tuscany	119,278	285,006
Lazio	41,667	95,834
South Adriatic	270,090	557,649
South Mediterranean	139,928	636,540
Sicily	104,373	730,238
Sardinia	51,582	211,005

The reports of the Italian minister of agriculture contain much that is interesting in regard to this industry.

The olive is indigenous to Asia. It is mentioned in Genesis, Hesiod, and Homer, but was not introduced into Europe, according to Pliny, until the two hundredth year of Rome. It is hardy, and grows wild in southern Europe—Linnæus calls it *Olea Europæa*, as if indigenous to Europe. It is cultivated in Spain, Greece, Italy, Languedoc, and Provence. The forty-fifth degree of latitude is considered the northern limit of culture. Great heat or cold is unfavorable to the plant. It is not found in Africa far from the Atlantic; and Humboldt noticed in various parts of St. Domingo and South America that it grew there without bearing fruit. It has been erroneously claimed that the olive would only grow near the sea. It is found at great distances inland, but abounds most near the coast, where the temperature is more congenial. The variation of altitude at which the plant can thrive depends upon the region. In central Italy the greater part of the olive zone is below an elevation of 500 meters, and in Sicily below one of 600, while in the basins of the lakes of Garda and Iseo 450 meters is the extreme limit. At this extreme limit the cultivation is unprofitable, as the fruit often fails to mature. The plant requires a soft and temperate climate. In districts where the temperature is higher than required by the plant it is cultivated by preference on elevated lands; in those where the temperature is low it is given a warm position. The north wind is the enemy of the olive. In the same region it flourishes on high lands pro-

tected from that wind, and languishes in low lands exposed to it. Upon the plains of Mugello and the Borgo San Lorenzo, swept by northerly winds, it will not grow, but flourishes 3 or 4 miles away on the hills protected by the Apennines.

Cold affects the olive according as the atmosphere is dry or humid. The same degree of cold is more fatal in spring than in winter, because in the former season, the plant having entered the period of vegetation, the young and tender germs are injured; so by reason of the greater moisture the cold of the plains is more injurious than that of the uplands. Nothing is more destructive than the formation of ice upon the branches after snow-storms. The greatest cold which the plant can resist is about 10° Réaumur; at 12° not only the leaves perish but the trunk and roots above ground. It sometimes suffers at even 7° when the cold is accompanied with humidity, or when the plant is in a state of vegetation. Sometimes the leaves are destroyed by a frost apparently light. The greater part of the olives of Liguria and Tuscany perished in the years 1709, 1782, 1820, and 1845.

As to the soil there is not much difficulty. Only exceedingly light or wet land is bad for the plant. It does better ordinarily in argillaceous or calcareous earth, mixed with stones, to which its roots cling, holding steadily against strong winds.

The olive is propagated in four ways—by seeding, by cuttings, by grafting, and by the system called ovolo.

Italian cultivators generally adopt the last method, but as the others are not unfrequently used it may be useful to give some facts in regard to them.

The manner of seeding is much the same as with other plants. The olive used for this purpose is selected from trees well grown, of a robust variety, possessing the qualities desired, and is stripped of its oily pulp. Seeding involves the labor of transplanting and improving by grafting, as the new plants raised from a given variety will not reproduce it, but return usually to the wild type. Another objection to this system is the slow growth of the olive. Hesiod said of it, "Those who sow the seed never gather the fruit." However, some use this method, as plants thus obtained have greater dimensions and a more perfect root system.

When cuttings are used they should be young and vigorous, from 50 to 55 centimeters in length, and about the size of a man's wrist. The bark must be bright, smooth, and sappy, and contain towards the lower part some knots, upon which roots form more easily. The cuttings are set in the ground in November in warm localities, and in February and March in temperate. About one-third of the cutting should be above ground, and the upper extremity, where cut, covered with grafting-wax. Although the olive is an exceedingly hard wood, it puts forth roots from cuttings as readily as the willow or poplar. Full-grown trees, even when much denuded of roots, can be transplanted from the forest, and often when those in the olive-yards are destroyed they are replaced in this way.

In the process of grafting sprouts are taken from the base of the tree and the operation performed as with other species of trees.

The propagation of the olive by means of ovolo (eggs), called by the ancients occhi (eyes), is the usual mode, because surer, quicker, and cheaper than any other. Ovolo are woody excrescences on the lowest part of the trunk and on the roots of the olive, and so called because of a supposed resemblance to eggs. These are detached with a sharp knife and put in the ground to the depth of 4 inches. This is done in November in warm districts, and in March where colder. When the ovolo germinates, one shoot is preserved and the others cut off. The preserved shoot is steadied against wind by a stake to which it is tied. The plant thus started is removed after three or four years to the permanent olive-yard.

In most cases the olive has to be grafted, as the young plants usually take the wild type, and consequently yield only small fruit.

By cultivation a number of varieties of the olive have been obtained, differing according to localities; some distinguished by a greater or less vigor of plant, some by drooping, and others by erect leaves, and more especially by the form, size, and color of the fruit. The color varies from green to red, and in some cases to a purple, nearly black. Professor Orphanides discovered in a grove of Attica an olive perfectly white, and which was exhibited at the Vienna Exposition under the name of *Olea cucocarpa*, or *chionocarpa*. Tavanti's work mentions twenty-one varieties in Tuscany. Piconni observed sixteen in Liguria, and Caruso fifteen in Sicily.

The extent and kind of pruning depends upon the variety of the olive, and must be performed with care.

Composts of slow assimilation, such as horns, bones, woolen rags, etc., are most used.

OLIVE OIL.

The quality of the oil depends greatly upon harvesting the olives at the proper time. If this is done either too early or too late the product has a fatty flavor and odor.

Italian oil.—The oils of Lucca, Calci, and Buti are the best in the world, and those of Umbria and Liguria are but little inferior. The best article is produced in moderately warm regions.

Thus the oils of Italy are more esteemed than those of the Orient, and of the former the oils of Pisa, Lucca, Arrezzo, Perugia, and San Remo are better than those of Sicily and the Neapolitan provinces.

While soil, climate, and the variety of the plant affect more or less the quality of the oil, much more depends upon harvesting and pressing the olives properly. This is done much better in central Italy than farther south.

Spanish oil.—Next to Italy comes Spain in extent of olive cultivation. According to Mueller the production of oil in that country is about 1,135,750 hectoliters per year. It is chiefly cultivated in the basins

Guadalquivir, Ebro, and Guadiana, and the product constitutes an important branch of commerce for Andalusia, Aragon, Catalonia, Murcia, Navarra, and the Balearic Islands.

Spanish oils are very little esteemed, and their exportation is rather diminishing.

French and Algerian oils.—In France the cultivation is confined to the southern districts, and covers 94,000 hectares. The production is about 250,000 hectoliters. In Algeria about 150,000 hectoliters are produced, of a quality inferior to that of Italy, but better than that of Levant, Spain, or Portugal.

Austrian oil.—In Austria the olive is a little cultivated in the southern Tyrol, in the territory of Gorixia, Gradisa, and Trieste; more extensively in Istria and Dalmatia. The yearly production is about 264,000 quintals. Of the production in Greece accurate statistics are wanting, though it is known that the cultivation is extensive.

Ottoman oil.—In the Ottoman Empire it is cultivated in Syria, Brussa, Roumelia, and in the islands of Candia, Cyprus, Metilino, Samos, and Rhodes.

Greek oil.—Grecian and Turkish oils are, however, only used in Europe for the manufacture of soap.

PRICES OF OLIVE OIL.

The price of olive oil fell from 170 francs per quintal in 1879 to 120 francs in 1882, and the several grades of this article are quoted in the Bulletin of Agriculture, of the 8th instant, as follows: Oil of Lucca, 168 to 195 francs; olive oil for burning, first quality, 85 to 88 francs; second quality, 78 to 80. The cause of this depreciation is the few uses to which olive oil can be put and the increasing competition of seed oils. The larger olive harvests in Italy and the whole Mediterranean basin is another and lesser cause. The competition is principally with the kinds of olive oil used for industrial purposes, and which represent about two-thirds of the entire production. Alimentary oils scarcely feel this competition. In the retail market the price of the oils of Lucca and Barri has been almost unchanged, and the demand for them abroad fully sustained.

COTTON-SEED OIL.

The seed-oil industry is assuming considerable proportions. Several kinds of this oil were exhibited at the Milan exposition in 1881, and classed among alimentary oils. There were some beautiful specimens of sesame oil exhibited by Messrs. Scerno & Gismundi, who were then producing 30,000 quintals per year.

The importation of cotton-seed oil was arrested in 1882, since which the demand for oleaginous seeds has increased. In 1882 the importation of these seeds amounted to 252,835 quintals, being 52,335 quintals more than the previous year. It is therefore urged that a duty should

be imposed on all imports of seeds and seed oils if it is to be continued on cotton-seed oil.

It is claimed that the duty on cotton-seed oil has served no good purpose; that the mixing of cotton oil with olive was not prejudicial to health, and that the mixture is now made with oils from flax and nuts, and other deleterious substances; and that the competition formerly coming from cotton oil has been replaced by oils of other seeds and by nut oils.

It is stated on good authority that no practical method exists by which these mixtures and their properties can be detected, and it is felt that frauds will diminish, and the public good be promoted, when prejudices against good seed oils disappear and they are sold under their true names.

DUNHAM J. CRAIN,
Consul.

UNITED STATES CONSULATE,
Milan, November 10, 1883.

GENOA.

REPORT BY CONSUL FLETCHER.

[Republished from Consular Reports, No. 41½.]

Varieties.—The best olive oil is extracted from the following-named trees:

I. The *Giuggiolina*, known as the Lavagnina or Taggiasca.
II. *Radiola* or Razzuolo and Pendolina.
III. *Grappolosa* or Merlina-Pignola doppia.
IV. *Tondolina* or Pignola.
V. *Martellina* or Martena-Papollina.

Seeding and planting.—The length of time between seeding or planting and fruit bearing depends altogether on the manner in which the work of cultivation is performed. If trees are raised from seed, sixteen years is allotted before fruit bearing; if by sprout, plant, or shoot, it depends on the age thereof; if by *snags*, it will take from twelve to thirteen years before a crop can be realized. A full crop can not be expected till the tree reaches twenty-five or thirty years.

Plants brought up from seed and shoots must be ingrafted; otherwise the trees and fruit remain wild; *snags* also; in fact, all must be grafted if taken from the root or below the graft of the parent tree.

The mode of cultivating olives in this province is as follows:

Olives are multiplied by shoots or sprouts; they are, when sufficient vitality is assured, replanted in the soil where it is designed they should grow; they are mulched every three years with manure of slow decomposition as, for example, the scrapings off horns, grounded hoofs, woolen rags, and stable manure. Manure of quick decomposition is good for

only one year, and has this disadvantage, it develops more leaves on the tree and rank vegetation than it does fruit. The trees must be kept clean, that is, free from sprouts and weeds; standing water must not be allowed around them, for in such case the wood will soon rot and be a subject for a malady called "lupa," which very much shortens the life of the tree.

Olive Regina, or queen olive, known in this province under the name of Olive of Spain, is a special quality grown from the imported tree cultivated for special purposes. The fruit, however, contains but little oil, and that little has to be extracted before using the olive for culinary purposes.

Production.—If olive trees are well cared for they generally give abundant fruit when they attain the age of thirty years, and even long after this age they increase if properly handled. An olive tree is liable to live for centuries if not destroyed by the "lupa."

The production of the olive depends on the care taken in its cultivation, and much on the weather, for, be it understood, the fruit is exposed nearly the entire year, before maturity, to all atmospheric changes. The yield therefore depends largely on the meteorological vicissitudes of the seasons, and for this reason the exact figures can not be given. This much, however, can be said, an olive tree between twenty-five and thirty years old will produce about 3 gallons of oil.

A hectare of land (=2.471 acres), in fine, if properly cultivated, ought to produce about 300 gallons of oil. The same measurement of land will produce better results providing the conformation of the soil permits the trees to be set closer than 12 meters, or about 40 feet, apart. The olive crop can be considered only from a biennial stand-point, and the above is the average for two years.

The relation between the weight of olives and the quantity of oil is not constant in all crops, nor equal on all lands, for this reason: On flat lands and in places where rains are frequent less oil and more water exists in the fruit; on the other hand, if the grove is on the hill-side the proportion is as one to four, or one gallon of oil from four gallons of fruit.

The distance between trees on lands exclusively devoted to olives should be about 50 feet—if on flat land and in orchards—on hill-sides 39 feet, or even less—always less on *pedente* or abrupt inclinations. *Flats* are especially prepared on hilly lands, and so arranged that the roots of one tree can not run down and interfere with those of another. In other words, the roots of trees are limited to certain space by the erection of stone walls, and when thus arranged the olive plant will flourish at a distance of only 30 feet apart from its neighbor.

Pickling.—For pickling purposes olives are gathered before they change from green to a reddish color. The faintish tinge from the original green indicates incipient ripeness. For pickling, olives are usually gathered toward the close of August. The olive must be fully

ripe when picked for oil. When matured it drops from the tree. This occurs late in the fall or early winter, as in all its stages, from bud to full-grown fruit, the atmosphere also has its influence in bringing the olive to maturity.

For table use you have the olive in three ways:

(1) Pickled green.

(2) Dried when ripe.

(3) Pickled when dead ripe.

They are prepared as follows: The green olive is placed in a strong solution of lime long enough to take the oily substance out; the well-matured olive is dried in the sun; the ripe pickled olive undergoes the same process as the green, only salt is used instead of lime. Further, the green olive, when purged of oil, is conserved in salted water. The dried olives are placed in jars, with sufficient oil on top to prevent the air drying and oxidizing the bulb, but no oil is allowed to sink to the bottom of the jar, for fear of getting rancid and thereby communicate a bad odor to the fruit. Aromatic herbs in certain quantity are generally used to aromatize the fruit preserved in this way. The ripe olive is pickled in brine of salt, as stated, but the brine is frequently changed in order to extract the oil and sour flavor. The olive must not be too salt. When prepared as given above olives will keep a long time.

Oil extraction.—Oil is extracted from the olive by crushing the fruit in a stone press. When a certain quantity are reduced to a pulp the crushed mass is placed in a sieve-like receptacle, and this mass when pressed produces the oil. Pressing by hydraulic engines has been tried in the past, in order to obtain a larger quantity of oil, but this power proved too great in that it actually spoiled the oil. Such a pressure is used now only for extracting oil from husks.

Results.—The best results in olive culture are derived from hill-sides and protected by sea winds; in such locality even the most gentle and tender kinds are comparatively safe. Olives raised on flat lands, as elsewhere mentioned, contain more water, for the reason that they are not sufficiently exposed to the sun (on account of mountain shade), and are always liable to be frost-bitten. Even on table-lands the olive is often damaged by winds, which forces the fruit to fall before maturity. Cold winds always hinder the growth of olives, and they are especially damaging to young branches.

Soil and climate.—In Liguria, including all the province of Genoa, the highest elevation of land on which the olive is cultivated ranges about 1,600 feet above sea-level; the orchards, however, are all in the south side of the hills and protected by lofty mountains from north winds.

The olive tree will prosper in almost any kind of soil, rocky land included, except that of a sandy nature; the latter absorbs too much heat, and therefore cause rapid evaporation, which deprives the soil of the necessary moisture in summer. Very damp soil is prejudicial for the reason that the tree is liable to the ravages of the "lupa." Olive

groves are not irrigated in the province of Genoa; the soil is generally considered strong enough to retain moisture a long time, even in the dryest seasons. Young plants are watered, however, in the summer, but great caution is practiced in this work, for too much moisture injures the roots and then comes the "lupa" plague. Throughout this entire province the olive orchards are all on the sea-coast; they extend inland but a short distance. You can find inland places, however, where olives would bear well; that is to say, in situations where the temperature undergoes no serious change.

The price of olive oil varies according to the quality and quantity of the crop. For same reason the average annual yield can not be given. On these points I particularly inquired, but failed to obtain satisfactory answer.

Cost of cultivation.—Answer 5 and 6 give possible yield under ordinary conditions, so I pass to the cost of cultivating olive groves. The work is divided into two parts each year, first, plowing so-called flat lands and hoeing hill-side orchards; second, clearing the ground of weeds.

The following statistics were given me by a gentleman experienced in olive culture, and while his statements may not be as clear as desired I can not do better than give them as narrated:

One day's plowing costs 11 francs ($1.90), and two days with the plow is sufficient for a hectare of land (2.471 acres). Where the plow can not touch on account of the trees, a hoe is used. As there are about 120 trees in a hectare of land 10 men at least are needed for such work, at 2 francs (38 cents) per day. Now as to manuring groves. The trees should be mulched once in every three years. Experience has taught that the best way was to manure one-third of the orchard this year, one-third next year, and so on. The compost for a tree which yields, say, 10 liters of oil (about $2\frac{2}{3}$ gallons) costs about 67 cents; at this rate the manure for an orchard of 120 trees will cost a fraction over $80. Consider then a workman's labor at mulching, 20 days, at 38 cents per day; clearing weeds 8 days at same wages, then pruning, plowing, etc., and you have incurred an average expense on each tree of 80 cents. In fine, you realize about $190 from a hectare of olive trees, and it costs you one-half that sum to care for the land. From the other half you must pay Government, provincial, and communal taxes, which are no small items.

Rain-fall.—The result of meteorological observations for the last ten years in the province of Genoa shows that about 48 inches of water had fallen each year (almost incredible, but substantially vouched for). It was much less on the oriental coast, and fully one-third less on the western coast.

EXPORTS AND IMPORTS OF OLIVE OIL.

Strange as the item may appear, it will be seen in the table that 28,358 kilograms of *pure* olive oil was imported into Genoa from the United States and Canada during the year 1883:

EXPORTS OF OLIVE OIL.

[All measurement in kilograms, according to the rule of Italy. One hundred kilograms equal to 220 pounds.]

	Kilograms.
United States and Canada	104,045
La Plata States	757,026
Chili and Peru	15,022
Other American ports	2.049,781
Austria	79,764
France	363,247
Germany	27,085
England	121,497
Holland	38,180
Russia	1,610
Spain and Portugal	4,195
Turkey	8,169
Tripoli and other African ports	275
Total	3,387,896

IMPORTS OF OLIVE OIL.

	Kilograms.	
United States and Canada	28,358	
Austria	152,872	
Tripoli and other African ports	1,832,201	
Total		2,013,431
Total exports over imports		1,374,465

JAMES FLETCHER,
Consul.

UNITED STATES CONSULATE,
Genoa, May 1, 1884.

LUCCA.

REPORT BY CONSUL RICE, OF FLORENCE.

The variety best adapted for pickling is the Trantojo olive, also called "National" or "Gentile," and is also good for extracting oil. The "Morajolo," "Gremignolo," and "Leccino" produce the purest oil.

The trees which produce the above varieties are grown on hilly ground, where the tree is planted, about 3 miles from the sea, and at an elevation above sea level of 650 to 2,300 feet, and in certain localities at even a higher elevation. The most favorable situation is facing south, and the soil best adapted is rocky and sandy. Severe cold spoils the tree and the olive.

When the tree is from three to four years old it is transplanted, always in the summer, and if found necessary watered. The cultivation takes place in autumn, for the manure, and in the spring for the working of the soil. The pruning takes place in autumn.

The olive is generally picked from October to May, but this must depend on the climate.

The olives are picked in two ways, viz: (1) In October, when the olive is green and not too oily, it is put under lime and ashes mixed with water, and washed afterwards in pure water; it is then put in other pure water, adding 17.10 pounds of salt for every 220.11 pounds of olives; (2) in February, when the olive is oily, it is picked by hand and placed for forty days in pure water and kept in it, until the nut leaves the fruit by squeezing it—then continued as above.

As to the process of making oil it is as follows:

The fruit as soon as gathered is brought to the store-rooms attached to the olive-mill, and there spread out until it can be crushed in a thin layer to avoid overheating. The ripe olives have a lustrous purple-black color. In making the finest oil any damaged fruit is put aside.

The mill consists of a large mill-stone revolving in a trough built of stone. It is driven by water-power if available, or else by animal power, generally oxen. The olives are placed in the mill and quickly crushed to a pasty mass, including the stones. The pulp is next transferred to fiber-bags, and these placed in a screw or hydraulic press; on pressure being applied, the oil flows forth, and is collected in a suitable receptacle. In order to disengage all the oleaginous particles, water is poured over the bags. In making the finest oil it is essential to use only cold water, which must also be pure and uncontaminated. Hot water, though more efficacious, would deprive the oil of all its delicacy. The first pressing of sound fruit yields the finest quality of olive oil.

Newly made oil is allowed to rest a while in tanks, so that some of the solid matter from the fruit, which is held in suspension, may have time to deposit. It is afterward clarified by passing it through pure carded cotton. It is then fit for the market.

The pulp from which the first oil has been expressed is again placed in the mill and the same process repeated a second time, hot water being used instead of cold. A second-rate quality of oil is thus obtained, which is kept separate at those olive-mills where the finest oils are produced. Even then the pulp is not done with. It is crushed again in another mill with the addition of water, then passed into a circular tank, where agitators separate the residuum of pulp from the remaining small parts of the olive kernels.

The latter is removed and used for fuel.

The pulpy residual is again subjected to pressure and some oil obtained of very inferior quality.

The water which has been used in the agitator flows down and passes through settling tanks where some little oil comes to the surface and is collected.

The trees commenced bearing fruit when about ten years old. According to plants, soil, cultivation, and climate, the yield may give from 220 to 330 pounds of olives.

The trees are planted at a distance of 10 to 11 yards from one to another.

Trees are propagated either by seedlings or cuttings. The latter are taken from trees which have been cut or blown down, and from the roots where suckers would develop. The seedlings revert to the wild species of olive tree, and hence must be grafted; this is generally done when the tree is from six to eight years old.

A fly termed "Musca oleae" is one of the greatest enemies of the olive-tree farmer. This insect is about half the size of the common fly; its head is of orange color, green eyes, body and wings variegated. The female deposits its eggs in the olive berries; they develop into small white maggots, which destroy most of the pulp of the fruit. In the cavity so formed water penetrates, causing rottenness. Oil made from such fruit is thick and nauseous to the taste. This fly makes its appearance in Tuscany in September. The ravages it causes are almost incredible. There is no possible treatment.

WILLIAM T. RICE,
Consul.

UNITED STATES CONSULATE,
Florence, May 23, 1890.

MESSINA.

REPORT BY CONSUL JONES.

Varieties.—The best variety for pickled olives is the Ogliaio; best varieties for olive-oil: The Ogliaio, Caloria, and Calabrese.

Nine-tenths of the olive-trees in this province are of the Ogliaio variety; the Biancolilla and Nasitana varieties are prolific bearers.

Tree planting.—The Calabrese must be planted considerably above the level of the sea; it thrives 4 miles inland. The other varieties above named do well on the coast and as far as $2\frac{3}{4}$ miles from the sea.

The elevation above the sea-level depends upon the exposure, variety, soil. With a southern exposure the Ogliaio thrives at an elevation of 1,200 feet; the Caloria at 1,500 feet; the Nasitana at from 1,500 to 1,800 feet, and the Calabrese at a still greater elevation.

When the olive is grown by the sea-shore a western exposure is the best. A southern exposure is required when the olive is grown at an elevation exceeding 1,000 feet.

Olives grown on hilly land yield the most oil and the best quality of oil. The crops on level land are much lighter and are of inferior quality. Level land produces the best olives for drying purposes.

Soil, etc.—The olive prefers a friable, porous soil. Water should not be allowed to stagnate around the trees. The olive rarely attains its full growth on level clay land owing to the humidity retained by such land. In winter clay soils run together; in summer, in cracking open,

they break the roots and seriously injure the trees. A very dry soil is also to be avoided. In the soil best adapted to the olive alkalies, chalk, and phosphates predominate. The calcareo-argillaceous, product of the tertiary calcareous rocks, is the soil of soils for the olive.

Climatic influences.—A moderately moist subsoil suits the olive best.

The olive prefers a temperate, dry, and equable climate. It does badly in hot climates, in which a southern exposure should be avoided by all means. The temperature from 34° to 95° Fahr. suits the olive; mean temperature, 68° Fahr.

Rain-fall.—In this olive zone the annual rain-fall never exceeds 23 inches. The rains are at irregular intervals; a drought of several months being followed by torrents of rain, greatly to the detriment of the crops.

Rain is beneficial to both trees and fruit, except when the trees are in bloom. It is invaluable in August, as it swells the fruit and thus increases the yield of oil.

Irrigation.—The olive does not require irrigation. When grown with the orange and lemon (which are irrigated) the olive produces heavy crops, but this fruit is good neither for pickling nor for oil; moreover, trees subject to irrigation grow old prematurely.

In the neighborhood of Milazzo it is customary to water the trees at the time of transplanting, 4 gallons to the tree. This is the only irrigation of the olive in practice in this province.

Cultivation.—The olive is worked three times a year. In October, after the first autumnal rains, when the earth from around the tree is thrown to a distance equal to the length of its branches and made into a low circular mound, thus forming a clean bed for the olives to fall on when the branches are shaken. This embankment also retains the rain-water around the trees.

In March and April this mound is broken up and the earth is piled in two smaller circles, thus offering as great a surface of the earth as possible to the action of the air.

About the end of May this earth is leveled.

As a rule the olive is not manured. There are growers, however, who enrich their trees every two years. They run a trench half way round the tree 5 or 6 feet from the trunk, fill it with manure one year, and complete the circle, manuring the other half of the tree the next year. Others open a trench near the tree on the side of the prevailing wind and fill it with manure to strengthen its roots on that side.

Near Milazzo the trees are manured every other year by turning under lupins and beans.

Pruning.—Olive trees are pruned and suckers removed every two years, from December to February. The head of the tree should be cut back so as to admit of air and light.

Pickling and Curing.—Olives for pickling are gathered green in October and November. When destined for the oil press olives are left to

ripen on the trees and are gathered as they fall. Olives are gathered by hand or knocked down with long poles. The young twigs are bruised and broken by the poles, which shortens the next year's crop; but, as gathering by hand is much slower, poles are generally preferred.

Olives for pickling are dried in the shade for a day or two, then soaked in water from two to four days and pickled.

Olives for the press are left for a few days in the baskets in which they are carried home; they are then thrown into vats and allowed to ferment; this fermentation diminishes the yield of oil and is detrimental to its quality.

The process for pickling olives is as follows: Dissolve in water a sufficient amount of rock-salt to float an egg or a potato. Put the olives in this brine and cover them with fresh olive twigs with their leaves on, wild fennel, bell peppers, and garlic. To make oil: The olives having become soft, macerated, during their fermentation in the vats, are run through (*i. e.*, crushed) a mill with horizontal rollers. The pulp is then put into large, round wicker bags, made of bulrushes, and pressed. "Sansino," or oil from the husks, is obtained by pouring boiling water on the olive husks and pressing them a second time. Tin dippers are used to transfer the oil from the press to wooden tubs, in which it is carried to the warehouse. The oil is then poured into large earthenware jars and left to settle before being put on the market.

Maturity.—At ten years of age the olive comes into bearing and continues bearing for centuries.

Yield.—Olive trees in full bearing yield from 1 to 2 gallons of oil per tree—78 to 156 gallons per acre.

Planting and propagating.—The large olives, Ogliaio and Calabrese, are planted from 36 to 39 feet apart; the dwarf olives, Biancolilla, from 15 to 24 feet apart. Trees are propagated by seed; eyes (excrescences that grow on the foot of the trunk and roots of the olive—best method); suckers; cuttings; and budding.

Insect pests.—The olive tree and the olive have a number of insect pests. The lepidoptera, in a chrysalis state, cut into the large branches; the *Tlesino oleiperda*, and the *Phlocotribus oleæ* eat into the twigs; small butterflies feed upon the leaves. A little hemipter, called *ouphyllura oleæ*, attacks the bloom of the olive tree and covers it over with a cottonous substance that smothers it. The fly, *Dacus oleæ*, lays its egg in the pulp of the olive, which egg produces a worm that feeds upon the pulp. This prolific fly is a terrible scourge. Olives attacked by the fly yield but little oil of inferior quality.

The beneficial insects are the parasites of the olive fly.

There are little hymenoptera that feed on the larva of the dacus.

WALLACE S. JONES,
Consul.

UNITED STATES CONSULATE,
Messina, January 27, 1890.

NAPLES.

REPORT BY CONSUL CAMPHAUSEN.

Varieties.—The name of best variety for pickled olives is the Andria or Gaeta olives, and for oil the Ritordella. The other choice varieties for pickles (eating) and oil, worthy of culture and for profit, are the Corregiole and Punzione (for oil), also Morrajole and Razze; but the Emopaca olive is cultivated in preference in the province of Naples.

The trees are grown in the provinces of Bari, Salerno, and Naples, and are distant from the sea 1,500 feet, and from 90 feet above sea-level to the tops of the hills, with southern exposure.

The trees grow on hilly, rolling, or level land, but hilly is the best, with fresh, rich soil without clay.

Climatic influences.—The same as stated in answer to question No. 5, under the head of lemons, oranges, and figs.

Irrigation is not practiced.

Cultivation.—Every year by working the soil and using barn-yard manures and refuse collected in the streets of the cities.

Pruning.—During the usual time, as in other countries, and by removing the suckers whenever necessary.

Picking and curing.—From November to February. They are picked by hand or beaten down. The middle of October is the time to gather those for pickling or eating. The fruit for oil is collected at any time after November. After picking, the fruit is mashed into a paste and pressed under a hydraulic press and the oil extracted. The pickling is done in the simplest and usual way, similar to pickling cucumbers, etc., in the United States. Before they are put in brine the olives are soaked for a day or two in a weak solution of potash and then for a couple of hours in fresh water.

Maturity.—The trees mature at the age of five years.

Yield.—Trees average 20 quarts of oil or 45 pounds of fruit per year.

Planting and propagating.—Trees are planted from 35 to 40 feet apart, and propagated by seed, sprout, or graft.

Publications.—I have no knowledge of any statistics issued by the Italian Government on this subject. The best information on this subject is to be obtained from or through the United States legation, or the United States consulate-general at Rome. Publications, scientific reports, etc., on this matter are published in the different cities of Italy, and articles are quite frequently found in the daily papers.

Insect pests.—The kermes injures the tree, and is destroyed by cutting of the bark where it nestles, saturating the place with a solution of lime. When the oil-fly makes its appearance the olives are gathered with the utmost diligence and made into oil to prevent the propagation of the insect.

EDWARD CAMPHAUSEN,
Consul.

UNITED STATES CONSULATE,
Naples, January 31, 1890.

PALERMO.

REPORT BY CONSUL CARROLL.

Varieties.—Among the six principal varieties cultivated in Sicily "Ogliaja" yields the most oil, as will be seen from the following table, viz:

No.	Name.	Oil found in 100 parts of olive weight.
		Kilograms.
1	Ogliaja	20.312
2	Caltabellottese	17.187
3	Bianchetta	15.625
4	Calamignara	15.625
5	Zeba or Zaituni	15.625
6	Cerasola	14.345

The names of other choice varieties for pickles (eating) and oil, worthy of culture and for profit, are Caltabellottese, Bianchetta, Zeba or Zaituni, and Cerasola.

The trees which produce the above oils are grown in Sicily and most parts of Italy.

There is no stipulated distance from the sea. The olive-tree grows either on the coast or inland, but groves adjacent to the sea or large bodies of water are more productive than those situated inland, the olives yielding more oil. The reason assigned for this is the influence of large bodies of water in modifying the extremes of temperature.

The limit of cultivation in the province of Palermo is stated at 827 meters (about 2,690 feet) above sea-level. As the trees suffer from extremes of temperature and from lack of moisture in either soil or air, the success of cultivation at various altitudes, depends largely on nature of soil, exposure to the sun, and distance from the sea.

Sunlight.—The position of an olive grove in relation to the sun appears to be of great importance. In an eastern exposure the diurnal changes from cold to warm, and *vice versa*, are very rapid, while with a southern, and still more with a western and northern exposure, the direct solar rays are preceded, in the morning, by the gradual diffusion of the sun's warmth, and in the evening the change to the cold of the night is similarly graduated. From this it appears that in the northern limits of the growth of the olive the most unfavorable position is an eastern exposure, experiments proving that in seasons of extreme cold, the first trees to perish are those most fully exposed to the east.

In the southern limit of growth, however, the eastern, western, or northern exposures are more favorable than the southern, since, in the latter case, the trees suffer from the extreme heat. In the intermediate and more temperate zones exposures to the southeast or southwest seem to be preferable. Aside from solar exposure it is important to choose a position sheltered from violent winds. In some parts of this island the

strong sea winds, charged with salt, are found to be very injurious, while in other parts with different exposure the wind most dreaded is the hot dry sirocco, blowing from the southeast.

Soil, etc.—Latitude appears to govern the character of the ground. For instance, in latitude 30° an inclination of 30° would be indicated in the land. Open, rolling ground seems preferable as allowing a free subterranean circulation and the escape of excessive moisture.

It is not true, as sometimes asserted, that the olive prefers the poorest soil. Where the earth is too sandy, and, in some conditions, where too hard, the trees suffer from lack of moisture, they grow slowly and with difficulty, and in elevated positions, in the absence of profuse rains and perennial moisture, the foliage is scanty, fruit ripens too rapidly, without full development, much of it withering half formed.

The most favorable is a loose mellow soil of moderate humidity. An open subsoil is preferable to clay, as the latter in winter seasons is apt to retain too much moisture and unduly chill the trees at the time when vegetable life is most feeble.

Temperature.—It is difficult to state the exact limits of temperature within which the olive will grow and flourish, as so many other conditions enter into the question, but a uniform temperate climate seems to be absolutely essential to its well being. In favorable localities the tree commences to vegetate in March, when the mean temperature of the air has reached 10.50° to 11° centigrade (50.9° to 51.8° Fahrenheit). The fruit buds commence to form, generally, in April, at a temperature of 15° centigrade (59° Fahrenheit). The tree blooms in May, when the mean temperature has attained 18° or 19° centigrade (64.4° to 66.2° Fahrenheit). In the beginning of June the fruit commences to form, under the influence of a mean temperature of 21° to 22° centigrade (69.8° to 71.6° Fahrenheit). The fruit attains its growth early in July and reaches maturity in October.

The mean temperature in Palermo (a locality favorable to the olive), as recorded for the nine years from 1866 to 1874 inclusive, was 18° centigrade (64.4° Fahrenheit). The maximum temperature during that time being 40.4° centigrade (104.72° Fahrenheit) and the minimum 2° centigrade (28.4° Fahrenheit).

The lowest winter temperature which the olive tree can support is 7° to 8° centigrade 17.6° to (19.4° Fahrenheit), and this not prolonged beyond eight or ten days.

In various parts of Italy where, during occasional hard winters, the mercury has fallen below this point, for two or three days only, the mortality among olive trees has been very great.

There seems to be no regular method of irrigation in existence here, no governmental supervision, and no co-operation of different proprietors obtaining, Each grower seeks, apparently, to utilize to the best advantage the rain-fall on his own property. Where this is scanty it is sometimes supplemented by the sinking of wells from which the water is

pumped by hand or animal power. This is, however, an insignificant item. The general method of irrigation seems to be to dig ditches close to and parallel with the lines of trees and connect these with cross canals in such a manner that the drainage of the land can be held in the ditches to be used when needed, or conveyed away in case of superabundance.

In the case of terraced hills or undulatory land the intervening basins are often necessary to an intelligent control of the rain-fall. These basins, as well as the main aqueducts are, in this country, built of stone or cement, and in this equable climate endure for centuries. As the olive suffers from too much moisture to as great an extent as from too little, careful cultivators protect the roots of their trees in the autumn from an excess of the cold rains of winter with as much care as they take to provide them with water during the dry months of summer.

Cultivation.—After an olive grove is fairly started the annual labor involved in its cultivation is as follows:

In autumn, in those localities where severe cold is apprehended, the earth is built up and solidly packed around the trees to prevent a too ready access of the chilling waters of winter to the roots. When no frosts are feared and the season is dry, the soil on the contrary is loosened about the roots to facilitate the entry of moisture.

In winter or early spring the earth is turned up as deeply as possible, in this country, with the spade.

In summer a superficial digging takes place to destroy the weeds.

In September the ditches and reservoirs are cleaned and opened to allow the winter rains to pass out.

The deep digging at the end of winter is to facilitate the absorption of the spring rains to as great a depth as possible. The superficial summer digging, besides destroying the weeds, breaks the continuity of the soil, the loose upper stratum acting as a blanket preventing the dispersion and evaporation of moisture from the lower depths.

In addition to this is the fertilization of trees in old and exhausted ground.

Pruning.—The olive, like the peach, bears fruit on the second year's growth; that is to say, the growth of one year bears the fruit of the next. The branches extend themselves from year to year, but the part thereof which has once borne fruit, never blooms again. In the absence of pruning these branches grow in length from year to year until they finally cease; the shooting out of collateral branches is very slow and the fruitage of the tree insignificant. By improper or irregular pruning the fruitage of a tree may be seriously diminished or even temporarily destroyed. By pruning the form and extent of the tree are controlled.

To constitute a healthy tree, the amount of upper growth should be proportioned to the development of the roots and will constantly vary with the age and vigor of each individual tree. Olive trees should be pruned annually, in the spring. The most desirable form is the reversed cone, the branches spreading more and more as the top is approached.

This is thought to produce the most uniform exposure to air and sun. The trees should not be allowed to grow too high, the trunk from the ground to the lower branches not to exceed 1½ to 2 meters (about 4¾ to 6½ feet).

When the young tree is sufficiently branched and has reached a height of about 1½ meters (or 4¾ feet) the top is cut off immediately above a vigorous embranchment. In the following spring the principal branches are pruned, being left shortest at the bottom and longer as the top is approached, and so on from year to year, preserving to the tree a symmetry of form and uniformity of density as far as possible. When the fruiting age is reached the skillful pruner will form such a relation between the general growth of wood and the fruit-bearing branches, from year to year, as will best subserve the health and vigor of the tree. In addition to this pruning there should be an annual cutting away of all decayed and unhealthy branches.

Picking.—All the olives on a tree do not mature at the same time and two pickings are generally made. In the first are taken the southern side of the trees and those trees situated on high ground, as these ripen first. The method is to pick by hand those within reach, then gently shake the branches until the balance drop to the ground. In large groves the wind is largely relied on to assist in the labor. It is estimated that to pick an ettolitro (or about 2⅝ Winchester bushels) of olives from the tree by hand requires a man's labor for eight hours, while the same amount can be picked from the ground in one and one-half hours.

Pickling.—Olives for pickling or preserving in any manner for table use are picked green; for oil, when fully ripe. It seems to be the opinion here that olives increase in amount of oil produced if left on the tree some weeks after fully ripe, but the quality of the oil deteriorates.

Manufacture of oil.—To make good oil the olives should first be thoroughly cleansed of all earth and leaves. If washing is necessary to effect this, they must then be carefully dried, after which they should be conveyed at once to the mill; but, if this is impracticable, they may be spread out 4 or 5 inches deep in a dry, airy place, care being taken to turn them over thoroughly every three or four days to prevent fermentation. If the olives are allowed to ferment the quality of the oil is effected injuriously both in color and taste. There are several varieties of machines for crushing the olives. Extensive producers have at least one grooved mill which crushes the olives but leaves the pips or stones intact. The oil from the latter, although amounting to 7 or 8 per cent. of the whole, is of an inferior quality, and its admixture detracts from the brightness and excellence of the first pressing. The olives, reduced to paste, are put in sacks made of a species of rush or reed (*Juncus acutus*), of strips of bark, or of hemp and placed under the press (worked by screw or lever), when the first extraction of oil is made. This is the "virgin oil," absolutely pure and highest in value.

To the paste or mash from which the virgin oil has been extracted, the pips, previously removed, are added, boiling water is poured on pressure again applied, and another and inferior grade of oil expressed. The operation repeated a third time produces a still more inferior grade of oil, used mostly in the arts.

In all these operations absolute cleanliness is indispensable; mills, presses, and utensils should be frequently washed in a solution of lye, as the slightest contact with rancid matter will impart a disagreeable odor to the oil.

In some districts the crushing-mill is dispensed with, the only machinery used being a small screw-press. In such case the sack of olives is placed on the bed of the press, trampled down by men, and then the pressure applied, and the so called "virgin oil" produced. The trampling is repeated, water added, and pressure renewed, and so on, repeating all the operations until nothing remains but the shells of the pips and the dry pulp of the olives. The oil obtained by this method is more dense and mucilaginous than the other. Leaving the press the oil is poured into glazed earthenware jars, well washed with cold water (to which is added a little vinegar) and wiped dry with clean cloths. The best form for these jars is that of a frustrum of a cone reversed. In some cases vessels hollowed out of calcareous stone are used, after being thoroughly cleansed with lime water. These jars or vessels are placed in dry cellars, cool in summer and sufficiently warm in winter to prevent congelation of the oil, as this impedes the deposition of the lees (*morchia*).

The winter temperature of these cellars should be from 15° to 18° centigrade (59° to 64.4° Fahrenheit). In June the oil should be clear, and can be poured off into other vessels.

This first pouring off is the "superfine oil" (*olio sopraffino*). From what remains in the jars a second pouring off or decanting takes place a month later, and this produces the "fine oil" (*olio fino*), and in August still another decanting from the bottom brings forth the third grade, called "fat oil" (*olio grasso*), used in manufactures.

The purification of the oil and deposition of the lees, or morchia, may be accelerated by washing or rinsing with pure water or a solution of alum. The color of the oil may be bleached, or clarified, by a solution of sulphuric acid and water, in the proportion of 20 to 24 parts of water to 1 of acid. There should be a quarter of an ounce of acid to each pound of oil. The mixture must be placed in a vessel and agitated until it becomes milky, the agitation repeated several times during the first twenty-four hours, and then left quiet for eight days to settle. The oil may then be decanted, and will be found extremely clear and limpid. This process also destroys any bad odors that may linger about the oil, though for this purpose vinegar or alcohol seems better.

Preparing for market.—For pickling the largest and most fleshy olives are selected. They should be immersed in pure water for five or six

days, the water being changed four or five times per day, and when they have lost all bitterness placed in a vessel (earthen jars are used here) filled with brine, care being taken that they are immersed, after which they are ready for use in sixty days, and will keep for a year or more.

Another method consists in steeping the olives in lye until the pulp is penetrated; then, having ascertained by taste that they have lost their bitterness, they are immersed in water, as before, renewed two or three times per day for four or five days, or until all disagreeable flavor has disappeared. This done, they are immersed in brine, to which may be added, according to taste, some odoriferous herb, as fennel. Cloves and cinnamon are also used.

Maturity.—The trees commence fruiting at from six to eight years of age.

Yield.—From experiments made in Sicily it has been ascertained that a mature tree yields 8.50 kilograms, and a hectare (about 2½ acres) of land, in perfect condition, 850 kilograms of oil per annum, from which it has been concluded that an olive grove in Sicily of the extent of 1 hectare will, as a rule produce an average quantity of oil of from 642 to 734 kilograms per annum.

Planting and propagating.—This depends on the soil and its formation. In Sicily they are planted from 20 to 40 feet apart, the closest being on side hills and poor land, and the farthest apart in rich valleys. From seed and by grafting. Trees dying, renew themselves from the root.

Successful cultivation.—The importance of avoiding all exposed localities in planting olive groves is enjoined upon them. As, for instance, when the trees would be exposed to the cold winds from snow-covered mountains, the hot dry blasts from the deserts of Arizona or New Mexico and strong sea winds laden with salt. It would also be wise to plant different varieties of trees until those best suited to special localities can be ascertained.

No doubt is entertained that in the sheltered valleys of California, as well as on the favorably exposed foot-hills and along the southern coast thereof, the olive would do well and prove a profitable source of revenue.

Insect pests.—These are very numerous, and commit great havoc. As there is a whole library of books on the subject, it is impossible in a report of this kind to give any summary that would be of value.

PHILIP CARROLL,
Consul.

UNITED STATES CONSULATE,
Palermo, March 7, 1890.

SICILY.

REPORT BY CONSUL LAMANTIA, OF CATANIA.

THE OLIVE IN ANCIENT AND MODERN TIMES.

It is said that Asia is the olive's native place, and that Cecrope brought it to Athens and the Phocesis to Marseilles (600 years B. C.). The olive plant is known from past centuries, and a proof thereof is that we find it mentioned in the Genesis, Homer, and in Hesiod. The legend of the pigeon having returned on the Noah's ark with a small olive branch as a sign of peace is well known. It would, therefore, seem that the olive tree vegetated on the land, even before the universal deluge. The ancients paid to the olive great honors, and, as a mark of admiration, they believed that the plant had risen through Minerva's action. Consequently, they consecrated it to that deity, and Columella declared it "The first tree of all trees"—*olea prima omnium arborum est.* In Asia nature disseminated the first olive shoot, which afterwards is seen cultivated all over Asia Minor, Phœnicia, Palestine, and Syria. The ancient Hebrews, Etrurians, Greeks, and Romans paid the olive tree divine honors.

The olive tree likes the sea, the calcareous soil, the mounts and rolling hills, as well as the lake borders and river shores. That is because it was diffusely grown all along the coast of Asia Minor, Phœnicia, and Palestine, as it is now seen in Greece, not in the interior, but all along the Ionic Islands and Archipelago, Cyclades and Sporandes, still in a wild growing state.

In what epoch the Greeks did really extract the oil from the fruit and use it for illuminating and condiment, as it is done now, it is impossible to learn, for want of historical records. But one thing is certain, however, that the primitive extraction of oil and its use is lost in the obscurity of night. When, between the seventh and eighth centuries, or eight hundred years (B. C.), the Greek colonies extended themselves towards the northern coast, they probably, with their industry and commerce, imported also the olive culture.

In the sixth century (B. C.) the olive tree was cultivated in southern Italy, in Sardinia, and in Sicily. The Romans knew the olive later than the Greeks. A century previous to that, we learn from Pliny, no olives existed then in Rome, but that they did exist all along the Adriatic coast, cultivated by Greeks. Gradually, later on, the olives were introduced into central and southern Italy, hence into this island of Sicily.

The olive tree is now cultivated in southern Europe, as in Spain, Portugal, and France, Austria-Hungary, Provence, Italy, Greece, and Turkey in Europe.

Italy is, however, a region of the few most privileged ones by nature,

wherein the plant can easily vegetate and produce profitably. In fact, out of the 69 Italian provinces only in 19 of them the olive plant is not cultivated. The production, as considered in regard to land occupied by the olive culture, is more profitable in Sicily, and precisely in the provinces of Palermo, Trapani, and Caltanissetta. As reported by the *ministro di agricoltura* in 1874, it seems that the present olive cultivated land in Italy (together with other plants) occupies an extension of 900,311 hectares, yielding an average of 3,385,591 hectoliters of oil, or 3.76 hectoliters per hectare.

The annual exportation from Italy is 635,000 quintals, equal to 63,500 tons, and the best and finest oil is made at Pisa and Lucca, and mostly in the whole region of Tuscany, on account of good picking and curing the olives and extracting and refining the oil.

The following table shows the olive cultivated land and the total production of oil in Italy:

Regions.	Superfice olive cultivated land.	Total oil production.
	Hectares.	*Hectoliters.*
Piemonte (not cultivated)		
Lombardy	4,591	6,318
Venetian	3,536	9,321
Liguria	84,931	343,264
Emilia	4,694	14,757
Marches L'Umbria	76,271	195,659
Tuscany	119,278	285,006
Lazio	41,667	95,834
South Adriatic	270,090	857,649
South Mediterranean	139,298	636,540
Sicily	104,373	730,238
Sardinia	51,582	211,005
Total	900,311	3,385,591

General average, 3.76 hectoliters per hectare.

After Italy the most oil-producing country is Spain; next comes France, Algeria included, and Austria-Hungary.

In Greece and Turkey the olive tree is also extensively cultivated, but the oil is mostly fit and used for soap-making.

In no other country of Europe does the oil equal the Italian made in quality.

As shown in the table, the extension of olive cultivated land in Sicily is 104,373 hectares, with an average production of 730,238 hectoliters oil a year, and at rate of nearly 7 hectoliters per hectare. The oil, however, it is proper to say, is generally too rich and strong, on account of the poor system of picking the fruit and not refining the oil. The finest oil in this island is made in Termini-Imerese, 24 miles from the city of Palermo, by using the same system of Tuscany. I now proceed with the practical one, by answering categorically the circular.

QUESTIONS ABOUT OLIVES.

Varieties.—The name of best varieties for pickling in this consular district is the *Marmorigna* of Catania, an egg-shaped olive, with small stone and much pulp, giving a good oil.

The names of best varieties for oil are: *La Biancolilla* (little white), an oblong white, yellowish olive, even when it is ripe, yielding a very fine oil; *La Calabrese*, a small olive, but very productive, yielding excellent oil; *La Ogliara*, of medium size, giving an ordinary quality of oil; *La Cerasola* or *Prunara*, a precocious and pulpy olive, yielding plenty oil, but very rich; it is used for eating. *La Raitana*, a very late fruit, of ordinary quality of oil; and *La Caltabellottese*, an oblong black olive when ripe, giving rather a rich oil.

The names of other varieties worthy of culture and for profit are the following: *La Mortillara*, *Giarraffa*, *Patornese*, *Messinese*, *Nasitana*, *Pizzutella*, *Piricuddara*, *Saracena*, *Siragusana*, and *San Francescana*.

Situation.—The said varieties are grown in Sicily in the provinces of Palermo, Trapani, Caltanissetta, Catania, and Messina, at the distance of from 100 to 300 meters from the sea, and at an altitude of 300 to 800 meters above the sea-level, exposed to sun and planted on hilly, rolling land, for it is the best, and on flinty, calcareous, argillaceous soil.

Climate.—The climatic temperature is: minimum 5° centigrade in January, maximum 35° in August, and 17° average in May.

The average rain-fall in Sicily is considered to be from 25 to 30 inches in the year. More than that rain would help the culture greatly.

Irrigation.—There is no regular method of irrigating olive trees, and a good crop of fruit depends entirely upon favorable weather and rain-fall in the proper season.

Cultivation.—The earth about must be regularly dug at least twice a year; that is, in the month of June and August, and manured at the end of the winter.

Pruning.—Pruning is to be done regularly after the fruit has been gathered.

Picking.—The olives for making oil are to be picked when turning to the dark violet color, for then the pulp is easily detached from the stone. When so picked they give the following favorable result, viz:

Pulp	51.26
Water	14.38
Stone	20.16
Residue	8.38
Oil of the curl	0.06

The following system may be established as the proper time for picking the fruit:

(1) Olives gathered before full maturity give very fine, but very little, oil.

(2) Olives gathered at full maturity yield the most quantity of oil and of a good quality.

(3) Olives gathered late produce oil of a poor quality.

Pickling.—The olives for pickling must be picked when full grown, but in green color. After so picked they are prepared for making oil and for pickling.

The process of pickling green colored olives in Sicily is very simply done, viz, by putting them in salt water, made out of one pound of sea-salt to every gallon of fresh water, stored in barrels, casks, or any other receptacle, and let them remain there until eaten. In that manner they are shipped and kept for home trade. As to the process of making oil, it is impossible for me to describe it minutely.

Maturity.—Trees commence fruiting at the age of eight years.

Yield.—The average yield from ½ to 4 hectoliters of fruit.

Planting and propagating.—The distance apart is from 16, 22, and 32 feet, and propagated by several methods.

VINCENT LAMANTIA,
Consul.

UNITED STATES CONSULATE,
Catania, January 21, 1890.

SICILY.

REPORT BY CONSUL WOODCOCK, OF CATANIA.

[Republished from Consular Reports No. 41½.]

At least ten varieties of the olives of the present age were known and cultivated by the ancient Romans. There are the Pausio, Algiano, Licinio, Sergio, Culminio, Orchide, Regio, Cercite, Nevio, and Mirteo. Of these the best for yielding oil are the Licinio and the Sergio. The fruit of the Pausio, Regio, and Orchide is of fine flavor, and excellent for eating as condiment, and yields a good quality of oil.

In this part of Italy, especially in the neighborhood of Syracuse, there are probably greater varieties of the olive than were known to the old Romans. Among these may be mentioned the Pæsano (native), by some called the African; the Oglialoro, which produces a smaller fruit than the Pæsano, but it is rich in oil; the Biancolino (white), of which the pulp of the fruit is white; the Pizzuto (pointed), the fruit being somewhat pointed in shape; the Prunaro (plum), the fruit being roundish in form; the Dattio (date), of which the fruit is elongated and oval in form; and the Ferlese, the fruit of which yields a finely-flavored oil, and is excellent for comfits.

The varieties that are preferred for the utility of their product and durability of the trees are the African and Oglialoro. These trees are possessed of great longevity, living to be three and four hundred years old, and continuing to be green, healthy, and productive. The other varieties do not attain so great an age, especially the Ferlese and Biancolino.

A stony or calcareous soil is best for the olive. It must not be planted in damp or clayey ground. Irrigation is not necessary; in fact, it is

injurious to the tree. The trees require a loose, dry soil. A hill-side is suitable, provided there is no danger of denudation by water and the soil is supported about the trees by terraces.

The usual method of propagation is to sow the seed, plant suckers, or off-shoots that spring up from the roots of the parent trees, or by grafting the best varieties upon the wild-olive stock.

An olive orchard may be commenced from cuttings in the following manner: Prepare the ground by spading to the depth of 3 feet and surround the same by a deep trench. Let the soil thus prepared remain for a time exposed to the sun. Take young vigorous branches two or three inches in diameter from the kind of tree preferred; cut the same into lengths of about one and a half feet, being careful not to injure the bark. Smear each end of the cutting with stable manure, coating the same with ashes. Then plant the cuttings upright in the soil so that the upper end will be a couple of inches beneath the surface. Care must be taken to plant the cutting the right end up, as upon the tree; otherwise it will not take root.

Many prefer to grow the wild olive from the seed, and when grown to the proper size, graft upon its stock the best varieties. Whichever method is resorted to, the time for planting must be in the latter part of the spring equinox.

The first year after planting, the ground should be frequently hoed; and in the second and subsequent years the rake must be used, that the young roots may acquire strength and vigor in a mellow soil. For the first two years the young plant must not be pruned. The third year it should be pruned, leaving but two branches thereon. During all this time the ground should be hoed and raked frequently. In the fourth year the weaker of the two branches must be removed. After cultivating thus for five years the plants are ready for transplanting to the orchard.

In transplanting to the orchard, a distance of sixty or more feet must be maintained between the trees, where the soil is rich. In poor soil the distance should be thirty or more feet apart.

A year before transplanting to the orchard, the holes for the trees should be dug to the depth of 4 feet. This should be done that the soil of the holes may become fertilized by the rays of the sun. If the trees are to be transplanted in autumn the ground must be dry; if in spring the soil should be fresh and the trees moved before they commence to bud. Prior to planting it is well to mark the position of the plants as to the points of compass, and give them the same position in the orchard.

The young orchard (thus commenced) must be plowed and hoed at least twice a year. After the solstice, when the earth erodes by the heat, care must be taken that the roots of the young trees do not become exposed to the sun. After the autumnal equinox equal care must be had (especially if the orchard be upon a hill-side) that the rains do not denude the roots. Each year the shoots that put forth from the stem

must be removed. Every third year the ground about the trees should be manured, the amount to be determined by the condition of the soil.

It is often the case that even in dry situations a moss gathers upon the trees. When this occurs the moss must be removed by scraping. Dregs of the oil should be smeared upon the trunks of the less vigorous trees. This will destroy the insects that infest the bark and thus injure the trees.

After the lapse of eight years the trees must be thoroughly pruned; cutting away all sprouts, and such branches as obstruct the air and sunlight; but no large branch should be cut near the body of the tree; and the lower branches should be spared, because being more exposed to the warmth they are the most productive.

At eight years old the olive is but a mere infant tree. At fifteen years of age it bears but little fruit. When thirty-five or forty years old it begins to bear abundantly, but then only every other year. Every alternate year there is generally a poor crop. At this age a hectare ($2\frac{471}{1000}$ acres) of trees in the fruitful year generally yields from 3 to 4 quintals metrique (660 to 668 pounds) of olives, or about 240 or 320 kilograms (530 to 705 pounds) of oil.

When the trees are fully grown the ground should be plowed at intervals during the year, and should be once hoed during the autumn. The cost of this per annum, including the pruning and cleaning of the trees, is about 100 to 130 lire ($19.80 to $25.09) per hectare ($2\frac{471}{1000}$ acres).

For oil the fruit should be gathered when it commences to change color from gray to dark red. The fruit must be picked by hand, not knocked off with poles, and care taken not to bruise it. If bruised or injured in any way it soon becomes rotten, and the oil from it is of poor quality. As soon as gathered the oil should at once be compressed from the fruit. In Sicily there are mills for this purpose. The fruit is placed between two stones and the stones forced together by screw power. It spoils the fruit to let it lie in heaps in a store-house before extracting the oil. The oil as soon as extracted is placed in large jars. The jars should be thoroughly cleaned with vinegar and water before receiving the oil. When the jars have been filled with the oil, they are placed in rooms where the temperature is kept about 15° above zero (Réaumar), (or Fahrenheit about 50° above zero). In the month of June following, as soon as the oil becomes clear (impurities settling to the bottom) the upper strata of oil (the clearest) in the jars must be poured off into other jars, the cloudy or poorer quality remaining. This oil is the first grade or best quality. In a month after this process is repeated, the turned-off oil being second grade or quality. After the lapse of another month the process is again repeated, giving an oil of third quality. The dregs are now left in the first jars, and are here used for making soap, rubbing on the bark of sickly young trees, etc.

For export the olives must be gathered by hand in the month of De-

cember, when they are of a green or whitish green color, according to the kind of fruit. The fruit is then placed in barrels or large jars and covered with a strong brine. In this condition the fruit is exported. The brine is thus prepared: Into a barrel or tub is poured fresh, clean water until it is three-fourths full; over this is hung a basket filled with coarse salt, the bottom of the basket being 3 or 4 inches beneath the surface of the water. When the water becomes completely impregnated, and will hold no more salt in solution, it is ready for use.

Black olives for condiments are thus prepared: They must be gathered by hand when they begin to ripen and commence to turn black. They must not be fully ripe. When gathered they are cleaned and salted in baskets. The proportion of fruit and salt is about a large handful of coarse salt to a gallon of the fruit. Coarse salt is first spread in the bottom of the basket, then a layer of fruit, then of salt, and so alternately until the basket is full. In this condition the fruit must remain a month, then with fresh water cleanse the fruit from the salt and place it in clean jars, covering the surface with laurel leaves.

Another method of preparing the black olive for table use is thus: As above the olives must be picked when they commence to lose their green color, becoming somewhat dark. Place the fruit in shallow baskets in the shade, letting it remain thus for a day. Then close the fruit in jars for twenty-four hours. Then salt the fruit in jars, scattering upon each layer of the fruit two handfuls of fine salt to a gallon of the olives. Some hours afterwards when the fruit is impregnated with the salt, remove it to other jars, pouring upon it a copious supply of olive oil of the first quality that is pleasant to the taste. Cover the surface with laurel leaves.

ALBERT WOODCOCK,
Consul.

UNITED STATES CONSULATE,
Catania, July 21, 1884.

TUSCANY.

REPORT BY CONSUL WELSH, OF FLORENCE.

[Republished from Consular Reports No. 41½.]

I have the honor to hand you my reply to the circular issued by the Department of State, under date of the 4th of December, 1883, and received at this consulate on the 23d of January, 1884.

I regret the delay, which has been unavoidable, and in this connection I may mention that the answer from the consular agency at Cagliari, Sardinia, reached me on the 15th instant, and that, although vines and olives are grown to a large extent in this district, there are scarcely any exports of the same made through this consulate. I have, therefore, had much difficulty in arriving at the information I am able to give.

OLIVES AND OLIVE TREES.

Olive trees are adapted to few countries, being so delicate that they can thrive under the influence of a mild temperature only. Cold winds and a soil too fresh or too dry are equally unfavorable to their productiveness. Therefore, on the Mediterranean coasts, and nominally in Italy, it seems that olive trees meet with most of the conditions favorable to their development. Olive trees in a favorable climate and soil grow quickly, and are both strong and leafy.

In Tuscany the diameter of the trunk measures from 0.25 meters to 0.30 and 0.42 meters (9½ inches, 11½ inches, 1 foot 4½ inches). The ordinary height of the tree when fully developed is from 5 to 7 meters (16 feet to 22 feet 7 inches), and the maximum and exceptional height is from 8 to 12 meters (25½ feet to 38 feet).

It is difficult to state the length of life and productiveness of olive trees. In the most favorable countries, however, they remain fruitful during two hundred or three hundred years, and if after this term of life they do not bear, young shoots are produced by them which become fruitful, so that actually, when properly tended, they may be said never to die.

Among the olive trees the following are the better known in Tuscany:

Infrantoio (fit for the press), one of the most delicate and very susceptible to cold.

Olivastro (dark brown olive), found on the hills; hardy, but not very productive.

Moraiolo (resembling the mulberry), hardy, ripening early, and fairly productive.

Razzo or *Grossaio* (large and lucent), much appreciated for the abundance and size of its olives and the good quality of its oil.

Coreggiolo (resembling the crucible from its lowering branches), susceptible to cold weather, and consequently not adapted to high localities, but still growing with northern expossure.

Gremignolo (a coarse description of olive), ripening in March or April, and found in the Pisan Mountains.

Leccino (holm-oak), coarser, but very hardy, and not susceptible to cold.

Quercetano (resembling the oak), deriving its name from Querceta, a small place in the Lucchese, where it is largly cultivated, owing to its strong constitution and resistance to sea winds.

Indolcitoio (tender and sweet), whose fruit, larger than other varieties, but with little oil, is eaten fresh after having been for some time well soaked.

The varieties mostly used in Tuscany are the—

Infrantoio, with favorable exposure, and the *Moraiolo* elsewhere. The *Infrantoio* grows well in sheltered places and on hillocks. This plant is very susceptible to exposure to or changes of weather. The *Moraiolo*, cultivated in a meager and arid soil, is very hardy and bears well.

Olive trees are generally reproduced from ligneous excrescences of the stock or roots, in the form of a half an egg, from which they are called *uovoli*, cut in the spring, placed in holes made in a plowed soil, covered with fine earth and watered according to the exigencies of the season. The *uovolo* sends forth shoots, the most robust of which are brought up, and in the third year of their existence may be planted. The reproduction by seed is not exclusive, however. Small plants are cared for in a nursery and grafted on in the third year, and in the fourth are transplanted. Olive trees are planted in square ditches of over 2 meters (6 feet 5½ inches) and at a depth of about 1 meter (3 feet 3 inches), with proper arrangement for drainage.

Olive trees commence to bear one year after being planted, and farmers anticipate the amount and increase of the crop from the date thereof, relying upon the Tuscan sayings, viz:

Se mignola d' Aprile, vacci col barile (bearing in April, look for a barrelful; abundant crop).

Se mignola di Maggio, vacci col saggio (bearing in May, hope for the best; scarce crop).

Se mignoli di Giugno, vacci col pugno (bearing in June, expect a handful; poor crop); which are confirmed by the following:

La prima oliva é oro (the first olive is gold).

La seconda argento (the second is silver).

La terza val niente (the third is of no value).

That is to say that the tree precocious in its bearing produces best; less sure are those flourishing later, and the produce of those bearing last is of little or no value.

In well-disposed orchards olive trees are planted at a distance of from 4 to 6 meters (13 to 19 feet 4 inches) one from the other. The number of trees is generally from 400 to 600 per hectare (2½ acres).

Pruning in the best-conducted orchards consists in well clearing out the center of the tree in order that all the branches bearing may have plenty of light, sun, and air. The trees are pruned every two or three years. Any dying or dead branches are taken off as soon as noticed. Every year the soil is turned with the spade and every other year manured. It is thought by scientists that pruning is carried to too great an extent. Columella, the ancient agriculturist, who greatly advanced oil culture, says of this plant that "the plowing of ground is a request, the manuring is a prayer, and the pruning is an order to produce fruit."

The best orchards in the Lucchese may produce each two years 180 hectoliters (510 bushels) of olives per hectare (2½ acres), from which quantity there can be had 2,160 kilograms of oil (4,761.33 pounds), or about 24½ hectoliters (646 gallons).

It is calculated that one hectoliter (2.83 bushels) of olives gives 12 kilograms of oil (26½ pounds), and Domenico Capponi, in his treatise on olive oils, considers fairly remunerative the production of from 10 to 15 kilograms (22 to 33 pounds) per hectoliter of olives (2.83 bushels).

The average biennial product is estimated at 120 hectoliters per hectare (340½ bushels, 2½ acres), equal to 1,440 kilograms of oil (3,174.62 pounds), or about 16⅓ hectoliters (430 gallons). The olive tree in Tuscany produces an average of 1.188 kilograms oil (2 pounds) per year. Such results, however, are given, but in good years and considering the fluctuation of the product, the biennial average is reduced to 11 hectoliters (290 gallons) of oil per hectare (2½ acres), at the price of 136 lire ($27.20) per hectoliter (26.417 gallons), as being the average price for the last six years, giving the gross amount of 748 lire per annum. To that is added the value of olive husks, from 1 lire to 2.50 lire per quintal, and of fagots derived from the pruning, which amount to 64 lire every two years, making a gross amount of 780 lire per hectare and per year ($156 from 2½ acres.)

The following statement will show about the expenses of working a hectare of olive trees and the approximate net receipts, calculating for one instead of two years:

	Lire.
Working the ground	20.00
Pruning	36.00
Manuring	300.00
Plucking olives	40.00
Pressing olives	7.20
Interest at 5 per cent. per annum	20.20
	423.40

Which, deducted from the gross amount of 780 lire, leaves 356.10 lire net.

It is generally calculated that the expenses of an orchard represent one-third of the actual value of the produce, and that estimate is made as an average. The expenses, however, exceed by far said figure, as the above estimate shows. The olive culture is sometimes managed by what is called *mezzeria*, or a system when half the *net* profits are paid to laborers, all the expense but that of pressing the olives being borne by the owner.

Tuscan oils from Lucca, Calci, and Buti are esteemed as the first oils of the world. Not all Tuscan oils, however, reach that degree of perfection, but even judging in mass, they are considered the best. For twenty years past Tuscany has not produced oil for burning or for lubrication, all attention being given to the production of salad and cooking oils.

In some places hot water is used to facilitate the pressing. The best rules adopted for extracting oil are the following, viz:

(1.) To expedite the careful gathering of olives already fallen from the tree.

(2.) To harvest the olives as soon as ripe, plucking the fruit by hand or whipping the trees gently.

(3.) To press olives before fermentation and to dispose them in small strata in the baskets.

(4.) To press slowly and at a cold temperature.

(5.)To have all machinery and recipients very clean, as well as to insist on the cleanliness of the laborer. Crushing presses of old system are used, and the quantity of olives submitted to each pressure varies from 150 to 250 liters (4½ to 7 bushels), but not over.

Olives must be well pressed and ground for about one hour, after which they are reduced to a paste and placed in frails, submitted to presses, and then mixed with cold water for a second pressure, and even a third pressure, but with hot water in that case. The oil produced by a first gentle pressure is the *virgin oil;* the other is mixed, and constitutes a second quality, usually called *olio mangiable* (table oil) ; a third quality is derived from the deposit of oil, and used by colonists for burning.

Olive oil is preserved in jars varnished inside, containing from 50 to 300 liters and over (13.200 to 79.251 gallons). Olive husks crushed and pressed again give an inferior oil for lubricating purposes. The clarification of oil must not be too cold nor too hot. The temperature is not to vary from 10° to 12° centigrade (54° Fahr.), in order that the oil fluid be such as to facilitate the deposit of heterogeneous substances.

The process of preparing olives for table use consists in their sweetening or drying; those green are sweetened, and the ripe olives are dried. To sweeten they are placed in clean water during five or six days, changing the water four or five times a day. When they have lost their bitterness they are transferred into a pitcher of brine with a few branches of fennel, taking care to keep them well plunged in. After sixty days they are good for table use and are so preserved until the following year. They can be sooner prepared for table use by crushing, extracting the nut and keeping the fruit moist for four or five days and changing the water four or five times a day. They are then placed in brine, and after six or eight days may be eaten alone, or with vinegar and oil, according to taste. Olives can also be sweetened by keeping them in brine until they lose their bitterness, after which they are placed in water renewed twice or three times a day for four or five days until they lose their disagreeable taste. Then they are kept in brine, adding thereto fennel, cloves, cinnamon, or nutmeg, but the fennel if used must be used alone. Dark olives are dried by exposure to the sun for from fifteen to twenty days, and are subjected to a slight sprinkling of salt.

Another process is to place the fruit in baskets, with alternate layers of salt. In the course of twenty-four hours the juice will commence to leave the fruit, and after five or six days the fruit is sufficiently dry for table use. Day by day the baskets should be gently shaken and a little salt sprinkled on.

Olives for oil are to be picked when thoroughly ripe, which is clearly shown by the bright black color, and also by the fact that at such time

their pulp is easily severed from the nut and has a violet color. Its compounds are:

Pulp	56.02
Water	14.38
Skin	9.38
Nut	20.16
Oil from the nut	.06
Total	100.00

From experiments made it results that one hectoliter (2.83 bushels) contains from 48,000 to 50,000 olives, the difference being ascribed to the variety, according to soil, climate, and season. Olives accumulated for some weeks might number 54,000 or 56,000 per hectoliter (2.83 bushels).

The "queen olives of commerce" are considered in Tuscany as the selected fruit of the common olive.

There is no system of artificial irrigation in use for olive culture in Tuscany.

The annual rain-fall in this district is about 1.067^{mm}, equal to about 42 inches.

Official statistics show that the following countries import olive oil from Italy, ranking in importance as to quantity of oil as named: France, England, Austria, Russia, South America, United States, Netherlands, Turkey, Sweden and Norway, Denmark, Portugal, Belgium, Greece, Switzerland, Egypt, Brazil, Algiers, etc. Barrels, bottles, or tin cans are used to hold the oil.

In Tuscany there are three prevailing diseases which seriously affect the olive tree, viz:

Lupa, meaning literally wolf, but actually being a description of dead rot, produced very often by excessive pruning. To cure this the affected parts are gouged out and a hardening liquid preparation applied, that the circulation of sap may continue.

Mosca dell olivo (the olive fly).—This insect lays its eggs into the olive itself, and when the deposit is discovered the olives are gathered immediately. Should the eggs be allowed to remain the fruit is much deteriorated, if not ruined. The eggs are red, and therefore easily discovered.

Bruco dell olivo (the olive grub).—This insect is the most dangerous enemy to the olive tree here, consuming the sap and thereby drying up branches and buds. When discovered the tree must be thoroughly pruned, all the foliage removed, and every portion containing the insect burned or buried away from the plantation.

ZONE FOR THE CULTURE OF OLIVE TREE.

The zone in which the *Oliva Europæa* is most appreciated and its culture most remunerative is on the shores of the Mediterranean. The

olive tree does not thrive with extremes of temperature; a climate too hot and dry or too cold and moist is not favorable to its culture. It thrives well on the sea-coast or on the hill-side, producing buds in March at a temperature of 10.50° or 11° centigrade (52° Fahr.), blossoming in April at 15° centigrade, flourishing in May at 18° centigrade, and forming the fruit in June at 21° centigrade.

The lowest winter temperature supported without damage is 7° or 8° centigrade; but this temperature can not be withstood any length of time, indeed not over a week.

OLIVE CLIMATE.

(*a.*) The minimum of the temperature should be 7° or 8° centigrade, and that not to exceed eight days.

(*b.*) Snow five or six times per year, and the snow to not last more than two or three days at a time. Over that would undoubtedly injure the tree.

(*c.*) Olives should commence to ripen before the end of October, and the average temperature should not be lower than 16° centigrade.

(*d.*) The months of June, July, and August should be dry to render the olive healthy.

From 25^{mm} to 30^{mm} (1 inch) of rain is necessary before June, supposing the previous winter to have been a fairly wet one.

Districts.	Latitude.	Altitude.	Maximum.	Minimum.
	°	*Feet.*	°	°
Florence	43 47	72.0	*39.5	†11
Pisa	43 48	8.0	35.5	9.5
Sienna	43 20	348.5	36.2	8.5

* Extreme heat known in summer at Florence; actually the thermometer seldom rises over 30° cent. or 86° Fahr.

† This degree of cold is very rarely felt. The thermometer at Florence during the winter very seldom falls lower than 5° cent. or 25° Fahr.

EXPORT OF OLIVE OIL.

I have now given the method of making pure olive oil, but it is to be regretted that no pure oil is exported from Italy. The cotton-seed oil is made and imported in large quantities for mixing with the olive, thus giving to the dealer a larger profit than he would receive from the pure oil. Twenty-five per cent. of the liquid exported is composed of cotton-seed oil, and the mixture sometimes contains as much as 50 per cent.

My dispatch No. 23, dated May 2, 1883, gives an easy method of discovering the presence of the adulterating liquid.* The cotton-seed oil

* The test of Prof. Commendatore Bechi, director of the Technical Institute and of the Agrarian School, is as follows:

In a glass bulb place 5 cubic centimeters of the olive oil to be tested; add to this 25 cubic centimeters of alcohol of 98° areometer. Then add 5 cubic centimeters of the test, which is composed thus: One gram of crystallized nitrate of silver dissolved in 100 cubic centimeters of alcohol 98° areometer. The bulb containing the matter just

is not unhealthy, but simply detracts from the flavor of the pure article.

WILLIAM L. WELSH,
Consul.

UNITED STATES CONSULATE,
Florence, March 17, 1884.

VENETIA.

REPORT BY CONSUL NOYES, OF VENICE.

[Republished from Consular Reports No. 41½.]

