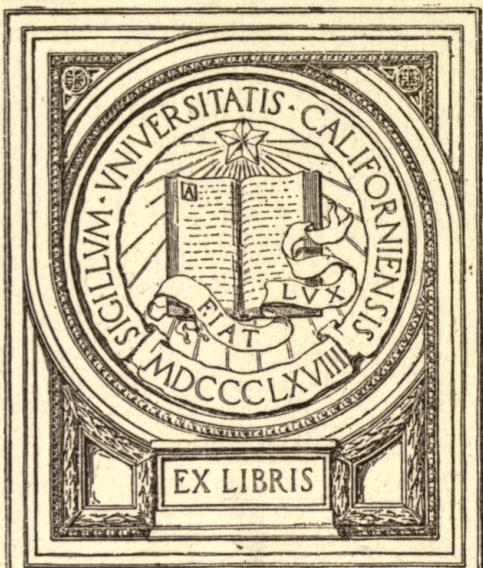


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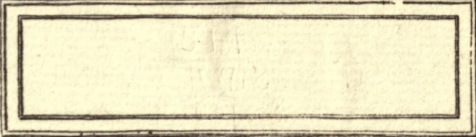
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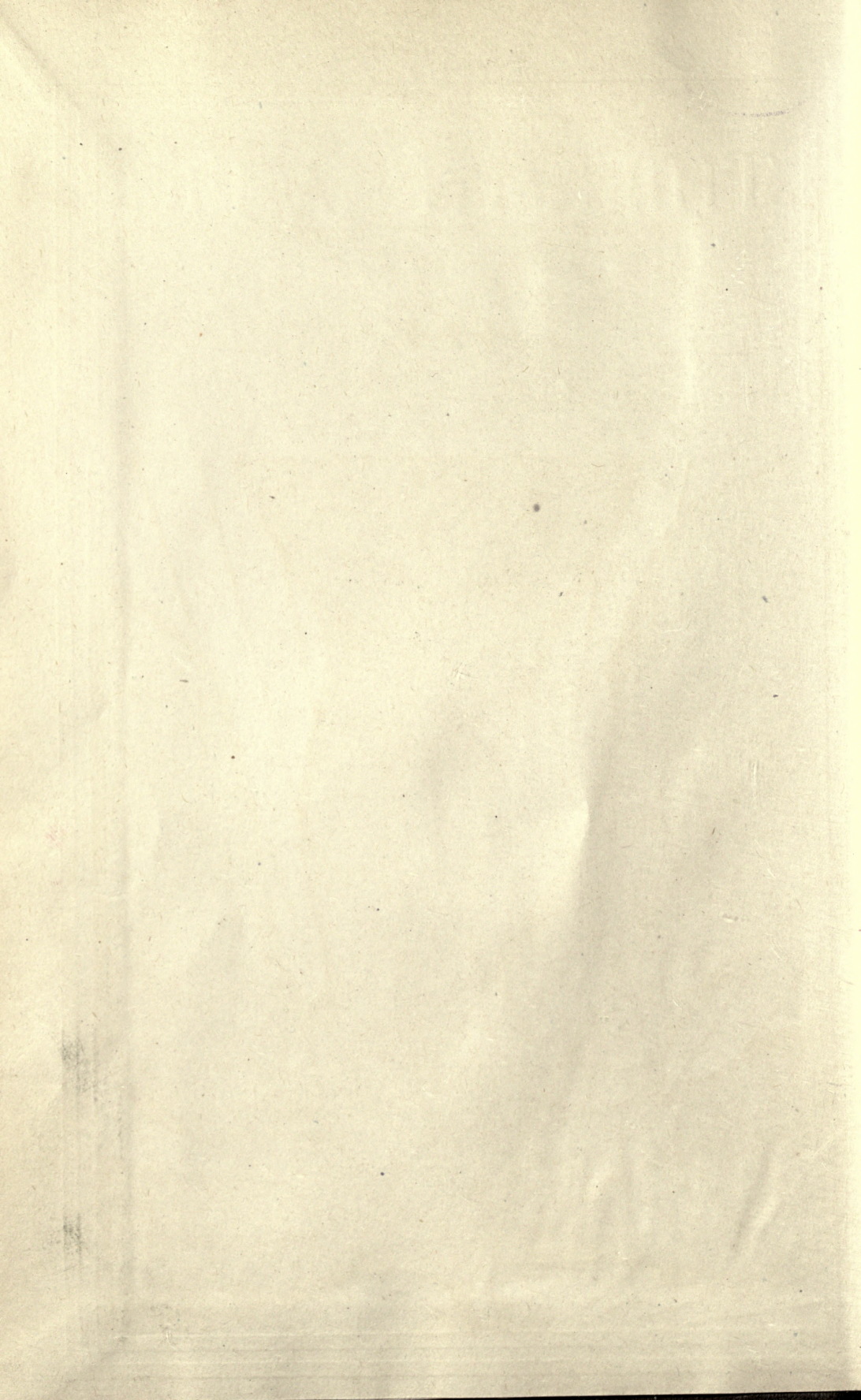
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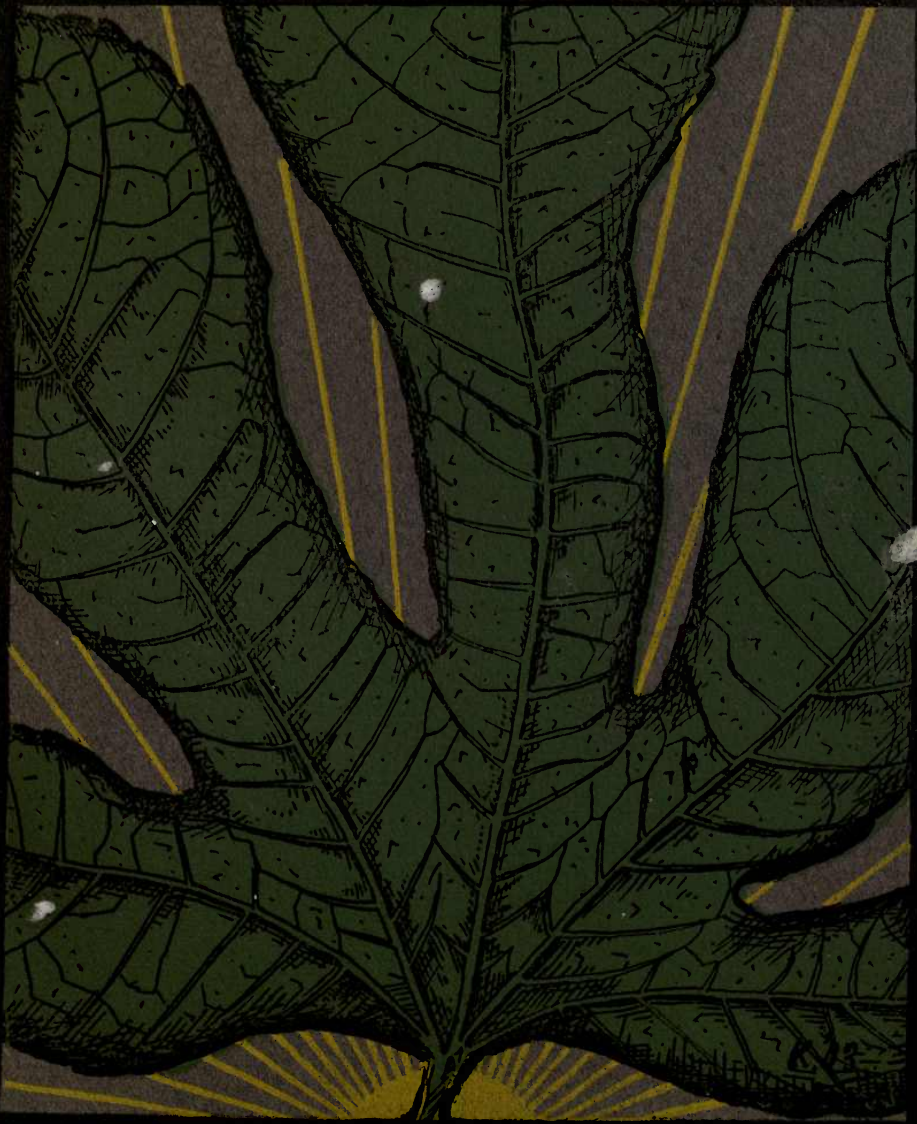
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THE SMYRNA FIG

AT HOME AND ABROAD



BY GEORGE C. ROEDING





From an original oil painting, very much reduced.

THE CALIMYRNA (SMYRNA) FIG IN ALL ITS GLORY.

THE SMYRNA FIG

AT HOME AND ABROAD

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A TREATISE ON

Practical Smyrna Fig Culture, together
with an Account of the Introduction of
the Wild or Capri Fig, and the Estab-
lishment of the Fig Wasp (*Blastophaga*
grossorum) in America. ❧ ❧ ❧ ❧

BY

GEORGE C. ROEDING.

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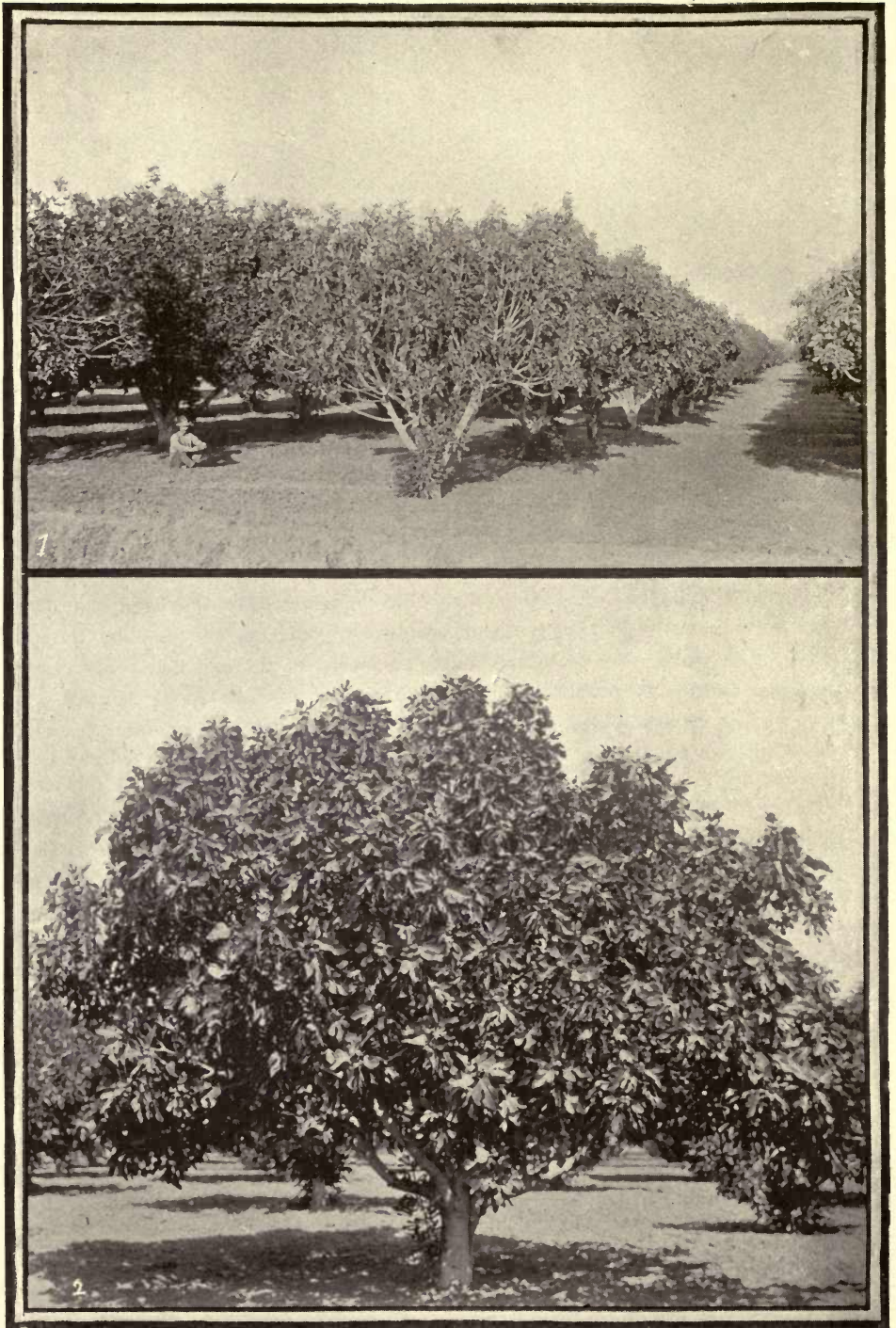
In the preparation of this book, the author has had occasion to consult the writings of various authorities on the question of fig culture in America, and especially that portion dealing with caprification. Acknowledgment is here made for the kindly interest manifested in the work by Hon. James A. Wilson, Secretary of the Department of Agriculture, at Washington, for placing the matter in charge of Dr. L. O. Howard, chief of the Division of Entomology, who was instrumental in successfully importing the insect; to Mr. W. T. Swingle, agricultural explorer of the Department, who was at the time in Southern Europe, and manifested the deepest interest in this subject; to Mr. E. A. Schwarz, of the Division of Entomology, for his careful and painstaking investigations and observations, made in the orchards of the Fancher Creek Nurseries, in 1900, bearing on the economic value of the Blastophaga; to Prof. E. W. Hilgard and Prof. Geo. E. Colby, of the University of California, for their kind efforts in analyzing the fruit; to Dr. Hermann Behr, for his advice and valuable suggestions extending over the entire period occupied in establishing the feasibility of caprification; and to the fig growers of the State, who have given encouragement, and manifested a deep and lasting faith, in the final and successful solution of the problem.

NO. 1000
UNIVERSITY OF CALIFORNIA

AT THE OPEN DOOR.

It is a trite saying that "Success comes to him who waits." It is now some twenty years since I first began experimental planting of the fig, with a view to its successful introduction into the Pacific States, and especially California. Conviction that it was possible, never for a moment left me, and though the failures, which have become history and the losses that many have sustained in planting this fruit, have at times been discouraging, the predominant idea that the genuine Smyrna Fig could be grown in this State and in the sheltered or thermal belt south of the Oregon line, in the Gulf and South Atlantic States, as well as in Hawaii, the Philippines and Australia, and the final solution of the problem, has demonstrated that my faith was not without good and redeeming qualities.

This monograph is the result of my personal experience with the fig in California, and it is now published in compliance with a great demand for specific information on the practical phases of the subject. My correspondence has become so voluminous as to make it a physical impossibility for me to keep abreast of the inquiries that keep pouring in. The aim of the book is to give the practice and methods which in my judgment will lead to the greatest success in the planting and culture of a Smyrna Fig orchard. The price is purely nominal, and merely covers cost of publication.



1. Smyrna Fig Orchard, Fancher Creek Nurseries. 2. Typical Calimyrna Fig tree, Fancher Creek Nurseries.

Reduced from original photographs.

THE HISTORICAL VIEW.

Who was the man who first recognized the economic value of the fig (*Ficus Carica*) in its native habitat, and who first took up a specimen tree from its wild environment and planted it in some sheltered situation along the thermal or foothill regions of Asia Minor or Persia? history does not mention. The records of the remote, as well as of the later period, are indeed sadly forgetful of the achievements man has wrought in the perfection of plants and fruits, calculated to contribute to his comforts and provide him food and shelter. Yet history records the deeds of an Alexander and a Caesar, and the lore of books immortalizes the works of a Plato and an Aristotle. The aphorism of satirical Dean Swift, "He who makes two blades of grass to grow where only one grew before, is more deserving of mankind than the hordes of politicians and literateurs put together," is indeed sadly out of joint both in the past as well as in the present. The spirit of the Anglo-Saxon is to the military rather than to the pastoral. He who introduces and perfects a new fruit of real value is quite as much entitled to the homage of his fellow man as he who conquers in battle, or wins renown in the halls of legislation, or in the arts and sciences. Hence, all honor to the pioneers in fig culture, whether in the valleys of the Orient, on the shores of the Mediterranean, or in the new home of its adoption in Western America.

The history of Smyrna Fig culture abroad, is shrouded in mystery and uncertainty, though books on this subject, without number, have been published during the past decade, in nearly all civilized languages. These, for the most part, deal with the botany, economic value, caprification, and natural history of the whole genus of *Ficus*. In view of this fact, their perusal and study is necessarily limited to people of a scientific and technical turn of mind, and does not appeal to the practical man of every day life, who is drawn to the subject on purely commercial lines. It is to this class, that the exploitation of fig culture on this continent and the islands of the Pacific, will command the widest recognition and secure for it the place its importance deserves.

The species which yields the famous figs of commerce, is botanically *Ficus Carica*, which under the influence of man has been developed into a large number of commercial sorts, many of which possess qualities of a high order and of value in the trade. It is quite generally admitted by the highest authorities, that the fig is indigenous to Asia Minor and Syria, but by dissemination through a long series of years, it is now found in a wild state in most of the countries aligning the Mediterranean region. Reference is frequent in the Bible to the fig, hence its spread even at the dawn of the Christian Era must have been quite general. The Greeks are said to have received it from Caria, hence its name. With them, it was one of the principal

articles of diet. From Hellas it must have found its way to Italy and the adjacent islands. The fig was held sacred by the Romans; the tree that overshadowed the twin founders of Rome in the wolf's cave, as an emblem of the future prosperity of the race, testified to the high value set upon the fruit by the Romans. The tree is now cultivated in all the Mediterranean countries, but the larger portion of the foreign supply of figs comes from Asia Minor, Syria, Greece, the Spanish Peninsula and the south of France. Those coming from Asiatic Turkey are considered the best, and under the name of Smyrna Figs constitute fully ninety-five per cent. of the dried and cured product in the European and American markets.

In Western Asia and Southern Europe, figs constitute a large part of the food of the natives, and their use among more northern peoples as a food is constantly on the increase. It is grown for its fresh fruit in all the milder parts of Europe and the United States, succeeding with protection in winter, as far as Pennsylvania on the Atlantic sea-board. In England it is usually trained against a wall, and sheltered with mats or branches against severe frosts, though in warm places near the southern coast, small plantations of standard bushes exist.

The history of the fig in the United States, and especially in California, is a record of strenuous efforts on the part of planters to successfully introduce the genuine Smyrna Fig, together with its essential adjuncts, the wild or Capri fig, and the Fig Wasp, *Blastophaga grossorum*. Outside of the Pacific Coast, however, it has never advanced beyond an amateur fruit. As early as 1833, Kerwick in the "New American Orchardist" described twenty-three varieties. Along the South Atlantic Coast, and in all of the Gulf States, figs grown primarily for their fresh fruit, have also been a feature of family orchards, and in not a few cases, some pretensions have also been made to produce the fruit in commercial quantities. The history of the fig in California, together with the successful introduction of the Capri, or wild fig, and the naturalization of the *Blastophaga grossorum* by the writer, with an account of his experiences in Asia Minor and Syria, as a Commissioner from this Government to investigate the Smyrna Fig industry, will be found in the following pages; also complete and minute instructions on soils and climates, planting and management of orchards, caprification and care of the *Blastophaga*, harvesting and curing of the fruit, packing, shipping and marketing, with a concise statement of the commercial prospects, and an outline of the industry as a whole.



PART I.

THE SMYRNA FIG ABROAD.

CHAPTER I.

OUTWARD BOUND.

Having become thoroughly convinced, after successfully producing the Smyrna Fig on a commercial scale in the year 1900, that we were on the threshold of a new industry, which promised to rival raisin and prune growing in importance, and run the orange a close race for first place, I decided to go to the very heart of the great fig center of the world, in Smyrna, and by personal investigation clear up many of the doubtful points in connection with the industry. After years devoted to experimental work, and the intense interest, which it naturally developed in connection with my investigations, this step at the time seemed to be fully warranted—an opinion since verified by the facts presented in this book.

Leaving San Francisco early in May, 1901, with my wife and family, I went directly to New York, and from there to Washington.

Dr. L. O. Howard, Chief of the Division of Entomology, having been previously apprised of my contemplated trip, kindly volunteered to secure letters of introduction to our representatives abroad, at such points as I might touch, but the matter having been brought to the attention of Hon. James A. Wilson, Secretary of the United States Department of Agriculture, he kindly gave me an appointment as Commissioner of the Department. It was largely due to the assistance and standing this document gave me, that my labors were brought to a successful and most satisfactory termination. The incidents of my trip across the Atlantic are not of particular interest to the reader, hence only a brief reference, by way of introduction, is here made to that phase of my experiences.

Boarding one of the huge express steamers of the Hamburg-American Line, "The Pennsylvania" (a boat capable of carrying 15,000 tons of freight), at Hoboken, on the 18th of May, we slowly steamed out into the Hudson, accompanied by music and the good wishes of our friends and the crowd, a common sight when any of these leviathans take their departure from New York.

Arriving at Cuxhaven after a pleasant voyage of twelve days, hurried good-byes were said to many friends and acquaintances, made en route. Our luggage having been passed by the courteous German custom officers, a compartment in the express was secured, and we were soon speeding along the banks of the Elbe to Hamburg. Berlin was the next point on the itinerary, where arrangements were made for the residence of my family during my absence in the Orient. After a few days' rest, preparations were made for the trip to Smyrna.

It will probably strike many of my readers as strange that I should be so anxious to reach Smyrna so early in the season, as the figs would not ripen until several months later. This anxiety will be more fully explained later.

On the second of June, I started on my journey across the continent to Constantinople, on the Oriental Express. This train, supposed to be one of the most elegant and palatial in Europe, consisted of a combination baggage and dining car and two sleepers, drawn by an engine, whose make-up reminded one of the engines of former days. An American, who is accustomed to so many comforts and conveniences when



1. A Calimyrna Fig tree in winter, showing habit of growth; orchard of Fancher Creek Nurseries.
2. Roeding's Capri Fig No. 1 in winter, with crop of Mamme Figs; orchard Fancher Creek Nurseries.
Reduced from original photographs.

traveling at home, must make a trip abroad before he can fully appreciate the luxuries of our modern palace cars, as compared with those of Europe. Their small size, lack of cleanliness in the sleepers, as well as the diner, make one long for our magnificent trains at home.

Passing through Southern Germany, Austria, Hungary, Servia, Bulgaria, and thence through Turkey, Constantinople was reached after forty-two hours travel. It will no doubt be of interest to the reader, to digress somewhat from the subject in hand, and give an idea of the customs and conditions abroad, as well as some interesting experiences, which fall to the lot of all travelers. Through Germany, the train sped along at a lively rate, but as it passed through the various countries, to the southeast, it slackened its pace, and when Turkey was reached, a snail would not have envied its movements.

Being somewhat familiar with the German language, I congratulated myself that I had some one to converse with during my journey. Imagine my surprise, when, in each successive country passed through, the entire train crew was changed. This also necessitated changing money to the denominations of each nation, and in the short space of forty-two hours, four such inconveniences took place. My utter ignorance of the language of the several countries, and unfamiliarity with the coins, placed me in a rather awkward predicament, and in paying bills there was no other alternative than to extend a hand filled with money and allow the collector to take what he wanted, by no means a pleasant experience for an American.

Every one knows that the Turk is a queer fellow, and that his love for his Christian brethren is not seasoned with very much honey. No privileges are extended to the tourist here, and if in his ignorance he transgresses the laws of the country, he pays the penalty either in fines or imprisonment.

Before reaching the frontier of the Turkish Empire, the conductor in the car informed me that it would be necessary to conceal all books and weapons, or they would be confiscated by the custom-house inspector, who was expected to board the train early next morning at a place called Musta Pasha.

Having hidden all articles, which were thought to be prohibited by the government, I retired with every assurance of being safe from molestation. When my compartment was invaded in the early morning, I confidently opened my valises, with every expectation that they would be passed. However, disappointment was my lot, for no sooner were the valises opened than the Turk espied a long black cylindrical object, which attracted his attention. Innocently I pressed a button and, lo, the compartment was flooded with light. My desire to show the gentleman the value and use of the cylindrical tube was the cause of my losing an electric lamp. Through the conductor I learned that the lamp would be returned to me the next day in Constantinople, but although several attempts were made to obtain it through the American consul, it never materialized. Later I learned that all electrical appliances were prohibited from entering the Turkish Empire, and so strict were the regulations that an edict had even been issued preventing the introduction of the typewriter. As a result of this measure, there is not an electric light plant in the entire empire, with one exception, and that is in the Pera Palace, the leading hotel in Constantinople, this plant having been installed before the law went into effect, and by special permission it had been allowed to remain. And why all this foolishness? Simply because a prophet had warned the Sultan that in electricity there lurked danger and that his life was at stake if he allowed electric appliances to be introduced into his domain.

Having passed through one inspection, I thought my troubles were over, but, to tell the truth, they had only commenced. On alighting from the train in Constantinople, I was met by a delegation of officials, demanding my passport. After asking several questions as to my occupation, et cetera, this was also to my surprise taken away from me, due to my not having it vised before leaving Berlin. To my

surprise another set of officials requested to see my valises for another inspection. All the books, etc., had been replaced, and to say that my heart was in my mouth would hardly express my feelings. However, my fears were groundless, for a few coins passed into the ever open hand of the officials by my guide, who had been telegraphed for previously, and who met me at the train, caused the grips to be closed with a snap. My guide having procured a carriage, and with the baggage piled around me, our driver dexterously piloted the way through the vile streets of the city and landed us at the hotel without further mishap.

My stay in Constantinople was to be of short duration, for arrangements had been made to depart on a steamer for Smyrna the same day. New troubles now arose. In Turkey, one cannot travel without a Turkish passport, called a *Teskera*, and how to get this, after having had my other passport taken from me, was the problem. In company with my guide I called on the American Consul General, who by the way was Mr. Dickerson, prominently connected with the rescue of Miss Stone from the grasp of the bandits. The consul being absent the only credential I possessed, viz., the commission from the United States Government, was presented to the vice-consul, my predicament and the importance of departure that day for Smyrna fully explained, with a request that I might proceed on my journey. This he stated was an utter impossibility, for not having my passport properly vised, it would take some time to secure the *Teskera*. Turkish officials take their time in attending to business and my experience would have been no exception to the rule, but by the liberal use of *baksesh*, the official machinery was accelerated, and by 2 P. M. a properly vised *Teskera* was handed to me.

The day before my arrival there had been quite a rain storm in Constantinople, and the streets were reasonably clean, but the bad odors for which the city is noted are truly emphatic, and are one of the first disagreeable features noticeable to the traveler, particularly in the lower part of the city, bordering on the Bosphorus, where the ground is quite flat. The next feature that impresses itself on the foreigner is the narrow streets, paved with rough stones, and so full of deep ruts that were it not for the rattle of vehicles, the yelling of drivers, and the vociferous voices of the street fakirs, one would almost be led to believe while riding, that he were on the high seas.

Everyone has heard of the dogs of Constantinople, and the reports have not been exaggerated, for no matter where you turn, these scavengers are to be seen in groups of from six to ten, sunning themselves on the sidewalks. Pedestrians rather than disturb them, pick their way gingerly over the cobblestones in the streets. A mother dog with a litter of pups, carefully protected from the weather with a canopy, which some kindly resident had made for her, is no uncommon sight in the main streets of the city.

Highly elated in having secured the *Teskera*, I started from the hotel with the guide, for the quay, fully an hour and a half before the steamer was scheduled to leave. Calling at the steamship office first, in order to exchange the Tourist Company's ticket for one of theirs, I was indignant to learn that an additional sum was necessary to that already paid in order to secure passage on the boat leaving that afternoon. This steamer, instead of going direct to Smyrna (a trip of twenty-four hours) called at several ports en route, so that the trip occupied several days, and for this reason additional fare was charged. As there was no other steamer for a number of days, my only alternative, after making a vigorous protest, was to pay the additional sum required. Money flows like water when you travel in the Orient, and plundering an American is one of the pastimes of all the many nationalities of the Ottoman Empire. The exciting incidents of the day, however, were not yet over, for on reaching the pier we were surrounded by a rough and uncouth crowd of porters, all of whom clamored for the privilege of carrying my baggage to the small

boat at the foot of the wharf. A few pointed remarks from my interpreter silenced the crowd, and having selected two of the porters, we proceeded down to the dock. Just before embarking another attempt was made to examine my baggage, but a few coppers placed in the palm of the official had the desired effect, and my baggage was stamped and loaded on the boat. We were quickly rowed out to the steamer, which was anchored in the stream. She was a small iron tub of a thousand tons burden, and her steerage and second class passengers were as untidy and dirty a crowd as one seldom sees. Among the first-class passengers were several Englishmen and Germans, so my trip was not as lonesome as I had anticipated it would be. Late in the afternoon, our staunch but dirty little boat steamed out of the Bosphorus into the Sea of Marmora, leaving the Golden Horn to our right.

Once away from the dirt and bad odors of the Turkish capital, its many mosques and striking minarets, and the finer residences on the higher elevations in the background, with the sun sending its glancing rays along the many colored roofs, odd buildings and palaces, made a pretty picture, not soon to be forgotten. The following morning we passed through the Dardenelles, where a short stop was made to unload passengers and freight.

Our next stop was at Mt. Athos, where we arrived the same afternoon. This is the most southerly peninsula of Turkey, and is noted for its large and ancient monasteries. The peninsula is heavily wooded with a luxuriant growth of olives, arbutus, laurel and oaks, and rises very abruptly from the water's edge.

The monasteries, situated in various parts of the peninsula, make a striking picture with their white walls, peeping out from the mass of green vegetation which surrounds them. The steamer drew close to the shore, the water being very deep, and during the short stay, some of the monasteries near by were visited. Fortunately, among the inhabitants, I found a Russian who had resided in New York, and who spoke very good English, from whom much of interest was learned of the inhabitants and their mode of living. The inhabitants consist mostly of Russian and Greek monks, members of the orthodox church, and although they are constantly migrating there are said to be fully 15,000 of them on the peninsula. Females, either bipeds or quadrupeds, are never permitted to land, and I was informed that there were monks located on the peninsula who had not seen a woman in fifty years. Birds and insects thrive and increase without molestation, and particularly the bed bug, which seemed, so I was told by a gentleman who had spent several days visiting the monasteries, to be very much at home in all of them. The monks make a rather striking picture in their long hair, their peculiar headgear, and cassocks, and if they were only a little cleaner would be fine looking men.

The next day we reached Salonica, June 10, an important seaport town of Turkey. No sooner had the steamer dropped her anchor in the offing than she was surrounded by a jabbering crowd of boatmen. Having signified my intention of going on shore for a few hours while our steamer was unloading freight, I was besieged by the yelling, fighting horde, who beckoned, pleaded in their broken pigeon English to be allowed the privilege of rowing me to shore. The scene became so animated I was finally compelled to retire to my cabin to get a few moments respite. Selecting one of the quietest of the lot, in company with a passenger familiar with the Turkish language, we were rowed to the wharf. The town is well situated on a slightly elevated plateau, rising gently from the shore. The streets are paved in a similar manner to all Turkish towns with rough stones, but the place as a whole was far cleaner than Constantinople. Commercially it ranks second in importance to that place, and has a population of 150,000, at least one-half of which are Jews. A close inspection of the city was not possible, due to the limited amount of time at my disposal, still one of the leading mosques, and a Jewish school were visited, and also several of the bazaars. This school is situated in a

small park, quite prettily laid out, while the children, young and old, were neatly attired and evidently belonged to the better classes. After partaking of an excellent meal at one of the leading restaurants, we returned to our steamer, but in a carriage; as the rain was coming down in torrents and walking was out of the question. Our boatman was on hand, his anxiety to return us safely being enhanced by his not having received his fare.

Late on the afternoon of the 11th, the steamer touched at Smyrna, situated at the northeast corner of the Bay of Smyrna. The steamer travels close to the shore for a number of miles, and the greyish green of the olive trees, interspersed here and there with the bright green of the vineyards, makes a striking picture with the dark uncultivated hills for a background.

No sooner had our steamer dropped her anchor than a violent rain storm sprang up, and it was some little time before we could land. Rain in Asia Minor in June is very unusual, as I was informed later on, but the season of 1901 was an exception in this respect.

Examination of my baggage had to be gone through with as usual, but no particular difficulty was encountered except that all my books were taken from me, but after they had been scrutinized by one of the scholarly custom house officials, nothing inimical to the welfare of the Sultan's realm having been found in them, they were later on, after I had furnished the material to grease the governmental wheels, returned to me. Guides are always on hand in all Oriental countries, and having found one who spoke German, I was conducted by him to the "Grand Hotel Huk," located close to the quay and the landing place for all passengers coming to Smyrna by water.

Grand is a prefix which all the hotels are blessed with, whether good, bad or indifferent. The Huk was nothing to brag of. It was here I had my first experience with the lively bed bug, but my troubles were mild as compared with my experience in other places in the interior towns of Asia Minor.

Registers are unknown in these parts, and I therefore handed the portier my card, little dreaming at the time it might get me into trouble. Events later on will show I had made a mistake.



CHAPTER II.

IN THE LAND OF THE SMYRNA FIG.

Smyrna is undoubtedly the most important town of Asia Minor, and is the principal commercial port of the Ottoman Empire. The city is well built, partly on level ground and partly on the lower slopes of Mt. Pagus. From the bright blue waters of the gulf, the eye wanders over the harbor crowded with ships of all nations, to the stately line of buildings along the quay, the towers and cupolas of the Christian churches, the tapering minarets, the tall cypresses in the cemeteries, the picturesque ruin that crowns Mt. Pagus, and the more distant hills with their graceful outlines.

Giaour ("Infidel") Smyrna, as it is called by the Turks, is divided into five quarters, viz., the Moslem quarters on the hillside in the higher part of the town, and the Jewish, Greek and Armenian quarters in the lower and flatter portions. The Frank quarter consists of three streets running parallel with the quay, and is occupied mostly by Europeans. The consulates and many fine marble front residences are located in this quarter on the street facing the quay; here are also numerous open-air theatres, cafés, all of which face the water's edge. At night from 6 to 10 P. M. in the summer, the inhabitants (that is the better classes) congregate and promenade up and down the quay, patronize the theatres and cafés, and have a general good time. This quay is two miles long, and is a substantial affair, being built of solid blocks of stone. It was constructed by a French company in 1870-'75. A street car propelled by mule power, traverses its entire length.

The climate as a whole is delightful; in summer the temperature often runs over 100 degrees in the shade; the heat, however, is tempered by the afternoon trade winds, so that the inhabitants have little to complain of.

The population is in the neighborhood of 300,000, and includes nations and creeds from all parts of the world, although the greater number are Moslems.

The following day after my arrival in Smyrna, I called on Dr. Rufus W. Lane, the American consul, presented my credentials, and explained to him my mission. In order to carry out my objects successfully he kindly promised to give me all the assistance in his power. On his advice and suggestion I engaged the dragoman and interpreter of the consulate as my guide, a Mr. B. J. Agadjanian, who was born in Smyrna, spoke excellent English, having resided in New York for a number of years, hence thoroughly familiar with the country. Having many friends in various parts of Asia Minor, he assisted me very materially in pursuing my work.

Needless to state here it was for the purpose of learning definitely all the facts in connection with the caprifigation of the Smyrna fig, that I made my hurried trip to Smyrna. It was intimated to me by several, including Dr. Lane and the dragoman, that I had arrived too late to observe this interesting phase of the question. Very much perturbed on receiving this information, after having traveled 8000 miles with only this one object in view, I determined to learn all the facts myself. In company with my interpreter, we engaged a carriage and drove out into the suburbs.

Numerous fig trees were seen, mostly of the Bardajic variety, and I had almost given up in despair of finding a Capri fig tree, when on descending into a small valley

close to an ancient Roman aqueduct, I happened to find a tree with the Profichi or male crop just commencing to mature. Very much elated I returned to Smyrna, and on the following morning started for the interior. Having learned meanwhile that the climate of the great fig district was very similar to that of Smyrna, I was satisfied I had arrived just in time to watch the workings of the insects in this the most vital stage.



Type of Entrance to a Smyrna Fig Garden in the Herbeyli District.

Reduced from an original photograph.

The first forty-eight miles after our train leaves Smyrna is a rather undulating plain, with vineyards here and there, but the leading industry is the raising of cereal crops. To see the natives harvest a crop is a sight which to an American closely approaches the ridiculous. The laborers gather a few sheaves of the barley and wheat in their hands, and cut it with a small hand scythe. Even with cheap labor, this ancient manner of harvesting is rather expensive, but in all the great grain districts this is the plan usually followed.

Ayassoulook is the first station of any importance in the fig district. It is situated close to the ancient ruins of Ephesus, the plateau being rather low and swampy. It is on the higher lands after leaving this point that the first fig orchards are to be seen. An agent of the Ottoman Railroad, who spoke excellent English, happened to be in our compartment during the trip, and from him I obtained much information of value in reference to the Smyrna figs. After our train left Ayassoulook the railroad ascends a steep grade, going high into the upper foothills, and then by a pass it reaches Balachik, practically the commencement of the great fig district of the Maeander Valley.

The orchards close to Ephesus comprise several hundred acres, bounded by the railroad on one side, and the ruins of Ephesus on the other. The Maeander Valley practically grows all the figs for export. It is about 200 miles long and from six to ten miles wide. The orchard district proper is not over ninety miles long; commences

at Ayassoulook and ends at Denizli. The general direction of the valley is northeast and southwest, with the fig orchards along the lower foothills and level plains on the north, just above the swampy ground of the river bottom. The Maeander River is a rather sluggish, shallow stream, flowing along the opposite side of the valley. The hills, which rise rather abruptly from its banks, are barren and almost void of vegetation, entirely unlike the opposite side where the olive, grape and fig thrive



Method followed in planting cuttings to start young trees in the Maeander Valley, Herbeyli District.

From an original photograph.

luxuriantly. The river bottom is devoted to the culture of cereals, cotton and licorice. The fig orchards are not over a mile wide at any point along the northern slope. The soils vary from a deep red loam on the higher ground to a rather sandy, gravelly, but very deep soil on the lower table lands.

Irrigation, except for starting young trees, is never practiced, in fact is not required, the rainfall averaging from twenty to twenty-five inches annually. The

rainy season starts in in October and continues until May. The climate of the valley is similar to that of Smyrna, except that it is somewhat warmer and the atmosphere does not cool off so quickly not being so close to the sea. The railroad which passes through the villages of Blachik, Deirmenjik, Herbeyli, and Karabounar, derives an immense annual revenue from the transporting of the fig crop.

After leaving Denizli, the railroad makes a rapid ascent, and no more fig orchards are to be seen. In recent years, the finest figs have come from Balachik and the small district just above Ephesus. The railroad runs through the very heart of the district, and as our train sped along, I had a splendid opportunity to watch the general condition of the orchards and the trees. I was particularly impressed with the fact that as far as my hurried inspection went, all the trees were of one variety, and this was still further confirmed when I examined the trees more closely later on. Strange as it may seem, not a single tree of the commercial variety is to be found growing in the outlying districts of Smyrna; the Bardajic, the great table fig, an occasional Kassaba, and one or two others which I could not identify and the names of which were unknown to my guide, were the only ones found. These trees are caprifiged, but in nothing like the systematic manner in which the work is carried on in the fig district.