If, as has been seen, the production of oranges and lemons at a special point of the Venetian territory is in reality a forced and artificial industry, that of the olive, so characteristic in many other parts of Italy, is hardly better suited to the natural conditions of the country here, and only reaches the importance of an industry in the same limited region. In all the eastern and central portions of Venetia the plant itself is rarely seen, and its cultivation for product insignificant or null. At the extreme west, on the hilly slopes with southern exposure around Verona, are found occasional plantations, though their extent and production have constantly decreased since the sixteenth century in consequence of the change of climate, caused by the excessive denudation of the mountains, and the exaggerated risk and difficulty thus produced to the cultivation, besides the outlay of time and capital before a return can be gathered. In an industry thus discouraged and declining, little effort is made for improvement, and in general, as it is one of the most ancient of all forms of culture, so is it perhaps that which has least benefited by the application of art or intelligence.

The olive cultivated here and throughout Italy, whatever modifications it may have undergone by climate and situation, belongs to but one species—*Olea Europea*—which, however, with long neglect and hardship is subject to a transformation so marked as to appear a change of nature. When the tree becomes scrubby and uncouth, changes the

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described is then placed in water, the temperature of which must be brought to 84° centigrade (151° Fahrenheit). After half an hour's immersion the oil, if impure, becomes of a dark, muddy color, and with practice and caution the actual proportion of the adulterating liquid can be determined.

Another method is to place 5 centimeters of the oil into a bulb and add thereto 30 centimeters of alcohol 98°. Shake the mixture thoroughly, and then let it rest until the oil and alcohol separate. Then transfer the alcohol to another glass bulb and add the test (same quantity as before). Put the bulb in the bath and heat the water to the same grade (84° centigrade or 151° Fahrenheit), when if the oil is impure a distinct dark color will be produced. This test is based on the essential quality possessed by the glycerine of the cotton-oil to reduce the nitrate of silver. It is always well to also use the test with pure olive oil, when, if the oil be thoroughly pure, no discoloration will be observed.

form of both its leaves and branches, bears only abortive fruit or none at all, and assumes almost the character of a different species, in this form it is known as the *Olea silvatica*. Ungrafted or abandoned trees always tend to return to this primitive type.

In the Veronese olive plantations a number of varieties are distinguished, resulting from local conditions, by which the plant is still easily influenced. Among these are specially prized the *Cosaliva* or *Prizzar*, a low spreading tree, with pendent boughs, long lance-shaped leaves, and small oval fruit, which has the merit of bearing each year regularly, not at all certain with other trees; the *Drupo forte*, taller than the above, with narrower and sharper leaves and fruit, rich in oil, but very delicate and capricious in its product; the *Gagnan*, likewise a considerable tree, with branches less inclined and roundish fruit very full of oil; the tree is hardy, but only bears every other year; the *Rosa*, *Razza*, or *Razer*, the tallest of its kind, with large pulpy fruit extremely rich in oil, but it bears only in two or even three years, and its oil is only middling in quality.[4]

For table use, the varieties which give the best fruit are called usually *compostar* (from *compost*, French *compôte*, a conserve). These are the *compostar* simple, a delicate tree with large oval fruit, but very variable in size and quality, according to locality; the *compostar grasso*, fruit large and round, more hardy, but, like the above, bearing well only in favorable years; the *compostar di Spagna*, fruit oblong, bears only in good years and favorable situations; the *compostar piccolo*, thrives everywhere, but inferior in quality; and others less deserving of mention.

Methods of cultivation.—The methods of cultivation and of propagation are simple in the extreme. The plant may be propagated by the *talea*, a quadrangular slip of the bark, some 3 inches long, with a portion of wood or woody protuberance adhering to it; or else by a fragment of the trunk, branch, or root, planted in earth well and deeply broken up, with the point only uncovered; but the tree thus produced would be weakly and short-lived. On the other hand, plants produced from the seed, although the most robust and durable, give no fruit till twelve or fifteen years old, and are not in full bearing till twenty-five or thirty, while the slow return of the tree is already one of the greatest obstacles to its cultivation. Between these objectionable methods, the usual practice here is to reproduce from *polloni*, or sprouts, which rise spontaneously from the more superficial roots of the old tree at their first ramification, or from wounds caused by instruments of labor. These sprouts are allowed to grow on the spot to about 3 inches diameter; the root is then uncovered and the bearing portion, with the sprout attached, removed to its future locality, the breach being neatly smoothed and covered with a plaster of dung diluted in water before replacing the earth. The sprout, at the moment of planting, is docked at about a foot from the ground, and the cut extremity covered with a similar

plaster of dung and clay. The trees produced in this manner commence bearing at the age of five or six years. Should these young plants be established in a locality differing much in soil or exposure from their original home they are grafted from trees already adapted to the situation.

When a new plantation is to be made the ditches for each row are opened some time before, with a width of 4 or 5 feet, and, if possible, 3 feet deep, or, if in separate holes, they should be 6 feet square and as deep as the soil will permit, and the first 9 inches of earth kept apart to allow that from below to profit more fully by the action of the air. When replaced it should be liberally mixed with manure, or, if none at hand, with bits of leather, of hoof or horn, woolen rags, shrubs, grass, or dead leaves, taking care to mix such materials well with the earth, but not in contact with the roots.

The distance between plants varies much with situation, but the medium in ordinary cases is to allow 10 or 15 yards between rows and from 6 to 10 in the row. A circular ridge of earth, a yard or so across, should be raised around the plant that the rain water may be kept and forced to filter among the roots. Some cultivators envelop the stems for fear of exposure, but this is not necessary at the season of planting, and has the effect of preventing the absorption of light, air, and solar heat, most necessary to the plant at this period.

INTERCROP CULTURE IN OLIVE PLANTATIONS.

In most cases the intervening spaces are cultivated with the ordinary crops of the country, maize, wheat, luzern, or a rotation of those crops; but, while the constant movement of the soil between the trees is advantageous, the exhaustion of its nutritive elements by such plantations is certainly a prejudice, especially after the trees have attained a certain size and vigor. The best authorities urge their discontinuance after ten or twelve years, without, however, neglecting to spade the ground in April or May, and, if possible, in August of each year. Those who attach primary importance to their olive crop oftener sow vetches, lupines, beans, and such vegetables only around their trees, and turn them in with the spade or plow, a practice which, by common consent, gives precisely the manure best suited to the requirements of the plant.

MANURE, AND PROTECTION FROM COLD.

About once in three years the supply of more stimulating manure should be renewed, and for this purpose, as before mentioned, besides the ordinary stable product, the refuse of the tannery, remains of hoofs, and other substances containing azotates, phosphates, and carbonates of potassa are excellent material.

It is usual, on the approach of winter, after the crop, to raise a considerable heap of earth around the foot of each tree to protect the roots

from a possible excess of cold. The olive perishes if exposed to a temperature of 11° or 12° centigrade below zero (=+10° or +12° Fahr.), and if attacked at the season of renewed vegetation, even at −7° or −8° centigrade (=+19° or +20° Fahr.).

PRUNING AND CULTIVATING.

A general pruning takes place in spring as soon as all danger of returning frost has disappeared, when decayed or suffering branches, as well as those which have borne fruit for several years, are removed, leaving the sap to be engrossed by the young sprouts of the year, it being the nature of the olive to put forth and nourish, during one season, the branches which are to bear fruit the next, as the multiplication of these branches tends constantly to disseminate the productive force in a thicket of unprofitable shoots, in which case the tree will give a satisfactory crop only once in two or three years. Constant pruning is necessary to concentrate its vitality. No less attention is required to combat the effort of the upper limbs, the so-called *ghiottoni*—gluttons—to draw the sap of their own vigorous growth at the expense of the fruitful branches lower down. The best bearing olives are generally kept low, often with pendent boughs, and this practice becomes a necessary precaution in exposed and windy situations.

YIELD OF OLIVES.

It is extremely difficult to fix the normal yield of olives in a region where their cultivation is so precarious, and where the success of the crop is more subject, perhaps, than that of any other to the influence of the season. Without careful and intensive cultivation the plant becomes savage and bears nothing. With the best treatment it will give 6 to 8 liters (7 to 8½ quarts) at 10 years, 16 quarts at 17 years, and 32 at 25 years; but this only in exceptionally favorable years, with refreshing rains in August and September.

It has already been stated that the olive in no case commences bearing fruit before the age of 6 years. It reaches a great age, 600 to 800 years on the average, frequently 1,000, or more. Researches, more or less reliable, have been published, affirming that each cultivated plant gives during its existence an average product of 10,356 kilograms of oil, varying infinitely, of course, with the age and nature of the tree and mode of culture.

GATHERING AND PREPARING THE OLIVES.

Olives intended for the press are gathered at full maturity in October, November, and even as late as January, with much difference of practice in this respect, as the fruit of the same tree ripens with very unequal promptness and grows richer in oil to the last moment. On the other hand, if over ripe, the oil is much more subject to become

rancid, besides the risk of injury from premature frost or snow and insects, so that the surer practice is to gather while some part of the fruit is still green.

For table use, on the contrary, it should be plucked not quite ripe, and, the finest and largest being selected, to neutralize the contained acid which renders them acrid to the taste, they are placed as soon as gathered in a vessel of glass or earthenware, filled with lime-water in which the olives float, and the orifice closed with osier. After standing thus for twenty-four hours the lime-water is drawn off from below and replaced by water, fresh and pure; thenceforward it should be renewed every twelve hours, alternating pure and lime water till the liquid comes from the jar flat and tasteless. In this condition the olives may be long kept good if immersed in a solution of seasalt flavored with any aromatic.

For drying, the olives are gathered later and riper, and dried in the sun or oven like any other fruit.

PROCESS OF EXTRACTING THE OIL.

The processes for extracting the oil all date from time immemorial, and are of the most primitive description. After fermentation the fruit yields its oil much more readily but of inferior quality and already with a commencement of rancidity. Nevertheless the difficulty of extracting it completely with their imperfect appliances, leads many to provoke fermentation by keeping the olives closely covered with matting or woolen cloths. They are then placed in a hopper, from which they drop gradually into the hollow, inverted, and truncated cone of a great stone mortar, in the bottom of which turns a sort of millstone, grinding fruit and stones to a coarse paste. The pulpy mass is now mixed abundantly with warm water, placed in sacks of hempen cord, and ready for the press. This last is of the simplest mechanism; a heavy wooden beam from 8 to 12 yards in length, fixed at one end and acted on by a screw at the other, forms a lever of the second class. The sacks are placed on the platform in piles of two and three or three and four on each other, in a double heap, to adjust them to the inclination of the press-beam, and as the pressure increases are crowded back and still bathed with warm water until the pulp begins to leave the sack with the oil. This is the first draught and the first quality of oil. The refuse mass is then emptied again into the mortar, with a liberal addition of warm water, ground over, and again put to press, yielding still a fair quality of indifferent oil. The whole operation is repeated a third time, and after passing through a coarse sieve, even a fourth time, but these last dregs are only fit for burning or mechanical purposes. This is all that can be obtained by the press power at present in use here, and yet so rich is the fruit that after this insistent extraction, the oil still held in the refuse gives it unequaled value as a fertilizer or as food for animals.

The oil from these repeated pressions, largely mixed with pulpy and

fibrous matter, passes into a large vat, where its freer and purer portion rises to the surface while the "*morchia*" or pulpy mixture is drawn off from below into large shallow basins, in which, when subjected to a warmer temperature, the albumen coagulates, and the remaining oil, with that already collected, is placed in stone jars ready for sale. From the refuse flux, if subjected to fermentation, which causes the still refractory oil vescicles to burst, a certain quantity of very bad oil may be extracted, but this operation is generally left to the press hands for their perquisites.

Another process is still more primitive. Here the olives are placed in a long woolen sack, and trampled under foot until the pulp is well separated from the stones. The sack is then doubled on itself and placed under the press, with constant additions of warm water as the operation proceeds, and the oil obtained purified in the manner above described. The refuse and unbroken stones are then sold to the owners of grinding mills for a fresh extraction. The product obtained by this simpler process, though less in quantity, is much preferred in commerce, being the pure extract of the pulp alone, the unavoidable mixture with that of the kernels after grinding greatly impairing the flavor of the whole.

CIRCUMSTANCES FAVORABLE TO THE GROWTH OF OLIVES.

All the circumstances which favor the growth of the olive are such as generally place it either on hillsides or the shelves at their feet, where, well protected from the cold winds of the north, it may bask in a long season of summer sun, and where, also, it finds oftener the light soil of granitic or schistous detritus that suits it best, while the large mixture of clay common to valleys and bottoms produces the damp and compact formation of all others the most inimical to its nature.

It is traditionally the plant of warm regions and of long dry seasons; an over supply of water would be more injurious to it than otherwise, and no irrigation is attempted or thought of here. However, moderate watering at the opportune moment is always of benefit, and, as before mentioned, those years when some rain occurs in August and September, improve the crop. Where the tree is intermittent, these are the bearing years.

Far from dreading the neighborhood of the coast, it has been said that the olive is never found more than 150 kilometers from the sea; and although instances are recorded of ancient plantations in Piedmont somewhat farther inland, it is certainly true that the olive orchards of Europe skirt the shores of the Mediterranean, and the most flourishing are those that clothe the narrow margin of rocky soil between mountain and sea. Those described above in the region of Verona, at about 125 kilometers from the lagoon of Venice, are among the farthest removed, and not among the most prosperous.

Some notice has been given above of the productiveness of the olive,

as rather precarious in the uncongenial circumstances of the region; I have not been able to procure any detailed statement of the economical elements of the culture, but as the plant is grown either in the midst of other crops or on ground which would be otherwise unavailable, it is not generally regarded here as a factor of importance in the account of a farm. The latest statements give the present production of oil in the province at about 10,000 hectoliters (264,000 gallons) consumed entirely there and in the neighboring region. The preparation of the fruit for table use is exclusively domestic, or, at most, for the retail trade and consumption of the town population adjoining, and no mention is made of it in the statistics of the country.

The rainfall registered for the city of Verona for a period of 20 years, from 1861 to 1878, is as follows:

	Inches.		Inches.
1861	19.21	1871	31.10
1862	32.44	1872	47.10
1863	29.31	1873	38.77
1864	26.16	1874	27.16
1865	21.51	1875	22.12
1866	29.21	1876	42.07
1867	18.68	1877	34.18
1868	40.72	1878	35.04
1869	56.61		
1870	29.85	Average	32.29

FIGS.

The fig is regarded here rather as a vile and common plant, insufficient either in quantity or quality for preservation as an article of export, and requiring neither care nor attention in its growth; it thrives everywhere unheeded, in sheltered spots, near country houses or along garden walls, and only serves to supplement the outfit of the market gardener for the nearest town. The fruit at Venice is neither succulent nor very well flavored, though large and showy, and often ripens badly, or rather decays in ripening. At Verona it is cultivated with care in a few localities, and one variety, with a fruit very small and intensely sweet, the *Segalini*, much resembling and probably an acclimation of the *Piccoli Verdini* of Tuscany, but inferior, has a local reputation. Besides this, the *Napoletani* and *Santi*, introduced from the south, are dried for home use.

As the tree is only found casually in odd corners, and usually single, there can be no estimate of yield per acre.

For planting, any portion of a branch, slightly beaten and bruised, if placed in the earth will readily take root; the variety preferred may be grafted on it at a proper age.

Along the shores of the Lake of Garda the product less in demand for the market as fresh fruit, is dried in small quantities by the simple process of exposing to the sun on osier gratings and packed in small kegs with a little sugar and a liberal sprinkling of flour; or else strung on twigs and hung in the sunshine till completely evaporated, but all

this only for family consumption; there is no exportation of the article, the consumption of which, on the contrary, is entirely supplied by importation from the south.

McWALTER B. NOYES,
Consul.

UNITED STATES CONSULATE,
Venice, March 3, 1884.

SPAIN.

REPORT BY CONSUL OPPENHEIM, OF CADIZ.

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OLIVE CULTURE IN SPAIN.

Origin.—The olive tree has been cultivated from the most remote historical times. The ancients believed the tree to have been spontaneously created by a beneficent divinity, and the Greeks attributed the gift sometimes to Minerva, then again to Mercury. Diodorus states that Aristæus introduced the tree into Sicily, and was the first to use stone mills and rustic presses for the extraction of oil. Both the fruit and oil-pressing were, however, known to the Egyptians at a period even more remote than that of Greek myths, as is evidenced by wall pictures representing the process of filling the olives into sacks, which, when full, were placed in presses, from which the oil is seen to flow. Strangely enough, that very Egyptian process of pressing in sacks was until a few years ago in use in remote districts of Spain (in La Mancha), and may still be practiced at this day. There exists some doubt as to whether the olive tree is indigenous to Spain. The wild species is undoubtedly found in many districts, from Catalonia to Cadiz, but by many it is held that these wild trees are merely the survivors of abandoned plantations, which have reverted to the aboriginal form. Be this as it may, and whether the tree be an immigrant or "to the manor born," Spain is certainly to-day its chosen home, and it is generally admitted that three-fourths of the olive zone in Europe lies within the borders of the Peninsula.

Varieties.—The varieties of the olive tree cultivated in Spain are numerous. The list following shows the kinds that are most largely raised, and describes the size and appearance of the fruit.

(1) The *Manzanillo:* This tree under good conditions of soil and temperature, grows to a large size. It is found in Seville and in Granada in great abundance, also in the maritime zone and some of the protected and fertile spots of the central region. It needs a rich soil, or, wanting that, high manuring and cultivation; makes good oil, but in the province of Seville is mostly used for pickling. It is a great bearer, and the

fruit, which is large, matures early. The dimensions and weight are as follows: length, 25 millimeters; diameter through the thickest part, 23 millimeters; weight of pulp, 7 grams; weight of stone, 1 gram.

(2) The *Sevillano Gordal:* A small tree; is found chiefly in Seville and the lowlands of western Andalusia; wants rich soil, manuring, and usually irrigating also; is not resistant to cold, and must not be pruned freely, as it is very sensitive to mutilation; does not yield much oil, and that little is of poor quality; is used almost exclusively for pickling; it bears the largest fruit known, which is identical with the "queen olives" of commerce. It is a small bearer and matures late. Dimensions and weight of fruit are: length, 40 millimeters, by 30 millimeters in diameter; pulp weighs from 12 to 14 grams, and stone about 2 grams.

(3) The *Bellotudo:* A large and luxuriant tree; not confined to any special district; requires phosphates in abundance and careful pruning, as the limbs have a tendency to intertwine; gives good oil and matures early, but is a small bearer. Dimensions and weight of fruit: length, 23 millimeters; diameter, 19 millimeters; weight about 3.2 grams for pulp, and 0.9 for stone.

(4) The *Redondillo:* A medium-sized tree; a hardy and resistant variety, found chiefly in Central and Northern Spain; needs good soil, manuring, and thorough cultivation, also careful and extensive pruning for the same reason as above variety; is excellent for pickling, and gives good oil also; is a large bearer, and the fruit matures very early, requiring only 3,400 heat units (*vide infra*). Dimensions and weight are: length, 18 millimeters; diameter, 16 millimeters; weight of pulp, 2.5 grams, and of stone, 0.5 gram.

(5) The *Lechin:* Under good conditions this tree reaches a large size; is found in the provinces of Jaen and Cordoba, though not in abundance, being really a northern variety, as it is very hardy and resistant. In Spain it is only used to make oil; in France, however, it is a favorite for pickling; is a large bearer, and fruit matures early. This olive is one of the smallest known, total weight being approximately 1.3 grams.

(6) The *Nevadillo blanco:* A tree of fair size, found chiefly in Jaen, Cordoba, and Cadiz; must be planted only in well-sheltered spots, being sensitive to winds and to frosts; is only used for oil-pressing; matures the fruit early and is a prolific bearer. Dimensions and weight of fruit are: length, 28 millimeters; diameter, 15 millimeters; weight of pulp, 3.6 grams; and of stone, 0.7 gram.

(7) The *Varal blanco:* A large-sized tree, with straight and vigorous branches; chiefly found in the province of Jaen; needs manuring and careful cultivation; the fruit, which is always scanty in quantity, makes good oil, and is only used for that purpose; matures irregularly, making collection troublesome. Dimensions and weight of fruit: length, 23 millimeters; diameter, 17 millimeters; weight of pulp, 2.8 grams; and of stone 0.6 gram.

(8) The *Empeltre:* A small tree, throwing out but few branches; very hardy, and therefore adapted to a cold climate; is chiefly raised in Navarre and in Aragon; requires light and fertile soil, plenty of humidity and manuring, under which conditions it is a most prolific bearer; it matures early, and is by many considered as one of the most desirable varieties; the fruit yields good oil, and is also excellent for pickling. Dimensions and weight are: length, 28 millimeters; diameter, 16 millimeters; weight of pulp, 3.2 grams; of stone, 0.8 gram.

(9) The *Racimal:* A medium-sized tree; resists a cold climate well, and thrives fairly even on poor soil; makes oil of a fair quality, though leaving much refuse in pressing; is given to "off years;" the fruit matures very early, probably earlier than that of any other variety. Dimensions and weights are: length, 23 millimeters; diameter, 15 millimeters; weight of pulp, 3 grams; of stone, 0.7 gram.

(10) The *Varal negro:* A fair-sized tree, with straight and large branches; only thrives in well-sheltered spots, as it hardly resists a temperature lower than — 5° Cent., especially when followed by a quick thaw; found sparingly in Jaen and Cordoba; requires very careful pruning and cultivation, and bearing limbs should be ringed; yields good oil; is objected to on account of its being given to "off years;" in good years, however, it is a large bearer, and the fruit matures early. Dimensions and weight are: length, 25 millimeters; diameter, 17 millimeters; weight of pulp, 2.2 grams; of stone, 0.9 gram.

(11) The *Gordal.*—A tree of large size, and fine, vigorous branches, also a very quick-growing variety; is one of the kinds most generally distributed throughout Spain; is largely cultivated in Andalusia and in the central provinces; requires good soil, manuring, and much cultivation in order to bear well; resists the cold very well, matures early, and is a prolific, regular bearer; the fruit is good both for oil and for pickling, and its dimensions and weight are: length, 23 millimeters; diameter, 18 millimeters; weight of pulp, 3.7 grams; and of stone, 0.5 gram.

(12) The *Verdejo.*—A tree of medium size, with a tendency to dwarf considerably if not well cared for; is found chiefly in Catalonia, Logroño, and Madrid; very hardy and resistant to cold; the yield will be in proportion to fertility of soil and the care given to cultivation; is generally used for pickling only; is not an early maturing variety. Dimensions and weight of fruit are: length, 22 millimeters; diameter, 12 millimeters; weight of pulp, 3.1 grams; of stone, 0.6 gram.

(13) The *Madrileño.*—A medium-sized tree, of symmetrical appearance, limbs arching over; found chiefly in the south and in the maritime zone; its name appears to be a misnomer, as it is not cultivated in Madrid or in the central provinces generally; requires good cultivation and cautious pruning; the fruit is excellent for pickling, next to the "queen" in size, and of delicious flavor; gives fair oil, but only yields a small quantity in proportion to the weight of its pulp; matures late

and is not prolific. Dimensions and weight of fruit are: length, 35 millimeters; diameter, 28 millimeters; weight of pulp, 11 grams; of stone, 1 gram.

(14) The *Cornicabra*, also called the *Cornezuelo*, the largest olive tree known, having strong, straight branches, is found all over Spain, but is most numerous in the central provinces; gives better oil than any of the other late-maturing varieties, which, however, as a class, are in that respect much inferior to the early-maturing species; is very resistant to cold and matures very late (it requires 3°.978 of heat, *vide infra*); production is variable. Dimensions and weight of fruit are: length, 39 millimeters; diameter, 19 millimeters; weight of pulp, 4 grams.; of stone, 1.2 grams.

(15) The *Picudo*.—A medium sized tree, with luxuriant limbs, placed obliquely on the trunk. Like the above, it is most frequent in the central districts; bears a fruit which is very much prized for pickling, and has besides the peculiarity of being a "clear-stone" olive; a fair bearer, but matures late, though earlier than the variety immediately preceding. Dimensions and weight of fruit are: length, 30 millimeters; diameter, 18 millimeters; weight of pulp, 3.2 grams; of stone, 1 gram.

(16) The *Nevadillo negro*.—A medium-sized tree, very luxuriant, and with short and distorted limbs; is largely cultivated in the province of Jaen, where it is prized above all other varieties; produces most plentiful and excellent oil; with careful cultivation and good soil it is a large and regular bearer; matures late; the fruit is pointed and much bent at the distal end, causing this end to point at a right angle from the axial line. Its dimensions and weight are: length, 23 millimeters; diameter, 15 millimeters; weight of pulp, 3.6 grams; of stone, 0.7 gram.

Every one of the above-mentioned varieties can be reproduced in several ways, which will be further descanted on when describing the mode of planting. The most generally adopted modes of propagation are either by planting *estacas*, which are round, large limbs specially raised for the purpose on the parent tree, as thick as a man's arm and from 2 to 3 meters long, or *garrotes*, which are shoots of from 70 to 90 centimeters in length, two of such shoots being usually planted in one pit. By the first system the trees bear after three years, but with *garrotes* it takes usually from six to eight years. Full bearing is in the larger varieties not reached before twenty to thirty years after planting. With the small and dwarf varieties twelve to fifteen years may be nearer the truth. The maximum of growth is, at least with all large varieties, not reached before eighty years, and individual trees, either on account of especial vigor or favorable surroundings, keep on growing for centuries, reaching gigantic size. A French writer mentions three enormous olive trees standing near Tarascon. In the hollow trunk of one of them twenty persons could stand next each other, and another had branches 16 meters long. The trees were reputed to be nine hundred years old. The trees standing on the Mount of Olives, near Jerusalem,

are by many believed to be the identical ones that stood there at the time of Jesus Christ. The duration of the productive period is also most difficult to determine; all that is known is that it lasts extremely long, when not cut short by injuries to the tree or exhaustion of soil surrounding it.

Planting and propagating.—Olive trees raised from the stone of the fruit always revert to the original form, called here *acebuche* or wild olive; hence in order to reproduce desirable varieties it is necessary to plant parts taken from the living tree, whether shoots, branches, or roots. The most general modes of reproduction is either by *estacas* or by *garrotes*. Both modes are followed pretty nearly all over the country, though in the central provinces the second process is the more general, whilst the contrary holds good for the south and the extreme north. The best time for planting (by either mode) is from January to March in the maritime zone, from January till April in the central provinces, and from January till May in the north; and it may be taken as a safe rule to plant only when the frosts are *over* and *before* the trees have begun to bud. The *estaca*, which, as before stated, is a stout limb about 3 meters long, should, if possible, be planted immediately after being cut from the parent tree. The hole is dug to a depth varying from 1 to 2 meters, the depth increasing with the severity of the climate; square pits 90 centimeters each way are the best, but quadrangular ones are less expensive and generally used; this pit should be about 85 to 90 centimeters long by from 20 to 30 wide, and if planting on inclined ground, the length should cross the line of descent. At the bottom of the pit a layer of well-rotted manure is first deposited, upon which a layer of active outer soil is laid to a depth of 3 or 4 centimeters; the limb is then placed in the center of the pit and earth (from the upper layer, not that dug from the pit) is then put in, thoroughly broken up, and pressed down with the feet; when about even with the surrounding earth, a small concavity is left in order to retain rain or irrigation water. This operation is best performed by two men; one keeps the limb in position and compresses the earth, whilst the other is filling in. In Andalusia it is usual to pile up moist clay against the protruding part of the *estaca* until no more than about 30 centimeters of its length is visible; this is held to be very efficient in all hot, dry regions, as otherwise it often happens that the limb produces shoots from the lower part only, whilst the upper part dries up. The moist clay is piled in the form of a slender cone, and at half its height an opening is left for supplying the limb with water, which in dry weather must be done plentifully. The *garrotes* are cuttings of from 70 to 90 centimeters in length, which with most varieties may be supplied in goodly numbers by such pruning as will benefit the tree. The pits are dug somewhat less deep than for the *estacas*, and two of the *garrotes* are planted together, leaning towards each other in such a position that the two cuttings and the bottom of the pit form a triangle,

of which the apex is even with the ground. In regard to manuring and filling the pit, the process is similar in both modes of planting, only the upper part of the smaller cuttings must be covered with about 10 centimeters of loose soil. The sprouts from these smaller cuttings are more exposed to damage by frost and by animals than is the case with the plan first described, and the bearing age is also reached some four or five years later, but it is held that the trees raised in that way are more vigorous and productive.

Other modes of propagation, such as by shoots from the living roots of a dead tree, or by raising stocks from seed upon which to graft later on, are known to give excellent results, and are occasionally practiced; but the vast majority of Spanish growers confine themselves to the two processes here described.

Cultivation.—During the first eight or ten years after planting, the orchard should be plowed three times each year (with a plow making a furrow 10 inches deep), and the soil immediately surrounding the plants hoed three times the first and second year, and later on twice a year. It will frequently happen that plants do not sprout the first year, in which case an extra supply of water and labor should be devoted to such plants; should they, however, not produce shoots for two complete years, they should be dug up and replaced by others. The distance at which trees should be placed depends primarily upon the variety planted, the rule being to allow an interval equal to twice the height of the full-grown tree. This is the general rule, which must, however, be departed from according to local circumstances of topography, soil, and climate. Considerations in favor of closer planting are that trees closely planted resist both frost and drought better and also cause the soil to retain humidity longer. Against it may be urged that trees lacking ventilation are more liable to the attacks of fungous parasites and noxious insects; nor must it be forgotten that the roots of the olive tree extend horizontally half as far again as the branches do, and, as the diameter of the crown is usually equal to the height of the tree, close planting may stunt root development. The trees may be placed either in squares or on the diamond plan, as described when treating of orange culture. The most approved way of manuring olive orchards is to dig a small circular ditch around each tree; the manure (which must always be well rotted and rich in phosphates) is placed therein and covered with soil. The diameter of the circle within the ditch must vary according to the size of the tree, the object aimed at being to place the manure within the range of absorption of the outer rootlets. Manuring is usually effected once every three years, and the best time is the fall of the year. Plaster from old walls is a beneficial addition to the stable manure, and may also be spread within the circle surrounding the tree; and calcined bones in moderate quantities are known to incite growth and to greatly increase the yield. Gasparin states that 100 kilograms of manure produce about 3 kilograms of oil. Hidalgo Tablada, a practical agronomist and recognized an-

thority on fruit culture, gives the result of his experiments as more favorable still. According to him, 100 kilograms of well-rotted manure applied as above directed increased the product of each tree the first year by 2.50 kilograms, the second year by 3 kilograms, and the third year by 2 kilograms, giving for the three years a total increase of 7.50 kilograms. Irrigation is advisable only in dry districts or in times of drought; in ordinary years and in places where there is a moderate rainfall the grown trees thrive very well without it. Latitude does not furnish any secure guidance as to the benefit conferred by irrigation, and, as a matter of fact, the practice is more common in the north and center than in Andalusia. It must be borne in mind that irrigation has a tendency to impoverish the soil (by washing away the mineral constituents); hence, whenever it is practiced, manuring must go along with it *pari passu*. In Saragossa irrigation is much practiced, and so is manuring, whilst in Seville there is very little of either one or the other. If the orchards are properly and deeply plowed, two or three irrigations each year will be found sufficient. When, from the direction of the wind or other signs, there is apprehension of a very severe frost, copious irrigation will often preserve the trees from injury, as the evaporation from the soil has a tendency to mitigate the effects of a sudden lowering of temperature.

Pruning and ringing.—Pruning olive trees is by many growers considered as the most delicate operation connected with olive culture, as well as the one upon which the prosperity of the orchard most depends. Independently of removing withered or injured branches, the purposes of pruning are the following:

(1) The removal of the secondary and tertiary branches that only bear weak and sterile twigs, thus making room for the development of more healthy and vigorous ones.

(2) The elimination of superfluous primary limbs when they obstruct ventilation and light.

(3) The general thinning out of the branches of certain varieties that have a tendency to extreme luxuriancy and to the intertwining of limbs.

(4) The correction of the habit of producing very long vertical shoots (which are usually sterile), thereby favoring the forming of lateral bearing twigs.

For the cutting of larger limbs the following directions are given: Let the limb be sawn off even with the trunk, taking great care not to damage the edges of the bark, as it is those edges which are eventually to grow over and cover up the wound. In order to facilitate this healing process, the exposed part of the wood is made slightly concave, using a scoop-shaped chisel for the purpose; the wound is then plastered with a salve made of wet clay and cow-dung, which should be applied with a brush. It is very important that this work be well and neatly done, leaving no protruding splinters or irregular surfaces. The smaller branches may be cut with the hatchet, always taking great care

not to remove any more bark than is absolutely necessary; and for the removal of shoots and twigs pruning-shears are to be used. In regard to the best time for pruning, the custom varies in different districts. Some writers on the subject contend that if pruning is effected when the sap ascends in the spring the healing process is more rapid; others are of opinion that it is best to prune at the end of winter and before the sap has begun to move upwards. It is, however, universally admitted that pruning is only to take place after the fruit has been collected and before budding has begun. Thorough pruning is generally only done once every two or three years, and as the pruned trees give a smaller yield the first year after the operation, it is well to divide the trees into two or three classes, one of which is pruned and trimmed every year, thus dividing the work and equalizing the annual yield.

As a direct means of stimulating the production and ripening of fruit the practice of "ringing" is recommended. The process consists in removing an annular strip of bark, varying from one-half to 1½ centimeters in width, from the base of secondary or tertiary flower-bearing branches, thereby preventing the descent of the sap, which is thus utilized for the formation of fruit. This operation, which must be performed when the tree has begun to blossom, but before the flowers are fully expanded and fecundation has begun, is of great usefulness with varieties that are given to "off years," or to exuberant flowering not followed by bearing. Individual trees, as well as varieties bearing scantily and irregularly, have been made to yield both plentifully and regularly by this process, which, however, like all pains-taking practices, is limited to a few careful growers.

Climate and situation.—The olive tree in Western Europe thrives in the open air as far north as 46°, though beyond 44° it only bears irregularly and scantily; from that point the size of the tree and the regularity of yield increase as one proceeds farther south until 18° is reached; beyond that latitude the tree grows luxuriantly, but does not yield fruit. Spain being situated between 35° 59′ 49″ and 43° 47′ 29″ of north latitude, the whole of its territory is within the limits of the olive region.

Observation has established the fact that the olive in order to mature requires a certain number of units of heat during the period of most active vegetative life, said period beginning with the first appearance of the blossoms and ending with the first severe frost. This number of heat units (each of 1° centigrade), which varies with different varieties, and ranges from 3,400° up to 3,978°, is to be computed by adding the mean heat of each day during the period between blossoming (which requires a temperature of +19°) and the first frost. Any district in which the temperature will sum up to 3,978° during that period is therefore adapted to olive culture, provided the winter is not severe enough to kill the tree. In that sense the limit of its endurance is a temperature −7° to −8°, which, however, must not last beyond eight continuous

days. Given the mean temperature of the summer months and the time of blossoming in any stated place, the time of maturity may be deduced; thus in Seville the olive tree blooms about the 1st of May, and the mean temperatures are:

Month.	Days.	Mean temperature.
		°C.
May	31	23.8
June	30	24.1
July	31	29.2
August	31	30.1
September	30	29.3
October	31	27.3
	184	163.8

If we divide the number of degrees by six, we obtain the mean monthly temperature, 27°.3, which, multiplied by 184 (the number of days), gives a total of 5,023°; hence the fruit in Seville usually matures about the 1st of October.

For Morata de Tajuña, 6 miles to the east of Madrid, where blossoming takes place at the end of May, the figures are:

Month.	Days.	Mean temperature.
		°C.
May	10	19.2
June	30	25.2
July	31	26.3
August	31	26.1
September	30	20.2
October	31	14.3
November	30	10.2
December	31	5.7
	224	147.2

Giving mean temperature for eight months 18°.4, which, multiplied by 224, gives 4,121°; hence the olive matures towards the middle of December.

Valladolid may be cited as a place where, owing to late blossoming and early frosts, the maturing of the fruit is impossible. Assuming blossoming to take place on the 15th of June, there will be:

Month.	Days.	Mean temperature.
		°C.
June	15	19.
July	31	26.3
August	31	24.
September	30	20.6
October	31	8.5
	138	98.4

NOTE.—In November the temperature falls to 4°.

Giving a mean temperature of 19.7°, which, multiplied by 138 sums up to 2,718°, less by about 700° than is required for maturing even the earliest variety of the fruit.

Altitude, in as far as it brings about a decrease of the temperature, is equivalent to latitude, and it is admitted that each 181 meters of height represent a change of climate equivalent to 1° of latitude, from which the conclusion may be drawn that olive culture can be carried on at high altitudes only in the southern parts of its habitat, and *vice versa*. In the vicinity of Madrid there are productive groves standing on ground that has 655 meters of elevation above sea-level. The altitude being 40° 24′ 30″, and 615 meters being equivalent to 3° 24′, the climatic conditions are those of latitude 53° 48′ 30″. In the province of Granada trees are found at an altitude of 1,000 meters above sea-level, representing 5° 31′ 30″, which added to the latitude of the district, which is 37° 11′ 10″, brings up the effective latitude to 42° 42′ 40″.

Exposure and incline are most important factors in olive culture. Exposure varies in its effects, both according to latitude and to local circumstances, hence no invariable rule can be given, though generally southern exposure is best, as being less liable to frost. In a warm, dry climate, however, trees thus placed will need irrigation in order to do well. Near the northern limits of the olive region, and on high ground, where frosty nights are common in the fall, eastern exposure is deprecated, because in such situations the first rays of the sun bring about very sudden and abrupt changes of temperature. A quick thaw after a moderate frost will generally cause more injury than a period of more severe cold followed by gradual thawing; this accounts for the fact that after a spell of very hard cold the trees most injured are those most accessible to the rays of the sun.

As regards incline, it is held by most growers that slightly rising ground is preferable to a perfect level. The benefit from an inclined situation, with southern exposure, increases as one goes further north, as the obliquity of the sun's rays is thereby counteracted. The rise should, however, not exceed the ratio of 6 meters to 100, as on steeper ground cultivation by plowing becomes difficult and the soil covering the roots on the upper side of the tree is apt to wash away. At inclines much exceeding the above it is usually necessary to bank up the ground, thus creating a succession of small level terraces, involving much labor and expense, and also losing the advantage derived from the greater perpendicularity of the sun's rays upon inclined surfaces.

Natural or artificial obstacles to injurious winds, such as mountains, forests, or walls, shelter a certain extent of ground on their lee side. Spots sheltered on the north are usually considered as being benefited thereby to the extent of fully one degree of latitude. The ground sheltered extends horizontally in the ratio of 11 to 1, as compared to the height of the obstacle; thus, a mountain chain 1,000 meters high will

shelter the land on its lee to a distance of 11,000 meters from its apex. Beyond that point, however, the injurious effects of winds thus impeded is more potent than it would be if the obstacle did not exist. The Sierra of Guadarrama, which rears its crest up to 2,385 meters, shelters its southeast exposure to a distance of 26,235 meters, but beyond that limit the action of the cold winds crossing its summits from north to south is felt most keenly.

The neighborhood of the sea is by no means prejudicial to olive orchards, and in the maritime zone, wherever the proper conditions of soil and climate prevail, olive culture is carried on in close proximity to the shore. The ancient dictum, laid down both by Latin and Arab authors, that olive culture could only be prosecuted within 30 leagues from the sea, has, however, been disproved by modern experience.

Soil.—It may be laid down as a general proposition that soil adapted to the vine is well suited also to olive culture. The characteristics of such a soil will be looseness and fair permeability, and for the olive it is necessary that the soil and active subsoil should have a depth of at least one meter. A calcareous soil, meaning thereby one which contains a large proportion of carbonate of lime, is considered valuable for olive culture, especially so in the south; in a northern district, where the summer is short, such soils are open to the objection of being cold, as their white coloring prevents absorption of heat. The presence of oxide of iron in such soil, by giving it a reddish tint, corrects this objection, and it is on such soils usually that great yields are obtained on the high central plateaus and in the north. Both magnesia and sulphate of lime are efficient substitutes for carbonate of lime—and some sulphate may always be advantageously applied with the manure. Oil produced on soils poor in these ingredients has usually a greenish tinge, and is not as limpid as oil from soils containing them. Potash is a necessary constituent for olive culture, and when not present in sufficient quantity, must be artificially supplied. A tendency to exuberant flowering and aborting of the fruit, shows a deficiency of phosphates in the soil, which must be remedied in order to obtain good yields.

The hygrometric properties of the soil are an important factor, which, however, must necessarily be appreciated according to the general climatic conditions of the locality. Here it is held that in order to be well adapted to the olive tree, soil should retain its looseness after a rain of forty-eight hours' duration, and that during the hot season it should contain 10 per cent. of its weight in water.

Pests.—The olive tree is subject to a disorder which some years ago gave rise to considerable controversy, some authors holding that it was caused by insect, while others ascribed it to the agency of a fungus. It goes by different names in the different districts; in Andalusia it is spoken of as *melera*, *mangla*, *melazo*, *tiñuela*, *tizne* (smut), *accitillo*, etc., and in other parts it is frequently called *negra*, *negrilla* or *negrura*, all

meaning blackness, and indicating the outward appearance of the affected trees. The disorder is now generally believed to be caused by a fungus either identical or closely allied to the *Dematium monophyllum*, already alluded to as one of the most damaging parasites of the orange tree. Trees standing on very moist ground are especially subject to its attacks, though dry ground does not give immunity when the foliage is luxuriant; removing excess of moisture from the soil and liberal pruning so as to admit light and air, are both preventive and cure for the disorder.

The olive tree has many enemies amongst the insect tribe, and the following is a list of those most frequently encountered:

The olive bug (*Lecanium oleæ*), which fastens itself to the green parts of the tree and sucks its juices. Pruning the infested limbs, and thereby giving free access to light and air, is the most efficient remedy, and the larger affected parts are to be smeared over with petroleum.

The olive moth (*Acophora olivetta*, also *Oruga minadora*) does damage chiefly in the caterpillar state. Bernard describes its appearance thus:

It is about 7 millimeters in length, and is composed of twelve segments, the body is of the same color as the under side of the olive leaves and sometimes yellowish; its mandibles are at first black, and later on they grow yellow. It frequently penetrates under the bark of the twigs, and causes the formation of the s. c. *agallas* (gall-nuts) upon them. It also introduces itself into the fruit, eating the pulp and even the kernel itself. The perfect insect is greenish white in color, has four wings and two large antennæ. Careful cleaning and pruning, removing all visible nests, and the application of petroleum or of a solution of lime to the limbs are the means usually successful in fighting this pest. It seems to be established that this insect is never found on a tree infested with the olive bug.

The olive fly (*Dacus oleæ*) is an insect about 5 millimeters in length, yellowish red in color, with three black stripes on the abdomen, wings larger than its body, and of a golden color with black striæ. This insect lays its minute eggs upon the nascent fruit, and the worm burrows galleries into it and feeds upon the pulp. When the caterpillar has reached its full size, it resembles that of the olive moth, but it has only 11 segments instead of 12, and its mandibles are always black. When this insect has obtained a foothold, it is best to gather the fruit at once (even though it be green and yield but very little oil), as this prevents the propagation of the pest and may thereby avert more serious damage the following season.

The olive flea (*pulguilla del olivo*) derives its name from its peculiar mode of rising, which looks more like jumping than flying. It is about 5 millimeters long, has transparent ovoid wings dotted with yellow, thread-like antennæ, and greenish abdomen. The larva, or worm, is light green, with head of a dark red. It places itself usually on the petioles of the leaves and buds; its time of fecundation coincides with the blossoming of the olive. The larvæ are deposited on a layer of a whitish downy matter called by the country people *algodon del olivo*

(*Anglice*, cotton of the olive tree). The insect's life does not last much beyond one month, but it causes many blossoms to fall off, and rain showers in blooming time, though in themselves prejudicial to the yield, are effectual in destroying the insect.

Two small beetles, respectively the *Hylesinus olesperda* and the *Phloiotribus*, are especially destructive to the soft white layer underneath the bark; the ova are deposited between the bark and the wood of broken branches, or after pruning. The perfect insects are about 3 millimeters in length.

The *Aspidiotus couchyformis* is an insect about 5 millimeters in length, ashy in color, provided with a proboscis with which it fastens itselfs to the bark of the tree in great numbers, generally, however, avoiding the leaves or tender shoots. This facilitates their removal by rubbing with a coarse mop or brush. As with all other noxious insects, petroleum is an effective remedy.

A small worm, commonly called *taladrilla* (*Anglice*, small borer), of which the perfect form is not identified, introduces itself into the stone of the olive, and after devouring the kernel, makes its exit by way of the petiole, causing the fruit to drop off, usually in an unripe state. In this case, as with the olive fly, it is advised to sacrifice the year's yield and gather the fruit at once, in order to prevent the recurrence of the pest the following season.

Picking.—The time of ripening varies considerably according to locality and the species cultivated. When intended for pickling the picking in Andalusia usually begins about the middle of September and lasts till about the 10th or 15th of October. The fruit at that time has reached its full development as far as size is concerned, but is yet green and hard. For oil pressing the harvest begins in November, and may last as late as early January. The usual mode of gathering is by knocking the fruit down with sticks, which is to be deprecated on account of the great damage done to the tender shoots on which the next season's fruit is to be borne. Careful growers pick by hand, which is less expeditious, but more profitable in the long run.

Pickling.—For pickling there are two processes in use.

The first one is the slow process, and the *modus operandi* is as follows: Place the freshly picked olives in fresh water, which must be changed every day, and let them lie thus about a fortnight. The water should be drawn off quickly and promptly replaced, not leaving the fruit exposed to the air more than is absolutely necessary. The water drawn off will at first be very bitter; this bitter taste will go on decreasing day by day, and the taste must be taken as a criterion as to when this process is to be considered completed, a fortnight or twenty days at most being usually the time required. The olives are then placed in a pickle made of salt and water, of a strength indicated by the French salinometer as 9°, found in practice to be equivalent to a proportion of

about 1 volume of salt to 14 volumes of water. It is best to use butts or barrels in which wine or brandy has been kept; those having been put to any other use are apt to give the olives the flavor of their previous contents; if new vessels are provided, they should be of oak, not pine, and they should be soaked about thirty days before being used. At the bottom a layer of olive twigs and leaves is first placed, which protects the olives from injury by pressure, and on the top of the fruit another similar layer is placed, taking care to have this layer well covered by the brine; the whole is kept down by some oak staves weighted with bricks or stone, all of which must of course be scrupulously clean, as any noxious taste or flavor imparted to the brine will affect the olives. The vessels should be covered with a cloth or tarpaulin, in order to exclude dust. Olives thus treated will be in good order for bottling or for consumption within about four months, and will keep sound certainly two years.

For pickling by the quick process a solution of caustic soda is prepared, this solution to be of a strength of about 4° of the French salinometer, and the fruit placed therein. After remaining in soak an hour a few olives must be sampled by cutting, in order to ascertain how far the solution has penetrated into the pulp; the depth of such penetration can be readily noticed by the color, and should not exceed half the thickness of the pulp; if after an hour this is not the case, other samplings must take place at intervals of not more than ten minutes, until the olives are found to be in the proper condition. Then the solution is to be immediately drawn off and replaced by fresh water, which must be changed quickly three or four times, the fruit being allowed to remain in the last water for twenty-four hours. During that time the brine is prepared, and next day the olives are placed in it, following the same directions as were given when describing the first process. By this mode the olives will be ready for use within about thirty days.

In both modes of preparation the olives should after being once wetted never be exposed to the air more than a few minutes at a time; and to handle the fruit ladles of wood or tin dippers should be used.

This gives a fair outline of the modes in general use for pickling, although undoubtedly some of the picklers have special recipes, upon which, however, no definite information could be obtained. It may be stated here that pickled olives in the Seville trade are at present roughly classed as *Manzanillas* and *Gordales*, meaning thereby, respectively, very small or very large (the latter being the "queen olives"), which names have no connection with the variety of the fruit put up.

Oil-pressing.—Oil-pressing is carried on in many ways, some of them yet very primitive. The first pressing is done by means of a mill somewhat akin to a cider-mill; the pulpy mass then has hot water poured on it, and is subjected to a second pressing, which in the Seville district is now usually accomplished by hydraulic machinery. The refuse from this second pressing is used as fuel, and in some cases as a cattle

food. Recently a new process has come into vogue whereby a further quantity of fatty matter is extracted, which is used for making soap. Where it is not thought advisable to utilize the refuse in any of the above ways, it will prove a very valuable fertilizer for the olive grove.

The yield of oil from a given weight of fresh fruit varies from 16 to 25 per cent.; the latter figure is not often reached even with the best oil-yielding varieties and the most improved processes. I have obtained data showing a higher percentage, but I believe that the figures expressed the proportion of oil to a given weight of olives which, as is usual in Andalusia, had been lying heaped up on the mill floors for several weeks, thus losing moisture and weight.

Extent and yield.—The area covered by olive plantations in Spain is not accurately known. The official cadastral data are notoriously misleading, nor do they exist in any shape whatever in relation to some provinces; no professional economist would take them to be more than mere approximations, of which the factor of error would probably vary in every district, rendering any scheme of rectification extremely difficult. Hidalgo Tablada,* who bears the reputation of being a safe guide on such matters, makes the following estimates:

Area of olive groves	hectares..	2,099,651
Number of olive trees (80 per hectare)		167,972,080
Arrobas of oil produced (1 arroba † to 6 trees)		27,992,347
Value of annual yield (at 10 pesos per arroba)	pesos..	279,953,470
Gross product per hectare	do...	133.33

From which product he deducts 80 per cent. for cultivation, harvesting, pressing, interest, and taxes, leaving net income of 26.67 pesos per hectare (equivalent to $2.08 per acre). This extremely low average yield can only appear credible to those who, like myself, have seen miles of olive groves in a state of utter neglect, unprotected from the inroads of cattle or game, and, in fact, left to thrive or perish without the intervention of human agency save at cropping time. The province of Cadiz has a perfect wilderness of just such groves, and of course the product must in these cases be miserably small.

The province of Seville possesses a number of carefully cultivated groves, ranking probably in that respect along with the best, and the value of olive orchards in that district some fourteen years ago ranged from a minimum of rsvn. 500 ($25) to a maximum of rsvn. 4,000 ($200) per aranzada.‡ The value of a good orchard does not frequently exceed the latter sum at the present day, although the working expenses and income of an aranzada of that class, as given me by a planter from the Utrera district (Seville), seem to indicate a higher value. These

* He wrote in 1870.

† The arroba=11½ kilograms=about 25 pounds avoirdupois.

‡ The aranzada=37 57 ares, or 0.9284 of an acre.

figures—which in my opinion only apply to a small grove of exceptional excellence—are as follows:

		Pesos.
Gross yield—90 arrobas of oil, worth		675
Plowing	Pesos	10
Pruning and cleaning	do	60
Harvesting	do	75
Pressing	do	90
Interest and wear and tear of plant	do	100
		335
Net		340
From which deduct taxes (about 20 per cent. of net yield)		68
Leaving net income		272

Equal to about $58 per acre.

The following data, in reference to a grove of 180 aranzadas situated near Ecija (province of Seville), show what, in my opinion, may be considered mean results of careful culture on a large scale:

*Fruit collected (in fanegas).**

	Fanegas.
1868	1,624
1869	1,045
1870	2,910
1871	2,784
1872	6,131
1873	2,346
1874	1,205
1875	1,317
1876	5,706
1877	820
1878	3,076
1879	920
1880	8,375
Mean annual product (equal to 16.35 per aranzada)	2,943

Taking the oil yield at 15 pounds per fanega of fruit, and estimating oil at 7.50 pesos per arroba (of 25 pounds), the average value of the harvest per aranzada will be 73.50 pesos (equivalent to $15.28 per acre). This estate previous to 1868 had not been carefully tended, and it is, therefore, fairer to take the mean of the last five years (1876 to 1880) as a standard, the extraordinary crop of 1880 being offset by the very small yields of 1877 and 1879. For this quinquennium the account stands thus: Total of five years' yield, 18,897 fanegas of fruit; annual yield, 3,779 fanegas; annual yield per aranzada, 21 fanegas, yielding 315 pounds, equal to $12\frac{3}{5}$ arrobas of oil, which, at 7.50 pesos per arroba, have a value of 94.50 pesos, equivalent to $19.66 per acre. Great as is the range of estimates in relation to the results of olive culture

* The fanega of olives weighs from 65 to 75 pounds, and yields from 12 to 16 pounds of oil.

for pressing oil, it would be as nothing when compared to the variations in the figures bearing upon the raising of fruit for pickling purposes. I do not believe that authoritative data can be obtained on the subject, and I therefore think it best not to discuss the financial results of this branch of culture at all. It may be stated, however, that any farmer engaged in raising fruit for pickling would expect a larger cash income per acre than if raising for oil, both on account of the more perishable nature of the finished commodity and of the more contracted and more fluctuating market. Olive oil is a staple of the first importance in this country, of which any quantity almost can always be disposed of readily for cash. The pickled fruit is looked upon more in the light of a fancy article, the sale of which, it is true, is just now very brisk, but which some vagary of taste or fashion may any day render less readily salable.

Exports.—The following are the latest official figures showing the exports of olive oil and of pickled olives from Spain:

OLIVE OIL.

Years.	Quantity.	Value.
	Kilograms.	*Pesos.*
Average of five years, 1877–1881	17, 585, 865	16, 148, 877
Calendar year 1881	24, 625, 487	22, 901, 702
Calendar year 1882	13, 730, 474	12, 357, 426

PICKLED OLIVES.

Average of five years, 1877–1881	1, 574, 309	788, 154
Calendar year 1881	1, 926, 350	963, 176
Calendar year 1882	1, 722, 945	861, 472

The destination of these exports for the year 1882 is given as follows:

OILS.

	Kilograms.
Germany	956, 417
Algeria	1, 531, 326
Belgium	63, 663
France	3, 123, 874
Holland	53, 208
Great Britain	2, 189, 611
Gibraltar	342, 390
Portugal	760, 093
Sweden	442, 354
Cuba	2, 824, 990
Porto Rico	476, 161
United States	80, 596
Mexico	183, 771
Argentine Republic	240, 399
Uruguay	192, 119
Philippine Islands	101, 001
All other countries	168, 501
	13, 730, 474

PICKLED OLIVES.

	Kilograms.
Algeria	142,508
France	58,727
Great Britain	146,868
Cuba	770,970
Porto Rico	104,625
United States	203,163
Mexico	31,563
Argentine Republic	141,016
Uruguay	33,797
Venezuela	17,851
Philippine Islands	38,982
All other countries	32,875
	1,722,945

ERNEST L. OPPENHEIM,
Consul.

UNITED STATES CONSULATE,
Cadiz, March 11, 1884.

MALAGA.

REPORT BY CONSUL MARSTON.

Varieties.—The name of the best variety for pickled olives is the "Mansanilla;" the best varieties for olive oil are the "Picudo" and "Ojiblanco."

Other choice varieties worthy of culture and for profit are, for eating, "Mansanilla," the largest of which are called the "Queen olive." In Malaga for oil the best is the "Picudo;" in Cordova, the "Ojiblanco."

The trees which produce the above are grown in the provinces of Malaga, Granada, Cordova, Jaen, and Seville.

Situation.—Distances from the sea, 2 or 3 kilometers; almost any elevation above sea-level; the more sun the better. The olive tree will grow almost anywhere, but best on level land; white subsoil is best.

Climatic influences.—Temperature 45°, 90°, and 78° Fahr.

No rain-fall record to be had here.

Trees and fruit require as much rain as possible.

Irrigation.—No irrigation for olive trees.

Cultivation.—The land is cultivated three times each year, during winter and spring.

Pruning.—Every three years—one-third of the orchard each year.

Picking.—For pickling, green; for oil, when ripe.

Pickling.—To pickle olives the following process is followed in this province. Put the olives, when green and just before they ripen, in fresh water for, say, fifteen or twenty days, changing the water every

two or three days during the interval; at the end of that time they then make a brine of salt and water, and in order to prove the sufficiency of salt they place a fresh egg in the brine; if the egg floats on the surface, the condition of the brine is good, and they then submerge the olives in such quantities that they will all be covered. They then make a kind of lattice-work of bamboo canes, the canes being split in two parts and fastened together, and these are, when arranged, placed on the surface of the water to keep the olives from floating to the top. The olives are then allowed to remain in this brine for at least twenty-five or thirty days before they are ready for use, or longer if they are not required for sale and shipment.

After being taken out of the brine, in order to please the taste of the Spanish people, they are frequently seasoned according to taste of those who are going eat them, by adding garlic, laurel leaves, thyme, or other herbs.

Oil.—The olives intended for making oil, after gathering are placed in small compartments under cover, from which place they are taken to the mill to be ground. These mills in the country are of the most primitive kind, their capacity being about 25, 40, to 100 fanegas per diem. From the mill where they are ground the paste that remains is put into esparto mats or bags and then placed in presses of different kinds, hydraulic and those more ancient with the old-fashioned wooden screw, which extract through pressure all the oil, and from these presses the oil runs through little gutters into a tub or receptacle of large proportions. They then pour in boiling water, which separates the oil from the water contained and extracted from the olives themselves. The oil is allowed to remain at least one month, in order to settle before being drawn off for market, but the longer it remains in the tub or vat the clearer it becomes.

Oil is always moved from country to city in goat-skins (prepared and made for the purpose) by mules and donkeys.

Maturity.—Trees commence fruiting at eight or ten years.

Yield.—There is great diversity of opinions upon this subject—depends upon size and age of tree; I can find no one who will venture an opinion.

Planting.—The trees are planted 12 yards apart, and propagated by planting branches.

Insect pests.—There are none.

H. C. MARSTON,
Consul.

UNITED STATES CONSULATE,
Malaga, December 6, 1889.

MALAGA.

REPORT BY CONSUL MARSTON.

[Republished from Consular Reports No. 41½]

Varieties.—The province of Malaga produces but few olives, Cordoba and Seville being the localities most favorable to their growth. I have, however, obtained all the information possible at Malaga upon the subject of olives, viz:

There are two kinds of olive trees which grow near Malaga, but not to any great extent. The "verdialis" proudces the olives used for making oil, while the olives from a tree called the "manzanilla" are used for eating purposes. Olive trees begin to yield at ten years, and at the age of fifteen years they are in their prime, and live for hundreds of years.

The "queen olive of commerce" is a splendid variety, and is produced in Cordoba and Seville, but not in the province of Malaga.

Cultivation.—The process of cultivation is plowing the ground, except in the immediate neighborhood of the tree, where the ground is loosened and broken by a hoe.

Maturity.—The older the olive tree the more it produces.

Yield.—I can get no estimate in this province as to the average yield per acre. It is estimated here that trees of fifty years old may produce from 200 to 400 pounds of olives, according to the richness of the land and the care taken in the cultivation. Every 100 pounds of olives is said to produce 25 pounds of oil.

Planting.—The trees are usually planted about 12 yards apart.

Pickling.—Olives for table use are put in very salt water, and, with the addition of certain herbs and pimento, etc., remain until they are fit for eating. The olives for making oil are ground into a kind of pulp, and with the use of a press the oil is extracted.

Situation.—Hill-sides. Olive trees do not grow to any extent near the sea-coast on account of the sea winds, which are injurious.

Soil.—Any soil will answer for the growth and production of olives. They require no water except that produced by rain.

Rain-fall.—The annual rain-fall in Malaga for the four years ending 1883 was follows:

	Inches.
1880	23.80
1881	30.73
1882	16.33
1883	17.05

Average rain for four years, 21.98 inches.

Olive oil.—It is very difficult, if not impossible, to determine the average production of olive oil in Spain, for there are no statistics; nevertheless 40,000,000 to 45,000,000 arrobas may be considered an average crop, of which only about 5,000,000 arrobas are exported, the

remainder being used in Spain. The principal cities from which oil is exported are: Malaga, Sevilla, Valencia, and Barcelona, the last two, however, only in a limited quantity.

The crop of 1882-'83 in Andalusia is considered a good one regarding quantity as well as quality.

According to private notes, about 1,426,000 arrobas were brought into Malaga by railway from July 1, 1882, up to May 31, 1883, of which about 1,012,000 arrobas were again exported. There was on the 31st of May, 1883, some 414,000 arrobas as stock on hand in Malaga.

The largest exports were made to the following countries, viz: Germany, 386,400 arrobas; England, 276,000 arrobas; France, 156,400 arrobas; United States and South America, 55,200 arrobas.

It is not possible to give an accurate estimate of the quantity of oil entering Malaga by beasts of burden, the largest part of which is consumed in the town (the daily consumption being about 500 arrobas); thus some 138,000 arrobas may have been brought into Malaga during the eleven months preceding May 31, 1883, forming a total (with the above-mentioned 1,426,000 arrobas) of 1,564,000 arrobas. Prices during the said period ruled from 30 to 35 reals vellon per arroba in store, the market having been depressed since the end of March, 1883.

H. C. MARSTON,
Consul.

UNITED STATES CONSULATE,
Malaga, March 28, 1884.

TURKEY.

REPORT BY CONSUL-GENERAL HEAP, OF CONSTANTINOPLE.

[Republished from Consular Reports, No. 41½.]

Varieties.—Through cultivation an olive slip becomes in twenty to twenty-five years a tree of from twenty to forty feet in height. The kind known in the Levant as the "thafnoyah" produces the fruit best suited for the table, and it is generally grafted. When grafted they give fruit in three or four years, but when planted in slips they seldom bear fruit in less than fifteen years, and the best results are not obtained until they have reached the age of from twenty to twenty-five years. Other descriptions are grown more especially with a view to the manufacture of oil for exportation and domestic consumption.

Cultivation.—As a rule the olives grown in this country receive little cultivation after the young trees reach maturity. At the end of autumn or early in winter a trench of 2 to 3 feet in diameter and from 18 to 27 inches in depth is dug round each young tree and filled with animal manure more or less rich according to the age and strength of the tree. The manure is well covered with soil so as to prevent its being disturbed

and to keep it as long as possible in the position best fitted to feed the roots of the tree. The ground between the trees is generally neglected.

The "queen olive of commerce" is almost unknown here. It is the pick of the largest and finest fruits produced by the best olive trees of Spain.

Maturity.—The olive tree generally comes into full bearing about its twenty-fifth year when it has been grown from slips; but when grafted it yields abundantly between its eighth and twelfth year. In both cases it continues to produce largely every alternate year for about fifty or sixty years, and if cultivated as mentioned above it will continue to yield fruit, though less largely, up to the age of one hundred years.

Yield.—Under ordinary circumstances a young healthy tree that has reached maturity will produce in a "poor" year about 82½ pounds, and with careful cultivation the same tree will yield in a "good" year double that quantity.

The trees vary in yield every alternate year. An acre will contain 120 trees, and each tree will yield an average of about 100 pounds of fruit; the produce of the acre will therefore be about 12,000 pounds. As it takes about 60 pounds of fruit to produce 1 gallon of oil, the yield of the acre will be 200 gallons.

In Smyrna, etc., a few new mills have been constructed to be worked by steam, but elsewhere the mills continue to be worked on the old system, notwithstanding the urgent necessity of substituting improved machinery.

Planting.—The trees are generally planted in rows at about 20 feet apart, but in some places they are grown much closer, especially on the steep slopes of hills. In the islands of the Archipelago, where the land is often broken and irregular, they are planted in places where the soil is so arid and barren that it will hardly grow anything else.

Picking.—When olives are intended for pickling a small portion is plucked while green to be pickled in that state; but the larger portion of the fruit intended for preserving is gathered when it has fully ripened and has turned black. It is preferred in this state by those who relish the oily flavor, and there is a large consumption of black pickled olives in Turkey.

Oil of a superior quality, but small in quantity, is extracted in some districts from green olives that have been plucked or have fallen from the trees; but as a rule olives specially intended for producing oil are picked only when they have become quite ripe and black. It is chiefly from the seed-vessel that olive oil is obtained, and not from the seed, contrary to the general rule of the vegetable kingdom.

Pickling.—To preserve black olives for the table, the fruit is packed in casks or boxes with a layer of common salt three-quarters of an inch thick at the bottom. On this is laid a layer of olives about two and a half to three inches in depth, upon which a light covering of salt is

sprinkled, and so on until the cask or box is filled, the upper layer of salt being deeper than the others except the lower one. The staves of the cask are left loosely bound to allow the bitter water from the olives to drain off. When they are drained the hoops are tightened.

To preserve green olives for the table, the fruit, after having been washed, is packed in casks in its natural state. The casks have a small hole bored in the bottom to allow the water to run off slowly. They are filled with olives to about 3 inches of the top, and the cask is then filled to the brim with fresh water once in twenty-four hours, until the bitter taste of the fruit has all but passed off. The hole in the bottom is then plugged, an aromatized pickle is poured on the fruit, and after the pickle has taken effect a little oil is added to soften the olives and reduce any bitterness that may remain in excess of what is required to give them piquancy or an agreeable savoriness.

Extraction of olive oil.—In the interior the method practiced to extract oil from olives is probably the same as was employed in the earliest times. The fruit is collected in a large bin near the mill where the crushing is done. The mill is simply a large, circular, shallow tank with an upright beam in the center, which runs through a large stone, and serves as the pivot around which the stone revolves. A horse harnessed to a horizontal pole attached to the stone sets it slowly and laboriously in motion. An improved apparatus consists of two stones attached to the horizontal pole and are dragged around with it. These machines resemble the Mexican arrastra for crushing quartz. The one last mentioned is the most effective of the two, as the stones describe a larger circle, but it requires greater power. The olives are crushed, but the oil is not expressed. When a sufficient quantity of the fruit has been thrown into the tank, the machine is set in motion, and a man precedes the horse with a pole armed with iron to push the olives under the stones. After a few rounds a couple of gallons of water at boiling heat are poured in to assist the action of the stones, and more is added as required, until the mass acquires the consistency of a thick paste. The mass is now put into a large jar and conveyed to the press, where it is kneaded with more hot water into a thinner paste, and as often as it is emptied into a shallow dish it is emptied into a square cloth of the same coarse material of which the cloaks of the country people are made, which will bear the greatest power of the press without bursting. A man forms the paste into a square flat mass, folds the cloth neatly over it, and ties it with a string attached to each corner, and places it in the press to the number of sixteen or seventeen cloths. The press is turned down by means of a hand-lever, and when more power is required a rope is carried from the lever to an upright rotary beam at some distance, which two men turn round with bars rapidly.

The oil and water expressed run into a trough before the press, which though rudely hewn from a log of wood is constructed on principles showing a knowledge of the relative specific gravity of oil and water.

The trough is divided into two parts longitudinally by a partition, which comes up to about 2 inches below the level of its sides, so that when the oil and water run in together on one side of the partition, the oil, coming to the surface, floats over to the other side, while the water is conveyed away by a pipe placed at the level at which it is desired to maintain the water within the trough. After the press has been screwed down as far as it will go, it is loosened and hot water is poured upon the pile to wash off any oil that may remain on the cloths, and they are kneaded without being unfolded. More boiling water is poured upon each package, and they are again placed in the press, to be again removed and undergo for a third time the same process, until no oil remains.

The oil comes out a light-green color, and is poured into a large jar near the press whence, after depositing any water or dirt it may have, it is poured into skins. It is next emptied into large earthenware jars, 4 or 5 feet in height, where it remains for at least two months, till all impurities are deposited.

Olive oil is refined by agitating it with a saturated solution of caustic soda which renders the whole soapy; but after a time the oil precipitates a saponaceous deposit, and the remainder becomes quite clear and pure and is then poured off. It is now of a yellowish color, with a slight odor and a milder taste. The bark of the olive tree has been used extensively by the French instead of cinchona, and large quantities of excellent soap are made from the refuse of the olive oil.

Situation.—The best results are obtained on the sides of lower hills, when the land is of a suitable nature; but very good crops are obtained from trees growing on the higher table-lands.

Soil.—Although the olive tree will grow on almost any kind of ground where it can obtain nourishment, it thrives best in a rich argillaceous soil, which is neither too damp nor too dry. It grows in the greatest perfection in the fine rich clays which, in many parts of the Levant, cover the hill-sides.

Although it is not the most suitable situation for them, olive orchards are sometimes planted near to the sea-coast, and in such places may be frequently seen extending to within a few yards of the sea-shore. In these situations they often suffer from exposure to cold winds, and are not so healthy.

Irrigation.—When the plants and trees are young they are sometimes watered in a rude fashion, but there is no system of artificial irrigation in olive culture.

Yield.—Around Smyrna, in Candia, Chio, and other islands of the Archipelago, more time and labor are bestowed on the cultivation of the olive than it receives elsewhere in Turkey. However, as even there, in certain districts, the natives attach unequal or secondary importance to this culture, very considerable differences are to be found in the cost of cultivation as well as the yield of this crop. Owing to these and

other reasons, especially the absence of clear and regular accounts among the native farmers, it is impossible to give a correct statement of the yield, proceeds, and cost of cultivation per annum of an acre planted in olives.

Rain-fall.—The annual rain-fall in this district during the last four years was:

	Inches.
In 1880	22.33
In 1881	25.76
In 1882	20.42
In 1883	29.55

In the three years first mentioned the annual rain-fall was comparatively light, and it was only in 1883 that it reached the average of the ten years from 1870 to 1879, inclusive.

C. H. HEAP,
Consul-General.

UNITED STATES CONSULATE GENERAL,
Constantinople, April 10, 1884.

CRETE.

REPORT BY CONSUL-GENERAL HEAP, OF CONSTANTINOPLE.

[Republished from Consular Reports No. 41¼.]

The island of Crete (Candia) is the most important olive oil-producing district in Turkey. The olive harvest for the season 1883–'84, just ended, is considered unusually small and of poor quality. It only augmented by 742,500 gallons the stock of oil remaining from 1882–'83 in the hands of merchants and with the cultivators. This result was foreseen in consequence of the exceptionally fine crop of 1882–'83, which exceeded the expectation of the most hopeful growers. Never, in fact, had Crete been known to produce so abundant a crop of olives or one of such good quality.

The following returns show the difference between the last and the preceding crop:

District.	1882–'83.	1883–'84.
	Gallons.	*Gallons.*
Khandia	4, 125, 000	220, 000
Candia	6, 875, 000	412, 500
Rethymo	2, 750, 000	110, 000
	13, 750, 000	742, 500

Of the crop of 1882–'83 there were exported to—

	Gallons.
England	3,300,000
Russia	1,100,000
Austria	750,000
Germany	275,000
Turkey	577,000
Egypt	412,500
Syria	137,500
Anatolia	357,500
Barbary	192,500
Other places	75,000
	7,177,500

Owing to the excellent quality and the low price of the oil produced in France that season, there was almost none exported to that country. The local consumption of Crete amounted to 3,272,500 gallons, and the soap works on the island absorbed about 2,200,000 gallons. Considerable stock remains on the island. The sellers who know that a good crop is always followed by a bad one prefer to hold their oils in the expectation of a rise in prices, which can not fail to come. At the commencement of the olive harvest, oil was selling at $1.39 to $1.41 the $2\frac{3}{4}$ gallons, while on the 1st of March last it was quoted at $1.67. In London the oil is selling at this date at $174.66 per ton weight, gross.

G. H. HEAP,
Consul-General.

UNITED STATES CONSULATE,
Constantinople, April 10, 1884.

DARDANELLES.

REPORT BY CONSULAR AGENT CALVERT.

Varieties.—The best varieties are the Ropadhes. There are a few other varieties, but they are little cultivated.

Trees.—The trees are grown all over the district, but principally in the Gulf of Adramytium, and from sea edge to some miles inland, at an elevation from sea-level, say, to 1,000 feet.

Situation and soil.—Wild olive trees generally affect sunny exposure. All situations but rocky sheltered valleys give the best fruit and most oil; clay and light soils, with rock or deep subsoil.

Temperature.—Rarely above 90° or below 5° Fahrenheit.

Rain-fall.—Thirty inches per annum. The olive crop is uncertain and does not appear to be much influenced by greater or less fall of rain.

Fertilizers.—Not used except when new plantations are made. Water, if required, is applied by hand.

Cultivation.—When practicable the ground is plowed between the trees and grain crops raised; more frequently in rocky situations. The

trees are surrounded by loose stone walls which are filled in with soil. Goat or sheep manure is sometimes applied.

Pruning.—Is limited to clearing out branches when too close—in the spring.

Picking and curing.—Picking commences from September up to November for green olives for pickling; from November to February for black olives and for oil; pickled with salt for olives and for oil. The olives are crushed in a revolving stone mill, the pulp is put in goat's-hair bags and saturated with boiling water; pressure, hand or power, is applied. The liquid runs off, the oil floats, and is collected fit for the market. The oil-cake is reset two or three times and repressed, but the oil is of an inferior quality. A still further quantity of oil can be extracted by chemical appliances, but it is fit only for making soap.

Maturity.—Four to five years. The life of the olive tree is very uncertain. There are trees with a girth from 12 to 15 feet and more, said to be over a thousand years old.

Planting and propagating.—Trees are planted from 20 feet in poor to 40 apart in rich soil, and propagated most frequently by planting wild trees, by separation of cultivated trees, or by off-shoots. In planting, from February to May, the stems of the trees, wild or cultivated, are cut down to 4 to 5 feet. They are taken with the massive root, the wild trees being grafted before or after removal; a hole is dug and water poured in, a portion of fine soil is added, and the whole worked to a semi-fluid state. The tree is then plunged in and set, the rest of the loose soil is drawn around the tree, but not trodden down till the following day.

Insect pests.—A worm attacks the fruit when ripening, in Thessaly, where the variety of olive is much larger in size. It does not exist here. The olive decays when the maggot grows and falls off the tree.

FRANK CALVERT,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Dardanelles, February 11, 1890.

PART III.

FIGS.

CONTINENT OF AFRICA.

MOROCCO.

REPORT BY CONSUL MATHEWS, OF TANGIER.

[Republished from Consular Reports, No. 41½.]

Varieties.—There are various kinds of figs—white, red, and black—which are dried for commercial purposes. Of the white variety there is the White Burgasot, of excellent flavor both fresh as well as dry. It does not produce the early large fig, but only second season figs.

The Marsellaise or Athens fig.—Fruit very sweet and small, round in shape; it ripens in August, and is the variety most preferred for drying.

The Blanquette fig.—A middling variety, which resists cold weather better than any other varieties, and can prosper north of the regions of the olive; is also of second season, and is preferred while ripe before drying.