The principal city of the valley is Aidin, which has a population of over 25,000, and is the commercial center of the fig district. It is situated on both banks of the Endor, an affluent of the Maeander, at the foot of the precipitous hill on which the ancient city of Tralles stood. From the higher portion of the town a grand view of the valley is obtained. Similar to all Turkish towns, the streets are all paved with rough stone, making walking very difficult. It is a great cotton mart, has a number of tanneries, in which fine morocco is made, and the helva and other sweetmeats are famous. The streets are narrow and slope to the center. The town is well supplied with water from springs, a stream of which flows almost continually through the streets, keeping them quite clean. Fountains are located in various parts of the town, in whose immediate vicinity there is usually a café, where the inhabitants congregate, drink Turkish coffee, and smoke their nargilehs. This is the national Turkish pipe, and is to be seen everywhere. It consists of a vase-shaped bottle, partially filled with water, through which the smoke passes before it reaches the mouth. A curious looking tobacco, especially prepared for this nargileh, is placed in a metal cup on the top of the jar. These cafés are all well patronized, and from the early morning hours until late at night they are well filled, particularly in the summer months. An immense plane tree (*Platanus Orientalis*) as a rule spreads its branches over the place in which the cafés are located, and affords shade for the easy-going and indolent inhabitants.

Fortunately my interpreter had among his friends in Aidin, a Greek gentleman of high standing, a Mr. S. G. Magnissalis. At his home I was very hospitably entertained. Hotels are the bane of the traveler's life in Asia Minor, for bed bugs are very much at home in all the caravansaries, and the traveler, who has an opportunity to enter a home of the better classes, has good reason to congratulate himself, for to sleep in any of the public hostleries is a torture not soon to be forgotten.

As has been previously stated, the object in making a trip so early in the season to Smyrna, was for the purpose of clearing up certain doubtful points in connection with the caprifigation of the Smyrna Figs.

Murray, in his hand book of Asia Minor, says in his remarks on this fruit: "Figs, a specialty of Smyrna, are grown in the Maeander Valley, and the curing of them is a Smyrna mystery." Verily, he told the truth, for the inhabitants are extremely ignorant of the entire subject of caprifigation, hence, it is not strange that the layman with no previous knowledge of the matter should have been still more mystified by

the unintelligible accounts given by men, who have been the possessors of fig orchards all their lives. All of the people in the fig district and in Smyrna proper are fully aware that without the Capri fig and the fig wasp (*Blastophaga grossorum*) no Smyrna Figs can be produced, but as to the life history of the insect and as to the manner in which it propagates its species, they know as little at the present time as did their forefathers of years ago. In fact, the American consul in Smyrna was the only person who was aware of the object of my visit to Smyrna. To others inquiring the nature of my business, I stated I was making a trip in the interests of the United States Department of Agriculture to investigate fruit culture and the

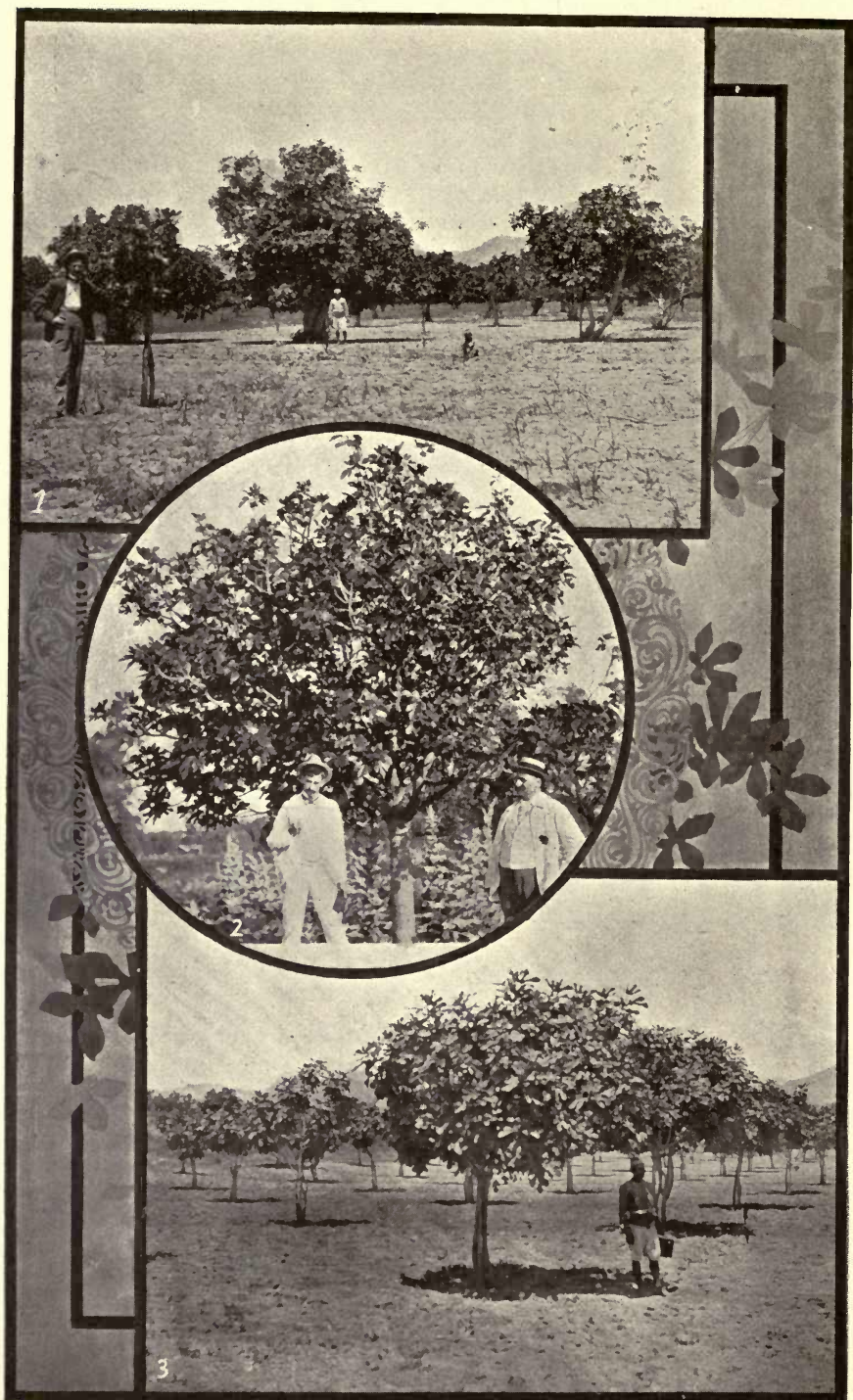


Type of Trunk of a Smyrna Fig tree, Herbeyli District.

Reduced from an original photograph.

methods followed in general in Asia Minor and Europe. Having represented to my friends that I regarded the necessity of an insect to produce figs a foolish custom, followed only in my opinion because their forefathers had done the same thing before them, they were extremely anxious to convince me that my views were incorrect, and took particular pains to give all the information they could. So ridiculous were their statements, I would, had I not had a previous knowledge of the subject, been more mystified than ever by what they told me.

The overwintering crop, known by us as *mamme*, is said to appear in February, and is called *boghadhes*. This is followed by the June or male crop, called *ashmadhes*. When this drops off, no further insects are to be seen, but in the following year, the flowers in the young figs appearing in February, are said to breed a new generation of insects. The number of young figs appearing at that time indicates whether the male crop will be heavy or not. All this is, of course, incorrect, but it indicates how little knowledge these people have of the entire subject. Let us now go into the whole subject more minutely, and get in close touch with the industry where it is native and where the world's supply of Smyrna Figs was produced until California horticulturists entered the lists and added a new industry to our rural economy and development.



1. A typical Smyrna Fig Orchard, Herbeyli District. 2. A Capri Fig tree in the garden of Mr. S. G. Magnissalis in the suburbs of Aiden. 3. Six-year-old Smyrna Fig orchard, showing method of training trees in the Maeander Valley.

Reduced from original photographs.

CHAPTER III.

SMYRNA FIG CULTURE IN ASIA MINOR.

VISITING A SMYRNA FIG ORCHARD.

My first insight into the methods of caprifying the Smyrna Fig was at Karabounar, in an orchard, the property of my host Mr. S. G. Magnissalis, located in the famous Herbeyli district. The visit could not have been made at a more opportune time, for on my arrival there, June 16, 1901, the Smyrna Figs were being caprified for the second time. Singular as it may seem, the Capri figs in the immediate vicinity of the orchards are never used, the natives insisting that better results are obtained when taken from other districts. This is another of their traditional theories, and cannot be of any importance, for there are so many Capri figs growing in close proximity to nearly all the orchards, that the Smyrna trees in many instances, (even if not caprified at all), would still produce good crops. The Capri figs are always picked in the morning before sunrise, for then the figs are cool, and none of the insects have commenced to issue. Before distribution, however, they are first strung on rushes (*Scirpus holoschoenus*), two at each end; these are found growing on the lowlands of the valleys in great profusion, the workman with a bunch of rushes and a basket of figs going through the orchard and stringing the figs, distributing as he proceeds. How often it was necessary to distribute the Capri figs and the number required to a tree were two of the important points which I wished to clear up. The number of times the Smyrna figs must be caprified depends entirely on the development of the young figs—a matter requiring some judgment. At the time of my visit, as already stated, the trees were being caprified for the second time, and as there were a number of young figs not developed enough to be in the receptive stage, I was informed another distribution of the figs would have to be made inside of six days. When the workman comes to a tree, he draws one of the rushes from the bundle, dexterously forces the stem end of the rush through a couple of figs, drawing them down to the blossom end, which has a small knob; he then strings two more at the same end, retaining the last fig in place by a sort of half hitch in the fig. This and other strings fixed in a similar manner are now thrown up into the tree at different points. From six to fifteen of these strings are hung in the younger trees, while in the gnarled old giants as high as twenty-five strings are suspended, depending, of course, on the quantity of the young figs on the trees.

While in the orchard, I examined a number of Smyrna Figs. When they presented a glossy green appearance on the outside and the flowers were of a creamy white color, invariably from two to three insects were found crawling around in each fig broken open. After the figs had developed beyond this stage, and even of a dull green color, the insects were found to be dead, indicating that the flowers had been fertilized and the figs had passed the receptive stage. The figs are distributed as far as possible in the morning before the insects have commenced to issue freely, although in many places the work proceeds all day, regardless of the fact that many of the wasps are lost, through the carelessness of the workmen in this respect.

MALE OR CAPRI FIGS.

In my trips through the fig districts, a great many varieties of Capri figs were found, none of which, however, were named. There seemed to be more or less variation in all the trees seen except in some instances where the grower had planted trees and selected the cuttings from a variety, which seemed to be valuable. The Capri figs are called "Ilek" in the Turkish language, which means male and as a rule are found growing in the gardens in the villages and towns, close to the high walls built to keep out intruders and thieves. No care is given them, and they assume any shape nature provides for them. It is no uncommon sight to see a steep river or creek bank covered with a dense growth of these trees. Isolated trees are found growing in the foothills and as border trees in the vegetable gardens close to the towns. Occasionally a small orchard is to be seen, in which case the trees were planted a number of years ago, when there was a scarcity of the Male fig. In recent years these trees have been grafted over to Smyrna Figs, but the work has been so badly done, due to the failure of the workmen to cut out the old wood, that all the trees are a mixed growth of Capri and Smyrna fig wood.

The Black or Purple Capri Figs are never used for caprifying purposes, as they are said to be wild and are not male figs. Examination of a number of these disclosed the fact that they contained just as many insects as the others, but nevertheless they are never used. None of the Capri Fig trees attain a very large size, a condition brought about by the lack of care bestowed on them, and through the fact of their being planted in places where they cannot develop properly. The Male or Profichi crop is the most distinct and the figs vary in color from a dark brown, purple, to green and yellow shades when maturing.

The general impression has been that different trees are necessary to develop the several crops. There is some foundation for this theory in the Mammoni and the Mamme, but without exception, all of the trees produce the Profichi crop. Hundreds of trees were examined and in not a single instance could a tree be found which was not loaded with the latter.

On my second visit to Smyrna in August a number of the Capri trees examined in June, were again carefully looked over, and on some of them, Mammoni Figs, were found, (but only in very limited numbers as this is always a light crop) just commencing to mature. A few of the Mamme were large enough to receive the insects, but most of them were quite small and were just forming in the old wood in the axels of the leaves. Quite a number of trees showed neither Mammoni or Mamme Figs, at that time, and it is quite possible that all of the trees do not develop these crops.

The ignorance of the people themselves, whether owners of fig orchards or not, as to the evolution of the insect, prevented my securing any information as to the development of the last two crops. My conclusions therefore in the matter are views based on what I saw. The size of the Mammoni Figs and the rather slow development of the Mamme crop would indicate that none of the trees produced more than three crops during the season.

CAPRI FIGS AS MERCHANDISE.

Selling bugs is something new in the line of horticulture, but it has been carried on for hundreds of years in the Asia Minor fig districts, Capri Figs being an article of merchandise just as much as the Smyrna Fig itself. The price of Capri Figs, like everything else, is regulated by the law of supply and demand. That the Capri Fig is considered an actual necessity is well illustrated by the prices prevailing in 1898. In that season the Boghadhes crop, corresponding to the Mamme crop, was practically ruined by frost, and the growers not having a supply of the Male figs, were compelled to secure their supply from the small island of Chios, about thirty

miles off the coast of Smyrna, where a great many Capri Fig trees are growing. The figs during that season sold for 50 piestas an Oke. An Oke is 2.83 pounds and a piesta is about $4\frac{1}{4}$ cents. In the season of 1901, the crop of Capri Figs was large and one piesta an Oke was the average price paid. Money is never too plentiful with these people, but so deep rooted is the fact that the Blastophaga must be present to develop their figs, they go to almost any extreme in price to secure what they want. In this connection it is a novel and interesting sight to watch the Turkish peasant women, their figures enveloped in a loose cotton garment, and their faces concealed from too observant eyes, come slowly walking up the narrow streets of Aidin in the early morning hours, with baskets containing from thirty to forty pounds of figs perched on their heads, and carrying in their hands bunches of the rushes neatly tied up for stringing the figs; the small donkey, the beast of burden for animate as well as inanimate freight, also contributes his share of the male figs. In this case they are carried in large burlap grain sacks, one on each side of the pack saddle; all, bound for the fig bazaar, a street designated by this name, deriving its title from the fact that it has been used for years as a market for selling Male figs. The fruit comes from the small gardens in the town or is gathered in the immediate suburbs.

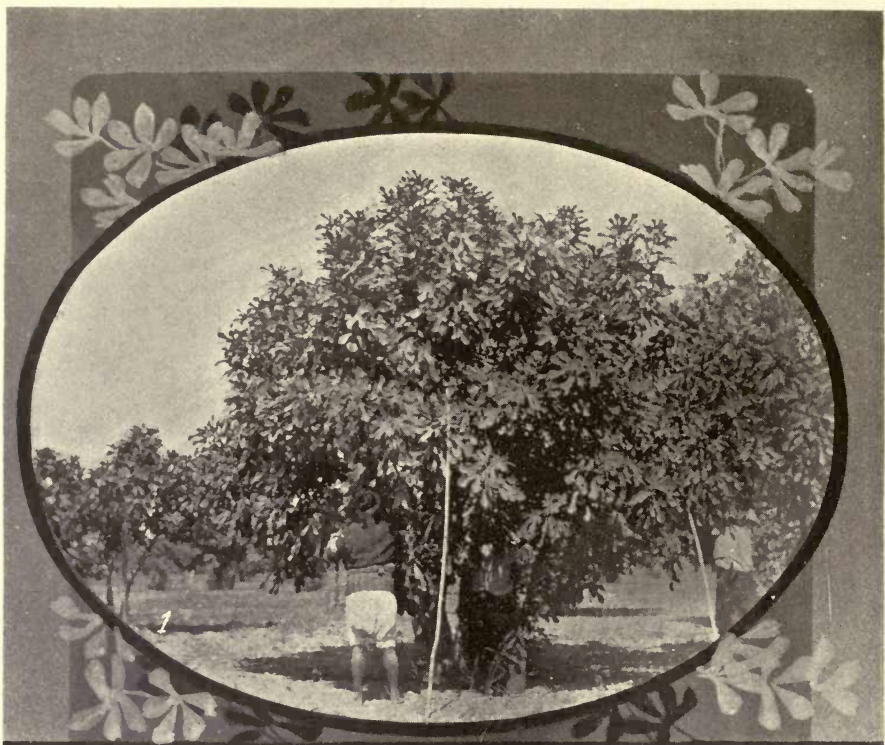
The women, with their baskets in front of them, squat down tailor fashion in the narrow streets, and silently and calmly await a purchaser of their wares. Being anything but handsome, great care is taken to conceal their faces from the eyes of the men, particularly of foreigners. Working in the fields and the hard life they lead makes all the women among the agricultural classes prematurely old. It is no uncommon sight during the height of the Male Fig season, to see from seventy-five to one hundred of these women congregated in the bazaar.

The buyers of the figs begin to arrive about 7 a.m. They take a fig from a basket, break it open, if the female insects are found to be crawling around freely, and the fig is well supplied with pollen, a sale is quickly consummated. The largest figs always command the best prices. The grower having secured his supply of figs, loads them in bags on his donkey, and goes to his orchard, which may be a number of miles distant.

Some remarks made to me by an old Turk, who had been in the business for years, on the value of the various insects in the figs, were indeed amusing. Breaking open one of them, and pointing to the male wasp, I learned through my interpreter that it was a very bad worm, the female wasp was pronounced to be a good insect, but the parasites, *Philotrypsis*, which were present in large quantities, were said to be the most valuable of all! Verily, a little learning is a dangerous thing.

FIG GARDENS.

This is the term applied to all orchards, whether of figs or other fruit trees. None of these gardens contain as a general rule, more than five hundred to one thousand trees, and where planted no other variety of tree or crop is grown among them. None of the orchards present a very attractive appearance. Trees are constantly dying out from want of care and from general debility, many of which are replaced with others planted in the very same spot. Trees of all ages from one year to fifty are growing in all the old gardens, giving them an uneven and spotted appearance. This unsightliness of the orchards is further enhanced by the mass of dead wood appearing above the green growth in the tops of the trees, caused by the terrible freeze of 1898. It was only in the season of 1901 that the trees fully recovered from this terrible ordeal. No regularity was observed in planting the older orchards and most of them are very much out of line, the distance between the trees varying from thirty to fifty feet.



1. Shaking a Smyrna Fig tree to cause such figs as have not fallen of their own accord to drop, as seen near Herbeyli. 2. Knocking off Smyrna Figs, which have not fallen when at the proper stage of maturity, with *Arundo Donax* poles, as seen near Herbeyli.

Reduced from an original photograph.

The bodies of the trees are made up of a number of stems of which all are more or less twisted together, and in many cases they are badly sunburned and rotted. Fortunately for the longevity of the tree, of the innumerable stems (although many of them are dead,) there are always enough to retain vigor in the trees until about fifty years old. The heart of the old trees are often badly rotted and the orchards throughout show neglect and lack of knowledge in cultural directions on the part of their owners. The current year's wood was found to be infested with a large brown scale, and the foliage with a small white scale, but neither of the pests are of a very serious nature, most of them perishing in the summer. The gardens are surrounded by walls, five to six feet high, made of dirt and covered on top with brush and thorny branches to keep out marauders during the harvest season. The entrances are all quite ornamental, heavy adobe or stone pillars, butting up against the dirt walls. To these are hung heavy wooden doors, on forged hinges.

CLIMATE.

The climatic conditions of the Maeander Valley are much the same as in Smyrna, except that it is slightly warmer in summer and very often very much colder in winter. The summer temperature varies from 95 degrees Fahrenheit, and in some cases the thermometer registers as high as 105 degrees in the shade. The rainy season starts in October and ends in the latter part of May. The agents of the Ottoman Railroad Company have kept statistics for a number of years as to the rain fall. The agent at Denizli permitted me to examine his report, and I found that the average for a period of ten years was about twenty inches annually, and in the year 1901, twenty-five inches had fallen. Irrigating the orchards is never practiced, and in fact is not necessary, except in starting young trees, when the water is carried to the trees in goat skins. Extreme cold weather occurs in some seasons, and the severity is evident from the manner in which the fig trees have been injured, as well as oranges growing in protected places in Aidin, being full of dead wood. As compared with the interior climate of California, particular reference being made to the Sacramento and the San Joaquin Valleys, it is very much warmer on an average in these valleys than in Smyrna, and it is only on very rare occasions it ever becomes equally as cold.