Of the red varieties the best for drying are the following: The *Date fig*, the most preferred for drying purposes; it ripens in August. The *Jerusalem fig* matures in September, very fine and large. The *Rose Blanche*, very large, and is only used for drying. *Sultana* or *Tunisian*, a large, choice variety similar to the Smyrna.

There are numerous varieties of black figs, bearing a different name in the various countries where they are grown.

Morocco produces a large variety of most delicious figs. They are called by the Arabs "Kermuse" in general, although each variety has its name. There are figs of various colors, some of which are white, yellow, black, purple, and others green. The Jews extract "aguadiente," an ardent spirit, from figs. In Spain they prepare a savory wine from which they extract spirits which they flavor and term "anisette."

Suffren has given a description and figure of three hundred and sixty varieties of figs cultivated in Spain, France, and Italy. Most of the fig trees yield two crops during the year: the first, producing the large fig, matures in June, and the second in August, September, and October. The fig tree grows on any soil, provided it is free of stagnant water retained on the surface over the roots. It prefers a light loam of a calcareus nature; should this retain its moisture the trees would grow taller; in dry soils the fruit is smaller.

Planting and propagating.—The fig is propagated from seed, shoots, suckers, slips, stakes, layers, and by grafting. From seed is only practiced by some to discover new varieties. In raising from slips or stakes, these should be chosen from vigorous branches of the shoots of the previous year, and about 26 inches in length. The proper time is either in February or November. A hole is opened about 2½ feet deep; good manure and a little lime should be well mixed with the soil which is dug out of the hole. The slip or branch is then laid horizontally, leaving out the last eye perpendicularly, which on shooting out will form the tree. Budding or grafting is seldom practiced in fig trees. The distance between trees should be 16 feet. During the heat of summer of the first two years the young plants should be watered.

Fertilizing.—Manuring the trees will greatly increase their crops. They require no pruning, only removing dry branches and new shoots from the trunk. When the tree obtains age it requires no cultivation. It is well to cover with straw the branches of the trees while from one to three years old, in the winter in cold climates, to protect the eyes from frost, after which the trees become hardier as advancing in age. There are male and female trees; the male is the wild or goat fig.

Male and female fig.—There should be amongst the fig orchards some of the masculine species, as those trees producing the small variety of fig and which yield so abundantly require the proximity of the male sort to come to full maturity and size, otherwise the fruit drops before coming to maturity. In the absence of male trees in an orchard where these varieties are growing the male figs, which are very small and unfit to eat, are brought and hung to the branches of the feminines. The wild fig produces a multitude of small insects of the genus *Cynips*, which settling on the fruits of the cultivated trees convey the pollen with which they are infected. This is a practice from time immemorial.

Maturity.—The fig trees commence to yield fruit when they are three years old, and come into full bearing when they are twenty years of age. From one hectare of land the yield generally is about 4,000 kilograms of dry figs, at value of $5 per 100 kilograms; total, $200.

Yield.—As an example of the great yield of the fig-tree, I may cite some trees at San Pedro del Piñatar, Spain, which produced each as much as $12 of early figs, besides 150 pounds of dried sold for $3, and 7 quintals of second-size figs sold for $9.50, which make the yield of each of these trees in full bearing annually to the amount of $20.50.

Curing the fig.—The fruit must be gathered when quite ripe, when they commence to dry on the tree, on a clear sunny day, after the dew has dissipated. They are exposed to the sun in lattice work made of canes or slips of boards, or in rough straw mats placed from the ground, allowing, if possible, the air to circulate under. The figs after a few days are pressed one by one into shape, to facilitate their curing. After sunset the fruit is removed to a dry and well-ventilated place for the

night. This operation is followed until the figs are perfectly cured. When they are selected, the various sizes are spread on sheets for a few days in a ventilated place, the windows of which must be closed when the atmosphere is damp; and lastly the figs are pressed downwards on a table to give them a round shape; then they are packed in boxes lined with paper. The boxes must be kept in a dry and ventilated room. The common figs are packed and pressed in mats.

FELIX A. MATHEWS,
Consul.

UNITED STATES CONSULATE,
Tangier, April 2, 1884.

CONTINENT OF AMERICA.

MEXICO.

LA PAZ.

REPORT BY CONSUL VIOSCA.

The Spanish or Moorish black fig is the best for preservation and for palate taste, and are very juicy once dry. The best varieties for eating when ripe are the Bordeaux and Smyrna white fig, but the early black Moorish (*breva*) is superior. Dry figs are an important export industry in this country, and their growth is found in every watering place or valley in this country. Trees are generally planted in limish and sandy soil, and whenever the soil is too rich ashes of any kind mixed in the soil is its best fertilizer. Never use manure or guano; it is the worst enemy of the fig-tree; the fruit becomes tasteless and besides attracts the insect pest called *conchita*, (turtle shell).

As to watering fig-trees: While young or the first and second year after planting are watered every third day; during the rainy season don't require any irrigation.

In pruning time, which is in October, the tree is simply cleaned out of dry branches or young ground-root shoots.

Picking and drying takes place in May and June, before the first rain falls. Early figs in April and part of May.

In this country the fruit is simply spread on the top of the house's roof or on mats, with full sun exposure all day, and at midnight it is taken in the houses.

JAMES VIOSCA,
Consul.

UNITED STATES CONSULATE,
La Paz, December 26, 1889.

ECUADOR.

REPORT BY CONSUL BEACH, OF GUAYAQUIL.

[Republished from Consular Reports No. 41½.]

The only kind of fig grown in Ecuador is the purple.

Though the fruit does well it is grown only in a small way. The trees should be subjected to treatment similar to that of the orange and lemon, in which respect the requirement is lived up to in Ecuador,

all being neglected. A tree in full bearing will yield about 100 pounds of fruit.

None of the fruit is dried in Ecuador. All that is grown is consumed fresh or made into sweetmeats.

HORATIO N. BEACH,
Consul.

UNITED STATES CONSULATE,
Guayaquil, February 26, 1884.

VENEZUELA.

LAGUAYRA.

REPORT BY CONSUL BIRD, OF LAGUAYRA.

The fig is rarely met with here, although the soil and climate seem well adapted to its culture. One may occasionally see a fig tree, planted, it would seem, more for ornament or shade than for its fruit, notwithstanding the fact that the tree yields two or three crops per year.

WINFIELD S. BIRD,
Consul.

UNITED STATES CONSULATE,
Laguayra, November 29, 1889.

WEST INDIES.

BERMUDA.

REPORT BY CONSUL BECKWITH, OF HAMILTON.

Figs are grown on the island, but the same insect which has destroyed all the peaches has attacked the figs, also the guavas, so in a short time these fruits, like the peach, will be a dead letter, for scarcely anything is done to destroy the insect, and as we have no winter they increase the whole year, the fruit falling on the ground and being allowed to rot there. At one time olive plants were imported here by the country, but no care was given them. They have since dwindled away, only a few trees here and there remaining, but the fruit is put to no use. A little more energy and enterprise are needed in the island to advance various branches of agriculture and fruit-culture which at present bring no profit.

HENRY W. BECKWITH,
Consul.

UNITED STATES CONSULATE,
Hamilton, November 29, 1889.

TRINIDAD.

J. H. Hart, Government botanist, to Consul Sawyer.

Only here and there a plant exists which ripens fruit fairly, but the produce is carried off when nearly mature by the frugiverous bats.

CUBA.

REPORT BY CONSUL-GENERAL WILLIAMS, OF HAVANA.

Figs grow here, but their cultivation is limited to private gardens, The trees do not obtain the size observed in the gardens of Norfolk, Va., Charleston, S. C., Savannah, Ga., or New Orleans, La. Neither does the fruit seem to be equal in flavor to that grown in those places. It is rarely ever seen for sale in the market houses, fresh from the trees. Dried figs in considerable quantities are imported from Malaga, Spain, where great attention is given to their cultivation.

RAMON O. WILLIAMS,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Havana, November 24, 1889.

GUADELUPE.

The few fig-trees found in the island are always sickly and covered with aphis or lice and ants.

ST. FELIX ELARDEAN,
Director of Botanical Garden at Basse-terre, to Consul Bartlett.

CONTINENT OF ASIA.

ASIA MINOR.

REPORT BY CONSUL EMMETT, OF SMYRNA.

INTRODUCTORY REMARKS.

There are several climatic influences which can not be foreseen or guarded against and yet have great effect upon the success of the crop, as, for instance, a greater rain-fall than the average tends to darken the fruit when ripe. A high wind blowing for several days from the north while the fruit is maturing has the tendency to make the stems wither and fruit fall prematurely, etc.

There are as many uncertainties and surmises about the fig crop of Smyrna before gathering as there are in reference to the peach crop in the United States.

As regards the cuttings which the honorable Secretary suggests my obtaining, I beg to say that I am informed that it is too late this season to take the same with any chance of their growing when they arrive in the United States.

Some provision for defraying the expenses and further directions as to quantity and to whom to be sent would be requisite before making a shipment of cuttings.

In 1886 a party from California, apparently well posted, came here in the summer, went to the fig district, and inspected the different varieties; he made his selection and marked the trees from which he desired cuttings. When the crop was gathered he obtained 30,000 female and 3,000 cuttings from male trees, packed and shipped the same about the end of October. I have been informed that great success rewarded his enterprise.

A box of figs grown and packed in California reached here this autumn and was inspected and universally praised by many dealers. In some instances it was impossible to persuade the parties that said figs were grown outside of the Aidin district; in fact some went so far as to designate the orchard. Those who grasped the full importance of this American enterprise predicted that Turkey's supremacy in the fig trade was waning. Some console themselves with the opinion that the American fig will not continue to be good; as the trees (grown from Smyrna cuttings) grow older the fruit will have thick skins and become tough; in fact become native American figs.

This deterioration of the fruit is very common here and has been well known for a long time. The transplanting of trees from their own orchard, even for a short distance, makes them give fruit of entirely a different flavor and nature.

It has been suggested to me that if some grower will grow seedlings from the fruit of young trees grown from Smyrna cuttings, the chances of American fig-growers will be greatly enhanced, and, perhaps, in time eclipse one of the staple articles of this country.

Varieties.—The best variety for drying and packing is known under the name of Lop. There are two kinds of figs for table use when ripe, but which will not bear drying and packing, viz, Zardajik and Cheker Inzir.

Situation.—The trees that produce the varieties above named are grown in the Aidin district.

Distance from sea, 30 to 100 miles; elevation above sea-level, 250 to 500 feet. Much exposure to sun is required.

The trees thrive in all descriptions of land, provided they should be protected against the north wind.

Soil.—Rich black vegetable mold is best.

Climatic influences.—A temperate climate is the main thing; the thermometer should never fall below the freezing point during winter; frost during spring kills the trees.

Temperature.—Minimum, 40°; maximum, 110°; average, 80° Fahrenheit.

Rain-fall.—Yearly average, 24 inches. Rain during winter strengthens the trees; during summer it injures the crop.

Irrigation.—Good fig orchards are never irrigated; newly-planted young trees need watering during the first two years of their growth.

Cultivation.—Fig orchards are ploughed four or five times a year, beginning from November.

Fertilizers.—Manure is made use of when the soil is poor.

Pruning.—When the trees grow old they need pruning during winter.

Picking and curing.—When perfectly ripe the fruit falls by itself. If not quite dry it is spread in the sun. There is no fixed time for picking, as the fruit when ripe falls.

The fruit is gathered from the ground and put in black hair bags; it is then loaded on camels and carried to the nearest railroad station, put in the freight-cars, and conveyed to Smyrna; loaded again on camels, it finds its way to the fig market, whence it is sent to the packing houses to undergo the final process of sorting, shaping (flattening out or squaring), and putting in boxes or bags, and is then fit for shipment abroad.

No chemical solution is employed; the packers wet their hands with plain sea-water, which hastens considerably the sugaring of the figs.

Planting and propagating.—Distance planted apart, 25 feet. The trees propagated by cuttings. There are small and large orchards.

Maturity.—The trees remain fruitful from eighty to one hundred years and even longer.

Insect pests.—A kind of bug, known under the name "Basra," is very injurious to the fruit, which it covers with dark yellow and black spots. No one knows how to free the trees and fruit of this pest.

The only beneficial insect is the one which comes out of the male fruit and impregnates the female figs, and the ants which feed on the bug called "Basra."

Securing cuttings.—Unovassi cuttings are the best and should be gathered by some one having a good knowledge of the trees.

W. C. EMMETT,
Consul.

UNITED STATES CONSULATE,
Smyrna, January 15, 1890.

PALESTINE.

REPORT BY CONSUL GILLMAN, OF JERUSALEM.

Varieties.—There is no exportation of the figs grown in Palestine, and scarcely any care is given to the cultivation of the trees. There are said to be as many as twelve varieties of the fig in this country, and, with few exceptions, they are all good for eating. The best known and more easily distinguished varieties are as follows: (1) The large green fig, early in fruiting, known as dafouri. (2) Small green, later fig, called ghoudri (greenish). (3) Large purple fig named gharroubi (carob, from its resemblance to the color of the pod of the carob). (4) Small purple fig, named also gharroubi. (5) Yellow fig, white inside, known as biadi (white). (6) Yellow fig, crimson inside, called karawi (crimson), resembling the Smyrna fig of commerce. (7) Black fig, named swadi (black).

While, as already mentioned, all these are good for eating in the fresh state, Nos. 1, 2, 3, 5, and 6 are the best for this purpose. Equally, though, all the varieties are used for drying. Nos. 5, 6, and 7 are the most suitable for the purpose.

Situation.—The trees flourish all over Palestine, from the sea-coast, up into the hill country, at an elevation of 3,000 feet or more. They generally have a full exposure to the sun, but seem to do well in all situations. They frequently attain an enormous size, even on the most rocky hill-sides; and whether the land is hilly, rolling, or level, appears to make no great difference to them. The soil is generally clay, or sand and clay mixed, with clay subsoil.

Climate.—At Jaffa and on the plains the minimum temperature is 32° Fahr., the maximum reaching 107° Fahr.; the average temperature in the day-time being about 70½°, and at night, 55½° Fahr. In the mount-

ains it is considerably colder; though, in general, there are only a few days in January in which it freezes. The rain-fall at Jaffa has already been given. At Jerusalem the average annual fall amounts to 25 inches. The growth of the trees and fruit is favorably affected by abundant rains.

Irrigation.—The trees do not require irrigation, and, except when growing in orange groves, are never watered. With systematic irrigation and cultivation, such as received in the orange groves at Jaffa, the fruit is improved.

Cultivation.—As already mentioned, but little cultivation is bestowed on the trees. At most they receive a spring and autumn plowing.

Fertilizers.—Fertilizers are seldom used except when in connection with the orange or lemon trees; and the kind preferred is generally horse manure, or the dung of the mule or camel.

Pruning.—Pruning is not practiced with any system, or to any appreciable extent. It is considered best to spare the lower branches, and when cuttings for propagation are made they are taken from above.

Picking and curing.—The fruit is picked when fully ripe. For eating, the morning is deemed the best time of day for picking; but there is little choice observed in the matter. In general, the fig of this country is of inferior size, doubtless in consequence of being given such little attention, and being only used for home consumption. The fruit is dried by being spread in the sun, usually on the roofs of houses, or sometimes on the ground. When partially dry the fig is pressed flat in the hands. Subsequently the nearly dried fruit is strung on strings; and it is often sold in this shape or when placed in sacks.

Planting and propagating.—The distance at which the trees are planted apart varies from 6 to 10, or even 20 feet.

Though the fig can be grown from seed, the usual method of propagation is by cuttings, or rather branches slipped off the parent tree.

The size of the orchards is in general not large, though sometimes consisting of several acres. There are only a few hundred fig-trees dispersed over the vineyards and gardens at Jaffa; but at Bethlehem, Hebron, and around Jerusalem orchards of fair size devoted to the fig may be found.

Maturity.—The tree here attains to the age of one hundred years, and with proper care and culture continues fruitful to the last. If neglected too much, it ceases to be productive; though on attention being renewed, it again responds with crops. The trees begin to bear at the third year, and are in full bearing when five years of age.

Insect pests.—But little has been observed as to insect pests, beneficial insects, or the parasites of the injurious ones. The fig seems to be unusually free from such. A fig is occasionally found containing a worm, which appears to be the larva of one of the smaller moths; but the species has not been determined.

Cuttings.—The rooted cutting, or the young tree would be, in all

probability, the best method of procuring desirable varieties. I understand that many thousands of young trees have been successfully transported from Smyrna to California, giving full satisfaction.

HENRY GILLMAN,
Consul.

UNITED STATES CONSULATE,
Jerusalem, February 11, 1890.

SYRIA.

BEIRUT AND VICINITY.*

FIRST REPORT BY CONSUL BISSINGER.

Varieties.—The best fig for drying is the green variety. The best variety for eating when ripe is the red variety with elongated stem, called "Buckaraty." Also a rounder red variety called "Seedany." Other varieties worthy of culture and for profit are the black variety and one which ripens in the fall.

Situation.—The trees that produce the varieties above named are grown in plains and on the hills, and from the shore to a distance of 25 miles inland to an elevation of 2,500 feet. Constant exposure to the sun is needed. Hilly and rolling land with white clayey soil are the best.

Irrigation.—No irrigation needed.

Cultivation.—Plow the land in the spring.

Fertilizing.—None put about trees, as it is injurious.

Pruning.—Pruning is not practiced.

Picking and curing.—The figs are picked when fully ripe in the early morning. Little curing is done in this country; simply dried in the sun. Either whole or split; no solution used.

Planting and propagating.—Distance planted apart, about 20 to 25 feet; propagated by slips. The orchards are small.

Trees attain an age of from fifty to sixty years, and are fruitful from four years till they decay.

Insects and worms are treated simply by covering the trunk of the tree with a coating of bitumen.

Slips can be put into earth and conveyed from place to place.

BEIRUT.

Rain.—Moderate rain-fall; about 30 to 40 inches on an average yearly, The abundance of rain is beneficial to old trees as well as to the fruit. October and November rains benefit the trees, and March and April rains benefit the fruit.

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* The several reports for Syria were forwarded by Consul Bissinger, being prepared from statistics supplied to him by parties in the several districts reported.

Irrigation.—Irrigation is only necessary the first and second years after planting. In light soil watering is necessary twenty days after the rains are over and in heavy soil one month thereafter.

Cultivation.—Plowing is necessary once or twice after the first rains in November and is then to be discontinued until the 1st of February, after which it is to be repeated four times or every fortnight, after the rains. As soon as the fruits appear no more plowing is necessary.

Fertilizers.—The fertilizing substances are: A donkey load of sand around each tree once a year, about the early part of December, if the soil is red, and a small quantity of cow's, or other manure if the soil is white, *i. e.* clayey. This treatment increases the growth of the trees and the quantity of the fruit.

Pruning.—Pruning is effected at the end of January by removing the weak and dead branches. To prune the low branches of fig-trees increases their growth and production.

Picking.—Gathering or picking takes place when the fruit is fully ripe; when for sale, it is effected either in the evening or before sunrise, and if for drying, it must be after sunrise, so as to be dry from dew, which would spoil the color of dried figs.

Curing.—After the figs are gathered they are split open in the morning and placed in an exposed position to the sun for three days, until they contract and assume a red or yellowish tint. They are then gathered from the drying-floor, and after being fully flattened out are spread in equal layers in a basket until completely filled up. A heavy weight is then placed on the top of the basket. As to figs dried in a heap, they should be gathered when perfectly dry (in other words when withered on the tree), and spread as they are on the drying-floor for four or five days, at the expiration of which they are picked up and pressed flat between the fingers. This species of dry figs may also be placed in hot water for 10 minutes, then left to dry well in the air before packing up in boxes. This bathing process imparts a good color to the figs and preserves them from worms. Dry figs are never placed in any solution.

Planting.—The distance between each tree should be at least 9 feet. The larger the distance the better the trees grow.

Fig-trees are propagated either by suckers or shoots (which grow at the foot of the mother tree) or by slips from the trees.

(1) The way of transplanting by suckers is to dig a hole in the ground about 15 to 20 inches in diameter and depth in which to place the same, after which the soil is to be so arranged as to be on a level with the surrounding ground, or even a little lower, to retain the water. Watering is necessary just after planting. Some people resort to the practice of putting in the hole of the newly planted sucker a handful of barley, to serve as nourishment for the roots. A sucker planted with barley never fails to take root and to thrive.

(2) To propagate by slips it is necessary that a hole be dug in the ground having an average length of 27 inches by 13 in depth. In this

hole the slip, which should be about 27 inches long, is placed obliquely, so as to leave about 2 inches of it above the ground. The planting of suckers must take place between the 1st of December and the end of January, and the planting of slips should begin with February and end with March. Watering is needed, as stated in answer 6, for the lands that had not been previously tilled and sown. As to the rich lands which had been plowed, they should be irrigated once a month or once every forty-five days.

There are some large and some small fig orchards, but generally their size is limited.

Fig-trees live from five to thirty years, some even longer, and produce fruit until they die off.

The insects are worms produced by excess of water and manure and want of proper pruning. The way to treat them is to put only a little manure or none at all, to prune the trees well, and to make a passage for the water, so as not to allow it to gather around the trees. Birds also attack fig-trees, such as the sparrow and the becafico. A scare-crow is most always successful in frightening away these birds.

No insect other than those mentioned above are known to exist.

Cutting.—Either by taking suckers which grow at the foot of the tree or cuttings from the tree itself.

No statistics or reports are published by the Government or otherwise.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, February 12, 1890.

SECOND REPORT.

Varieties.—The best variety for drying is the "Abyad," white inside green outside, and for eating when ripe, the "Bokraty," red inside, green outside. The "Asfoory" and "Bokraty" are also cultivated. The Smyrna district is the principal one, Syria coming next, in which fig-trees are grown.

Situation.—No matter where fig-trees are planted, moderate altitude is best. Fig-trees are benefited by being exposed to the sun.

Soil.—The white clayey soil is preferable. It should be manured once every three years.

Climate.—Minimum, 40° Fahr.; maximum, 90° Fahr.; average, 65° Fahr. The more abundant the rains the better the trees and fruits prosper.

Irrigation.—Fig trees need no irrigation.

Cultivation.—After the soil gets dry it should be plowed three times during spring-time.

Fertilizers.—The soil should be manured once every three years and plowed as stated above.

Pruning.—After the fruits have been gathered the dead branches only are cut away.

Picking and curing.—When the fruit is ripe the morning is the best time for picking. If they are to be transported from place to place figs must be gathered before they are fully ripe and placed in boxes, but can not be sent to any distant place. When figs are to be dried they must be gathered when fully ripe, then spread on a lofty spot for from ten to fifteen days and nights. In this way they can be preserved in boxes during the whole year.

Planting and propagating.—The trees are planted about 13 feet apart and propagated by slips. The orchards are generally small.

Maturity.—Fig-trees attain thirty to forty years of age and produce fruit from the fourth or fifth year.

Insect pests.—There are some insects which infest the soil and invade the trunk of the tree and sometimes cause them to decay, but they do not injure the fruit. Trees so attacked are treated by introducing an iron wire into the affected holes until the insect is reached and destroyed.

Slips.—Slips are to be secured in March.

No printed matter, reports, or statistics exist or are issued by the Government.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, February 12, 1890.

SIDON.

Varieties.—The "green" varieties for drying are the "Bookraty" and "Abyad" for eating when ripe. Other varieties cultivated are the black and one which ripens in the fall.

Situation.—Both in plains and hills; best kinds within 30 miles of coast; best growth from 500 to 2,000 feet above sea-level; constant exposure to the sun; hilly lands the best; clayey and chalky soil the best.

Climate.—Thirty degrees Fahr. to 90° Fahr.; rain-fall about 30 inches, on an average, annually; an abundance of rain is beneficial.

Irrigation.—Never irrigated at all.

Cultivation.—Spring ploughing.

Fertilizers.—None applied. Figs become wormy in rich earth.

Pruning.—Dead branches only are removed.

Picking.—When ripe, and in the morning.

Curing.—Dried in sun only. No solution of any kind used.

Planting and propagating.—The trees are 32 to 35 feet apart; propagated by slips; the orchards are generally small.

Maturity.—The trees attain to about fifty years and bear from four years till they die.

Insect pests.—Principally worms. The remedy is to cover the trunk of the tree with a coating of bitumen.

Cuttings.—Cuttings are secured either by suckers which grow at the foot of tree or cuttings from the tree itself.

TRIPOLI.

Varieties.—The best variety for drying is the "Bayadi" (white inside); the best variety for eating is the "Bookraty;" the other varieties known in this country are the "Bookraty," the "Bayadi," the "Asfoory," the "Aswad," the "Hammary," and the "Shataway."

Situation.—Fig trees grow in the plains as well as in the mountains; the more they are exposed to the sun the better they prosper; they are found in rolling and level land, which is alike adapted for their growth. It is customary in this country to plant fig-trees in either white clayey soil or in a blackish soil (the latter not being good for other kinds of trees). In red soil the fig-trees grow still better, but the taste of the fruit is less delicious than if grown in a white or blackish soil.

Climate.—Temperature varies from 30° Fahr. to 90° Fahr.; average, 60° Fahr.; rain-fall averages 26 to 40 inches per annum, according to locality.

Irrigation.—Most of the fig-trees in this country are found in non-irrigated lands. The fruit of irrigated fig-trees are affected by worms and liable to rot.

Cultivation.—Lands upon which fig-trees are planted should be plowed three times in the spring.

Fertilizers.—Manure is the fertilizer known, but it is not used for fig-trees, although it increases their production, for the reason that it causes the fruit to be invaded by worms and to rot.

Pruning.—Dead branches only need to be removed.

Picking.—Figs for drying are picked when fully ripe any time in the course of a sunny day, so as to be well dried by the rays of the sun and thus prevent their contracting a sour taste.

Curing.—Figs, after being gathered, are spread in the sun for from ten to fifteen days. When they become dry they are placed in a basket and plunged for two minutes in a large copper kettle full of boiling water, in which a small quantity of the fennel plant has been deposited to impart a nice aroma to the figs. After this process of "bathing," the figs are dried again and then stored away. Figs are gathered and dried as they ripen, during August, September, and October.

Planting and propagating.—Distance planted apart, 12 to 15 feet, according to the quality of the soil. Fig-trees are propagated by cuttings from the branch of a large tree having three or four sprays, which is to be placed in a hole dug for the purpose, then covered with earth, allowing one of the sprays only to project, at a height of about 2 inches above ground. This should take place in the spring, *i. e.*, from the beginning of March to the end of April. Orchards are generally small.

Maturity.—The age of fig-trees depends on the quality of the soil and the care bestowed upon them. If good care is taken of a fig-tree it lives up to one hundred years.

Disease.—The branches of fig-trees are sometimes liable to a disease that manifests itself in the shape of slight swellings called snails. The remedy adopted is to make small cuts in the tree, which causes the disease to subside.

Cuttings.—No plantations of young fig-trees exist in this country. The way to plant fig-trees is to secure cuttings from large trees and plant them as stated above.

ERHARD BISSINGER,
Consul.

UNITED STATES CONSULATE,
Beirut, February 12, 1890.

INDIA.

REPORT PREPARED FOR VICE-CONSUL BODE, OF BOMBAY, BY MR. G. MARSHALL WORDROW, LECTURER ON BOTANY AND AGRICULTURE AT THE COLLEGE OF SCIENCE, POONAH.

Varieties.—Figs are not dried in India to any considerable extent, as the local consumption absorbs the supply. The retail price of ripe figs is about 2 annas per pound (say 6 cents) at Poonah, within 14 miles of extensive gardens. Varieties of figs are not named in India except with the name of the village they are grown at, and such a name is not distinctive. The variety grown in the Deccan is inverted conical, green at the stalk and gradually deepening to brown at the broad end. Good examples weigh one-seventh of a pound.

Situation.—The village of Khed Shivapoor is an important center of fig culture. It stands 14 miles south of Poonah, which city lies in north latitude 18° 28′ east longitude 74° 10′. The altitude of Khed Shivapoor is about 2,200 feet above mean sea-level, but the fig thrives at Baroda as low as 100 feet above the sea-level. The orchards are fully exposed to the sun.

The land of the orchards is nearly level, but they are situated on the slope of a range of hills 3,500 feet in altitude, at a height of 2,200 feet, and about 50 miles from the sea.

Soil and subsoil.—The soil is calcareous loam, the subsoil, at a depth of about 2 feet marl (a mixture of lime and clay), overlying disintegrated trap.

Temperature.—Average, about 75°; minimum, 48°; maximum, 95°. The village is shut in on the northeast and west by hills, which keep out hot winds.

Rain-fall is about 50 inches annually, falling chiefly from June till October. The setting in of rain makes the trees ripen the young growth that was made during April and May in the hottest and driest season, and determines the ripening of fruit.

Irrigation.—Irrigation is effected from wells, about 25 feet in depth, by a leathern bucket drawn up by oxen at a cost of 10 pies (say 2.5 cents) per 1,000 gallons. Two inches of water on the surface of the orchard, per month, from the end of October till the fruit is ripe; the low quantity of water given keeps the fruit sweet. One inch of water is given twice monthly.

Cultivation.—Cultivation consists of plowing or hoeing once yearly after the fruit is gathered.

Fertilizers.—Fifty pounds per tree of well decayed village sweepings is applied at the end of the dry season, in May, after the crop is gathered.

Pruning.—After the young tree has been made to send up five to seven shoots from near the base by stopping the first strong shoots sent out by the cutting, little, if any, real pruning is given. Weakly decayed or broken branches are cut out to the base, and such as have gone too high for a man's hand to reach are stopped, and if branches are plentiful, cut out when all the fruit is gathered from them; but the less pruning that is necessary the better. In a few instances the trees are grown as standards; a straight stem is led up about 6 feet, and from the top of this branches are encouraged to spread horizontally.

Picking.—The picking is done when the fruit is full grown and shows a slight yellowing at the stalk. Early in the morning is preferred because fruit picked at that time and kept in shade retains a delicious coolness. For local use each fig is wrapped in a leaf when it has attained this stage to protect it from birds and left on the tree a week longer. This improves the quality greatly but prohibits carriage to a distance. No boxing or curing is done in India. The skin of the variety grown is much too delicate and I have not been successful with European varieties.

Planting and propagation.—Propagation is effected by cuttings of one year old wood planted in a moist, shady place during February. The trees are set out 10 to 12 feet apart.

Size of orchards.—The orchards are 2 to 3 acres in extent only, because the position on the slope of a hill does not afford larger spaces sufficiently level, and a well rarely waters more.

Maturity.—The trees attain fifteen years and are fruitful about twelve years.

Insect pests.—Red spider, *Tetranichus telarius*, or some nearly allied insect, is a serious enemy. No futile attempts are made against it by the cultivators. They think sacrifices to idols effectual. Much yet remains to be done in the entomology of the fig.

Cuttings.—I have never sent cuttings as far as America, but I think that if cut in February, packed in moist sand in a tin box and sent by post, a few would survive the journey. Whether it would be profitable is doubtful, as I am of opinion the fig of the Deccan is synonymous with brown Turkey, which you probably have in cultivation. I will be glad, to send you cuttings if wanted.

Publications.—The Government of India does not issue statistics regarding figs. The latest edition of my book on gardening in India, published at the end of 1889, has the fullest account I know of, but it is not as full as this report.

Olives are not grown in India; the tree lives but does not fruit.

G. MARSHALL WOODROW.

POONAH, *March* 14, 1890.

AUSTRALASIA.

REPORT BY CONSUL GRIFFIN, OF SYDNEY.

The fig is not cultivated to any great extent in the Australian colonies. The tree will grow and bear excellent fruit all over the country, but its cultivation can not be called an industry in any part of Australasia. Figs are not dried or prepared in any way for export. There are growers who have experimented with drying figs, but I have never heard of locally dried figs being offered for sale. The figs that find their way to the Sydney market are in a green state. Baron Fred. von Mueller, government botanist for Victoria, in his work entitled "Select Extra-Tropical Plants," strongly urges the extensive planting of the fig through favorable portions of desert waste for shade and fruit and in warm districts where the fruit could be dried with particular ease. He directs attention to the ease with which small cuttings of the fig tree were sent by horse post in the early history of these colonies from Port Phillip (Melbourne) to the Central Australian Mission stations, a distance as far as from St. Petersburg to the Black Sea, or from San Francisco to the Upper Missouri. Baron von Mueller mentions two main varieties which have been successfully introduced into Australia. One includes the purple, white, and golden fig-trees, producing two crops a year, but are not suitable for drying. The other main variety embraces the Marseillaise, Bellonne, Barnisote, and the Aubique. These produce but one crop a year and supply the greatest quantity of figs for drying. The Marseillaise and Bellonne are usually regarded as the best varieties. The Barnisote and Aubique are dried with fire heat and are usually consumed fresh. The ordinary drying is effected usually by the sun. Mr. Angus

McKay gives the black Province and black Italian as the best varieties for drying in Australia, but says very little drying is done here.

The white and yellow Ischia are favorite varieties. Then there are the Morocco and the white and brown Turkey. Different names are given to the same variety of figs and, as no systematic attempt has been made to classify them, there is some confusion in the nomenclature and it is almost impossible to say which is the best. The fig grows on the sea-coast and also many miles inland. It has been found to do fairly well at an elevation of 2,500 feet above the level of the sea. Excellent figs are, I am informed, grown in the Forbes and Parkes districts of New South Wales, but the finest figs I have seen were grown at Tumut, also in this colony, where the soil is of a dark rich loam to a depth of about 10 feet. Figs also grow at Port Stephen, where the average annual rain-fall is about 62 inches. Mr. Angus McKay says the fig thrives best in hilly country, and as to soil, it seems that they do very well in poor sandy soil; where the temperature is 100° figs are produced and where it is not less than 20° above zero. When the rain-fall is not less than 12 inches or more than 30 inches they appear to succeed best. When the rain fall is heavy the trees run to wood. When cultivated here both plowing and digging are practiced; the trees are usually 20 feet apart each way and are propagated principally from cuttings. The only insects yet observed consist of a small beetle. The tree fruits in the third year. Caprification is said to be practiced in New Zealand, but it is not done, so far as I have been able to learn, in Australia, and Baron von Mueller says it is unnecessary and in some instances injurious and objectionable.

G. W. GRIFFIN,
Consul.

UNITED STATES CONSULATE,
Sydney, January 21, 1890.

FIJI.

Figs are not cultivated. The very few experimental trees that have been planted have proved a decided failure. The fruit has not been grown in these islands. A blight, black in appearance, strikes the tree before it comes into bearing, which, if it does not kill the tree, so retards its growth that it never bears any fruit.

ANDREWS A. ST. JOHN,
Commercial Agent.

UNITED STATES COMMERCIAL AGENCY,
Levuka, January 11, 1890.

CONTINENT OF EUROPE.

FRANCE.

REPORT BY CONSUL TRAIL, OF MARSEILLES.

The fig-tree (*Ficus carica*) that is cultivated in France was brought from Greece many centuries ago and is now, like the Olive, common to the whole of the south of France and of the adjoining countries, more especially eastward.

It grows in a wild state in almost any place and position. On many an old wall small fig-trees are to be seen and on many a road-side bank they are the tree most frequently to be found. In country farm-yards, inn-keepers' gardens, stable-yards, the fig-tree is invariably present and very often as a solitary specimen. It would be difficult to find a garden of any description in southern France without a fig-tree.

Varieties.—The varieties are innumerable, and it would be hard to give a list of all the different ones, as they vary according to soil exposure, treatment, and climate.

The chief varieties cultivated in this district are the following:

The "Marseillaise," or Athens fig, a white fig of very nice, delicate taste, both when eaten fresh from the tree and when dried. This variety is considered the best in the south of France, and many people prefer it even to the Smyrna fig.

The "Mouissonne," a dark fig with a fine skin, very good when eaten ripe and fresh, and good for drying.

The "Barnissotte," one that is almost only eaten fresh.

There are several other varieties that could be mentioned, but they are all more or less similar to the above three kinds.

Soil.—The fig-tree grows in almost any soil common to its climate, but dry ground suits it best. Along certain dry and even arid strips of land bordering on the Mediterranean fig-trees flourish and produce fruit in abundance.

Climate.—The same climate that suits the olive tree is favorable to the fig, *i. e.*, a warm climate, where excess of heat and cold is scarce. With special reference to this district it is worthy of note that on the right side of the Rhone figs do not develop very well; the fruit remains small and is not good for drying. Whereas on the left side, and from the Rhone to the Italian frontier, figs attain a far higher degree of quality; they are larger, sweeter, more delicate, and are excellent for drying.

The explanation of this fact is that the plains and districts on the right side of the Rhone are not sheltered by hills as on the other side.

Situation.—Sheltered hillsides are very favorable to fig culture; exposure to cold winds is not conducive to good results.

Rain-fall.—The winter rains generally give sufficient moisture to the soil for the whole year; fig-trees that are intended to produce fruit for drying ought not to be watered artificially. Too much moisture lessens the quality and the richness of the fruit, and frequently renders drying difficult.

Tree planting.—When planting fig trees care should be taken to select a deep soil, or in any case to dig as deep as possible and mix some fertilizer (manure, old leaves, etc.) well into the earth, on which the roots will rest. During the first two years it is always advisable, in districts that are subject to frosts, to cover or bind the trees with straw for the winter. After the second year the young trees are generally strong enough to stand the winter uncovered. The ground should be well dug up at least once in winter and once in spring.

Fertilizers.—Fertilizers should be dug into the ground once a year, during spring, for young trees, and once every two years for older trees. Fig-trees, once well rooted and well established in a place, require very little fertilizing, and this can even be dispensed with if the soil be well dug occasionally.

Pruning.—Pruning should be done once a year, but only lightly, *i. e.*, one should only thin out dead and useless branches in the body and crown of the tree, and cut away all young shoots that spring up at the foot of the stem. The latter point is important, as the fig-tree being very voracious young ungrafted shoots would only uselessly exhaust the soil and weaken the original tree. For this reason, too, it is well to keep fig-trees apart from other trees, for not only does the fig-tree weaken its neighbors, but its neighbors weaken it as well.

Maturity.—The fig-tree produces fruit pretty regularly every year. Some varieties give two crops, the first of which begins about the 20th of June and lasts till about the 20th of July, the figs of which, called "Flower" figs, are not good for drying, and the second at the end of September. Several black and gray figs come under this variety.

The other kinds, of one crop only, begin to ripen about the middle of August and continue ripening successively throughout August and September; these are the best for drying, and to this class the "Marseillaise" belongs.

With reference to those that give two crops, it is interesting to note that the figs of the first are borne by the branches of the previous year only, and that those of the second crop are borne by the young branches of the same year. This accounts for the latter ripening successively, as each fresh leaf that opens out bears a fig in its axil.

Picking and curing.—Figs, either for immediate consumption or for drying, ought not to be gathered before they are quite ripe. The signs

of ripeness are complete softening of the fig, slight bursting of the skin, a tear or drop of gum oozing out of the center.

Figs must be gathered by hand, and in plucking them off the branches care should be taken to pick them with the short stalk that attaches them to the branch.

The state of the weather and the time of day are points to be taken into consideration when gathering figs for drying. It is true that in this district it is seldom that the weather is not fine during August and September. However, fine days should always be selected, and picking should not commence until the morning dew has disappeared from off the fruit. As soon as the figs are picked they must be laid in rows on wicker or basket-work hurdles or boards and well exposed, but in a sheltered position and raised from the ground, to the full force of the sun. The figs should not be placed too close together, and they must be turned round every day about midday, when the sun is hottest, so that every day a fresh surface is exposed to the direct rays of the sun. The hurdles or boards, without touching or disturbing the figs, must be taken indoors every evening and placed in dry, airy rooms till the morning, when they are brought out again in the same way. No dampness nor moisture must be allowed to get to the figs whilst drying, and if the weather be uncertain one should be near at hand and take them in at the first sign of rain.

In fine weather six days suffice to dry figs, and this is generally the case with the first batches in August and beginning of September. But as the days grow shorter and the sun becomes less powerful more time is required and the process of drying lasts from ten to fifteen days. Wet weather is exceedingly detrimental to drying, as it is a very difficult and uncertain operation to dry figs indoors by artificial heat. Artificially dried figs are never as good as sun-dried ones.

The quicker the drying takes place the better the figs are, and the exact stage of complete dryness can generally be ascertained by the firmness of a fig taken between two fingers and rolled. The interior seeds lose their red color when the fig is quite dry, and this is one of the signs that the process is completed.

They can then be classified according to size, appearance, and quality, and packed in baskets of flat wicker, or boxes, ready for storing or for shipment. They are usually packed in rows and layers, pressed down one by one with the thumb, in such a way that the stalk is in the center underneath, and then each layer should be pressed down with the aid of a small board, slightly, until the basket or box is full.

Prices.—Fresh ripe figs sell very readily at the time of the crops, especially the early ones, for a few cents a pound. No exact price can be given, as the value varies from 3 to 7 or 8 cents a pound according to time, quantity, and quality of crop, also place where they are sold. In unfavorable seasons for drying and in late crops, quantities are made into jam and are sometimes even boiled into other fruit jams, such as

raspberry and strawberry, to which the fig, when boiled, assimilates itself in appearance.

But the chief trade is done in dried figs and the prices of these vary according to quality, quantity, and time of year. The grower dries his own figs and usually sells them in bulk to the dealer, who then sorts them and sells them again separately as per their respective qualities.

The "Marseillaise" fig fetches from 75 centimes to 1.50 francs per kilogram (from 8 to 16 cents per pound) and frequently even more in retail. Other varieties sell cheaper; ordinary dark and blue figs generally fetch from 30 to 40 centimes per kilogram (from 3 to 4 cents per pound). Very common small figs, dried, are sold in some districts in large quantities, packed in sacks, for distilling purposes, but this applies more generally to Italy and Spain. This kind of fig is also sometimes used, baked or roasted and ground into coarse powder, to adulterate coffee with.

Insect pests.—The fig-tree, well cared for, is very rarely attacked by either disease or injurious insects; in some regions these are unknown. In some cases a kind of a louse attaches itself to the branches and spreads over the whole tree, if not detected in time and rubbed off carefully by means of a coarse piece of cloth. If, however, it has not been detected in time and the parasite has already covered and killed certain branches, these branches must simply be sawn off.

Reproduction.—Like the olive, the fig-tree grows to a good old age. Reproduction takes place, naturally, by seedlings, but as this process is slow and uncertain, it is generally done by cuttings, which are selected from good healthy trees and planted in deep soil. They must be grafted in about the second year and bear fruit in their third year already after transplantation to their definite ground. If the grafting takes well, fruit is even produced before the third year.

CHAS. B. TRAIL,
Consul.

UNITED STATES CONSULATE,
Marseilles, April 30, 1890.

CORSICA.*

REPORT BY CONSULAR AGENT DAMIANI, OF BASTIA.

Varieties.—(Common fig-tree, *Ficus carica.*) The varieties cultivated in this locality are, for drying, the White (*Bourgassotte Blanche*); Napolitaine, very good quality, very good to dry, yields small number of flowers; for eating when ripe the Verdale; the Marseillaise; Athens fig, the kind best adapted; Dunmine, very good for drying; Franciscana, for drying and for eating.

* Translated at the Marseilles consulate.

Black (*Bourgassotte noir*), very good fresh figs; Niello noir, the earliest eating figs.

Colored (*Figue latte*), excellent fresh and dry; Observantine, very numerous flowers; Bellone, excellent fresh or dry.

Situation.—The fig tree is abundant in Corsica, particularly on the littoral, especially on well-exposed hill-sides, on the rocks at the foot of the mountains close to the sea, on dry ground. The roots being very long, it is cultivated in deep, calcareous soil. It grows from the sea-level to 800 meters of altitude. The trees grown in the plains and shoals produce figs which dry and have not the requisite flavor and whiteness. Although the fig-tree grows on dry soil, often in the fissures of rocks and walls, it yields the most abundant and best flavored fruit when cultivated on good light soil. It is affected by dampness, but yet requires watering in very hot weather.

Cultivation.—The fig-tree does not require much attention; the ground has only to be dug once or twice a year and the fig-tree thrives. If planted in a warm locality it assumes a goodly shape.

Climate.—It prefers a warm climate, especially in the vicinity of olive-trees. Where the thermometer does not fall below 12° Centigrade it produces leaves and fruit continuously. It does not prosper without manure from farm-houses. It is multiplied by cuttings. Small branches of 2 centimeters broad by 20 centimeters long are the best.

Planting and propagating.—The slips are put entirely under ground, except the terminal bud. The ground should be dug to a depth of at least 45 centimeters, and the trees should be about 6 meters distant from each other. Figs ripen at two seasons, at the end of spring and beginning of summer, and in the autumn for the second figs. The second is the most important.

Picking and curing.—The gathering is long, because they ripen successively. They wait till the figs are perfectly ripe, and even overripe. Those gathered unripe mature by keeping, but have not the flavor of those matured on the tree. Perfect ripeness is indicated by their being soft, the cracking and falling away of the rind, and by a liquid in the center. The day and hour are important if the figs are to be dried. The dew must have disappeared and the weather must be dry. After being gathered they are taken into the house and placed on planks or on hurdles, exposed to the greatest heat of the sun, and in a sheltered place, and at night in a well-aired place. The form and preservation of the fig depends on the promptitude of the operation of drying. The figs have to be turned over and flattened frequently.

Sometimes during the operation of drying rain comes on. The drying then becomes difficult and almost impossible except by means of the artificial heat of furnaces, which, however managed, injures the quality of the figs and lessens the market value by a third.

Yield.—A fig ground of a hectare, containing 267 fig-trees, twenty-five years old, will yield (at the rate of 12.5 kilograms each, 3,214

kilograms of dry figs, of the average value of 37 francs the 100 kilograms, and 30 francs, reckoning losses) about 963 francs. On account of the difficulties in drying nearly one crop in three is lost, which reduces the average profit to 640 francs.

SIMON DAMIANI,
Consular Agent.

BASTIA, CORSICA.

SOUTHERN FRANCE.

REPORT BY VICE-CONSUL MARTIN, OF MARSEILLES.

[Republished from Consular Reports, No. 41½.]

The fig tree is common in Southern France, and specimens of the several varieties known in the country are to be found in almost every ground lot, but it is not the object of special culture. The preparation of figs requires too much time and care, and the price could not repay hired labor. The figs must be culled one by one, when perfectly ripe; great care must be taken not to bruise the fruit or sever the peduncle. The figs are then laid on cane hurdles, exposed to the sun, and turned over every now and then until perfectly dry, that is, for a period of ten or fifteen days. As the least exposure to moisture would turn the figs black and reduce the value by one-half, these hurdles have to be taken in every evening, to be again taken out every morning. The difficulties of the operation deter most farmers from undertaking it, except those that own small farms where everything must be turned to account, and that cultivate them themselves with no other help than that of their family. The small quantities thus prepared are gathered at the end of the season by commercial travelers, who pay from 1.50 to 2 francs per kilogram for "Marseillaises" figs (which are the most esteemed variety), and generally mix them with figs imported from Italy, Spain, Algeria, and the East. It is in consequence impossible to form any idea of the importance of the production, or of the proceeds. In 1882 the importation of figs from the above-named countries amounted to 9,964,743 kilograms, whereas the exportation was not even given separately, for it was included in the official returns with that of other dried fruit not elsewhere specified, amounting in all to 397,269 kilograms.

The climate of this consular district does not agree with orange and lemon trees, which are not seen in the open field except at a short distance from Nice.

J. S. MARTIN, JR.,
Vice and Deputy Consul.

UNITED STATES CONSULATE,
Marseilles, March 11, 1884.

ITALY.

REPORT BY CONSUL-GENERAL RICHMOND, OF ROME.

(Republished from Consular Reports, No. 41½.)

In Italy many varieties of the *Ficus carica* are cultivated. The widest spread of these varieties may be divided into two groups, as follows: The *fico gentile* and the *fico portoghese*, which are the earliest; the *verdini* and *brogiotti neri*, the *brogiotti bianchi*, the *brianzosi*, the *datteri* or *dottati* (which are thick skinned). All these varieties bear fruit only once a year. The *fico albo* and the *fico San Pietro* bear fruit twice a year. A fig tree of medium size will yield generally from 44 to 60 kilograms of fruit. Usually the fig is planted in company with other fruit trees (olive, almond, and others); but fig orchards, where figs alone are grown, may be found (at Lecce, for instance), and in such cases the trees must be planted at such a distance apart that when they reach their fullest development they may not come in contact one with the other; (1) because the fig needs a great deal of sun; and (2) because, otherwise, if the partial and easily located infection called rizoctonia should show itself it would spread rapidly through all the orchard. In many places it is the custom to alternate the fig, almond, and olive, so that each fig tree may be isolated.

In Tuscany the figs called *dottati* are preferred for drying. They are peeled and dried in the sun, and then, with a slight sprinkling of anise-seed, are rolled into disks or small loaves. In other cases the rind is not removed, but the fig is split in two, flavored with anise or fennel seed, dried in the sun, and so sent to market.

The common purple or black figs are dried in the oven or in the sun, just as they come from the tree. At Lecce, Reggio, Calabria, Cosenza, and Cotanzaro this system is adopted. They also make a fig paste with walnuts, almonds, cinnamon, etc. It is customary to drop a little honey on them while drying.

There are coming into use stoves with hot-air chambers, especially adapted for drying figs as well as other fruits.

LEWIS RICHMOND,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Rome, April 1, 1884.

CATANIA.

REPORT BY CONSUL WOODCOCK, OF CATANIA.

(Republished from Consular Reports, No. 41½).

Of the fig tree there are severalvarieties; some yield a large fruit, others small. The fruit also varies in its degree of sweetness; also in color from white to black. The fruit of some varaities ripen sooner

than that of others. The trees grow well in poor or rich soil, and bear abundantly in our mild climate (mountain side, if not too high), or hot climate (of the valleys). The soil for the fig must be dry. It will not flourish in wet ground.

The favorite varieties here are the Sangiovannaro, the Sottuno, the Melinciano, and the Ottato. The Ottato has smooth leaves; the peduncle of the flower and fruit is longer, and the fruit is sweeter than of other varieties. The fruit of the Ottato is best for drying.

The fig is here propagated from the suckers that spring up from the roots; cuttings from the tree also are used in propagation. Cuttings in this climate should be set in the months of February and March. In orchards the distance to be maintained between the trees is 8 meters (26 feet). The fig is long-lived, because it is constantly being renewed by shoots that put up from the roots taking the place of the main trunk when it becomes old and decayed. The soil must be worked in the spring, also in November following. The best varieties are grafted, also budded upon the stock of the wild fig. Grafting and budding are also done upon healthy trees of the best varieties. The time for pruning is in March, or when in blossom in June. All dead and diseased branches should be cut away. But little pruning is necessary. Too much is injurious.

Figs here are dried in the following manner: The fruit must be gathered when partially ripe. It must not be what is termed "dead ripe;" in other words, it must be more green than ripe. When gathered give the fruit a plunge bath in boiling water, removing them from the water quickly. Then place the fruit in a shady place. The next morning at sunrise spread the same upon a platform (not upon the ground, because of its dampness), that it may be flooded with sunlight. Here shallow willow-work baskets are used for holding the fruit while drying. These are never placed upon the ground, but in an elevated position. At going down of the sun the fruit must be covered to protect it from the night dews or unexpected showers of rain. Continue thus for several days until the fruit becomes dry.

When dry place the fruit in layers in small boxes or baskets, artistically and neatly arranging the same. Press the fruit down firmly by hand, and continue the layers of fruit until the vessel is full. The boxes (or baskets) must be securely covered and kept in a dry place.

The culture of the fig is not a specialty in this part of Sicily; but little of the fruit is exported from this district and none from Catania to the United States.

The raisin grape is not cultivated here. The grapes grown in this part are manufactured into wine.

For the information given on the culture of the olive and fig, I am indebted to our respected consular agent, Mr. N. Stella, of Syracuse. The foregoing statements about the olive and fig are almost a literal

rendering of his excellent Italian letter addressed to me on this subject. Mr. Stella has represented the United States at Syracuse for thirty-nine years past. He is certainly a veteran.

ALBERT WOODCOCK,
Consul.

UNITED STATES CONSULATE,
Catania, May 21, 1884.

MESSINA.

REPORT BY CONSUL JONES.

Varieties.—The best variety for drying are the fico albo, white fig (round), and the fico petrociano, purple fig (oblong). The best variety for eating when ripe are the brogiotto, the adottato, the graziano, the catalano, the palermitano, the verunio (winter fig), and the lardaio.

Tree planting.—The above-named varieties are grown throughout this province. They are not planted by themselves but are scattered through the vineyards, groves, orchards, and pasture-lands.

Distance from sea.—The fig thrives 10 miles from the sea-shore. The brogiotto and the petrociano do better near the sea than any other varieties. The graziano is ill adapted to low levels and sea-breezes.

Elevation.—The fig does well at an elevation of 2,000 feet above the sea-level.

Exposure to sun.—All exposures suit the fig. A northern exposure is the least desirable.

Position.—Hill-sides suit the fig best. At but a slight elevation above the sea the fruit is insipid and soon spoils. The finest trees are to be met with at an elevation of from 900 to 1,200 feet above the sea. Upland fruit has the highest flavor and the best keeping qualities.

Soil, etc.—The fig delights in a friable, dry, and somewhat cold soil, composed in special of the detritus of calcareous rocks. It shuns wet and marshy soils. The best soils for figs for drying are hill-sides of disintegrated calcareous rocks of the Tertiary and Quaternary periods. Soils in which sulphur abound are excellent for the fig.

Climatic influences.—Spring frosts and autumnal fogs are disastrous to the fig; the former kill the young buds and the latter cause the leaves to fall off, which prevents the fruit from ripening.

Temperature.—The fig requires a temperature of from 28° to 95° Fahr., average temperature, 66° Fahr.

Rain-fall.—The fig requires from 22 to 28 inches of rain annually. It suffers greatly during protracted droughts. Spring and summer rains are always of benefit to the fig. September rains are most injurious; they are heavy and so charged with nitrogenous salts that they cause the nearly ripe fruit to split.

Irrigation.—Irrigation is not required by the fig. When grown in

orange and lemon groves which are subject to irrigation the fig produces a large crop but its fruit is inferior in quality and is lacking in keeping qualities.

Cultivation.—The fig might well be called the pariah amongst plants. It is rarely worked—occasionally the soil is stirred around the base of the tree (in November). When grown with orange and lemon trees, vines, etc., being worked when they are worked, it comes into bearing early and dies early.

Fertilizers.—In this district the fig is not even fertilized with its own leaves, which are gathered and fed green to cattle. Stable manure does not suit the fig; ashes and rags are better adapted to it.

Pruning.—The fig is never pruned, as pruning causes the wood to rot; dead branches only are removed.

Picking and curing.—Figs for drying are left on the trees until they are overripe and soft. The season for gathering depends upon the time of flowering. The varieties that produce two crops a year, such as the fico albo and the fico petrociano, bear their first crop in June and July and their second crop in September and October. The fruit of the one crop varieties, the brogriotto, graziano, catalano, ripen in September and October.

Figs for market are gathered at sunrise or at sunset. Figs for drying are gathered at noon.

A small plot of land, near the farmer's house, is carefully swept and inclosed by a temporary brush fence. In this space large flat trays, made of reed cane, are laid on the ground, and the figs to be dried are spread out upon them. The figs are turned over daily at noon until they are thoroughly dried. They are left out at night unless it rains. Some figs are dried whole, others are cut in two. When dried the figs are strung on pieces of split cane 24 inches in length. If a fig does not split open when pressed between the first finger and thumb, it is thoroughly dried and ready for exportation.

Should it rain on figs put out to dry, they are put in an oven and dried. Figs dried in an oven are inferior to those dried in the sun. These figs are never dipped in any kind of solution whatever. They are cured simply as above stated. The exporter, not the grower, boxes this fruit.

Planting and propagating.—Properly speaking there are no fig plantations. Figs should be planted from 24 to 36 feet apart—dwarf varieties from 15 to 24 feet.

The best varieties are propagated by budding. The fig is also propagated by cuttings—the cuttings are set out in winter; no manure is used. Old fig-trees are cut down and the most vigorous shoot sent up by their roots takes their place.

Maturity.—Very few trees live forty years. The fig begins to bear the year it is set out and goes on bearing as long as it lives. At twenty it produces its maximum crop.

Insect pests.—The *Cossus ligniperda*, a large night moth, destroys nearly every tree that it attacks. The homopter, the *Columnea testudinata*, covers the trees with little pustules (fig-tree scale or mange) as it feeds on the tender twigs, leaves, and fruit. Remedies: Bleed the tree or sprinkle it with a mixture of kerosene and water—nine-tenths water to one-tenth kerosene.

The *Halterophora hispanica* eats into the pulp. Remedy: Smoke the tree during July and August with sulphur fumes.

There are no parasites of the injurious insects of sufficient importance to mention.

WALLACE S. JONES,
Consul.

UNITED STATES CONSULATE,
Messina, January 27, 1890.

NAPLES.

REPORT BY CONSUL CAMPHAUSEN.

Varieties.—The name of the best variety for drying is the Dottato, and for eating when ripe, the Troiano. The other varieties worthy of culture and for profit are, the Samese, the Nerolello and the Paradiso.

Situation.—The trees that produce the varieties above mentioned are grown in the province of Naples. The Troiano is largely cultivated on the plains of Sorrento, where it attains a height of from 30 to 40 feet and 18 inches in diameter. Some trees reach a height of 50 feet and yield about 900 pounds of green fruit per year, which matures between August and the first half of October. Some of these trees grow about 2,200 feet above the level of the sea in Mojano near Sorrento; but fig-trees grow generally on land, varying from 300 to 600 feet above the level of the sea. Figs are also largely cultivated in Basilicata and Calabria.

Climatic influences.—Rain is very beneficial to the trees and also to the fruit. What was said regarding the climatic influences regarding lemons and oranges, applies also to figs. During the months of June, July, August, and part of September, there is generally no rain at all, but the atmosphere is moist and vegetation hardly ever suffers from drought.

Irrigation.—Fig trees do not require any irrigation; neither are the orchards cultivated nor fertilized.

Pruning.—Every two years in the month of January, in the usual manner.

Picking and curing.—They are picked from July to September, when they begin to soften and the skins burst. After they are picked they are cut in two and dried in the sun and finally put in boxes. They are not dipped in any solution. The treatment is very simple, about like the drying of apples in the United States.

Planting and propagation.—The trees are planted about 30 feet apart, and propagated from sprouts, slips, or graftings. (All trees in this district are propagated by sprouts.)

The orchards are of all sizes. They (fig trees) are usually planted among other trees.

Maturity.—Sometimes one hundred years, bearing all the time.

Insect pests.—The *cocciniglia*, which must be looked for and destroyed by hand. There are no beneficial insects.

Cuttings.—Cuttings may be secured by writing to Dammann & Co., at San Giovanni a Teduccio, near Naples.

EDWARD CAMPHAUSEN,
Consul.

UNITED STATES CONSULATE,
Naples, January 31, 1890.

PALERMO.

REPORT BY CONSUL CARROLL.

The introduction of the fig-tree into Italy is so remote that it is difficult to even approximate the period thereof. Pliny refers to a tree which existed long anterior to the founding of Rome, under which the citizens of that city were wont to assemble to discuss the topics of the day, years thereafter. Tradition ascribes this tree to have been that under which Remus and Romulus were found, and in commemoration thereof it was preserved.

The fig-tree grows spontaneously in the arid wastes of Greece, Asia, and Northern Africa. In countries where the thermometer does not fall below 59° Fahrenheit, the growth and maturing of the fig proceed without any appreciable interruption, but in colder countries upon the advent of the first frost the fig-tree loses its leaves and those seed receptacles which, under favorable circumstances, would have continued to develop, harden, and remain inert until the following spring, when, with the return of warm weather, they resume their growth, being the first to mature in the summer. The figs thus resulting are denominated "fig flowers" in order to distinguish them from those which first appear in spring and mature later.

In hot countries the fig-tree grows to large proportions, and in isolated and favorable localities it assumes a beautiful form, without need of modification or pruning. Its branches project themselves regularly toward the earth from year to year, and finally reaching and entering it they throw out new roots, thus forming additional sources of propagation.

The tree prospers best in a deep, rich, moist, calcareous soil, but in a warm climate it will grow in almost any soil.

The fig tree is propagated from the seed, slips, and roots, as well as

by grafting, but the former method is rarely resorted to on account of the slowness thereof and only under peculiar circumstances.

A good method to propagate the fig on a large scale is to amputate a young tree at a point of about two inches from the ground and as a result, and soon thereafter, a myriad of sprouts or branches present themselves which in due time may be bent and the ends thereof buried in the ground to the depth of a few inches.

After the branches in question take root they should be amputated close to a joint, thus detatching them from the parent tree, each of which then being a separate tree, may be planted at pleasure.

There are many varieties of figs, differing in size and color, the white growing larger, and, in a fresh state, not standing transportation.

The fig in most favor here is that known as the "Indian fig." It is a native of South America and is the dried fig of Italian commerce. It only prospers, however in southern countries, and in calcareous ground without too much moisture, etc.

PHILIP CARROLL,
Consul.

UNITED STATES CONSULATE,
Palermo, March 7, 1890.

SICILY.

REPORT BY CONSUL LAMANTIA, OF CATANIA.

Varieties.—The name of the best variety for drying is the *Dottato*, an excellent quality of fig largely cultivated. Figs with fine peel and small seeds are also worthy of culture and best for drying.

The names of best varieties for eating, when ripe, are the *Sangiovannaro*; the *Datternolo* (an early fruit), and the *Natalino* (a late fruit).

The other varieties, worthy of culture and for profit, are the *Melanzana*; the *Olivuzza* (a small fruit), and the *Ficazzana* (a very large fig).

In reference to the latter, I desire to mention it, for the reason that it is an extraordinary large black fruit, bearing twice a year, viz, about the end of June; and the second crop, larger than the first one, commences in August and lasts till the end of October. This fig, however, is not for drying purposes, but simply for eating when fresh. The fig is so large that six generally weigh about 2 pounds.

Situation.—The trees producing said varieties grow around Mount Etna, as well as in the low lands of this province, from 300 to 6,000 meters from the sea-shore, and from 500 to 600 meters above sea-level. When exposed to sun, on level ground, they yield more fruit, but those on hilly, rolling land produce them sweeter. The same grow also by the sea-coast, and either in poor or rich soils. The soil must be rather dry, for in wet ground the fig-tree does not flourish well.

Climate.—The minimum temperature is 5 centigrades in January; the maximum 35 in August, and 17 average in May.

The sweetest drying figs are grown in mild climate land, while those in warm regions are fit for eating when fresh. Rain-fall in this province is known to be at an average of 25 to 30 inches per year. Rain favors these fruits greatly when they are small, before maturity; but when full ripe it hurts them badly, making them lose their natural, sweet flavor.

Irrigation.—Irrigation is never resorted to, the rain-fall being sufficient.

Cultivation.—Cultivation is very simple, and it does not require much labor to be done. A good digging in summer and winter time is more than sufficient. The planting is seldom done by rows and the trees are generally spread out through vineyards and olive groves, where they grow and bear well.

Fertilizers.—This plant, as a rule, is never manured in Sicily; but in arid lands it is always better to remove from time to time the ground, in order to give its base some fresh air.

Pruning.—Pruning is done by cutting off all the dead branches, and the best time to do so is in the months of March and June, or when the pitch is dry. In hot climates, however, pruning is not necessary, for the reason that the plant is one of those which, left to itself, yields always many fruits.

Picking.—Picking is done when the fruit is fully ripe, and generally not before the sun is up, so that the fruit is dried from the night dew. The process of drying is very simple, and is as follows:

Curing.—When the figs are thus gathered they are cut in two, and so set on planks and exposed to the hot sun's rays for drying. Every once in awhile they are turned to be dried on both sides. In the evening, however, they are taken into houses, or are well covered, to protect them from the night dew, dampness, or rain. After four or five days, when they are sticky dry, they are pressed by hand, facing one another together on the pulp sides, and then they are strung together with a big needle and twine and formed in *reste* (traces) of about 2 feet long. Others, dried in the same way, are passed through small sticks and formed in *chiappe* (square tables) of about 1½ feet each way. After this has been done the figs so dried and prepared are dipped for a few minutes in hot water, to prevent them from fermentation, and exposed to sun again for drying.

The small figs, however, are picked, dried, and cured in the same way, but not cut open, and pressed and packed with some laurel leaves in boxes, containing 25 pounds, and in round or square baskets for shipping, many of which are exported to the United States.

Planting and propagating.—The distance planted apart is from 20 to 30 feet. They are not planted in rows, but are generally scattered in vineyards and olive groves, where they grow and produce well. Prop-

agation is generally done by *succhioni* (suckers) springing from the roots, or by *talee* (cuttings). Seeding propagation is seldom used, as it is difficult, and trees so obtained take a long time to bear. The orchards are small ones in some localities, while in others are pretty large and give favorable production.

Maturity.—The fig-tree lives very long and almost perennial, for the reason that shoots springing from the roots take place of the old trunks on decaying.

Insect pests.—The insects injuring the fruit and tree are: The *Bostrico* (*Bostricus fici*); the *Coccinigliа* (*Ceroplastes caricae*), and the *Psilla* (*Psylla fici*).

The *Bostrico* is a very small insect, which digs a gallery in the trunk under the bark, causing the tree to rot, and dies. Said insects during the fall and winter abide in lethargy under the bark of the tree, and in summer, after they have joined together with the females, go on the branches to deposit their eggs.

The "cochineal" is known from the remotest times. At first blush it appears like a small piece of whitish wax, and, in fact, this insect, from its chemical composition, is of a wax nature, and, like the other cochineals, the females protect under them their eggs, and when dead their corpses act as a covering.

The fig tree, badly attacked by the said insect, follows the same phenomenon as the olive tree and acid fruit trees, in similar conditions. The leaves become covered with a sort of black smoke, owing to a very small microbus (fumago) generating from the sticky substance which forms the so-called melata (sugar and gum) exuded from the leaves, on account of the cochineal's presence, although they stay on the branches and not on the leaves. The damages brought the fig tree by the cochineals it is useless to speak of, as they are identical to those caused by other cochineal and aphis. The former insect is a very singular parasite, belonging to the calcididei's family. To destroy the same, it is necessary to cut all the branches off, when badly attacked, and burn them.

The psylla is quite different from the olive psylla. It generally lives on the leaves, sucking their humors and causing the tree to become quite a skeleton. Besides destroying them, the branches thrive ill, the fruits fail, and the tree remains damaged. The insect is a little larger than the olive's psylla, with greenish body and large transparent wings. The larva seems to have no waxen secretion, for the fact that no such substance is seen on the leaves like soft cotton.

VINCENT LAMANTIA,
Consul.

UNITED STATES CONSULATE,
January 22, 1890.

PORTUGAL.

THE AZORES.

A considerable quantity of figs is produced, but they are consumed in a fresh state, with the exception of a small proportion converted into an ordinary brandy for home consumption. Scarcely any are dried, the climate being unfavorable to the operation.

S. W. DABNEY,
Consul.

FAYAL, 1884.

SPAIN.

MALAGA.

REPORT BY CONSUL MARSTON.

Varieties.—The names of the best varieties for drying and eating when green are the *Hijo Verdijo*, thin skin, white, and very sweet when green and ripe; the *Hijos Blanco*, a white fig with harder skin, and the *Hijo Panetijo*, brown in color, inclined to purple. All the above are good to eat either fresh or as they say here "green," or can be dried as figs. The quality is in accordance with the order in which they are given.

The trees that produce the varieties of above-named figs are grown throughout all the province of Pralaja, Granada, Almeria, Sevilla, and all other provinces of Southern Spain.

Situation.—Distance from sea, 2 kilometers; elevation above sea-level, 100 feet. The more sun the better. Hilly land is the best. Sandy subsoil is best.

Climatic influences.—Temperature, 45°, 90°, and 78° Fahrenheit.

No record of rain-fall to be had here.

The trees require no more water than falls naturally in rain.

Irrigation.—No irrigation for figs.

Cultivation.—Dig around the roots in the latter part of November or December, to the depth of 18 inches, and use stable manure.

Fertilizers.—None used here.

Pruning.—In the month of December, by cutting the ends of all projecting branches.

Picking.—In month of August, when full ripe and when the sun is shining brightest.

Curing and packing.—When the figs are quite ripe they are picked only on fine days, during sunshine, and are cured in the same way that raisins are dried. The sun furnishes all the heat required. It is enough to construct simple divisions made of either brick or stone, exposed to its rays, in an inclined position, say 10 yards long and 2 yards wide. The

divisions or apartments are built up at one end with a sort of triangular masonry, which, from afar, gives them the appearance of a range of uniform tombs. The triangle is so constructed that the sun, during clear days, never fails to shine upon the contents, the interior of these divisions or compartments being filled with fine gravel which attracts the heat.

Immediately after picking, the figs are placed in these divisions, and are exposed to the heat of the burning Andalusian sun of August. Never, it appears, have they dreamed of ascertaining the degree of heat thus obtained, but the experienced cultivator affirms that they do, during the heat of August, attain a temperature of 145° Fahrenheit.

At night-fall a very simple method of covering is applied to guard the figs from the heavy dews or rain, either of sail-cloth or heavy canvas, so arranged that it covers entirely the figs that are drying within, and being supplied with rings on the two sides, slide up and down as a curtain at a moment's notice, in many places planks or boards are used for covering, giving the appearance of a sort of roof. The figs during the process of drying, which occupies from ten to fifteen days, are turned over and over, in order that they may dry and color uniformly. When completely dried they are then packed in boxes, or frails, the latter made of the palm leaf dried, nailed or sewed up, and are then ready for shipment. They are not dipped in any solution.

Planting and propagating.—Planted apart about 5 yards, and propagated by planting a branch when the tree is beginning to bud.

The orchards are mostly large.

Maturity.—The tree begins to yield in six years and lives seventy-five to one hundred years.

Insect pests.—There are no insect pests or parasites.

Cuttings.—Cuttings can be secured by arranging with some grower of figs to give or sell the cuttings about the time of sprouting.

H. C. MARSTON,
Consul.

UNITED STATES CONSULATE,
Malaga, December 6, 1889.

TURKEY.

REPORT BY CONSUL-GENERAL HEAP, OF CONSTANTINOPLE.

[Republished from Consular Reports, No. 41½.]

Production.—The fruit of the fig tree may be reckoned among the staple foods of man for ages before cereals were cultivated by any settled agricultural population. In the temperate regions, where it thrives best, it fills the place of the banana of tropical climates, and yields fruit during several months of the year. In Asia Minor, where

the tree is found wild and where the best figs of commerce are grown, it is extremely fruitful.

The best figs for drying come from the valleys of the Meander and the Kaistros, to the south of Smyrna, where the trees are planted with great regularity and care, and the ground is dug and hoed from four to six times during the summer. When the figs reach Smyrna they are sorted by women and packed in boxes by men. They are best when newly packed, and as months go by get drier and harder in the warehouse. No one who has not eaten them in the Levant, packed in the ornamental drums in which they are sold for local consumption, knows what the best figs are like. The cardboards of the fig boxes are supplied chiefly by Belgium and Austria.

Two seasons ago 54,000 camel-loads of 4 hundredweight each had reached Smyrna by the 22d of October of that year; and the production increases annually. Fifteen years before that time not more than half that amount was recorded for the whole season.

England, Germany, and the United States take the greatest part of the figs exported. France, where the smaller and much inferior figs of the Mediterranean are consumed, takes little of the finer kind of the figs of Smyrna.

The improved facilities of transport which have so much increased the stock brought to market have also brought down prices. Taking averages, prices ranged about ten years ago from $4.08 the kintal (112 pounds) for Aidin figs, to $8.75 for Elémés, while the very best, the Ekinis, sometimes brought $19.22 the kintal, or nearly 16½ cents per pound. Now small parcels of excellent quality bring about $6.60 the kintal.

Although throughout the world there are to be found about one hundred different species of figs, only some five or six kinds are cultivated in this country. Of these, the best description are called Elémé, and are grown most largely and in the greatest perfection in the districts around Smyrna; but considerable quantities are also grown in other parts of Asia Minor. The fruit is of various colors, from deep purple to yellow or nearly white. The tree usually bears two crops, one in the early summer from the buds of the previous year and the other in the autumn from those of the spring growth. The last forms the chief harvest.

Yield.—The trees are propagated by seeds and suckers, and frequently by layers and cuttings. When young they require care in pruning, and the immature fruit formed late in the summer should be removed to strengthen the shoots.

The *Ficus carica*, which yields the well-known figs of commerce, is a bush or small tree, rarely more than 18 or 20 feet in height, with broad, rough, deciduous leaves, very deeply lobed in the cultivated variety, but in the wild plant nearly entire. After the young tree attains maturity it receives but little care beyond being occasionally lopped in places and being well manured in the fall of the year. The fruit begins to ripen at

the end of June, and the summer yield, which gives employment to a large population, comes to market in immense quantities in September and October. The trees sometimes give a third crop, which ripens after the leaves have fallen.

Curing.—When ripe the figs are picked and spread out to dry in the sun, the sugar which they contain in abundance being thus rendered available for their preservation, those of better quality being much pulled and extended by hand during the process. Thus prepared, the fruit is packed closely in barrels, rush baskets, or wooden boxes for commerce. Recently the practice of preserving fresh undried figs has been adopted, but the amount used in that form is as yet insignificant compared with the quantities that are preserved by drying.

OBSERVATIONS.

Figs, especially when fresh, are largely used by the local population as an article of food. The trade in this fruit is of long standing and of very considerable importance in this country. During the year 1880–'81 Smyrna district exported 6,991½ tons, worth at the port of shipment $1,646,998.89. The exportations were principally to England, Germany, the United States, and France. In one fortnight no fewer than 195,000 barrels, cases, bags, boxes, drums, and baskets of figs and raisins were shipped from Smyrna alone. The export trade of figs at the other Turkish ports is unimportant in comparison with Smyrna. Figs are grown largely in the other provinces of Turkey, but the quantity exported is small compared with Smyrna. They produce but little more than is sufficient to meet the local demand, but if railroads existed in the interior the production would be immensely increased.