NEW ORCHARDS, PLANTING, CULTIVATION, ETC.

Before planting a new orchard, the ground is thoroughly tilled, but not very deep, the crude plows built entirely of wood with a V shaped iron nose, not permitting it. Two round pieces of wood extend a sort distance back from the iron point and on both sides of the wooden standard, causing the plow to throw dirt both ways. Greater care is exercised than in former years to have the trees set in regular rows and in lines. The trees are set from 30 to 35 feet apart, and on the square system.

Cuttings are used exclusively for starting new orchards, as well as for replanting old ones, where the trees have died out. These are cut about twelve inches long from good mature wood, the butt end having some two year wood. The cuttings are taken in January, heeled in, in moist warm ground, and as soon as they commence to callous, are planted in orchard form. Two cuttings are planted in each hole a few inches apart, in a vertical position, the idea being that in case one does not grow, the other will. If both of the cuttings start, they are allowed to remain. Care is taken to tamp the earth firmly around the base of the cuttings, and to water them to make sure of settling the earth well around them. Three short sticks are placed above the cuttings to show where they are planted, and care is taken in plowing the orchard not to disturb them in any way. The first season the trees are watered only when necessary. The following year, a stake is driven down

close to the young tree, and it is trained to branch from four to five feet from the ground. All the suckers are tied to this stake, and a tree where both cuttings have started, at three years old will have as many as five to seven separate stems at its base.



Drying Ground in the Fig orchard of Mr. S. G. Magnissalis, Herbeyli District, showing children of employees in the foreground. *Reduced from an original photograph.*

The exposure of so much wood to the sun without adequate protection, causes many of the trees, when about six years old to deteriorate, and were it not for the numerous feeders, their lives would be of short duration. On pointing out that this method of pruning was injurious to the well being of the tree, and that it would be better to follow another plan, I received the characteristic reply: "Our forefathers grew the trees this way, we know of no other method and follow in their foot steps." The branches forming the stem are twisted around one another in many cases, and this is one of the causes of the gnarled appearance in the older trees. After the body of the tree is strong enough to support itself, the stake is removed, and in after years, little care is bestowed on the trees, except to remove suckers, and cut out branches extending down too low and interfering with the cultivation of the orchard. Interfering and crossing branches are never removed, and as the trees develops, it presents a mass of twisted stems and branches, through which the sun can never penetrate. All trees present this appearance as they grow older, and although the density of growth might be obtained to just as good advantage by following a more modern plan, the ultimate aim of the method followed is to have the figs to a certain extent in the shade. Wasps enter figs so protected more freely than those exposed to the direct rays of the sun.

The plowing of the orchards commences in October, and this work is repeated four to five times during the winter and spring months, up to the first of June, when the ground receives no further cultivation. Clean cultivation is the rule rather than the exception, but many of the orchards present an unsightly appearance owing to the presence of Johnson Grass and Wild Morning Glory, which have made them-

selves as much at home in Smyrna as in the rich valleys of California. No measures have been taken to eradicate either of these obnoxious weeds, but their spread is somewhat retarded, as irrigation is not practiced.

JEALOUSY OF THE INDUSTRY.

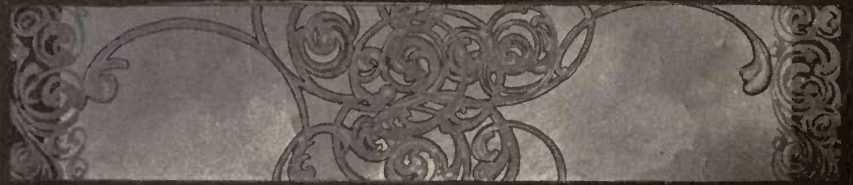
My peace of mind was somewhat disturbed during my stay in Aidin by the news that an article from *The Saturday Evening Post* of Philadelphia had been copied in a Greek newspaper printed in Smyrna. This article referred to an extract from Dr. L. O. Howard's report on the Smyrna Fig in California, printed in the Year Book of the United States Department of Agriculture in 1900. My name, with that of others interested in the introduction of the Smyrna Fig, was mentioned a number of times. A copy of *The Post* had no doubt been sent to a correspondent in Smyrna. The subject was of such vital importance to the Smyrnoites that it was given a great deal of prominence, and was printed in its entirety. My host and interpreter were under the impression I knew nothing about the fig business, but after this article appeared, I was compelled to admit that I and the Roeding named therein, were one and the same person. Not a very pleasant experience after having practiced the deception on them, to be sure, but as they took the matter in good part, I congratulated myself on having fallen into such good hands.

Before my departure to Smyrna, I had the pleasure of giving my host an insight into the life history of the fig wasp. After explaining to him how the insect propagated its species and the manner in which it passed from one crop of Capri Figs to the following one, he exclaimed, "I have been the owner of fig orchards all my life and my father before me, but your explanation of how the little insects performs its functions is the first clear understanding I have ever had of the subject. Strange you should come here to make an investigation of the matter when you already know more than any of the residents and owners of fig orchards here." I explained to Mr. Magnissalis, I had made the trip for the purpose of clearing up certain practical points, which could only be understood by personal investigation on my part.

On my return to Smyrna it was deemed expedient by my interpreter as well as myself, to change my name, from the fact that my being in Smyrna had been widely circulated in the newspapers. So as not to be annoyed by reporters, who might want to interview me, and then cause obstacles to be placed in my path, I passed under the nom de plume of "James George," a wise plan, as I ascertained afterwards, the public having been warned not to give me any information, as it might lead in the end to their losing one of their most important industries.

My next trip was to Kassaba, a large town of considerable importance and the center of the cotton district, and celebrated for the excellence of its melons. Certainly not entitled to any credit for melons, for those sampled in my second trip in August were of very inferior quality, no doubt due to the fact that the seed from the same strain was being used year after year. The Kassaba Fig trees grown here are fine, symmetrical trees, much handsomer than the Lop Fig grown in the Maeander Valley. No trees are planted in orchard form, only a few growing here and there in the vineyards are met with. The figs are not dried but are eaten fresh. The Lop figs are not grown at all. An attempt has been made to grow them, but the fruit was said to be so inferior to that grown in the Maeander Valley that no further attempts were made to grow this variety.

With the expectation of finding the "Lop Injir" elsewhere, or varieties equally as valuable from a commercial standpoint, other districts were visited, but no gardens were to be seen. The only trees visited were planted as borders or in vineyards or small gardens for home use. These all required caprification, but no attempt was



1. Spreading Smyrna Figs for drying on rushes, (*Scirpus Holoschœnus*) Herbeyli District. 2. Gathering Figs in baskets, Herbeyli District.

Reduced from original photographs.

made to do this artificially, there being enough Capri figs growing in the immediate vicinity to supply the edible figs with insects. At Narli Dere, located six miles south of Smyrna, one of the great vineyard sections, a San Pedro fig known under the name of "Vidi Veren Maning," "7 Giver," was found growing in one of the vineyards. This and the Bardajic were the only two varieties, in neither of which Capri figs had been distributed, which does not seem necessary, the insects coming of their own accord to the female figs, and of course caprify them. The Capri Fig trees grow in the mountains near by, so I was informed, and the insects migrate pretty much over the fig district. Having thus obtained all the necessary information on the subject of caprification during my first visit, I took my departure from Smyrna the latter part of June with the intention of returning in August to observe the methods followed in harvesting the crops.

My first stop was at Athens, where four days were spent visiting the vineyards and ancient ruins. Time did not permit of my visiting the fig districts in the extreme southern part of Greece, where figs of a very inferior grade are grown, and where caprification is also practiced. Distinct types of Capri Figs and also edible figs were observed along the roadways leading out of Athens, but information as to varieties could not be obtained. The Capri Figs here were much later in reaching maturity than those in Smyrna, due, no doubt, to the season in Greece being somewhat later. Leaving Piraeus, on one of the steamers of the Messagerie line, my next stopping place was Naples, Italy.

Vesuvius, the ruins of Pompeii, and many other points of interest were visited in the limited time devoted to this place. My itinerary included a visit to Rome, and many other important cities of beautiful sunny Italy, before returning to Berlin, but illness made it imperative for me to go direct to Germany without making any stops. Having fully recovered from my spell of sickness in Berlin, in company with my wife, a tour was made through Germany, Switzerland, and thence through France to Paris. Returning to Berlin the latter part of August, preparations were made for my second trip to Smyrna.

DIFFICULTIES OF THE SECOND TRIP.

The Bubonic plague, which had been creating more or less havoc in Egypt for several months, was reported to have made its appearance in Constantinople, and that port had therefore been quarantined. The Tourist Company would sell tickets to Constantinople, but no further; none of the steamship lines being permitted to take passengers from the infected port, or if they did, the passenger had the prospect of spending a couple of weeks in a Turkish lazarette on his arrival in Smyrna, by no means a pleasant outlook.

Steamer connections from Italy could not be made without a great loss of time, so wiring to my former interpreter at Smyrna of my predicament, he wired back that there was a way out of the difficulty, and told me to start for Constantinople at once. My trip from Berlin was made over the same line I had previously traveled by, but the experience gained in my travels prevented a repetition of the difficulties encountered on my first trip.

On arriving at Constantinople, Mr. Agadjanian was there to receive me. Having taken the precaution to have my passport vised at the Turkish Consulate in Berlin before starting on my second trip, the vexatious annoyances of my first trip were avoided. During my brief stay of two days in Constantinople, my time was taken up in visiting the suburbs around the city, the leading mosques, including the largest and most historical one, Santa Sofia. It was finished something over thirteen hundred years ago, and dedicated to Christ. In the year 1453, when the Turks captured Constantinople, it fell into their hands, and from that time it has been



1. Flat car loaded with Goat Hair sacks filled with Smyrna Figs. Guards in charge waiting for train to start. *From photograph taken at Aiden.* 2. A Fig Train. *From photograph taken at Karabounar.*

dedicated to the Moslem faith. It still retains much of its splendor and magnificence, but its walls in many places have been defaced by the removal of the mosaics.

The country in the immediate vicinity of Constantinople is rough and rugged, vineyards and gardens are neglected, and rapidly going into a state of decay.

The trip up the Bosphorus from Constantinople to the Black Sea is one not soon to be forgotten. The shores on both sides are lined with pretty villages, and the hills in the background are clothed with trees and green vegetation. Here are to be seen the picturesque summer residences of the wealthier Turks and foreigners, and the summer palace of the present ruler and those of deceased Sultans. The dirt and the squalor of Constantinople are here forgotten, and the traveler is impressed with the beauty and air of cleanliness of the surroundings.



CHAPTER IV.

THE TRIP TO SMYRNA BY LAND.

To escape the quarantine regulations, the trip to Smyrna was made overland. Starting from Constantinople on the 26th of August, the Bosphorus was crossed on a small ferry boat, landing us at Scutari. Here a train was boarded, and for several hours we traveled close to the shore, getting a beautiful view of the sea of Marmora, and in the distance the snow-covered peaks of the Olympus Mountains. Just after leaving the coast, the train came to a halt, and we learned we were at the quarantine station. All the passengers were required to alight. The first and second-class passengers were marched into a building, their coats and vests were removed, and after being fumigated in a large cylinder, were returned. The lower classes were not accorded the same consideration. The women were marched into one building, the men into another. They were compelled to divest themselves of their clothes. The women in particular were loud in their objections, but it availed them nothing for they had to submit. After the better class of passengers had paid a fee of a quarter of a midjidi, about 25 cents, they received a certificate of good health. The fact of the matter is the quarantine regulations of the Turkish Empire are nothing more or less than a farce, and are maintained for the purpose of supplying the officials of the government with ready cash.

A few hours after leaving the quarantine station, the railroad strikes into the mountainous districts, and passes through a succession of valleys and narrow passes, all of which are heavily wooded. The former are very fertile and devoted to fruit and vineyard culture, but more extensively to the growing of the White Mulberries, to supply food for the silk worms, the production of silk being the great industry in this district. The trees are planted very close, about 8x8 feet apart, and headed three feet from the ground. In the distance they present the appearance of vineyards.

Late in the evening our train reached Eshki-shehr, where we remained over night. For fear of being wrecked by the superstitious and fanatical natives, trains never travel at night in Asia Minor. This town is of considerable importance, and is located on an immense plateau, devoted largely to the raising of wheat and barley, and also noted for its marble and meerschaum mines.

The night at the hotel was a constant torture. It was infested with bed bugs, and the persistence with which all the vulnerable parts of one's anatomy were attacked put all thoughts of sleep out of the question.

Early the following morning we boarded our train, and at noon arrived at Afum Kara Hissar, located in the center of a great district devoted to the growing of cereals, opium, and enjoying also an immense trade in wool, hides and beeswax. The altitude of the town is 3500 feet above sea level. Close to the town, and rising 800 feet out of the plain, the remnants of the old fortress of Acroenus, built in the Byzantine period, is to be seen. The place is largely populated by Armenians, many of whom are wealthy, and who occupy the best and cleanest portion of the town. No trees relieve the monotony of the low adobe buildings and dirty and crooked streets, giving to the place a dismal and uninviting appearance.

The climate of this district is unlike that of Smyrna, being very cool in summer and cold in winter, snow storms being a common occurrence. After partaking of a lunch with some wealthy Armenians, friends of my interpreter, we again boarded our train, bound for Uschak, another town presenting the same general outline as all the others located on this plateau, which ranges in elevation from 3500 to 4000 feet above sea level. Uschak is noted for the fine quality of its barley, most of which is exported to England, from which the famous English ale is made; also for its "Khali" Turkish carpets, their manufacture being the chief industry of the inhabitants. The looms used in their manufacture, of which there are said to be 2000, are all situated in their homes, entire families devoting their time to the manufacture of these carpets. The annual output, it is said, has a value close to a million dollars.

The "Quercus Aegilops," Valonia Oak, occupies great stretches of the plain in the vicinity of Uschak. The cups, which run from an inch to two inches across, are gathered in the fall of the year, the acorns are removed, and the cups are then shipped by rail to Smyrna. Here they are sorted into sizes, and eventually find their way to Germany, England and Russia. They are prized for their tannin. The famous Morocco and other high-grade leathers are manufactured by their use. They contain from 40 to 45 per cent. of tannin. The exports from Asia Minor of these oak cups, which are grown in many other districts, amount to from 15,000 to 20,000 tons annually.

Leaving Uschak in the morning of August 29, the railway runs through the mountainous districts until it reaches Ala-Shehr, the "Spotted City," which stands on a terrace beneath the range of Mt. Tornolus. The growing of licorice is an important industry, particularly in the swampy sections. From here to Smyrna the line passes through a level valley, every acre of which is devoted to the culture of Sultana raisins and cereals. Shortly before entering Smyrna, the train passes through Burnabat, a charming summer resort of the wealthy Smyrnoites. Some of the villas, with their well laid out and nicely kept gardens, are very picturesque. On arriving at our destination, we were in no manner detained, a few bakshesh to the guard and our baggage was passed without examination.

Deeming it advisable to keep my business while in Smyrna as far as possible from persons of too inquisitive turn of mind, I avoided the hotels, and took up my residence in a private lodging house. I again assumed the name of James George, thinking it wise from my former experience not to take any chances in having my identity known. The day following my arrival, I started with my interpreter for Aidin. Mr Magnissalis, who had entertained me before, was traveling in Europe, so lodgings were secured in a private family.

The railroad runs through the very heart of the fig district, and as our train sped along through mile after mile of the fig orchards, I had a splendid opportunity to observe the general condition of them as well as of the trees, and was particularly impressed with the fact that all the trees were of one type. My conclusions in this respect were still further verified when I examined the trees more closely later on.

The harvesting of the Smyrna Figs was going in full sway, and the methods of doing the work was closely observed and every phase of the process minutely scrutinized and noted.



CHAPTER V.

HARVESTING AND DRYING THE SMYRNA FIG ABROAD.

Before treating on this subject, it will not be amiss to verify my statements made in an earlier chapter, that there is only one variety of Smyrna Fig, which has any commercial value, namely the Lop Injir, it being the only one which is dried and exported, and which has done more than any other one product to make the name of Smyrna famous the world over. In my first trip to Smyrna, my only guide as to the variety of fig planted there for commercial purposes was the habit of the trees and the character of the foliage. My conclusions at that time, as to there being only one variety of Smyrna Fig, were more fully confirmed on my second trip, when the ripe figs were examined in many orchards. The Lop Injir was found to be the only fig dried and exported; it therefore is the only one having any real commercial value.

As has been previously stated, the orchards are well cultivated, but before drying commences, the ground under the trees is cleaned of weeds, so the figs when they drop can easily be seen and gathered. In the district from Ayassoulook to Aidin, the harvesting in the season of 1901 commenced August 5, while further up the valley the season is fully five days later. In the early part of the harvesting season of 1901, westerly winds, which always carry a great deal of moisture, prevailed, and in consequence of this, many of the figs soured, and the complaint was general by the packers that the quality was inferior to that of the first figs. A few days before my visit to the orchard district, the winds changed, and blew from the north, the growers in consequence were elated, for the promise for a better quality of figs meant correspondingly better returns. In my inspection of the orchards, a number of sour and split figs were found, some of them having a black fungus growth inside, called by the growers "Bassarah," a Turkish word. The best figs are harvested in September, the figs being larger and the climatic conditions in all years being more favorable for the maturing of a higher grade of fruit in that month.

Figs are gathered according to the rapidity with which the crop matures, early in the morning or late in the afternoon. When the harvesting season is at its full height the figs are gathered daily, but this is a matter in which the man in charge uses his judgment, and is dependent on the weather and the rapidity with which the figs ripen. The laborers, either men or women, gather the figs in baskets, holding fully forty pounds, which are never filled but half full. The figs drop to the ground of their own accord, but if a number of figs are seen in the trees which have reached the proper stage of maturity, the trees are shaken vigorously, and those still remaining are knocked off with *Arundo Donax* canes (false bamboo). A fig is mature when it has lost its handsome form, and hangs limp and shriveled in the tree. So tenaciously does it cling to the branch before reaching this stage it cannot be picked except by tearing the skin and breaking it from the hard stem end adhering to the branch. Nature, it seems, has made ample provision to have the figs remain in the trees until they have reached the proper degree of ripeness. A fig gathered before it is mature makes an absolutely worthless dried fruit, being without flavor and substance, and so inferior is the quality it is difficult to believe it came from the same tree.

During the harvesting season, the women receive four piestas and the men eight piestas per day, working twelve hours, and boarding themselves. A piesta is a little over four cents.

All figs are harvested by the last of September. Should heavy rains occur before this time, the figs remaining on the trees are unfit for packing, and if gathered are used for distilling purposes. From a commercial standpoint, only one crop of Smyrna Figs is borne annually. The fruit appears like small buttons on the young wood in the latter part of May, is fertilized in June, and matures from August to October.

The drying ground is usually an open space in the orchard where a few trees have died out, and have not been replanted. The method of drying is very simple. A layer of rushes, the same as is used for hanging the Capri figs in the Smyrna Fig trees, is laid on the ground, two inches thick, in rows three feet wide, and from sixty to seventy-five feet long, and with a narrow walk between each row, to permit the workmen to handle the fruit. The contents of the baskets are dumped out on the rushes, and no attention is paid as to whether the figs touch each other or not, or how they lie. They are spread out on the rushes by hand, the only precaution exercised to have them all in one single layer.

Each fig is not turned individually, but they are shuffled around every day with the hands. After the smaller figs, which naturally dry the quickest, have been gathered up, the larger ones are placed by themselves, and turned by hand. The time of drying varies from two to four days, the rapidity of desiccation depending on the weather. The proper degree of dryness is determined by feeling and kneading the figs between the fingers. If they have a leathery feeling to the touch, it is a sure sign they are sufficiently dried. It is in determining whether the figs have been sufficiently dried, that the experience of the foreman in charge of the orchards comes into play. All the figs which are sufficiently dry are gathered each afternoon just before sunset. Tule mats are used for covering the figs at night the day before taking them into the shed, should there be much moisture in the atmosphere. The storing shed is usually a tumble down adobe structure, in many cases a small room partitioned from the dwelling in which the foreman and his family live. When the pile of figs is large enough, they are sorted over into three grades, no care being taken to separate the split and sour figs from the others. The grades are made according to size. The lack of cleanliness and the crude and careless manner in which the figs are handled, show how little regard these people have for those who are to consume the fruit. They are never processed in any way from the time they drop from the trees until they finally are packed in the wooden boxes for export.

However, there is no mistaking the fact of their fine quality. When piled in the sheds, the skin is white, soft and pliable, and has a silky feeling when handled. The pulp is a mass of honey and seeds, giving to the fig a luscious sweetness not found in any other dried fruit.

TRANSPORTING TO MARKET.

When enough figs have been gathered by a grower they are packed in large goat-hair sacks, holding about 250 pounds each. A piece of paper is placed in the top of the sacks and the flaps are drawn up and over this with heavy twine. Camel trains visit the various orchards in a certain district, and two of the goat-hair sacks are loaded on each animal. The train, as soon as the camels are loaded up, starts for the nearest railroad station, where the bags are unloaded in a large freight shed, and later to the small box and flat cars standing on the siding.

The Ottoman Railroad Company makes special provision for the transportation of the figs, and daily trains leave the stations in the fig district every afternoon, arriving at Smyrna during the night, all stopping at the outskirts, close to the old Caravan Bridge. Each owner has a letter or brand sown into his sacks, for the purpose of identifying his figs, and also to recover his sacks, should they be lost. These goat-hair sacks are rather expensive, and are used exclusively for shipping the



1. Fig Bazaar, Smyrna. 2. Smyrna Figs dumped in Packing House: sorting and maccaroning by the women, preparatory to packing. 3. Women sorting; baskets used for taking figs to the packers, in the foreground. 4. Capri Fig Bazaar in Aidin, Capri Figs being sold as merchandise in June, 1901.

Reduced from original photographs.

fig crop. They are not only very strong, lasting many years, but the lint does not come off from them, as in ordinary sacks. Either the owner himself or a trusted employee travels with the figs, until they are delivered, and the returns are received from the packing house. The maximum weight carried by the cars is seven tons, and the fig trains are a mixture of flat and box cars. Their general appearance reminds one of the cars used in the United States when railroading was in its infancy. In each car there are from five to ten guards, lounging on the sacks of figs, patiently waiting for the train to pull out with its sweet and toothsome consignment. When the train arrives at the Caravan Bridge Station, the camel trains are again brought into requisition, and the work of unloading and carrying the figs to the fig bazaar goes on without interruption all night, and by early morning they have all been delivered to the brokers; or, if they have been consigned, are distributed to the different packing houses. Early in the morning, the heads of the packing houses in company with their brokers go to the bazaar and make their purchases. Hundreds of camels are engaged in this work, and it was a novel sight as our train pulled into Smyrna, to see row after row of these brutes, resting, and patiently waiting to commence their night's work.

The fig bazaar consists of a lot of rough adobe buildings and the bags are piled up in them in a single tier, in many cases extending far out into the narrow streets. To get through, it was necessary in many instances to walk over the tops of the bags. The packers, in company with their brokers, examine the various lots, make their purchases, and by nightfall the bazaar is cleaned up, and the trusted guard receives his money for what he has delivered, and returns with his load of empty sacks to his home.

The average receipts of figs daily at Smyrna during the height of the season, is from 1000 to 1500 tons per day. On the day of my return to Smyrna, from the interior, I learned that the receipts had been so heavy there was a possibility of breaking the market, and that the government had sent word to the growers not to make such heavy shipments.

VASTNESS OF THE INDUSTRY.

While in Smyrna during June of 1901 I learned that conservative men estimated the crop of figs at 100,000 camel loads. All estimates of crops are made in this manner. In former years where camels were the only means of transportation, the crop for that season of any agricultural product, was based on camel loads. Approximately a camel load is 500 pounds. The year 1901 was the first season in which the Smyrna fig trees had recovered from the terrible freezes of 1898, and as the young Smyrna figs had set well, and there was an abundance of the male figs, the estimate no doubt was a conservative one, considering the favorable conditions prevailing at that time. The rather unfavorable weather when the drying season opened caused a great many figs to sour, hence, the estimate of the crop was reduced to 60,000 camel loads; or, to make the matter more clear, 15,000 tons. It is difficult to realize that such an enormous quantity of figs should all come from the Maeander Valley, where the fig district proper is, not over ninety miles long and from a half to three-quarters of a mile wide. What a contracted area when compared to the vast plains of the great San Joaquin and Sacramento valleys. The price of these figs is from 2½ to 4 cents per pound in Smyrna, the price varying according to the quality.

PACKING HOUSES.

The packing houses, of which there are fully fifty, are located not far from the quay in the Frank quarter of Smyrna. All the figs go to these establishments, none being packed in the fig districts. Many of them are rude affairs, old warehouses, cleared out temporarily for the purpose of packing figs. The houses of the leading

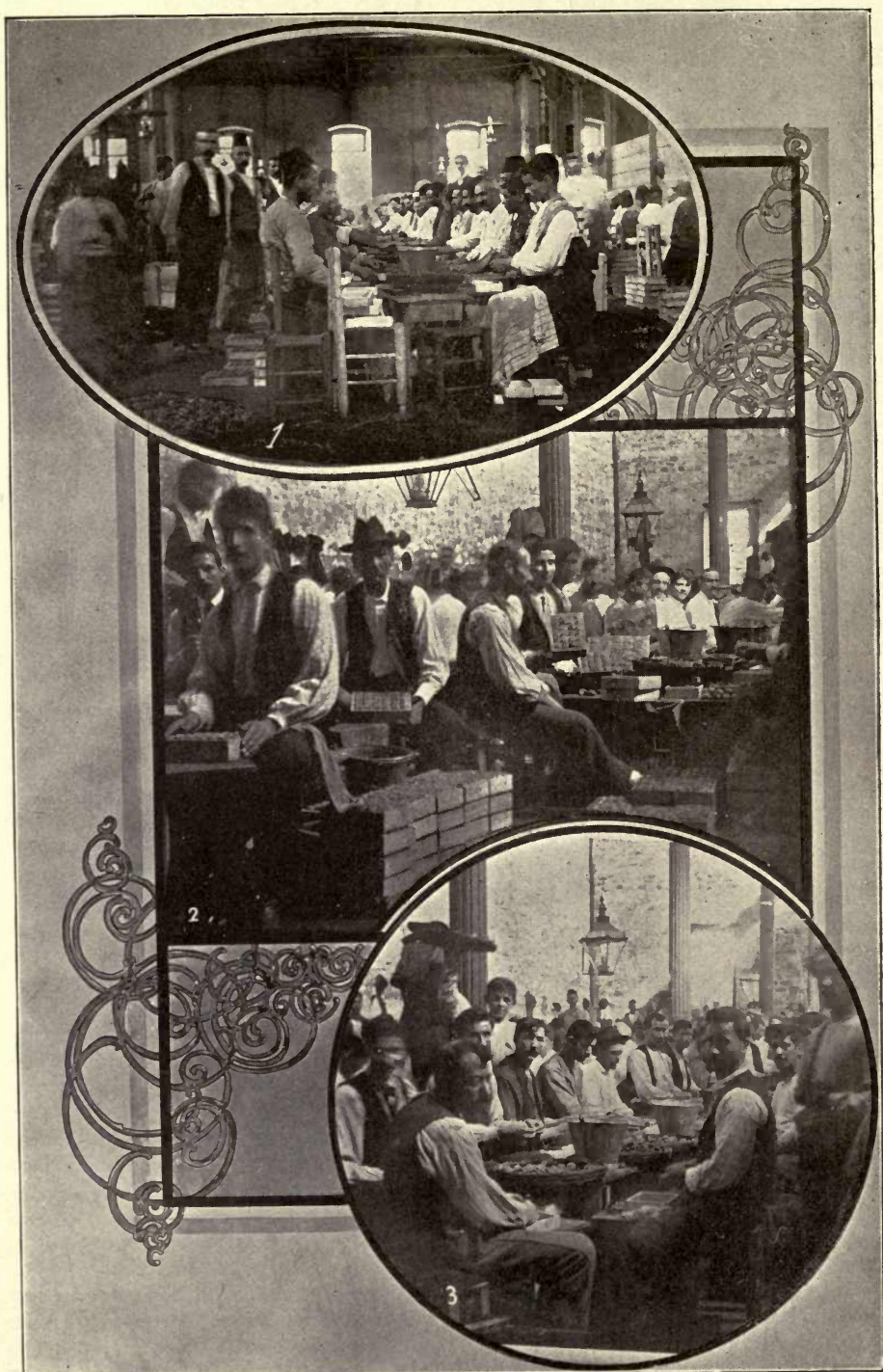
packers are substantial stone buildings, two stories high, the lower part being devoted to the storing of box material, and the upper story for the packing. From one hundred to as high as six hundred men, women and children are employed in the largest houses.

The opening of the fig season is the occasion for a grand festival, for it means employment for the poor classes for at least two months in the year. In Smyrna during the fig season alone, fully thirty thousand people are said to be engaged in various capacities, which gives a fair idea of the vital importance of this industry to the country.

When the figs are brought to the packing houses, they are emptied from the sacks into large heaps from three to four feet deep. Women and girls sit around the piles, working the figs between their fingers. This work is called "maccaronia." The grader takes up a fig, closes the hand over it, then pulls it until it is shaped like a bag. This handling leaves it soft and pliable, and it is then graded into three grades, according to size and quality. Nos. 1, 2 and 3 are thrown in circular baskets, about twenty inches in diameter and three inches deep. When these baskets are filled, they are taken to the packing rooms, which are long and narrow. Here narrow benches about three feet wide run the entire length of the room, with one row of packers on each side, leaving an aisle between for the convenience of the boys bringing in the figs, and taking away the packed boxes. In the largest packing houses, where Turks as well as Armenians and Greeks are employed, the Turks all work in a room by themselves, and have a Turkish foreman over them. They will not work in the same room with other nationalities. The packing is done exclusively by men, the women doing the sorting and grading.

On the bench within easy reach of each man are placed pans or small pails filled with sea water, which is used to moisten the fingers to facilitate the work of packing and to prevent the figs from sticking to the fingers. This water is dipped from the quay, close to where all the sewers empty, and is hauled up in hogsheads to the packing houses; obviously a very inviting prospect to the consumer of the far famed Smyrna Figs. The men packing No. 1 figs all sit together, likewise those packing Nos. 2 and 3. The No. 4's are not packed, but are dumped into sacks and are exported to Europe to be used in making a cheap grade of coffee or for distilling purposes.

The packer takes a fig out of the basket before him, squeezes it flat and by using the thumb and forefinger of each hand he brings the stem of the fig on the upper side, and the eye or ostium underneath; he then pulls the fig as much as possible, squeezing it very thin; then again takes the fig in both hands, the stem end turned down, and with the thumbs pressed close together on the opposite side with the two forefingers placed firmly against the fig underneath; still pressing the thumbs down he gradually draws them in opposite directions and splits the figs by this process from the stem to the eye; then turning the stem towards him, he straightens the fig out making the sides nearly square, when it is ready to be packed in the box. This is the most difficult part of the packing, the object being to have the bottom look as well as the top, should the box be opened from the bottom. After the first layer is packed, the box is changed round, the next layer being packed the other way, and so on until the box is filled. This mode of packing cannot be done, however, unless the fig is split, thus permitting the drawing out of the fig until it is almost twice its original size. The lines, between the layers are perfectly straight, no guide of any kind being used. In the top layer, however, which is almost a quarter of an inch above the box, a few leaves of the Bay Laurel (*Laurus Nobilis*) are placed. The boxes, without lids, are then taken by the boys and placed in stacks, the weight of the boxes after a few days pressing the figs down so the lid can be nailed without difficulty. No presses or machinery of any kind are used, the work being done entirely by hand. This style of packing is known to the trade as "Eleme," meaning



Packing Smyrna Figs. Scenes in the Packing Houses of Smyrna.

Reduced from original photographs.

selected. Figs handled in this manner are called "pulled" figs. The majority are packed in this way, the trade demanding it, but the better class of packers prefer the "locom," or bag shaped packing, as it is difficult to practice any deception as to size when this method is followed.

The packing of "locom" figs requires much more care and also far more time than the other style of packing. Only the largest and finest figs are used. The eye of the fig is first turned to the underside and then the fig is taken between the thumb and forefinger of each hand, and stretched lengthwise as far as possible. It is now taken between the thumb and the forefinger of the right hand. The thumb and forefinger of the left hand are held at each end, and the third finger is pressed underneath; a little careful manipulation and the fig is pressed into the form of a cube, presenting an even surface on top while underneath there is a deep indentation where the finger was pressed in. When the box is opened, it presents a very neat appearance, the figs looking like small cubes.

BOXES.

The lumber for the boxes is all shipped in from Russia, and during the fig season the mills, which are located close to the quay, work day and night turning out box material for the various packing houses. Boxes are made in all shapes, some rectangular, others square, varying of course with the style of fig to be packed. In size they run from one to one hundred and fifty pounds. Very few of the latter are packed, however, and those that are, are called elephants, and are shipped to the larger American cities for exhibition purposes in show windows. The popular sizes are 1, 3, 5, 8 and 12 pound boxes.

The grade of the figs is indicated by the number of crowns or crescents on the boxes, the larger the number of same, the better is the quality of the fig. No definite standard is fixed among the packers, so it is a difficult matter to determine a grade similarly marked as to crowns and packed by two different firms. In recent years a number of packers who have a large export trade to the United States, have been packing figs in one pound bricks. These are shipped in twenty to twenty-five pound boxes, and on arrival are wrapped by the merchants in wax paper, and sent out under their own brand. This manner of packing has been adopted in many instances to offset the method followed of packing figs in California in one pound bricks. The finest figs for export go to England, and the United States. Australia is a heavy importer of figs, but mostly of the smaller grades.

I visited a large number of packing houses, and in only one did I find them engaged in packing figs in baskets. This packer was putting up a special pack for export to New York, and was packing figs in long rounded and circular baskets, made of wicker work. The figs were carefully flattened out on the top, none are split, and when the packing is finished, the baskets are taken to girls, who cover them with pieces of silk with the name and brand of the packer printed thereon.

None of the figs seen in the United States packed in straw baskets, nor the small wooden boxes sold on the trains by the persistent train boy, are packed in Smyrna. The figs used for this purpose are shipped over here in bulk, and after being treated with glucose, are re-packed.

WAGES.

The wages of the men vary from 50 to 75 cents per day, the average being about 50 cents, and only the most expert receive more than that. The women and girls receive from 15 to 25 cents per day. I made a number of inquiries to learn as to what constituted a days work in packing, but no two packers agreed as to the number of pounds a man should pack, but striking an average from the various estimates given, it is safe to say that a days work was from 50 to 75 pounds to the man. No check is kept on the men to determine how much they pack, this being intrusted entirely to the foreman.

WORMY FIGS.

The packers one and all consider the figs as they place them on the market, clean enough for the consumer. In reply to my question as to the reason why they did not steam or pass the fruit through boiling hot water before packing, they invariably replied that they did not have the time. Knowing that all the fruit has worms, which usually leave the figs before the shipment reaches its destination, they flatter themselves that the consumer never sees the unwelcome intruder, hence it is not necessary for them to incur any more expense in handling the goods. Nevertheless, it is a well known fact that Smyrna Figs always have worms, and it is said that when a steamer loaded with a cargo of figs is several days out from port, it is no uncommon occurrence to see worms issuing from the figs and crawling all over the ship. It is safe to assume that it is a difficult matter to find a single packed Smyrna Fig from which a worm has not issued. Like all improvements in the oriental countries, changes in old methods are made with reluctance, and the same methods of treating the figs will be followed until competition with the United States will compel them to make a change. No more money is spent on the figs to make them marketable than is absolutely necessary to make them pass muster.

In reply to my many inquiries where the worm in the figs came from, the invariable answer was, that it was the egg of the little insect which was necessary for the production of the Smyrna Fig, which hatched out just about the time the figs were being packed, or shortly thereafter. That the worms should come from insects laying their eggs during the drying process, was never considered for a moment.

MY WORK COMPLETED.

Having now fully completed my investigations as to the methods employed in the development of the Smyrna Figs, from caprification to the final packing and shipping of the dried product, I made preparations to depart from Smyrna. In addition to my regular baggage, I carried with me an assortment of fig and grape cuttings, which I had to smuggle through the Custom House, as the exportation of such articles is prohibited by the Turkish Government.

Boarding my steamer, the *Equateur*, one of the large ships of the French Messagerie Line, on September 7, I bade good-bye to the friends whose acquaintance I had made during my brief visit in Smyrna. As we steamed out of the harbor of Smyrna, I congratulated myself on having met with so much success in pursuing my investigations. As the familiar and striking points of interest in the suburbs, and the minarets of the mosques, and the numerous buildings lining the quay faded away on the horizon, I looked back and my thoughts wandered to the many enjoyable as well as the slightly disagreeable incidents which occurred during my visit to the Ottoman Empire.

The following day we arrived at Piraeus, the harbor of Athens, in Greece. It was here that I first learned of the untimely and tragic death of President McKinley.

Our next stop was made at Naples, where I disembarked, and from this point forwarded the cuttings, etc., collected in Smyrna, to the Agricultural Department at Washington.

Space will not permit my touching at length on the many pleasurable instances of my trip through Italy and France. Suffice it to say, however, I stopped on my return to Berlin, at Rome, Florence, Monte Carlo, Marseilles and Montpellier. At the latter place I learned much of interest relative to the *Phylloxera* and resistant grapevines. From that point I went by train through France and Switzerland, and finally arrived in Berlin on the 21st of September. After my hurried trip of investigation, I felt that I was entitled to a rest, and my sojourn in Berlin was devoted to sight-seeing in company with my wife and relatives. In the early part of October we took our departure for home on another express steamer of the Hamburg-American Line, the "*Graf Waldersee*." After a few days spent in New York and Washington, we returned via the Southern route, passing through New Orleans, reaching Fresno the last of October.

After all, "there is no place like home." My trip, however, was of such an interesting nature, and so much valuable information was gleaned from it, that I will always regard it as one of the greatest events in my life.

PART II.

THE SMYRNA FIG AT HOME.

CHAPTER VI.

EARLY HISTORY OF THE FIG IN CALIFORNIA.

Fig growing in California is by no means a new industry, and dates back to the advent of the Mission Fathers, who probably planted the first figs at the same time the vine and olive were started. Where the trees came from has never been fully determined, and the early history of their introduction is somewhat shrouded in mystery. The fig, the olive and the vine, which originated in these Missions have been widely distributed throughout the state, and their proper names being unknown, they were all designated as Mission, so that at the present time we have the Mission Olive, Grape and Fig. The old Mission Fig is the well-known large black variety common in our gardens and widely distributed throughout the Pacific Coast region.

In after years, when the horticultural possibilities of California became more and more apparent to those, who had interested themselves in this line of work, many other varieties of figs were introduced notably from Asia Minor, Greece, Portugal, Spain, Italy, France, Austria and England.