It is probably not generally known that a considerable quantity of the inferior kinds of figs find their way to the Austrian "chicory coffee makers" and the French brandy distillers. Much liquor labeled "fine champagne," "cognac," etc., owes its origin to the refuse of the Smyrna fig market.

G. H. HEAP,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Constantinople, April 10, 1884.

DARDANELLES.

REPORT BY CONSULAR AGENT CALVERT

Varieties.—Figs are not dried here. The best variety for eating when ripe is the Syah Ingir (Black fig).

Trees.—Very few trees of other kinds are cultivated. The trees producing these figs are grown in Thracian Chersonese, Dardanelles coast, and elsewhere. They are planted from the sea inland, but not above 1,500 feet, and open to all exposures.

Soils, etc.—All soils and position, rocky ground with sunny exposure, produce the best flavored fruit.

Alluvial, light, and stony soil in general; hard subsoil is best suited to the fig.

Climatic influences.—Rarely above 90° or below 5° Fahr.

Rain-fall.—Thirty inches per annum. Much rain is apt to cause the fruit when ripening to split and decay.

Irrigation.—Irrigation is not practiced.

Cultivation.—No method of cultivation practiced.

Fertilizers.—No fertilizers are applied.

Pruning.—No pruning. Suckers are removed.

Picking.—When the fruit matures the early morning is the best time for picking.

Planting and propagating.—Trees are planted from 15 to 30 feet. The ordinary method of propagation is to take a cutting (or branch *torn off* preferred) 3 to 4 feet in length, with terminal bud. A trench about 20 inches deep is made, the branch is layered with the end projecting 4 to 8 inches above ground. If the summer be dry, a little water is given the first year. Suckers and spray-wood are not generally planted (unless to be grafted like the wild fig) as they produce fruit inferior to that of the parent tree.

Orchards.—All sizes.

Maturity.—Fifty to a hundred years. Fruitful till decay. The stem, when it decays, is almost always replaced by its offshoots.

Caprification.—A contested question is that of caprification. The prevailing idea is, the parasite of the *Ficus carica*, or wild fig (called by the natives the male fig), fertilizes the cultivated tree. The *Blastophaga grossorum* and *Cynips sycomori* are now recognized to be the apterous male and winged female of the same insect. So rooted is the idea that in a year of scarcity the puff figs are sold at $2 and $3 per pound to suspend on the cultivated fig-tree. A series of observations have been made to test the theory in different countries. I was requested by Sir S. Saunders, of the Entomological Society of London, to contribute by the examination of the fig-trees in these parts. Like all the other observers, I found the parasites and their ichneumonidæ in abundance in the wild fruit, but failed to discover any trace of these insects in the cultivated fruit at any stage of its development.

Insect pests.—A kind of blow-fly attacks the fruit sometimes when mature, especially when damaged by rain.

Cuttings of best varieties can easily be secured.

The matter relating to the parasites was published in the Entomological Monthly Journal (London). No Government statistics exist.

FRANK CALVERT,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Dardanelles, February 11, 1890.

PART IV.

THE VINE.

CONTINENT OF AFRICA.

MOROCCO.

REPORT BY CONSUL MATHEWS, OF TANGIER.

(Republished from Consular Reports, No. 41¼.)

The grape-vine is truly a cosmopolitan plant; is a gross feeder; it will flourish in the richest soil as well as in the poorest, on hills and in valleys and amongst rocks; in fact it will grow and its roots will find their way in the smallest crevices of rocks, where no other plant will grow; the vine will stand repeated droughts as well as the most severe winters. The preferable soil is that which contains alkali and lime. Manure will increase the yield of fruit and assist in resisting diseases and insects.

The vine will live in, but is impatient of, continued or stagnant wet soil.

The vine raised from cuttings is capable of producing a given quantity of wood and fruit to perfection, and if allowed to exceed that proportionate quantity, a small, unripe fruit, and rusting, shriveling, or other evils will be certain consequences.

When a little less proportion of wood and fruit than the vine can mature is left on it no evil can be derived, but certain advantages.

The vine bears on shoots of the present year out of the wood of last year; hence the practice of leaving a sufficient quantity of last year's wood.

There are numerous ways of pruning vines; every country, in fact every province, has its favorite way; but always bearing in mind that so long as a proper quantity of last year's wood be preserved, and not too much be left to push fruit and wood, a vine will bear, the actual style of pruning and training may be suited to the place in which it has to grow. In Jerez and other places they cut the first roots near the surface of the soil, to allow the lower roots all the force to penetrate deeper in the soil; in other places they condemn this practice. Still, the Jerez vineyards, treated as stated, leave nothing to be desired.

The length of barren stem before the branches are allowed to start is immaterial; therefore a vine with its bearing wood 30 feet high on the roof of a house and a bare stem all up the front will give as much and as fine fruit as a fellow-vine with its bearing wood within a foot of the ground.

The vine is propagated from cuttings, by grafting, by layering, from eyes, and by seed.

The vines propagated from cuttings, graftings, layering, and from eyes, being the direct issue of wood centuries old without intermixture, are sooner or later liable to run out by impoverishment and produce numerous diseases and evils, and lastly the phylloxera, although it is said that a well-manured and well-kept vine will not be troubled by the latter pest.

Propagation from seed is the most natural, and more important and certain of success than all others. It is from seeds that the innumerable varieties are obtained. A vineyard reared from seed will not be troubled by the phylloxera, even if the surrounding vineyards are all infested with the pest. The strong phosphor and youth in the vine raised from seeds will not permit the phylloxera to live; whereas the exhausted vine raised from cuttings, the origin of which is perhaps centuries old, and which have lost those peculiar defensive fluids of phosphor and potash, will breed the phylloxera, in the same manner as parasites and other miseries are created on old, wasted, careless men or poor animals.

Propagation from seed is a very simple operation. Obtain seeds from all the finest varieties of grapes and raisins; sow the seeds in compost of loam, sandy soil, and dung manure, equal quantities, in the month of January or February if in Upper California, or in November or December in Lower California. They will grow rapidly, and as soon as they can be handled well plant out the desired distance 5 or 6 feet each way, and water well with manure water, and they will make a good growth the first season. They should be fastened as they advance to prevent the wind from breaking them, and they may be then treated and trained like plants from cuttings or eyes as soon as they are large enough. On the sixth year they will bear fruit, which will improve in size and quality as they advance in age. On the seventh year the selection is made, leaving the finest varieties, and grafting those varieties which may not be found acceptable; they can be grafted from the others or from any other old plants, as the young roots will stand the attacks of all pests. When no selection of new varieties is desired, seedlings can be grafted when two years old of cuttings imported from foreign countries of the finest, choicest varieties. When planted the results are uncertain, according to the nature of the new soil when they are set, while choice seeds on new soil are certain of producing some of the most excellent varieties, particularly if the young plants are encouraged by attentive cultivation.

Manures.—Return to the vine all that which it has given with the exception of the wine. Here is the great reform, of easy execution and fecund results. The lees and drosses of the wine-press and of the casks where the wines have fermented, the skins of the grapes, the ashes of the cuttings, and the residue of the distillery after evaporation has taken place until dry in the open air—these are the most precious manures for the vine, owing to their richness in alkaline salts.

Phylloxeric Congress.—The members of the International Phylloxeric Congress, which had its session at Bordeaux, affirmed that they obtained satisfactory results in their vineyards by submersion.

The submersion, according to their opinion, gives luxuriance to the wines, because water supplies phosphor and potash, both of which elements are indispensable to those plants, and of which elements much is used up in the shoots, leaves, and fruits yielded annually, and submersion restitutes them in the proportion which is mixed with water.

The submersion should be made by leaving the water standing in the vineyard, as in this manner the phylloxera dies quicker by drowning for want of air, because if the submersion is made through running water, the current of which carries air with it, the insect is not destroyed.

Phylloxera takes a longer time to die by submersion in winter, on account of the slower evaporation of the water.

Finally, submersion will always give good results if it brings to the vine the necessary quantity of potash and phosphoric acid.

These are the conclusions arrived at in the discussion sustained by the vine-growers, who agreed on this point with scientific men, each side of which brought forward their arguments.

FELIX A. MATHEWS,
Consul.

UNITED STATES CONSULATE,
Tangier April 2, 1884.
156A——25

CONTINENT OF AMERICA.

SOUTH AMERICA.

ECUADOR.

REPORT BY CONSUL BEACH, OF GUAYAQUIL,.

[Republished from Consular Reports No. 41½.]

Until very recently no attempt has been made to grow grapes in Ecuador, except here and there vines about dwelling-houses. These have been grown on frames or poles, and with little or no attention to pruning or cultivation. Nearly all classes of grapes can be grown to perfection. Of late some attention has been given to the subject in the interior; and on mountain sides, between ranges of the Andes, at an altitude of from 6,000 to 8,000 feet (the soil decomposed lava), small vineyards have been started with very favorable results, indifferent cultivation considered. The vines are set by digging a hole with a hoe, and are cultivated only by the use of a *machete*—a long, broad-bladed knife—with which all other vegetation is cut down. The land costs little or nothing, and the laborer is paid 20 cents a day and kept. The vines are grown to stakes. As considerable wine is consumed in the country, the National Congress, now in session, to promote grape culture, has passed a law that all persons engaged in their cultivation shall be exempt from military service—a great inducement to engage in the pursuit, as the numerous revolutions have made frequent calls for soldiers, retarding all industries. The value of the grape crop per acre can be approximated by the value of wine, the most common bringing $1.25 per gallon. The yield of grapes would doubtless be as large as elsewhere under similar cultivation. It is not known that grapes may not be grown in any section of the country. The general conditions appear to be favorable for the growth of raisin-grapes, but I can not ascertain that the experiment of growing them has ever been tested here.

HORATIO M. BEACH,
Consul.

UNITED STATES CONSULATE,
Guayaquil, February 26, 1884.

CONTINENT OF ASIA.

ASIA MINOR.

REPORT BY CONSUL STEVENS, OF SMYRNA.

[Republished from Consular Reports No. 41½.]

Aidin.—The vilayet of Aidin contains about 35,500 square miles, and has a population of nearly 1,000,000. It is the most productive and in all respects the most important section of Asia Minor. It lies in latitude north 38° 28′ 7″, west 1° 50′ 44″ longitude of Constantinople, compared with the meridan of St. Sophia. Two considerable rivers flow through it. The arable surface is made up of valley, table-land, and hillside. The soil, except in the more mountainous districts, is extremely fertile and easily tilled. The climate is mild and admits of field labor at all seasons of the year.

Climatic effects.—The cultivation of fruits, figs, and raisin-grapes, especially, is extensively carried on. Smyrna figs have a world-wide reputation for excellence. The raisins produced are also of superior qualtiy. The natural conditions are favorable, and to this fact more than to the methods pursued in cultivation must be ascribed the success attained. To reach the fullest development of which these fruits are capaple a semi-tropical sun, unobscured by clouds during the summer months and early autumn, is needful. A wet winter and early spring with a dry summer and autumn are conditions most desired by the cultivators of these fruits, and indeed for nearly all the other crops of this region. The accompanying table, marked A, showing the amount of the rain-fall in Smyrna for each month, beginning with the year 1864 and ending with 1882, will be found useful in this connection. To enable American fruit growers to estimate the influence of climate upon the raisin product here it should be stated that, even in mid-winter, frosts are very infrequent, and the freezing point is rarely reached. The spring is very short, the transition from the cold rains of winter to the balmy breezes of summer often being almost immediate, but the hot season does not set in until the middle of May. From that time until the middle of September the thermometer ranges from 78° to 90° in the shade. For weeks successively there is very little variance in the temperature. Both in winter and summer the wind for long intervals blows from one quarter. On the sea-board the heat of summer is tempered by a breeze from the sea, called "imbat," which blows fresh and strong nearly every afternoon.

Coming now to the specific interrogatories, I submit the fullest information obtainable upon the subject.

Situation.—The vineyards are located on table-lands and hill-sides, the latter always facing the south. The soil of the former is sandy and of a light red color, the alluvion of torrents; that of the latter, calcareous and clayey. Vines planted on the plains are more productive than those planted on the hillsides, but do not last so long, the latter continuing in good bearing condition for well nigh a century, while the former became barren at the age of thirty years, sometimes sooner. The quality of the hillside product is far superior.

In the vicinity of Smyrna vines are planted near the sea-shore, but there are flourishing vineyards in localities from 7 to 20 miles inland. Vineyards planted near the sea-shore are often injured by mists and fogs.

Varieties.—Four kinds of raisins are cultivated, viz, Sultanas, Red, Black, and Muscadine. The Sultanas are not palatable while fresh, and are marketable only when cured. The black and red are excellent while fresh, and are put in that condition on the local markets in large quantities. There is also another variety of black grape which is cured and shipped to France, where it is used in the manufacture of wines. The wines made in Smyrna are the product of the same variety of grape.

The vines on the coast run the greatest danger during the months of March, April, and May, from the cool, damp mists blown in from the sea. The losses sustained from this cause are frequently from 20 to 30 per cent. of the total yield.

Pruning.—Pruning is done in December and January with small, sharp saws, curved at the end. The branches are cut about 1 foot 6 inches from the ground. Care is taken to do this work during the first and second quarters of the moon.

Planting.—Vines are planted from the beginning of March to the middle of April, according to nature of soil and atmospherical condition, the ground having been dug the previous summer to a depth of 3½ feet. This manner of planting was introduced here some twenty years ago by emigrants from the Grecian Archipelago, and gives the best results. Another and older method is to plant fields which have been plowed over three or four times by the plow of the country, which dates back to the infancy of ancient Greece.

Cultivation.—The cultivation of vines in vogue here is as follows: In November trenches are dug round the vines and filled with manure. Six weeks later, as above stated, the process of pruning begins. During January, February, March, and April the vineyards are dug twice only, the first time at a depth of 1 foot 6 inches, taking care, of course, not to injure the roots, and the second time very lightly, in order to destroy the weeds which absorb the moisture necessary to the plants. The process of watering vineyards is not in favor with the growers of this province.

Maturity.—The Black, Red, and Muscadine vines begin to yield in their third, but do not reach their full strength until their fifth or sixth year. The Sultana vines begin to bear in their fifth and attain the maximum of production in their seventh or eighth year. A good, healthy plant will produce about 25 cwt. per acre, but the average yield is from 10 to 15 cwt. per acre.

Vintage.—The grapes begin to ripen about the 1st of July, the Sultanas being the earliest. Their vintage begins towards the end of July and lasts till the middle of August. The vintage of the Red grape begins by the end of August and lasts till the 20th of September; that of the Black in the early days of September, ending with October. The Muscadine is gathered during the second half of August. An excellent wine is made with this variety, but in small quantity. Less than 5,000,000 gallons of wine are manufactured annually in this province, although the best materials are at hand and in great abundance.

Rain-fall.—It happens occasionally that rain falls during the vintage time, causing heavy losses to growers through the inevitable deterioration of quality. This was the case last season, and large quantities were in consequence shipped to France to be made into spirits.

Cultivation.—The work required in the cultivation, gathering, and curing of the grapes is performed by hand, and, notwithstanding labor is cheap, is rather costly. The average yield per acre per annum is valued at about $88. The value of vineyards per acre is about $440, and the cost of a crop per acre, tithes to Government included, is nearly or quite $50.

Exports.—The exports of black raisins amount yearly to from 800,000 to 900,000 cwt.; 70 per cent. of this quantity is shipped to France; the remainder finds its way to Austria, Germany, Russia, and Roumania. The best quality of black raisins is exported to Roumania, to the extent of 45,000 cwt. per year. In general, the crop of raisins of all qualities and kinds, in the province of Smyrna, amounts to about 1,900,000 cwt. It is yearly increasing. Out of this quantity 650,000 cwt. consist of Sultanas, 80 per cent. of which is exported to England, 10 per cent. to Russia, and 10 per cent. to Germany, Austria, and the United States.

W. E. STEVENS,
UNITED STATES CONSULATE, *Consul.*
Smyrna, February 28, 1884.

MITYLENE.

REPORT BY CONSULAR AGENT FOTTION.

[Republished from Consular Reports, No. 41½.]

Vineyards are cultivated at Mitylene in valley, table-land, and hill-side, inland and on the sea-coast. They are cultivated very near the sea-coast because here there are no sea-fogs. The custom of pruning

in the best-conducted vineyards is at the end of January or during the first half of February. All the large vines are pruned on two stems, but middle-sized and small ones on a single stem, preserving one eye more. In March the first work is done on the vine, when the first digging is done. In April they sulphate the vine, and in May give the first nipping to all branches which grow very rapidly. In June they repeat the sulphur. In July and August the heat does not permit any work on the vines. The harvest begins about the first half of September, and usually about the end of October the second digging is finished. At the close of autumn and in the winter, manure is used for old vines, but in very moderate quantities, about 4 pounds per vine in best soils and 7 pounds per vine in medium, and 10 to 12 pounds per vine in poor soils. They are manured every three years. The character of soil where best results are obtained is on a shallow dry soil, receiving the sun's rays, on hill-side, valley, or table-land. The vines here come into full bearing the fourth year and they remain fruitful until the fifteenth year.

No system of artificial irrigation for raisin culture exists here.

The yield value per acre per annum is about $68, and the cost of crop per acre is about $1. The different kinds of vines grown are: In districts of Kallonie red grapes and white grapes, from which are made the celebrated Kallonie wines, anciently *Anthosmias*. In the districts of Ploumari black grapes, from which are made the celebrated Kountoura wines, very much better than the Bordeaux. All the wines made at Mitylene are for home cosumption; the export is insignificant.

M. M. FOTTION,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Mitylene, March 12, 1884.

SYRIA.

BEIRUT.

REPORT BY CONSUL ROBESON.

[Republished from Consular Reports, No. 41½.]

In the district of Beirut, vineyards are mostly planted on high table-lands or hill-sides (where the best results are obtained), at an elevation of from 1,000 to 4,000 feet above the level of the sea. Some years ago a disease something like mildew spread in Syria, and destroyed most of the vineyards. Asphalt was used to counteract the same; but little, if any, benefit was gained by its use. The only remedy was to destroy the affected vines, and plant in their place plants taken from healthy vines. In January and February vines are pruned; two or three strong shoots are left on each vine.

The soil best adapted to the cultivation of the vine is reddish-black in color; however, grapes are raised in all kinds of soil, but when the

vines have not the advantage of rich soil, they require to be carefully cultivated. Hill-side and table-lands are preferred for the planting of vines for raisins. Vineyards are plowed three times a year: 1st, in December; 2d, after the pruning of the vine stocks; and 3d, a short time after the appearance of the leaves.

The vines come into full bearing in six or seven years; they remain fruitful fifty or sixty years if properly cared for. In regard to the irrigation there is no system of artificial irrigation in practice for raisin culture throughout this country. It is considered that the watering of vines, by increasing the juice, diminishes the sweetness of grapes, and they become, in consequence, unfit for raisins. The yield per acre per annum is estimated at from 2,000 to 3,000 pounds, the average value of which is from $15 to $25; the cost of cultivation amounts to about $5.50.

JOHN T. ROBESON,
Consul.

UNITED STATES CONSULATE,
Beirut, May 3, 1884.

ALEPPO.

REPORT BY CONSULAR AGENT POCHE.

[Republished from Consular Reports, No. 41¼.]

In the vicinity of Aleppo very few vines recently planted are found. As a large majority of the inhabitants of this country are Mohammedans, they are prohibited by their religion from using any alcoholic drinks, and the manufacturing of wines being constantly forbidden to them, the vine is only planted for its fruit, and the cultivation of the same is very poor. The care taken of the vine consists of pruning and the frequent plowing of the soil. Vines are indifferently planted on the declivity of the hills or table-lands, in reddish soil, both near to and far from the sea. The slopes exposed to the wind are preferable. No consideration has been given to the disease of the vine, for want of competent persons to examine the same, although the vine disease has raged in some parts of this country. The vine begins to produce in the third year; in the sixth it comes into full bearing, at which time it yields about 20 to 30 pounds of grapes. It lasts for a great number of years. When the stem is opened up it is cut and the root shoots anew, and the vine produces again after three years. No system of artificial irrigation is adopted. The fruit is either used fresh or dried. The planting is made at the same distance as the olives; *i. e.*, about 20 feet between each plant. Raisins are cured, just like figs, by being dried in the shade and then steamed.

F. POCHE,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Aleppo, April 16, 1884.

HAIFA.

REPORT BY CONSULAR AGENT SCHUMACHER.

[Republished from Consular Reports, No. 41½.]

Raisins are not produced in my consular district; but as we have been engaged in the culture of grapes for the past ten years, and this question being closely related to the question upon raisins, I want to answer it at the same time.

Experience has shown that southern hill-slopes and table-land are equally well adapted for grape culture, whilst in valleys and on plains no very good results have been obtained. Directly on the sea-coast grape vines do not prosper near as well as in the interior.

The vineyards of the American-German colony here are situated about a half mile from the sea-shore; the close proximity of the sea (we never have fogs), however, appears to act injuriously to the vines, as we have but very little dew, which further inland falls abundantly, and which causes the vines to remain fresher during the rather hot and rainless summer months. In the mountainous district of "Belâd Bishâra" (Galilee), at an altitude of 1,500, to 3,000, feet above sea, the saccharine contents of grapes is greater both in quality and quantity, so that wine made from them has a finer flavor; the acidity contained in the grapes cultivated in the vineyards near the sea-shore, and which makes wine made from them unfit for exportation, is almost entirely absent in the grapes from Galilee. Besides this, our vines suffer from mildew. This is a flour-like substance which surrounds the berries of the grape when they are about half grown, preventing them from developing and ripening. Every locality of our vineyards, whether in a valley or on a hill-side, has suffered with this mildew, but the higher elevated the vineyards are the less they suffer.

As a remedy we were advised to strew the grapes, shortly after blossoming, with powdered sulphur, but it did not prove to be very efficient with any of the foreign or native varieties. The Isabella (a blue grape originally imported from the United States) was the least affected of all, and in some spots did not suffer at all. Experiments will have to be made yet whether we can not find a variety which is not subjected to this malady.

According to information from natives, thei r vineyards in the interior have at times also been affected with mildew, b ut it disappeared after it had lasted seven years, whilst we on the sea-coast have had to contend with it for nearly ten years. But we find on the slope of Mount Carmel, where our vineyards are located, ancient wine-presses and cisterns cut in the solid rock, which shows that grape culture must have flourished here formerly. From experience thus far, I can make the assertion that for this region grape culture does better in the interior than on the sea-coast.

Pruning.—The vines are pruned in the months of December, January, and February. The first-grown shoots are cut off, so that only four or five buds remain on them. A reddish humus soil with limestone beneath appears to be especially well adapted for vines. The ground is worked twice with the hoe, the first time after pruning, and then again when the first leaves come out. The vines come into full bearing after four or five years, and remain fruitful until they are at least fifty years old. No vineyards are irrigated here, and if practiced would tend to diminish the saccharine qualities of the grapes. The yield is from 400 to 800 gallons per acre per annum.

JACOB SCHUMACHER,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Haifa, February 20, 1884.

SIDON.

REPORT BY CONSULAR AGENT ABELA.

[Republished from Consular Reports No. 41½.]

Position.—Vineyards are placed in this section of the country mostly on the high mountains or on high lands from 2,000 feet in elevation to 5,000 feet above the sea-level. A southern exposure is preferable to any other. Vineyards on the mountains away from the sea give somewhat better crops than those near. The vines are not injured by clouds or mists; fogs are very rare in this climate, and seem to do no harm. Vines grow within two miles of the shore, but do not give the best results. About thirty years ago all the vineyards of this land were blasted by mildew, and the only effectual remedy was to dig up the old vines and plant new ones from stock untouched by the mildew.

Pruning.—Before the vines put forth leaves they are very closely pruned, all shoots being cut off, with the exception of two or three left quite short.

Soil.—The nature of the soil makes little difference. Red, loose soil is preferred. Stony, rocky soil produces the best grapes.

Cultivation.—In the best vineyards nothing else is planted in the soil, nor is manure usually applied. The ground is plowed three times a year, which in this land is merely scratching the surface, the object being to pulverize the soil.

Bearing.—Vines begin to bear fruit about the fourth year. Good crops are raised by the seventh, but the fruitfulness increases to the fifteenth year.

Irrigation.—No system of irrigation is practiced anywhere, but is considered very injurious to the crop.

Yield.—This, of course, varies from year to year, and according to the soil, etc.; but on the average may be estimated at about 1,500 pounds to 2,000 pounds the acre.

SHIBLY ABELA,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Sidon, February 21, 1884.

TARSUS.

REPORT BY ACTING CONSULAR AGENT AVANIA.

[Republished from Consular Reports No. 41½.]

The best sites for the culture of vineyards are the hill-side lands, the table-lands, and in general all light soils. The interior of the country is better suited than the coast. In this province there are but very few vineyards in the vicinity of the sea. The largest part is at a distance of from 9 to 12 miles and upward. At Mersine there are some vineyards at a distance of from one-half to 3 miles, the produce of which is middling. Mildew and fogs not being very frequent all along the province, vineyards never suffer from the same; consequently no specific is used. Sulphur, however, is the only remedy used, as in Anatolia. In this country, and I think in all the Levant, vineyards are never irrigated; the winter and spring rains are sufficient. The best results are obtained where the soil is a light reddish and more or less sandy. Vineyards are cultivated twice a year, because if they are kept free from parasites, and in condition to absorb the necessary water, they yield better and last longer. In Adana, a vineyard country, people sow even cotton and sesame in the vines without prejudice to the same. After the third year of their plantation the vines come into full bearing and begin to give fruit, which increases gradually. They remain fruitful till their fortieth year. However, vines last fifty or sixty years, and give relative fruit if they are regularly cultivated and pruned annually. The pruning of vineyards commences about the end of January. The pruned branches, when sound, are used for the plantation of new vineyards.

There is not any system of artificial irrigation in this province. The rains that fall are sufficient to revive the plants.

The yield, value, and cost of vineyards per acre (of 49 square acres) are in this country as follows: In every acre from 150 to 160 vine-stocks are planted, which yield on an average from 13 to 17 pounds of grapes each; value from $50 or $60 per acre. In this country, where the wages of workmen are rather low, the keeping of vineyards costs but little.

The greatest part of the grapes produced are absorbed by the local

consumption either in their fresh condition or for distillation. Nevertheless since France began to ask for foreign grapes a quantity of about 3,300,000 pounds of raisins at a value of $66,000 is annually exported from this province. The raisins destined for exportation are dried up in the sun, placed in bags, and sent to the sea-ports to be shipped in steamers.

ELIE AVANIA,
Acting Consular Agent.

UNITED STATES CONSULAR AGENCY,
Tarsus, March 3, 1884.

TRIPOLI.

REPORT BY ACTING CONSULAR AGENT YANNI.

[Republished from Consular Reports No. 41½.]

RAISINS.

Vineyards are found in all parts of this district, but especially in the hedges surrounding the orchards of the large village Elminyeh, about 6 miles northeast of Tripoli, on the hill-sides of the Dunniyeh district, in the elevated valleys of the Lebanon, and on the table-lands of Elkoura and El-Zawiyeh districts.

The above-mentioned village, Elminyeh, is very close to the sea.

Nothing is known concerning injury caused by sea fogs or mist. The only injury to the vines occurred in the District of Dunniyeh, about thirty years ago. This district is some 9 miles from the sea, and before the time mentioned was famous for its excellent grapes. Some disease of an unknown character reduced these grapes to a very poor condition, so that the vines were almost destroyed. It is only within the last ten years that the vines of Dunniyeh have begun to revive.

In February and March, after the heavy rains are over and the sun's rays begin to animate vegetation, people begin pruning the vines by cutting off all the branches of the last year, so as to give place for others. All kinds of vines are not pruned, for there are some sorts which need no such treatment except in case of dead branches only, which are cut off.

Vineyards are planted in all soils, but the best results are obtained from those of siliceous character.

The lands planted to vines are cultivated four or five times a year, and if neglected the product is correspondingly small.

Vines begin to bear in their third year, but do not come to maturity before the fifth year. They remain fruitful as long as they are properly attended, except when they are planted among olive trees, which, when grown, kill not only vines but other trees. Vines in such situation rarely live more than fifteen years.

There is no need of irrigation for the vineyards of this region; and in consequence vines are planted where no irrigation takes place.

The estimated average yield from each vine is 5 to 10 pounds of grapes, worth from 4 to 8 cents for the whole product. The expenses are about 7 per cent. of the income.

G. YANNI,
Acting Consular Agent.

UNITED STATES COSULAR AGENCY,
Tripoli, March 18, 1884.

CONTINENT OF EUROPE.

AUSTRIA-HUNGARY.

REPORT BY CONSUL-GENERAL WEAVER.

[Republished from Consular Reports No. 41½.]

INTRODUCTION.

Although the raisin industry, strictly speaking, does not exist in this empire, and the production of figs, olives, oranges, and lemons is very unimportant, yet it is thought that the grape and wine industry and the commerce in tropical fruits may be of sufficient interest to the fruit-growers of the United States to warrant the transmission of the following items in regard thereto.

The Austro-Hungarian Empire is situated between 42° 10′ and 51° 5′ north latitude, and 9° 10′ and 26° 15′ longitude east from Greenwich. Omitting, however, its irregularities, the empire lies mainly between the forty-fifth and fiftieth degrees of north latitude and the twelfth and twenty-sixth degrees of east longitude, having, therefore, a rectangular form of about 350 miles in breadth by 750 miles in length, comprising an area of 261,272 square miles, with Bosnia and Herzegovina included. The mean latitude, therefore, of Austria-Hungary corresponds very closely to the northern boundary of the United States.

The climate of this country, however, is much less rigorous, as is well known, than that of the United States. The extremes of heat and cold at Vienna, which is located at about the center of the Austro-Hungarian Empire, were during the past thirty years 98° and 4° Fahrenheit, while the average yearly temperature during the same period was 10° centigrade or 50° Fahrenheit.

It may, consequently, be very confidently affirmed that in Austria-Hungary the winters are not as cold nor are the summers as warm as in the United States by probably from 8° to 10°, notwithstanding its higher latitude. The rain-fall during the last thirty years varied at the 186 stations for meteorological observations in Austria-Hungary from 43 to 242 centimeters per year, equivalent to 17 and 95 inches.

These stations are grouped as follows: 41 in Hungary, 80 in the Alpine region and on the Adriatic coast, and 65 in Bohemia, Galicia, Moravia, and other interior provinces removed from the sea. The rain-fall

in these regions was respectively 28, 49, and 28 inches, making for the entire empire an average of 36 inches per year.

The average cloudiness of Vienna, estimating complete obscuration at 10, during the years 1853–'72 was 5.7, the months of July, August, and September giving a minimum of 4 and November a maximum of 7.4. Consequently the degree of moisture in the air is very large, averaging for Vienna during the last thirty years a humidity of 72, when reckoning complete saturation at 100.

The foregoing data will aid those interested to estimate the general influences of climate upon the production of fruit in this empire whose territory in general is usually far removed from the sea and other large bodies of water which might injuriously affect the grape crops by excessive moisture.

The same influences, however, arise from the large river system of this country, particularly in Hungary, to the end that the best vineyards are found upon the highlands and slopes of hills and mountains, of which Austria possesses a great number and variety.

GRAPE AND WINE INDUSTRY.

The methods of grape culture, as practiced in the neighborhood of Vienna, will be seen from the following reply of Robert Schlumberger, proprietor of valuable vineyards in the Vöslau region, given in response to certain inquiries as to soil, vines, crops, and the methods of cultivation practiced in his district. He says:

The methods of pruning the vine in the various wine-growing districts of Austria differ somewhat, and vary also in regard to the kind of grapes in the same part of the country.

In most districts, especially those to the south of Vienna, in the neighborhood of Vöslau, where the best red wines of Austria are produced, the branches are cut down to one or two eyes, and on each vigorous vine five to six branches are left. At a longer cut, the vines usually grown in the country, the Portuguese and Blue French, bear grapes superabundantly, producing an inferior quality and resulting in the exhaustion of the vines in a few years. A longer cut is only customary in regard to the Blue Burgundy and the St. Laurent vines, which, however, are not very extensively cultivated, at which operation either four eyes are left on each of twelve branches, or on a longer grape-bearing branch five to seven eyes, whilst the remaining branches are cut down to one or two eyes. During the subsequent year, the old grape-bearing branch is cut off and the strongest of the branches produced from the eyes of those cut down the preceding year will be employed as the grape-bearing one.

The soil in the vicinity of Vöslau and Gumpoldskirchen, where the most excellent white wines are produced, consists of a light, flat, and loamy ground, the subsoil of which near the mountains consists of calcareous rock and on the plain of alluvial gravel.

The fine wines grow on the slopes only. The valleys are left to the cultivation of other products.

In the plains wines of inferior quality are produced, but in larger quantities than on the hills. The produce, however, is very uncertain on account of the night frosts in spring, which do great damage on the plains, while the slopes are spared.

The soil in nearly almost all the vineyards of Austria is worked three times a year with the hoe: First in spring after the April cutting; second after the binding up and weeding at the end of June; and third, at the end of July or early part of August.

In Vöslan and vicinity for the last fifteen years the soil has also been worked a fourth time, at the end of the vintage in October or November, by digging the soil as deep as possible, in order to keep it loose during the winter, which has an extraordinarily favorable influence on the growth of the vine and renders the working in spring much more easy.

This example has often been followed, and in course of time no doubt this fourth working will be generally adopted.

In some districts, especially in Vöslan, in the plains and on some hills lately, the vines were trained on wire frames after the French style, in order to be able to work the soil with the plow. The number of workings is the same as with hand work. The plows employed were mostly imported from France.

The full fruit-bearing period of a vineyard occurs at different periods, according to the situation, nature of the soil, etc. Most vines will fully produce the fifth year after the planting, but with some kinds, like Burgundy, this will happen the seventh or eighth year. The time during which the capacity of producing will last depends upon the situation, nature of the soil, and especially upon a careful working.

Some well-cultivated vineyards will give a good return even after thirty years, whilst neglected ones will lose their fertility much sooner. Vineyards on the plains which have often suffered from spring frosts also soon lose their fertility, whereas there are vineyards on the slopes which are more than fifty years old and still give a sufficient return.

Artificial irrigation is nowhere employed in Lower Austria in the cultivation of the vine.

The yield of one hectare,* without regard to the various ages, varies according to the situation, the nature of the growth, and the kind of grape.

On an average a return of 40 hectoliters† per hectare may be obtained in Lower Austria.

The value of a hectare of vineyard property in Lower Austria depends upon the district, and there again upon its particular situation, and varies from 400 florins‡ to 5,000 florins.

The working expenses naturally are unequal in the various districts. In Vöslan the same amount to 550 florins to 600 florins per hectare per year, including fertilizers, whereas they are much less in most of the other districts.

The vineyards of Austria-Hungary, in 1881, covered 1,192,446 acres; of which 440,722 acres belonged to Austria and 742,724 acres to Hungary. The area cultivated varies very slightly from year to year.

The fruit gathered is almost entirely consumed for the manufacture of wine, as only 4,338 tons of grapes are reported as being sold for table consumption in Austria-Hungary in 1881.

Furthermore, the quality of grapes cultivated for wine are, as a rule, not suited for table use, being much less palatable than the well-known varieties in the United States, nor are they suitable for the raisin industry, as they possess neither size nor pulp sufficient for the drying process.

The average wine production of Austria-Hungary during the last five years, 1879–'83, amounted to 6,954,934 hectoliters, of which 2,603,956 hectoliters were produced in Austria and 4,350,978 hectoliters were produced in Hungary.

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* 1 hectare=2.471 acres.

† 1 hectoliter=26.43 wine gallons.

‡ 1 florin=40.1 cents United States currency.

The average value was estimated by the departments of agriculture at Vienna and Budapesth at about 10 florins per hectoliter, being only 40 kreuzers, or 16 cents, per gallon, which is manifestly quite below the commercial value of even the most ordinary wines.

In Austria the chief producing districts are Dalmatia, Lower Austria, the Northern Tyrol, Styria, and Istria. The character of the Austrian red wines is lighter and cruder than those of France, while the white wines, in respect to quality, are inferior to those of the Rhine, but possess a larger quantity of alcohol than either those of the Rhine or the Moselle.

Among the finest and most celebrated Austrian wines stands the Vöslaner, while of the Hungarian the Tokay and Paluggay are the most noted.

The phylloxera appeared in Austria in 1872 in the gardens of Klosterneuberg, near Vienna, from some vines imported from Germany for experimentation. Chemicals were first employed; sulphuret of carbon placed about the roots of the infected vines, but without avail. Flooding was then tried with like results, and finally the total destruction of the vines growing in the infected district was enforced by law, but without satisfactory results, as the phylloxera was found several years after the destruction in a living condition upon the roots of the vines. So that the plague is extending from year to year, until in Austria in 1883 there were 4,000 vineyards, aggregating 612 hectares, infected.

In Hungary during the past several years experiments have been made with imported American vines, with great success it is affirmed, but the Austrian Government until now has refused all applications for permission to import American vines, on the ground that insects equally dangerous to agriculture might be imported with them; consequently only the seeds of the proper varieties of grapes have as yet been imported and planted in Austria proper, but the growth is so slow that the result can not yet be declared.

Unfortunately there seems to be a difference of opinion, and probably of interest, among the experts of this country in regard to the importation of American vines, for while one party cry out loudly against the arbitrary action of the Government in refusing the introduction of the American vines, which they claim to be the only salvation for the decaying wine industry of this country, the other party as violently attack the projected move, and deny that success has attended the same either in Hungary or in France.

COMMERCE OF WINE AND ARGOLS.

The importation of wine into Austria-Hungary in 1883 was 4,167 tons, valued at 1,492,552 florins, against an export of 40,818 tons, valued at 7,555,938 florins.

The prices of the imports were taken at 26 florins per hectoliter in barrels, 50 florins per hectoliter in bottles, and 100 florins per hectoliter

for champagne, while the prices for the exports of these classes were, respectively, 18, 50, and 70 florins.

The imports and exports of wines during the last five years, 1878–'82, were as follows:

Years.	Imports.		Exports.	
	Quantities in metrical centners.*	Value in silver florins.	Quantities in metrical centners.	Value in silver florins.
1882	39,409	1,509,883	410,427	9,150,777
1881	30,271	1,311,270	438,213	8,852,684
1880	32,912	1,236,816	905,841	15,539,957
1879	106,580	1,888,980	434,674	7,105,068
1878	91,268	1,898,735	222,140	5,125,267

*One metrical centner=100 kilograms=220.46 pounds avoirdupois.

The origin of the wines imported to this country can not be definitely given, except for the champagne which came from France, via Germany, to the amount of 5,346 hectoliters in 1882 and 4,284 in 1883.

Of the total importations of wine in 1882, 21,388 metrical centners crossed the German frontier, 8,867 the Roumanian, 4,933 the Servian, 2,103 the Italian, 1,846 via Trieste, and 185 via Fiume and other ports.

Of the exports 182,477 metrical centners crossed the German frontier, 85,938 passed out by Fiume and other ports, 62,708 by Trieste, 37,625 passed over the Italian frontier, 13,690 the Swiss, 13,297 the Roumanian, 9,477 the Russian, and 4,994 the Servian.

Wines to the value of about $50,000 are shipped annually from this country to the United States. It is affirmed also that large quantities of red wines are sent from Hungary to France to be manufactured into claret, etc., and the large quantities shipped from Fiume and Trieste would seem to give credit to the charge.

The quantity of raisins and dried currants imported into this empire is very considerable, amounting in 1882 to 6,991 tons, valued at 2,473,682 florins, on which a duty of 711,744 florins gold was paid, being at the rate of almost 30 per cent. They entered almost entirely by the port of Trieste.

The duties on wines imported into Austria-Hungary at present, according to the general tariff law May 25, 1882, are as follows: In casks or bottles, 20 florins per 100 kilograms. Italy and Roumania, however, enjoy special privileges by virtue of conventional tariffs for the frontier traffic, by which they pay respectively 3.20 florins and 5.26 florins per 100 kilograms in place of the 20 florins of the general tariff.

Champagne pays by the general tariff 50 florins per 100 kilograms, but the recent commercial convention with France reduced the duty on French champagnes to 40 florins per 100 kilograms.

The total amount of duties collected on wines in Austria-Hungary

during 1882 was 552,144, against 362,316 florins in 1881, and 365,881 florins in 1880.

The commerce in crude tartar or argols has become very important of late years; the exports amount annually to over 1,000,000 florins. The following table gives the quantities and values of the imports and exports during the last five years, 1878–'82:

Years.	Imports.		Exports.	
	Quantity.	Value.	Quantity.	Value.
	Met. cent.	*Florins.*	*Met. cent.*	*Florins.*
1882	3,651	310,325	11,505	1,035,450
1881	4,745	403,325	12,362	1,112,580
1880	4,352	348,160	15,572	1,323,620
1879	3,157	220,990	8,826	661,950
1878	4,069	264,485	4,849	339,430

The shipments of argols were made almost entirely to or through Germany, amounting in 1882 to not less than 11,188 metrical centners. Considerable quantities of these, however, were in transit to the United States, as the value of the invoices of argols authenticated by the consular officers in Austria-Hungary during the last three years shows large increase, being as follows: In 1881, $174,537; in 1882, $254,041; and in 1883, $342,445.

PRICES AND CONSUMPTION.

The average import and export prices of wines, as estimated by the Central Commission, are respectively about 40 florins and 20 florins per hectoliter, being equal to $1.60 and 80 cents per gallon.

The prices at the vineyard cellars generally run from 12 to 15 florins per hectoliter for the ordinary red and white wines, and from 25 to 40 florins for the finer qualities.

The prices at which the various wines are retailed for consumption are so varied as almost to defy any approximate average price; but it must range somewhere between 75 kreutzers and 1 florin per bottle, containing about four-fifths of a quart, to the end that the average price of a gallon of wine in Austria-Hungary may be set down at $1.50.

The average annual production of wine during the last five years is given at 6,954,934 hectoliters, the importation at 60,088 hectoliters, and the exportation at 482,259 hectoliters, leaving for consumption an annual average of 6,532,763 hectoliters, equal to 172,595,598 American wine gallons.

If, therefore, the average price stated above be not excessive, which can hardly be the case, the total annual average value of the consumption of wine in Austia-Hungary amounts to $259,000,000, equivalent to a pro rata of $7 per year for each inhabitant. If to this amount we add the value of the beer annually drunk in Austria-Hungary, 12,000,000

hectoliters, equal to 317,000,000 wine gallons, valued at $79,000,000, we have a grand total of $338,000,000 as the value of the wine and beer annually consumed in the Austro-Hungarian Empire.

JAMES RILEY WEAVER,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Vienna, April 8, 1884.

FRANCE.

SOUTHERN FRANCE.

REPORT BY VICE-CONSUL MARTIN, OF MARSEILLES.

[Republished from consular reports, No. 41½.]

Climate, soil, etc.—The climate of that part of France which is washed by the Mediteranean can be placed among the most pleasant in the world. Extreme heat and cold are alike unknown, and while under the influence of regular sea-breezes the thermometer rarely shows a temperature of more than 80° or 86° Fahrenheit in summer, the winters are remarkably mild, and snow and ice are in fact a rarity in the country. On the other hand, drought is exceptionally severe, and in the warm season months are sometimes passed without a drop of rain to moisten the parched ground. The water streams are mere torrents, which can not supply any water for irrigating purposes in the dry season, and, when swollen in the fall by frequent floods of rain, rush impetuously to the sea, carrying away large quantities of the light vegetable earth, in the place of which they leave rocks and pebbles brought down from the steep barren hills with which the country is covered.

The soil is generally light and stony, calcareous or argillaceous, some times granitic or schistic. Frequent and strong winds from the north-west sweep across the country, and, being cold and dry, are extremely injurious to agriculture.

For all these reasons the modes of cultivation and the produce of the soil are widely different from what they are in the other parts of France. The culture of grain, so largely predominant elsewhere, is here confined to a few plains and valleys that are favored with means of natural or artificial irrigation, and is entirely inadequate to the demands of local consumption. Arbustive culture, on the other hand, is extensive, and furnishes the country with most of its revenue. The olive tree, which is not cultivated beyond a compartively short distance from the Mediterranean shores, and the vine, which is more extensively grown in these than in any other parts of France, stand foremost in that branch of agriculture.

Varieties.—In a general way, vines in this country can be planted in

any sort of ground, without regard to altitude, declivity, or distance from the sea. Still it is a well-established fact that better results are obtained in valleys and plains as to quantity and on hill-sides as to quality. In other words, wine being the chief object of vine-culture in this country, the produce of hill-side vineyards will be less abundant, but obtains higher prices for its superior flavor, richness, and strength.

As for the nature of the soil, every different ground appears to be better adapted to the different varieties, numbering three hundred or more. A complete enumeration of these varieties would be tedious and of little interest, and I shall confine myself to a brief description of the varieties mostly to be found in southern France.

The "Mourvedre" or "Mourvedu" thrives best on calcareous soil, with a thin layer of vegetable earth and a substratum consisting of crackled rocks. Each plant can then give as much as five pints of a wine that is substantial, of a rich color, with a slight tannic flavor, containing about 11 per cent. of alcohol. The grapes are sweet, black-blue, round, rather small, and more or less thick on the bunch. In this country they come to maturity in the first days of September, and do not rot as easily as other varieties. The "Mourvedre" bears fruit on its third year, comes into full bearing on the sixth, and is fruitful after that as long as it lives, viz, from forty to one hundred years.

The "Grenache" has a preference for hillsides and dry and gravelly soil; it thrives on all kinds of ground, provided they be free from dampness; it is more sensitive to cold than the Mourvedre, and can be killed by a temperature of 17° Fahr. There are two varieties of Grenache, the black and the white. The white produces good fruit for the table, and a kind of white wine that is much esteemed.

The "Peconi touar" is remarkable for its durability and abundance of produce. It gives the best returns on rocky hillsides and meager soil, but does not bear fruit until the fifth or sixth year. As the wine produced is light in strength and color, the grape, of a black purple hue, is generally mixed with the fruit of other varieties in the preparation of wine.

The "Aramon" or "Ugni noir" only thrives in loamy soil, and must be extensively cultivated. It produces large quantities of a wine that is light, poor in alcohol, does not keep long, and suffers much from transportation.

The "Brun fourca" is mostly cultivated on hill-sides or in dry, gravelly, or stony land. The grape, which is large, elongated, of a bluish-black color, is not fit for the table, and must be mixed, for the making of wine, with other grapes richer in sugar and tannin. The production, which begins in the third year, increases as the plant advances in age. On favorable soil it reaches the quantity of three quarts of wine for each plant.

The "Carignau" or "Monistel" must be planted on high, substantial ground, free from dampness. It begins to bear fruit on the second year,

and produces a spirituous wine that keeps well, improves with time, and stands transportation remarkably well, but is somewhat rough to the taste. The vine is apt to suffer from oidium.

The "Picardan" is one of the most productive varieties cultivated in this country. The best results are obtained in rich, pebbly, consistent, high land. Dampness is rather beneficial to the plant. The grapes are lare, elongated, fleshy, sweet, and very palatable. The wine produced is of a fine red color, mellow. It possesses a pleasant flavor, with a smack of the fruit, and keeps well.

Owing to the general preference given by the consumer of this country to red wine, the white varieties are but little cultivated, and the grapes are generally consumed fresh. Still the number of these varieties is large, and I shall only mention those that are most common in the country. The "Ugni blanc" is one of the few white varieties that are grown in view of wine-making, owing to the small size of the grapes. In low and rich land the quantity produced is larger and amounts to an average of two quarts for every vine. On high, stony, or gravelly ground, on hill sides, the quality is much superior, and the wine produced commands much higher prices than that of the plains. The plant thrives better near the sea-coast, where it is less affected by cold. The other varieties, "Clairette," "Colomband," "Mayorguin" or "Marseilles plant," and "Muscat," are generally cultivated on hill-sides, and their produce is sent to the market for table use. The Muscat grape is only turned into wine in one district of the department of Hérault, that of Lunel and Frontignan.

Plantation and culture.—In this warm and dry climate it is necessary to break up the earth to the depth of 2 or 3 feet; the time when this preparatory work is performed varies according to the nature of the soil. It can be done on high and dry ground before the rainy season sets in, and even in summer; for low and damp soil it is preferable to wait until the heavy fall rains are over and delay the operation until March or April.

When the ground has been previously planted with vines, it is a general custom to allow it to rest for a number of years, varying from one to two for strong, consistent, fertile, or clayey soil, and for a longer time in sandy, light, permeable land. Lucern or other leguminous plants are raised in the interval, but the culture of wheat should be avoided, as it deprives the earth of much of the gluten which is necessary to the grape from which wine is to be made. When the ground has been properly prepared the vines are planted in the form of cuttings or young plants raised in nurseries. The latter grow faster, but vines that have grown from cuttings appear to do better in the long run, especially when they have been taken from vines twenty or twenty-five years old. Slips can be kept for some time before being planted, but must then be allowed to soak in water for some days.

The time and depth at which to make the plantations are also regu-

lated by the nature of the ground. In dry and high land winter is the most favorable season; in low and moist ground the middle of spring is preferable. The depth generally adapted is that of 2½ feet in dry and light soil, 20 inches in medium land, and 13 inches in rich, damp earth. In this country, where vines are grown in bushes and without the support of poles, no other care is taken of the vineyard for the first year beyond that of keeping it clear of weeds by tilling and hoeing. After the first year the first pruning takes place. Only one branch is left on the stem, generally that which is nearer to the ground. It is well established that a short stem helps maturity to a great extent, but as on the other hand the plant is made by it more liable to rot and frost, the above rule is only followed on hillsides or dry land; in valleys and low, damp land the branch which is left on the plant is selected at a distance of 12 to 14 inches from the ground. In all cases that branch is itself pruned short and left with two or three eyes only. Every year after the first a new branch is left on the stem, but the total number is rarely over four or five. The guiding rule for pruning is that branches shooting from the stem are unproductive and should be cut close to the stem. The fruitful sprigs issue from one-year-old branches. Each eye of these sprigs generally produces two bunches of grape and one shoot. The quantity of eyes that should be allowed to remain on the vine depends largely upon the nature of the soil and the strength of the plant; the number on a full-grown vine varies from 12 to 24. There is no generally adopted time for pruning, every vine-grower using in this respect his own judgment. It ordinarily takes place between the months of January and March, and is followed immediately afterwards by a first plowing, which after a few days is completed by a second hoeing; the same operation is repeated in April and May; and, in the best-conducted vineyards, a third time in June. The culture should always be applied with great care, and never exceed the depth of from 10 to 12 inches, for fear of hurting the roots.

There are but very few districts in this region where an abundant supply of water can be obtained, and the vineyards are in consequence rarely irrigated. When practicable, water is brought into trenches that run along the rows of vines, but never in excess, as it is well ascertained that moisture, while improving the yield as to quantity, is detrimental in a large measure to quality, and makes the vine much more sensitive to frosts and cold weather.

Fertilizers.—In new soils the vine can easily dispense with fertilizers of any kind for thirty years or more; it is even claimed by some good cultivators that an addition of virgin earth or calcareous marl prove to be the best fertilizers. Still the custom is prevalent to use stable dung at the rate of 12 tons per acre, applied once in from four to six years. A ton per acre of horns, woolen rags, or oil-cakes, which are abundantly imported or produced at Marseilles, is frequently used as a substitute.

Horns and rags remain effective for five years, oil cake for two only. Whatever may be the manure employed, it is customarily buried in furrows cut between the rows of vines. These rows are generally from 3½ to 5 feet apart, and the same distance is kept between each plant in the row, but in some parts of the country a larger space frequently exists between the rows. The intervals thus intervening are then devoted to some other culture, wheat in most cases. But it has been found out that the system proves injurious to both cultures, and it has been abandoned to a a great extent.

Yield.—Grapes are never dried in this country, except by such farmers as do not have a sufficient number of vines to enable them to undertake the making of wine, or are too far away from a consuming center where they could send to the market the small quantity of fresh grapes produced on their farm. The method followed by such farmers is very simple: The grapes are dipped in boiling water and exposed to the rays of the sun for eight or ten days. The raisin thus prepared can not compete with that imported here in large quantities from Spain, and the amount produced is consequently insignificant.

Railroad facilities have made it possible to dispose of a certain quantity of fresh grapes at paying prices, but still the great object is the production of wine. In consequence, all the calculations made regarding the yield, value, and cost of crop depend upon this production, which is regulated by so many circumstances that it can not easily be established on a fixed basis.

While the cost is submitted to little variation, between the sums of 300 and 400 francs per hectare ($24 to $40 per acre), including the purchase of manure, sulphur (as a preventive against oidium), and the making of wine, the yield is entirely subject to the weather throughout the year, as is the value to the quotations of the wine market. It is generally conceded that one acre of vines can produce from 200 to 400 gallons of wine, and that the cost of cultivation takes up one-third of the proceeds.

Diseases.—Many causes can affect the yield and value of the crop. Amongst those of frequent occurrence are atmospheric influences, early spring frosts, that blight the plant and leave no other remedy than the cutting of the stem on a level with the ground to let the new sprouts grow from the roots, or the uprooting of the whole plant, which is either replaced by a new one or, more rarely, by means of "provining," that is, forcing into the ground one of the long branches of the next vine.

Extreme drought prevents the growth of the grapes in size and quantity, but improves the quality of the wine wonderfully, according to the common saying, "A year of drought is a year of good wine." A wet season, on the contrary, brings abundance of wine, but impairs the quality, so that in many instances the wine is unsalable and must be turned into alcohol.

The vine also suffers from many parasitic insects or diseases. Few

of these ever produce disastrous effects except oidium, phylloxera, and, more lately, mildew.

Oidium, which at a time endangered the future of the French vineyards, has been and is still successfully counteracted by the use of flowers of sulphur. They are mixed with an equal quantity of plaster, or a smaller proportion of lime, and carefully sprinkled on the young leaves once or twice before the ripening of the grapes. The wine-growers of this country, who could procure flowers of sulphur at low rates from the important refineries of Marseilles, were in the end benefited by the appearance of the disease, as it opened for the abundant but inferior wines produced in this region a more extensive market, and brought about a decided advance in the prices, which had been as low as 6 francs per hectoliter (8 cents per gallon). When the rates of 20 and 30 francs per hectoliter could be obtained the production of wine increased in a remarkable measure. In 1874 the seven departments of Bouches-du-Rhône, Gard, Aude, Hérault (the production of which alone amounted to 13,000,000 hectoliters), Pyrénées-Orientales, Var, and Vaucluse, forming this consular district, contributed more than two-thirds of the total production in France.

It was just then that phylloxera made its appearance and raged in this district, where it worked its more pernicious effects. Many vineyards were entirely destroyed, all were attacked, and an idea of the extent of the damage can be formed from the following table, giving the area planted in vines in thousands of acres and the production of wine in thousands of gallons, in each of the seven departments, for the three periods 1856–'60, 1866–'70, 1876–'80:

Department.	1856–'60.		1866–'70.		1876–'80.	
	Surface cultivated, 1,000 acres.	Production, 1,000 gallons.	Surface cultivated, 1,000 acres.	Production, 1,000 gallons.	Surface cultivated, 1,000 acres.	Production, 1,000 gallons.
Aude	175	17,013	200	44,486	279	85,565
Pyrénées-Orientales	111	7,555	131	16,062	161	34,844
Hérault	390	108,228	524	362,636	363	143,576
Gard	198	30,379	222	50,192	54	5,468
Vaucluse	71	6,393	74	10,435	30	1,479
Bouches-du-Rhône	108	11,040	114	10,540	67	2,747
Var	200	20,341	185	23,564	161	12,733

In this connection the following table of importation and exportation at the port of Marseilles may be a more striking evidence of the vicissitudes undergone by the production of ordinary wine in southern France:

	1862.	1867.	1872.	1877.	1882.
Importation ..... gallons..	185,206	263,563	1,605,202	1,308,355	13,175,188
Exportation ..... gallons..	267,544	6,045,848	7,806,198	5,719,651	4,602,899

The emotion created by the ravages of phylloxera was immense, and the French Government instituted a prize of 300,000 francs to be awarded by a special committee sitting at Paris every year to examine into the progress of the disease and that made in counteracting its effect. In its last sitting, which took place this year, the committee decided that submersion, sulphide of carbon, and sulpho-carbonate of potassium should again be recommended for the year 1884, and admitted that it would be well to use American vines as "graft bearers," particularly the Riparia, Solon, York, Madeira, and Jacquez. It finally decided that the prize of 300,000 francs should once more be reserved, as none of the remedies so far invented were of a sufficiently effective character to justify its being granted.

As I have already remarked, there are but very few places in this region which can dispose of a sufficient supply of water to make the submersion system available.

The appliance of sulphide of carbon is costly, and although it has proved an efficient preventive, it does not appear to possess marked curative efficiency. In consequence, the planting of American vines has met in this part of the country with general favor, and it is expected that in a few years hence all the vineyards that have been destroyed will be renovated by means of American plants.

Most satisfactory results have been obtained wherever the experiment was made. M. Reynaud, our consular agent at Toulon, informs me that he planted several acres of his property with Riparia and Jacquez vines on which he grafted the French varieties previously grown on the same soil. After three years, he reaped 3,360 liters per hectare (a result somewhat superior to the average) of a wine that was in all respects the same as was formerly produced by the original French plants. His plantation does not suffer in the least from phylloxera, but requires more cultivating and fertilizing than the French vines.

Mildew.—It was not until last year that mildew caused noticeable damage in the vineyards of France. No means have yet been found out to counteract the disease. In fact very little is known so far about it and the conditions under which it propagates. It has been noticed that vines planted near the sea-shore were more liable to it, and the prevalent opinion is that mildew is caused by a persistence of moderate moisture in the atmosphere, which is of very rare occurrence in this climate, except in the month of September. As the crops have already come to maturity by that time, and the disease seems to attack the leaves only, no great anxiety is felt here concerning it.

Wine-making.—The making of wine is, in the southern region of France, carried on in the most simple method. A dry, sunny day is selected, when practicable, for the picking of the grapes, which must be ended before sunset. All the grapes are placed, just as picked from the vine, in immense wooden or masonry vats of from four to six thousand liters' capacity, and trampled under the feet of a number of men

sufficient to permit of the operation being completed in one day. The "must" is left to ferment in the vats some eight days, and then decanted into barrels, which are not bunged until fermentation has stopped, that is, forty or fifty days.

As the producer generally sells his wine at once to the merchant, he does not submit it to any of the many manipulations that take place in the traders' cellars.

The only practice in force is to sprinkle the top layer of the grapes in the vats with a small quantity of plaster, which, it is claimed, gives to the wine a better color and a slight degree of astringency necessary to its preservation.

J. S. MARTIN,
Vice-consul.

UNITED STATES CONSULATE,
Marseilles, March 1, 1884.

CHAMPAGNE.

REPORT BY CONSUL FRISBIE, OF RHEIMS.

[Republished from Consular Reports No. 41½.]

I have the honor to acknowledge the receipt of Department's circular dated December 4, 1883, with interrogatories regarding grape culture, methods of cultivation, etc., in the best conducted vineyards, and the method in practice for raisin culture; which interrogatories have been prepared and submitted at the request of some of the leading fruit-growers of California. I realize that the subject is one of considerable importance, and shall be glad if I can furnish anything of interest and profit to the great industry centered in the cultivation of the vine in the United States. In the first place, however, I am estopped from giving any information regarding raisin culture from the fact that no grapes are grown in this consular district for that purpose, the climate and soil not being suitable.

The vineyards here are cultivated and the grapes grown for the exclusive purpose of manufacturing champagne sparkling wine, the best growths always being used for that purpose, the manufacture of table and dessert wines for commercial purposes having entirely ceased in the champagne district.

Recognizing the importance of the cultivation of the vine and the manufacture of its product to a large class of cultivators in the United States, soon after my arrival at this consulate I began an earnest study of the subject, and in the spring of 1882 I communicated to the Department, in three separate reports, the results of my investigations, which were soon after published in the monthly consular reports. In those reports I wrote all there was to be written on the subject, in so far as I

could inform myself at the time, and I have really learned but little new or interesting touching the matter since. However, as a greatly increased interest seems to have sprung up among all classes of our people within a short time past in regard to the importance and value of consular reports, and as very many are now interested readers who never read them before, and as the reports now called for are for the special benefit of a class of interested cultivators, I have thought it well for me to go back to the minutes of my study of the subject two years ago and give our California friends and other vine-growers a recast of what I then learned about the cultivation of the vine in the champagne district and the manufacture of its product, together with such new facts as I shall be able to give, believing that it will now come under the notice of many new and appreciative readers.

As far as the champagne country is concerned there can be no doubt that the vine has been cultivated since the most remote times, the dry and chalky soil of the surrounding hills and valleys being specially adapted to the cultivation of the vine. The cultivation of the vine in the province of Champagne, in the department of the Marne, and particularly in the districts of Rheims and Epernay, is, according to the most reliable authorities, of very ancient date. One writer says: "Strong men, we know, lived before Agamemnon, and strong wine was made in the fair province of Champagne long before the days of the sagacious old monk, Don Perignon, to whom the world is indebted for the sparkling vintage known under the now familiar name of champagne." Cato the elder informs us that in his day vine plants were brought into Italy from Gaul; and Cicero, in his speech on behalf of Fonteius, refers to the great trade in wine carried on by the Gauls, of which at that time Rheims was the capital.

Domitian ordered all the vines in Champagne to be uprooted and destroyed. He had an idea that the culture of the vine caused people to neglect that of cereals and general agriculture, and he also feared that the desire of drinking wine would attract the barbarians to the country. It was not until about two centuries later (280 A. D.) that they were replaced by the Emperor Probus.

There are several groups of low hills situated on the banks of the Marne and the Vesle, possessing a light, shallow soil, and with a pervious understratum principally composed of Tertiary layers and of chalk, with a mixture of silica and light clay, combined with a varying proportion of oxide of iron. These groups of hills are finely situated for sunshine, and of very little good for the cultivation of other vegetable produce. Such advantages as these seem to point to a special provision of nature for the cultivation of the vine. Poor, sometimes even barren soils, so long as they are easily accessible to air and water, are, as every one here will tell you, quite sufficient for its growth.

If the first attempts at cultivation were crowned with success, still it was not till a comparatively recent date, which we may fix at the last

quarter of the preceding century, that this industry sprang into importance. It was, indeed, from this time, that champagne wines, already renowned for their fineness and lightness, began to be the object of new experiments. These resulted in a gradual increase and improvement in vine-growing and to the perfecting of the produce.

Sixteen thousand five hundred hectares (about 40,700 acres) are at the present time devoted, in the department of the Marne, to the cultivation of the vine. In each district the nature and situation of the soil, and more especially the experience of vine-growers, partly founded on tradition, have led to the adoption of different kinds of vines and various modes of culture.

Unquestionably the finest grapes are produced in the hilly regions in the neighborhood of Rheims and Vertus. The wines coming from the slopes of these hills have long been celebrated; the first under the name of *river wines*, and the second under the name of *hill wines;* but this distinction has nearly ceased since the appropriation of wines of a certain quality for the manufacture of sparkling champagne.

The most renowned vineyards extend—

1. Along the right bank of the Marne from Mareuil to Damery. Along the line of railway from Paris to Rheims, the traveler sees on his left in succession the fertile hills of Damery, Cumières, Hautvillers, Dizy-la-Rivière, and Ay. Further on, as the line curves, those of Mareul, Bouzy, Ambonnay, and Trépail come into view.

2. On the slope which faces the Vesle and the city of Rheims are the not less prosperous ones of Villy, Mailly, Tillery, Verzenay, and Verzy.

3. On the left bank of the Marne, 4 or 5 miles from the railroad and the river, lie the celebrated vineyards of Epernay, Pierry, Cuis, Cramant, Le Mesnil, and Avize.

Not far from these vineyards, from which are made the celebrated champagne sparkling wines, are others of less pretensions, which produce red table wines of some value. In the districts of Châlons, Vitry, and Ste.-Menehould, only wines of less value are produced, which are seldom used in the manufacture of champagne.

In these different localities the principal kinds of wines grown are: White grapes, *épinette,* or the white *morillon*, and the large *vert-doré* of Ay; red grapes, the *pineaux*, and among them the small vert-doré, distinguished by its compressed, irregular bunches of middling-sized grapes, by its large leaves, somewhat rough on the upper and smooth on the under side, lobed, and but little indented. The *épinette* is a prolific bearer, and its round, transparent berries, which hang in no very compact clusters, are both juicy and sweet. It ripens much earlier than either the other varieties. The *vert-doré* is robust and productive, but yielding a less generous wine than the *pineau*, the plant *doré* of Ay, and the berries of which are dark and oval, and very thin-skinned, and remarkably sweet and juicy.

One variety is the plant *gris*, or *burot*, a somewhat delicate vine, whose fruit has a brownish tinge, and yields a light and perfumed wine.

There are several other species of vine of second rank, cultivated in the champagne vineyards, notably the common *meunier*, or *miller*, bearing black grapes, and which derives its name from the circumstance of the young leaves appearing to have been sprinkled with flour. There are also the black and white *gonais*, the *meslier*, a prolific white variety, yielding a wine of fair quality; the black and white *gamais;* the *tourlon;* the marmot, and several others.

These second-rate vines produce in abundance the wines which were formerly reserved by the vine-growers for their own consumption, but which are now used by not over-nice speculators to mix with their superior wines. It is but fair to say, however, that these second-rate vines are rapidly disappearing, and vines of the first class taking their place.

On the hills around Rheims and Vertus the method of low cultivation prevails, whilst tall vines are almost exclusively grown on the hills of Chateau Thierry. These widely different methods are said to be required by reason of the different nature of the soils. Along the course of the Marne the vine grows on a shallow, dry soil, receiving and reflecting nearly the whole of the sun's rays. The mode of culture employed allows of the assimilation of the vines to a sort of trellis-work, the trunks of which are in the ground, while the bearing branches growing up from them extend along the face of the soil just the same as if they were trained on a wall, only in this case the face of the soil representing the wall. On the hills of St. Thierry, on the contrary, the situation is less favorable, the soil being richer, deeper, and more humid; hence the need of a higher growth and a special mode of cultivation. The vines are almost invariably planted on rising ground, the lower slopes, which usually escape the spring frosts, producing the best wines.

In the champagne country the vine, whether cultivated on the high or low method, becomes productive as the result of the most minute, incessant care and attention. In the localities where it is almost the only industry, it involves during the whole year a series of operations which employ the greater part of the population. According to the statistics the hands employed are about equal in number to the hectares of land in cultivation, and an average of one vine-dresser for every $2\frac{3}{4}$ acres of cultivated land.

The various operations required in cultivating the vine are performed by the owners or vine-growers, properly so-called, or by laborers employed by them, who are to be hired at wages which vary according to the urgency of the work.

The heads of the great champagne houses are as a rule proprietors, in one or more localities, of extensive vineyards. They possess also a large wine-making establishment, and retain a regular troop of vine-dressers, whom they lodge and employ by the year.

Pruning, tilling, propagating by layers, bedding, hoeing, propping, pruning and nipping the buds, and making storehouses are the principal

operations of these workmen from January to September, when the harvest is made. At this season they conduct the vintage; then, when the wine is made, and the vine props pulled up, they profit by the fine weather at the end of autumn, and in the winter, by manuring, digging ditches, charring or sulphating the poles, etc.

For the champagne vine-dresser the year begins directly after St. Vincent's day; that is, at the end of January or the first half of February. At this date, if the weather be fine, operations are begun by pruning. At Ay and Dizy all the large vines are pruned on two stems; but middle-sized and small ones on a single stem, preserving one "eye" more. At Avize, Cramant, and Verzenay they are trained on a single stem, but a much longer one. It is also towards the end of February that the twigs that have been cut off are gathered into bundles, either to be burnt or to be sorted out and kept for slips. In March the first work is done on the vine, when the first digging is done. If it were done earlier, there would be the inconvenience of the soil being too hard; and if later, the danger of losing the young shoots, so tender and so slenderly attached, by want of attention mainly on the part of hired work people. In this month, too, the vine is usually rebedded, which is done by surrounding the plant with earth as high as the new shoots of the year; but in some places this is done by leaving a cutting of the year before out of the ground. This work is done with a hoe, the workman digging a small hole under the stem, which he then lowers by pressing on it with his foot, and then fills up again with fresh soil.

In April these operations are continued. It is also in this month, if the weather be favorable, that the making of layers is begun. In order to do this a ditch is dug, or perhaps was dug the season before, 20 centimeters (about 10 inches) deeper than the roots of the parent stem, and a layer of well mellowed earth taken from the surface soil is placed there; then a horizontal layer of cuttings, prepared for the purpose, is inserted on the parent stem and is covered with fresh soil taken from the bottom of the trench. This method of propagating the vine (the bedded plant being destined to separation from the parent stem) has the advantage of rapidly producing new sources of production, and is in general use in the champagne district. It is also during April that the propping of the vines is commenced, the vines being supported by stakes, usually of oak, and as a close system of plantation is followed, no less than 24,000 stakes are required on every acre of land. These stakes are set up by men and women, and an expert laborer, it is said, will set as many as 5,000 of them in the course of a day.

In May, if the season is early, it is convenient to give the first nipping to those branches which grow too rapidly. About the 25th, when there is no longer any fear of frost, the ground is plowed (or delved) again. This light work, which is needed to get rid of pernicious weeds and vegetation, is performed with a hoe or weeding-hook. This is best done in dry weather, and should not be done after rain or heavy morning dew.

Toward the end of May, and especially about the beginning of June, commences the training of the vines. All the branches of the same stock are tied by the same band to the supports (stakes). It is the custom to cut off the shoots which do not reach the ligature at a leaf above the last grape, and to cut off short those which do not show any sign of fruit. After the vines have been secured to the stakes and have been carefully hoed around their roots the tops are broken off at a shoot to prevent them from growing above the regulation height, which is usually from 30 to 33 inches.

The cultivators regard the numerous stakes which support the vines as affording some protection against the dreaded white frosts of spring, but I think there can be placed but little, if any, reliance in such a source of protection. These frosts invariably occur between early dawn and sunrise, and, to guard against them, some cultivators place heaps of hay, refuse, dead leaves and branches, etc., about 6 or 7 rods apart, taking care to keep them moderately damp to prevent too rapid combustion. When a frost is feared the heaps on the side of the vineyard from whence the wind blows are set on fire, and the dense smoke spreads over the vines, and is said to produce the same results as an actual cloud, warming the atmosphere and converting the frost into dew. In case there is no wind blowing, all the surrounding heaps are set on fire and the desired effects obtained. There are other methods of protection against frosts employed, such as roofing the vines over with a straw matting about 1½ feet in width and in rolls of considerable length, etc., but the system of creating a dense, warm smoke, as stated, appears to be most in favor.

Besides the plowing, which a good cultivator is never afraid of repeating too often at this season, it is useful toward the end of June to give the ground a second delving. This second digging over (it is generally finished by the first week of July), it is well to prune the lower "eyes" which have sprouted since the first operation of the kind, it always being considered desirable and important to prevent, so far as possible, the growth of superfluous woody matter, which tends to draw nourishment from the growing fruit and injure its development. This is a matter which I believe should more earnestly engage the attention of vine-growers in the United States with profit to themselves and satisfaction of their customers, in being able to procure well-developed and consequently luscious fruit.

From the 20th of July to the 15th of August the heat is too great to permit of work in the vines, which in fact are now in no need of particular attention, except it be a little digging if the weather be rainy. The vine-grower makes use of this time to make use of his *magazines;* this is the name given in the champagne country to the heaps of fertilizing matters which he collects at the side turnings from the roads or other places as near as possible to the vines, and which fertilizing matters are composed chiefly of a kind of compost formed of the loose

friable soil dug out from the sides of the high hills, and of supposed volcanic origin, mixed with animal and vegetable refuse. This is also the time to look after the young plants of the year.

Toward the end of August it is the rule to submit the vines to a severe pruning, so as better to expose the grape to the air and the light, always taking care not to bruise it.

At the vintage season, which is generally the middle of September, hundreds of families of the surrounding districts and departments, the Aisne, Ardennes, and Somme, throng into the vineyards, and receive as compensation for their labor from 40 to 60 cents a day.

The harvest is made with the utmost precaution. The grape-gatherers are advised to support the fruit with the left hand, so as to prevent the riper grapes from falling; not to bruise it by throwing it into the basket. These small baskets are afterwards emptied into larger ones, or hampers, in which the fruit is taken to the owners of the vineyard, where their contents are minutely examined by men and women, who pluck of all the bruised, rotten, and unripe berries and throw them into a separate basket, as such fruit is a decided if not fatal injury to a first-class wine. If the grapes are very ripe, wisps of straw are placed in the bottoms of the hampers to prevent jolting and bruising.

The picking ordinarily commences with daylight, and the vintagers assert that the grapes gathered at sunrise always produce the lightest and most limpid wine, and that by plucking the grapes when the early morning sun is upon them they are believed to yield much more juice. Later on in the day, too, spite of all precaution, it is impossible to prevent some of the detached grapes from partially fermenting, which frequently suffices to give a slight excess of color to the must, a thing to be especially avoided, no matter how rich and ripe the fruit may be, in a high-class sparkling wine. I desire, in passing, to call the special attention of those attempting to make sparkling wines in the United States to the important fact that the use of unsound or unripe fruit, even in a small quantity, is fatal to success.

When the harvest is over, usually about the end of October, the stakes are taken up and arranged in vertical piles or horizontal heaps. Then, until the bad weather, the roads or paths of the vineyard are repaired; old vines are pulled up; the earth is leveled, the materials from the magazines (manure, etc.) are turned out; the trenches for propagating the vines are constructed; and when on approach of the frost the vines can not be approached, the time is spent in making stakes (props), the earth ends of which are first charred and then soaked in a solution of sulphate of copper.

Such are the principal operations which custom and experience have sanctioned in the true champagne vineyards; that is, in the hilly regions of Rheims and Vertus.