The desideratum of every horticulturist interested in this work was to introduce and establish a fig, which would equal in flavor and sweetness the Smyrna Fig of commerce. Although many figs were to be found growing throughout the state, none of them compared to the imported article, hence the introduction and establishment of a fig, which when dried would be equal in flavor and sweetness to the imported fig, was considered of vital interest to the well-being of this industry in California.

It will not be within the province of this work to go into details in reference to the importation of other varieties of figs than the Smyrnas, and I will therefore confine the subject to that class as applied to Pacific Coast conditions.

IMPORTATIONS OF SMYRNA FIG CUTTINGS.

The first shipment of cuttings from Smyrna was made in the year 1880 for the San Francisco Bulletin Company, through the assistance of Mr. E. J. Smithers, United States Consul at Smyrna, five hundred cuttings being imported at that time. In the following year, another importation was made by the same people through the instrumentality of Mr. Alexander Sidi, an American merchant in Smyrna. These were widely distributed by the Bulletin Company, gratuitously to its subscribers. After a few years the trees commenced to bear, but the fruit failed to mature, and people receiving the trees therefore concluded that they were worthless, and the Bulletin Company was censured for having innocently placed an article before the public, of no value. In fact the Bulletin people themselves came to the conclusion that they had been tricked by the wily Smyrnoites.

In the year 1885, Mr. E. W. Maslin raised quite a number of trees from Smyrna Fig seeds, and the following is an extract from an article read by him before the State Fruit Grower's Convention at Fresno, November 5, 1889:

"In the spring of 1885, I bought in San Francisco, a box of the largest Smyrna Figs, which I could find, and sowed in a hot-bed, letting the growth remain until 1886, when the trees were planted on a hillside in a deep, warm soil. They have made a wonderful growth, the trunks being from four to six inches in diameter, and

the trees ranging from ten to fifteen feet high. They have never been irrigated, but have been cultivated. They have born this year an abundance of fruit, which, while it remained on the tree, has not matured. The figs are about the size of a pigeon's egg, the receptacle well filled with flowers, but so far I have not observed any seed. My impression is that the forces of the tree have been expended making wood instead of fruit."

In the year 1886, Mr. F. Roeding, Proprietor of the Fancher Creek Nursery, after having given the White Adriatic, then the most popular fig for drying purposes in this state, a thorough trial, was convinced it could never be made to equal the Smyrna Fig; hence decided to send Mr. W. C. West, then in his employ, to Smyrna, for the purpose of investigating the fig industry on that spot, to secure a variety of cuttings and all possible information for the successful prosecution of experimental planting.

Mr. West did not reach Smyrna until October. Owing to the jealousy of the inhabitants in general, and the prohibitive policy of the government in not allowing trees or cuttings of any kind to be exported, he met with some difficulties. However, with the assistance of an Englishman and a Greek, both of whom were residents of Smyrna, he ultimately succeeded in obtaining cuttings. Twenty odd thousand of the true Lop or Commercial Fig were taken in the vicinity of Herbeyli, several thousand Wild or Capri fig cuttings; several hundred each of Kassaba, Bardajic and Cheker Injir were also secured in other districts. In addition to these, numerous cuttings and seeds were obtained of various plants and trees, the total weight of which was about ten tons. The consignment came via London, but Mr. West having found that the expense of transportation would be enormous, abandoned half the shipment of the Lop fig cuttings, and forwarded the remainder. More or less delay was experienced in London, and the cuttings for this reason did not arrive in Fresno until May 24, 1887. The cuttings were in an excellent state of preservation, being packed in moist sawdust in paper lined cases; many of them had commenced to callous, and send out young rootlets. They were immediately planted in a nursery rows, and were given the very best of care and attention, revertheless a large percentage of them went back after starting, the warm weather having already set in.

In the year 1890, Mr. H. E. Van Deman, chief of the Division of Pomology of the United States Department of Agriculture, imported a number of cuttings of the Wild or Capri Fig direct from Turkey Asia, and distributed them among a number of parties in California, and in several of the Southern States, a few of which are said to be growing and flourishing. The following is an extract from Mr. Van Deman's letter, dated November 2, 1890:

"Having recently noted in the public press that you have succeeded in successfully pollinating the fig, I write to get direct information from you. I have no doubt you have the true Capri Fig, or you would not have performed the operation mentioned. Last winter, I imported a number of the cuttings of the Wild or Capri Fig direct from Turkey, and sent them all over the fig growing districts of this country. If I had had your name on my list, as one of the fig growers, would have sent you some also, but of course that would not have been necessary, inasmuch as you already had it growing."



CHAPTER VII.

AN HISTORICAL VIEW OF OUR ORCHARD.

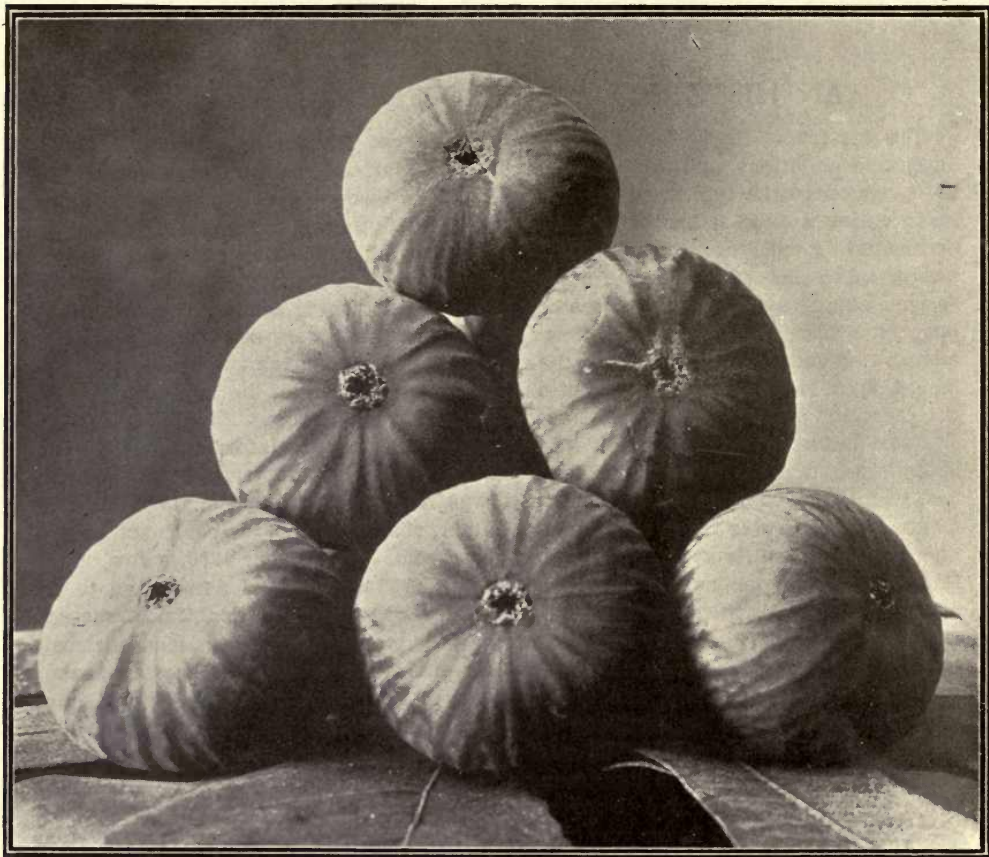
The history of fig culture in California is indeed fraught with disappointment, hopes and ambitions, and this grove for the first fourteen years of its existence was no exception to the rule in so far as results to its owners were concerned. Taking its inception in 1888 it has been the seat of the largest and most varied line of experimental fig cultures on the Pacific Coast,—a line of painstaking effort entailing no end of labor and the expenditure of much money. At particular periods success seemed almost assured, only to see our hopes again turn to ashes. The first plantings were made in 1888; in 1889 twenty acres additional were set out; and in 1891, feeling very much encouraged over the experiments in producing the figs by artificial means, another twenty acres was put out, consisting entirely of the Lop variety, with the exception of forty-eight Capri trees, planted in a single row.

From letters written by Mr. West, and from what meagre information I had succeeded in obtaining from reports made by the leading scientists, who had been investigating the subject of caprification, I was fully aware from the time the shipment of cuttings was received from Asia Minor, that Smyrna Figs could not be produced without the fig wasp, *Blastophaga grossorum*. In the year 1890, a few of the Smyrna Figs as well as the Capri Figs having produced fruit, I determined to try an experiment of artificial fertilization, although I was extremely doubtful of success. On June 15, quite a number of the Capri Figs were opened; the stamens or male blossoms at that time were matured and covered with pollen, which when shaken into the palm of the hand, and then transferred by means of a wooden tooth-pick into the orifice of the fig, fertilized the female flowers. Of the half dozen figs thus treated, every one matured, while all the others on the tree, when one-third grown, shriveled up and dropped to the ground. When the fertilized fruits were dried, they were carefully examined and to my surprise, were found to contain a large number of fertile seeds, with a flavor very similar to the imported fig, but not equal to it, as only a portion of the female flowers had developed seeds, due to the crude manner of fertilization.

To my mind this experiment proved conclusively that although other varieties of figs grown in California would mature their fruit, the Smyrna would not do so unless the flowers were fertilized, either by artificial means or by the fig wasp. It will be readily understood that artificial fertilization could only be carried on to a limited extent, and even these results were not satisfactory for carrying on the experiment, for owing to the crude method employed, the tissues of the fig became more or less injured.

Experiments of artificial fertilization were carried on for a number of years in the absence of the insect. In the year 1891, the old method was improved upon by using a glass tube, drawn to a fine point at one end for introducing the pollen. After gathering a small quantity of the pollen in the tube, it was inserted in the orifice of the fig, and by blowing through the other end, the pollen was more evenly distributed than by the method followed the previous year; 150 fruits represented the results of this experiment and when dried, they were sent to a number of the leading horti-

culturists and fruit growers of the state, all of whom made most favorable comments, and the concensus of opinion was that they were the finest figs ever produced in California, and were equal in flavor to the Smyrna Fig. In spite of these experiments, the fruit growers and the public at large were loath to believe in the subject of caprification, and I, as well as others, who had interested themselves in this subject, were regarded as cranks with some ulterior object in view.



The Calimyrna Fig, the True Fig of Commerce. Very much reduced

From an original photograph

In the year 1891, Dr. Gustav Eisen and E. W. Maslin made similar experiments on some Smyrna Figs growing on the Shinn place at Niles, and succeeded in obtaining the same results.

The future of the orchard, during the many years attempts were made to introduce the insect, seemed to rest in the balance. I continued to give it the very best of care, but at times became very much discouraged, due to the many failures in attempting to introduce the insect, and the temptation was great to dig the orchard up, or graft it over into some other variety of fig, which, although I knew would be of inferior quality, would at least bring in some returns for the money expended. Advice was freely given to me during all the years experimental work was being carried on, by men who were supposed to be expert in the fig business in their own country, as to what should be done to make the orchard bear, but as is usual in such cases, those giving the advice had no conception of the subject, and their instructions were more amusing than edifying.

CHAPTER VIII.

INTRODUCING THE INSECT.

Having become fully satisfied of the genuineness of my trees, all that now seemed necessary in order to produce the Smyrna Fig on a commercial scale was to introduce the fig insect, in which no difficulty was anticipated. That expectations in this direction were not to be very promptly fulfilled, the following will show.

In the fall of 1891, in corresponding with Mr. Thos. Hall of Smyrna, who had assisted Mr. West in obtaining the fig cuttings, arrangements were made with him to send several consignments of Capri Figs containing insects, the first of which was received June 30, 1892, in very fair condition. Those which followed, however, arriving in July, were mostly rotten and the insects dead. The first figs were cut open and placed in glass jars, and thousands of insects were seen to emerge from them. These were then taken to the orchard and hung in branches in which young figs were growing, the same having been previously covered with cloth in order to prevent the insects from escaping.

In the same year, during the months of April and May, a number of consignments of Capri Figs with insects were received from Mr. E. W. Maslin, the same having been forwarded to him from Mexico, by Dr. Gustav Eisen, who was there at that time making investigations in the interest of the California Academy of Sciences. These figs, like the others, were given every attention, but the *Blastophaga* evidently objected to making Fresno its abode, for it failed to establish itself.

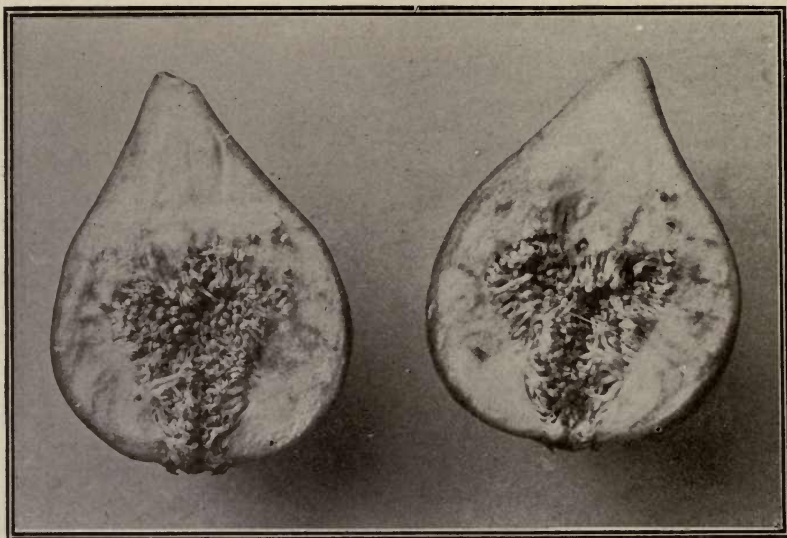
No further consignments of insects were received until April, 1895, when a package containing half a dozen specimens of Capri Figs in an excellent state of preservation, arrived from Smyrna, the same having been forwarded to me by Mr. M. Denotovich, a resident of that place. These figs were green and hard, and upon cutting them open were found to be full of galls, the insects being in the pupae state. One fig each out of this lot were sent to Mr. Alexander Craw. Prof. W. C. Woodworth and Dr. Hermann Behr, in the hopes that one of these gentlemen would succeed in breeding the insect, but they, as well as myself, were unsuccessful. A very important point was brought to light through the receipt of this shipment. Knowing that the Capri Fig, as well as the Smyrna, were deciduous trees, it was quite evident that the figs received were obtained in a locality free from frost; in other words, it proved that the insect hibernated in the Mamme or fall crop of figs, which remained on the trees during the winter months in a dormant condition, the insects during this period remaining in the pupae state, in the galls.

Following out these deductions the writer in the year 1896 planted a number of Capri trees in a cañon in the foothills in a place known to be almost entirely free from frost. Several of these trees are now in full bearing and producing regular crops. In addition, two old fig trees at this place had been grafted, one of which is now completely worked over, and many of the grafts are 4 inches in diameter, and from 12 to 15 feet long.

In the year 1896, another series of consignments were received from Dr. Francis Eschauzier, of the State of San Luis Potosi, Mexico, which were also failures.

Learning that Mr. Koebele was in Mexico in the employ of the Hawaiian Government, another attempt was made, with his assistance, to establish the insect, but as

usual nothing materialized. Finally Mr. Koebele wrote that he was satisfied that each species of *Ficus* had its own species of *Blastophaga*, and in his opinion it would be necessary to import the insect from the locality from which the fig cuttings were taken, to succeed.



Cross-section of Roeding's Capri Fig No. 3, Profichi crop. What appear to be seeds are galls containing insects.
From an original photograph.

In the year 1897, through the efforts of the State Board of Trade of San Francisco, the importance of introducing the fig wasp and establishing it here, was forcibly presented in a letter to Hon. James Wilson, Secretary of Agriculture. This was referred to Dr. L. O. Howard, chief of the Division of Entomology, who communicated with Mr. Walter T. Swingle of the Division of Botany and Pathology, who, at that time, was in the South of Europe, studying at the International Zoological Station at Naples. Mr. Swingle had become interested in the subject of capricification, and had made a number of investigations on his own account, so that he was well prepared to carry out instructions given him by Dr. Howard.

In April, 1898, several consignments of the Mamme or winter crop of figs, with insects, were received from Mr. Swingle, the first of which were in good condition; those which followed were mouldy and rotten.

A Capri Fig tree had been previously covered with sheeting so that immediately upon receiving the figs, they were cut open, placed in jars and suspended by strings on the branches of this tree. However, none of the insects became established.

In the year 1899 another attempt was made by Mr. Swingle, each fig being wrapped in tin foil and packed in cotton in a wooden case. A series of consignments were forwarded by him to Dr. Howard at Washington, and the same were remailed from there, arriving at Fresno between the 6th and 15th of April. The figs arrived in excellent condition, due to Mr. Swingle's painstaking method of packing. They were quite firm, plump and green, and looked as if they had just been picked. On cutting them open it was found that they contained many live and fully developed insects.

So many experiments had been made in former years to establish the insects in a similar manner, without success, that the writer foresaw no better prospects in this instance, and the following is an extract from a letter written to Dr. Howard at about that time:

"I will cut the figs open and place them under the Capri trees, which I have covered, but anticipate no results, nor do I think a success will be made of this matter until fig trees with fruit on them are sent out here during the winter months. If this is done, the insects will have a chance to develop in a natural way, and, being full of vitality, will enter our Wild Figs, just as they do in their nativity, passing from one crop of Capri figs to the following one."

While one of my employés was engaged in artificial fertilization, in the latter part of June, 1899, he informed me he had found seeds in some of the Capri figs, and to him it was a singular fact, as he had performed this same work of artificial caprifica-



Sorting and stringing the Profichi Figs preparatory to their distribution upon the Smyrna trees

From an original photograph

tion before, and had never found any seeds. On making an examination of one of the figs which had been left for the writer's inspection, what were apparently seeds were found to be in reality galls, and the writer's elation after so many years of work and experimenting can be well understood. A careful inspection of the tented tree revealed that there were fully forty figs which were still green, but badly shriveled, and on opening a few it was found that the female wasps had already made their exit, and those that remained were the wingless males. The figs under the covered tree had reached maturity much earlier than they would have done ordinarily, because of the higher temperature maintained by the tree being enclosed. Fortunately, for the success of the experiment, the tree adjoining was also a Capri fig tree, and some of the insects having escaped through an opening in the cover, caprifried about twenty-five figs on this tree. These figs were picked and taken to the other Capri trees in the orchard, which at that time had a few figs, most of which were so small, however, that it seemed impossible for the insects to enter, none of them being larger than two peas. A few figs were also taken to the foothill ranch, but no fruits were to be found on the Capri trees growing there.

During this time the writer was in active communication with Dr. Howard, and an effort was made to secure the assistance of an entomologist, but all who were communicated with were absent from their respective homes. All that could be done now was to patiently await developments. One fact was established, and that was, that it was not necessary to import trees to secure the insect, and that at least was a source of gratification.

The Capri trees in the orchard were carefully watched, and on July 19, 1899, for the first time, a marked change in the development of some of the young figs was



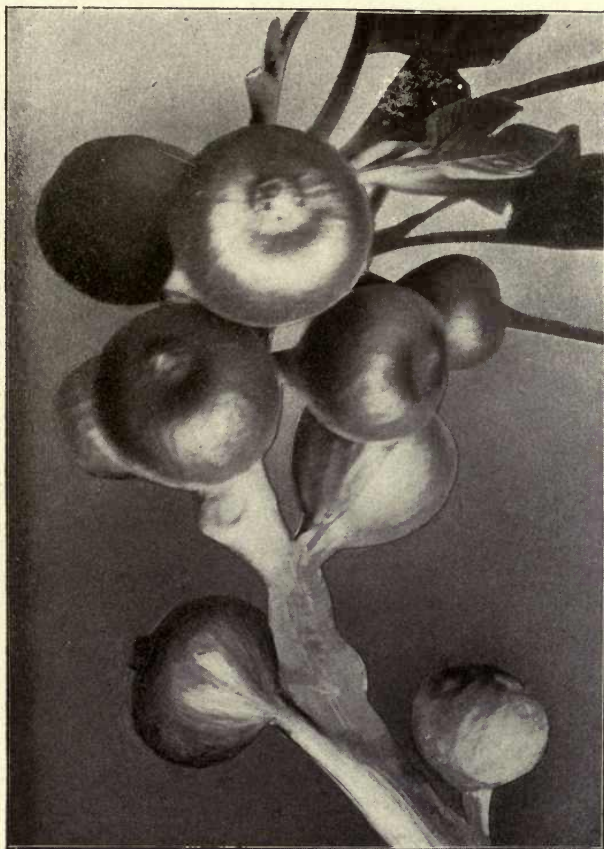
Distributing Profichi Figs upon the branches of the Smyrna Fig trees

From an original photograph

noticed; they being of a dark green color, plump and hard, an indication that they contained something; the metamorphosis in the appearance of the fruit being the same as in the Smyrna Fig when artificially pollinated.

On August 12, the first Capri Fig matured on one of these trees, and on examination it was found to contain pulp, a few galls containing female insects, as well as fertile seeds. This was a great disappointment, and the writer in his letter to Dr. Howard said that he was convinced that if all the figs then developing in the trees should, on ripening, be like the first one, a new and difficult problem had arisen, and it was feared the insect would be lost, as it would be smothered in the pulp of the fig before it could make its escape. Between the 20th and 26th of August, ten Capri Figs came to maturity, resembling very closely the June crop, except that the staminate flowers were absent, and the figs were much smaller. About the same time a new crop of figs made its appearance, and the insect entered them. When this crop began to mature, from the 15th of October to the 10th of November, nothing but pulpy figs were to be found. On the last date named and during a visit of Mr. Walter T. Swingle for the purpose of observing the workings of the insect, thousands of them were found to be emerging from the figs, these again being without pulp.

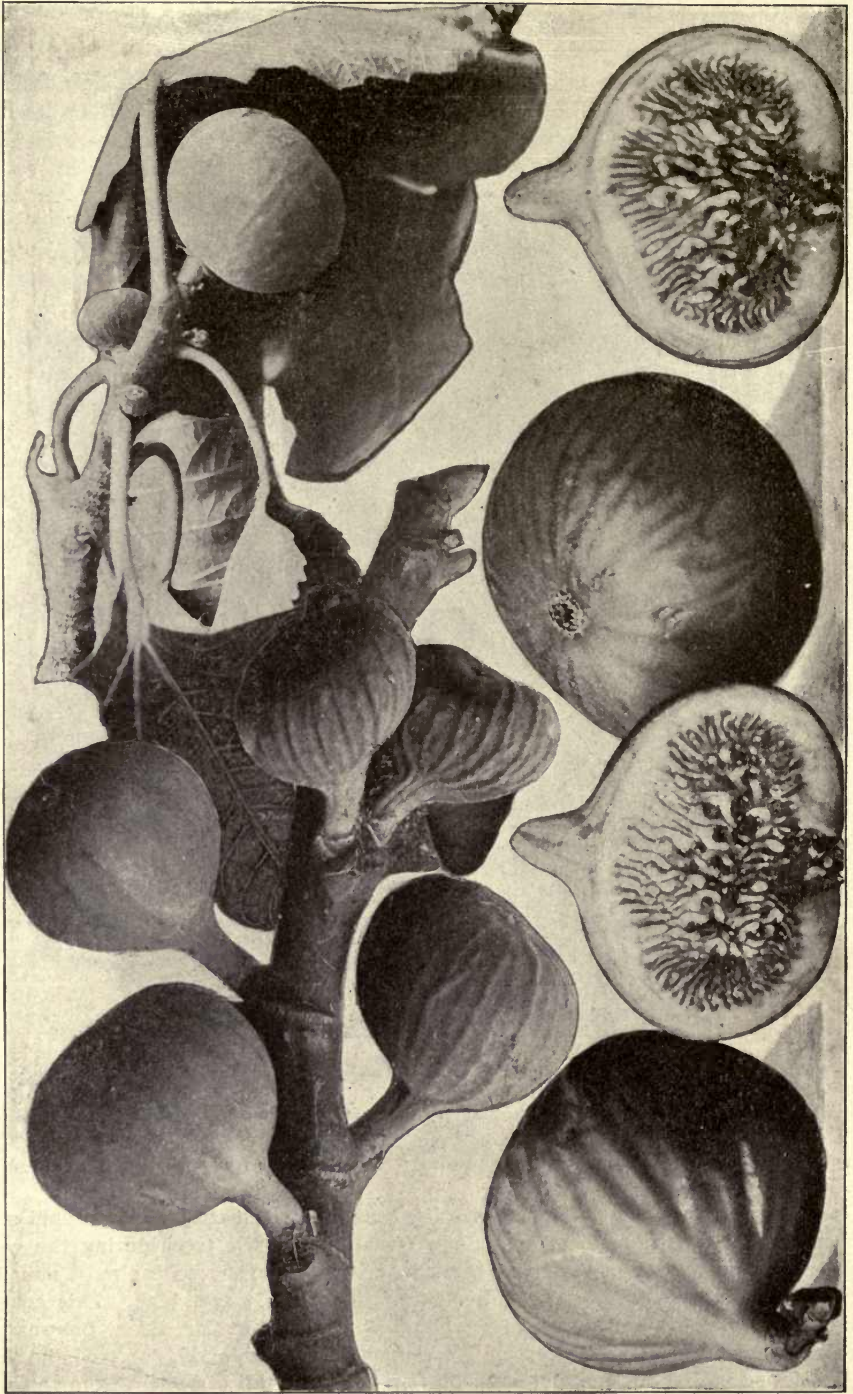
This was a new phase in the matter, for all writers on this subject had described only three generations of the insect, but in the salubrious climate of California a fourth generation had developed.



Courtesy of U. S. Department of Agriculture.

Branch of Roeding's Capri No. 1, showing two winter or Mamme figs (the two nearest the lower side of plate), from which the hibernated *Blastophaga* are about to issue, and the bunch of spring or Profichi Figs (near the tip of the branch) which are in the receptive stage,—that is, ready to receive the *Blastophagas* issuing from the winter figs. *Reduced from an original photograph.*

Not knowing how low a temperature the Mamme or fall crop of figs would stand, it was deemed advisable to protect those remaining on the trees during the winter months, and over three of the trees, those in which this crop was the most abundant, a cloth house was built, 28 feet wide, 75 feet long and 16 feet high. This covering served its purpose admirably, and on March 5, 1900, when Mr. E. A. Schwarz, the special agent from the Division of Entomology at Washington, arrived, he found fully 400 or more of the Mamme crop, in fine condition, all of which, from their general appearance, indicated that they contained the insect in the hibernating state. Quite a few figs on the Capri Fig trees, which were not covered, were also found to be in fine shape, although the temperature during the winter on several occasions had been as low as 29 deg. Fahrenheit.



At the lower left hand side is represented a twig of a Smyrna tree bearing young figs showing the striking difference between those on the left hand side, which are caprificated, and those on the right hand side, which are not. Photographed July 2, 1900, almost natural size. The large specimens on the right side of the plate, are nearly ripe caprificated Smyrna Figs, reduced. Photographed August 20, 1900. The small twig with figs in the upper left hand corner, represents the earlier and later Mamme crop of Roeding's Capri No. 1. The large fig at the tip being nearly ripe and about ready to give forth the winged female, natural size. Photographed August 20, 1900.

Courtesy of U. S. Department of Agriculture.

CHAPTER IX.

AREAS, SOILS AND CLIMATES.

Figs are often classed as products of the tropics or warmer regions, when, as a matter of fact, the whole family of *Ficus* cover a wide distribution over the earth's surface, many species withstanding considerable cold. Specifically, the edible figs, (*Ficus carica*), are native of the thermal belts of Asia Minor, from which they have spread to the warmer localities of the Mediterranean region, the South of France, the Islands of the Pacific, Australia, the South American States, Old Mexico, the Gulf States, and throughout California. This statement is literally true, as applied to the tree; some modification must be made, however, in the yielding of profitable crops, as a situation subject to cool summers and foggy weather is quite apt to retard the development and ripening of the fruit, and at the same time decrease the secretion of saccharine or fruit sugars, so essential to the production of merchantable cured figs. Thus it will be seen that California possesses every requisite for the exploitation of the fig industry, particularly in the warm and dry interior valleys, reasonably exempt from biting frosts. Portions of Arizona, Southwestern Texas, the Gulf States, and Old Mexico, are similarly blessed with climatic conditions calculated to furnish congenial conditions for commercial fig culture. The great San Joaquin and Sacramento valleys—veritable empires in themselves—are destined to be the two great centers of the fig industry in this country. Not only possessing every advantage of soil and climate found in the fig regions of Asia Minor but in addition thereto better methods of culture and handling of the product, there is every reason to believe that the Smyrna Fig will become more of a feature to the landscape than the orange and the lemon, because it luxuriates over a wider geographical area, and has a much wider range of soils and climates. Wherever the summer season is exempt from fogs and frequent rains, and the thermometer does not go below 18 degrees, Fahrenheit, it is a safe proposition to plant the fig as a commercial investment.

To people unfamiliar with the fig, the first impression is that it is particular as to soils and climates, even in its native habitat. Nothing could be further from the truth. As a matter of fact, it is more indifferent in this respect than any other sort of our standard deciduous fruit trees, and will thrive with less moisture and more neglect and abuse. Its range in this regard is, indeed, a wide one,—a fact which has been amply demonstrated, not only in California, but wherever conditions are at all favorable to its successful culture. Situation is also of no great consequence; trees do equally as well in the foothills and on elevated mesas as on the mountain sides and in the great interior valleys. These remarks apply more essentially to the tree and crops for family use; when grown for commercial purposes, the summer temperature must be sufficiently high to afford ample opportunity for the ripening of the fruit during the summer months, thus affording sufficient time to harvest and sun dry the crop before the fall rains set in. For these reasons commercial Smyrna Fig culture will always command the widest success in the hot and semi-arid interior valleys and along the higher plateaus and table lands of Arizona, Southwestern Texas, Old Mexico, and some of the more sheltered regions of the Gulf States. Of course countries like

Australia, Hawaii, the South American States, and Cuba, where the thermometer never goes below 18 degrees in winter, and ranges in summer from 95 to 105 degrees, Fahrenheit, with prevailing dry winds and clear weather during the drying season, fig culture can be safely practiced.

When it comes to character of land, it can be specifically stated that the Smyrna Fig will grow and bear crops planted in a wider diversity of soils than most any other fruit. It will give satisfactory growth in soils slightly impregnated with alkali, and at the same time luxuriate in a red adobe soil along the foothills; orchards of vigorous constitution and yielding fine crops are features along the mesas of San Bernardino and San Diego counties, while the slopes of Butte and Placer counties are dotted with



Upper part of Capri Fig tree (Roeding's Capri No. 3) showing abundant crop of caprificated Spring (Profichi) figs. *Courtesy U. S. Department of Agriculture.*

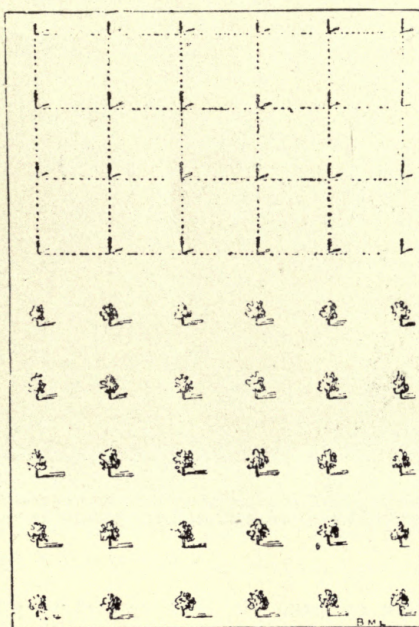
fig trees calculated to satisfy the mind, the eye, and the pocketbook for results; the sheltered sections of the extreme South and the valleys of Old Mexico, with their varied soils and degrees of moisture, harbor fig trees that are the joy of their owners. Sandy soils and the heaviest adobe soils are found to be well adapted to Smyrna Fig culture; the great requisite is good drainage. In soils where the water levels throughout the year stand too close to the surface, Smyrna Figs should not be planted, for in such locations the tendency will be for the trees to go largely into wood, and there is a possibility of some of the figs souring, should cool weather set in during the drying season. Experience has shown, however, that the Smyrna varieties suffer far less from this trouble than the ordinary sorts. In the orchard of the Fancher Creek Nurseries, where a few of the White Adriatic figs are still growing, from 50 to 75 per cent. will sour on the trees, and in adjoining rows of Smyrna Figs it is only occasionally that a sour fig can be found.

CHAPTER X.

PRACTICAL SMYRNA FIG CULTURE.

PLANTING THE TREES.

The future of an orchard and its ultimate success from a financial standpoint is wholly dependent on the initiatory steps taken in its planting. As has previously been stated, the fig tree adapts itself to a great variety of soils; nevertheless, it behooves the intending planter to select a piece of land where the soil is of sufficient depth, well drained, and can be easily tilled. It must not, however, be over-



The Square System, recommended for planting Smyrna Fig orchards.

looked that the entire success of any culture in fruit growing is dependent on the care and thoroughness exercised in the work on the outset. Slipshod and careless methods in the preparation of the ground can only lead to an indifferent success, if not to utter failure. Hence, it is the part of wisdom to exercise every possible precaution in the preparation of the land to be devoted to this fruit.

In preparing a suitable environment for the future Smyrna Fig orchard, the first thing to do is to level or grade the land so that the trees can readily be irrigated in rows or by a system of checks. In localities where other varieties of fruit trees thrive without irrigation this is not of so much importance, still a little expenditure, even in such cases, for grading will not be amiss, as there is always a liability of a dry season when irrigation must be resorted to if we are to maintain the orchard in

good condition and secure bountiful crops. In localities where the average annual rainfall is not less than fifteen inches, it can be safely stated that the Smyrna Fig tree will flourish and bear good crops without irrigation. The land, after being leveled and graded, the next thing to do is thorough plowing and cross-plowing to a depth of not less than 12 inches, to be followed by systematic harrowing until the entire plot of land to be planted is as friable as an ash heap. Too much emphasis cannot be given to this point, as the fig, like all other trees, is quickly responsive to intensive culture.

The land can now be said to be ready for the trees, excepting the laying off of the ground to the square system and the digging of the holes. The former is ex-



Ten-year-old Roeding Capri No. 2. Tree in prime condition as seen March 30, 1900, when the foliage was not fully developed; had been protected during the winter by a canvas tent, and the illustration shows the framework of the tent. In the background are rows of Smyrna Fig trees.

Courtesy of U. S. Department of Agriculture.

plained by the illustration on page 51. The method of procedure is as follows: The first thing to observe carefully is to clearly define a true corner as a base from which to mark off your plot of ground accurately, an allowance of half the distance between the rows of trees in the orchard to constitute your base line for actual planting from the line defining the boundaries of your land. Having your base or boundary lines defined, running at right angles to each other, start at one side of the field, at a point about 250 feet from your true corner, and run a row of stakes parallel to the line running at right angles to the base line. In small fields this work can easily be done by sighting to a stake set at the proper distance from the corner on the opposite side of the field; in larger plantings, however, these lines, in order to facilitate the work and insure accuracy, should be run by a surveyor. Having laid out your field in sections, the stakes where the trees are to be planted can easily be defined by using a heavy wire 250 feet long, marked at the proper distances, indicating where the trees are to be set. Before digging the holes for the trees, the planter should be provided with a narrow board

about 5 feet long, with a hole bored into each end, and a notch in the center. The notch should be placed against the stake originally set and indicating just where the tree is to stand. Now pull up the stake, place it and another stake in the holes at each end. Then lift your board and proceed to dig the hole at a point about the center between the two stakes. Repeat this operation by proceeding to your next stake, and in this manner complete the digging of the holes over the entire field. It is at the option of the planter to either dig the holes and plant the trees as he goes



The Bardajic Fig, showing habit of growth and cross-section of fruit. Very much reduced.

From an original photograph.

along, or to dig all the holes before setting any trees at all; obviously the latter method will require more stakes to indicate the positions over the whole field that the trees are to occupy. The holes should be at least 18 inches in diameter and of equal depth.

The Smyrna Fig tree is a great surface feeder, and in its maturity becomes a tree of no mean dimensions. Owing to these two conditions, it is advisable to plant the trees not less than 25 feet apart, and, on exceptionally rich soils, 35 feet would be preferable. Indeed, the experience of planters in California points decidedly in favor of giving the fig plenty of latitude in this respect. Sunshine is always a desideratum with this fruit, as it has an important bearing on its proper ripening during the summer season.

The ground is now ready for the reception of the trees. In planting the Smyrna Fig extra precaution should be taken to avoid any unnecessary exposure of the roots. Before planting care should be taken to cut away all bruised and lacerated roots to

a clean, smooth surface with a sharp knife. When planting the tree, be sure to fill in with surface soil first, carefully spreading out the roots in as nearly a natural position as possible. When set, the tree should stand at the same height out of the ground as it stood in the nursery, or at the most not over 2 inches deeper. The earth should be well firmed around the roots, but in order to insure a successful growth each tree should be given at least ten to twenty gallons of water. When planting is completed, the trees should be cut back to at least 20 inches from the ground, and the wounds covered with rubber paint or grafting wax.

As the reader learns further on in this work, Smyrna Fig culture is only feasible by the addition to his orchard of trees of the Wild or Capri Figs, and the assistance of the Fig Wasp (*Blastophaga grossorum*). Capri Figs are the natural home of this insect, and though essential to every orchard, do not require the care and attention of the Smyrnas. The general practice is to plant them in a single row or hedge; or, if planted in orchard form, in a block by themselves to one corner of the grove. The trees should be set about 20 feet apart. To insure immunity from severe cold weather, and to protect the life of the insects, it is often advisable to plant Capri Figs in sheltered localities against buildings and other protected situations.

AFTER CARE AND IRRIGATION.

The after care of the fig tree is less exacting than the average citrus or deciduous fruit orchard, and in this respect much resembles the care and labor bestowed on an olive grove. While it is conceded that the Smyrna Fig will withstand more or less neglect, it is nevertheless keenly alive to good culture and healthy growing conditions. Clean culture will pay the grower, and where the rainfall is less than eight to ten inches annually, irrigation must be resorted to, especially in the warm interior valleys of Central and Southern California and portions of Arizona. As a general proposition, only one irrigation is necessary, namely, before or just about the time that the Smyrna crop is fertilized by the *Blastophaga*, which occurs usually during June and July in the San Joaquin and Sacramento valleys. Irrigation, in sections of scant rainfall, or during seasons of drouth, may be essential oftener than once a year; of this the grower must be his own judge. A want of proper moisture in the soil during the growing season is quite as apt to check the development of the Smyrna Fig as any other crop. On the other hand, care must also be exercised to avoid irrigating orchards situated on lands that are sub-irrigated by waters from running ditches seeping underground and spreading under the land. Soils of this nature when cultivated, are quite apt to bring up this moisture from below by capillary attraction. A safe guide to follow is to learn the character of your soil. In digging the ground, if it should turn up at a depth of say ten inches dry and crumbly, refusing to mold to the form of the hand when sampled, it is safe to say that your ground can be irrigated to the advantage of the trees and growing crop.

A Smyrna Fig orchard should be plowed reasonably deep (except close to the trees), and cross-plowed once a year, and well cultivated during the growing season. Should the trees be wanting in vigor and robustness, or fail in producing good crops of merchantable fruit, it is an indication that the soil is poor in plant food, and needs an application of fertilizer.

PRUNING.

The fig requires less work with the saw and shears than any other variety of fruit tree; notwithstanding this fact, it is important to observe a few simple rules, for mistakes in pruning are difficult to rectify, and an error in using good judgment in this line may result in a loss of a crop for several years to come, as well as impair the vitality of the tree.