In the vines called St. Thierry, or high vines, the succession of operations is much the same, and the work differs but little from that al-

ready described. This method of cultivation, however, necessitates three or four plowings; further, at the early spring pruning all the fruit-bearing branches of the preceding year are lopped off; then suppose one had to choose between four branches left by the preceding time of growth, it would in general be best to cut off two and preserve those which were nearest the parent stem, one being pruned with two "eyes" and provides the woody matter, and as for the other, destined to become the fruit-bearing branch, it should be of medium thickness, with well projecting knots, and with a tendency to grow horizontally. At a later season the first is fixed vertically to tall stocks 6 feet high, and the second is bent round, fixed, and becomes the bend.

Both low and high vines undergo at proper times, differing according to locality, manuring, and improving operations of various kinds. Whether the vine should be manured, and if so under what conditions and at what times, is a disputed question amongst the greater number of writers. Thus, Dr. Guyot recommends manuring every three years, and enough manure to be put in each time to last those three years, viz, 3 pounds per vine in the best soils, 6 pounds per vine in medium soils, and 12 pounds per vine in poor soils. On the other hand, M. Violart, of Ay, another eminent authority, recommends the moderate use of manure for oldish vines, and protests against the mischievous use of manures for young vines.

The fruit which is grown from it is only nourished by the manure that has been put into the soil; it hardly takes any of the nature of the soil. An abnormal vigor is given to the vine, and it is in a way plethorized for several years, and when the juices of the manure are exhausted it begins to grow weak; it is ill, as the vine-dressers say. It is therefore necessary to manure young vines with much moderation, but the older ones will bear more.

One of the most important questions, important both by reason of its presence and its dangerous character, is without doubt that of the diseases of the vine.

Although the phylloxera has not yet made its appearance in the champagne country, still there is no lack of other scourges to the cultivation of the vine. Every year has its records of substantial disasters, more or less local in character. Here, as everywhere else, despite the attention and shrewdness of vine-growers, and notwithstanding the invention of many means of protection, there are some vines, generally those with the lowest situation, which pay a heavy duty to the frosts and mists of spring. Often, also, some districts are robbed of their produce by hail.

Apart from these cosmic disturbances, in some districts where the earth, more likely rich than poor, rests on an impervious understratum, generally of a strong character, there appears, after a luxurious vegetation of several years, the disease which the vine-dressers call *chabot*—the withering and death of the plants, which is due simply to the rotting of their roots, caused by an excess of humidity collected in an unretentive substratum.

But it is especially vegetable and animal parasites that have for a longer or shorter time back threatened the harvests. Of late years an infinitesimal mushroom, the *Oidium tuckeri* (vine mildew), has appeared very frequently, not only on trellised vines, but even in the vineyards. Flowers of sulphur is an undoubted antidote; but notwithstanding its efficacy it has not yet been generally adopted by vine-growers. Frequently, too, the leaves of the vine suffer from the incursion of another fungous or asexual plant, *Erineum necator*, but the damage done by it is of small importance.

Animal destroyers belong chiefly to the insect order. Every year the different districts suffer from the devastations of several kinds of *Coleoptera*. In the early spring the shoots suffer from the incisions of the *Culs-crottés* or *Coupe-bourgeons* (*Oliorhynchus ligustici*, *O. raucus*). Later on the *Gribouri* (a vine-grub) or *Ecrivain*, scribe (*Bromiris vitis*), comes out and bites the leaves and buds, and lays its eggs on the stem of the vine. Lastly, in June and July, appears the *Bêche*, grafter, and *Lisette*, vine fretter (*Rhynchites betuleti*), which rob the plants of their leaves.

Among the *Lepidoptera* there are two which are especially obnoxious: The vintage-worm (*Cochylis omphaciella*) breeds twice a year, and destroys the fruit both in spring and in autumn. The summer worm (*Olnophthira pilleriana*) has taken up its abode (as is testified by many old records) for a long time past in two localities especially. It commits its depredations at various intervals of time, but always for several years at a time. Its scene of operations is the locality of the best vines half-way up the hill between Ay and Dizy. Its second rendezvous is at Verzenay, in the best vineyards, also situated about half-way up the slope.

Every year the champagne vines, more or less the victims of these accidents, yield, as a rule, a rather poor crop; in fact, in spite of the careful attention and care of the vine-grower, an acre rarely yields more than 3 or 4 measures (6 or 8 hogsheads), of 2 hectoliters, *i. e.*, about 6 or 8 measures to the hectare of prepared wine. To this calculation of yield we must add about two-thirds as much again for secondary wines, known under the names of first "taille" (pruning), second "taille," and "rebêche" (second tilling). With the exception of the first "taille," which is sometimes used in the preparation of sparkling wines, these wines are consumed by the proprietor and his vine-dressers.

At Ay, which may properly be chosen as the center and type of the true production of champagne, unbottled wine is worth in an average year from 600 to 800 francs a measure of 2 hectoliters, and the price is about the same for the not less famous vintages of Cramant and Verzenay. One year with another, then, the vine-growers receive a sum of about 1,800 francs ($360) per acre, that is, by reckoning the minimum price of 600 francs and the production at three "pieces" per acre; but they have been obliged to spend from 1,000 to 1,200 francs during the

year on the vines and in the production of the wine. This result would be certainly most satisfactory if this average figure of production was reached every year, which unfortunately can not be said to be the fact.

The comparatively limited extent of the champagne vines (for although there are in the department of the Marne 16,500 hectares—40,700 acres—of vineyards, the real centers of champagne making only occupy from 600 to 800 hectares) is the principal cause of the high prices which the first crop, good or bad, fetches every year.

JOHN L. FRISBIE,
Consul.

UNITED STATES CONSULATE,
Rheims, January 31, 1884.

COGNAC.

REPORT BY CONSUL PRESTON.

The culture of the grape-vine is the first and most important industry of the people of this district. It is the principal source of employment and of wealth, and therefore great attention is paid to it. They spend much time and money in experimenting and studying the best means of planting, grafting, and overcoming the chlorosis and phylloxera.

The committee of viticulture of the arrondissement of Cognac which directs these matters is, then, a very important body; its transactions are made the subject of an annual report, the last one being made in February of this year.

They spent 30,000 francs for the purchase and gratuitous distribution of American plants for grafting on the native vines of the country of the Charente, for the creation of a nursery garden, and for the establishment of a school of grafting.

The number of plants received the past year for grafting was 256,000. To aid in the success of the plantations, they published and addressed gratuitously to every one who asked for the plants, detailed instructions to guide them in the grafting. There was some trouble in finding land having all the qualifications necessary for a nursery garden, but at last they hired land at Crouin, on the route to Saintes, containing 13,300 square meters.

The soil was good, entirely cleared up, and sufficient for two hundred and fifty to three hundred thousand grafts. A house was built of wood, in which to preserve the plants which they receive for distribution, and there they will start a school of graftage.

Numerous grafts will be made under the direction of a professor and in the presence of the proprietors who will be convoked to witness the works.

Mr. Rivas, the able professor, constantly occupied in the study of the

subject for many years, has hired a young man from the agricultural school who directs it.

Five experimental fields have been established, in which about two hundred and fifty new varieties of hybrides have been cultivated. At the annual meeting I speak of, in February last, Professor Rivas made an elaborate report to the committee of which I transmit a free translation.

WILLIAM S. PRESTON,
Consul.

UNITED STATES CONSULATE,
Cognac, August 26, 1890.

CULTURE OF THE VINE IN COGNAC.

Report of Professor Rivas to the committee of viticulture of the arrondissement of Cognac.

[Translated by Consul Preston.]

The old French vines, planted in the low-lands where the soil is clayey and moist, continue to become more and more vigorous. This is due solely to the persistent rains of the last two or three years. Retained in the low-lands at the surface of the soil by a clay very compact they have almost drowned the phyloxera, as if making a complete submersion, or at least placed them in such a condition that they can not multiply themselves actively. A proof that it is really so is that the vines placed on the hillsides where the water runs off continue to perish. This state of things is maintained if the years are rainy, but not if they are dry. When the dryness becomes more intense all the vines to-day more vigorous disappear anew.

It would then be imprudent to make new plantations of French vines; inasmuch as the young vines succumb rapidly to the attacks of the phyloxera. In the dry lands, it goes without saying, the young vines last hardly three, four, or five years, which is proved by numerous examples. It is not the same if these new plantations are treated for the destruction of the insects. The sulphur of carbon and the sulphurated carbonate of potash have been tried and proved. The sulphur of carbon in the warrens, in the lands which drain well and even in clayey land when the soil is well dried again: the sulpho-carbonate of potash in the lands of the open country.

The high price of the vines indemnify largely for the expenses of the application of these insect-destroyers.

FIELDS OF DEMONSTRATION.

The fields of demonstration which the committee of viticulture have created in this arrondissement of Cognac are six. They are situated on the principal routes which end at Cognac, Jarnac and Châteauneuf.

The field of Chateauneuf is established in a flinty land, or in some places clayey, redish and sometimes poor. The plantation has been made in grafts on the Saint-Emilion and of Balzac or Jacquez, York, Vialla. Some ranks have been planted in roots, which will be grafted in the spring.

The vegetation of these vines is very fine, save in one point, where the water has remained during a long time, and their vigor has very favorably impressed the numerous visitors.

The two fields of demonstration of Jarnac are less fine. This comes from the bad quality of the plants (the last year the plants grafted with leaves were rare, and those which should have been employed were defective), and above all from abundant

rains, which came so soon after planting. The ground was very compact, the water had been retained in the holes and drowned the roots. Besides, in the low country, many of the French vines have been completely stranded for the same reason. This year the failures will be replaced with very fine plants, grafted and soldered; and there is reason to hope that very soon these fields will leave nothing to desire.

The vegetation of the vines of demonstration established near Cognac is really very remarkable. One of these is situated on the route to St. Sulpice, on ground belonging to Mr. J. Brisson. The plantation has been made in grafts and soudés de Folle, or Jacquez, Solonis or York. Five ranks have been planted in roots, not grafted, of Rupestris, Solonis, York, Riparia, Jacquez, etc. A part will be grafted in some months in places; the other parts will serve as witnesses, and will furnish the slips. As I have already said, all these vines are very fine; many of the grafted plants bear grapes this year, that is to say of the second leaf; and it is hoped, if there is no accident, that the harvest will largely cover expenses of culture.

Another vine is found on the high road to Saintes near Yourezac, and if I am well informed it is the admiration of all who have seen it. The ground is reddish, flinty clay, above an under soil of chaple of 60 centimeters and over of depth.

The graftings employed are the Solonis, the York, the Jacquez. They have not been able to cultivate there the Rupestris and Riparia; these two were wanting, but they will be vigorously developed. The plantation has been made in soldered grafts; some feet only of roots not grafted are cultivated as specimens.

For manure, 5 cubic meters of manure have been employed from the farm. This is not excessive, and the vine-growers are advised to use more on the new plantations (for the grafts and soudés it is important above all that the first year the vegetation should be very vigorous in order that the closing of the cuts may be more perfect in the folds); but I insisted that in order to render our vines demonstrative as rapidly as possible they must be planted under rather bad conditions.

The field of demonstration of Cronin has been planted in a great part with roots of Jacquez, Solonis, Rupestris, and York, which will be grafted in the coming spring. The grafts soudés occupy but five ranks; here they will be able to judge in the same ground of the comparative value of the plantations of grafts soudés and of plantations made with the roots planted and grafted on the spot.

Up to the present these vines are all very vigorous; all the fields of demonstration have been broken up to a depth of from 40 to 45 centimeters by the hand or by the plow, afterwards the plantation has been made in holes, the roots of the young plants being cut 15 or 20 centimeters in length.

Some persons planted the roots with a bar, grafted or not, after cutting the roots smooth. This is a bad system of planting; above all for the plants grafted and soldered. It has already been said that these plants ought to vegetate vigorously the first year, in order that the solder may be completed. It is important, then, to leave them all their roots. The planting with a bar, which requires their suppression, or at least their reduction to almost nothing, is not suitable to grafts soudés.

To sum up, the vines of demonstration of the committee leave nothing to desire (those of Jarnac excepted), and these certainly count for something in the great enthusiasm manifested in favor of American vines in the borderies near Chateau Neuf, etc.

RECONSTRUCTING THE VINEYARDS WITH AMERICAN PLANTS.

What prevents many from planting American vines is that they believe these plantations are very expensive. We will try to show that it is not so.

Without doubt the plantations made with plants grafted and soldered, taken from the nursery gardens, come very dear, and this is not a very practical way of reconstructing to a great extent; but these same plants can be raised here, and then the cost is insignificant.

With a thousand slips of Jacquez one meter in length they can make three thousand grafted slips. Put in nursery gardens and well cultivated, they can give a

harvest of 50 per cent.; some in the neighborhood of Cognac obtained even 60 and 70 per cent; say 1,500 plants grafted, which will have cost the enormous sum of $2. This is the price of 1,000 slips of Jacquez; with the Solonis, Riparia, Vialla, the price would be a little higher.

We do not mention here the expense of hand work of grafting, of the culture of the nursury slips, etc., for this kind of work can be done in the evening by the fireside, or on rainy days, etc. But these plants will yield some grapes the second year, and a passable harvest the third year. I can mention here a vine at St Mêrne which has yielded four barrels of wine to the journal at its second leaf. Besides, in the Beaujolais they often harvest the second year of planting, always the third; while the French vines generally produce but at the fifth, sixth, or even the seventh year. Dare we add that the American vines grafted produce a third more than the French vines; this, however, is the exact truth.

The grafted slips are, then, a rapid and economical means of reconstructing vineyards; but they can operate differently and just as economically. Instead of grafting the slips on the stalk they can graft on the roots, and so put them in the nursery. The success of the grafting is better and the plants finer.

Another economical means is good; to put the slips of 45 or 50 centimeters long in a nursery and graft them there the following year, and plant the vines afterwards the second year where the grafting has succeeded. The slips themselves cost from 4 to 15 francs per thousand, according to the graft bearers; that is less than the Folle-Blanche, and St. Emilion cost.

They can also plant the roots, which are grafted where they are at the end of a year from planting. If the grafting succeeds, the vines are thus very vigorous, but in one locality the grafting in place often gives but very insignificant results.

The cause appears to be the cold and moist climate. The reasons are not very well known, but they can very easily obviate that inconvenience, or at least attenuate its effects. It suffices to make at the same time the grafting takes place a nursery of grafts and soudés with which they can replace all the failures.

Some graft the roots on table and at once plant in nursery. This is a bad proceeding, for it has all the inconveniences of grafting in place and of grafting on table without the advantages. They succeed well sometimes, but very rarely. The breaking up of the ground is what costs the dearest. The American vines require a ground well broken up, but when they understand it a hectare of land can be broken up with a plow for 150 francs ($30) or less.

Besides, the expense of breaking up of plantation of grafting might be still greater, the two or three harvests that the grafted American vines produce sooner than French vines would more than cover the expense. If we add that they produce more during their duration; and that, thanks to them, the blight is no more to be feared, or at least it will not be very serious. We shall have shown what every one already knows, that if the American vines have some inconveniences, they offer also serious advantages.

Grafting still frightens many: but the school of graftage which will be open three months at Cognac will offer them an opportunity to convince themselves that there is nothing in the world so simple or so easy to do. As for the difficulties of the choice in best graft-bearers for a given soil, they are not very great. It is well understood to-day what lands are suitable for the usual graft-bearers; such as Riparia, Solonis, Jacquez, Vialla, York Madeira, etc. Besides, in many of the lands of the arrondissement all these old vines can give good results. Where the difficulty commences is where the proportion of calcaire becomes considerable; but this is a question we will examine later. Hereafter they can plant without hesitation the American vines in a large part of the arrondissement. We can not give exact figures; but after what I have observed in my voyages for the gratuitous distribution, I believe I am not far from the truth in estimating it as about one-half of the total surface of the arrondissement.

That is, then, 30,000 hectares where American vines can now be planted in all security; that is to say, the area of the old vineyards before the phylloxera. Here is a list of communes where success is certain: Cognac, Crouin, Saint-Laurent, Louzac, Saint-André, Saint-Sulpice, Cherves, Bouthiers, Breville, Saint-Sevére, Houlette, Nercillac, Reparsac, Julienne, Chassors, Jarnac, Bourg-Charente, Saint-Brice, Gondeville, Saint-Amant de Graves, les Graves, Châteauneuf, Mosnac, Saint-Surin, Saint-Simon, Triac, some parts of Fleurac, Foussignac, Sigonne, Ars, Mainxe, Saint Preuil, Touzac. Malaville, Bonteville in Champagne.

Besides the nature of the lands, which can not deceive us, plantations dating already from several years show that in these communes American vines work well and give good results.

AMERICAN VINES IN CALCAREOUS SOILS.

For the lands of Champagne and of Groie we are less favored. For the most part American vines which have there been cultivated have not prospered well.

But it will be seen that we need not despair of finding one, and perhaps several, graft-bearers which will develop very well.

Let us first see what is the organization of our fields of experiments. These fields, four in Champagne, with Henry Perrin, of Boussac; Henry Pelletant, of Genté; Aimé Richard, of Louzac; Filloux, of Angeac. The fifth, in Groie, with Mr. Arsandeau at Sigonne. Two other experimental fields will be created this year. One in the Groie will be planted exclusively with varieties which have already given good results in Champagne. The other, in Champagne, will receive from two hundred to two hundred and fifty new varieties. We will have, also, in the spring of this year, from four hundred and fifty to five hundred varieties on trial, all very rare, and all recommended for diverse reasons for calcareous soils. It is the unique collection of the world.

Each variety is represented, as far as possible, by ten, twenty, thirty, or forty slips in each field. The Berlandieri, Cinerea, and Cordifolia vines are the most numerous. Half of these will be grafted, the rest not; so that we can judge of the value of each old vine as a graft-bearer and direct producer (for many can do both) and the influence of grafting on each one of them. All these varieties resist the phylloxera; most are unharmed, others carry it on their roots but do not suffer from it. The phylloxera in our judgment is the most inoffensive insect, and in what follows it will not be in question. The soil is the great enemy of the vines. It is not then a study to find a vine that will resist the phylloxera (there are thousands), but to find a vine that will not only resist phylloxera, but also prosper in lands of Champagne and Groie. This, we shall see, is not far from achievement.

CHLOROSIS IN AMERICAN VINES.

Before examining in detail how American vines prosper in calcareous soils, we should endeavor perhaps to find out what are the causes of non-success of most of them in these lands.

Notwithstanding the number of works already published on this subject, which do not throw much light on it, I have not at present any plausible explanation to give for want of success. I do not, therefore, give any detailed examination of opinions which have been expressed on the subject. I merely observe that many are in contradiction with certain facts, which all have had occasion to observe.

The chlorosis of the vines, grafted or not, and the stunting which follows, have turn by turn been attributed to moisture, to drought, or to these two elements combined; to want of coloring in the soil, want of iron; to want of light or too much light; to climate, to the calcareous soil itself, etc. The influence of too much moisture on the vegetation of the vines can not be denied. I even believe that it may become a serious cause of failure; but to attribute all cases of chlorosis to moisture is clearly

an exaggeration, as I have seen vines planted in very moist lands (the water remained on the surface from October to June, and the culture was impossible, save at rare and short intervals) that never grew yellow; and I have more than mere doubts about the part that moisture plays in turning the leaves yellow.

Indeed, the stains of chlorosis which at times are noticed in the vineyards in question are always on the hillsides, where water never remains and where the soil and subsoil are neither too moist nor too dry. Besides, the chlorosis is never very dangerous which can be attributed to excess of moisture. It appears chiefly in the spring, and in the course of vegetation it disappears.

The influence of drought is equally great. I have often noticed vines that were planted in very dry land. After a few days of sun and a slight breeze to dry the land entirely, the leaves fade and the grapes wither and fall, but no chlorosis.

As for the alternatives of drought and moisture, these seem to be the natural conditions of vegetation. Under this hypothesis, calcareous lands absorb much water, then rapidly dry; at first drowning the roots, then leaving them completely dry. The chalky lands in the vicinity of Cognac do not swell with water, and a few hours after rain they can be easily worked. They do not dry up either. We have never observed vines suffer from chlorosis, although it is in such lands as these that chlorosis is most intense.

Iron seems to play a certain role in the formation of the green matter of the leaves; some have even supposed that the yellow color might be owing to this element in the soil; but this is not so. For a long time past it has been remarked that the white soil (where this cause is chiefly placed) is as rich in iron as highly colored lands.

This metal, it is true, is not found there in the same state of oxidation and of liability to assimilation; but it matters little, since the roots which grow in the white soil contain as much iron as those growing in soil very rich in color. Besides, most of the land of Groie in the Charentes where American vines do not thrive is the most highly colored, the soil being very red, and consequently ought to contain more oxide of iron in the best state to assimilate.

It must, however, be said that an addition to the soil of a solution of sulphate of iron poured at the foot of the roots has a happy action on the formation of the green matter of the leaves. This is the result obtained from numerous trials made in land of Groie * by Mr. Jord in the Charente-Inférieure. The same result I have myself obtained from experiments made in land of Champagne. But this action of sulphate of iron is very limited; the vines thus treated are a little less yellow, that is all the difference.

The slight overheating of the soil, which results from want of coloring on the surface, does not account for the greater part of cases of chlorosis. The lands of groie, it has already been stated, are colored red or ocher; the heating of the soil is almost too intense. The greater part of the land of Champagne has a deep gray, or even black color, like marsh-land.

The same may be said of the pretended influence of light, which, according to some, is one cause of chlorosis when it is not intense, and according to others when it is excessive.

As for the climate, it surely plays a certain role in the adaptation; but generally speaking, the more it is soft, temperate, and, above all, less burning, the more it favors the development of American vines. And this is so true that in the south of France the Riparia rupestris and Jacquez solonis are almost the sole vines cultivated as graft-bearers, while less-heated regions cultivate many more.

The Vialla, which does not grow badly in the south, vegetates here very well, and equally well in the Beaujolais. It is quite the best for light lands that are silicious.

The Herbemont, that turns yellow so rapidly and is stunted in the Herault, thrives in analogous soils of the Charentes, and even in bad soils it grows vigorously. The same is true of the Oporto, York Madeira, etc. It is clear that the phyloxera makes

* Groie: Light, yellow soil, mixed with chalk-stones.

less ravage in moist and temperate climates, and that is owing to the fact that the moist lands are more favorable to the vegetation of the vine than very hot and burning lands. The Mediterranean region is not, therefore, considered any more as a favored land for the reconstruction of vines.

The soils being equally good the Charentes have the advantage over the southwest, center, etc., the facility of adaptation of the same grafts to different soils being here much greater.

The influence of carbonate of lime appears more certain. It is of daily observation that the richer in calcaire the lands, the less they favor the culture of American vines. This has been proved by Mr. Chauzit by means of two hundred comparative analyses of soil from regions quite diverse. The most interesting is to know just what these "special properties" are. Others suppose that the carbonate of lime acts directly on the plant. This supposition pleases me if it were confirmed. Unfortunately up to the present time nothing has justified it. The researches I commenced last year and have continued this year will perhaps give the key to some of these phenomena.

To resume, neither moisture nor dryness, or the two combined, count for anything in most of the cases of chlorosis and stunting which occur in very calcareous soils. If their action is not completely null, it is at least very limited.

Most of the phenomena of chlorosis are owing to the carbonate of lime, with which they appear united, as cause to effect. Carbonate of lime is much more injurious to the vine in proportion as it is mixed with the vegetable soil, whatever may be its depth.

In a trial field of the committee of viticulture the vegetal land has a depth of 40 centimeters. It is a soil of good quality, where formerly vines grew with vigor, and I hoped that in consequence of the depth of earth most of the American vines would grow there, at least for a certain time. But it is there that they are more yellow; the soil contained 39 per cent. of calcaire.

While in another field of the same geological formation, and of which the vegetal bed was not more than 15 centimeters deep, overlying immediately a bank of chalk, tender, and easily pulverized, the vines are much less yellow, the soil containing not more than 34 per cent. of calcaire. I believe, then, that the composition of the subsoil has not all the importance which was at first attributed to it. Without doubt, when the arable land is calcareous it will injure the vines if it contains much lime; but, if the arable bed is not calcareous, whatever may be its depth, the American vines have good chances of prospering, even when placed over a subsoil of marl or chalk. Besides the examples cited, there are a good number of lands in Champagne whose vegetal bed does not exceed 20 or 25 centimeters immediately over chalk, tender and easily pulverized, and yet American vines grow well there. It is because the thin layer of earth is not at all calcareous. There is a third deposit, sometimes clayey, sometimes formed of quartz gravel. Such is also the case of several plantations which have been cited as examples of reconstruction in chalky lands. They are in reality in entirely different conditions.

It is equally certain that all American vines are not alike sensitive to the action of carbonate of lime. Most are not adapted to calcareous soils; some appear to resist it completely, and this is the case with several vines which Mr. Vialla observed in America. Further on it will appear that it may be necessary to add several new hybrids, both natural and artificial.

In the same species the numerous forms inclosed present differences tangible enough that it is possible by selection to isolate those which offer a real interest.

The species and varieties the most meritorious will now be reviewed and some details given on most of the vines which have been tried in very calcareous land. These condensed indications have been gathered by myself in the experimental fields of the committee of viticulture of the arrondissement of Cognac established in chalky lands, where until now American vines have failed. We have verified them during a long voyage made last year in all the regions where the soil offers some analogy with

those of the Charentes (in the center, southeast, south, southwest) by observations made in the experimental fields and in the vineyards.

The wild species (*Riparia*).—After having been much used for the reconstruction of vineyards then almost abandoned after numerous cases of chlorosis, the *Riparia* is once more in favor, and properly so, for it is one of the best known graft-bearers.

In the first place, it strongly resists phyloxera, a quality deficient in many American vines cultivated for the same purpose. It bears quite well grafts of most French vines (except Balzac and Mourvède, and a few others which it nourishes badly), both in Provence and Languedoc, as well as in the Charentes. Its stalk does not swell much where the land in which it is planted does not suit it, but this is perhaps of minor importance.

Grafts have been seen on the *Riparia* double the size of the subject, and the same were not in appearance less vigorous. Can these dimensions have any bearing on the duration of the root? It can not yet be asserted, but it certainly is much to be feared. The exaggerated swelling of the graft, or, rather, of the graft bearer, have been attributed to the effects of annular incision.

In fact, it is known that in plants which have undergone this operation the part above the cut swells much, while the lower part remains thin. The consequence is a general feebleness which if not excessive favors the fructification, but which may also hasten the decay of the plant. This is often the case with grafts on the *Riparia*. French varieties grafted thereon are more fertile than when alone; they fear less the blight and their fruit ripens more rapidly. But in reality, notwithstanding these analogies, there is nothing in common between the circular incision and the graft, except during the first and second years that follow the grafting.

Until the solder is complete, the graft can be assimilated to a partial incision or cut of any kind; but as soon as the solder is perfect, and the tissues of the graft are in communication with those of the subject, there is nothing that resembles the incision.

In a branch or stem in which an incision is made, as soon as the ends are reunited and soldered, the circulation of the sap is re-established as before the cut, and the lower part swells like the upper part; the tree or branch ceases to be more fertile. In grafts on the *Riparia*, well soldered, nothing like this occurs.

Although there is no apparent obstruction to the circulation of the sap, yet the grafted part continues to grow immeasurably, while the subject rests feeble. The explanation of this phenomenon, I believe, is of the physiological order. There is perfect harmony between all the organs of the same vegetable; each one contributes to the growth of the others in the best conditions. Grafting seems to me to break this harmony. The matter elaborated by the new stem is no longer that which suits the subject; placed henceforth in less favorable conditions of growth it is less developed; it suffers and remains feeble; the matter, not absorbed by the subject, accumulates in the grafted part and produces an abnormal swelling.

The disorders, then, which follow the grafting are not in consequence of the graft itself. They arise, in my opinion, from the internal and external differences, or the vital differences which exist between the graft and the subject.

A vine grafted on itself (whether *Riparia* or any other species) ought not to produce any anomaly like this. As soon as the solder is complete it should grow as if never grafted. It is easy to give proofs. Besides those found in arboriculture, and which are so well known that it is unnecessary here to cite them, I will observe that our old French vines, grafted with neighboring varieties, have never shown anything like that offered by the *Riparia*. They grow as before; their vegetation is the same.

There is the most perfect analogy between the functions and mode of living of the grafted part and the subject. The latter preserves the same conditions of vegetation that it had before the grafting. The more, therefore, two grafted vines offer analogy in their functions, the less the subject will suffer from the grafted part. It is this analogy which establishes the identity (in the case of a vine grafted upon itself),

which is now called affinity. On the other hand, the more two grafted vines differ from each other, the more the subject will suffer from the grafting.

Riparia being quite different from the French vines, which it must bear, it is not surprising that, for the reasons given, the grafts are always feebler than other kinds. This weakness will, in certain cases, kill the vine, or, at least, engender chlorosis and stunting of grafted roots. *Riparia* has frequently developed quite vigorously, as well as other vines, as long as it is not grafted, even in very bad soils; but once grafted vegetation suddenly stops. And then the disorders caused by grafting increase those of the non-adaptation of the soil. This weakness is produced in all kinds of soil, but it is, perhaps, mitigated by a good adaptation. For these reasons the *Riparia* requires a deep and rich soil, or it must be manured very highly, and the manure must be azoté to maintain it in good vegetation. And thus *Riparia* will prosper many years. For some time it has been an experiment to plant *Riparia* in all soils, but soon it appeared that it could not be an universal graft-bearer. Wherever the white marl, chalk, tender and easily pulverized, forms a part of the arable bed, *Riparia*, when grafted, turns yellow. It is one of the most calciferous of American vines. All these varieties are not equally subject to chlorosis, and some were selected which turned yellow less than others, although none have a sufficient vegetation to be safely used. In general these varieties die earlier than the common varieties. Considerable noise has, however, been made of late about a certain species of *Riparia* called *Riparia-Ramond*. This species has its own value, as the propagator of it has succeeded in reconstructing vineyards in parts where the ordinary *Riparia* and other graft-bearers have rapidly turned yellow.

As it has become notorious, let us examine under what conditions of soil and culture it thrives with Mr. Ramond.

The subsoil of his vineyards is very calcareous. Sometimes quite hard, of white rock, but now and then quite tender, and softening under the influence of frost, it changes in some parts to a pulverizable marl. The composition of the vegetal land varies. It is almost deficient in calcaire in narrow places where it has not been broken up or mixed with the subsoil. In some places it is siliceous, flinty in others, whatever may be the depth. Wherever the subsoil is near the surface, ferns, pines, chestnuts grow, although I did not know that such plants and trees were adapted to calcareous soils. The composition of the parts cultivated is unlike. In plowing the subsoil has mixed with the siliceous or flinty surface and numerous small fragments of calcareous marl, and the soil is consequently quite diversified; but it offers often strong resemblance to land of Groie. Now and then it is a sandy soil, with 20 per cent. of calcaire; sometimes the land is quite fertile and even very rich, with 12 per cent. of carbonate of lime. This proportion of carbonate of lime may be less than that.

The depth is from 10 to 40 centimeters, with subsoil more or less compact of calcareous rock. The *Riparia-Ramond* thrives in all these lands; the grafts last year were much admired and the harvest bountiful. But in every case the soil is broken up carefully and abundantly manured. It moreover profits by the flinty and sandy soil. The *Riparia-Ramond* certainly benefits from this cultivation. But unless it resists chlorosis better than *Riparia* it can not last. Still, in addition to increasing the nutritive properties of the soil, these considerable additions to the land from the third year of plantation profoundly modify the physical composition of the arable land. There are some places, it is true, where this is not the case, but then either the grafts have not been grafted or only recently. To be able to estimate the value of this vine it should be planted under the most ordinary conditions.

In an experimental field containing above 40 per cent. of calcaire, Rupestris, York, and Solonis fail, while *Riparia-Ramond* thrives, but only after two years of growth. *Riparia-Ramond*, in fine, in lands of Groie, of Charente, Bourgoine, etc., which are partially calcareous, will do well, but it will certainly be insufficient in chalky grounds containing a large proportion of carbonate of lime. These lands have been tried in four different places and invariably the vines turned yellow, although less

than ordinary *Riparia*, and, in some cases, very stunted. In land of Groie, wherever I have observed, it was deep green.

Ripâria-Ramond is easily described. Its root or stem grows higher than ordinary *Riparia*, but does not equal it grafted. The branches shorter, knit hard, of hazel-nut color, as they ripen, red during vegetation, and this shade is occasionally found in the veins or fibers of the leaves. The latter quite ample, opening like V, intensely green on both faces, and bright. On the lower face the filaments are stiff as well as in the veins and on the edges. These filaments are united at joints of the principal veins or fibers. The teeth are large, slightly projecting, wall-crowned, unarched, regular or almost so at the end of the limbs. The teeth facing the lateral and terminal lobes are only a little bent. The grapes are small, short, and thick seeds, compact and peculiar to the taste.

All this proves that it is not a genuine *Riparia*. The form of the teeth, the shape of the veins, the diminutive size of the stalks, and the hardness of the wood, its color like weeds, as well as the form of the grapes, etc., are so many indications which seem to establish the relationship with *Rupestris*.

Each time I have occasion to compare it with *Ruparia-Rupestris*, cultivated side by side, it has always seemed to bear the closest analogy to these hybrids.

Last year was remarkable for *Riparias* in calcareous lands. The number was considerable. One of them is native of the Charentes. According to the information at hand, it grows in lands which contain over 60 per cent. of calcaire. But *Riparias*, not grafted, and slips from them planted in similar lands and subsequently grafted, quickly disappear.

Another species coming from the North will also be vigorous. According to the information acquired it does not sustain its reputation. It will grow, it is true, in very calcareous soil; but that proves nothing.

As for those grafted, and which compose the small vineyards, the land is not the same as those of Groie and Champagne in the Charentes. In some the subsoil is clearly chalky, a tender turf, rich in chalk; but it has already been shown that the subsoil does not play a great rôle in the manifestation of chlorosis.

The soil is quite flinty, red or gray, and the ordinary *Riparia*, as well as many others, should certainly have prospered in it.

Without limiting these observations to the vegetation of plants not grafted, a dozen forms of *Riparia* and as many of *Rupestris* might be named, which have lived for the past ten years in open ground of Champagne very calcareous and chalky.

The Taylor, Clinton, Solonis, and Yacquez were planted in these lands thirteen or fourteen years ago, and do not turn yellow; but none of these vines are grafted.

Some have, however, been grafted in these poor lands and have done well. It was done on roots of seven or eight years old, which had acquired sufficient strength to sustain without much suffering the greffage.

One of the ablest viticulturists in the Charentes has already confirmed this observation. He only grafts on roots of three or four years on the sprouts of a year's growth cut down close to the ground. This may be an interesting item; but of what practical value? And then it is not proved that these vines would live even grafted upon vines of seven or eight years, after a few years of graftage.

On the whole, after all that has been said, it will not do to try the *Riparia* (except with prudence) so much recommended for calcareous lands, for none have as yet been proved in these lands. *Riparia-Ramond* alone is an exception. Yet it can not be cultivated in the chalky lands analogous to those of Champagne.

Rupestris.—This vine has also been recommended—I scarcely know why—for very calcareous soil. Perhaps the reason is that it has been seen growing vigorously on rocks which border the rivers in the United States. But there are many species of rocks, and even calcareous rocks, when very hard, are quite favorable to American vines. Some of the waste lands in the Hérault are proofs; and some calcareous chalky lands in Charente which contain 95 per cent. of carbonate of lime.

And then Mr. Vialla states that *Rupestris* grows specially in America in very poor ground, formed, however, of flinty gravel, and not intermixed with vegetal soil. It is the same thing in France.

It does not answer to plant *Rupestris* in calcareous soil. It dies there even sooner than *Riparia*, and if it is superior to the latter in many parts of the South, it is only because these lands are not too calcareous. In all cases when the proportion of calcaire is too great, *Rupestris* dies. In the lands of Champagne and Groie it dies where the *Riparia* is sometimes strong. The silicious is by far the best soil for it, and in such a soil it is superior to all graft-bearers, which it surpasses as the lands are less and less fertile. I have seen it very vigorous in tertiary deposits formed exclusively of gravel of the size of buckshot and hazel-nuts, while *Riparia*, *Vialla*, and *York-Madeira* were there very feeble.

Rupestris is then the best vine of all for poor, silicious soil, although it succeeds in rich soil, also; yet cheaper graft-bearers are as good. It grows admirably, also, in certain calcareous, sterile lands, formed of calcareous fragments rolled very hard. In these lands *Riparia* does not turn yellow, but *Rupestris* is far superior to it. For the old alluvial earth of Charente, of which the subsoil is gravel mixed equally with calcareous and silicious fragments, I believe *Rupestris* the best vine. Like *Riparia* various species of *Rupestris* were recommended for calcareous soil. Certain ones are in our experimental fields, and others in soils of diverse nature, all growing in about the same way, and in very chalky land they all turn yellow.

V. Cordifolia.—This vine has been recommended by Mr. Vialla for several years for calcareous soil. Until recently this vine had not been much cultivated on account of the numerous suckers that grow from it, and it does not appear to play any important part in the reconstruction of the vineyards. It is not adapted, either, to very calcareous soil. Several trials of the vine have failed. In chalky land it is affected with chlorosis, and soon dies, often during the first year. This, at least, is the result of our experiments. The greater number of varieties cultivated were, it is true, issues of the seeds planted in France and gathered, not upon Cordifolia in calcareous lands of America, but on those growing in the rich alluvial earth of the rivers. It is possible that the vines which grow spontaneously in rich silicious lands are not adapted to calcareous, poor soil, and therefore our experiments may not be considered important. But I have unfortunately cultivated Cordifolia that came direct from calcareous lands in America, and they did no better than the others. In conclusion, I do not consider Cordifolia of use in poor ground.

V. Cinerea.—The remarks made above of *Cordifolia* will apply word for word to *Cinerea*. Like *Cordifolia*, it turns yellow and is stunted during the first year, both the species coming directly from calcareous lands in America, as well as those obtained in France.

Nothing, then, can be expected from this vine.

It has been recommended for moist and flinty lands; it grows in fact very well in flinty beds in the Aude; but until now no plantation of this vine has been made to any extent in France, and it is preferable to abstain from much use of it.

V. Monticola (*Fœxeana Texana*).—A species of vine but little known as yet in France. Mr. Vialla noticed it in America in very calcareous land, and which bears much analogy to land of Groie. It might therefore prosper in analogous soil in France. We have several cultivated in chalky land; none have turned yellow; their strength is sufficient, notwithsanding the vine passes for very feeble. This is all that is known of this vine, and its future can not be judged.

Candicans.—The Mustang (*V. Candicans*) is the vine that attains the greatest dimensions in America. It grows vigorously even in quite bad lands.

It has been little cultivated in France, on account of the difficulty of propagating it by cuttings or slips, and this is the reason why we have not been able to cultivate it in our experimental fields. Some of these slips are always found mixed accidentally with roots sent to us from the South. They turned yellow like those of *Cinerea* and *Cordifolia*. It follows that, if this observation is of any value, it will not do to

plant this vine in bad land. Moreover, Mr. Vialla never observed it in Texas in lands rich in carbonate of lime. It has not yet been tried in other lands, and should it be an object to find a process of rapid multiplication, the trials of adaptation, which have been made with other varieties successfully, must be recommenced.

V. Arizonica.—This vine is very rustic and a strong resistant of phylloxera. It is employed in California as a graft-bearer, and not cultivated in France.

It grows spontaneously in California and Arizona on very dry hills, stony and calcareous.

If it was more vigorous, it would perhaps have some value for lands of Groie. We have planted a dozen roots in Champagne. They grew yellow a little, but without degenerating. It is not in any case a vine to multiply.

V. Californica.—This vine is of no value either in France or America. It dies of phyloxera, and samples we cultivated in Champagne turned rapidly yellow.

V. Berlandieri.—It has been in France for some time; resists phylloxera very well, and makes a good graft-bearer. Until now it has but little multiplied in France, on account of the difficulties to propagate it from slips that easily break. It has, however, been proved to grow well in bad lands even where there was much lime. On Dr. Davin's lands it grows in chalky soil. The same may be said of the experiments made by Mr. Planchon in loam, composed of four ingredients and very calcareous. Its grafts were really remarkable. The same is seen at some places in the Charente Sufirieure, where it remains deep green, while numerous varieties around it turned yellow. Nothing more was known about this vine, when Mr. Vialla discovered it in America in Texas, in soil analagous to the calcareous land of Charente and of Champagne. The various experiments I have made show that it will resist a strong dose of calcaire.

In our experimental fields four hundred roots planted show no trace of chlorosis. It is the same in other parts of the Charente Inférieure, while numerous varieties, recommended for calcareous soil, even the Folle Blanche, planted in equally good conditions, have not escaped phylloxera. It is not yet known whether these hopes will be realized or not. It is objected that in the beginning this vine is feeble, but, later, it is strong, and compares favorably with the most vigorous graft-bearers. It is propagated by slips of a year's growth. This system is excellent, and it is advisable to multiply it by grafted slips. This way, I hoped, last year would overcome the difficulty. But it failed. The grafted slips succeeded no better than the slips. It is preferable to graft slips of Berlandieri from 30 to 35 centimeters long, or even shorter, on French or American stalks. They grow very well. The slip planted in good soil, leaving one or two eyes above ground, take root at once, but the Belandieri soon throws off a certain number of roots. Very fine roots are thus obtained. Grafts with only one eye have not succeeded, and the issues from them have not had sufficient strength. A preceding report, all that was interesting to relate of the hybrids of Berlandieri and French vines, was given, so far as chalky land is concerned. Numerous experiments have verified these previsions.

We shall see, in the next place, that even if Berlandiera can not play any great part as graft bearer in chalky lands, it is not the same with these hybrids.

HYBRIDS—*American hybrids.*—Hybrids that result from crossing American vines are very numerous. The best known are *Solonis, York-Madeira, Huntington, Champins, Novo-Mexicana, Cordifolia-Rupestris, Riparia-Rupestris, Rupestris Æstivalis, Cinerea Rupestris*, etc.

Solonis.—This vine is, according to Mr. Millardet, a hybrid of *Riparia-Rupestris* and Caudicans; of *Riparia* and Caudicans only, according to Mr. Vialla. In either case Solonis is a graft-bearer that is less exposed to chlorosis in chalky lands, as well as in flinty and cold soils. The reason is not to be found in the aptitude of its generators. Riparia and Rupestris are not, as has been seen, adapted to calcareous soil. *Mustang* (*V. Caudicans*) is even better, although doubted. It is a vine with acquired qualities by hybridation, and this is common to all hybrids. *Solonis*, in very calcareous soil, develops well generally when not grafted, and is not excessively chlo-

rotique. But, grafted, it is rapidly stunted. In land of Groie the grafts exist, do not turn yellow much, but remain very feeble. When the ground is broken up and manured, it is better. It gives good enough results under these conditions. But really it is only in flinty, moist lands that *Solonis* should be planted. There it is the best graft-bearer of all. When it has been planted side by side with *Riparia, York*, etc., in such conditions, its vigor was always superior to them; but for land of Groie it must be entirely abandoned.

Novo Mexicana.—According to Mr. Vialla, hybride of *Ruparia* and *Mustang*, and consequently related to *Solonis*, to which besides it offers the greatest analogy. *Novo-Mexicana*, then, is a group of hybrids only dissimilar by very little. *Solonis* is one of these hybrids. It resists chlorosio, like *Solonis*, better than many other vines; but it has been cultivated for so short a time in France that we can not pronounce upon its value. In one of our experimental fields of Champagne it turned yellow, but less than *Solonis*. In ordinary lands it is vigorous and well adapts slips, but it has not yet acquired resistance of phylloxera. It is, then, an interesting vine for study; but too great hopes must not be placed upon it. Among its many varieties a choice should be made. Mr. Vialla sent me lately a remarkable species, called *Nova Mexicana d'Hutchon*.

York Madeira.—This vine is recommended for dry lands. It succeeds there very well, and few phylloxera are found on its roots, but these dry lands ought not to be calcareous. It does better in siliceous soil formed of big stones, with a little vegetal earth and poorer than the soil of *Rupestris*. York is quite feeble whenever the siliceous grains are unmixed with good earth and compact. In these conditions its grafts are never very fine. They bear much fruit, too much, even, but it ripens badly. In the calcareous land of Groie it does not turn yellow much, but its development there is always so restrained that it can not well be utilized for plantations. In Champagne lands it dies rapidly, and it is equally bad in moist, flinty soils.

The *Vialla* and *Franklin* should be planted in light, siliceous land, as it is only there they will grow vigorously. If the proportion of calcaire is a little raised they soon die, and they are also feeble in moist and stony soils. We pass by the Clinton and Taylor, which have been almost abandoned as graft-bearers.

The *Oporto* has been recommended for calcareous soil, but, I think, wrongly. It is only vigorous in soils that suit Vialla, where it is even more vigorous than the latter.

The Champins.—These vines, cultivated in France, are hybrids of *Rupestris* and *Mustang*. Their characteristics are quite various. Some which are bushy with glittering leaves, almost smooth, resemble *Rupestris*; others which are portly, dull leaves, downy, as well as the branches, are more like Mustang. These vines do not equally resist phylloxera. Although for the most part quite difficult to multiply (the slips take badly, the layers only succeed), still, hopes are entertained for their adaptation to bad soils. Some of them have so far resisted chlorosis, where *Riparia* was torn up; but the resistance of many of these hybrids to phylloxera is more than doubtful. Some even died under the attacks of this parasite. And in the experimental fields of Champagne all the species (Nos. 1, 2, 5, 10) which were cultivated turned yellow the first year. Elsewhere they did well a little longer time, but only to the moment of graftage. It is uncertain how they would do in land of Groie, as they are not strong, and it is not likely that they will ever serve as graft-bearers in these lands. The hybrid *Champins*, result of crossing *Berlandieri*, *Monticola*, etc., with *Mustang* and what Mr. Vialla found in America, may prove to be better resistants of phylloxera and less liable to chlorosis on account of their origin. I have not yet made the trial.

Huntington.—This is a hybrid of *Ruparia* and *Rupestris*. According to Mr. Millardet, it is allied to *V. Labrusca*. The latter's influence must be feeble, for there is no well defined characteristic of *Lebrusca* in the *Huntington*. The fruit is not foxy; the leaves are entirely smooth as well as the branches and the tendrils are prolonged in some of the branches. Until now this vine has been little used as a graft-bearer, on

account of its feebleness, and also as its resistance to phyloxera has not been yet determined. It is multiplied in the Charentes and the south of France as a direct producer. The grapes are very numerous, small, of medium seeds, compact, of a peculiar taste, but not sour. The wine produced is bad. For want, however, of better, the inhabitants of the Charentes mix it with other wines and drink it. It is most remarkable for its fine vegetation in very bad lands. Whatever may be said against Huntington it remains green and vigorous in lands of Groie where *Rupestris, Solonis,* and *Riparia* are soon stunted. It is the same in lands where American vines grow well; much better than *Riparia, York, Solonis, Rupestris,* etc., and which nevertheless grew finely. It is not to recommend its culture or to advise its use as graft-bearer or direct producer, for it does not resist phyloxera well; but in calcareous soil it is a vine least of all liable to chlorosis. The cause is unknown.

Riparia-Rupestris.—This vine is an example of what has already been said, that certain hybrids offer certain aptitudes which certainly were not transmitted from their originals. Almost all hybrids are more vigorous than their generators. They swell more and their branches are longer and stronger. They are better adapted to bad soils than *Riparia* or *Rupestris.* Few of these vines have been grafted, but they will not do it well and their trunk would rapidly develop, as we believe. The swellings, so frequent and voluminous at the point of solder on *Riparia,* are never seen, and it is thought that *Riparia-Rupestris,* or some among them, will make excellent graft-bearers. Other reasons, too, than these might be given. First, among vines that grow well in very calcareous soil, like the Groie, are found just two of these hybrids, *Huntington* and *Riparia-Ramond.*

In a plantation in very poor, calcareous land some roots were more vigorous than *Rupestris* planted under the same conditions by their side, and on examination the roots were identified as hybrides of *Ruparia* and *Rupestris.* In very calcareous land of Provence a *Rupestris,* result of crossing with *Riparia,* grew very well where many vines planted at the same time are already dead.

Nearer Cognac, in land of Groie, where the best of *Rupestris* may die, some of the *Riparia-Rupestris* are very fine. In Ardèche, in soil of bad quality, of Mr. Coudere *Ruparia-Rupestris* is remarkable. And I may be excused in my preference for these vines by adducing proofs of their beauty in the worst lands of the Charente, as may be witnessed in lands of Messrs. Foex, Millardet, and Grasset. All that have been cultivated in our experimental fields have a fine vegetation in Champagne, a few only have turned a little yellow; it is not believed, however, that they will be good graft-bearers for these lands. But, on the other hand, in lands of Groie they may be used without apprehension. In fact, they have a marvelous vegetation and surpass the finest species of Franco-American hybrids. All are not equally fine, it is true, and a serious selection must be made. Thus a *Riparia-Rupestris* of Yæger comprised two kinds: one, more like *Rupestris* (its branches erect, shorter, and red-colored like herbs), was the more vigorous; the other, resembling *Riparia,* has longer branches of yellowish green, prickly leaves; it turns yellow in land of Champagne, while the first remains green. In addition to several well-selected specimens, upon which experiments have already been made, we shall continue to make others known.

Cordifolia-Rupestris.—These vines grow vigorously in America, and also in some parts of the south of France. Mr. Millardet has commended their use in calcareous soil. But, in my opinion, it is an error, for they will not prosper. Several I have had planted, both natural and artificial, all turned yellow rapidly and died in a few months. They take better in land of Groie, but the poorest vines imaginable. It is not known for what reason they have been recommended so highly. Mr. Millardet maintains that they are adapted to flinty soil, cold and compact. But they have failed in good garden soil, and no reliance can be placed in them, whatever be the kind of soil. They are not of value either in chalky lands or in Groie.

Rupestris Æstivalis.—Of this vine we possess very few specimens. One did well in lands of the south of France; but transplanted in chalky land near Cognac, they were stunted before the expiration of the first year. Nothing can be expected of these

vines. Some of them, however, have merit. That of Lezignan grows well with Mr. Bouisset, and the Taylor, after four or five years, continues to grow vigorously in land of Groie, according to Mr. Tord. But these vines are not adapted to chalky soil.

Cinerea-Rupestris.—This vine is no better than *Cinerea* and inferior to *Rupestris* in our experimental fields. In some bad lands of the South there is a variety quite fine, but it is not of any interest to ourselves. Experiments are actually made with several of these hybrids, sent to me by Messrs. Foex, Couderc, Millardet, and Grasset. They have been too short a time in the fields to give an opinion, and we have but five or six samples. Those which resist phylloxera best are *Othello*×*Rupestris*, *Solonis*×*Othello*, *Canada*×*Rupestris*, *Cognac*, etc. The American hybrids, by Franco-Americans are greenest. *Canada*×*Rupestris* is also very fine with Mr. Couderc, in Ardèche, and will surely be a good graft-bearer.

Hybrids Franco-American.—This name is assigned to crossings of a variety of vine vinifera with any American vine. And during this report by vine of French origin, must always be understood vine vinifera.

Jacquez.—As a direct producer this vine has been much cultivated in the south of France, and it is now grafted almost exerywhere. In warmer latitudes the color of the wine changes very rapidly, and in the north the fruit ripens badly and is very susceptible to cryptogamic diseases. It is advantageous as graft-bearer. A few years ago when chlorosis generally prevailed among *riparia* vines, and they ceased for this reason to multiply it, *Jacquez* grafts alone remained green. In very calcareous land of marl *Jacquez* die, but much later than *Riparia*. They are fine graft-bearers for most of our vines; save, perhaps, *Balzac* or *Mourvéde*, which in most places are covered with excresences. It is so well adapted to grafts that after a short interval the joint can not be distinguished. It is known already why these grafts are less fertile than on *Riparia*.

The affinity between subject and graft places the root in as good conditions as if it were not grafted. The harmony is perfect and it is not therefore surprising that grafts on Jacquez produce less than on *Riparia*, and they are fully as fertile as French vines of the same age.

Jacquez is especially remarkable for the facility with which it grows in very diverse lands. In marl and chalky soil it is not a good graft-bearer, but it grows best there; but in Champagne it is the only graft-bearer that succeeds well. It is not yet proved that it resists phylloxera, or its reconstitution in calcareous soil would already be possible. In cold, flinty soil it also grows well. In a word, it grows like our French vines and is at the same time hybrid of American vines, to which it owes its resistance to phylloxera, and of a French vine, to which it owes its adaptation to all kinds of land and resistance to chlorosis. And from these analogies it adopts easily most of the grafts.

But it is more sensitive to blight than *Riparia*, and this is a sign of great strength. This defect can be remedied, too, by a longer slip, or perhaps by proper manure. When grafts on *Riparia* grow feeble they should receive a compost of azotes; here, on the contrary, it should be manure of potash and phosphates. It is important to note that Jacquez, hybrid Franco-American, resists better than its American generators chlorosis, and consequently agree well with it as a graft-bearer, and develop as if they had not been grafted.

Othello, Canada, Triumph, etc.—They make little resistance to phylloxera; but, as direct producers, these hybrids are interesting species, found in our vineyards on account of their facility of adaptation to very bad soils; and they enable us to judge the value of species daily furnished to us by Messrs. Conders, Foex, Grasset, and Millaudet. But whatever may be their value as direct producers, and the quality of their fruit, they will never replace in renowned vineyards our ancient French varieties. It is in their culture in very calcareous soils that I have to speak. They all sustain a very high dose of calcaire. According to Chauzit, *Othello*, a hybrid of Clinton of Canada, by Black Hamburg, will live in soils containing 50 per cent. of car-

bonate of lime, and it is also successively cultivated in lands of marl, where the reconstruction of the vineyards with *Riparia, Rupestris, Solonis*, and *Vialla* was checked. It has been seen in several chalky lands around Cognac, aged from three to eight years, very fine and green; while by its side Noah, the famous American hybrid, the savior of Chareutes, was stunted.

Canada also resists chlorosis. It has been seen in bad land of Groie, subsoil marl, to grow well, very green; by the side of herbemonts very feeble. The same with Triumph, etc. Thus we see that these vines by right of origin are well qualified for our lands (except as to their resistance to phylloxera). Their American generators are *Æstivalis, Cinerea, Labrusca*, and *Riparia*, all sensible to chlorosis, and we can expect to do even better with crossings of Berlandieri or other species resisting phylloxera with our native vines. And by selecting those adapted to calcareous soils, such as *Folle-Blanche, St. Emilion, Ugni-Blanc, St. Peter, Colombo, Pinet*, etc., the success would seem to be assured for the most calcareous soils. These hybrids offer much interest. In my opinion, after several experiments, hybrids *Franco-American* and *V. Berlandieri* are sure to reconstruct chalky soils. Hybrids *V. Berlandieri* by French are among the most remarkable. In several of our fields of Champagne *Berlandieri* by Roussaune, *Cabernet, Sultanieh, Aramon, Malbec*, etc., have not turned yellow, but have all retained a very bright green color. They are not all, however, equally vigorous and a choice must be made. A few received from the school of Montpellier are feebler than *Rupestris* hybrids by French ones. But their vegetation is more vigorous than *Jurançon Folle-Blanche* planted by their side. French hybrids by *Rupestris* vegetate better than the preceding and are of equal foliage. They are certainly the most vigorous hybrids yet known.

At the school at Montpellier they have had for some years Rupestris×Alicante-Bouschet of unheard-of growth, and it succeeds in our trial fields very well.

Among other plants of the same group which grow finely, *Aramon-Rupestris-Gauzin* may be here mentioned. They turn a little yellow in chalky soil around Cognac, but very little. *Gamay-Condere* is also very strong and green in our trial fields and elsewhere. One of the finest is *Rupestris-Cabernet*, of Mr. Millardet, then *Gros Coleman-Rupestris, Aramon × Rupestris, Alicante-Bouschet × Rupestris, Petit Bouschet × Réparia*, etc. There are also diverse hybrids of *Rupestris* by French vines in other trial fields which have been established in chalky lands of Champagne and Groie identical to these, which are still greener and more vigorous. These I have myself proved. Hybrids of value are not formed from *Vitis-Cordifolia*. They turn yellow a little less than *Cordifolia*, but can not be relied on, and the same may be said of hybrids from *Cinerea*. Crossings between these and our French vines have not succeeded. The samples sent to me have almost all turned yellow. Hybrids *Riparia* are very vigorous and not very liable to chlorosis.

The complex hybrids of American vines, *York, Othello, Solonis, Clinton, Taylor*, etc., and French are not strong and some turn yellow. The following is the order of preference to be given to vines, according to their strength and foliage, which I have carefully observed in our experimental fields and elsewhere in identical lands:

First. Those strongest and greenest: *Cabernet × Rupestris, Gros Colman × Rupestris, Colombean × Rupestris Martin* on *Gamay-Condere, Canada × Rupestris, Aramon × Rupestris-Ganzin, Petit-Bouschet × Riparia*, etc.

Second. Very green and not so strong. *V. Berlandieri, Folle-Blanche, Aramon × Berlandieri, Malbec × Berlandieri, Cabernet-Berlandieri, Sultanieh × Berlandieri, Roussonne Berlandieri*, and a few other hybrids of French vines, with *Berlandieri V. Monticola.*

Third. Very strong, but a little yellow. *Ruparia-Rupestris*, No. 10875 *Ruparia-Rupestris* of Jæger, and a few numbers of the Montpellier school. In Groie they do not turn yellow.

Fourth. Less strong and more subject to chlorosis, *Riparia-Ramond.* Diverse hybrids of *V. Cordifolia, Riparia, York, Othello*, with sundry French vines, may be joined to this group.

Fifth. Most subject to chlorosis: *Mexicana, Solonis, York, Champin, V. Arizonica, Californica*, etc.

Sixth. Those very yellow and more or less cottis: *V. Cordifolia, Cinerea Candicans, Cordifolia Rupestris, Rupestris-Æstivalis, Cinera Rupestris*, etc.

CONCLUSIONS.

Can definite conclusions be drawn from all that precedes?

These experiments are of recent date, but the results are in harmony with numerous facts of vine culture proved several years ago and already reported by me. First. *V. Berlandieri* and hybrids resulting from crossing it; *Rupestris* and even *Ruparia* with European varieties grow best in the chalky lands of Champagne; most of them do not turn yellow there.

Second. In lands of Groie these vines grow finely; but it must be added that *Riparia-Ramoud* and sundry species of *Riparia-Rupestris*, such as Nos. 108, 101, 75, and some natural *Riparia-Rupestris* of Jæger, develop well in the same soil.

Third. Other varieties of hybrids or species, although offering more or less resistance to phylloxera, will not in any way suit for cultivation in lands of marl or chalk.

Fourth. How will these vines do when grafted? On account of their relationship to the slips which are grafted upon them there is every reason to believe that they will unite much better with them than *Riparia, Solonis*, etc. Some of the facts brought forward by Mr. Millardet seem to prove this. What has been said of *Jacquez* and *Riparia* show it as well. Consequently, the disorders which are followed by chlorosis and appear so frequently after grafting will not here be apprehended, and the adaptation to the soil will be so much more easier on account of this.

It is to be feared that their grafts will be less fruitful than those of *Riparia, Solonis*, York, etc., but they will surely be more vigorous: besides they will always produce as much as the same French varieties, not grafted, of the same age and strength.

PHYLLOXERA IN CHAMPAGNE.

REPORT BY CONSUL PRESTON, OF NICE.

So much has been said in the papers lately about the reappearance of the phylloxera in the French vineyards that I thought anything on the subject would be useful to our viticulturist. The inclosed slip is taken from the Little Gironde of August 20, 1890, and shows the energy with which some proprietors are determined to act to destroy the pest and the prompt measures they have taken.

I send inclosed the original article, with my translation, as an addenda.

WM. S. PRESTON,
Consul.

UNITED STATES CONSULATE,
Nice, August 20, 1890.

PHYLLOXERA IN CHAMPAGNE.

A prominent wine merchant of Champagne, Mr. Chandon, while waiting for sulphur of carbon to come from Villefranche, Rhone, had the vines attacked by phylloxera in the district of Treloup, Aisne, torn up and destroyed by fire. To one of our

correspondents who criticised this way of doing Mr. Chandon replied and gave the reasons that induced him to act.

"As soon as the news that the vines were touched with phylloxera reached me," he says, "I immediately proceeded to the land and satisfied myself that the disease dated at least from four years.

"Numerous delegates of phylloxera, commissioners, inspectors, etc., had been there, and nothing had been observed by them during four years. No sulphur of carbon prescribed; in fact, nothing done. Without waiting for administrative formalities, so slow, or administrators who, without my initiative, would still be inquiring what was best to be done, I purchased the land and ordered the vines to be rooted up. At the same time I covered the land with straw saturated with petroleum and fired it, in order to prevent the escape of a single insect. Then I had the land planted with clover. These preliminary steps closed as soon as the sulphur of carbon and poles arrived. The latter eight days after the phylloxera was discovered."

Mr. Chandon adds that in destroying the vines he pursued a twofold end:

First. He prevented the spread of the evil by the shoes and clothing of the crowds who came, out of curiosity, and walked all over the contaminated vineyard.

Second. He indicated, or used, the only practical remedy, namely, destruction when the disease is in its infancy. This system is practiced in Switzerland and Hungary with perfect success.

Mr. Chandon complains that the people of the locality refused to co-operate with Mr. Conanon, inspector delegate of the Secretary of Agriculture, and they were consequently obliged to wait a month after the discovery of the phylloxera for credits, decrees, regulations, etc.

In conclusion, Mr. Chandon says:

"In order to prevent the swarming and subterranean propagation it is necessary to act promptly and at once, and I have contributed, I think, in the best way possible to destroy this formidable insect.

"I mention these facts to stop the malevolent insinuations which have been put in circulation.

"To conclude, growers can only preserve their vineyards by the formation among themselves of great syndicates, which will be able to indemnify fully proprietors of contaminated vines destined to be completely destroyed.

"This is the only sure way known to-day capable of hindering the progress of the invader and of protecting the vineyards."

GIRONDE.

REPORT BY CONSUL ROOSEVELT, OF BORDEAUX.*

[Republished from Consular Reports No. 41½.]

Soils.—The land more or less devoted to viticulture in the department of Gironde may be divided into six categories: (1) Alluvial or palus land, (2) rich, strong soil, (3) marly calcareous land, (4) gravelous land, (5) siliceous, and (6) sablo-argillaceous land.

The alluvial or palus lands lying in the bottom of the valleys are the result of the successive deposits of rivers. This category includes the drained marshes and substratum of the valleys.

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* Consul Roosevelt acknowledges his indebtedness for the greater part of the information contained in this report to M. Edoner Feret, of Bordeaux, a recognized authority and author on vine culture.

The soil of drained marshes is mixed with mold, fine sand, and organical particles of vegetable and animal matter; the subsoil is composed of clay, sand, turf, and sometimes marl. The nature of palus soil is simply that of the marsh where the alluvial ground has been drained and improved by culture. The best palus land is in the district of Lesparre, in the cantons of Blanquefort, Barbon-blanc, Blaye, and Saint-Ciers-Lalande, and borders the side of the Garonne, the Dordogne, and the Isle. The wines of those vineyards possess color and vinosity, but lack delicacy of taste.

The highlands are those where the argils predominate; they exact, according to their nature, the assistance of manure, transports of light earth, and constant plowing. These lands are generally to be found on the hills and hill-sides; they have, in general, a calcareous or stony subsoil; this kind of soil is particularly appropriate to the vine.

The marly calcareous land covers a considerable part of the country; it agrees with the vine when sand, argil, or gravel forms an important proportion of the ground.

Gravelous land is the most favorable for vine culture as regards the quality of the production, and may be divided into two classes: (1) On gravelous land composed of stones or quartz, being about 3 feet in depth, and having a subsoil of clay and argil or alios, the best growths of Médoc and Graves are cultivated; (2) sandy, gravelous land, forming a composition of sand and stones, based on an inert sand or upon aliotic layers, is not propitious to the vine in consequence of the humidity of the subsoil.

The siliceous land covers nearly half of the department. It partakes of the siliceous nature, mixed with clayish, calcareous elements, which, when properly worked, is well suited to the culture of the vine.

The batardes, or terres batards, present an intermediate state between the rich land and the siliceous sandy lands; their fertility is more or less great according to their situation; the ordinary white plants grow in these soils with facility.

Subsoils.—The study of subsoils is also of importance to those desiring to cultivate vineyards. They have a considerable influence upon the success of the vine and upon the nature and quality of its production. I shall divide them in six classes: Argillous, sablo-argillous, calcareous, marly, gravelous or stony, sandy aliotic.

Argillous subsoil, when it is composed of close or compact argil, is hurtful to the vine, because it is moist, and in consequence the roots are easily attacked by cold, and giving to the fruit a very definable earthy taste.

The sandy argillous subsoils are favorable to the vine, providing the sand enters for about one-half into its composition, permitting the water to pass through sufficiently to exercise a salutary influence on the roots—that is to say, refreshing them without leaving behind an unhealthy humidity; but then the vine on these soils is ordinarily more

cultivated with a regard to quantity rather than quality of its productions; meanwhile the soil is fertile, and admits of the finest vines being cultivated here.

The calcareous or marly subsoils are often compact and not sufficiently porous, by reason of which a free flowage of water is checked, and when near the surface of the soil they are extremely hurtful to the vine, they may, notwithstanding, be of great use by digging the ground and mixing it with the upper layers of earth. If these layers are sandy or sandy gravelous, a very favorable result may be obtained; but if composed of greasy sand, the mixture will not be so good. The nature of this soil is especially favorable to the white vine.

The gravelous or stony subsoils are very favorable to the vine. They present sometimes small siliceous stones or pebbles, white, gray, bluish, and transparent; these stones are termed "graves;" sometimes little blocks or stones of a dull opaque; sometimes also little pieces of stone or rock in the crevices of which the roots of the vine generally penetrate, thereby forming the base of a great hardiness and vigor for the plant, and of an agreeable, well-developed taste and flavor for the wines.

The sandy subsoils are suitable to the vine, because they permit its roots to penetrate to a great depth, to find the stability of temperature which is favorable to them. The most part of these soils produce a fine delicate wine, but lacking sometimes in body and color.

The aliotic subsoils, sometimes ferruginous, are impervious as those of the argil and marl; they form a bed which arrests water, thereby rendering the earth too dry, especially if sloping; the water, following the bent of the incline, settles in the lower parts. When flat it is too damp, a defect, however, which can be easily remedied by digging up the earth to a certain depth. Under these circumstances, they are very much in request. The best vineyards in the Médoc are established on grounds of this nature.

Planting.— Before planting the vine the nature of the soil should be attentively studied, and the preparatory labor performed according to its species. It is most urgent that the vine should be sheltered from prolonged dampness; to this effect the earth must be disposed in such a manner as to regulate the slopes and facilitate drainage. If in a very hard, argillous land, called *terre tape*, or *boulbaine*, or *tuf*, the marl or alios should be found of shallow depth, the subsoils must be broken up to render them pervious and to mix them with the superficial layers of earth.

The earth, purified by the means above indicated, and by drainage whenever it is essential, demands a most important operation—improvement and manure.

To manure the earth about the vine is always a most essential preparatory feature, at least when not operating upon alluvial soil, but when this is the case a liquid manure is sometimes employed and poured into the hole assigned to each plant. When planting superficial earth,

which has not been before used for cereals, or which has not been manured for a long time, at least half a cart-load of manure is required for a row containing from 75 to 80 plants. In planting a feeble or used-up ground double that amount of manure must be employed. It is very important to have the plants well chosen; to this end it is only required that the foot or base should be healthy and vigorous, taking them only from branches having hitherto borne fruit. In certain communes each cutting has a little of the wood of the preceding year; but great importance is not attached to this latter precaution, as many succeed as well in planting the young end. To replace the dead feet in a young plantation root-plants are sometimes preferred (called "chevelus" or "barbeaux") to the ordinary plants or layers.

This replacement is also made by "provins." The term "provins" is applied to a branch or tributary of the old vine-stalk, upon which new roots develop without separating it from the mother vine. In order to make a "provin" a long branch is left upon the old vine-stalk nearest to the one to be replaced, and if possible in the same row; a pit is then dug, about 1 foot deep, between the two plants; it is then filled up with mold or manure, if the earth be poor; the branch is then put into the pit without separating it from the mother vine, and the end raised in the place of the dead stalk; it is supported by means of a wooden stake, and requires to have its top cut off like the mouth-piece of a flute, care being taken that the bud should be on the side opposite the slope in order to avoid its being drowned or damaged by the flowing of the sap. The severing of the "provin" is indispensable to prevent the mother plant from declining or even dying. The separation is begun after the second year by cutting on the branch a cross-section about one-third deep, and by completely cutting it the year after. These "provins," or layers, have the advantage of producing from the first year; it is admitted in the Médoc that every "provin" pays its expenses from the first year. The "provins" are made at the period when the sap begins to ascend into the branches, rendering them more supple; care is taken to make some slight incisions in the part of the branch lying under ground, so as to facilitate the growth of the roots. In the planting of the vine by layers I find that five different modes are employed in the department. The three first are the most extensively used.

(1) *Planting by reversion.*—This mode is certainly the best, but also the most costly, inasmuch as the work for one acre costs about $117. It consists in opening trenches in the direction of the vine-rows, a sufficient distance apart; the first trench being finished, the earth coming from it serves to fill up the last; manure is then thrown in and the plants, or "barbeaux," are placed in, being supported by stakes. The next trench then undergoes the same operation, and so on to the end. Planted in this manner the vine produces early, but is not of long duration.

(2) *Planting by staving and with a stake or bar.*—Another mode generally used when the subsoil approaches the surface of the ground and when its nature renders it accessible to dampness, were it not broken up, consists in turning up with picks the subsoil of alios or clay to a depth of about 2 feet and mixing it with good earth or manure brought for that purpose. These operations being over, a crowbar is driven into the ground to make a hole, into which the scion is placed, and which is carefully filled up with earth all around the scion. Sometimes, in order to increase the adherence of the plant to the ground, it is watered with a kind of liquid mud or manure.

(3) *Planting with the stake or bar.*—This mode is certainly the simplest and most economical, but can be employed only in loose earth easily perforated and comparatively fertile. Pulverized and liquid manure is generally employed in this mode of planting. It consists in thoroughly plowing and harrowing the earth, after which a hole is made with an iron bar. This hole is sometimes enlarged by means of a wooden cone armed with an iron point in order to increase the quantity of manure given to the plant.

(4) *Planting with "araire" or plow.*—This mode, which is one of the less expensive, can only be used in deep soil. It is little employed. It consists in making a deep furrow by means of the plow and filling in with manure, placing the plants therein and covering the furrow.

(5) *Planting in the little trench.*—This mode has been for a long time almost entirely given up. It differed slightly with the preceding method inasmuch as a little trench one foot wide and one and one-half deep was dug instead of a furrow. All of these plantings are generally made in the months of February, March, and April, even before, weather permitting, and can be continued up to the middle of June, on condition that the plants be kept under ground in a northern direction, in order to prevent them from growing. Finally the plant is set upright, earthed up, cut at the third knot above ground, and fastened to a little stake.

During the first two or three years after planting, certain vineyards of Médoc are tilled six times yearly, but for the greatest part tillage takes place but four times during the year. The young vines at this period require particular attention; they must be freed from snails as much as possible, and each year the plants which have not thrived must be replaced by layers. If among the plants that have succeeded there should be one or more of any kind not wanted, these must be grafted. Grafting, which was formerly occasionally employed by the vine-growers, is every day becoming more universal; since the invasion of the phylloxera many fine plants have been ingrafted on American plants, which resist phylloxera.

Situation and care.—For the ridges there are no fixed directions; the slope of the ground is previously consulted, in order to facilitate drainage without risk of the subsoil being carried away. Some vine-growers

(when the ground permits) set their ridges from east to west, asserting that the wind and hail come from the west; by this method the first feet of each row alone are injured; the others, affording mutual shelter to one another, have less to suffer. It is noticeable that this direction of east to west is practicable only in the Médoc, where the vines are very low, because the shade of any individual plant can not be prejudicial to the others; nevertheless, it sometimes happens that the land is not evenly exposed to the action of the sun, which, of course, is not so favorable. Other vine-growers plant in the direction of north to south, so that the rays of the sun may penetrate into the vine rows as long as possible, in order to heat the surface of the ground and the different parts of the fruit in a more equal manner.

The soil, according to its condition, is tilled from two to four times a year, either by plow or by spade. The wages of laborers having doubled of late years, the plow is consequently in greater use in most of the vineyard.

When the vine is stripped of its leaves and fruit laborers are employed to examine each vine row, in order to weed out the quick or dog grass, which is very destructive. The old vine plants are often covered with a kind of moss which serves as a refuge for crowds of injurious insects to the vine. Some proprietors take the precaution to destroy them during winter; others do not attach the same importance to them. Since the appearance of the new disease of the vine, some proprietors have obtained favorable results from barking, by which means a great number of insects and their eggs can be destroyed, including those of the phylloxera.

Another part of the winter labor consists in removing the earth brought by the plow or by the waters into the "capvirades," a kind of alley made between the rows for facilitating the running of water and for allowing sufficient room for the teams to turn.

After the pruning, which should take place as late as possible, on account of the spring frosts, the laths and decayed stakes are replaced; the branches or *hastes* are then fastened by means of a kind of rush to the nearest stave. The best season for this, as the *hastes* have frequently to be curved or bent, is when the sap begins to ascend into the branches, rendering the wood pliant. This work should be carefully avoided in dry weather. When once the vine is in good condition labor commences.

In the month of June the vine is nipped; that is to say the sap is stopped from going into the "suckers," thus named because, though possessing much vigor, they notwithstanding are unfruitful. The shoots or sprouts appearing on the old wood are cut off (at least, those not intended to become fruit-bearing branches). In July the vine is somewhat freed of its suckers, in order that the air may circulate round the plant and that the grapes may be better exposed to the solar influence. This also facilitates the passage of the plow.

In August the leaves are thinned. This work does not take place every year throughout the department, particularly in those vineyards which only produce common wine. Great attention should be bestowed upon this work, in order to avoid too much exposure to the sun, and at the same time aid maturation.

Pruning is certainly the most important operation that the vine claims from its care-takers. On this depends not only, in a great measure, the abundance of the crop, but especially the health of the plant. It takes place generally from the end of the fall of the leaf until the commencement of the hard frosts. Before this period the wood is not sufficiently ripe, and would cause the loss of a part of the sap. Later the cicatrice arising from the pruning would not have time to heal up before the sap ascends, and a serious flow would occur in spring. For some years past the vines have been considerably tried by spring frosts; it has therefore been judged wise, even at the risk of losing a small portion of the sap, to prune as late as possible, in order to retard the shoot. This is customary in the Burgundy vineyards.

It is recommended to vine-dressers, when operating, to have with them a little box of some fatty liquid, and to put a little of such on each wound made by the pruning, above all on the old wood, so as to protect it from the changes of temperature, which often cause the interior of the plant to decay. The pruning is conducted in two fashions: with a pruning-knife or with vine-scissors; this latter instrument is very expeditious. But in the Médoc, and many other places, they prefer the pruning-knife, with which the judicious vine-dresser carries on his work better, without injuring the wood, cutting and paring here and there, where he thinks fit to do so, making incisions, lifting a very light piece of wood, etc. The vine-shears are preferable to the pruning-knife when cutting young vines which have no thick wood to take up. I shall not undertake here a treatise on the pruning of the vine, or an appreciation of the different modern systems. Such details would require a volume, and are consequently out of my compass. The value of these different systems is so intimately connected with the nature of the soil and its situation, and with the nature and vigor of the plant, that I can not go further than commending practice, observation, and intelligence as the best guides to the vine-dresser. To the general information already given I may add the following fundamental principles:

Charge the vine only in accordance with its age and vigor; equalize the burden of the different arms of the vine, so that one side should not bear all the sap at the expense of the other; carefully save on each plant the short cuts which are intended to become fruit-bearing branches for the next year, and which, being low shoots, keep down the vine, which has a tendency to spring up.

In the Médoc the vine is planted in rows which, according to the vineyards, vary between 180 to 300 feet in length; the latter is seldom used, on account of the difficulty of transporting manure, gathering the grapes,

etc. In certain districts the rows are 3 feet apart; in others, a little less. The plants are more or less distant, according to their nature and that of the soil; this distance varies from 3 to 4 feet. The trunk of the plant is from 6 to 8 inches long, and fixed to a little stake about 15 inches high; laths are attached to the tops of the stakes, and to the laths are fastened the two arms of the vine. For some years past these wooden laths have, in several vineyards, been profitably replaced by iron wires. This system, which presents great advantages above all in an economical point of view, has been in use for the last twenty-five years by Monsieur Richier, the inventor, and by his heirs, in all of their vast vineyards.

The stakes are sometimes of pine, but more generally of chestnut wood; the latter cost from $2.30 to $2.70 the thousand, while the former, which do not last so long, cost from $1.35 to $1.55. The laths come from the west of the Médoc, where for some years past pines have been grown on a large scale. When delivered at the vineyard they cost from $3.85 to $4.80 the thousand.

Pruning.—On the first year of planting the vine is pruned from the two eyes nearest to the ground. The second year the process is performed in the same manner. The third year, when pruning, three or four buds are left untouched. In strong earth the weaker plants are cropped short; but two arms are left to the most vigorous plants. The fourth year, in light soils, arrangements are commenced for establishing the two arms; in heavy soil this operation is completed, the trunk of the vine is then made 6 inches high, so that when the plant is earthed up the arms start almost on a level with the top of the ridge. Special care should be taken that the arms follow the direction of the laths. The vine always having a tendency to rise, great attention is paid to save, when pruning, the short cuts which are intended to become fruit-bearing branches, in order to be able to cut off the old wood when it becomes too long. The fruit-branches are chosen from those of the preceding year, near the old wood; the under branch is chosen by preference, so as to avoid the plant rising too quickly.

The branches are allowed 13½ or 15½ inches in length; they are fastened horizontally to the lath; this is intended to equalize the distribution of the sap, and to form at the base of the branches a proper wood for renewing the vine. One, two, and sometimes more of the last buds of the branches are taken off to increase the strength of the shoots produced by the others, and to facilitate fastening. As soon as the pruning is over, the branches gathered up, the different kinds of winter work concluded, such as the clearing of the dog-grass and of the moss covering the trunks of the old vines, the transports of earth conveyed from the alleys to the middle of the ridges, and the vines propped, plowing commences. Four plowings are made; the first one toward the end of February or the beginning of March. The object of this is to "open the vine," according to the expression of the country; that is to say, to

unearth it; but as, in plowing on both sides of a row, the earth can not be raised between each plant, women pass behind the plow with a hoe to take up the earth and spread it in the middle of the rows. The second plowing generally takes place in the middle of April, with a plow of a peculiar shape called "bent." Its purpose is to earth up the vine, so as to spread about the foot the earth taken off by the last plowing. When the vines are young or surrounded by the young plants, a woman with a shovel follows the plowman and lays her shovel between the plow and the young plants or layers, so as to avoid their being stifled or bent by the earth. The third plowing takes place in the month of May, before the flowering, and is exactly the same as the first one. The fourth takes place at the end of June, after the flowering; for this the special plow called the "bent" is again used. After the fourth plowing, women or children pass down the rows to raise the young bunches which are sometimes a little earthed up. It is also at this time of the year that the leaves begin to be thinned more or less, according to the strength of the vegetation and to the temperature.

In all vineyards a constant war has to be made against the destructive insects which swarm in them, especially snails. Many proprietors in the Médoc keep for this purpose hens and ducks, which go into the vineyards to feed on these parasites; but care is taken to remove them in due time, in order to avoid their injuring the new buds or attacking the grapes.

Expenses of culture.—The expenses of culture in the Médoc vary according to the communes, and, above all, according to the facilities of working. (1) A small property cultivated by the hands living on the place has hardly any expenses beyond the keeping of the vine-dresser and his family. (2) A large property requires a manager, with foreman, laborers, vine-dressers, etc. (3) A middle-sized one is cultivated by the proprietor, who hires a team of oxen and oversees his laborers. Each of these properties not only has different expenses of culture, but obtains different prices for the products.

The "*prix-fait*," or "agreed price," is the name given to a certain space of ground, for the culture of which the price has been agreed in advance.

Expenses for a "prix-fait" composed of 24,000 vines, planted about 1 yard apart and occupying about 6 acres of land.

The following necessary expenses attendant on the vineyard are almost invariable:

Manual labor, for pruning, binding, lathing, etc	$43.42
Manual labor, for clearing away the dog-grass	4.63
Purchase of 10,000 stakes, at $2.02 the thousand	20.20
Purchase of 5,000 laths, at $3.86 the thousand	19.30
Purchase of 10 sheaves of binding reeds, at $1.16 each	11.60
Four plowings and a winter supplementary plowing	52.11
One hundred and fifty days' wages to the women for raising the vines, destroying the insects, unearthing the young branches, etc., at 19 cents	28.50

Layers	$7.72
Expenses of vintage of 5 tuns, at $6.75	33.75
Expenses of racking and other coopers' work	7.72
Purchase of twenty casks, at $3.47	69.40
Expense of delivery at Bordeaux for 4½ tuns	4.82
	303.17

Expenses varying according to the nature of the soil and according to the proprietors.

Sulphuring: Labor and purchase	7.92
Manuring 5,000 feet a year: Manual labor, at $2.70 the 1,000 feet	13.51
Purchase of manure or mold: 92 cubic yards, at $1.18	108.56
Cleaning of the trenches and vine-tracks, hauling earth, etc	17.37

General expenses incumbent on the vine domain.

Taxes, duties, etc	25.09
Keeping the buildings in repair	9.65
Overseeing and sundry details	21.23
Keeping the stock in good order (wine-vessels, etc., wheelrights, blacksmiths, farriers, etc.)	19.30
Wear and tear on teams, harness, etc	19.30
Renewal of the vineyard, 2 per cent. every year	46.32
Interest on advances, six months, at 5 per cent. per annum	14.79
Total general	606.21
Average yearly revenue, supposing the sale of 5 tuns (20 casks) of wine at vintage time at $168.87 per tun	844.35
To be deducted:	
7 per cent. discount and brokerage — $59.10	
3 per cent. waste for 6 months — 33.77	
	92.87
	751.48

If from this be deducted the expenses for culture ($606.21), there remains $145.27, representing the net yield of each "*prix-fait*," corresponding to about 6½ acres (6.42), which makes $22.63 per acre.

If a vineyard of superior table claret be valued at $390.50 per acre, it will be found that it yields a net revenue of 5.80 per cent. per annum. Such a revenue can be obtained only by those who can afford to appropriate a certain amount of money to improve the estate. A yearly outlay of about $485 per acre is indispensable, and has to be repeated for several consecutive years before giving any profit, because the harvest is generally sold only after two or three years, in order to give the wine sufficient time to acquire its qualities and realize a fair price.

The sum of $485 per acre is overreached in some of the famous vineyards of the Médoc, where the care and treatment of the vines and wines are almost luxurious. Extravagance may well be afforded when the wines are sold from $380 to $580 the tun of four casks. In this case the capital represented by the vineyard is much more considerable than the foregoing valuation, and the price of the land rises proportionately

to the produce of the vines and the price of the wines. The vineyards at Château-Lafitte are valued at nearly $4,700 per acre. On the other hand, there are many vineyards in the Médoc—in fact, the majority of them—whose wines at vintage time do not obtain quite an average of $168 per tun. Yet most of those vineyards are worth $390 per acre. In fact, good management, a thorough experience in the matter, and money always in readiness, are indispensable conditions for success.

GEO. W. ROOSEVELT,
Consul.

UNITED STATES CONSULATE,
Bordeaux, January 23, 1884.

ITALY.

REPORT BY CONSUL-GENERAL RICHMOND, OF ROME.

[Republished from Consular Reports No. 41½.]

The vine in Italy is cultivated on the plains, in the valleys, and up the sides of the mountains to an altitude of 500 and even of 600 meters above the level of the sea. On Mount Etna the cultivation is successfully prosecuted at an elevation of 950 meters above the level of the sea. Along some portions of the coast the vineyards are brought close down to the edge of the sea, and the vines are planted right in the sand deposited by the action of the waves. In this latter case, however, it has been found that the sea-breezes are often hurtful to the vines, but no remedy has ever been thought of to combat the evil effects resulting therefrom.

The Italians cultivate the vine in vineyards, which are exclusively devoted to that end, or in orchards in conjunction with other fruits and vegetables. In many places the vines are only allowed to reach a low growth, and are not supported by props, while in others they attain a medium height, and are supported by poles or trained along wires. When trained to a greater height they are attached to trees, of which latter the most affected for the purpose are the black poplar (in the Campagna), the white poplar (in Tuscany), and the elm (in Emilia). There are also trellises especially adapted for the training of grapes intended for table use. All these different methods of vine-culture are to be found in the same sections, only varying with the different conditions of the soil, the qualities of the vines, and the exigencies of the wine trade.

With regard to the soil, it may be stated that in Italy the vine is cultivated pretty much everywhere. But there are certain qualities of soil which are more favorable than others to secure a desirable result as to quality and quantity of crop. The most productive vines are those growing in localities subject to inundations, and the best quality of wine is produced by the vineyards planted in light gravel soil of the hills,

containing a certain quantity of oxide of iron. In porous volcanic soil the grape is of excellent quality, and the wine obtained from the growth on chalky soil is very highly esteemed. The best Chianti wine comes from a slaty soil of reddish color, containing a certain percentage of carbonate of lime, and in the hilly districts there is considerable chalky soil not adaptable to any other use than that of viticulture. In the majority of the vineyards where the custom is to plant the vines in rows, and train them on trees, the intervening spaces are cultivated in the usual rotations of planting, but care is taken to avoid such growths as might be incompatible with the successful development of the vine. In low-growing vineyards, however, no other culture is ever prosecuted.

It is not generally customary to irrigate the vine, although it is sometimes done with marked success. Drainage is always carefully provided for in the vineyards.

The average yield of wine to the hectare may be set down as 14.29 hectoliters. The yield in Veneto is only 10 hectoliters, but in Piedmont it reaches 23.07 hectoliters to the hectare.

The cost and mode of planting vineyards vary considerably according to locality. In Viterbo the vines are planted some 18,000 to the hectare, and are trained on poles at an outlay of 1,823.58 lire to the hectare, for the first four years, and the cost of maintenance averages 383.03 lire, while the average yield to the hectare is 33 quintals of grapes. At Bari, in Altamura, the vine is cultivated without props, and the cost of planting 6,200 vines to the hectare is 1,215.24 lire, the annual cost of maintenance is 266.86 lire, and the average yield per hectare is 25 quintals of grapes. In Tuscany the vine is also cultivated without props; the planting per hectare costs 2,518 lire; annual cost of maintenance, 466.12 lire, average yield 49.50 quintals to the hectare.

LEWIS RICHMOND,
UNITED STATES CONSULATE-GENERAL, *Consul-General.*
Rome, April 1, 1884.

TUSCANY.

REPORT BY CONSUL WELSH, OF FLORENCE.

[Republished from Consular Reports No. 41½.]

To the cultivation of oranges, lemons, and figs little or no attention is given in Tuscany. More attention is paid in Tuscany to vine culture than to that of olives, inasmuch as the grape-vine is less delicate, and withstands better the severity of climate and variety of soil. Excepting in some mountainous regions, it may be said that the grape is cultivated all over Tuscany.

To enumerate the different vines of Tuscany would take up too much space. For the province of Florence alone there are about 150 different

varieties grown, of which two-thirds (or 100) produce raisins and grapes for table use, and, with the others, the grapes are made into wine.

The systems of cultivation are not less numerous than the varieties of vines. There are vines disposed in the French system, trained low and in rows at a meter (3 feet 3 inches) distance one from the other, supported by iron wire or stakes; low vines placed in rows on the edges of fields; vines stretched between maple trees, elm trees, or poplar trees; low vines in rows over the trees, and in the neighborhood of Pistoia and Lucca many vine arbors.

Vines are reproduced sometimes with sprigs, but generally by shoots left free for two years in the ground, which should be well dug at the commencement and end of each summer. The third year the shoots are dressed and the most vigorous selected. Two or three years later the vines are affixed to stakes and the year following the grapes appear. Ditches measuring 1.20 meters (4 feet) in width and depth are dug for planting vines at a distance varying from 60 to 70 centimeters (2 feet) for rows with low vines, the distance being less on the hillside than in the plains.

At Val di Nievole, in the middle of a field surrounded by vines, a row of mulberry trees is always to be found, and on the sea-coasts of the Lucchese olive trees are to be seen along the edges and rows of vines in the interior of the fields. Olives and vines are often grown together.

The pruning of the vine is done before or after winter. For vines united to trees, two systems of pruning are in use, viz *piegatoio*, or *tralciaia*, and *penzana*, or *catena*. The former is the most common, and consists in twisting two vigorous shoots, to which twenty or more cuts have been made, and tied to a supporting branch with the extremity turned down. For the latter the shoots are preserved much longer, twisted with another vine and supported by another stake. Low vines are usually pruned on the system "cornetto," viz, with two, three, or four cuts, according to the variety, and while growing they require the taking off of the tops of the shoots, they being tied to a stake whenever they are 50 or 60 centimeters (1 foot 8 inches or 2 feet) long, and tied again when they have reached the height of the stake; and finally twisting the extremities of one vine with another, so as to make an arch, which last operation is made when the grape is already completely formed. In the vineyards managed according to the French system the soil is spaded in the spring, and also in August, and each year well manured. The vine thrives throughout all Italy, needing a sunny exposure in northern Italy, while in the middle and the south it thrives equally well in valley, table, or hill-side lands, but prefers a rough soil, far from moist or foggy localities, and avoiding ground excessively compact or clayey. Stony soil, if sufficiently watered, is well adapted to vine culture.

WM. L. WELSH,
Consul.

UNITED STATES CONSULATE,
Florence, March 17, 1884.

VENETIA.

REPORT BY CONSUL NOYES.

[Republished from Consular Reports No. 41½.]

CLIMATE AND FRUIT-GROWING IN ITALY.

While it is true that the soil and climate of Venice seem specially favorable to the fruit of southern regions, and while in fact almost every species of such fruit may be produced in some specially favored spot of its territory, even the palm tree flourishing unsheltered at certain well-known points of the Riviera, yet this is far from being a tropical country; and when it is remembered that Naples has almost exactly the latitude of New York, that Venice lies farther north than Halifax and nearly on a line with Mackinaw, regions where fruit-culture of any kind is rather precarious than otherwise, it will be evident that with all allowance for the isothermic variations of the two continents, the success of such semi-tropical fruits as oranges, lemons, and olives must always be partial, and dependent rather on exceptional advantages of situation than on the normal conditions of the country and climate.

That vegetation so foreign to the latitude should find a congenial home in Italy is mainly due to the topographical peculiarities of the region, as is proved by the abrupt transition in crossing the Adriatic to the inhospitable climate of the Balkans. The semicircle of the Alps, shutting out the vicissitudes of temperature caused by the action of frost and thaw on the plains of Northern Europe, leaves these narrow shores only open to the genial rays of the southern sun, and to winds charged with the heat of Africa and the moisture of the intervening sea. The influence of these exceptionally favorable conditions is strikingly illustrated by the fact that while the orange and lemon are in their natural element only in Sicily, the point where, after Gibraltar, Europe approaches nearest the coast of Africa, yet, strangely enough, the only other locality where their production becomes a profitable industry is found at the northern extremity of the kingdom and almost in the heart of the Alps. All travelers are familiar with the olive plantations of Northern Tuscany and the Riviera of Genoa. The oil of Lucca is proverbial for its excellence, due evidently, with the prosperity of all this favored region, to the redoubled barrier of the Apennines, a protection not only from the rude climate of Northern Europe, but from the chilly influence of the Alpine snows as well, maintaining here perpetual spring even when winter reigns on their sheltering heights

VINE-GROWING IN VENETIA.

The vine, on the contrary, thrives anywhere with the luxuriance of a native product, finding all its requirements satisfied by the relative warmth which barely suffices for more sensitive plants, and finding, be-

sides, in the volcanic origin of much of the Italian soil the elements best suited to nourish its vigorous growth. This natural adaptation, and the extreme facility with which it lends itself to every situation and every mode of treatment, have, by allowing the persistence of antiquated methods of cultivation, almost as effectually as the difficulty of succeeding with the more exotic plant, maintained the present imperfect and unsatisfactory state of the industry. Until very recently no efforts have been made to improve the stock of vines or the appliances and processes for the manufacture of wine, and no standard types exist to fix any permanent character for the one or the other. The plants change their nature and name as they change their locality; the same product bearing different names, or the same name applying to different varieties in neighboring regions, while the quality of the wine depends on the accidents of the season and the chances of unintelligent manipulation. Including all the slight variations caused by climate and situation, and known only by their rustic names, some 125 varieties of red and 70 of white, grapes are counted in the territory, mostly belonging to the species *Vitis Vinifera*, a few to the *Vitis silvestris*.

ISLAND AND LAGOON VINEYARDS.

Of these, several of the sweeter and more delicate kinds, cultivated on the Lido and islands of the lagoon, are abundant in the market of Venice; but this very abundance and cheapness would make it seem here an idle superfluity to prepare them as conserves for commerce, and nothing of the kind is thought of. Besides that, being the lightest and least alcoholic of Italian grapes, it is doubtful whether they possess the strength and flavor desirable for the purpose.

The existence of these vineyards, surrounded by the sea, and often so low-lying that they must be defended from the invasion of unusually high tides, as well as the abundance and excellence of their product, is sufficient assurance that the situation causes them no prejudice. It seems, however, to deprive them of the vigorous flavor necessary to a good wine-grape; and for the small quantity of wine fabricated at Venice is generally used the fruit of the neighboring mainland. For this purpose the hill-side growth has a traditional superiority well established here, as in all vine-growing countries.

The plants employed in these island vineyards are none other than the choicer varieties common to the surrounding country. The *Marzemena* or *Lugliatico* (the Balsamina of the Romans) is a vine of medium growth and extension, the leaves indented to one-third of their width, with branches of moderate size, and grapes quite round, deep-colored, and extremely sweet. Inland it thrives best in the valleys and along the foot of the hills, and is used to color and sweeten the finest wines, but is too poor in tannin and salts to suffice alone. The *Pignola* (*Pignola rossa* of Tuscany), much resembling the above, but more robust in flavor, is prized in mixtures for its large proportion of salts. The *Ver-*

diso and *Bianchetto* are the commonest of white grapes throughout Northern Italy, and need no description. Besides these varieties, evidently of the ordinary stock, the *red* and *white Muscadel* are abundant, with larger and more oval fruit, of a decided musky flavor, called the *Fragola* (strawberry) grape by the Venetians, and a certain quantity of the small, deep-colored fruit of the wild species, in long, close bunches, with the pungent sweetness everywhere familiar.

The absence of trees and want of space on the diminutive islands where these grapes are grown have made close cultivation a necessity. The vines are planted 4 and 5 feet from each other, in rows about 3 yards apart, and trained on gratings of lattice, slanted from about 5 feet 9 inches, the height of a man, to within 2½ feet of the ground, or else on upright espaliers or trellises around the inclosures or on the banks of the numerous canals and ditches which intersect these amphibious gardens in every direction. The plants are tended with the care and attention of the market gardener, and so far have been free from all the prevalent diseases of the vine.

The nature of the climate is a sufficient guaranty against any risk of injury to the fruit from sea-fogs and mists, the long summer heats and frequent droughts being the dangers most to be apprehended, and often compromising the success of crops of every kind. Fogs are rare at all times, and during the season of vegetation absolutely unknown, while the ordinary evening mist from the water does not prevail till late in autumn, when the sun, sinking early toward the horizon, loses somewhat of its dissipating power. The rare wet seasons cause an occasional falling off by preventing the full maturity of the grapes, but the permanent enemy is drought, which the vine certainly fears less than many other plants.

VINEYARDS ON THE MAINLAND.

On the mainland the plan is far from receiving the same careful and rational treatment. Every traveler has been charmed with the graceful luxuriance of the vine-mantled trees which border the routes of Northern Italy with their interminable festoons, and overrun the country, making it an ideal picture of exuberant vegetation, but an example of the worst possible farming, say the specialists. From time immemorial the Venetian cultivator has imitated the simple arrangement of nature in marrying the vine to its primitive support, and the best proof of the inexhaustible fertility of the region is the fact that with such a system he succeeds in producing delicious grapes and passable wine. Efforts are made to introduce vineyard culture, but the want of capital or impatience for hasty gain still prevails, and in the Valpolicella district of Verona, where the choicest of Venetian wine is made, the old system is universal, while in Conegliano some of the new plantations commenced under the auspices of the school there have been torn up, and the number of vineyards has rather diminished during the past ten

years. The practice is the same for fruit or wine grapes, and the same varieties serve indifferently for both.

In this double cultivation the sustaining trees are planted some time previously, with the same regularity as the vines, from 3 to 10 yards from each other, and in rows from 10 to 30 yards apart, according to soil and situation, much deeper if possible, also, to avoid the interference of their root as well as to lessen the drain on the soil to the prejudice of the vines. The ash, maple, and cherry are generally preferred for the purpose, as less impervious to the sun, on the hill; the maple, elm, and poplar in the plain. After reaching the height of 6 feet, all the vigor of the young tree is confined by pruning it to three or four of its most robust branches.

PLANTING AND CULTIVATING THE VINES.

The vine (and the methods of cultivation are given here with some detail, as they are the same substantially for all sorts of vines and in all parts of the territory) is reproduced from slips (*magliuoli*) carefully chosen from the best individuals, well furnished with buds, and cut near the middle of the bearing trunk with a small portion of the wood attached. Before planting, these slips are subjected to a sort of maceration, exposed to the sun with their lower ends immersed in running water. This softening process predisposes them to take root and bud more promptly. They are then planted by some cultivators in a nursery for two or three years, but most generally on their permanent locality, to allow the young vine to adapt itself at once to the soil in which it is to grow. The furrow is commonly 2 or 3 yards wide and half a yard deep, shallower in light and loose earth, but a compact or clayey soil should be broken as deeply as possible. At the bottom are often placed large stones or fascines of osier, a sort of rough sewerage to aid a freer circulation of air and moisture. On rocky hillsides it is also a means of economizing the scanty supply of vegetable earth. These furrows should be opened and well broken up some time beforehand, in autumn if possible, since the soil gains in quality by the action of air, sun, and frost.

The planting takes place with the opening of spring—from the middle of February to the 1st of April. The slips are placed four or five on each side and at 9 inches to 1 foot from the tree, disposing them in the best position to take root easily, and covering lightly at first with fresh soil and manure or vegetable refuse, to be filled up afterward with earth improved by exposure, according to the progress of the season, till the surface is leveled or the plant properly imbedded; rapidly in the plain, more gradually on the hillside, where the spring rains would soon wash away the unsolid mass, while on the contrary the cavity, aided by a little support of stones below, retains and profits by whatever they may bring from above.

The choicest and best cultivated vines of the region, those of the

Valpolicella, often require to be terraced thus with a succession of sustaining walls, and are in such localities so closely planted that in a few years the tendrils are festooned not only from plant to plant but from row to row—a thing never permitted in the plain, where this cross-festooning would obstruct plowing for other crops in the intervening spaces.

Generally both the vine and its support are pruned low and only allowed to spread horizontally, the vine, as it extends beyond its sustaining limbs, being led over their forks and left pendent till long enough to be attached by its extremities to those of a neighboring plant; more rarely bound to upper limbs it mounts to the height of the tree, since at a certain distance from the earth it loses its vigor and sterilizes. At Valpolicella, the sustaining plant, after reaching the necessary size and force, is often killed, that it may no longer rob the vine of its nutriment.

During the earlier period of its growth the vine is pruned rigorously to confine its vigor to the portion by which it attaches itself to the tree, lopping all but the clinging tendrils. Afterwards the practice is to retrench the higher shoots and force it to bear as low as possible, removing at the same time those which have borne for one or more years, the better to re-enforce those intended to bear the succeeding year. According to treatment and situation, the vine begins to give a profitable crop at from three to six years.

VARIETIES OF GRAPE.

Of the 200 or more indistinct varieties, confusedly attributed to the various districts of the territory, not more than 25 are cultivated to any extent or furnish a product of commercial value.

The principal of these for the district of Verona, the base and substance of its most generous wine, is the *Corvina*, a close-growing vine, whose branches, with little tendency to spread, are thickly budded and bear an unusual abundance of rather small fruit in pyramid-shaped clusters. This grape is specially rich in all the elements for vinification, saccharine, saline, coloring, and tannic, and is at its best along the bases of the hills and in the upper valleys. On higher ground it changes its character somewhat, with lighter and longer branches; the fruit is less crowded and abundant, extremely sweet, and delicious for table use. As a rule, the red varieties succeed better on the hillside, the white in the valley, and the same plant removed to a higher level changes more or less, the fruit becoming rarer and smaller, but more concentrated in quality, while both it and the stems take a deeper color. This alteration the cultivators call "*ingentilire*." The Corvina is the only grape capable of producing superior wine alone and without mixture, though to heighten its excellent qualities it generally figures only for 45 to 50 per cent. in the best fabrication.

Next in value is the *Terodola*, a plant more spreading than the above,

with deeply serrated leaves, small but well-furnished bunches of round, thick-skinned, and very black grapes; affects the same localities with the Corvina, and makes strong, high-flavored wine, improved by mixture with the last named and others, where it serves best in the proportion of 20 per cent.

After these superlative products come the *Rossignola*, choice, also, but very delicate; thrives only in the best exposures, always the first attacked by epidemics, and requires constant sulphuration.

The *Schiavo*, a strong-limbed and vigorous plant, abounding with fruit; only tolerable for wine, but excellent for the table.

The *Lambrusea* grows wild in Tuscany; improved by culture and properly qualified by mixture gives superior wine; and the *Marzemina*, indifferent for wine, delicious for eating.

Among white varieties, the *Bigolona* and *Durassena*, gathered extremely ripe and concentrated by drying, both make an exquisite dessert wine, the *Vino Santo*, so called because the grapes may be kept, and sometimes are not brought to press till Holy Week.

The *Montenara* and *Torbiana* are preserved more exclusively for the table during the winter.

Most of the white varieties may be kept and improve in flavor by drying till the approach of spring. For this purpose the clusters are laid on a grating or hung from the ceiling in a well aired situation—a process as old and as well-known as the grape itself.

It is hardly necessary to make special mention of the grape cultivation in other parts of the territory, where the same varieties in less favorable conditions are produced with less perfection. The whole range of country along the foot of the Alps is fertile in abundant and excellent fruit.

At Conegliano, to the north of Venice, as mentioned in my last annual report, the soil and situation are exceptionally well adapted for the culture, and a school has been established, aided by state and provincial subvention, for promoting more rational and efficient methods. The soil here is the most decidedly calcareous to be found in the territory, derived from the disaggregation of the masses of dolomite and oolithic limestone of the mountains above, and from extensive beds of marl lower down, largely mixed with fragments of the underlying porphyry, quartz, and granite. Where this soil rests on strata of loose conglomerate, as is generally the case here, the vine finds a congenial situation.

Here, to the contrary of Verona, the white wines succeed best. The *Verdiso* and *Bianchetto* have much local reputation, and, properly manipulated, make a good foaming wine of unusual body and flavor. The *Prosecco*, *Pignola*, and *Baschero* are also excellent, and are largely consumed in Venice and the surrounding country, though their want of alcoholic force prevents exportation to any great extent.

The red wines of the *Rabosa* and *Schéavo* are also a permanent staple in the consumption of the eastern part of the territory, and all are excellent for table use, being cultivated along with others for the exclusive purpose.

In proceeding westward the soil, with the constant predominance of the calcareous element, but with a larger admixture of scoriæ and volcanic matter, lends itself to the production of stronger and richer qualities both of fruit and wine. This is particularly the case in the extreme westward districts of the territory, where the hills of Verona are almost exclusively composed of the detritus of Cretaceous strata, mingled with quartz and the disaggregation of basalt and friable basaltic tufa. The vine prospers everywhere, varying with the differences of the region; sweet but light and watery on the limestone of the plain; deep-colored, strong, and aromatic on the basaltic hills to the east; rough and tonic on the glacial accumulations beyond the Adige.

INTERCROP CULTIVATION IN VINEYARDS.

The practice of cultivating for other crops the spaces between the vines is universal; in fact, the vine can hardly be said to have any distinct apportionment, but rather to be superadded as the necessary garniture of every field, which, regardless of its presence, is tilled in all respects according to the ordinary agricultural routine of the country, and this double culture only fails where the situation is so precipitous or so bare as to make any product but that of the vine out of the question.

PROFITS OF VINE CULTURE.

According to situation and treatment, the vine begins to become profitable at about three years, and is in full bearing at six.

Throughout the Venetian provinces in strong contrast with those of Lombardy, artificial irrigation is little developed; in several it is almost unknown, and where it exists is much more in request for meadow and other culture. The vine, intermingled with other crops, may receive an interloper's share of the common benefit, but the localities which it prefers, as well as the nature of the plant, mostly place it without the scope of any special arrangement for the purpose. Occupying, besides, no special place in the apportionment of the farm, its balance of outlay and return is always liable to be confounded with the general mass of operations for the year, while the selling price of its product differing more widely with slight shades of real merit, and often depending on an artificial or fanciful value of appreciation, the ordinary calculations of commerce are not easily adjusted to it. Estimates vary greatly in official as well as professional publications. The following data, however, are the most detailed that I have been able to procure, and may represent one of the most successful and best-conducted vineyards of Verona:

Expense per acre for harrowing, hoeing, etc	$4.80
Expense per acre for manuring	3.20
Expense per acre for pruning, osiers and stakes	3.60
Expense per acre for leafing	40
Expense per acre for sulphur	2.40
Expense per acre for gathering	96
Expense per acre for bringing in	40
Total	15.76
Product, 1,200 kilograms of grapes, at .04	48.00

To illustrate the extraordinary differences of return to which the industry is subject, independently of outlay or treatment, an estimate purporting to represent facts may be cited from a parliamentary return on the subject. The comparison is limited to a parcel of 60 vines married to 15 trees, and provided each with 5 additional sustaining stakes, and the expense incurred, in each case the same, is:

300 stakes, at 2 cents each	$6.00
Pruning (6 days' work)	1.20
Sulphur (30 kilograms, at 5 cents)	1.50
Sulphuration (2 days' work)	.40
Vintage (10 days' work)	1.60
Total	10.79
MAXIMUM PRODUCT.	
3,532 pounds of grapes	$46.40
444 pounds of wood	1.19
Total	47.59
MINIMUM PRODUCT.	
444 pounds of grapes	$5.80
222 pounds of wood	.60
Total	6.40

McWALTER B. NOYES,
Consul.

UNITED STATES CONSULATE,
Venice, March 3, 1884.

RUSSIA.

REPORT BY CONSUL-GENERAL STANTON, OF ST. PETERSBURG.

[Republished from Consular Reports No. 30.]

Along the shores of the Black Sea, Sea of Azof, and on both sides of the Caucasian Mountains, Russia possesses a vast territory devoted to the culture of the grape. Astrachan may be considered as the home of Russian grape culture, since the first vines were planted there at the

beginning of the seventeenth century. During the latter half of the same century Russian vintners were sent to the river Terek, and laid the foundation of the present grape culture in that district.

In Transcaucasia the culture of the vine dates back to immemorial times, and the opinion prevails that the diffusion of the grape-vine over Europe proceeded from this country.

In the Taurida peninsula and modern Bessarabia the grape culture owes its origin to the Grecian colonies founded there some six centuries before the Christian era. Old Grecian amphora, which have been found on the banks of the Don, justify the inference that the Greeks extended the culture of the grape to these districts also.

In the Crimea, grape culture attained its prime between the eleventh and fifteenth centuries, under the dominion of the Genoese. Under the Tartars, however, it fell into decay, similar to that of the Caucasian districts under the rule of the Turks and Persians. With the accession of the Russians the grape culture began to flourish again, and was extended by them to the Kuban and Terek districts.

In the following short review of the grape culture in the various districts of Russia, the data given (with the exception of Bessarabia and the Don districts) refer to the period of 1870 and 1874.

GRAPE CULTURE IN EUROPEAN RUSSIA.

1. In Bessarabia the culture of the vine extends over the whole Government and into the bordering districts of the Governments of Kerson and Podolia. In 1870 the yield was 965,250 gallons of wine, and, according to official data, in 1879 Bessarabia alone produced 18,756,000 gallons. The wines are generally light, the red varieties resembling the French, the white the Rhine wines. The wines produced in Bessarabia from French and Rhenish vines are known in trade as Bordeaux, Burgundy, Rhinewine, Sauterne, etc., the label indicating also the district in which the wine was grown. The best known are the Ackermann, the Odessa, and those of the Bulgarian colony. The majority of the grape-growers sell young and unfermented wines to dealers, and in the whole district but six wine-growers made and sold a finished wine under their own names.

2. In the Crimea grapes are cultivated throughout the whole Taurida peninsula, but only four districts are of importance, viz, Yalta, Eupatoria, Simferopol, and Feodosia.

Compared with the rest of Russia, grape culture has attained its greatest perfection in the Crimea. The newest methods are adopted, and relatively a large number of vine-growers, particularly those on the southern shores, make and sell their own wine under their own names in St. Petersburg and Moscow.

The Government has paid the greatest attention to grape culture in the Crimea. In 1812 the Imperial Nikita garden was laid out on the southern shores in the vicinity of Yalta; and in 1828 the Margaratsch

school of vine culture was established. In 1868 the above-mentioned garden was transformed into the Nikita vintage and gardening school, but Margaratsch school remained unaltered, in order that the students of the Nikita institute might learn grape culture practically.

In 1870, 3,037,500 gallons of grape juice was pressed in the Crimea. The yield of this district has steadily increased since the beginning of the present century, viz, in 1823, 466,154 gallons; 1849, 2,119,000 gallons; 1853, 650,000 gallons; 1870, 3,037,500 gallons. In the district of Yalta the yield has increased as follows, from 1861 to 1871, viz:

	Gallons.
1861–1863, annual average	298,854
1864–1866, annual average	382,846
1867–1869, annual average	506,557
1870–1872, annual average	1,130,676

The Crimean vintners pass the grapes through a kind of grater, in order to separate them from the stems, the juice flowing into double-bottomed vats, the upper one being perforated, and the berries are then put in the press. Ordinarily the wine-presses are of wood and of the simplest construction. The must is filled into casks, in which it remains 24 hours, when it is poured into other casks, where it remains fermenting from 10 to 12 days, being kept at a temperature of from 16° to 22° Celsius. When fermentation ceases the partially empty casks are refilled. The first transfusion takes place in December, the second and third in March and September. For clarifying, gelatine and isinglass are used, and at times, for red wines, albumen also. The majority of the vine-growers sell their wine to wine dealers in unfermented and unripe condition, by whom it is perfected and put upon the market. In the main the Crimean wines are known by the name of the estate in whose cellars they have ripened, sometimes by the name of the grape they are pressed from. They are consumed throughout Russia and also abroad. In 1872 and 1873 the Yalta district exported 364,443 gallons and 212,904 pounds of wine.

3. The Don wine district lies in the Government of the Cossacks, and owes its existence to Peter the Great. Up to 1820 the annual yield was not more than 65,000 gallons, while in 1870 it was not less than 4,875,000 gallons. The grape-growers seldom make any wine themselves, but sell their crops to wine-makers called "Vinniki." Fresh and dried grapes are used for wine-making, and that made from the latter is the best and strongest. The wine is seldom ripened and clarified by the "Vinniki," but transferred by them to wine dealers for this purpose. Generally the Don wines are light, watery, and keep badly. A certain quantity is employed in the manufacture of "Don champagne." Those vine-growers who make wine for their own consumption pay the greatest attention to its manufacture, and produce an article which will compare favorably with many a European wine. These wines are not in the market, however, but only the very inferior article produced by the "Vinniki."

4. The Astrachan wine district embraces the lower reaches of the

Volga lying in this district. The wine production is unimportant, since the grapes, which enjoy a good reputation, are sold as fruit. In 1870 not more than 48,750 gallons were produced, and, according to official data in 1880, one firm made $15,000 worth of wine.

CAUCASIAN DISTRICTS.

The culture of the grape is carried on north of the Caucasian Mountain chain in four districts, viz, the Kuban, the Kumaschia, the Terek, and the Daghestanian. The Terek-Kumyksian district produces the greatest quantity, viz, in 1870, 4,875,000 gallons; in 1874, 9,750,000 gallons. These wines are quite celebrated among Caucasian wines, about 1,625,000 gallons being sold annually at the Nischni-Novgorod fair. Grape-pressing in this district is done in vats and troughs, with the hands and feet. The must ferments in casks, in which it remains until autumn, when it is clarified and put on the market. The Kuma district ranks second, and produces annually from 812,000 to 975,000 gallons. The wine of this region is sold after the first fermentation, is light and watery, and consumed chiefly in the Novgorod and Black Sea districts. In Daghestan about 487,500 gallons of a wine is produced which is chiefly consumed by Caucasian Mussulmans. In the Kuban district grape culture is of recent date, and the wine produced is consumed on the spot. In 1870 the production was about 18,200 gallons; in 1873, 33,508 gallons.

In Transcaucasia not less than 32,500,000 gallons of wine are annually produced. The province may be divided into five districts, viz:

1. The Rion-Black Sea district, which yielded in 1870 10,725,000 gallons;
2. Kachetian, yielding 9,725,000 gallons;
3. The Kura district, with an annual production of 4,872,500 gallons;
4. The Arax district, yielding 3,250,000 gallons; and the
5. Shemahka district, producing 325,000 gallons.

The Circassian wines are for the most part consumed in that province, but latterly the better varieties are finding a market in the leading cities of Russia. The best wines are found in the Kachetian and Black Sea districts, where red wines especially are of good quality. The Government of Erivan produces the strongest wines. Only about one-third of the annual production finds its way into the markets, the larger portion being reserved for private consumption.

In Kachetia the vintners erect a peculiar style of barn called "maralyen," in which are placed wooden or stone presses, whose floors slope to an opening for the issue of the wine. Above the press is a beam, to which the laborers cling whilst treading out the grape juice with their feet. Earthen jars serve as receptacles. The must first issuing is separated from that resulting from an increased pressure. The former yields a poor and weak, the latter a better and stronger, wine. The fermentation takes place in jars. White wines ferment from eight to ten,

red wines from three to seven, days, when they are transferred to new jars. The lees are used for the distillation of brandy. The wine remains in lightly closed jars, which are buried in the ground until December, when they are hermetically closed and covered with about 2 feet of earth. This method of wine-making prevails, with slight alterations, throughout the Caucasian wine districts. In Transcaucasia the wine is transported in goat-skin bags, and generally sold in them. The casks are smeared with fat or kerosene, which gives the wine a disagreeable taste. The vine is also cultivated in Turkestan, and to some extent brandy and wines are made.

RUSSIAN VS. FOREIGN WINES.

The great drawback to Russian wines is the faulty manner of preparing them, which leaves much to be desired, especially as regards their keeping qualities. There is, moreover, a great deal of mixing and adulteration practiced in the districts where the wine is grown. Wines of various vintages are constantly mixed, causing a great variation in the quality of the wines. Dealers are also in the habit of adding various ingredients to the unripe wine for the purpose of counterfeiting the better known varieties of foreign wines. Laterally, in consequence of the depredations of the phylloxera in France, foreigners have appeared in certain districts who buy up the new wine and export it abroad, whence it returns labeled as French wine. The habit prevailing in so many lands of giving the foreign product the preference over the home-made article is a serious obstacle to the development of the Russian wine trade. The majority of Russian consumers prefer the imitations sold as Madeira, Sherry, Bordeaux, etc., to the natural Crimean wines.

The Crimean, the Kachetian, the Bessarabian, Don, and Astrachan wines are better than the others. All have not been carefully analyzed, but in 1864 and 1870 many of the better varieties were analyzed in Moscow and Odessa. The dessert wines have the greatest specific weight, the table wines (vins ordinaires) the least. All carefully-prepared and well-fermented Russian wines are as a rule stronger than foreign wines made from the same variety of grapes.

The Russian wines, classified according to their acidity, rank as follows, viz: The Bessarabian red wines are the sourest; then come the Caucasian and Crimean red wines, the Caucasian and Bessarabian white wines, and the Crimean dessert wines. Altogether the Russian red wines, as regards acidity, resemble most the French red wines; the white wines are less sour than the German wines. The Russian red wines contain more tannin than the French ones, while the white wines have little or none.

TOTAL WINE PRODUCT.

The grape-growing districts of Russia and Caucasia yield annually not less than 48,750,000 gallons of grape juice, nearly 16,125,000 gallons

of which are consumed on the spot, the remainder coming into the general market. The following table shows the relation of that consumed by the vintners to that consumed by the public.

EDGAR STANTON,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
St. Petersburg, February 13, 1883.

SPAIN.

DENIA.

REPORT BY CONSUL ARQUIMBAU.

[Republished from Consular Reports No. 41½.]

The production of raisins in Denia for 1883 amounted to 2,800,000 boxes, of 28 pounds net each, valued at $4,200,000; the crop is considered to be about the same as that of last year.

These raisins are principally consumed in the United States and England; the exports to the former amount to 979,000 boxes and to the latter 1,385,000 boxes, leaving a stock in the country of 436,000 boxes.

The consumption in the United States has increased, although the price has been $1 higher for each 112 pounds during the past two years. I also observe that the fine qualities, such as those called "selected," have been in much request of late. Previously this grade was mostly consumed by the English markets.

All raisins are prepared here by scalding, and the system is as follows: They construct furnaces of feeble draft, in which wood is used as fuel. A round kettle, varying in capacity from 300 to 400 liters, receives a lye formed from the residue or refuse of the grape after pressing. The lye used is either that obtained from the present year or that which has been kept from the previous vintage. Placed in wire colanders, with long handles, containing 20 pounds each, the raisins are plunged in this lye, boiling at a temperature of about 212° Fahr. After this immersion the workmen examine the skins to note if they are sufficiently shriveled, and if not they are immersed again. Thus scalded, they are carried to the drying place, and, after a space of seven to ten days, from thence to the stores, where they are packed in boxes.

The process of immersion is a very delicate one, and requires skillful watching and great judgment on the part of the workmen who conduct it. In reality, according to the quality of the skin, its resistance, which varies with the fruit, the immersion should be more or less rapid, at the risk of having the grapes burst; besides, much skill is necessary to recognize the fissures which may appear. When the heat has been too great, the raisins too rich in sugar will mold shortly after having been packed. This process has the advantage of drying the fruit more rap-

idly than when only exposed to the sun, and avoiding by this chances of being damaged by rain while drying.

American ships.—None have visited this port for many years, the entire freight business between this port and the United States being done by English steamers, which, from August to December, average three a week, loading from 200 to 1,200 tons each.

Lumber for boxes.—Lumber being scarce and dear, it is largely imported into this district from Norway and Canada, for the manufacture of boxes for raisins and oranges. The last transaction I have information of was at £8 10*s.* 11*d.* for spruce, St. Petersburg, standard 3 by 9 with deal ends. It seems to me that a portion of this business could be done, if well looked after, by dealers in the United States. So far I understand the business is transacted through London dealers with the said mentioned countries.

JOHN D. ARQUIMBAU,
Consul.

UNITED STATES CONSULATE,
Denia, December 31, 1883.

MALAGA.

REPORT BY CONSUL MARSTON.

[Republished from Consular Reports No. 41½.]

Climate.—The climate of Malaga has the reputation of being the finest in the world for persons suffering from consumption and all diseases of the throat and chest, and many invalids are ordered by their physicians to this part of Spain, their only hope of recovery, or, in some instances, to extend their lives for a few short months. In many cases they die, away from family and friends, from the lack of many comforts easily obtained at home, but which a stranger never finds while temporarily residing in Malaga.

People in Malaga during the winter season wear as heavy clothing as they do in the coldest season in America, but instead of wearing this heavy clothing in the open air they wear it in the house. Outside the air is balmy and spring-like, but the massive stone-built houses are cold with their marble floors (even to the fifth story), and in your walks along the promenades you will find the residents walking dressed in almost spring-like costume, while in your social visits, an hour afterwards, you will find them wrapped in shawls and cloaks suffering from the damp cold which a small fire would instantly dispel. One day of such experience would affect a person suffering from consumption more than a whole winter in a colder climate where home comforts could be more easily obtained.

The hotels or boarding houses here offer no comforts to invalids; they

have no fire-places; the floors, of marble or brick, are uncarpeted, and the portiéres and table-covers, if the rooms possess any at all, are faded and covered with the dust of ages. The fare of the table is generally of Spanish cookery, which, though sometimes not bad to one in health, is not such as an invalid could eat, and not nourishment in any sense to one of feeble digestion. Unquestionably the climate would arrest disease if its hand was not too firmly posed; but without the aids of comforts, which are nowhere to be found in Malaga—in hostelries I mean—it is a cruelty to the invalid to be ordered here.

There is, it seems to me, a fortune for some enterprising American who can "keep a hotel" with the American standard of comfort; but it would take time to draw the winter visitors of former years, who, for the reasons I have given above, have sought cities more hospitable, though less gifted in climate.

Situation.—The relative position of vineyards is about 80 per cent. of hill-side lands and inland, about 10 per cent. of valley and plains, and about 10 per cent. of sea-coast. Vines are said to grow equally well on sea-coast or island.

The nearest vineyards to the sea-coast are about one-fourth of a mile.

Sea fogs are seldom experienced at Malaga, and are not considered as injurious to the production of grapes; on the contrary, they are beneficial.

The valleys and table-lands when especially cultivated produce the best grapes.

Pruning.—Pruning-scissors with a spring are chiefly used here for pruning vines, and are considered in the best conducted vineyards as superior to all others, although the old custom of using something like a chisel, about 2 inches wide, very sharp, which cuts a "clean cut," is still used by many in this province. Vineyards are pruned once a year, viz, in the months of November and December.

Soil.—The nature of the soil on the mountains is clay slate; in the vegas or plains gravel, clay, and ferruginous earth.

Planting.—The vineyards are generally planted in new lands and when the soil becomes exhausted fertilizers are employed. Stable manure and street sweepings for table-lands have been found to be productive of fruitful vineyards. The usual distance between each vine is about 7 feet.

Best results are obtained in valleys, table-lands, and plains inland, much better than on the hill-side, where the rains wash away all the richness from the soil to the plains beneath.

Cultivation.—Lands are cultivated in the vineyards twice a year, viz: First, in December, cutting the branches (within 1½ or 2 inches) from the root, where it protrudes from the ground, leaving only one single sprout; then they clean perfectly the knob of the vine, removing all the soil to the depth of 10 or 12 inches. Second, in April, when they cover again the root with the earth, cutting away all grass and weeds,

which draw the richness from the soil. Later in the season, if there are any more grass or weeds they are pulled by hand.

Maturity.—Vines come into full bearing at eight years old and last about thirty or forty years in fruitful condition if the land is good.

Irrigation.—There is no system of artificial irrigation in practice in this province for grape culture, but all vines receive the necessary rains naturally during the winter and spring.

Yield.—An estimated average yield per acre per annum is about 9,000 pounds of grapes, which will yield about one-third that amount when prepared as raisins, viz, 3,000 pounds, or 120 arrobas, at an average value of 30 reals vellon per arroba in the vineyard as they run, good and ordinary alike, which aggregates 3,600 reals vellon, or $180. From this must be deducted 20 per cent. of the total yield for all kinds of Government taxes, 10 per cent. on average production as interest on capital invested, and about 30 per cent. for cost of crop, leaving a profit to the producer of about 40 per cent. on the total yield.

The figures are given for vineyards that are fruitful and healthy, free from phylloxera and other plagues; but it would be impossible to attempt to average any particular crop, as years differ, from many unforeseen causes.

Picking.—The vintage season for raisins commences about 1st of September each year, and the record of all statistics is calculated by vintages.

I have prepared a table, annexed, marked A, containing a comparative statement, at parallel dates, of the raisin crop of Malaga, for each vintage, for the five years ending August 31, 1883, including the amount exported, together with the names of the different countries to which these exportations were made.

General exports of box raisins up to end of crop compared with other vintages at parallel dates.

Whither exported.	Crop of—				
	1882.	1881.	1880.	1879.	1878.
United States	967,571	1,043,727	1,115,101	1,146,228	1,182,088
British North American colonies	38,431	31,730	46,717	30,598	58,242
Great Britain	176,379	141,415	174,126	237,659	194,471
France	277,253	251,382	297,412	368,420	330,767
North of Europe	130,646	101,828	108,222	107,888	99,661
West Indies and South America	98,007	81,196	75,456	63,688	98,429
Mediterranean and Portugal	76,842	72,746	92,735	69,330	65,107
	1,765,099	1,724,024	1,909,769	2,023,811	2,028,765
Coastwise and interior	102,901	75,976	105,231	101,189	151,235
Total boxes (22 pounds each)	1,868,000	1,800,000	2,015,000	2,125,000	2,180,000

H. C. MARSTON,
Consul.

UNITED STATES CONSULATE,
Malaga, March 28, 1884.

MALAGA.

THE EXTENT TO WHICH GRAPES ARE CULTIVATED, AND THE MANNER OF THEIR PREPARATION FOR EXPORT.

REPORT BY CONSUL MARSTON.

[Republished from Consular Reports No. 41½.]

Notwithstanding the neglectful condition of agriculture in Andalusia, and the primitive processes still followed in many ways, the marvelous fertility of the soil impresses the most inattentive and indifferent observer. But among all the natural riches that abound in this luxuriant country, the most worthy of mention are the vines, so justly famous both through the celebrated wines and the delicious raisins, of which Malaga is the principal market for all Europe and the New World.

It will, perhaps, be instructive to make some remarks on the production, preparation, and commerce of the raisins, which seems to me, although of ancient origin, to offer an attraction of novelty.

There are two distinct vines, the muscatel and the Pero-Ximenez, the first indigenous, the second imported from the borders of the Rhine two hundred or two hundred and fifty years ago by a German, whose name, corrupted in Andalusia, was given to the vine. Opinions seem divided as to the respective merits of these two vines; some insist that they are equally good, others that the muscatel are much the best. I give the decided preference to the muscatel. A box of raisins made from the muscatel, recently sent to the exposition at Moscow by a firm of Malaga, contained samples presenting the appearance of large prunes.

The cultivation of the vine requires hard labor. The soil is dug out around the root, leaving a circular hole about 1 foot deep, and, owing to the firmness of the soil, the digging is very difficult. Manure of great strength is used by many proprietors.

Different from Meridional Italy, where the vine, always clinging to the elm, throws itself from the soil in forms of graceful arbor, as in the time of Horace and of Virgil, in this country it stretches itself over the ground and thus gathers all atmospheric heat. Thus, although white, the grape has a golden tint, the skin resisting and slightly tough. The branch appears like a root.

The vintage is conducted with great care; they do not gather all the fruit at one time, but mostly go over the same piece of ground thrice, in order that the grapes may have the necessary ripeness.

There are three different methods of preparing the raisins, viz, washing, drying by steam, and the simple drying in the sun. The drying by steam is more particularly followed in the province of Denia, because of the insufficiency of solar heat. It is also employed in the south in case the season is wet during the vintage.

The cut grapes are put in baskets and carried either on the backs of mules or donkeys or in carts to the places, often distant, where they

are prepared, and although they transport the fruit with great care, it suffers naturally; the skin often breaks, which renders the drying difficult, if not impossible.

To dry the grapes by the washing method they construct furnaces of feeble draught, in which wood is used as fuel. A round kettle, varying in capacity from 300 to 400 liters, receives a lye formed from the residue or refuse of the grape after pressing. The lye used is either that obtained from the present year or that which has been kept from the previous vintage.

Placed in wire colanders with long handles, containing 2 or 3 kilograms each, the raisins are plunged in this lye, boiling at a temperature of about 212° Fahr. After this first immersion, the workmen examine if the skins are sufficiently shriveled; if not, they immerse the grapes a second time, usually the last. Thus scalded, the grapes are carried to the drying place, and from thence to the stores, where they are packed in boxes. It is not difficult to imagine that the process of immersion is very delicate and requires skillful watching, and great judgment on the part of the workman who conducts it. In reality, according to the quality of the skin, its resistance, which varies with the fruit, the immersion should be more or less rapid, at the risk of having the grapes burst; besides, much skill is necessary to recognize the fissures which may appear. In cases where the heat has been too great, the raisins too rich in sugar will mold shortly after being packed. This process offers, among others, the inconvenience of exposing the raisins to fermentation during transportation, necessitates expense for the construction of furnaces, and the necessary last drying in the sun; besides, no matter what grapes employed, or what care bestowed in the preparation, the results will always be relatively inferior.

The method of preparing raisins by steam is as follows: After having been exposed nearly twenty-four hours to the sun's rays, the grapes are carried on boards under cover to a building arranged with shelves 6 or 7 feet high. A heat is produced by steam that circulates in an iron tube 7 or 8 inches in diameter through the entire building. It is unnecessary to submit the grapes to a jet of steam, which would injure them by making them damp, but to a veritable heat of 160° Fahr. Valves, arranged on the floor, cause an even temperature. At the end of twenty-four hours, usually, the drying is finished, but as the immediate transfer from a temperature of 160° Fahr. to the open air would injure the ultimate result, it is necessary to let raisins cool gradually in a room constructed for the purpose adjoining the heated room, and only when the raisins are entirely cool are they carried to the stores for packing.

This is the process most generally employed in the region of Malaga, a process they are trying to extend to other less favored climates. The sun furnishes all the heat required; it is enough to construct divisions, of either brick or stone, exposed to its rays, in an inclined position, say 10 yards long and 2 yards wide; the divisions or apartments are built

up at one end with a sort of triangular masonry, which from afar gives them the aspect of a range of uniform tombs. The triangle is so constructed that the sun never fails to shine upon the contents, the interior being covered with fine gravel, which attracts the heat. Immediately after gathering, the grapes are placed in three divisions, and are exposed to the heat of the burning Andalusian sun of August. Never, it appears, have they dreamed of ascertaining the heat thus obtained, but the experienced cultivators affirm that, during the heat in August, they attain a temperature of 145° Fahr. At nightfall a very simple method of covering is applied to guard the fruit from the heavy dews or rain, either of sail-cloth or heavy canvas so arranged that it covers entirely the grapes that are drying within, and, being supplied with rings on two sides, slides up and down as a curtain at a moment's notice. In many places boards or planks are used, giving the appearance of a roof. During the process of drying they carefully remove the grapes that remain green or spoiled, and they turn each grape in order that they may darken in color uniformly. Competent judges give the preference to this simple method of drying, as much for the results as for the simplicity of the process. The raisins that have been prepared by the scalding process dry in four days, while those dried by the sun take ten days, but this loss of time is largely compensated by the economy of expenditure. The raisins are not ready for packing immediately after being dried, but have to be kept several days in the stores on the planks on which they are carried.

The raisins that are spoiled or defective are picked out, especially any that are broken or bruised, out of which one drop of moisture would be likely to damage a whole box. This has to be done with exceeding great care. Finally they are classified, which is a task exceedingly difficult, as cultivators and merchants differ greatly in their opinions. The merchants nearly always remodel the boxes packed by the producers. In the demands of foreign countries for Malaga raisins each has its particular and special requirements for what may be considered first-class fruit.

For France, raisins may be classified as follows:

Sur-couches, *ordinaire*, sur-couches, choix, sur-choix, royaux, impériaux. The first, which is the most ordinary, is never shipped, except under a fictitious name: the other brands bear the true name of the merchant, but rarely the name of the producer.

For England the raisins may be classified as follows:

1st. Finest Dehesa, 3 crowns.
2d. Finest Dehesa, 2 crowns.
3d. Fine Dehesa, 1 crown.
4th. Dehesa.
5th. Choice layers.
London layers (from good to poor).

For the American market the following brands are shipped:

1st. Imperial finest Dehesa layers.

2d. Royal finest Dehesa layers.
3d. Finest Dehesa layers.
4th. Fine Dehesa layers.
5th. Dehesa layers.
6th. London (ordinary) layers.
London, loose, 1, 2, and 3 crowns, the last being in three qualities.

The boxes are mostly made by contract at 75 centimes of a peseta (about 15 cents) each. I think the best boxes are made of fir imported from Portugal. The producer almost always provides the boxes and packs them, but they are always repacked in the town by the merchants, who usually employ women or girls for this labor. All raisins are packed in boxes, except those shipped in barrels and frails, and are divided into four layers in each whole box, which, if of full size, contains 22 pounds of fruit, the total weight with the box usually being 28 or 29 pounds. The first or top layer is always the finest and largest, being selected with great care. The merchant is obliged to be familiar with the tastes and demands of the country for which the raisins are intended.

Although the United States are the principal buyers, they do not purchase the finest quality, almost all the best going to England and France.

For England the layers are not presented in bunches, but are all separated from the stem and pressed very tightly down by the lid of the box, which has the effect of making them, in show, a very large raisin.

For France the bunches must be entire; this difference proves that in England the buyers observe the appearance of the fruit, whilst in France they examine very critically, more desirous to assure themselves of the quality rather than appearance. In this regard, and contrary to their usual habit, the English show themselves less practical than the French.

The average cost in Malaga of 100 boxes loose muscated raisins, the staple shipped to the United States for the year 1880, was about—

Raisins (100 boxes)	$126.10
Boxes (100 boxes)	14.55
From holder's warehouse to ship, including examining, marking, cartage, lightering, and nailing (100 boxes)	5.00
	145.65

In the choicest raisins sent from Malaga, there can be expended in decorations of inside papers from 5 cents to $1 per box, at the option of the purchaser.

Before closing my report upon raisins, I would allude to a practice which has caused much dissatisfaction between American purchasers and Malaga merchants in the fruit trade, *i. e.*, in the shipping of light-weight boxes of raisins. It has been customary to make the boxes of exceedingly thick wood, which weighed more than the amount allowed for tare. Thus the New York purchasers paid for one or two pounds more of raisins in each box than they received, and great trouble was experienced in consequence. Lately, however, there has been a con-

certed agreement upon this point, in which the New York buyers have united, and they have issued a circular laying down the rule that all intend to follow hereafter, which is, that all boxes of raisins that do not contain 22 pounds net will not be received, but will be considered unmarketable, and will be sold at public auction for account of shipper.

Under this new rule, fear is expressed by some that, wood being scarce and dear in Spain, and not being able to continue to profit out of the thickness of the box, boxes will be made so thin that they will lack the strength to bear the necessary handling in transportation.

The crop of raisins produced in the Malaga district from the vintage of 1880 and 1881 is estimated at between 2,000,000 and 2,050,000 boxes, not much varying from the previous vintage.

The stock of raisins in the province of Malaga to-day is estimated at about 150,000 boxes, while one year ago it was estimated at only about 50,000 boxes. At the commencement of the present vintage prices ruled about 40 per cent. higher than during the same time the year previous, and since the 1st of January last but few shipments have been made to the United States as compared with the same period in 1880.

H. C. MARSTON,
Consul.

UNITED STATES CONSULATE,
Malaga, April 27, 1881.

TURKEY.

REPORT BY CONSUL-GENERAL HEAP, OF CONSTANTINOPLE.

[Republished from Consular Reports No. 41¼.]

Situation.—In this district and throughout the Levant there are vine yards on the table-lands, on the hill-sides, and in the valleys—both inland and near the sea-coasts; but the positions preferred as the most suitable for growing the vine are on the slopes of elevated and sheltered undulating lands, or on the sunny sides of the lower hills that do not lie too near the sea-coast, or are naturally protected by higher lands from the cold winds and fogs that arise in the neighborhood of the sea-shore at certain seasons.

In the island of Cos, which is called the "Paradise of the Sultana grape," and in many other places in the Levant, nature has protected the vine by the best possible shelter.

The steep slopes of hills are often planted with vines, and nothing can be more suitable than situations where patches of good soil are mingled with bare rocks, nor anything more beautiful than the rocks covered with foliage and rich fruits.

In some places, especially in the islands of the Archipelago, on the

shore of the Marmora, and on the coast of Caramania, vineyards extend down to within 50 yards of the sea-shore.

Near the sea-coast, sea fogs and mists, especially when frequent or of long duration, are very apt to injure the vines, particularly those growing nearest the sea-shore; but to check and counteract their injurious action the plants and fruit are sprinkled lightly with powdered sulphur, the sprinkling being repeated two or three times if after the first application the rain should wash the sulphur off before the heat of the sun has had time to complete the sulphuration required.

Pruning.—In the opinion of foreign planters, the system in vogue here of pruning and "backing" is rather the carrying out of a hand-to-mouth principle than the application of a scientific or economic idea, because the wholesale, ruthless pruning is often done, first, to get a second crop; second, to ripen the grape quickly, or rather prematurely; third, to allow the sun to color the grape a rich golden hue; and, fourth, to admit of greater facility in getting around the plants.

Vines "backed" and pruned in the native fashion in summer, unless they are planted in deep, strong, and heavily manured soil, become prematurely old, and their yield diminishes yearly, until at last they become quite unprofitable.

But in the best-managed vineyards extensive pruning in summer, especially of the foreign vines, is regarded by foreign vine-growers as robbing the plant of its lungs, and that, too, at the time when all its breathing powers (leaves and branches) are mostly wanted. Happily, both systems have been tried and found to prosper here.

Soil.—A cultivator who wishes to plant a vineyard that will give profitable results should have considerable scientific as well as practical experience to guide him in the selection of the most suitable ground for the purpose, as any defect in the nature of the soil or in its position, both as regards exposure to the sun and protection from cold winds, might render the enterprise abortive.

The vine dislikes a damp soil, but will thrive in almost any open ground with good drainage. In rich, deep soils it grows luxuriantly, but on shallow, dry soils the fruit, though less abundant, is of finer flavor, especially where the earth is ferruginous.

The best results are obtained from vineyards planted in good soils on the hillsides, the next best being those situated on undulating table-lands, and afterwards from those planted in the valley, especially where the vines are most exposed to the influence of the sun, and best protected by nature against dry, hot winds and sudden and unseasonable currents of cold air.

Cultivation.—Lands cultivated by native farmers are first turned up about the end of June, with rude plows or implements of husbandry of the most primitive description. In some places the young vines receive little care beyond being occasionally hoed and partially cleaned of weeds and couch-grass (*Triticum repens*). In other places they require and re-

ceive more care, and have to be manured once in two or three years. On lands in the vicinity of Constantinople, cultivated by foreigners, many of the local methods of culture have been retained, to which the aid of the most economical implements has been added, together with the science, art, and practical skill that have brought the vines of France, Spain, and Italy to so high a degree of perfection.

When about to lay out a vineyard on virgin lands, foreigners sometimes plow the earth first for wheat, and after the wheat has been harvested they turn the soil again, so as to allow the sun to get at the roots of the couch-grass, which is the only sure method of destroying this enemy of the young vine. New varieties are raised from seed, but the ordinary modes of propagation are by layers and cuttings. Fine varieties are sometimes budded or grafted on less valuable ones.

Besides the native grapes grown for the purpose of making raisins, native wines, and for food, special kinds have been introduced into the country especially for the manufacture of wine for exportation. Within the last ten years upwards of a million of plants, costing from $5 to $10 per thousand, and embracing thirty-seven varieties of the best French vines, have been introduced, acclimatized, and successfully cultivated. A French company, with a capital of $500,000, in five hundred shares, has purchased estates near Heraclea, on the Roumelian (European) side of the Marmora, with the view of producing wines for the French market. The vines are cultivated in rows, about a square meter being allowed to each vine, which enables the numerous processes of cultivation to be carried out promptly and efficiently, and permits the cultivator to inspect the plantation with scrupulous minuteness.

The planting of the vines in rows sufficiently wide apart to give free passage between them allows the sun free access to all the plants alike, and facilitates the carrying out of certain operations, such as hoeing, pruning, dressing, powdering, destruction of insects, etc., upon the proper performance of which the quality of the vintage and sometimes the very existence of the vineyard depends. This system, besides offering these palpable advantages, allows the whole of the cluster to ripen equally, and precludes the possibility of unripe grapes getting mixed up with the ripe ones. The fruit can, moreover, be more promptly gotten in than in the case of vines cultivated on the system known in France as "*en foule*," where they are allowed to grow closely together and at random. Although some vine-growers are in favor of this system, common practice in France and other vine-growing countries has shown that its disadvantages outweigh its advantages. The vine must have equal exposure to the sun on every side, and to facilitate the many operations which promote a good vintage it must be of easy access.

When the ground has been selected on which a *new* vineyard is to be planted, it should be carefully trenched by digging with fork and spade to a depth of 2½ to 3 feet, the earth being thrown up in a series of rows. This long and expensive operation has to be repeated several times.

It is generally done late in the fall or in the winter, when the ground is damp and soft. Great care must be taken to remove all stones, roots, and other hard substances. The ground is then ready to receive the tender shoots, which are generally planted 3 feet apart. Then begins the long and unprofitable period, during which the vines must be tended with unremitting care in order to bring them to maturity and fruitfulness.

Many open and hidden enemies threaten the life of the young vine, and it is only by resorting to methods which are sometimes elaborate and expensive that it can be safely reared.

While the grower in Turkey has no such pest to contend against as the deadly phylloxera, he has several species of vine-fretters, including the aphis or *puceron*, the vine saw-fly, the grub, and numerous other small insects which infest both the young and the old vines, to tax his patience and science.

The most dangerous enemy of the vine-grower is the vine mildew, a fungus of the genus *Oidium*, which forms a white, delicate, cottony layer upon the leaves, young shoots, and fruit of the vine, causing brown spots to appear on the green parts, and finally a hardening, and the destruction first of the surface, and, if not taken in time, of the whole vine, root and branch. A rusty or moldy vine if left to itself soon becomes worse than useless, because it not only cumbers the ground, but communicates its deadly taint to its healthy neighbors. The *Oidium*, however, can be easily kept down, and if taken at its first appearance is generally stamped out by one or two applications of sulphur.

Concurrently with these elaborate precautions against the numerous dangers which threaten the safety of the whole vineyard, other duties claim the constant attention of the grower. The growing plants must have the earth continually hoed around them, special care being taken not to disturb their feeble roots; in seasons of drought each plant must be carefully watered, and when its leaves and tendrils begin to shoot, the vine must be continually trimmed, dressed, and pruned, so as to induce a strong growth without reducing its productiveness.

During the first year the grower does not, of course, expect to gather grapes, nor even in the second year, but he considers himself fortunate if at the end of that time all has gone well. He may hope for a few grapes the third year, but it is not until the fourth year that he has a real crop to reward him for all his pains and outlay.

When properly cultivated, the vine blossoms from about the 25th of May to the 5th of June. The flowers are small, of a greenish-white hue, and fragrant. Seventy to seventy-five degrees Fahrenheit generally suffices to ripen the grapes, and they mellow between the end of August and middle of September. The vine comes into full bearing in its fourth or fifth year, after which it continues very fruitful up to its thirtieth or thirty-fifth year. Its stem sometimes attains a diameter of eighteen inches, and it is said that in certain instances the vine has lived upwards of three hundred years.

Irrigation.—When any system of irrigation exists at all in this country it is generally of the most primitive kind, such as trenches supplied with water by the aid of the *manganos*, or water-wheels of the natives. But properly speaking there is no system of artificial irrigation usually employed, and as a rule the cultivators depend mainly on the showers and dews, which generally feed and refresh the vines during their growth. Of course advantage is taken of springs or small streams that may exist in the neighborhood of the vineyard to secure as long as possible a sufficient supply of water from such natural sources, and where they exist the vines are generally well watered, and as often as they require to be.

Yield.—The crop varies according to the nature of the soil, the seasons, the position of the vineyard, and the degree of care and attention bestowed on the vines. An acre of good vine-growing land in Turkey will, as has been proved by repeated experiments, give from 616 to 880 gallons of wine. It is estimated that when the vineyards held by French companies at Omurtshed and Heraclea, which contain about 10,000 acres, have attained full maturity, their vintage will be about 6,160,000 gallons.

The following is an estimate of the cost of laying out a one-acre vineyard, with the working expenses, for five consecutive years, and the probable profits during the first five years if cultivated according to the French system:

Trenching, etc	$116.16
Planting 4,000 vines, hoeing, etc., first year	38.72
Digging, pruning, hoeing, etc., second year	38.72
	193.60
Less 60 gallons wine, at 70 cents	42.00
Loss	151.60
Digging, pruning, hoeing, etc., third year	38.72
	190.32
Less 140 gallons wine, at 70 cents	98.00
Loss	92.32
Digging, pruning, hoeing, etc., fourth year	38.72
	131.04
Less 300 gallons wine, at 70 cents	210.00
Profit	78.96
To be placed against cost of plant, cellar, casks, etc	78.96
Digging, pruning, hoeing, etc., fifth year	38.72
Less 500 gallons wine at 70 cents	350.00
Profit fifth year	311.28

Varieties.—The principal varieties of grapes grown in the Levant are the following: the "Sultaninas" (without kernels), the "Tchaouche," the "Amigdala" (on the island of Scio), the "Psilaroga," the "Robola," the "Caramisali," the "Resaki," the "Roditis," the "Koutoura," and the "Mavreli."

The "Sultaninas," "Tchaouche," "Amigdala," "Robola," and "Resaki" are white; the "Psilaroga" both black and white; the "Roditis," red; and the "Saramisali," "Koutoura," and "Mavreli" are black.

The finest quality grown in the neighborhood of Constantinople is the "Tchaouche," which is remarkable for its size and fine flavor, and is the most esteemed for the table. The French growers admit that for the table (and unpreserved) its quality is unequaled, with the exception of the "Sultanina." The other varieties, especially the black, are used chiefly for the manufacture of wine. Besides affording a wholesome article of food to the local population, considerable quantities are exported to Russia and elsewhere.

Process of drying raisins.—The raisins of commerce are dried grapes, prepared by two different methods.

One method consists of partially cutting through the stalk of the ripened bunches and allowing them to shrink and dry upon the vine by the heat of the sun.

The raisins prepared by the other method are gathered and hung on lines or laid on prepared floors to dry in the sun. When dried, they are dipped in a hot lye made from wood ashes or barilla with water until the filtered fluid has a specific gravity of about 1.1; to this are added, for every four gallons of lye one pint of olive oil and four ounces of salt. After dipping, the fruit is laid on hurdles of wicker-work to drain, and is exposed to the sun for about a fortnight. The raisins are then pulled from the stalks and packed in boxes for export.

Distilled spirit from grape skins.—From the skins of the grape a spirit is distilled called "mastic" (the gin of the East), which is largely used by the natives, both Turk and Frank.

Raisin trade.—The raisin trade much exceeds in importance that of figs.

The three principal kinds known in commerce are the "Small Sultana," the "Large Red," and the "Large Black."

The "Sultanas" are chiefly taken by England and Germany; about three-fourths of the "Large Red" go to Trieste, Germany, and Holland, and the "Black" were until lately almost entirely for Constantinople, Salonica, and the Danubian provinces. But the growing manufacture of raisin wine in France draws an increasing quantity of raisins to French ports. Vast quantities are taken by distillers in all European countries.

Quantities of raisins produced.—A well-kept vineyard in Asia Minor ought, it is calculated, produce an average of 7 tons of grapes to the acre. In the Turkish custom-house returns for 1880–'81 the valuation of the

raisins exported from all Turkey was $4,393,655, but this sum is evidently incorrect, as trustworthy statistics give the exports from Smyrna and the neighboring district for the same period as follows:

	Value in Smyrna.
Black, 528,278 kintals, of 112 pounds each	$2,522,397.18
Red, 185,754 kintals, of 112 pounds each	1,077,084.06
Sultanas, 173,237 kintals, of 112 pounds each	1,002,907.13
Say 49,687 tons, valued at	4,602,388.37

During the last two years the quantities produced have increased, but the quantities exported have not been published.

Raisins come principally from the neighborhood of Smyrna, the shores of its gulf, and the valleys of the nearer rivers. Quite three-fourths of the laboring population are said to be Greek Christians and the remainder Turks. The highest prices are obtained for the Karaburnu fruit, which was recently quoted as high as 18 cents per pound for red raisins and 24 cents for Sultanas. The black raisin ranges as low as 3 cents per pound on the spot. The total yield of raisins in the Smyrna district, which was 48,000 tons in 1871 and only 31,000 tons in 1872, had risen in 1879, in consequence of the general planting of new vineyards and the greater facilities of transportation from the interior, to the large quantity of 75,000 tons.

While the quantity produced has been increasing so largely, the prices, instead of falling, as in the case of figs, have considerably risen, principally, no doubt, in consequence of the vine diseases in Western Europe. It may be mentioned, however, that the removal of the stalks adds much to the value of an equal bulk of fruit and forms an important element in the rise of prices. About fifteen years ago the practice of stripping the red raisins from their stalks commenced at Tchesmi. This rendered them more salable, and they afterwards were classed with "Eleiné" (choice). The practice also applies to the Sultanas and the black fruit.

Most of the fruit grown in the immediate districts of Smyrna is known as "Yerlis," and in the island of Samos a red "Muscat" grape is produced, which goes in barrels to Holland and Austria, there being scarcely any demand for it in England. These exports for 1882 amounted to $35,000. About Aïdin, where the population is almost entirely Turkish, a small black and not very sweet raisin is grown in large quantities. Half are kept in the country, and the rest, which bring a low price, go, without their stalks, and packed in bags or barrels, to Russia, Greece, France, and Trieste.

Packing.—The manner of packing the fruit differs according to its destination, in order to meet the requirements of the markets. The best "red raisins," whether with or without stalks, are packed in boxes of thirty pounds, except for Russia, where they go in barrels of 250 pounds. The "Sultanas" for Trieste are sent in boxes of 12 pounds, and they go to England in larger boxes of 22 pounds. To Germany and

Holland they go in cases of 30 and 60 pounds. The "Large Black" raisins are generally exported in barrels of about 370 pounds each, and the *Eri Kara* of Smyrna are shipped in sacks.

Freights.—The freight charged by steamers for raisins is at present $8 to $8.50 per ton, but it is sometimes as high as $10.32 per ton to Liverpool for small lots. Freights are not quoted to the United States, as there is no direct trade.

Besides the foregoing, some five or six thousand tons of grapes are converted into wine exported annually from Smyrna. Considerable quantities of wine are also exported from Roumelia, principally through Constantinople to France, where it is converted into French clarets, but the quantities have not been ascertained.

Among the other districts which produce considerable quantities of grapes may be mentioned that of Broussa, the islands of the Archipelago, and Roumelia. During the season 1881–'82 the wine produced in the Kirkillisia region alone was 3,581,907 gallons. The vilayet of Trebizond produced in 1882, 3,790,300 pounds of grapes, but very little in any shape was exported.

G. H. HEAP,
Consul-General.

UNITED STATES CONSULATE GENERAL,
Constantinople, April 10, 1884.

SALONICA.

REPORT BY CONSULAR AGENT LAZARO.

[Republished from Consular Reports No 41½.]

Situation.—The best position of vineyards is the hill-side lands of the interior, at least 2 miles from the sea-coast.

There are some places on the plain where mist and fogs occasion mildew, for which sulphur flour is used.

Pruning.—The vines are pruned in the month of February.

Soil.—The soil where the best results are obtained is a pebbly, sandy loam, and on warm, south-side positions.

Cultivation.—The ground is hoed in ridges once a year, and is afterwards weeded. Before the grapes are ripe the ends of the vine are pruned 1 yard from the root to give strength to the plant.

Maturity.—Vines bear fruit the third year and are in full bearing the fourth. When well tended they remain fruitful for fifty years and over.

Irrigation.—Irrigation is not practiced in this district.

Yield.—The yield varies with the position. The best fruit is grown on dry soil, but it is less abundant. Generally the yield is from 3½ to 10 tons per acre per annum. Prices vary from $15 to $20 per ton of 2,000 pounds. The cultivation of vineyards costs about $28 per acre per annum.

Climate.—As to the climate of this district, it is mild; the severest weather is limited to two months and a half; snow seldom falls, and ice never forms over half an inch thick. The greatest heat, which occurs in July, is about 96° Fahrenheit.

The total yield of grapes in this district is unknown, for want of any kind of statistics. It is supposed, however, that two-thirds of the vintage are exported in the shape of native wine, manufactured simply by extracting the juice and keeping it a couple of months. The rest is consumed at home in grapes and wine.

Exportations are made in barrels to Constantinople, Alexandria, Roumania, and Servia. French buyers purchase much of the wine of this province to remanufacture it in France and convert it into French wines.

P. H. LAZARO.
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Salonica, February 19, 1884.

SUPPLEMENT.

CRYSTALLIZATION OF FRUIT IN FRANCE.

[Republished from Consular Reports No. 60.]

MARSEILLES.

REPORT OF CONSUL MASON.

The business of preserving fruits by the crystallizing process is peculiar to Southeastern France, and is practiced on a large scale at Apt, in the department of Vaucluse, at Clermont, in Auvergne, as well as at Marseilles, Grasse, Avignon, and other places of less importance.

The product is exported largely to England, the United States, and various other countries, including Algiers, the East and West Indies, and even South America, where the profusion of fresh fruits would seem, at first thought, to render such an expensive import almost superfluous.

The kinds of fruit preserved by this process are mainly pears, cherries, apricots, pine-apples, plums, figs, citrons, oranges, melons, and a kind of dwarf orange called "chinois," which grows to some extent in the district of Nice, but is imported here mainly from Italy and Corsica. Peaches are used for this purpose only to a limited extent in the region of Marseilles, the "free-stone" varieties being too costly and the supply too small for profitable use on a large scale.

The crystallizing process is in principle simple and nearly uniform for all the above kinds of fruit, but it requires a certain skill and delicacy of manipulation which can only be obtained by experience, and which it is difficult to precisely define.

The essential thing to be done is to extract the juice of the fruit and replace it in the pulp with liquid sugar, which, upon hardening, not only preserves the fruit from fermentation and decay, but retains it in its original form and consistency. For this purpose it is necessary that the fruit should be fresh, clear of all decay or other blemish, and of precisely the correct degree of ripeness. This last is an important and difficult requirement, as the proper degree of ripeness for crystallizing varies with the different varieties, and is so precise as to exclude from use for this purpose much of the fruit sold during the season in open market, and which has not been gathered, assorted, and transported with sufficient care.

SUPPLY OF FRUIT.

In the neighborhood of Apt and Avignon, where this method of preserving forms a leading industry, fruit-growers are carefully instructed in this respect, and deliver their crop to the confectioners in the best condition. Contrary to what is popularly believed, native fruits are rarely or never really cheap in Southern France, except sometimes for a brief period, when, by reason of some exigency of weather or sanitary trouble, the supply of apricots, figs, or melons, may temporarily exceed the demand.

Oranges, which come from Spain and Italy, and citrons, from Corsica and Algiers, are, in favorable seasons, plentiful and reasonably cheap, but apples, pears, cherries, peaches, plums, and berries are always costly in the market of Marseilles. At this time, the end of October, ordinary apples command at retail from 4 to 8 cents per pound, and the average price paid by confectioners for the various fresh fruits used in crystallizing varies from 8 to 10 cents per pound.

At Apt and Clermont, which are small towns in the midst of fruit-growing districts, prices are somewhat less than this. Refined sugar, the other principal material, costs $9.65 per 100 pounds. If moist or inferior sugars are used, this item of expense may be slightly reduced, but the saving thus effected is more than lost by the inferior quality of the product. This is exemplified by the Corsican citron preserved at Leghorn.

It will be borne in mind that the preserved fruits under consideration are of two kinds, "*fruits glacés*," glazed, and "*fruits crystallisés*," but this difference relates simply to the exterior coating of sugar, which results from the final stage of the process. Until that finishing process is reached, the method of preparing glazed and crystallized fruits is identical and the value of the product is the same.

THE PROCESS OF CRYSTALLIZING.

The fruit is first carefully assorted in respect to size and uniform degrees of ripeness.

Pears, pine-apples, and quinces are pared, citrons are cut into quarters and soaked a month in sea-water, and the "pits" of apricots, cherries, and peaches are carefully removed.

Even this preparatory process requires a certain degree of skill, since the stone must be removed with as little injury as possible to the form and solidity of the fruit. This work is done mainly by women, who earn thereby 50 cents per day.

Thus prepared, the fruit is immersed in boiling water, which quickly penetrates the pulp, dissolving and diluting the juice, which is thereby nearly eliminated, when the fruit is subsequently taken from the water and drained, leaving only the solid portion of the pulp intact.

This process of "blanching" must also be done with exact nicety, the

period of immersion in the hot water being determined by the size and ripeness of the fruit. If immersed too long, the pulp is either overcooked or is left too dry and woody. If taken out too soon, the juices left in the pulp prevent perfect absorption of the sugar afterwards, and, by eventually causing fermentation, destroy the value of the product. In this, as in other stages of the process, the only guide is experience. A skillful workman can tell by the color and appearance of the pulp when it is properly "blanched," and this knowledge invariably commands employment and liberal compensation.

After being thus scalded some fruits, apricots, for example, are again assorted into two or three classes, according to the degree of softness that has been produced, for the reason that if kept together they would take up the sugar differently, some losing their form entirely, while others would remain sufficiently impregnated. From these different grades, sugar-sirups of different degrees of density are required, the softer the fruit the stronger the sirup required for its preservation.

For the same reason each of the different varieties of fruit requires a sirup of corresponding strength.

Pears, citrons, and pine-apples, which remain hard and firm, take best a sirup having a density of from 18° to 25°, while apricots, plums, and figs are treated with sirups which gauge from 30° to 42° by the aerometer.

The requisite sirup having been prepared by dissolving the sugar in pure water, the fruit is immersed in it and left at rest for a certain period in large earthenware pans, glazed inside, and having a capacity of about 8 gallons.

The sirup penetrates the pulp, and gradually withdraws and replaces the remaining fruity juice, which, as it exudes and mingles with the transparent liquid, produces a certain filmy or clouded appearance, which marks the commencement of fermentation. When this has reached a certain stage, the vessel containing the sirup and fruit is placed over the fire and heated to 212° F. This corrects the fermentation and raises all impurities to the surface, whence, if necessary they can be removed by skimming. If the sirup is of proper density, this process of impregnating the fruit with sugar will be complete in about six weeks, during which time it is usually necessary to perform this heating process as above described three times. The impregnation of the fruit with sugar being thus complete, it is taken out, washed in pure water to remove the flaky particles that adhere, and is then submitted to one of two finishing processes, as follows:

If the fruit is to be "glacéd," that is, covered with an ice or transparent coating, it is dipped in a thick, viscid sirup of sugar and left to dry and harden rapidly in the open air. If it is to be "crystallized" it is dipped into the same sirup, but is then cooled and dried slowly in a kiln or chamber warmed to a temperature of 90° Fahrenheit.

This slow cooling causes the thick sirup with which the fruit is cov-

ered to crystallize and assume the usual granulated appearance. The work is now finished. If properly done, the fruit thus preserved will bear transportation to any climate and will keep, firm and unchanged, for years. It is packed in light wooden or card-board boxes and may be shipped in cases containing several hundred pounds each.

USES OF THE SPENT SIRUP.

During the process of impregnating the fruit with sugar the sirup in which it is immersed is gradually deteriorated by losing its sugar and absorbing the juices of the fruit. It is finally utilized in the preparation of "confiture d'Apt," which is made of the soft overcooked and irregular pieces of fruits of all kinds mixed in irregular proportion and preserved in the spent sirup, which is boiled down to the required consistency. This branch of manufacture, like many others, gives opportunities for sharp practice, particularly in the use of glucose in place of pure sugar, and of certain chemicals, notably salicylic acid, which there is reason to believe is employed to some extent by certain confectioners to shorten and thereby cheapen the process of preservation.

Salicine, the basis of this acid, is a flaky substance derived from the bark of certain species of willow. It is used in medicine as a febrifuge, two grains per day being regarded a safe allowance for adults. Salicylic acid is made by the action of sulphuric acid, bichromate of potash, and water upon salicine. In just what degree salicylic acid is deleterious to health I am not informed, but it is the opinion of good judges that its use in the preservation of fruits and wines should be prohibited by law. It is a powerful antiseptic, and is for this reason used in the mixing of wines and, as already indicated, in the fruit-crystallizing process, to arrest and prevent the acetous fermentation of the juice, which would otherwise spoil fruits which have been imperfectly prepared.

As has been shown above, the process of eliminating the natural juices of fruit and replacing them with sugar by immersion in sirup requires about six weeks. By the use of salicylic acid, which penetrates the pulp and exerts upon the juices an antiseptic influence which prevents fermentation, this process can be reduced to a few days only. Time, labor, and sugar are thereby saved, but naturally at the expense of quality in the finished product.

COST AND MARKET VALUES.

The net cost of preserving fruit by this process varies, of course, with the price of sugar, labor, interest on investment, etc., and this is moreover a point upon which confectioners are not disposed to be communicative.

But with the facts at our disposal, the question of costs can be closely approximated. Sugar costs here this season, as already stated, 9.65 cents per pound, and fruit in condition for crystallizing on an average

8 cents per pound. The labor of women to pare, stone, and otherwise prepare the fruit costs 50 cents per day; that of men sufficiently skilled in the processes of scalding and preserving to work under the direction of a foreman, commands from 80 cents to $1 per day. In most establishments the proprietor or a member of the firm is the superintendent, who personally directs the work.

Most leading confectioners and caterers of Marseilles manufacture their own crystallized and "glacé" fruits, which they sell at retail from 50 to 75 cents per pound.

The wholesale trade prices of quantities for export are much less, as will be shown by the following exhibit of the average values, as declared for export to the United States and other countries, of the several fruits during the season of 1884, which was a year of abundant fruit harvest, and the present summer and autumn, when all fresh fruits, except cherries and figs, have been more expensive by reason of a short and inferior supply:

Articles.	1884.	1885.
	Cents.	*Cents.*
Apricots ..... per pound..	27½	29
Chinois:		
Green ..... do....	24½	23
Ripe ..... do....	24	25½
Cherries ..... do....	23	23
Figs (Marseilles) ..... do....	21	20
Pears:		
Red ..... do....	24	25½
White ..... do....	24	24
Plums:		
Green gauge ..... do....	24½	29
Yellow, mirabelles ..... do....	25	26
Pine apples (from West Indies) ..... do....	33	33
Citron ..... do....	13	22
Melons ..... do....	24½	25½
Strawberries ..... do....	29	29
Mixed fruits ..... do....	25½	30

This would give an average of about 24 cents per pound for 1884, and 26 cents for 1885.

Deduct from these values, say, 20 per cent. for manufacturer's profit, and we reach from 19 to 20 cents per pound as the average cost of production.

Add to these values the cost of importation and a duty of 35 per cent. ad valorem, and the crystallized fruits of Provence become a rather expensive sweetmeat to American consumers.

THE INDUSTRY IN THE UNITED STATES.

But there would seem to be no good reason why this dainty and profitable industry could not be established with immediate and complete success in the United States, where most ordinary fruits grow in profuse abundance and with finer flavor than is developed by the same varieties in any part of Europe. Sugar is equally cheap, and fuel far less expensive in our country than it is here. From the foregoing ac

count it will be seen that the process of crystallizing fruits, as well as the requisite apparatus, are exceedingly plain and simple. But the most profusely furnished kitchen, abundant raw material, and a library of books on cookery will not enable a novice to prepare a well-cooked dinner.

There is so much in the art of crystallizing fruit, which can only be learned by experience, that in order to begin the experiment with certainty of success, American pioneers in this manufacture should employ competent French workmen to superintend the construction of their plant, instruct the operatives, and superintend the whole process of preserving and packing during the infancy of the business.

The extent to which the crystallized fruits of this country are imported by the United States would seem to indicate that here is an opportunity for a new and profitable enterprise.

FRANK H. MASON,
Consul.

UNITED STATES CONSULATE,
Marseilles, October 31, 1885.

COGNAC.

REPORT BY CONSUL IRISH.

I have extended my inquiries as far as practicable for this portion of France, and am enabled to state that the actual processes of crystallizing fruits have been generally abandoned throughout the country, on account of the expense attending thereon and the general scarcity and usually high price of fruit.

However, there are, in all the towns of this region such as Cognac, Angoulême, Saintes, Rochefort, La Rochelle, and Limoges, persons who are familiar with the business, who deal in the crystallized fruit, and who have formerly engaged in its manufacture. The testimony on the subject is to the effect that the process of crystallization is now largely and almost entirely confined to a few points, namely: Clermont-Ferrand, in the department of Puy-de-Dome, in the consular district of St. Etienne, and Carcassonne, department of Aude, in the extreme south of France, and in the bounds of the Cette agency of Marseilles.

A reasonable amount of manufacturing is done at Paris, and also at Bar-le-Duc, department of Meuse, where the production is chiefly confined to the preserving of currants, gooseberries, and such like fruit.

Clermont-Ferrand is the most important place for this industry in France, and as fruit is usually abundant and cheap in that locality, they are enabled to furnish the dealers throughout all this region to much better advantage than the dealers themselves can manufacture it.

As a consequence of the confinement of the work to localities beyond my bounds it will be seen that I have not the data for its cost and extent of production.

Neither are the manufacturers usually disposed to furnish detailed information concerning their business, and many obstacles lie in the way of an investigation.

I am enabled, however, to furnish a tolerably clear statement of the various processes of the work, which, as a whole, is quite uniformly practical whenever the labor is performed.

WHITENING FRUITS.

Much precaution is necessary to be taken to well preserve the fruit, whether it be dry or watery, in order to obtain good results.

Success depends largely upon the first act of bleaching. The bleaching, or whitening, of the fruit must be regulated according to the quality and maturity of it; the water must not boil, must simmer only.

It is well to choose each kind of fruit a few days before being ripe; it should be hard or firm and gathered in dry weather in the morning, and whitened as much as possible the same day, for if too ripe it will fall in marmalade; if not enough it can not be properly preserved, the pores will become closed, and the sugar can not penetrate. The fruit will become hard, acid, black, and moldy. It is necessary to place the fruit in a considerable quantity of water to whiten it, that the water cover it at least 8 inches, in order that there be no necessity to increase the quantity during the process. In such a case added water should be of the same temperature. Cover the fruit with an osier screen or linen cloth, and put about 4 inches from the bottom of the vessel a copper colander, to prevent injury from the fire. Stir the fruit from time to time lightly, with a skimmer, to aid the riper portion to rise. Usually the fruit is whitened with the naked fire, but it is much easier to do it with steam, because in that case it is not exposed to the danger of scorching, and the degree of heat for the various kinds of fruit is easier regulated.

M. Rangot, confectioner, 4 Rue de la Verrerie, Paris, has invented an apparatus, called a *confisoire*, very convenient for preserving fruit. The use of this is to avoid the necessity of decanting, and 25 gallons or more can be preserved at a time in sixty hours, and watery fruit in 72 hours.

Each kind of fruit is whitened in a different manner. Stone fruit is placed in cold water over a slow fire, and removed with a skimmer as soon as it rises to the top of the water. The condition of the cooking is ascertained by the use of a pin, which must easily penetrate, or by softly pressing with the fingers; when it is found to be sufficiently soft it is taken out and put in cold water. If there is a great quantity of fruit to be whitened, the same water may be used again, especially for plums and green fruit.

Plums that are whitened in the first water, not being so nice and transparent as those whitened in the second, the poorest and ripest and ill turned may be whitened first to acidulate the water. Some confectioners employ lemon juice, virjuice, pyroligneous acid, alum, marine salt, epsom salt, etc., to preserve the whiteness of the fruit, and blue

vitriol, vinegar, or salt, to turn it green. It is dangerous, however, to use the blue vitriol; too great a quantity causing the water to turn bluish, the fruit will then become black. If used, put not more than 3 grains to a quart of water, and when the fruit is whitened, put it in water for twenty-four hours, changing four or five times.

To be assured the water or fruit does not contain any part of the vitriol, plunge a well polished bar of iron into the water; if it is not covered with a copper tint there is no danger.

When plums or other fruit are to be whitened, if the water is to be used again, let it cool before using until it becomes lukewarm, and leave the fruit in it awhile before heating; this is why the use of steam is so helpful.

Fruit with a tough skin requires longer to whiten, and time, according to its quality; hence the following notices of the time required to preserve each kind of fruit.

SUGARING FRUIT.

After the whitening process is completed, great care is still required to properly preserve them in sugar. If the fruit is too firm or hard, or not ripe enough, on being removed from the whitening process it must be put in sugar reduced to a sirup of 23°; the water contained in the fruit will be eliminated and the sirup reduced to 20°; it will be necessary the next day, for the first operation, to increase it to 25°. Cover the fruit and boil it, pour it out gently into an earthen dish, and place it in the cellar in a cool and dry spot to avoid fermenting. Continue cooking it from day to day, making it one or two degrees thicker. Covered when boiling.

Ordinarily this process is repeated from five to eight times, thickening to 36°, or more, according to the maturity of the fruit. If the fruit is soft or too ripe it will be necessary to cook the sugar more to harden it and preserve it from falling into marmalade. Reduce the sugar to 28° for the first shape or condition, increasing 2° each day for each shape. It is sometimes necessary to give two shapes each day, morning and evening. In that case increase the sugar only 1° each time, and only simmer the fruit; afterwards put it in the cellar. If it is desired to preserve the fruit very clear and white, it is necessary to change the sirup in the middle of the shape. In such case it is necessary to thicken the sirup with apple jelly or glucose, to prevent its candying. When the fruit is sufficiently preserved, it is left in a cool and dry place from eight to fifteen days, in order that all the water may escape and it become impregnated with the sugar.

It is necessary that the fruit be well drained at each shape or stage of the process, because if reduced sirup remains at the bottom of the vessel into which the fruit has been poured, and a covered boiling or simmering has been neglected, it will contribute to its fermentation.

A spigot at the base of the vessel for the purpose of draining the

sirup is very useful in the case of apricots, chestnuts, strawberries, raspberries, and all tender fruit. The quantity of sugar necessary to preserve each sort of fruit is not indicated, as the fruit will take only the amount of sirup necessary for it; it is only necessary that it bathes in the sirup.

PREPARING PARTICULAR FRUITS.

I present herewith instructions for preserving a number of the more important kinds of fruit:

Apricots, whole.—Choose the white apricots, from high trees, or grown in a garden, along the wall. They will be recognized in opening by the meat forming species of rays around the stone.

It is necessary to take them some days before their maturity, when they begin to turn yellow, and the stone is easily detached, and they are firm.

Make a little incision at the head with the point of a knife. Hold the fruit in the left hand with the thumb and fore-finger, then pushing the knife at the place of the stem, the stone goes out at the top or head. Proportion the apricots in water slightly alumed, or acidulated with lemon juice. Prick them in the green parts which are not ripe enough, then whiten them on a slow fire, stir them from time to time to aid the ripest to rise to the surface; try them on the skimmer with the fingers or a pin, and put them in fresh water as soon as whitened. When they have become cooled, after having changed the water several times, put them in sugar warmed to 20°, and make them simmer or slightly boil, if they are not too ripe. The next day put them in sugar at 22°, boil them, covered, if the fruit is firm, or simmer them if it is tender; continue thus each day for five or six days or processes, increasing 2° each time until 36°, then let them remain for fifteen days, as heretofore indicated.

When the fruits are a little large, turn them with a thin and suitable knife that the sides may correspond; with a toothed knife the sides are better and neater. Cherries, oranges, nuts, pears, etc., are turned in the same manner.

Stuffed apricots.—Take whole, preserved apricots, and introduce in each plum or other small preserved fruit separated from the stone, which replace by lemon or lime.

They are equally stuffed with the marmalade of apricots, pine-apples, strawberries, apple-jelly, currants, cherries, raspberries, etc., and a peeled almond is put in the middle.

Apricots in quarters.—Choose apricots already yellow, without being ripe, firm, and with the stone easily detached. Peel them, or turn them, and prick them lightly with a pin, and immediately throw them in fresh fountain water lightly alumed. Whiten them and put them in the sirup like the whole ones. When they are preserved, drain them, put them in a stewing dish with sirup at 20°, and add the juice of a fine orange. The apricots are iced and candied, drained, and placed with preserved fruits in boxes. Increase the sirup at each process, so that the fruit is bathed in it.

Pine-apples.—Choose the pine-apples before they are entirely ripe, remove with care the first pellicle, leaving half of the middle of the crown, prick them with a large needle to the heart in several places. Whiten and preserve them like the apricot.

Cherries.—Take fine cherries with considerable acidity, take off the stems, push out the stones with a quill, and place them reversed side by side on a strainer. Afterwards put them in an earthen dish in layers, with equal parts of powdered sugar, until the next day. It is necessary to decant them several times to dissolve the sugar. Heat them slowly and proceed as with sirup.

Quinces in quarters.—Choose quinces of a fine yellow, and well ripe and sound. Take off the down with a linen cloth, prick them to the heart with a large needle, put them in a proportional quantity of alumed water, place them afterwards over a quick

fire, boil for time, and when tender throw them into fresh fountain or river water in preference to well water (as such contains less calcareous salt and is softer.) Fountain water is preferable for preserving all fruit, especially white fruit. Peel them and take out the cores, cutting them in equal quarters; put them again in alumed water, and continue whitening them until the head of a pin passes easily through the quarters and the hole closes up again. Quinces are also whitened in the following manner: The fruit is just peeled, and a lemon rubbed over each slice to prevent its becoming red; then put in alumed or acidulated water, then they are whitened.

The former process is preferable. They are preserved like apricots, having care to cover them with a white linen cloth at the surface of the water, and to cover each vessel into which they are poured with linen or white paper, to hinder the fruit from reddening. It is necessary to take these precautions for all white fruit. When it happens that water reddens in whitening them, it is necessary to change the alumed or acidulated water.

Lemons.—Choose fine lemons well united, turn them, make a hole with a punch at the right of the stem, put them successively in fresh water. Whiten them, empty them like oranges, preserve them, and ice them the same.

Quarters of lemons.—Take fine lemons, well ripened, united, and without spots; separate the largest part of the white, after having cut them in equal quarters. Whiten these skins like citrons, and preserve them and ice them the same.

Citrons.—Choose fine citrons uniformly ripened. Test them with a piece of glass to raise only the surface of the rind. Make a hole with a punch a little larger than for lemons. Whiten them with much water. When they are half whitened, empty them with a coffee spoon, put them in fresh water, and finish them and whiten them like lemons, and preserve them the same. Citrons in quarters are emptied only when they are whitened. Leave them forty-eight hours in fresh water, changing it two or three times a day to remove the bitterness of the rind.

Raspberries.—Choose fine red raspberries, not too ripe, that you examine carefully. Put them in an earthen dish; about 9 pounds in each: cook with an equal part of sugar *au soufflé;* empty, decanting four or five times during an hour, into a similar dish; put them on a slow fire, bringing them to a boil again; put in the cellar until the next day, draining slowly so as not to crush them; and cook in sugar at 28°, covered while boiling. The next day cook them at 30°, the third day at 32°, afterwards drain them so as to dry and candy them. I need not specify their numerous uses.

Strawberries.—Choose them firm, without being quite ripe, and preserve them the same as raspberries and cherries.

Oranges.—Choose very fine oranges, very firm, and with a thick skin. Turn them, making all sorts of designs, and put them in fresh water. Whiten them, and empty like lemons and citrons. They are preserved and iced the same.

Oranges in quarters.—Choose similar oranges. Mark four separations in the orange without detaching the quarters. Whiten as heretofore shown, and when they are well preserved divide the quarters for the various uses. The skins and peels are preserved and iced the same, and are used to perfume sweetmeats, etc.

Plums.—Choose fine fresh plums, not too ripe, but commencing to turn yellow. The plums of Metz are superior to all others in France for preserves. They are very transparent, and once preserved have a very delicious taste. Prick them to the stone with five or six pins fastened in a cork. Put them in a proportional quantity of fresh water lightly alumed. Let me here refer to a former statement about using water more than once in whitening plums. Care must be taken to put the fruit only in lukewarm water to commence to whiten it, and to leave it in some minutes before increasing the heat. The plums are whitened and preserved the same as apricots.

Pears.—Choose fine pears, like the butter pears of England or Rheims or Bergamots, and when not too ripe, when the pips are black, and when in paring them they are white under the skin. Put them, with a good deal of water, on a quick fire, or with

steam, until they are softened, then remove them and put them in fresh, cold water. Pare them as lightly and promptly as possible, prick them from the head to the core, cut and scrape the end of the stem, and throw them into a quantity of fresh water, alumed and acidulated. Put them again on the fire, cooking them until the head of a pin enters easily, and the hole closes on withdrawing it; then put them again into fresh water, lightly alumned or sharpened with lemon juice. Preserve them with the same precautions as quinces and apricots. As the pears are easily candied, the sugar must be thickened with apple jelly or glucose.

Peaches.—Choose fine peaches, before their maturity, and quite firm; whiten them and preserve them whole, or in quarters, like apricots, being careful not to boil them, for it is a very tender fruit and liable to fall into marmalade.

Green gages.—Take green gages of a good size without being ripe or colored, of a fine green rind, firm, the stone being detached easily. Cut the end of the stems, and prick them in divers places, notably near the stem, with a little bodkin. Put them in a basin full of water on the fire, or with steam, so that they may have ample room. As soon as they become yellow, remove them from the fire, and throw in a pinch of salt, vinegar, and spinach, or verjuice. Blue vitriol is also employed, but in small quantity; to make them green again let them remain quiet for some hours, then put them on a slow fire without boiling, stirring them from time to time until they again become green; then increase the heat, and as they rise to the top of the water, remove them and put them in fresh water, removing it several times until they become thoroughly cool. They are preserved with sugar like other plums.

Chestnuts.—Which grow very large in this country and are much sought for as an article of food. Take the fine chestnuts of Lyons or Lucques, rend off the outside with a point of a knife, being careful not to touch the meats, and put them in a proportional quantity of fresh water. When they are all prepared, put them on a quick fire, or with steam, with a large quantity of water. Boil them until the skin can be removed and they become tender, of which assure yourself with a pin, then remove them from the fire, and change the warm water, diluting the second water with a little flour to preserve the whiteness of the chestnuts. Peel them as promptly as possible to prevent them becoming too tender, and also not to break them, for this fruit is one of the most difficult to preserve, and all possible precautions must be taken. Put them in a proportional quantity of hot sugar reduced to 20°; keep them warm over a slow fire, covering each dish with linen or white paper. The dishes must be provided with faucets to drain them more easily. Proceed to preserve them with the same care as with apricots; they may be iced with vanilla. Some confectioners do not give them the *shape* or *fashion* for fear of spoiling them, for they separate easily at the least contact with too strong heat. They keep them continually warm in a drying stove or slow oven. With steam or a hot water bath, they decant them from time to time; or stir them, the sirup can be reduced to 32°. This means is very difficult and only a small quantity can be made at a time.

ICED FRUITS.

The preserved fruits are iced to dry them. They are drained, then passed through lukewarm water to wash them, then put an hour or two in a drying stove in an earthen dish. Sugar cooked to the grade *au petit soufflé* is put with them, and they are made to take a covered boiling, are skimmed, the basin taken from the fire, and placed on a table in an inclining position, where the sugar is massed on the border of the basin with a spatula. When the sugar commences to whiten, turn one or several of the fruits in the whitened portion, remove them with a fork, and spread them on a grate or strainer placed over a dish or mold to candy.

When the fruit is small and the sugar commences to grain, mix the whole together, raise the fruit quickly with a skimmer and put it on a strainer. When the fruits are soft it is necessary to cook a little harder and mass the sugar more than for hard or dry fruits and rinds.

This ice is now kept for use, and when wanted a little sugar is added each time. When thick or gelatinous, it is cooked and massed more, or replaced.

CANDIED FRUITS.

Drain the preserved fruits, wash them in lukewarm water, and put them on a strainer on the stove to dry. When they are dry put them side by side, and put them between two strainers made for the purpose, and place them thus in a mold to candy

Take sugar cooked *au petit soufflé* at 36° to 37°, and pour it slowly over the fruits from above. and then place the mold in a drying stove, heat to 40°, drain when sufficiently candied, ordinarily at the end of five or six hours.

Fruits that are dry and firm are also candied cold, the candy is finer and less subject to mass, in that case the sugar is cooked 1° or 2° less, is put to candy at night and drained the next morning.

SUGARS.

I now, perhaps, have sufficiently presented the processes required by my instructions, but it seems important, to make matters clear, that something be said concerning the various forms of preparation of sugar that are used in the business.

Only clarified sugar is used, and this is reduced to sirups of various densities. The degree of density is ascertained by a *pèse sirup*, an aerometer invented by Beaumé.

The first condition of cooking which I shall mention is called *La nappé*, and the sugar weighs 20°. When, in dipping the skimmer into boiling sugar, after a turn of the hand the sirup spreads along the skimmer, it has reached this stage.

Petit lissé.—The sugar weighs 25°. Some boilings after *la nappé*, pass the forefinger on the skimmer charged with sirup, and apply it against the thumb. If in spreading these two fingers you see a little thread which breaks immediately, leaving a drop on the finger, you have *petit lissé.*

Grand lissé.—The sugar weighs 30°. When the thread has more consistency, and spreads more, you have *grand lissé.*

Petit perlé.—The sugar weighs 33°.

Grand perlé.—The sugar weighs 34° and 35°. If at last in speading the two fingers the thread sustains itself without breaking, you have the *grand perlé.* The attentive workman will distinguish these two cookings by the aspect of the liquid. It produces large, high, round bubbles going out from the boiling in the form of pearls.

Petit soufflé—The sugar weighs 37°. It will be recognized when, in blowing through the holes of the skimmer after it has been shaken, the liquid forms little bubbles on the side opposite, which lightly detach. This is the *petit soufflé* employed in icing fruit.

Grand soufflé.—The sugar weighs 38°. After some boilings operate as in *petit soufflé.* If the bubbles are larger, resembling soap-bubbles and maintaining themselves a moment, it is the *grand soufflé.* Or dip your finger in fresh water, plunge it in the

sugar and dip it again in the water, if there remains a little compact sugar at the end of your finger you have the same thing.

The same means are employed for the cooking of *gros candi*.

Petit boulé.—The sugar weighs 39°. Dip your finger in fresh water, then in the boiling sugar, and then again in the water. If it forms a soft ball which one can turn in the fingers you have the cooking for bon bons with liquors.

Grand boulé—The sugar weighs 40°. After some boilings more renew the preceding operation. If the ball is larger and harder you have the cooking for preserves which are not clear.

Petit cassé.—After some boilings operate as before. If in cooling the sugar it breaks; if it attaches to the teeth, it is a *petit cassé*.

After the *grand boulé*, the degree of the sugar is no more observed. It is then the cooking of the twisted sugars, or *sucrestors*.

Grand cassé.—When after being further cooked the sugar produces a little simmering in water and adheres no longer to the teeth, it is a *grand cassé*. This is the cooking of barley sugar, caramels, burnt almonds, etc. An experienced workman will readily recognize it by the crackling which the sugar makes in the fingers.

J. E. IRISH,
Consul.

UNITED STATES CONSULATE,
Cognac, November 25, 1885.

RHEIMS.

REPORT BY CONSUL FRISBIE.

While crystallized fruits (*fruits glacés*) are kept on sale by all first-class grocers and confectioners, and quite extensively used by the people, they are not manufactured to any extent in this district, for the principal reason that the fruit grown here is not of sufficient variety, quality, and quantity for the purpose, and by reason of its scarcity it usually commands too high a price to make the business profitable. I have found that the industry of manufacturing crystallized fruits, and other preserving methods, is carried on in Southern France, the great center of the industry being at Clermont-Ferrand, in the department of Puy-de-Dome, about 100 miles west of Lyons, which is the greatest fruit-producing section of France, and where fruit of many kinds is nearly always plentiful and of the best quality. The dealers in this section usually purchase their crystallized and other preserved fruits from the wholesale houses of Paris, who receive it in large quantities from the section named, and in some considerable quantities from Nice, where it is also quite largely manufactured. It is said that this fruit is not so finely and nicely made at any other place in France as at Clermont-Ferrand and at Nice. There is at Rheims, however, an occasional confectioner of the first class, who finds himself in a position to advantageously manufacture his own fruits, but this is always done on a small scale and only for the needs of his local customers and never for wholesale nor for export, and which my information teaches me they manu-

facture according to the following methods, and which are said to be substantially the same as that employed in the large establishments in the south of France:

CRYSTALLIZED FRUITS.

Begin the operation by dipping the fruit into hot, melted sugar for a moment; let it drain and dry. Then wash it lightly in lukewarm water, after which put it in earthenware pans or dishes and place it in a warm (not hot) oven for a couple of hours. Cook some sugar over a slow fire in a copper dish at 105° of heat; put the fruit in the boiling sugar for a few seconds; skim; remove the dish from the fire and place it on a table in an inclined position and collect the sugar on the side with a spatula. When the sugar begins to whiten roll the fruit in it, one or two at a time; remove it with a fork and place it on galvanized or tinned-wire sieves or grates, over earthenware dishes or candy molds. When the fruit is small, as soon as the sugar begins to granulate mix the whole, fruit and sugar, rapidly together and remove quickly with a coarse skimmer, placing the fruit on a wire sieve as above described. If the fruit is soft cook it a little more, and stir the sugar longer with the spatula than if it be hard, dry, or of the rinds.

Keep the glazing (sugar) for future use, and, if necessary, renew it by adding more sugar. Should the sugar become pasty, cook and stir it longer, or, better still, replace it with fresh glazing.

CANDIED FRUITS.

First dip the fruit in hot melted sugar for a moment, let it drain and dry, after which wash it lightly in lukewarm water; then place it on a sieve to dry in a warm (not hot) oven. When it is dry cook some sugar over a slow fire to 95° or 100° of heat. Place the fruit side by side between two galvanized-wire sieves or grates in a candy mold; pour the sugar carefully over the fruit and then place the molds in an oven heated to 105°. When the fruit is sufficiently candied, which is usually accomplished in five or six hours, remove and let the fruit drain and dry.

Fruit that is hard or dry may be candied by the cold method, the candy being finer and less liable to granulate. Cook the glazing to between 95° and 100° of heat. Place the fruit in the glazing in the evening and remove it the following morning, when it is allowed to drip and dry.

CARAMELED FRUIT.

Begin by preparing each kind of fruit, according to its nature, to be dipped into the caramel, a substance obtained as follows: Cook about 2 pounds of clarified sugar, which is preferable to melted sugar, to which add a spoonful of glucose to prevent its granulating, and cook it until it becomes hard and brittle when placed in cold water. Place

an earthen or copper dish in an inclined position over a slow fire or over hot coals lightly covered with cinders or ashes so that the sugar does not get cool. Dip the fruit in the sugar and then place it on a sieve or hang it on strings over an oiled marble slab; for small fruit, on wire sieves or grates made for the purpose, and for large fruit, such as oranges, chestnuts, etc., simply place them on the marble.

If the fruit has been prepared on strings, cut the strings and place the carameled fruit on sieves and put it away in a dry place. If the fruit has been done on skewers, especially oranges, remove the skewers before the caramel is completely cold, as otherwise the caramel gets broken and the juice of the fruit escapes. When removed in proper time the hole made in the fruit by the skewer is easily closed up by the warm caramel.

Fruit should only be carameled a few minutes before serving, so as to be nice, fine, and fresh. Carameled fruit can be either served up in fancy structures and forms or separately. When carameling fruit two or more persons should always be engaged in the operation, as the caramel should be kept hot and never allowed to cool, as if it is reheated it will granulate and redden. To caramel fruit wooden skewers, string, or galvanized or tinned wire may be used.

In carameling cherries there are three things to be considered, viz: If fresh they must be very fresh and sound, and have the stems cut short, that is, about half length; (2) if the cherries have been preserved they must be dried before the operation; (3) if brandy cherries are used they must be allowed to drip and be left a few minutes in a warm oven. They are either tied together or fastened on skewers, then dipped and hung up to dry.

Chestnuts.—Roast the chestnuts slowly so as not to scorch them; remove the shell and inner husk. Put them on skewers and dip them in the caramel. In removing them give them a twirl, so as to spread the caramel evenly over them and lay them on a slightly oiled marble slab.

Oranges.—Choose the finest and firmest fruit, remove the peel, divide into quarters, remove all the white with a knife, taking care not to cut the skin, as the juice would come out and dissolve the caramel. Put them on skewers on a sieve and place them in a warm (not hot) oven, to be slightly dried before dipping. Finish as with chestnuts. Oranges should be skewered through the center so as to prevent the juice from running when the skewer is withdrawn.

Preserved fruits.—All kinds of preserved fruits, such as apricots, small oranges, plums, nuts, pears, dates, prunes, etc., can be carameled by following the foregoing instructions. Only care should be taken that the fruit be first washed in luke-warm water to remove the sirup and then dried in a warm oven.

Grapes.—Fresh or dry Malaga grapes are frequently used and grapes of the country in their season. Several grapes are fastened on galvanized wire, and the bunches thus formed are fastened to a wooden skewer;

they are then dipped into the caramel and then placed on small wire sieves, of which the meshes are made of proper size to hold the grapes, and placed as usual above a marble slab.

Small fruits, such as currants, raspberries, strawberries, almonds, filberts, hazelnuts, etc., can be carameled, but care should be taken that the fruit be separated when removed from the sugar.

JOHN L. FRISBIE,
Consul.

UNITED STATES CONSULATE,
Rheims, November 11, 1885.

BORDEAUX.

REPORT BY CONSUL ROOSEVELT.

Having carefully examined the methods employed in crystallizing fruits, I am enabled to report as follows:

All fruits indigenous to France, and a few select fruits from other countries, as also several species of soft shell-nuts are employed.

The kettles used are generally of copper (much broader than deep, to prevent crushing the fruit), provided with a wire frame placed 1 or 2 inches from the bottom to protect the fruit from scorching. When ready for use they are three-fourths filled with water, which is heated to boiling point (95° centigrade) and covered by a towel or straw cover.

The fruit should be gathered several days before maturity; and, if possible, early in the morning of a dry day. The first important step is the bleaching, or, more properly speaking, the parboiling of such fruits as are to be subjected to this preliminary process. The fruit should be picked and bleached the same day to obtain best results. The pits are carefully removed and the fruit plunged into very cold water before being transferred to the kettle. During the process of boiling, the fruit is occasionally gently stirred, so that each separate piece may be equally cooked. When the fruit begins to settle at the bottom of the kettle the fire is reduced for ten minutes, then gradually increased until the fruit again rises to the surface and becomes sufficiently tender to be punctured with a straw. They are then carefully removed from the kettle with a skimmer and dropped into very cold water, which is renewed several times, or until they are thoroughly cold; they are then placed upon wire frames to dry. The boiling should be accomplished quickly so as to submit the fruit to as rapid and sudden change of temperature as possible. The boiling is generally done over an open fire, but the most satisfactory results are obtained when steam is employed, as it is an easier matter to regulate the heat from steam necessary to the different kind of fruits.

Great care must be taken in the first boiling, since the fruit, if overdone, falls to pieces, and if underdone the pores are compressed, prevent-

ing a thorough permeation of the sugar, and in consequence the fruit becomes tough, dark in color, and soon grows moldy. When the same water is used a second time for the purpose of boiling, it is thoroughly cooled before receiving the fresh fruit; it is then slowly heated, the temperature being maintained at a low point for a considerable time.

When the fruits are not sufficiently soft after the first boiling, they are put into a hot sirup (invariably made of cane sugar) of 25° of density, the water remaining in the fruit is absorbed by the sirup and is gradually reduced. After the preliminary boiling in water the fruit is submitted to the sirup daily for five or ten days, or until the sugar has thoroughly penetrated the pores. After each boiling the fruit is carefully removed from the sirup and put into a cool place to dry. The sirup for the first boiling is always 25° of density, and is increased 2° each day until it reaches 36°, excepting in cases where it is necessary to submit the fruit to the sirup twice in the same day, then it is only increased 1° and is not allowed to boil, but only to scald the fruit.

Fruits are crystallized with and without rind, whole, in halves, and in quarters. Pears, apples, quinces, and oranges are generally crystallized peeled. To retain the delicate coloring in such fruit as the apricot, pear, peach, and chestnut, it is necessary to add to every hectoliter of cold water 40 or 50 grams of pulverized alum.

Some confectioners employ lemon juice, verjuice, salt, sugar of milk, and epsom salts, to preserve the whiteness of the fruit after boiling and sulphate of copper, vinegar or salt, to retain the green color natural to certain fruits.

When the crystallized fruit is destined for warm countries it receives additional cooking. The fruit when crystallized is packed in boxes containing from a quarter of a pound to two pounds each.

There are several establishments in Bordeaux devoted to the crystallization of fruits. The most important of which is that of Alexander Droz & Co., to whom I am under obligations for much valuable information. Their average annual sale of crystallized fruits is 160,000 pounds, the half of which is consumed in France. Their annual exportation of cherries alone to England and Russia is 24,000 pounds.

It is estimated that very nearly 700,000 pounds of fruit is crystallized at Bordeaux annually. The average cost per pound (not including the price of the fruit) to the producer is 15 cents, or $15 per cwt. The fruits in greatest demand on this market are apricots, cherries, and chestnuts. The separate preparation of each I give in full below.

APRICOTS.

The apricots should be picked several days before maturity. An incision is made by a knife at the head, and the pit gently forced out, the unripe parts are lightly pricked, and the fruit is then plunged into very cold water containing a little alum or lemon juice. The water is changed frequently before the fruit is transferred to hot sirup of 20° of

density, preparatory to boiling. After boiling, the fruit is taken from the sirup and removed to a cool place until the next day. This process is followed for five or six days, each day increasing the density of the sirup 2° until it reaches 36°. The fruit is only permitted to boil after the first cooking if it continues too firm; if soft, it only simmers. The kettle containing the fruit is removed from the fire, and as the sirup begins to whiten the fruit is carefully turned in the whitish parts and then removed from the kettle and placed on a wire frame to dry.

CHERRIES.

Large cherries should be chosen. After the stems are removed the pits are taken out, the cherries are placed on a dish side by side, with the open side up, and covered with powdered sugar; layer after layer is thus formed until the dish is filled; it is then set aside until the next day. They are frequently stirred, and finally are slowly cooked and crystallized.

CHESTNUTS.

The large chestnuts of Lyons, France, or Lucques, Italy, are preferred. The outer shell is removed, care being taken not to bruise or break the nut. They are immediately put into cold water, from which they are transferred to a large kettle of boiling water, where they remain until they become tender; they are then taken from the boiling water, freed from the skin surrounding them, which is a delicate operation and should be accomplished as quickly as possible, as the nut is liable to crumble, and in consequence is difficult to crystallize. Once peeled they are put into sirup of 20° of density, and are kept hot over a slow fire. The kettle is covered with a towel or piece of white paper until the sirup begins to whiten. The kettle is then removed and the same process followed as employed in crystallizing apricots.

GEO. W. ROOSEVELT,
Consul.

UNITED STATES CONSULATE,
Bordeaux, November 19, 1885.

NICE.

REPORT BY CONSUL HATHEWAY, OF NICE.

The art of fruit crystallization, as employed in France, is, in theory, a process by which certain fruits are preserved by withdrawing their juices which lead to fermentation and substituting a thorough saturation of sugar.

The successful practice of the art depends largely on the judgment and experienced skill of the confectioner, for many conditions, independent of any formula, may operate in favor of or adversely to the desired results.

The nature of the soil from which the fruits have been produced must first be carefully considered. Confectioners here prefer, therefore, to select their fruits among those grown on a dry soil, as such are more palatable, damp land producing those too soft, or of an insufficient firmness of fiber to support the fabrication.

The process also is modified by the variety of fruit used, and its degree of hardness or ripeness; and the exact adaptation of the sirup thereto is also a requisite to complete success. For instance, pine-apple demands a density of sirup of only 18°, while other fruits of less consistence require according to their kind a sirup up to a maximum of 42°.

Again, some fruit must receive a special preparation. Thus cedars, mandarin, and bitter oranges should be soaked first in a bath of sea-water, often changed, which gives them consistency and removes a disagreeable flavor which renders them otherwise unfit for use.

All fruits produced here, apples excepted, can be crystallized, but the more "fat" the fruit the less easily the sirup penetrates into its pulp; thus oranges admit the process easily, but plums much less readily.

The oranges used for this purpose are gathered at times commencing when the fruit is hardly formed, and has simply the firmness and taste of fruit, and continuing until when nearly ripe and of full size it begins to be somewhat colored.

PROCESS OF CRYSTALLIZING FRUITS.

The fruit is plunged into very hot water for a short period, or until it is white or has become bleached.

It is then completely drained of water and placed in a sirup of white sugar which has been cooked until a small quantity separated between the thumb and forefinger forms slight filaments, and it is adapted in strength to the hardness, softness, and degree of ripeness of the fruit employed.

In this sirup the fruit remains until the mixture of juice and sirup shows a white clouded appearance, indicating the beginning of fermentation. The whole is then again subjected to heat and raised to the boiling point and then removed.

Such alternate fermentation and boiling is usually three times undergone, the fruit and sirup remaining together from two to five weeks, according to the kind and quality of the same.

Red copper boilers, with iron handles at the sides, and containing about 25 pounds, are used in the process.

BEAUMÉ AEROMETER.

The aerometer employed to show the amount of sugar which the water contains is about 8 inches in length, formed in ordinary glass, and in weight the same as the volume of water which, when used, it displaces.

One end of this is heavy, that it may stand upright in the liquid, the center has a chamber of rarified air, and the other extremity is a slender tube, on which is marked a graduated scale from the top toward the center of its length, and numbering 50°. The rising of this tube above the liquid shows the density of the sirup.

One of the confections made from this preliminary process is styled "crystallize;" the other "glace."

To crystallize the fruit thus prepared (as in the foregoing description) it is taken from the sirup and dried in a room at a heat of 100° F., when the sugar appears in small crystals on its surface. "Glace" is prepared by removing the fruit from the sirup and allowing it to dry gradually. The sugar thus forms a glaze on the fruit, which gives it its name.

PRODUCTION AND COST.

The quantity of fruits thus preserved in this consular district can not be accurately determined, as there are no statistics of these products. The following data per year may, however, be received as nearly correct:

	Pounds.
Nice	90,000
Cannes	30,000
Mentone	15,000
Monaco	10,000
Whole amount	145,000

The expense of labor and sugar employed in the manufacture of them may be estimated as follows: (1) 1½ pounds of sugar to 1 pound of fruit, cost price of sugar, 14 cents; (2) labor, per pound, of production, 5 cents; entire cost of sugar and labor, 19 cents.

One pound of crystallized fruit is sold here at the manufacturers' wholesale sales, at from 28 cents to 50 cents, according to its kind and quality.

I am indebted to the most experienced confectioners of this district for the foregoing information, and especially to the courtesy of M. Voggade, of Nice, and J. Negree, of Cannes.

ALBERT N. HATHEWAY,
Consul.

UNITED STATES CONSULATE,
Nice, December 1, 1885.

Consul Dufais, under date November 9, 1885, sends the following translation of a letter of the mayor of Clermont-Ferrand on the subject of crystallized fruits:

CLERMONT-FERRAND, *November* 7, 1885.

In answer to your letter, 28th last month, I have the honor to transmit to you the following information which Mr. Dionis, confectioner, has been pleased to give me:

"The candying (glaceage) of fruit is an operation learned entirely by practice, and which is difficult to describe.

"When the fruit is well drained boil the sugar briskly, put the drained fruit in it cover up your pan (a large one) after one boiling, then withdraw it from the fire, work your sugar until entirely melted. Take the fruit out with a skimmer, put them on gridirons in a drying stove. The price of candied fruit varies according to quality and kind from 2 to 4 francs per kilogram (about 2¼ pounds)."

THE DATE-PALM IN PERSIA.

REPORT BY MINISTER PRATT.

[Republished from Consular Reports No. 86.]

As a first result of my endeavors to obtain practical information on the subject of the date-palm (*Phœnix dactilifera*), with a view to its introduction into the United States and cultivation along our South Atlantic and Gulf coast and in Lower California, I have succeeded in gathering from Persian sources the following:

The date-palm is found in countries situated within the zone of 16 and 30 degrees north and south latitude. Except, however, in rare instances it will bear no fruit in localities removed 120 or 135 miles from the sea.

There are two methods employed for propagating the date-tree; one by setting the date stone, the other by transplanting the seedling (self-sown).

When it is desired to raise a plant from the stone of the date one perfectly ripe and faultless is selected and both ends are either filed, or scraped off with a knife, until the inner kernel is laid bare. It is then planted in a mixture of gravel, sand, and camel manure. From twelve to forty days usually elapse before it makes its appearance above ground. It will then put forth long, narrow, thin, and tender leaves, somewhat the shape of a saddler's needle. From the fourth to the seventh year it produces nothing except long, rough, reed-like leaves. It is, however, possible that during this period the tree may, from its leaves, which resemble the shoots of the oleander, bring forth other leaves; but owners of palm gardens pluck off these in order to give the tree a graceful appearance. Under no circumstances, however, do they touch the leaves that shoot out from the crown of the tree. If its head is severed from its body the whole tree withers and dies. Each individual plant is either male or female.

When the tree has attained its full stature a flowering branch is cut from the male palm and applied to the half-open flower bowl of the female, thus giving it the fecundating principle without which it can not mature its fruit germs.

In no instance has it been recorded by botanists that one of these trees possessed in itself the different natures of male and female, and for this reason was it that the Arab savants classed the palm as the first of the vegetable kingdom and the last of the animal.

The height of the date-palm varies from three to twelve meters. The tree itself will indicate the time of fruit bearing.

When it has arrived at its maturity it will cease its upward growth and throw out from its head a large mass of long, broad, green, leaves, which protect the neck from the glare and heat of the sun. The young seedlings must be removed from the foot of the parent tree in the month of January, and planted and reared according to the foregoing instructions.

In Persia the palm is grown near the ports on the Persian Gulf; also, in the hot districts of Kerman, Khûrzistan, and in the oasis of Jandak.

E. SPENCER PRATT.

LEGATION OF THE UNITED STATES,
Teheran, July 3, 1887.

CULTIVATION OF THE ALMOND TREE.

REPORT BY CONSUL MATHEWS, OF TANGIER.

[Republished from Consular Reports No. 41½.]

Soils, etc.—The almond is a tree of third magnitude, and is remarkable for the facilty in raising it, for its hardiness in standing continued droughts growing in the poorest soils, in the sands, gravels, and amongst rocks; and finally for the abundance of and high price which its fruit commands. In fact, the almond-tree being the easiest and cheapest to rear and cultivate is the most useful tree to industry, medicine, and the arts.

California abounds in soils which are considered, owing to their locality, lightness, or hilly nature, unprofitable or unfit for any use but pasturing cattle in certain seasons of the year, which, if planted with almonds, would become sources of great wealth and utility. The culture of almonds is in fact the easiest, most economical, and productive. At the sixth year the almond trees commence to yield by far greater product than the expenses incurred in their raising and cultivation, owing to their rustic habit, requiring no care from the time of their planting to the long period which these trees live.

The many varieties of almonds are variously described; they are divided in two groups, the sweet and the bitter almond. The most prominent are the Princess almond, the largest and most superior of all; others, large, soft-shell, and large, sweet almond, very much sought; the common almond, with a small fruit; sweet almond, with a tender shell; Jordan almond, with a tender shell and a large, sweet kernel. These almonds are largely exported. The Sultana almond, or Ibiza of the Balearic Islands, with a small fruit and tender kernel; the Pistachio almond, with smaller fruit than the last mentioned, and a variety of hard-shell and bitter almonds.

Propagation.—The only and usual mode of propagating the almond is from seed. The soil preferred by almonds is a light sandy soil; excessive or even great richness is to be avoided, as in this the trees will produce large and luxuriant branches and foliage, but no fruit. The hardiest almond is the bitter, and is preferable as stock for budding or grafting on a given variety. The next hardiest for stocks is the sweet, hard-shell almond. The land selected should be plowed or worked with hoes immediately after the first rains. In the month of November or December small holes are dug, as if for sowing water-melons, and distance 20 feet each way. Procure the nuts of the last season and those which have not been much exposed to the air. In procuring almonds for seed the best quality of soft-shell almond must be used; then they will grow as standards, requiring no budding nor grafting, producing fine almonds even if some issue the hard-shell variety. Plant an almond in each hole from 1½ to 2 inches deep, but not deeper; sow them with the sharp point upwards, without breaking their shells. They will come up in about thirty-five to forty days. The first year they should be protected against frost and snow with sticks and straw around them, for, hardy as they may be when once established, they would be in some danger while young. They must be kept clear of weeds, and in the spring the surface of the soil should be stirred. On the second year trim off the lower shoots and head down those in exposed positions or intended for dwarfs. The buds that are pushing on the main stem should be rubbed off; branches, where they are wanted, should be encouraged, and the buds, where shoots are not wanted, rubbed off. It is far better to prevent the waste of strength in wood that has to be pruned off; then the almond will require no pruning, but an annual removal of dry branches.

In order to provide and replace with plants those holes where the seed has failed to come up, there should be a number of almonds sown in some selected place near at hand; sow them as you would walnuts, or rather plant them at regular distances 8 inches or a foot apart every way, and 2 inches deep; in the spring they may be transplanted to their definite places, and well watered.

Fertilizing.—The best fertilizers of the almond trees are grass, weeds, leaves, etc., buried around them. Almonds are grafted or budded on plum stocks when it is desired to retard their bloom, but it is considered more certain, in order to avoid the only defect of the almond tree, precocity to plant the trees in sites exposed to the north winds, in cold places, in order to retard flowering as much as possible, and escape the spring frosts.

Maturity.—The almond tree comes into full bearing in the eighth or tenth year, according to soil and climate. The fruit is gathered when quite ripe and allowed to dry before it is cleaned and packed.

Yield.—The annual product of the almond varies according to the age or situation of the plant; a twelve-year-old tree may produce from 8 to 16 pounds of unshelled almonds—the average yield is 12 pounds—

which sell readily at 10 cents per pound in France, Italy, Spain, and even Morocco, the above being the lowest wholesale price; and should the trees stand 20 feet apart, at the rate of a hundred trees to the acre, the yield per acre will be 1,200 pounds, of the value of $120 per acre. If we take into consideration that the culture of almonds in a favorable climate is carried on on lands which are often useless for other crops, and the expenses of cultivation very small, often absolutely nil, it will be seen that it is a most profitable culture.

FELIX A. MATHEWS,
Consul.

UNITED STATES CONSULATE,
Tangier, April 2, 1884.

GRAPE-VINE FERTILIZER.

REPORT BY COMMERCIAL AGENT MALMROS OF ST. ETIENNE.

[Republished from Consular Reports No. 117.]

M. George Ville, the eminent professor of vegetable chemistry at the Paris Museum of Natural History, writes as follows:

During the last five years I have been devoting myself to the study of new formulas of chemical fertilizers. The one employed for the grape-vine, in 1889, at the experimental vineyard of Vincennes, has yielded 20,000 kilograms of raisins per hectare, equal, say, to 180 hectoliters of wine. The receipe is as follows:

	Kilograms.
Superphosphate of lime, at 15 per cent	400
Carbonate of potash, refined, at 90 per cent	200
Sulphate of lime	400
Total	1,000

The manner of employing this fertilizer is very simple. A little cup-shaped cavity is made with the spade around each vine and into this cavity one pours the quantity of fertilizer, which has been ascertained by dividing the 1,000 kilograms by the number of vines on the hectare. A common water-tumbler may serve as a measure by surrounding the tumbler with a thread at the height of the dose required. After the fertilizer has been applied, the hole is filled up with the earth removed in order to make the hole. In case the vineyards are of very great extent, one may proceed in a still simpler manner—one spreads the fertilizer in front and behind the vines and covers it with earth by plowing. This manure ought, as far as practicable, to be applied in autumn, in November and December, or in case this can not be done, in January and February.

The above recipe is applicable to every variety of soil on which vines are grown. I have only experimented on French vines, but am convinced that the above fertilizer will have the same effect on American vines. To the above recipe I may add that it is desirable to trim the vine stocks but little, and to let them remain tall, very tall. This will have a tendency to avoid the attacks of the phylloxera, for it is a fact well demonstrated to-day that vines on trellis-work have been free from such attacks.

The Année Scientifique, indorsing the recipe of Professor Ville, says that, in view of the fact that in the entire south of France short-cut

vine stocks are of immemorial tradition, the recommendation to keep them very tall (*taille à long bois*) constitutes a bold innovation, but feels no hesitation in advising viticulturists to reform their habits in this respect in order to place themselves in the conditions prescribed by the distinguished chemist for the application of his recipe.

I am informed that the above-mentioned large production of the experimental vineyard at Vincennes can not exhaust the soil, as the said fertilizer fully restores to the soil all the ingredients consumed by the production of the crop of raisins. I am also informed that the favorable consequences of keeping the vines tall may be attributed to the circumstance that vines kept in that condition are provided with plenty of leaves, which constitute the respiratory as well as digestive organs of the plant, and that an abundance of leaves are required in order to give vigor and productiveness to the vine; that, on the contrary, a deficiency of leaves causes a decrease of sugar in the raisins and, in course of time, probably, a tenderness or sponginess in the roots.

OSCAR MALMROS,
Commercial Agent.

UNITED STATES COMMERCIAL AGENCY,
St. Etienne, June 4, 1890.

THE CITRON OF COMMERCE.

[Republished from Consular Reports No. 61.]

ITALY.

ROME.

REPORT BY CONSUL-GENERAL ALDEN.

As citron is not grown within the limits of this consular district, I have been able to obtain but a limited amount of information in regard to it.

The citron tree, or shrub, will grow wherever lemon or orange trees grow. It flourishes, however, only in a sandy soil and in the immediate neighborhood of the sea. It is most successful in sheltered situations on the shores of bays. As might therefore be expected it is largely grown on the Ligurian coast, which is sheltered by mountains from the north wind, and also in the Southern Mediterranean provinces of Italy, and in Sicily. The French island of Corsica is probably the most prolific citron-producing district of the Mediterranean Basin. The present Corsican crop is estimated to be nearly 5,510,000 pounds. Great care is needed in the cultivation of citron. The fruit when full grown is large and weighs from 1 to 3 pounds, and will, unless the branches are carefully propped up, either break them or bend them to the ground.

The average crop per acre of citron can hardly be ascertained, as the size of a crop depends upon so many conditions—such as the climate and soil. If we assume that each shrub or tree is planted 3 yards from every other, which by many growers is regarded as the best arrangement, we should have 1,110 shrubs to the hectare. If the average product of each shrub be assumed to be 14 citrons, we should have a total product of 15,400 citrons to the hectare, equivalent to 6,231 citrons to the acre; or, assuming the average weight of the fruit to be 1½ pounds, about 9,346 pounds to the acre.

The cost of production varies so greatly in different localities and at different times that no trustworthy and generally useful answer to the question of cost can be given. In the neighborhood of Genoa, however, it is roughly estimated at about $68 per acre.

More citron is imported into than is exported from Italy. The following table shows the imports and exports of citron for three years:

Year.	Imports.	Exports.
	Pounds.	*Pounds.*
1882	3,896,701	513,019
1883	3,996,791	341,719
1884	2,743,454	262,572

The greater part of the imports of citron comes from France, and nearly all from the island of Corsica.

Citron is chiefly prepared for the market at Leghorn, which is the most important citron port in the Mediterranean. The fruit is first put into a salt pickle, in which it is allowed to lie for three months. This pickling in the case of the Corsican fruit is done to a limited extent by the Corsican citron grower, but as a rule it is done after the Corsican fruit reaches Leghorn. The next process consists in dividing the fruit into halves and quarters, and packing them into sugar sirup. The sirup when first used is weak, but its strength is gradually increased by additions. Four weeks is the ordinary period during which the fruit remains packed in sugar, after which it is ready for the market.

The market price everywhere fluctuates greatly. During the present year the price at Leghorn has varied from $14.47 to $22.19 per 50 kilograms, or 110.20 pounds. To some extent, so it is said, these fluctuations were due to the speculative condition of the market in New York, where the price has varied greatly.

WILLIAM L. ALDEN,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Rome, November 29, 1885.

LEGHORN.

REPORT BY CONSUL SARTORI.

CULTIVATION.

The citrons which are subsequently converted into the candied citron of commerce are grown chiefly in Greece, Calabria, and the islands of Sicily and Corsica. Most of those which come to this port, Leghorn, are from Corsica, where it is claimed the finest qualities are produced. The citron tree is of the same family as the orange and lemon, and is propagated by cuttings, which begin to bear fruit the third year after being planted. It bears one crop of fruit yearly, which matures and is gathered during September and October. The trees are pruned every year, the branches being made to grow as much as possible in the shape of a hollow circle. They are also manured yearly, generally with stable dung. In summer it is essential that they should be kept well watered; otherwise, if there should be a drought, the trees suffer, and the fruit will drop off or will not attain its full size. The citron tree is more susceptible to damage from frost and cold winds than the orange or lemon, hence sheltered situations with a favorable exposure are sought for planting them, and hedges of brushwood disposed so as to protect them from the winds. The fruit resembles a huge lemon, and is often so large and heavy that it must be supported on the tree.

They are shipped to the factories for candying, sometimes in sacks, but usually in large hogsheads filled with brine. On being taken out of these hogsheads or sacks they are placed in tubs containing fresh brine and left for about a month. The brine is then renewed, and the fruit may remain in it until required for use, even for a period of four or five months.

CANDYING CITRON.

When the citrons are to be candied they are taken out of these tubs and boiled in fresh water until sufficiently soft, which is ascertained by testing them with a fork. This usually takes about one and one-quarter hours, and they are then cut into pieces, the seeds carefully removed, and they are immersed in cold water and left for twenty-four hours, and become a green color. After this they are placed in large earthen jars with hot sirup, which should entirely cover them, and remain about three weeks. During this time the proportion of sugar in the sirup is gradually increased. They are then put into boilers, with crystallized sugar dissolved in a little water, and cooked; then allowed to cool for twenty-four hours, and boiled again until they can absorb no more sugar, and then taken out of the boilers and placed on a wire netting to dry. They are now ready for packing and are placed in small wooden boxes containing about 25 pounds each, and these in their turn are packed in cases (half cases they are termed in the trade) which contain ten of them. The proportion of sugar used in the proc-

ess of candying is 80 per cent.—that is, 80 pounds of sugar to 100 pounds of citron—and the kind used is generally Egyptian crystallized sugar, which costs at the factories 11.85 cents per pound. The Government allows a drawback at the above rate—that is, 80 pounds of sugar to 100 pounds of fruit—on such as is subsequently exported. As the duty is 5.7 cents per pound, it being returned makes the cost of the sugar used in candying the fruit afterwards exported 6.15 per pound.

There are nine factories for candying citrons in Leghorn, employing about 300 men and producing annually 4,400,000 pounds. In 1884 the United States took of these 1,921,341 pounds, valued at $214,652.23, and up to the present date in 1885 they have taken 1,819,764 pounds, valued at $261,566.61, a decrease in the quantity and an increase in the valuation. The remainder is sent principally to Holland for distribution through northern Europe and England.

As there are no citrons grown in this consular district, it is difficult to give correct figures as to the cost of producing this fruit. The price paid by the merchants here varies according to the supply, $5\frac{3}{4}$ to $6\frac{1}{4}$ cents per pound being about the average cost of the fruit in brine at the factories.

The article is handled almost entirely by speculators, and the prices of the candied fruit show great variations. While during the early autumn the prices ranged from $16\frac{1}{2}$ to $18\frac{1}{2}$ cents, it can now readily be purchased for 13 cents per pound.

VICTOR A. SARTORI,
Consul.

UNITED STATES CONSULATE,
Leghorn, December 21, 1885.

MESSINA.

REPORT OF CONSUL JONES.

THE CITRON TREE.

Formerly in the Province of Messina the citron (*Citrus medica*) was extensively grown in hedges, as dividing lines between neighbors, but within the last twenty years this tree has been nearly exterminated in this vicinity by the diseases known as *gomma* (bleeding) and *cagna* (foot-rot).

The citron was the first of the citrus family introduced into Europe. In its bearing and general appearance it is the most strongly characterized of the genus. The tree is low, with a full head; it is strong-shooting; its shoots are tender and straggling; its leaf is large, thick, oblong, wingless, and toothed. Changes occur at short intervals in the vitality of the tree. It frequently happens that healthy shoots live but one or two years; hence the necessity of cutting off the vertical shoots to prevent sudden disturbances in the head of the tree that would exhaust

its strength. The diseases of the citron are constitutional, and prematurely destroy its life. The most promising subjects suddenly cease growing and became chlorotic; the branches gradually turn yellow, and are often covered with scabs, from which exudes coagulated sap resembling gum; the sores assume a cankerous appearance, and the tree dies. The citron's dying out to such a great extent in this province was due principally to its propagation by cuttings. It has been found that where the citron was budding on an orange seedling, and more especially on a sour orange, it acquired a stronger constitution and did not grow in such a straggling manner. The citron blooms at all seasons of the year. The flowers are white inside and purplish outside. Black ants destroy many of the blossoms. Once set, the fruit grows rapidly. Citrons often weigh from 6 to 8 pounds. The fruit presents a bumpy appearance; its base is full and flat; its perfume is delicious. It is necessary to prop up the branches of vigorous trees, as unassisted they could not support their heavy fruit. Good culture doubtless would improve the nature of the citron and perfect its development, but it cannot prolong its life, which is very short compared with that of the citrus family generally.*

Citron trees receive the same attention as the orange and lemon trees among which they grow. From March to October these trees are worked five times. Irrigation is found indispensable. During the summer, the dry season, the trees are watered twice a week. The average cost of cultivating an acre in orange or lemon trees is $50 a year. The distance between these trees is from 14 to 20 feet, according to the soil and the location.

SHIPMENT OF CITRONS.

The citrons now exported from Messina are brought from Reggio, in Calabria. They are shipped in brine, and are prepared as follows: The citrons are cut in halves, thrown into casks and salted—100 pounds of salt to the cask. The casks are then filled up with sea-water, and turned on their side. The citrons are left to soak from fifteen to twenty days. The casks are then opened and the citrons weighed—770 pounds of citron are allowed to the cask; sea-water and a little salt are added, and the cask is ready for exportation. A small auger-hole in the bung permits the gas produced by fermentation to escape. The casks are of chestnut. They cost $3 apiece, and contain 105 gallons. It costs $1 a cask to cut and salt the citrons, and $1 a cask to pack them, cooperage included.

PRICES AND EXPORTS.

A citron tree bears from 35 to 50 citrons, which are worth to the grower from 5 to 10 cents apiece. First quality citrons weigh 1 pound and upwards. Last year citrons on the tree sold for $20 the 220 pounds.

* For the above details I am indebted to the comprehensive work of Prof. F. Alfonso "Coltura degli Agrumi."

November 1, 1885, they brought $17 the 220 pounds; December 1, 1885, they fell to $12.50. Salted citrons, November 1, 1885, were quoted at $64 the cask; December 1, 1885, at $59. November and December are the great shipping months; the fruit is then half grown and half ripe.

The custom-house statistics show, for the year ending December 31, 1884, that 455,400 pounds of citron in brine; valued at $16,560, were exported from Messina. No preserved fruit is shipped from this port. England, France, Genoa, and Leghorn are the principal markets for the "citron of commerce."

WALLACE S. JONES,
Consul.

UNITED STATES CONSULATE,
Messina, December 8, 1885.

NAPLES.

REPORT OF CONSUL CAMPHAUSEN.

CULTIVATION.

The cultivation of the citron begins with the sowing of the seed of the bitter orange, being the same seed from the fruit of which marmalade is made.

After four or five years, when the seed has produced plants or small trees, they are transplanted, at the time of blossoming, in regular rows, at a distance of 25 centimeters.

When they have a diameter of 8 centimeters they are grafted with small citron branches. The grafting is indispensable to give long life to the trees and hasten the production of the fruit.

Three years after the grafting the tree is transplanted into a ditch 1.25 meters wide and 1.50 meters deep, at a distance of 4 meters from one another. In planting the trees in the ditch particular care should be taken not to injure any part of the roots.

The leaves are taken from the trees and the branches cut back to the length of 20 centimeters. The ditch is filled with earth to a depth not exceeding 25 centimeters, left sufficiently loose to allow the roots to spread with ease, and prevent smothering the plants. If the plants do not sprout at once the earth on the roots is loosened and moistened.

For fertilizing old horse-manure or other old manure is to be applied. No fresh manure ought to be used, because it would be injurious and have a tendency to kill the plants. Manure should be used only in the winter, between October and March, and be placed at a distance of 10 or 15 centimeters from the roots. Around the tree a deepening in the shape of a basin should be formed, and unless the ground be moist or damp the plants require frequent applications of water during the summer.

In Sorrento the planting is done from March to June, according to the state of the temperature; grafting during the same months. The rest of the cultivation is the same as for the orange and lemon. Hoeing and pruning of useless limbs are done in May. The tree requires great protection against severe cold or very warm winds, as well as against hailstorms. In order to give it as much protection as possible hedges are planted and coverings of straw-matting or something similar provided, having regard to the situation of the tree and the means within reach of the cultivators. The plant is much more tender and delicate than the lemon.

The tree blossoms between March and May and up to the months of September and October, at which time the fruit is ripe. In about two years' time the grafts will begin to bear fruit, and after six years, if the ground and climate suit, the tree will bear from 40 to 50 kilograms of fruit a year, and when in full age up to 2 quintals, and perhaps more.

The greatest part of the expense in the cultivation is caused by covering the tree to protect it against the winds. In milder climates this expense is not incurred, and the only outlay is for manuring and hoeing. These expenses vary according to the price of labor in the different localities. When the ground is of the right kind—that is, loose and moist—the climate mild, there is a great profit made in the culture of the citron.

The exact amount of the profit can not be given, as it varies according to the price obtained for the fruit, which is subject to great fluctuations, ranging from 15 to 100 lire per quintal on the ground. This year, for instance, garden citrons have sold at from 30 to 70 francs or lire a quintal on the ground. Some years when Corsica, where the citron is cultivated to a very large extent, gave large crops, the fruit sold for 15 lire a quintal, while at other times, when the crop was small, 100 lire a quintal was paid.

PACKING AND PRESERVING.

This fruit is packed the same as lemons, wrapped in paper and boxed or barreled.

The fruit is not candied for exportation in this neighborhood, but sent to Leghorn or Genoa, to large factories for this industry.

The information received on the subject of preserving the fruit is as follows:

The citron is cut in two or four pieces; it is then placed on the fire and boiled until the inside can be easily taken out with a spoon then soaked in cold water for 4 or 5 days, and the water changed twice a day, until the citron has lost its bitter taste. To every kilogram of fruit 1 kilogram of sugar and 1 liter of water is added, and placed over a slow fire and left standing for two days.

Then 100 grams of sugar to every kilogram of fruit is added, and the boiling process repeated, left again for two days, and then again repeated

at intervals until the sirup is thick. The fruit is then dried in an oven or before the fire, and can be exported in wooden boxes.

According to another authority, the fresh citron is divided, the pulp taken out, and the rinds are then steeped in brine for several weeks. They are then boiled in sirup until the rinds are quite cooked; they are next dried and boxed, as above described.

Others again, after taking the rind out of the brine, boil it in water for two days, changing the water two or three times per day and beginning each time with cold water; then 1 kilogram of sugar to one-half kilogram of water is taken; put into the quantity of sirup thus made 1 kilogram of the rind as above prepared. Each day for six or seven days bring the fruit now in the sirup to a heat in which you can just bear your hand, adding 50 grams of sugar each time. Let the fruit in this sirup become cold, and, as above, add 50 grams. Make another sirup of 1 kilogram of sugar to one-half kilogram of water; boil for one-half hour; then take the fruit out of the first sirup and put in the last prepared, which should be exceedingly hot, and boil the fruit ten minutes, stirring it at the same time. Thus the last sirup is absorbed by the fruit, and it becomes dry.

The citrons, both fresh and in brine, are exported in immense quantities from Messina, Palermo, and other places to foreign countries, but chiefly to the English markets.

EDWARD CAMPHAUSEN,
Consul.

UNITED STATES CONSULATE,
Naples, December 19, 1885.

SICILY.

REPORT OF CONSUL WOODCOCK OF CATANIA.

In this district, comprising the southeast third of Sicily, the land rises gradually from the sea-shore to the summit of Ætna. The mountain is a little over two miles high, and Sicily is in a semi-tropical climate. The slopes of Ætna, therefore, have every variety of climate from the semi-tropical to the frigid, according to altitude. Citrus groves make beautiful these slopes with their vivid green, from the sea-shore to an altitude of about 1,000 feet. At this higher altitude the cultivation of the orange and lemon is not so profitable, owing to the uncertainty of a crop. Heavy frosts at such an altitude are liable to injure the buds. The fruit, however (called *montegna*), is of the best quality.

The orchards that skirt the sea-shore bear abundantly, and seldom fail in producing a good crop. The fruit (called *marina*), is inferior to the mountain fruit, and both trees and fruit are more subject to disease and pests.

The most desirable locality for a citrus orchard is that most distant from the sea and not of such an altitude as to lie within the frost line.

PROPAGATING THE PLANT.

There are four methods of propagating the citrus plant; by the seed, by cuttings, by grafting, and by budding.

The seeds for planting are taken from the choicest fruit when perfectly ripe, and are planted in the spring in some warm sheltered spot from 4 to 5 inches apart. The soil should be composed of loose earth and well-rotted manure. The young plants should be sparingly but frequently watered. The plants must be transplanted to the orchard after the growth of a year or two.

To propagate by cuttings, young healthy shoots that are straight are selected. They should be about 1 foot in length, and must be planted in the ground to the depth of 4 or 5 inches in a soil similar to that used for the seed. Care should be taken to plant the cutting upright, as it grew upon the tree. When the cutting becomes well rooted, and has had a healthy growth of a year or two, it may be removed for final planting to the orchard.

The grafting and budding methods, which are so commonly practiced, need not be described. Citrus plants in this part of Sicily are propagated almost entirely by the budding method.

For the stock upon which to bud, use is made of the bitter-orange tree. The bitter orange is indigenous to this climate. It is more hardy and less liable to disease than those that bear the choicest fruits. Its natural fruit has no value, but the Sicilians sometimes convert it into a kind of preserves.

For the purpose of propagating the choice fruits, the bitter-orange plant is grown in nurseries from the seed. When the plant is a year old it is transplanted, and when it has attained a growth of about 1 inch in diameter (being three or four years old) it is again transplanted to the orchard.

ORCHARD.

The distance to be maintained between the trees in the orchard depends much upon the location and nature of the soil. When the locality is warm and the soil is naturally rich, mellow, and of easy culture, the distance between the trees must be greater than when the soil is hard and the climate colder, because the trees will grow more luxuriantly and form larger tops. In such a soil, for lemons the plants should be about 24 feet apart, and for oranges about 17 feet. When the soil is naturally hard and poor and the climate colder, the distance between the trees for lemons may be about 20 feet, and for oranges about 13 feet. The judgment of the horticulturist must determine this matter.

When the bitter-orange plants are thus transplanted to the orchard the tops are cut off about 4 feet above the ground. When they become

well rooted and of healthy growth, they are budded from the choicest varieties of orange and lemon. Two buds are generally inserted in the stock opposite each other.

The orchard is thoroughly cultivated, being worked over with the mattock and spade at least five times during the season, commencing in March and ending in October. The ground when the trees are young does not require so thorough a cultivation.

The plants are irrigated whenever they require it. For this purpose the streams that tumble down from Ætna are utilized. Where this is impracticable, water is elevated from wells by steam or mule power.

Some grow vegetables between the trees, but this practice is condemned by the best horticulturists.

As to the time when the trees begin to bear a full crop much depends upon the climate, cultivation, and fertility of the soil. Generally they commence to bear a full crop when fifteen years old.

As to the longevity of the citrus tree, there is here a diversity of opinion. I have been told by some horticulturists that the lemon and orange budded upon a bitter-orange stock will live and continue fruitful from one to two centuries. Doubtless they will live and continue to bear from fifty to one hundred years.

Lemon trees are healthy and vigorous, bear annually on the average about a thousand of the fruit, and oranges about six hundred. There are instances in which trees have borne ten times the number specified.

GATHERING AND BOXING THE FRUIT.

The time for gathering the fruit for export is here in the month of November. For export to so distant a country as America, the best and soundest fruit is generally selected. It is plucked when not fully mature, and is yet of a greenish color.

In gathering the crop great care is taken not to bruise the fruit. It is plucked by hand, and gently deposited in a basket that is lined with cloth. The stem is not removed from the fruit, but is cut off about a quarter of an inch from its base.

Great care is taken in preparing the fruit for market. Each individual fruit is carefully cleaned of all insects, or injurious matter, with a sponge and cold water, and is wiped perfectly dry before boxing. The fruits are carefully assorted. Those that are large, plump, and healthy in appearance, without marks or spots upon the surface, are boxed by themselves, and denominated "first class." Those whose skins bear any blemish or otherwise are not fine in appearance are boxed by themselves and denominated "second class."

The boxes for the fruit are so constructed that they will hold from 250 to 360 of the fruit. Each box is inspected to see that no nail or sliver protrudes to injure the fruit. It is then lined with common silk paper. Each individual lemon is enveloped in the same kind of paper

prior to being deposited in the box. The boxes are frequently opened, inspected, and all infected fruit removed. Especially is this done just prior to shipment.

Laborers in citrus orchards recive as wages from 30 to 40 cents a day, without food being furnished to them. In summer they are required to work ten hours a day, and in winter eight hours.

The cost per annum of cultivation in the best orchards per hectare (2.471 acres), as estimated by a practical grower, Mr. Augustus Peratoner, United States vice-consul, is on the average 650 lire ($125.45).

DISEASES AND PESTS.

The diseases and pests attacking the citrus trees in this part of Sicily are as follows:

A disease called the "colla" (glue) sometimes (though not often in this district) affects the citrus. It is said to be caused by a sudden change from a high to a low temperature; this checks the exhalation of the tree, and the matter to be exhaled accumulates within until it bursts the passages and forces its way out through the bark. On coming in contact with the air it condenses in drops of a light-yellow gum. The only remedy for this disease is to cut off the branches infected.

A parasitic growth of a fungus nature frequently gathers upon the bark of the trees. The lemon tree is more subject to this than the orange. It is removed after a heavy rain, or after thoroughly soaking the parts affected, by scraping.

An insect called the *pidocchio nero* (black louse) infests the bark, leaves, and fruit of both the orange and lemon; also, an insect called the *pidocchio bianco* (white louse) infests in a similar manner the lemon tree. In appearance it is like a minute scale or scab, of oval form, and attaches itself with great tenacity to the bark, leaves, and fruit. This insect prevails to a large extent in our orchards. As a remedy, a wash of lime-water is used; also, water slightly tinctured with kerosene.

The fruit of both orange and lemon is sometimes injured by an insect called the fly. It makes its appearance in the beginning of summer, and commences its devastation by stinging the fruit and depositing therein its eggs. These eggs develop into grubs, which destroy the fruit. When the fly first appears the fruit on the tree should be frequently washed. The water should be applied with a sponge. Some slightly tincture the water with kerosene or soda. Fumigating the trees with the smoke of sulphur has also been tried. No remedy has yet been discovered that effectually destroys the noxious pests. Good ventilation, thorough culture, and plenty of sunlight are the best preventives.

EXPORTS TO UNITED STATES.

In the export of citrus fruits from Catania to the United States during the past three years there has been a gradual decline. This is prob-

ably owing to the decline in prices. There were exported from Catania to the United States of lemons and citrons—

Years.	Boxes.	Value.
1882	241,107	$441,227.72
1883	228,857	324,284.84
1884	168,575	391,068.20

ALBERT WOODCOCK,
Consul.

UNITED STATES CONSULATE,
Catania, November 25, 1885.

CUBA.

REPORT OF CONSUL PIERCE OF MATANZAS.

In the district of Matanzas the citron, though not indigenous to Cuba, is to some extent cultivated here, but not as an article of commerce. Scarcely any attention is paid to its cultivation, and, like a great many other useful products, it is almost entirely neglected, owing to the prior preference for the staple product, which up to this day is the sugar-cane.

It may be surprising that an article so universally growing in the island should not appear as an article of export, but to one well and thoroughly informed as to the tendency of the agricultural class here it is not surprising. Nearly every farm-house garden or plantation has a few citron trees growing. The soil is eminently adapted to its cultivation, and, in the production of it, it is flourishing and florescent, but as small cultivations have been entirely abandoned in preference to the sugar-cane, there has been neither foreign exportation nor an interior commerce in the article—at least in this district.

The citron is used to a limited extent here as a tonic and for preserves. In its use as a tonic or a medicinal article only the outside bark or peel is used. The interior is used as a refreshment and for preserves.

The citron is grown on a bush about three yards high. From the time of planting, in about two years, fruit may be expected.

It will grow in any ground, but rich earth is naturally preferable. As the fruit has never been attentively cultivated here, it is almost impossible to digest the many opinions given by the isolated cultivators who have given it any attention; but I have given what I deem a fair synopsis of the various data obtained, and will add that it is deemed and classified as hardy as the orange.

Propogation may be done by planting the seeds (but production is later in this way), or by cutting, or, as in the case of the banyan tree, by intertwining branches which readily take root.

FRANK H. PIERCE,
Consul.

UNITED STATES CONSULATE,
Matanzas, November 17, 1885.

MADEIRA.

Acting Consul J. Hutchinson writes from Funchal under date December 3, 1883—

The cultivation of the fruit on the island is on so small a scale that it is impossible to obtain any definite information. There are a few trees in two or three districts, on the lands of small holders who never think of making any calculation as to the cost of culture, yield, or profits.

The fruit is sent into town in small parcels for sale to the shippers. The present prices range from $1 to $2 per hundred, according to size. The buyer places the fruit in a cask with sea water for shipment. It all goes to London, the average annual shipment being about 50 casks of 1,000 citrons each.

MEXICO.

Consul James Viosca, of La Paz, Mexico, reports, under date November 24, 1885, that, while the citron has never attained a commercial importance in Lower California, the tree thrives luxuriantly, bearing yearly an abundant crop of very deliciously-flavored fruit, weighing from 1 to 5 pounds each, thus proving the fitness of the soil did a market exist for the produce. A small quantity of the green or seasoned fruit is yearly exported to the ports of Mazatlan and San Blas, for domestic uses in making sweet preserves, or what is known as *fruta enbuelta en azucar*. Otherwise it has no commercial importance.

FRUIT-TREE CULTURE IN COGNAC.*

REPORT BY CONSUL EARLE.

[Republished from Consular Reports No. 108.]

There seems to be several reasons for dwarfing fruit-trees, distorting them out of their usual shapes, and planting them in queer and unusual places and positions. These reasons may be stated, according to my observations, as follows:

(1) For economy of space.

* As carried on in the Billardine, a garden near Cognac, belonging to Mr. Hennesy.

(2) For protection against weather.

(3) For facility of making medical applications when the tree shows signs of disease.

(4) The facility with which the ripening of the fruit may be accelerated or forced.

(5) For ornament.

Let us glance a moment at these various objects, and how they are accomplished.

(1) Economy of space.

The great bulk of the land holdings here are small—very many of them very small—and as grapes for brandy making was the great, the all-absorbing crop, every rood of available land was concentrated to that to the exclusion of everything else whatever. And after the prosperity of the country was gone, through the death of the vines by the phylloxera, the farmer required all his land for food crops to support his family. So in both cases, avarice and poverty, the fruit tree, a luxury, had to take the wall.

Again, in close built quarters in town there was naturally no space for fruit or vines. There is almost always a court-yard, however, and along the walls of this the thrifty Frenchman has strung his fruit trees. On the outside he takes up a flag-stone from the pavement of the sidewalk, prepares a place, plants a vine, and replaces the stone so as to conform to the new conditions. The vine grows, its stem is supported against the wall to a height, say, of from 10 to 12 feet, when it is trained out laterally between the upper and lower windows on a sort of a horse-rack shaped frame of iron rods. Thus it forms a beautiful ornament to the dead white house front and furnishes many a welcome cluster of juicy grapes to the breakfast table at no cost.

(2) Protection against the weather.

This is by no means a rigorous climate, measured by New York standards, although by reference to a map it may be seen that Cognac is about the latitude of Montreal, Canada. The Gulf-stream has so modified the climate, however, that the "winter isotherm," so to speak, would fall about Macon, Ga., Montgomery, Ala., or Columbus, Miss. It was not colder here last winter—an average season—than in any of the three southern cities. But, remembering the latitude, it will be seen that the shortest winter days are only about eight hours long, and after that the long, cold night. Then the wind blows chill and cold, piercing even to the joints, and on still nights the frost lies like snow on the ground. As to snow itself, other than as a feathery shower, melting almost as soon as it falls, it is rare. So with sleet—that sleet which even in the far south thickly glazes all out-doors, from leaf, twig, and stem of tree and plant to roof of house and bed of road—here it is almost unknown. Still, as this climate is ill adapted to such delicate fruits as peaches, apricots, etc., some sort of artificial protection against cold and frost is necessary for them, and they obtain the best protection

from the wall itself. The body of the wall protects against the wind and driving cold, and the screens and sheds, which can be readily adapted to the wall, against frost and snow. These screens are made thus: The walls are almost invariably capped with a coping or fluted tiles projecting several inches; under the little shed thus formed a slanting frame of iron rods and wires is adapted, supported below by braces of the same metal. Upon this frame and overhanging the trees is placed a blanket of straw made by the gardener himself at a nominal cost; if this is not enough, it is very easy to hang similar mats of straw or old rugs, etc., against the wall and in front of the trees.

(3) For the facility of making medical applications to the tree when it shows signs of disease.

The trees here are subject to many ailments, some affecting the present or prospective crop of fruit only, and others touching the life of the tree itself. French horticultural therapeutics seems to limit itself to a solution of sulphate of copper and quicklime (the *bouillie bordelaise*), or a solution of sulphate of copper and aqua ammonia (the *eau celeste*). The solutions are applied by means of a spray apparatus, or an atomizer, and when the tree is fairly spread out against the wall, as in the methods of cultivation now under consideration, these applications are a very simple matter.

(4) The facility with which the ripening of the fruit may be accelerated or forced.

From what has been said under the second heading it needs no further argument to show how the early heat of the sun may be utilized for the ripening of the fruit and what measures should be taken to protect the tree and its fruit against sudden lowerings of the temperature in the late spring. Suffice it to say that the thrifty gardener, by making use of the means above indicated, can get his apricots early into market when they bring him 5 to 6 cents apiece.

Lastly, for ornament. All the gardens here are surrounded by high stone walls, and, of course, no gardener of taste or feeling could permit his wall to remain white, bare, and naked. Hence many of the designs used are merely to hide the nakedness of the wall. They have but little practical utility so far as bearing fruit is concerned, and are maintained in the forms in which they are drawn with infinite difficulty. Sometimes, after several years of careful management, the tree is gotten into the desired elaborate form, when suddenly, to the great disgust of all concerned, half of it dies and its symmetrical beauty is gone.

With this style of tree culture, however, I have but little sympathy, since it is much easier to get vigorous, hardy trees, bearing fruit, whose forms are more graceful to my eye than those intended merely for ornament.

So much, then, for the *raison d'être* of this method of tree culture. Let us glance now at how the results are obtained.

(1) The first requisite is, of course, the wall. This should be from 9

to 12 feet high, depending on the size of the garden or inclosed space. It should be covered with some sort of slightly projecting coping, as tiles or slate, and should be of sufficient thickness to insure its stability. Here, where the whole soil is nearly underlaid with soft chalk-stone, the cost of the wall is a mere trifle—the trench for the foundation and that for the trees furnish nearly enough stone for the purpose.

(2) After the wall is built some sort of trellis should be attached to it upon which to tie and train the trees. The poorer gardeners employ a plain wooden diamond-shaped trellis, made of slats nailed against the wall. The walls of the best gardens, however, are provided with trellises of iron wire, and each strand is furnished here and there with thumb-screw swivels so that they may be drawn taut when required. This is much the neater, more desirable, and, in the long run, more economical system.

(3) A trench should be dug at some slight distance from the wall for the reception of the new plantation. The distance from the wall and the dimensions of the trench will depend on the height of the wall as regulating the height of the tree and the kind of fruit-tree to be planted, say, ordinarily, 1½ feet from the wall and 2 feet deep by 3 or even 2½ feet wide. This trench should now be filled with carefully prepared upper soil, or loam, mixed with a suitable quantity of stable manure. The tree, or vine, is now planted, in the month of November or February, with the stem slanted through the side of the trench and towards the wall, and, its first bent being given it, attached to the trellis.

Here let me stop a moment to say that the consensus of opinion among gardeners here seemed to be decidedly in favor of seedling trees in preference to budded or grafted stocks. Of course, if a bough can not be gotten where it is desired to have it by natural means, that is, if a wood bud can not be found at a point where a limb is required, this want may be supplied by a bud artificially introduced, or by a graft. Still, the French gardener prefers to deal with a seedling in the first instance, holding that it is easier to give it the desired shape, and that the buds for the production of lateral and other boughs may be more certainly counted on than is the case with grafted or budded stocks.

Having now arranged the preliminaries it becomes a question of what shape shall be given to the trees. For my own part, I much prefer the rather simpler forms, say the U forms and their modifications, or the candelabra forms. The best of all the forms, however, both as to beauty and utility, I regard the palm-shape and its modifications. There are other very good shapes, the names of which I have been unable to get. My distinct preference, also, is for the forms which have vertical or oblique branches, for these reasons: The sap of a tree has always a tendency to mount, and under ordinary conditions the best fruit will be found on the ends of the branches or the periphery of the tree. Therefore, the oblique forms follow more nearly untrammeled nature, and thus yield better general results. As a proof of the foregoing may be

cited this fact: If a horizontal form is sought after, and one side of the tree (that is, the boughs forming one side) develops at the expense of the other, or if any one bough on the one side is weaker and smaller than the corresponding branch on the other, the condition is easily remedied by bending the overdeveloped branch downwards or the atrophied branch temporarily upwards. In either case the sap quits the dependent for the elevated branch, and soon they are brought to an equal development, when the restraints may be removed. Whatever form is selected, however, the trunk of the tree should not be allowed to grow higher than 12 or 15 inches. At this height it should be made to branch or bifurcate, and the branches then arranged in such forms as may be desired. I can not here go into the various methods of pruning and training. These will vary, naturally, with the sorts of trees with which we have to deal. Suffice us to say that all redundant growths are to be cut away, and even the bearing branches pinched back from time to time as the exigencies of the tree and its crop require.

One word as to the results obtained here by this method of fruit-tree culture. In my judgment it is the only system practicable in this climate, but with the protection which the trees thus obtain even peaches and apricots do fairly well. I have counted, for example, a hundred well-formed, beautifully colored peaches on a single U-shaped tree whereof the stem was no larger than my wrist.

EDWARD P. EARLE,
Consul.

UNITED STATES CONSULATE,
Cognac, August 21, 1889.

FRUIT CULTURE IN MENTONE.

REPORT BY CONSULAR AGENT VIALE, OF MENTONE; TRANSLATED BY CONSUL WILSON, OF NICE.

[Republished from Consular Reports No. 54.]

Two promontories of the Maritime Alps, Cape Martin and Cape Martola, descending to the Lear, form in the Mediterranean, at the gates of Italy, the beautiful gulf which the ancient geographers called *Sinus Pacis*. From the midst of the semicircle, protected from the winds of the north, the east, and the west, another promontory advances, less important, which finishes in low hills at the edge of the sea. In this delicious corner of the world was formerly found a little village, surrounded by olive and lemon trees, which were reflected in the azure sea —this was Mentone.

One day some travelers, wandering on the Cornichè road, perceived its picturesque situation and learned of its mild climate. It required but few years to bring to it renown, and the little village has become

a town, where the valetudinarian and the chilly people from all the countries of the world meet during the winter season. During the season of 1882–'83, 2,500 families from a distance came to warm themselves under our sun. There were 87 American families, making about 350 individuals. The reports of subsequent years will doubtless show an increase.

Mentone and its environs was the ancient station "Lumone" of the Roman road of Julia Augusta. In this small territory are cultivated the lemon, the vine, and some fruit trees.

THE LEMON.

The lemon tree is propagated by sowing the seed. Generally it is preferable to sow the seed of the bitter orange, and graft the lemon on the plant when it shall have acquired a certain strength. It requires about ten years' growth to obtain a productive tree. The lemon is cultivated on the plain, and on the sides of the hills, or wherever it can be irrigated. For this culture, as well as that of the olive and the vine, the hills are terraced with stone walls. One are (4 square rods) of ground contains ten lemon trees.

According to the strength of the tree it yields during the year from 100 to 500 lemons, and even more. The tree requires much care. It must be manured. For this they use the common farm manure, the scraping and refuse of horn, and old woolen rags.

In summer the trees must be watered at least every two days; must be dug about in winter, and the soil loosened every year. The lemon tree flowers all the year, and the fruit is gathered every day.

The harvest is divided into three grand epochs. The first and second blossoms, produced by the flowers of spring, are harvested from November to February and March. Then follows the *Granètte* (second grade) harvested from March to September, at which time the *Verdamie* (third grade) begins to ripen.

In a good season the harvest amounts to 30,000,000 lemons.

The culture of the lemon is diminishing for two reasons: First, because much of the land is now being occupied by hotels and villas; and second, the workmen have become scarce and the price of labor high, so that the culture has become unremunerative.

The lemons from Mentone, though not so fine as those of Messina, were formerly much preferred for exportation during the months of March and April because they could be sent fresh from the trees, while those from Messina, having been harvested in the previous November (their harvest is but once a year) were already five months in boxes.

One can scarcely form an idea of the care necessary in picking and handling the lemons and in packing them for exportation. Formerly one-half the population of Mentone were thus employed.

The merchants had their chosen laborers of much experience to gather the fruit, make the boxes, and do the packing.

Since this pretty village has become a winter resort, the habits of the villagers, in respect of their work and their wages, have changed greatly. The picturesque *capellina* which shaded the face of the young Mentonaise has been replaced by fashionable hats, veils, and parasols from Paris. The young men have become *valets*, *chefs de cuisine*, waiters, etc., and thus the cultivation of the lemon is left to strange and ignorant laborers.

This has lost to Mentone its export to the United States, for fruit badly gathered or poorly packed arrives at its destination in a pitiable state.

The first choice lemons are usually sent to the North and to America; the second quality are used in France and Italy. The first quality are those having no blemish, are large and fine, and not too ripe to stand the long voyage.

The lemon and orange trees are subject to divers maladies:

La Morfea.—A sort of louse which eats the rind of the fruit, and also covers the tree in its worst stages with a disgusting white mildew. When this malady attacks a garden the trees are unproductive for years.

La Fumie is another malady, which turns the branches and leaves of the tree as black as though they came from a chimney.

For some time past they complain of a little worm which attacks the center of the flower, eating the pistils.

Hail will also destroy the fruit, but happily this rarely occurs in Mentone.

The changes of weather, such as a prolonged spell of damp weather, predispose the fruit to certain maladies which may develop in the packed fruit if not well guarded by an experienced packer, and even with the best care in choice of fruit and packing the fruit of certain years is more likely to spoil and rot.

The exportation of lemons to the United States, as taken from the books of the agency, has been as follows:

Year.	Invoices.	Cases.
1873	51	42,016
1874	70	48,710
1875	12	15,612
1876	29	47,339
1877	17	15,909
1878	3	4,059
1879	13	10,726
1880	.....	.....
1881, 1882, 1883, 1884	None.	None.

Cases packed for the United States contain 360 lemons.

THE ORANGE TREE.

The oranges of Mentone have but little commercial value. The trees ornament and perfume the gardens and furnish a passable fruit for the table. Very few, if any, are sent away.

The culture is much the same as that of the lemon tree. It flowers but once a year, in the spring, and the fruit is perfected about every other year. It resists the cold better than the lemon tree. It flourishes at Nice and Cannes, where the lemon does not grow successfully.

THE GRAPE VINE.

The grape loves the hills. It prospers at some distance from the sea and 200 or 300 meters from its level. All land seems to agree with it, but especially that which is stony.

The vine is propagated by branches or shoots, having 6 or 7 buds, and about 50 to 60 centimeters long, which are buried in the ground with the aid of a piece of iron, leaving only one bud, or eye, out.

Before planting the vines the land is dug up about 1 meter in depth, the vines are planted from 80 centimeters to 1 meter distance, and 1½ meters is better.

At the end of four years the vines commence to produce. A vine in good condition, well cared for, ought to produce at least 1 kilo of grapes for each stock. At the third year they commence to tie up the loose branches to stakes or trellises. The vines are manured with woolen rags, bone shavings, and stable manure.

The soil must be worked two or three times per year, for the vine will permit no other to partake at her table. It must be white and light, into which the vine roots may push at will and receive all the nourishment possible.

The pruning is done in January and February, and two or three times a year the straggling and useless branches are trimmed off to prevent the sap being wasted on branches not destined to bear fruit. The best means of pruning is to leave one large branch at the bottom of the vine with two buds, or eyes, only, which will produce two new branches for the next year, and to leave at the top of the vine a fine branch with several eyes. Every eye will produce a branch with at least one bunch of grapes; and the year following, this branch will be cut away to perform the same operation with the two new branches which will have been left at the bottom of the vine.

The vines are never watered, as that would injure the quality of the wine.

The country of Mentone produces scarcely enough wine for a month's use. Italy and the center of France furnish the rest.

The wine of Mentone is somewhat strong and heady. We class it between the wines of Burgundy and Spain. It is the type *Maruverno.* The grapes are sweet-black, with round seeds.

Other varieties are the Varlentin, the Rossese, the Salerno, and the Tobacco; but all are in such small quantities that they are mixed in the cellars and are known only as a *Maruverno.*

Latterly some proprietors have brought slips from Alicante. The

wine, in small quantities, is good, and is distinguished from the *Maruverno*.

The maladies which attack the vine are the oidium and phylloxera. The first shrivels the leaves, destroys the grapes, and puts the vine in danger. Happily the flour of sulphur is a sufficient remedy. The second, much more terrible, are microscopic worms attacking and covering the roots of the vine. Its ravages have extended more or less over all France. Happily Mentone has thus far escaped, though the scourge has appeared within the department.

THE OLIVE TREE.

The olive trees of Mentone are several centuries old; they are said to have been planted in the twelfth century by the Crusaders.

They are propagated by means of young plants which are detached from the parent tree with some roots. This is the theory. Actually none are propagated in late years. The same reasons mentioned as affecting the lemon, to which must be added the slow growth of the olive, have conspired to turn trade into other channels, and the propagation of the olive tree has nearly ceased.

Ten or twelve years are necessary for the growth of a small tree commencing to yield fruit. The life-time of a man, fifty or sixty years, or even a hundred, is necessary for a full-grown tree. They grow in the plain and on the hills.

A full grown tree in a good season will yield 60 to 80 liters of oil. One can never have two good harvests in two consecutive years; fortunate if you have one. A fruit which remains a year on the tree is subject to many dangers. Sometimes the early heat burns the flower, or the wind blows it or the fruit off the tree; a prolonged rain prevents the gathering, or destroys the fallen fruit, or the dryness of the season may blight it, etc.

But the greatest enemy of the olive is the worm. Myriads of small flies (*Musca oleavia*) sting the olives and deposit their eggs, which in a short time attack the pulp of the fruit. These worms go around the fruit and then go out in the form of a new fly. These in turn attack the remaining olives, so that the entire harvest can be destroyed in less than a month.

The ground must be worked once a year; useless or dead branches lopped off every two or three years.

The olive is never watered here, as water is almost always scarce and sometimes insufficient for the lemon trees.

The olive oil of Mentone and its neighborhood is good, and is used here and sent to other parts of France.

Including the surrounding country, the product of a very good season has been from 15,000,000 to 20,000,000 quintals of oil (a quintal is 100 kilograms; a kilogram is 2.20469 pounds avoirdupois). The olive tree flowers in March and April. The fruit is gathered from Novem-

ber to April. The best oil is made from that gathered in March and April when the fruit is most mature.

MISCELLANEOUS FRUITS.

The fig, the peach, and the plum are grown in Mentone, but only for home consumption and in small quantities. They have no place in commerce.

PERFUMERY.

Perfumery is made from the lemon and orange rinds and from the leaves of the bitter orange; but there is only one establishment, and its exports are principally to Germany and Russia.

N. VIALE,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Mentone, April 1, 1885.

FRUIT CULTURE IN ZANTE.

REPORT BY CONSULAR AGENT CROWE.

[Republished from Consular Reports No. 44.]

In accordance with the instructions contained in the circular addressed by the Department to this agency, in date of December 4, 1883, requesting information on the fruit culture of this island, I have the honor to furnish the following particulars, derived partly from personal observation during my long residence in Greece, and partly from data kindly imparted to me by some of the best and most practical cultivators.

CURRANT-GRAPE VINEYARDS.

Raisins, such as are generally known by this term, are not prepared here, though many varieties of the grape grow in profusion in this island. The currant-grape was originally imported here by refugees from Corinth in the year 1530 A. D. It is a small, purple grape, free from seeds, and now forms the staple production of this island, the adjacent island of Cephalonia, the Morea (Peloponnesus), and is also cultivated to a certain extent near Missolonghi, Lepanto, and the islands of Ithaca and Santa Maura.

The position of these vineyards is mostly on the plains bordering the sea-coast; the foot of a wooded hill, the deposits from which enrich the soil below it, with a sunny aspect and good circulation of air, is considered the best position. Although many vineyards extend right down to the sea, the plants within 500 or 1,000 yards of it are liable to suffer.

Sea fogs and mists are not considered injurious. The mildew (*Oidium*

tuckeri) which first appeared amongst the vines in 1852, is most efficaciously combated by sprinkling finely-powdered sulphur (imported from Sicily) over the shoots and leaves, say, just before the flowering, and if required to be repeated, at intervals before the ripening of the fruit, it is either applied with a small perforated hand dredger or by means of a bellows with a recipient made of tin attached to it which contains the sulphur; the latter is more generally in use.

The mode of pruning, in principle, is much the same everywhere, but the height of the stem, and other peculiarities in the form given to the plant, is somewhat different here to what it is in the Morea.

The best results are mostly obtained on a rich, light soil, with an admixture of sand in it; but it is a singular fact with the currant-grape that, however carefully it may be cultivated, it will not give the same results as to size of berry, color, saccharine substance, or aroma in all districts. For instance, the Zante currants (as indeed all the island currants) are much smaller in the berry than those produced on the mainland, but they have more aroma and sweetness than perhaps any other currants grown. Then, again, commencing from the top of the Gulf of Corinth, southward all along the sea-coast of the Morea, right down to Calamata, in Messenia, the quality gradually deteriorates; thus Corinth, Fostizza, and Patras, all within the gulf, producing the first quality, then Gastouni and Pirgos, in Elis; after this, Filiatra and Gargaliano, in Trifyllia, and finally the produce of Pylia and Messenia. To a connoisseur there is a marked difference in the average quality of these various grades; the market value confirms this.

Whereas Gulf, Vostizza, or Patras may be worth 25*s*. per hundredweight, Calamata or Pylos would not fetch over 15*s*. or 16*s*. per hundredweight, the redeeming point for the grower being that in the southern districts the vines are more prolific, frequently doubling the production of other vineyards.

The best results, as mentioned above, are generally obtained at the foot of the hills; but this is not always the case. The great point is that no trees of any kind be planted in a vineyard; that it should get plenty of sun, and that the air should circulate freely in it. Sometimes during its infancy a vineyard is planted with tomatoes, melons, and such like; but this is strongly deprecated by all good cultivators as tending to weaken the soil, and if planted at all, it should be done sparsely.

Planting and cultivation.—Cuttings which have been buried since January are planted out in March, if the soil is dry enough, at a distance of about 4 feet from each other, and should commence bearing in the third or fourth year, but the seventh or eighth is reached before full bearing. I have seen plants over 100 years old, but they naturally produce very little; if carefully attended to, a vineyard should continue to be fruitful up to the fiftieth year, though the system of "ring-cutting" or making an incision all round the stem or principal branches

has tended to weaken the plants, and in poor soils they have to be renewed every thirty or forty years.

The incision is made after the fruit has set, to keep the sap up and produce a larger berry, or what is known in commerce as "bold fruit," and as this is in vogue in most consuming markets, by far the greater portion of the crop is thus treated, the result being that the keeping properties of the fruit are sacrificed to the fashion of trade.

Irrigation.—There is no system of artificial irrigation, but if the winter has been a dry one every means are resorted to to try and irrigate as best one can.

Yield.—The yield, value, and cost of the crop per acre varies according to the soil, cultivation, and other circumstances. The wages of laborers are an important item; as a rule they are much lower in the islands than on the main-land; here 50 cents per diem is considered high, whereas in the Morea it sometimes exceeds 75 cents and even $1 per diem. A good average in this island is 260 pounds net fruit per "axinari," or 2,083⅓ pounds per acre, since 8⅓ "axinarias" form an acre; the average value of late years has been $62.40 per acre; the cost of the crop as far as cultivation goes, from beginning to end, including sulphuring (about 80 pounds per acre being under ordinary circumstances consumed), is $22 per acre. The cost of a good vineyard would be about $450 per acre.

This island's annual yield of currants is now, on an average, nearly 7,000 tons, the acreage under cultivation being over 10,000 acres, but this is going on increasing, as many fine olive groves are being rooted up to make room for the currant plant.

I hope I may prove a false prophet, but this tendency to trust all one's eggs in one basket, I fear, will in the end prove disastrous to the interests of this beautiful island, where the olive flourishes, and the produce can be collected without much expense, and showing a value, one year with another, of over $300,000, and this whilst large tracts of virgin soil in the Morea are annually being brought under cultivation, threatening before very long to bring the total production of currants in excess of the requirements of the world, especially if the condition of the vineyards in France improves since, owing to the ravages of the phylloxera in that country, some 30,000 tons of dried currants have in recent years been annually imported direct, or via other countries, for wine-making purposes.

The annual total production of currants of late has exceeded 120,000 tons—indeed, had not rain damaged a considerable portion of this last year's crop the yield would have been over 130,000 tons—and the production could be increased to an almost unlimited extent should an unforeseen demand require it.

The old English firm of Barff & Co., established in this trade since the early part of this century, gives a table showing the production and distribution of the whole currant crop from 1820 to 1883, of which I inclose a copy.

WINE GRAPES.

Besides the "currant" grape, there are probably sixty or seventy varieties of the grape grown in this island, of which only some seven or eight are cultivated for making wine, the remainder being for eating purposes; amongst the latter, one occasionally meets with a very luscious black American grape (the Susquehanna, I believe), known here as the "Isabella," in flavor something between a strawberry and a raspberry; a peculiar feature about it is, that the "oidium," or mildew disease, has no effect upon it, and consequently sulphuring is dispensed with, although often grown in the midst of a vineyard of other grapes subject to the disease; the conclusion is that its resistance is owing to its belonging to a much younger stock, and is consequently hardier.

The vineyards producing the best wines are mostly on hill-side, with sunny aspect, or on light shallow and rather stony soil. I have heard of grapes grown in a soil entirely of sand, near the sea, producing excellent wine, though the yield is small. A very superior quality of both white and red wine is made here, resembling the best full-bodied Sicilian, and in the cellars of careful viticulturists a capital imitation of Sherry, and even Port, is to be occasionally met with.

Mode of cultivation.—The cultivation of both the currant and wine grape is very similar to the French method, only that the system of low cultivation prevails, no plant exceeding 4 feet in height; only eating grapes, especially winter species, are trailed up.

Owing to the difference of climate the various processes are somewhat earlier in these latitudes than in France, and the currant has the attention of the grower before the other vines. The fruit of the former is ready the latter part of July or beginning of August, when the bunches are gathered and laid out on carefully prepared drying grounds which have been previously besmeared with a coating of cow's dung liquified in water, or in wooden trays, and remain exposed for eight, ten, or more days, according to the power of the sun's rays. They are then cleared by a light twig-broom from the stalks, heaped together for about twenty-four hours, and finally passed through a winnowing machine, and are then ready for market.

The vintage of the wine grape commences the latter part of September. If an extra sweet wine is required the grapes are exposed to the sun for three or four days after being gathered, before they are pressed out.

ORANGES AND LEMONS.

There are many varieties of both, including the egg-shaped, the blood, the mandarin or tangerine orange, and splendid lemons, some without pips, the bergamot, etc.; in fact, I should say that they are as fine as those of any country. Trees begin to bear fairly well after the sixth or seventh year, and may remain fruitful upwards of one hundred years. Much depends upon the soil and care bestowed upon them. They are reared from seedlings, grafts, and buddings,

Budding is preferred to grafting. Another method pursued here is to cut a healthy, smooth branch of about 1¼ inches in diameter into lengths of about 1 foot; they are then buried in the ground in January at a depth of rather over a foot, and in the following April are planted out, slightly inclining, leaving only an inch or so above the surface. Another plan is clasping a pot or box round a young branch of a tree, keeping it well filled with earth, and after the third year, when it will have formed strong roots, severing it from the parent stem, and planting it in January or February.

As a rule the trees here have not been troubled with any serious malady. Although in some parts of Greece, notably in Poros, whole orchards have gradually dried up, no remedy has so far been discovered. The trees are planted 15 to 18 feet apart. Here the orchards succeed best in a sheltered part of the plain or valley, at some distance from the sea; the best results are on a light, sandy soil, though on some rich boggy soil I have seen some marvelous specimens of both orange and lemon. The best orchards, as a rule, are at least a mile away from the sea.

In very hot weather the trees are irrigated at night from wells or cisterns, but there is no regular system in use, and in certain localities it is not necessary. The ground is dug thrice a year, in March, May, and October. Very little pruning is required beyond keeping the trees in good shape, and free from dead twigs or branches. Manure is laid on every two or three years if the soil is poor. No crops are grown under the trees in properly cultivated orchards, and only the peach tree is in some orchards planted, as it does not last many years, and the soil is not weakened by it.

A first-class orchard yields about $400 per acre annually, expenses being about $35, including manure.

OLIVES.

There are two varieties here, the indigenous and a variety introduced from Corone, in Messenia; the latter is the most prolific. Both bear a small, greenish-black fruit.

Process of cultivation much the same as the orange tree. The ground is plowed regularly twice a year, in March and December, and every fourth year during the summer manure is sown, resulting in a crop of hay in the following spring.

The Queen olive is not produced here.

The trees come into full bearing after the twentieth year. There are fruitful trees several centuries old. The average annual yield per acre of mature trees is 33 gallons of liquid oil; 325 pounds' weight of olives yield 4 gallons of oil; much depends upon the quality of the soil and the season.

The trees are planted about 20 to 24 feet apart. Olives intended for

pickling are picked when they are barely ripe, but these are few and only for local wants.

The olives for oil-making are picked, or rather knocked, off the trees when ripe. The process of preparing them for table use is simply salting them, putting them in oil or vinegar; in the latter case they are generally slit on the sides. The process for extracting oil is very primitive. The olives are generally crushed between millstones, the upper stone being turned by a horse. Another process is to put the olives between goat-hair sacks, throw boiling water over them, and then press them as one would grapes. Such oil is never good. The peasantry frequently keep a portion of their crops of olives for a couple of years without crushing them. To do this they are thoroughly sprinkled with salt, and simply left in a corner of their room. It is said that they do not lose either in weight or liquid, but such oil when extracted is liable to be rancid. The process of knocking off the fruit with sticks is much to be deprecated, since many fine shoots are thus destroyed.

Valley, hill-side, or table-land are all adapted to olive trees. Much depends on the nature of the soil. A hard clay is bad. The best oil is from trees grown on a stony hill-side, but the yield is small.

There is no system of artificial irrigation, but copious rain-falls in winter are indispensable to insure a good crop; even then the olive seldom bears a full one except every second year.

Orchards come right down to the sea-coast. The olive requires plenty of air, and a high wind is indispensable to insure the proper setting of the fruit. Close, sultry weather during the flowering prevents the flower from falling, and a worm is then generated. Of late years many orchards have been attacked by blight, which causes much of the fruit to drop off when approaching maturity. The cause is unknown, and on remedy found so far to combat it.

The cost of cultivation is not over $12 to $14 per acre, and $6 to $8 more for collecting the fruit, cost of manure not included. As a rule the proprietor of an orchard is satisfied with the benefit derived from the manure, and the person who provides it has the hay in return.

No meteorological observations are taken here. I am indebted to Mr. W. G. Foster, superintendent of the Eastern Telegraph Company, for the inclosed table showing the temperature during the summers of 1882 and 1883.

FIGS.

No figs of commerce are grown here. Four or five varieties are produced in abundance, both green and black, but they are eaten fresh, the large orchards bearing fruit after the middle of May and all June. A smaller and sweeter fig ripens in August and September, but these are not grown in orchards, only a tree here and there in gardens.

The cultivation resembles that of the orange and lemon, only that less attention is bestowed on the orchards, and crops of beans and such

like are frequently grown under the trees. If figs are grown on a rich soil they are liable to suffer from worm disease.

No figs are dried in this island; an attempt was once made, but it did not succeed. The only part of Greece where figs are cured is at Calamata, in Messenia, but they are very inferior to the Smyrna fig; they are principally exported to Southern Russia or to Trieste, and thence forwarded to the interior of Germany, where the refuse lots are baked or burnt and then ground and used as a substitute for coffee.

A. L. CROWE,
Consular Agent.

UNITED STATES CONSULAR AGENCY,
Zante, March 15, 1884.

FRUIT CULTURE IN THE ALPS MARITIME.

REPORT BY CONSUL WILSON, OF NICE.

[Republished from Consular Reports No. 47.]

The Alps, projected southwards from Lake Geneva, come to an abrupt termination at the Mediterranean Sea, in the department of the Alps Maritime. On the one side high mountains, on the other deep water. The mountains are seamed with small rivers, and their banks and the sea-coast proper are fringed with narrow valleys, which, with the sometimes sloping hill-sides, are the only agricultural lands in the region.

These mountains shelter the valleys from the cold north winds of the Alps, while the sea tempers the sultry south winds of the Great Sahara, producing a soft and equable climate, which the fashionable world has declared to be the most delicious in all Europe.

In the public gardens, and in many private ones, too, the palm trees, the cocoa, the cacti, and the aloe flourish. Flowers bloom in banks of loveliness of color and fragrance on either side of the highways; hedges of rose trees and geraniums guard the orchards of orange and lemon trees, which, bearing both fruit and blossom, make for them a ceaseless round of seed time and harvest, while violets and jessamine are as plenty as dog daisies on a village common. I saw the other day a heap of violets which had just been brought to the mill and were on the floor, a pile 20 feet across. They were to be ground up and their fragrance transmitted into the essences and pomades of commerce.

I visited this winter the gardens of the enthusiastic amateur, Monsieur Doquin, at Cannes, covering near 20 acres. They were filled with all sorts of tropical fruits, growing at all seasons in the open air. He has no plant under glass, yet on my way home I saw plainly, in the near neighborhood, the snow-covered mountains. This, with the fact that Nice is in about the same latitude as Portland, Me., was to me a matter of astonishment, and would afford thought and study for the meteorologist.

CLIMATE.

During the thirty years from 1849 to 1878, inclusive, the wind blew at Nice as follows:

	Days.
Feeble or moderate	7,373
More or less strong	2,397
Calm	608

Averages and extremes of temperature at Nice during thirty years, from 1849 *to* 1878 *(thermometer centigrade).*

Month.	Temperature during the day.					
	Daily average.	Highest temperature.		Lowest temperature.		Number of times over 30°.
		Day.	Year.	Day.	Year.	
	°	°		°		
December	11.69	18.5	1872	1.1	1867	.....
January	11.19	19.2	1855	3.0	1862	.....
February	12.36	18.9	1866	3.2	1854	.....
March	14.33	21.4	1871	5.2	1860	.....
April	17.74	27.8	1871	7.0	1849	.....
May	21.83	29.6	1870	8.7	1861	.....
June	24.53	31.6	1877	17.4	1855	15
July	27.47	33.7	1865	20.7	1851	144
August	26.90	33.2	1869	19.2	1857	99
September	23.83	33.9	1853	17.2	1852	6
October	19.85	31.2	1879	11.0	1869	1
November	14.86	26.7	1849	4.2	1851	.....

Month.	Temperature during the night.					
	Daily average.	Highest temperature.		Lowest temperature.		Number of times below zero.
		Night.	Year.	Night.	Year.	
	°	°		°		
December	5.15	14.8	1852	—2.7	1870	28
January	4.59	15.5	1854	—3.0	1862	34
February	5.13	13.5	1867	—3.5	1861	27
March	6.52	13.3	1871	—0.6	1860	5
April	9.50	17.8	1865	+2.9	1869	.....
May	13.32	21.3	1852	+4.6	1870	.....
June	17.24	25.0	1868	+6.5	1871	.....
July	18.73	26.2	1859	15.0	1878	.....
August	18.97	26.0	1859	12.3	1876	.....
September	16.59	22.6	1855	10.4	1876	.....
October	12.79	18.9	1873	2.6	1869	.....
November	7.96	18.0	1859	—1.5	1858	1

The differences between these extremes are as follows: Between the annual averages, 31°.60; between the *greatest* extremes in one year, 1859, 35°.5; between the *least* in one year 27°.0, 1850; between greatest extremes in the 30 years, 37°.2; highest 33°.7, July 10, 1865; lowest 3°.5, February 8, 1864.

The average number of rainy days in Nice in each year is 64.4. The most rainy year, 1853, gave 103; the least, 1871, 45 days.

This average divides itself among the seasons thus: Winter, 16.1; spring, 19; summer, 9.3; autumn 19.8.

The average rain-fall for ten years (1870–'79) was 796.4^{mm}. The maximum (1872) was 1,383.9^{mm}; the minimum, 452.9^{mm} (1875). The most *frequent* rains come from the east and the southwest, but the *hardest* rains come from the northeast and the south. Scarcely any rain comes from the north or northwest.

SOIL AND AGRICULTURE.

The country has generally a gravelly limestone soil. Agriculture is difficult and comparatively insignificant. The farmer has a continuous struggle with nature for a living; but then it is not what we have that makes us happy, but what we need, and happily for him, his needs are small.

The ground is solid and difficult to dig. It lies usually or frequently in narrow terraces on the mountain-side, each one supported by the rough stones piled up perpendicularly and forming the lower side of the terrace, giving to the whole affair the appearance of an extensive stair-case, up which a giant might climb the mountain. The *tread* of the steps is the space devoted to agriculture. True, they cultivate the valley below, but it is also divided into small patches, surrounded by high stone walls, with espaliers (trellises) covered with roses, geraniums, etc., and sometimes peaches or grapes. In all this there is small chance for a plow, first, from the small and irregular shapes, and second, from the groves and trees of lemons, oranges, olives, and figs, which occupy the ground, and spread their roots in every direction. The most of the work of turning up the earth preparatory to planting must be done with the spade. It is hard labor, and shows its effects in the dwarfed and early-bowed forms and the brown and grizzled faces one sees in the market places.

On the mountains and high up their sides one can find numberless opportunities for, and illustrations of, geology, mineralogy, and sometimes archæology, but not of agriculture. Rocks and stones here abound, but, except for the ass and goat, there is scarcely enough vegetation to support animal life.

The culture of flowers is fast becoming the more serious and remunerative occupation. They are used for the essences and pomades of commerce. Extensive establishments for these purposes abound throughout the neighborhood.

The principal food of the peasant is the *fève de marais*, a sort of bean (frequently made with other vegetables into soup), vegetables dressed into salad, and black bread made of flour compounded of wheat and rye, or wheat and oats. Their drink is the common wine of the country.

THE OLIVE AND ITS OIL.

The olive tree is of the highest antiquity. It appears on the earliest page of written history in the leaf which the dove brought to Noah in the ark as evidence of the receding waters.

It held the highest rank in the ancient mythology. Minerva taught the Athenians its uses. The peoples of antiquity held it in great respect, and used its oil in their various religious ceremonies. It was at once the emblem of holiness and peace. The Romans refused to burn the wood, even on their altars.

The olive was brought from Egypt to Greece, and from thence spread over the countries where it is now grown.

It flourishes best in the basin of the Mediterranean Sea, between 35° and 43° north latitude, though this, as I have stated, will, owing to the difference of temperature on the same parallel, be but an uncertain guide in the United States. The oil produced on the African shore of the Mediterranean is inferior to that of the north shore.

Some of the islands of the Grecian Archipelago and the Adriatic produce fine oil, but the center, both for quantity and quality, so far at least as concerns commerce, is at Nice and the surrounding country. From St. Tropez to Savone generally, but chiefly from the Var to the Roya, from Cannes to Vintemille, the best oil is produced.

Here the trees have been indigenous since before the Christian era, and here they grow to the largest size and the greatest age. One at Beaulieu, in full vigor and bearing, is 22 feet in circumference and is supposed to be 700 or more years old.

The slower the fruit ripens the better oil it makes, but as it must be fully ripe and entirely free from blemish to make the choicest oil, and as it requires two years to come to perfection (the crop is only biennial), one can easily comprehend the dangers of climate, season, malady, and accident which must be avoided and the difficulties which must be overcome in order to obtain final success.

To accomplish this with a plant so tender requires a climate and situation of peculiar adaptation, and unless that is secured any attempt at its cultivation will be fruitless. The fruit freezes at 23° Fahrenheit and the tree at 16°. Once frozen, no remedy exists; the tree is destroyed and must be cut down.

It speaks volumes for the climate of this region to say that the olive trees have here grown successfully for the centuries I have indicated.

If the weather be too warm and the land too rich the fruit ripens too fast and its good taste is gone. If, on the other hand, it should become too cold, fruit and tree are both destroyed. Possibly I can do no better than answer the question propounded in the circular to which this is a response.

VARIETIES OF OLIVE TREES.

What varieties of trees produce the best results and at what age?

There are sixteen or seventeen different kinds, each with its botanical name, which have been grown in this region, but nearly all as exotics. The tree in common use is the European olive, and all the information given concerns this. It gives the best oil.

FRUIT-BEARING AGE.

The tree begins to bear fruit at ten years of age, but it does not come to maturity until from thirty to fifty years.

For the olives of commerce—that is, to eat, either fresh or pickled—the young tree produces the best result; the mature trees produce the best oil.

MODES OF PLANTING AND CULTIVATION.

What is the process of planting and cultivation?

The reproduction of the olive tree may be accomplished by all the modes known for trees. The best mode—planting the seed or pit—is practiced here the least. The people prefer planting the sprouts which come up from the roots of the tree, or which may be artificially made by bending a twig and covering it with earth until it has taken root. At the age of two years this stock may be grafted, or the operation is more like that of "budding." The graft is cut all on one side and introduced under the bark, then bound up in moist earth and allowed to grow. The stock above the graft is cut off.

The earth around and between the trees is tilled each year, and a crop, sometimes of wheat or beans alternately, planted in the spring and gathered in the autumn. The earth is manured every two years and the trees are pruned every four years.

THE BEST TREES.

What variety of tree produces the best olives of commerce? Are they the selected fruit of the common olive, or a superior variety grown from an improved tree?

It is the same tree and the same fruit for oil as for commerce. But the best olives for commerce grow on the young trees; they are larger and plumper, and by selecting the fruit they obtain the finest quality, which are then preserved for commerce. There is a species grown at Nice for which is claimed a superiority of taste and fragrance. It is distinguished by a small black spot on the blossom end of the fruit. These olives are eaten in the country when ripe, are semi-dried and slightly seasoned with salt.

TIME OF FRUIT GATHERING.

At what age do the trees come to full bearing, and how long do they remain fruitful?

The trees begin to bear at ten years of age, but they do not reach their full capability or maturity until from thirty to fifty years. They continue fruitful for two and a half or three centuries. This is for grafted fruit. The wild olive lives and bears until twice that age. In Provence and other countries not so well adapted to them, they commence earlier and also die earlier. The trees are smaller and the fruit can be picked

by hand. There the crop is annual, the harvest being in November and December, while in Nice and surrounding country the harvest is biennial. Here the blossom or flower comes in April or May, and the first fruit, consisting of the smaller and inferior, is gathered in November and December, the better in January and February and March, while the best (for oil) is the last, in April and May. It produces the best oil when it ripens slowly, and in some exceptionally good years the harvest is continued into June and even July. The tree then recuperates until the following spring, when it flowers again. An olive tree, even here, would bear a crop each year if so permitted, but the "whipping" necessary to gather in the fruit destroys the blossoms, which do not come again until the next spring.

HOW THE TREES ARE PLANTED.

At what distance apart are the trees planted; how many to the acre?

From 10 to 15 yards each way. The larger trees require larger space and the larger the space allowed the larger the trees produced. The trees need sun and air, and if crowded it will be to their detriment. This would permit, if I have figured aright, forty to fifty trees to 1 acre. But they do not calculate by the acre, for the trees are planted on the hill-side, usually on made terraces impossible to plow, cultivated with the spade, and it is difficult to get an acre of olive trees together. In poorer soil and on the hill-side the trees may be a lesser distance apart, even reducing it 6 to 8 yards.

OLIVE YIELD.

What is the average yield of mature trees in fruit; in oil; and how much or in what proportion does the fruit produce the oil?

The difference between olive trees in their product is as great as between apple trees. But the average production, per tree, biennially, may be stated thus: In fruit, from 60 to 120 liters; in oil, from 8 to 12 kilograms, or 12 to 18 liters.

The production of oil from the fruit is about as one to five; *i. e.*, some 5 liters of the best olives will make 1 liter of oil; though in many cases it takes 7 liters of olives to make 1 liter of oil.

PICKLED OLIVES.

The prepared olives of commerce come from Marseilles and farther around the coast. They are outside my district, and my information might not be reliable, therefore, I shall not attempt it. Olives for the table at Nice are usually eaten ripe and fresh. Sometimes they may be pickled green and preserved in salt or brine, but this is all for the local use and does not enter into commerce.

OLIVES FOR OIL.

When and how are they picked, and what is the process of extracting the oil?

I have already indicated that the harvest was only biennial, that it commenced in November and lasted until May, or even (as in this year) until June. The fruit is gathered when ripe, or, what is better, just before it comes fully so. When ripe it is apt to become damaged by decay and by attracting bad tastes. For these reasons it can not be allowed to remain on the tree until it falls from its ripeness. The tree is too slight and frail to be climbed, and so a sheet being spread on the ground to receive the fruit, it is whipped off with long switches.

The harvest is divided into three periods, of about two months each.

The first, November and December, produces the *oil ordinaire.* This is greenish in color. It is used as food by the common people, while the inferior quality may be used for lubricating purposes.

The second period, January and February, produces *oil fine*, straw color, and is the oil of commerce.

The third period lasts from March to the close and produces the oil *sur fine* or *sur choix*, which is the very best, with only a tinge of yellow in it.

MANUFACTURE OF THE OIL.

The olives gathered in either of these periods are taken to the mill where they are ground to pulp; and then put under the press by which the oil is extracted and the fruit and seed left a dry mass.

The mill consists of a stone about the size and shape of the common millstone, but stood on edge, is made to thus revolve on its axis around a given center by means of a long wooden arm operated by horse or man power, its weight being on its perimeter, inside a large tub of stone (mason work) with a stone bottom. Into this tub the olives are thrown and the revolving stone crushes them in its path.

Much care and experience is required for all these operations. The olives must be in proper condition; they must have no bruises or decayed places, no unnatural or improper taint or taste; the weight of the millstone must be such as that the fruit shall be macerated but the stone or pit not broken, for the kernel gives the oil a bitter taste.

The ground pulp is put into a sort of sack or open-work basket, and our or five of these are placed under the press. The oil thus extracted s the best quality for that period. Afterwards a second quality is obtained by soaking the residuum with hot water. The operation of grinding and pressing may follow immediately the gathering, but if the fruit is dry and in good order it will keep for eight or ten days if spread out in a dry place to a depth of 2 or 3 inches, and not disturbed.

HOW BEST RESULTS ARE OBTAINED.

Are best results obtained on valley, hillside, or table-land?

On hillside. Not only is the fruit better and more abundant, but it makes finer oil.

SUITABLE SOIL.

What character of soil is best adapted to olive trees?

A limestone soil; marl and clay or any soil wet and cold are not good. It will flourish in almost any kind of soil light and dry. A light limestone, gravelly soil is its delight.

IRRIGATION.

None is needed here for the olive.

SITUATION OF ORCHARDS.

How near to the coast are the olive orchards?

If on the plain, half a mile distant; if on the hillside and protected from the cold winds, they grow and flourish within 20 yards of the sea

DISEASES.

To what maladies are the olives subject?

The principal ones are the cairon, a small worm (*Musca oleæ*), and the morphea, an almost imperceptible bug (*Cirnea barbanus*).

The slow ripening indispensable to the production of the best fruit causes sometimes a fermentation, by which is engendered the small worm, cairon. It attacks only the fruit, and gives a bad taste. Its effect is felt most seriously in the next harvest, and thus is produced the succession of good and bad harvests.

The morphia, on the other hand, attacks the tree, and its evil effects are greater, paralyzing the vegetation, rendering the tree fruitless, and frequently causing its death. It flourishes in damp seasons and places, and propagates itself with an astonishing rapidity. It operates by spinning or weaving a sort of web, resembling in some degree that of a spider. This, after a short time, becomes black and dry and resolves itself into a powder which covers the leaves, flowers, and fruit; this powder is corrosive in its effect, and deadens all with which it comes in contact. The insect flourishes on the olive, but the dust spreads and settles on everything; so a country thus infested presents the appearance of a field of death, the valley of the legendary upas tree. No cure has yet been employed with success. It runs its course, and of the trees the fittest only survive.

COSTS AND PROFITS.

The yield, the proceeds, and profit, and the cost of cultivation.

I have given the yield per tree per crop biennial: In fruit, 60 to 120 liters; in oil, 12 to 18 liters or 8 to 12 kilograms.

In average years, and at average prices, the fruit of a single tree will sell at the foot of the tree for, say, 8 francs; if rendered into oil it will bring, say, from 10 to 15 francs. According to quality the prices are,

of olives, from 3.50 to 5 francs for 20 liters (a double decaliter); of oil, from 1 to 2.50 francs per liter. The average product of one tree, then, will be, biennially, in fruit, from 8 to 10 francs; in oil, from 10 to 15 francs.

The cost of cultivation is slight; manure every two years and pruning every four. The cost of harvesting is also slight; whip off the olives and gather them up. If this could be done and completed in one operation the cost would be much reduced. But the whole cost may be estimated at from 4 to 5 francs per tree biennially, 2 to 2½ francs annually. This applied to 40 or 50 trees will make the cost at from 80 to 100 francs per acre. Stretched out, as it is, over a long period of time, it cannot all be done by the peasant with his regular force, and is not, as in our American harvests, forced into a few weeks, requiring a large increase of help, and, consequently, of expense. So the profit on each tree may be estimated at 4 to 8 francs, or possibly 10, each two years. This would give from $20 to $40 per acre per year.

NO MORE OLIVE-TREE PLANTING.

I am informed, however, that the cultivation of olives is falling into desuetude.

Flowers pay better than fruit. Olive trees are not being cut down or destroyed for the purpose of changing, but when destroyed they are not again planted. The planting of olives here is to be likened to planting forest trees in the United States; and though by every method of figuring it would pay, yet the benefits are postponed for so long time that no one does it.

This is all made apparent when one considers that the olive does not arrive at maturity for thirty to fifty years, a longer period than the average life of the man who plants it, and that it does not even commence bearing until ten years old.

So the planting of an olive tree is, or may be, regarded as work done for posterity.

ORANGES AND LEMONS.

The orange flourishes better at Nice than at Mentone, but it is the reverse with the lemon. Mentone is slightly warmer and more sheltered.

VARIETIES AND VALUE.

At what age do they come into full bearing and how long do they remain fruitful?

There are the sweet and the sour or bitter oranges. They cultivate fourteen different varieties—*Le Portugal* or *Bergamotte*, *Le Chinois*, *Le Mandarin*. The lemon has also its varieties.

The sweet orange and the mandarin are the most esteemed and the most cultivated. They furnish the fruits for the market and for commerce.

The bitter orange is cultivated only for its seed, the essence, and the flower. It is not eaten. The tree begins to bear fruit in two or three years after the grafting, but it does not arrive at full maturity until ten years of age. They last for two or three hundred years.

PROPAGATION.

Are the trees seedlings, gratted, or budded?

All three practices prevail. The bitter orange is grown from the seed, and when it attains the thickness of 1 inch and the height of 5 or 6 feet it is grafted or budded with the sweet orange of whatever variety desired.

The same process in effect is pursued with the lemon trees.

MALADIES.

Frost, or freezing, is hardly to be called a malady, but it is equally fatal, and the tree requires care and protection against it.

The principal malady attacking the trees here is that called *La Mousse.* It seems to be a blight, but whether fungus or not I can not say. It would seem to be produced (I don't know which is cause and which effect) by a superabundance of water in the trunk of the tree under the bark. The symptoms are that the tree withers and becomes yellow, the fruit, flowers, and leaves fall, and all begin to decay and rot. The disease seems to be contagious or infectious. There appears to be no cure, and the only course to save the trees or gardens adjacent seems to be the immediate destruction of the diseased trees.

HOW PLANTED.

At what distance are the trees planted?

Oranges about 5 meters, lemons 3 meters.

SITUATION OF ORCHARDS.

Are orchards inland or on the sea-coast, hill-side, valley, or upland?

Protected from the cold, the orange tree will grow in any of these situations, but that preferable is the valley, where it can be irrigated when necessary. The lemon tree prefers a dry soil, and not having absolute need of irrigation, will flourish on the hill-side. But as both these trees love the warmth, they can not be *here* transplanted far from the sea. They (especially the lemon) are to be found with the greatest success on an espalier, or trellis, on the protected side of the high stone walls which are the common garden-fence in this country.

How near to the sea-shore are the orchards?

Within 100 meters for the oranges and even less for the lemons.

IRRIGATION.

Irrigation is requisite for the orange in this country.

I have given the rain-fall (maximum fall) in ten years, 1870–'79, 1,384

minimum, 453 millimeters. Average for ten years (1870–'79), 796 millimeters, divided by seasons thus:

Season.	Average.	Maximum.		Minimum.	
	Millimeters.	*Millimeters.*	*Year.*	*Millimeters.*	*Year.*
Winter	193	409	1873	33	1878
Spring	215	460	1879	81	1871
Summer	80	231	1870	3	1873
Autumn	308	484	1872	168	1875
Total	796				

It will thus be perceived that the rain-fall may be very slight during the summer, so slight that without aid from irrigation the entire crop, and possibly the orchards, would or might be so parched as to be destroyed.

The town of Cannes led the way in procuring a system of artifical supply of water. It brings the water of the Soigne in a canal from St. Cezaide, a distance of 25 miles. Nice has just completed a similar system by means of which waters are brought down through *Quartier de Cinsiez*, a distance of 10 or 15 miles, and at a height of several hundred feet.

The town of Grasse is agitating the same subject, and soon the valleys along this coast will all be indulging themselves in the luxurious enjoyment of a plentiful supply of pure water fresh from the mountain springs.

HOW THE TREES ARE PLANTED.

Is the ground between the trees cultivated?

It is plowed or spaded and manured, but they do not grow anything except some flowers, usually violets.

PRUNING.

This is done once each year, giving the tree the form of a parasol, that it may have sun and air and to facilitate the gathering of the fruit.

YIELD AND COST OF CULTIVATION.

Give the yield, proceeds, and cost of cultivation?

The gathering or harvest of the fruit is biennial, that is, if the drought, cold, or some malady does not interfere.

The product of the lemon consists here solely of the fruit, whilst in other places the flowers are a source of revenue.

The orange is different. It may be denominated *previous*. Its branches, its leaves, its flowers, its fruit, and even the skin of the fruit, which would be otherwise valueless, all these form parts of the regular harvest, while the wood of the tree is in great request as making the finest marquetry.

The proceeds are somewhat difficult to calculate. A good harvest will produce a minimum of 10 francs per tree; many of them will produce 50 francs each. This is for fruit alone. Leaves and flowers may bring this up to 15 or 16 francs per tree.

The trees begin to produce at ten years of age; their best product is during their growth, until their maturity, say to forty or fifty years.

The cost may be approximated as follows:

The grafted stock as sold by the nurserymen, original cost, each, 1.25 francs.

Annual cost:

	Francs.
Irrigation, each	.50
Cultivation and manure	.50
Pruning and plowing	.50
Total	1.50

FIGS.

Indicate the kinds of trees producing the figs of commerce.

Among the 67 species of figs which can be counted at Nice, they cultivate the following: *L'Abicou* and *La Cottignane blanche.* These are to be eaten fresh about the last of June. Succeeding them in point of time are the *Bernissou noir*, *Bernissou blanc*, *La Bellone*, and *Le Col de Dame*, to be eaten dried. To be eaten dried—*La Bellone* (can be eaten either dried or fresh), *La Sarrasine noire*, *La Rollandine blanche.* The latter is the fig of Calabre.

MODE OF CULTIVATION.

Production and process of cultivation.

The fig tree grows from a slip or cutting. They are planted at about 6 meters distance; the warmer and more sheltered the better. Though they will grow in colder climates, yet their tendency is to stunted growth and a return to a savage state.

The rain suffices for them without irrigation. The earth should be dug and manured here each year and the tree trimmed. The cost here is about 40 francs per hundred trees.

The production in the best years at good prices is about equivalent to 30 or 40 francs per tree.

PROCESS OF DRYING AND CURING THE FIG.

The harvest of some kinds may commence in June or July and it will last until October and November.

The ripe fruit is placed on a trellis or basket work (1½ to 2 by 2 to 3 meters) in a thin layer and exposed to the sun for ten or twelve days. They are then removed to a dry place under cover, and by keeping them stirred they will not damage for a long time, when at one's leisure

he can put them in the basket, case, or hoop, and, decorated with peach or laurel leaves, they are pressed in the form in which they are known to commerce over the world.

RAISINS.

None are raised or prepared in this district. There are vineyards, but not for raisins. They are situated on the hill or mountain sides.

The fruit is sold in the markets to be eaten fresh, though they keep them fresh for a long time. These grapes are sweet and luscious to the taste. They are thus strongly impressed upon my recollection. Those not used thus are made into wine, of which that from Bellet has acquired a local celebrity.

This trade is not sufficiently extensive in comparison with other parts of France to justify a description.

THOMAS WILSON,
Consul.

UNITED STATES CONSULATE,
Nice, September 13, 1884.

THE MANGOSTEEN.

REPORT BY CONSUL STUDER, OF SINGAPORE.

[Republished from Consular Reports, No. 10.]

TANNIC QUALITIES.

For the benefit of such among our public as are engaged in the manufacture of leather, and who may take an interest in what I am about to state, I have the honor to inform the Department that in the local paper, the Daily Times, of the 3d instant, appeared a very interesting as well as important article (taken from a Java paper), of which the following is a true copy:

Mr. G. Naeff, at Lochun, has made a comparative examination of mangosteen shells and oak bark to determine the value of the former as tanning material in leather making. It appeared therefrom that the mangosteen shells contain one-sixth more tannin than oak bark, and that the value of the former may, therefore, be set at about 7½ guilders per 100 kilograms.

I think it was well that this comparison between mangosteen shells and oak bark was made. I regard this new discovery as very important, in view of the fact that many of our valuable "hard-wood forests" in the Eastern and Middle and, in a great measure, our Western States, have either entirely disappeared or become denuded of oak trees, and this, too, near or around leather-manufacturing districts. True, many substitutes for oak bark, such as hemlock, gambier, and other materials, have been resorted to, but none of these, I believe, are able to take the

place of oak bark, and "oak-tanned leather" still commands the highest price in the market. I do not know the present prices of oak bark in the United States—whether 100 kilograms in a broken state ready to be ground, and bought where grown, would be dear at 7½ guilders ($3); but if the price of it should be the same as of mangosteen shells bought out here for the same price, the prices of both the same there and here—the mangosteen shells having one-sixth more tannic properties would be more valuable—the difference would more than pay for the freight, besides proving a valuable article of freight for our ships, being easily shipped, and, owing to the hardness of the shell, not liable to spoil or to suffer from sea-water, except after long submersion.

That mangosteen shells contain much tannin and are a very strong astringent I knew long ago. The Malays when they want to check bowel complaints of serious character grate or cut fine the shells, make tea of the same, and use it with good results. This is well known here. About ten years ago an eminent Austrian naturalist and physician, sent by his government to the Indo-Malayan Archipelago on a scientific tour of exploration, had his attention drawn to the shell of the mangosteen fruit as a powerful astringent, and its common use among the natives as an antidote against the diseases mentioned. It would seem that after his return to Vienna the imperial family read his report, and noted the medical value of the mangosteen shell, for about six years ago, when cases of Asiatic cholera had occurred in Austria, the Austrian consul here, who was then my near neighbor, was written to by request of Her Majesty the Empress to cause a quantity of mangosteen shells to be procured, and to ship them with dispatch to Vienna, where it was believed they would answer for checking cholera, in case the latter should make progress.

To order mangosteen shells from here for the cure of cholera was a mistake; for no one *here* ever heard that they had been used for that purpose. Still, as a remedy for dysentery, if taken immediately on being attacked, the astringent is very effective.

THE MANGOSTEEN FRUITS.

The mangosteen is beyond any doubt the choicest, most refreshing, and wholesome fruit in this part of the world, and is found throughout the whole Indo-Malayan Archipelago, and in New Guinea, say between the twelfth degrees north and south latitudes. Strange to say, it does not thrive well, if at all, in other tropical countries within the same degrees of latitude. In Siam and in French Cochin China there are large orchards of it; also on the Malayan peninsula, wherever human habitations are found. It is equally at home, and plenty, on the large and small Sunda Islands, in the Moluccas, and a naturalist told me that he found them growing plentifully in the forests of New Guinea. On the peninsula of Malacca, in Sumatra, and Borneo, large groves of them in a wild state can be found, generally near the banks of rivers and creeks.

My opinion is that they were originally planted by Malays who lived there, and abandoned their settlements owing to internecine wars, or to change lands. The Malays are more or less of a nomadic disposition. Their abandoned orchards, indigenous as the mangosteen tree is, took care of themselves like other forest fruit trees, and the seeds of the fruits, dropped here and there by birds and monkeys, rooted easily.

The wild mangosteen fruit is just as good as the cultivated, only a little smaller. My experience is that the trees yield fruit, generally very abundantly, about three times in two years, or, to be very safe, four times in three years.

In seasons when rain squalls and fine weather alternate regularly, with a slight preponderance for rain, they bear best. The tree, in ground and atmosphere, likes much moisture. If the natives, throughout the mangosteen-producing countries and islands named, should once become aware that they can sell the shell of the fruit, or that it had become an article of export, there would be no great difficulty in securing immense quantities of the same, and, the trade once inaugurated, it is my opinion they might be had for less than $300 per 100 kilos. The average size of the fruit is about the same as medium-sized apple, while the average thickness of a shell is about one-third of an inch. The fact is, there is "more shell than fruit." I firmly believe that the said shells would make first-class "tanning material," that they are well worth a trial in our tanneries, and it is my opinion they might prove a valuable dye-stuff as well.

A. J. STUDER,
Consul.

CONSULATE OF THE UNITED STATES,
Singapore, June 14, 1881.

CULTIVATION OF TROPICAL FRUITS.

SAMOA.

With regard to the circular of September 28, inclosing a list of questions about different tropical fruits, I am sorry to say that I can give no information.

Oranges and lemons grow wild in Samoa; they are not cultivated at all. There are no figs or olives grown here.

W. BLACKLOCK,
Vice-Consul.

UNITED STATES CONSULATE-GENERAL,
Apia, Samoa, December 6, 1889.

POLYNESIA.

HAWAII.

The information sought can not be obtained, owing to the fact that no system of cultivation exists in the orange or fig. These fruits grow well in this climate, while the lemon and olive are scarcely known.

H. W. SEVERANCE,
Consul-General.

UNITED STATES CONSULATE-GENERAL,
Honolulu, December 3, 1889.

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