The first season, from three to four branches should be allowed to diverge from the body of the tree, none of which should start at a point closer than twelve inches

from the ground. To prevent the stems from becoming sun-burned, the tree should be protected by wrapping paper or burlap around the trunk, or, better still, use a tree protector, of which there are several makes in the market. After the branches forming the head have started and they have been thinned out to the required number, no further pruning except to remove suckers starting from the base of the tree close to the ground, will be necessary.

The importance of starting a tree so it will have a single stem to begin with, thus forming a base, so to say, for the main branches which will eventually form the head of the tree, should not be lost sight of. It would be a great mistake to permit the tree to start its branches close to the ground, for such trees are difficult to handle, and as they grow older, the workman is always puzzled how to prune them. Furthermore, the branches of such trees will break off close to the ground quite often, and where this happens, the symmetry of the tree is destroyed.

What is finally the object in training a tree? Surely there can only be one definite aim in view, and that is, when the tree comes into bearing, to secure as large a fruit-producing surface as possible to insure the very largest crops obtainable. The branches diverging from the main body of the tree must be sturdy and strong, for they are the ones which must eventually support the numerous laterals forming the head of the tree. Care should be observed the first season in not allowing them to grow too close together on the stem, otherwise they will be cramped and cannot develop as they should. The second year after planting the laterals should be shortened in from one-third to one-half of their growth, the amount of pruning depending, of course, on the growth made during the previous season. From each one of the branches shortened in, from two to three shoots should be allowed to develop, evenly distributed and close to the point, where the main branches were cut off. The head now is practically formed, and in the third season not much pruning is necessary, except to cut out all interfering branches. In subsequent years, provided the tree grows thriftily and is covered during the growing season with a sufficient amount of foliage to afford partial shade no pruning is required. Should this condition not be maintained, then a shortening of all the laterals and a method of thinning out should be followed to promote new growth. It has been a fixed rule that fig trees should never have their lateral branches shortened in, like the peach, pear and many other deciduous trees; experience, however, in the orchard on the Fancher Creek Nurseries, has impressed me with the folly of this rule as applied to Smyrna Fig trees. An open top into which the sun can penetrate is not a desirable condition to have. Climatic conditions may make it necessary to deviate from this in other sections, but in the hot, dry valleys of the semi-arid regions, the best success and largest crops will be obtained when the trees are maintained in the condition already described.

The Fig Wasp (*Blastophaga grossorum*), seeks the shade when flying in the trees, and the largest number of fertilized figs will be found where the sun does not penetrate too freely. It is not necessary to follow the shortening-in method each season, but only in cases where the tree is not making much new wood, and in consequence of which the young figs are not shaded sufficiently for the insects to properly perform their functions.

Attention is here also called to the treatment of the Wild or Capri Fig tree. This being the natural home of the Fig Wasp, it is important that the tree be developed along lines calculated to meet the wants and requirements of the insect. In view of this, the tree should be pruned sparingly, and then only with a view to producing a dense head, even to the exclusion of direct sunlight. In other words, cut back only strong, straggling branches which may at times make their appearance and prevent the development of the dense growth which the insect demands for its best development and propagation.

CHAPTER XI.

THE FIGS OF ORCHARDS AND GARDENS.

In the orchard of the Fancher Creek Nurseries, fully seven varieties of Smyrna Figs entirely distinct from the true fig of commerce have been found. Three of these were received in the original importation, viz., Kassaba, Bardajic and Cheker Injir. The other varieties, several of which are still unidentified as to their correct names, have been found growing here and there in the orchard of the Lop Figs.

As only the commercial side of the question is involved in this book, the other varieties of Smyrna figs having only value for table purposes, it is not considered necessary to give them more than a passing mention. They, like all other varieties of Smyrna Figs, require caprification to mature their fruits. Originally the name California Smyrna was given to the fig of commerce, the Lop Injir of Smyrna, in order to give some distinction to the variety growing at home. Fully appreciating that others having an inferior fig would not only pack figs and sell trees under this name, as soon as the superiority of the California Smyrna was established, it was deemed of sufficient importance to adopt for this particular fig a distinctive name. Following out this idea, a premium of \$25.00 was offered for the most appropriate and euphonious name for this fig. Among the hundreds of names submitted, the word "Calimyrna," a contraction of the two words California and Smyrna, was selected as being the most satisfactory name for the new fig. The name "Calimyrna" has been copyrighted, with a view of giving protection, not only to this brand of dried figs, but to the trees as well. To be plain, the Calimyrna Fig is a distinct variety of Smyrna Fig, and there is as much difference between it and the other varieties of Smyrna Figs, as there is between a Muir and an Early Crawford Peach. This statement is not made for the purpose of discrediting in any way the genuineness of Smyrna Figs received in other importations, but merely to show that the Calimyrna is a variety in itself.

For the benefit of those who may be interested in the group of economic figs, the following brief descriptions of Smyrna classes and varieties are here given:

THE SMYRNAS.

Bardajic. Derives its name from its close resemblance to the form of a water-jug used by the people of Smyrna. Medium to large, ovate pyriform, neck long; stalk long and slender; ribs distinct, of a greyish green color; orifice small; skin very thin, greyish green, and sprinkled with small light grey dots, becoming seamed when fully matured and showing the white meat beneath; pulp rich deep crimson; seed small, fertile and numerous. Tree a compact, low spreading grower with very thick closely jointed branches; leaves very large and only slightly lobed. A magnificent table fig, but of little value for drying, for, although it is exceedingly sweet, the skin presents a dirty brown color, and is quite tough. It is used exclusively as a table fig in Smyrna; scattering trees are to be found growing in the gardens near Smyrna, and in the foothills a few miles from the city. They are always caprifigged, but not systematically as is done in the fig district proper.

Calimyrna, Lop Injir. A copyrighted name given to the world famous fig of commerce to distinguish it from the other varieties of Smyrna Figs. Very often packed in Smyrna under the name *Erbeyli*, meaning superior fig, and indicative of the district of "Herbeyli," in the Maeander Valley, Asia Minor, where the finest grade of these figs are supposed to come from. Known in the Turkish language as "Lop," and in the Greek as "Lopia," meaning sweet fig. Fruit large to very large, turbinate, almost globular, except that it is very much flattened at the apex; neck very short, in many instances almost entirely absent; stalk short and breaking from the tree readily when the fig has lost its form and hangs limp, shriveled and seamed on the tree; ribs very distinct, and of a slightly greenish shade; skin lemon-yellow, smooth and very thin, turring nearly white when the fig is dried, and feeling almost like silk when in this condition and rubbed between the fingers; orifice large, of pale ochre color and widely open when the fig is mature and before shriveling; pulp reddish amber, sometimes pale amber turning to dark amber just before falling; seeds large, yellow fertile, overspread with a clear white syrup, giving the fruit a richness and meatiness surpassed by no other fig. Tree a strong grower, of spreading habit and inclined to be straggling, a difficulty readily overcome by shaping the trees when young; leaves medium to large, of a dark green shade, slightly downy underneath, lobes very deep, and five lobed. The dried figs contain 63.92 per cent. sugar, which is $1\frac{1}{2}$ per cent. more sugar than found in the imported Smyrna Fig. Dries readily and with less trouble and expense than any other fig, dropping to the ground of its own accord and being practically dry when it falls. The only variety of fig planted in Asia Minor for export, and the only one having any commercial value.

Black or Purple Smyrna. Small, globular, stems short; no neck; skin very thin, purplish, with prominent light greyish ribs, sprinkled with round, brownish dots; pulp dark amber; a most delicious fig to be eaten out of the hand. Dries well, but the skin is thick; fruit is too small for commercial purposes. Tree a dense, compact grower, giving as dense a shade as the Texas Umbrella; leaves small, five lobed, slightly serrated. Name local, found as a mixture in the orchard of Calimyrna Figs.

Black or Purple Bulletin Smyrna. Fruit large to very large; obtuse pyriform; neck short, stalk long; skin light purple, streaked and ribbed with grey and sprinkled with small brown dots; pulp reddish pink, very rich and luscious; seeds large, fertile; orifice open when mature and very small. A superb fruit in the fresh state. Of little value when dried, the skin being thick and leathery. Several trees of this variety (the name being local) were received among the Bulletin Smyrna Figs from the Bulletin Company in 1883.

Cheker Injir. Signifying "Sugar Fig," and grown in the Island Scios. Tree a very strong grower, branches heavy and closely jointed; of upright growth; leaves very large, deeply lobed and slightly serrated; fruit roundish, oblate, short neck; pulp reddish-pink, seeds small, fertile; skin greenish-yellow, very thin, ribs distinct, light green. Of no particular value for drying purposes.

Kassaba. Medium to large, rounded; obtuse pyriform, flattened at the apex; short neck and stalk; ribs slight; orifice decidedly large and open; skin pale green; pulp reddish pink; seeds small, fertile. Deliciously sweet both fresh and dried, the analysis showing higher sugar content than the Calimyrna, and when dried the skin is even whiter than that variety. The objection to it is that it ripens late. Tree is a beautiful, erect, upright grower, of good habit. More trees of this variety are to be seen scattered among the "Lop" figs of the Maeander Valley than any other. In drying no effort is made to separate these figs from the "Lop" figs. The men in packing the figs, however, invariably discard them, remarking that they are no good. They are readily distinguished by their deep red colored pulp. This variety is found principally in the vineyard district of Kassaba, as a border tree, or growing as isolated specimens, when they attain an immense size. No attempt is made to dry them, the inhabitants claiming they are of no value for this purpose.

Maple Leaved. Medium, turbinate, rounded at apex; stem short; slight neck; pulp red; no ribs; orifice widely opened, dark straw-colored; skin pale, yellowish-green; seed fertile, small. Tree of spreading habit, branches short jointed; leaves large, deeply lobed and heavily serrated. A rather inferior fig and possessing no value for drying purposes. Not seen by the writer during his inspection of the fig orchards in Asia Minor, and it probably is only found as an occasional mixture in the gardens of the "Lop" figs. The name given is a local one derived from the peculiar form of the leaves.

WILD, OR CAPRIS.

Allusion has already been made in previous chapters to the Capri Fig, and its economic relation to the Smyrna type of figs, so it is not necessary to repeat these facts again. The group is a very extensive one, and comprises hundreds of varieties, which have originated, no doubt, as seedlings in the countries bordering on the Mediterranean where caprification is practiced, and later on the varieties having the greatest value for caprification purposes were propagated and planted in the gardens and suburbs of the towns in the fig districts. Distinct types of these figs are to be found growing in Asia Minor, Greece, Italy, Algeria and Spain. In Asia Minor none of the Male or Wild Figs are named, but in Greece, Italy and Algeria, according to statements made by Messrs. Swingle and Fairchild, agricultural explorers of the United States Department of Agriculture, many of them are described and named. As a rule the trees are readily distinguished from the other figs, by their slender branches and radically different habits of growth. While the writer was examining Capri figs in Asia Minor, however, one variety was discovered which so closely resembled the "Lop" type of figs, not only in its character of growth but in the formation of the leaves as well, he would have pronounced it to be of that variety had it not been loaded with Profichi figs at the time this observation was made. There are fully thirty distinct types of Capri Figs, growing in California today; time and experience will alone determine their value. A short description of the three varieties used in caprifying the Smyrna Figs on the Fancher Creek Nurseries is given herewith. The Profichi crop of figs are by far the largest figs, and are the only ones described, the others possessing no value in the caprification of the Smyrna Figs.

Roeding's Capri No. 1. Profichi, about $1\frac{1}{2}$ inches wide by $2\frac{1}{2}$ inches long; oblong pyriform; neck long; very few ribs and not pronounced; skin dark, dull green, orifice large; gall flowers very numerous, and male flowers producing an abundance of pollen; tree of a low spreading habit, limbs heavy; leaves very large and dark green color without gloss. Profichi come to maturity a week earlier than Roeding's Capri No. 2. Particularly valuable on account of its producing all the crops necessary for successfully carrying through all the generations of the Blastophaga. Six hundred female insects have been counted coming out of a single fig of this variety. The first Blastophaga were established in the Profichi crop of this variety from the importations made by Mr. Walter T. Swingle, in April, 1899.

Roeding's Capri No. 2. Profichi about $1\frac{5}{8}$ inches wide by $2\frac{1}{2}$ inches long, almost globular, with short stalk and neck; ribs distinct; skin very smooth, waxy, greenish yellow; gall flowers numerous; tree of rather erect growth, with slender limbs, leaves medium, light, glossy green color; produces an abundance of the Profichi crop and a limited number of the Mamme, some individual trees, however, producing this crop in abundance. Its value lies principally in the fact of its lengthening the season for caprifying the Smyrna Figs.

Roeding's Capri No. 3. Profichi about $1\frac{3}{4}$ inches wide by 3 inches long; stem short, turbinate, with an extremely short neck; ribs very pronounced and running the full length of the fig; skin light, shining green; orifice very large. Gall flowers as well as male flowers very abundant; tree a rather straggling grower, with heavily noded branches, and of dwarf habit; leaves medium, light green, very rough and serrated; ripens a few days earlier than No. 1, and valuable on this account, being sure to have insects for the first Smyrna Figs, which are in the receptive stage. As high as 1000 female insects will issue from one of these figs. The Mamme of this crop are easily distinguished from the others, by their larger size, distinct ribs, and dark purplish green color.

CHAPTER XII.

GRAFTING THE CALIMYRNA (SMYRNA) FIG.

With the successful establishment of the Calimyrna Fig, identical with the true Smyrna Fig of commerce, the culture of this particular sort is destined to create a revolution in the fig industry in America. Obviously, all the common varieties of figs that have been planted in this State, excepting a few garden sorts for family use in

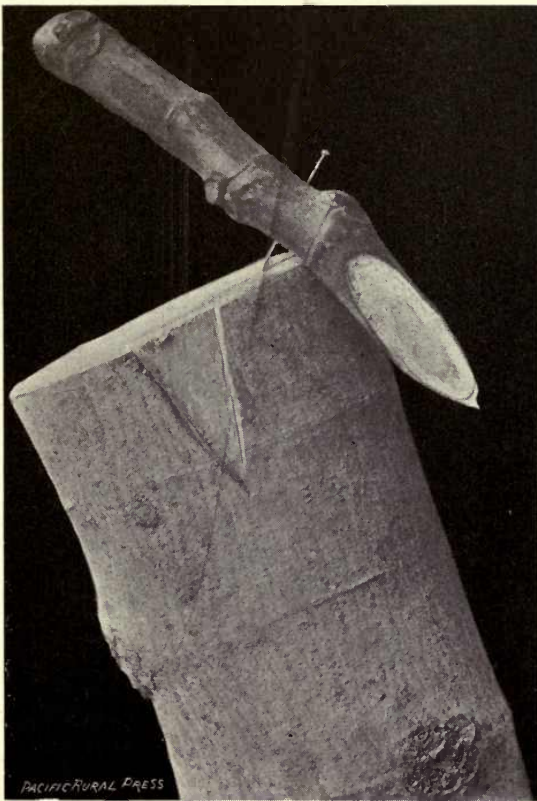


Fig Grafting. Preparation of Stock and Scion.
From an original photograph.

the fresh state, are destined to become obsolete as factors in the fig market. In view of this, many orchards of the Adriatic class will be grafted to the Calimyrna, or True Fig of Commerce, which is perfectly feasible and easy of accomplishment, as has been thoroughly demonstrated in the experience of the writer in his own orchard. The following paragraphs give a concise statement of proper methods to be employed in working over undesirable varieties of fig trees by means of grafting:



White Adriatic Fig tree, grafted with Calimyrna (Smyrna) Fig scions.

From an original photograph.

In grafting over orchard trees the branches to be grafted should be cut off to within 18 to 24 inches from the point of divergence from the body of the tree, allowing at least two branches to remain, one of which should be on the southwest, if possible, so that the grafts will be shaded from the afternoon sun.

The object of leaving the branches, is for the purpose of having an outlet for the sap, for the removal of the entire top of the tree is dangerous. In the Coast counties trees can have their entire tops removed, and still withstand the shock, the scions taking readily, if properly inserted; but in the interior valleys, where the atmosphere is dry and warm, to remove the entire top of a fig tree close to the main body would result in the loss of the tree, a fact which has been fully demonstrated by actual experience. The two branches which have been allowed to remain can be sawed off entirely the following season, or they can be in turn grafted, if the scions of the year before have not taken well.

After having sawed off the branches the stumps or subjects to be worked on should have the tops neatly smoothed over with a sharp knife, so as to have a clean, smooth surface, particularly along the edge. From two to four scions should be placed in each stock, the number of course being regulated by the size of the stump. Cut out a V-shaped piece of bark; the distance from the top of the stock to the point of the V should be from 1 to $1\frac{1}{4}$ inches.

Select a scion of the proper size, making a sloping cut along the lower end, as long or somewhat longer than the incision on the stock. The scions should be cut the same as for a whip graft, except that the cut is all on one side and should have a



White Adriatic Fig tree, with summer growth of graft.

From an original photograph.

little more bevel, and the second cut for the tongue of the whip graft should be omitted. The scions should never be smaller than an ordinary lead pencil; as a rule scions from 2-year-old wood, as they have very little pith, with a diameter of five-sixteenths to one-half inch, will be found to give the best results.

The scion should be of such a size that it fits snugly into the opening in the stock, so that the bark on both sides of the scion touches the bark of the stock. After the scions are inserted, wrap tightly with five or six-ply cotton twine, so as to hold them in place, and cover the wounds as well as the stub with liquid grafting wax. Also be careful to wax the top of the scion to prevent drying out. Never use wax cloth for wrapping, or if you do, be careful to remove it early in the summer before the warm weather sets in or the bark, when the grafts are set, will be smothered and the grafts will die. After the scions have become well united, which takes from two to three months, the strings can be cut.

The writer prefers this method of grafting to all others, and has had no difficulty in making fully 90 per cent. of the scions grow, many of them making a growth of five to seven feet in a single season. This method of grafting cannot be practiced until the sap begins to flow, and from the latter part of February to the 1st of April has been found to be the best time. The scions should never be more than four inches long.

The grafting wax should be melted in a pot and put on hot, using a small paint brush, or a brush made out of short pieces of hay rope tied to a small stick

answers the purpose just as well. The best results have been secured by using a wax made of one pound of beeswax, three pounds resin and three ounces of raw linseed oil by weight. Place the beeswax and resin in a kettle and cook same until thoroughly dissolved, then add the oil and allow the ingredients to cook slowly for ten or fifteen minutes longer. Remove from the fire, and as soon as the wax has cooled some, pour a small quantity into a bucket of lukewarm water. Grease the hands and take the congealed mass and knead and pull it until it becomes very tough; wrap in oiled paper and it is ready for use. By preparing the wax beforehand the ingredients are mixed in proper proportions, which is not easily done when you have a large amount of work to do in the field. This wax is also far superior to wax which has not been pulled.

CHAPTER XIII.

INSECT PESTS AND DISEASES.

It is pleasant to note the fact that among all the fruits now grown commercially in California, and, for that matter, in sections with similar soils and climates, the Smyrna Fig is strikingly alone in being almost wholly exempt from the attacks of injurious insects and immune from many of the diseases to which general orchard crops are subject. In so far as the writer's observations and experiences go—now covering nearly a score of years—the Smyrna Fig in this State is practically exempt from attacks of this nature. The same may be said of the Smyrna Fig orchards in Asia Minor. So striking is this fact that the statement seems almost utopian; nevertheless, it is borne out by the facts. The Smyrna Fig in this respect presents an anomaly in California horticulture,—instead of being the subject of attack from injurious insects its well-being and commercial importance depend wholly on the attacks of what must be considered the greatest beneficial insect which ever found its way into the realm of an enlightened horticultural practice, viz.: the little fig wasp—*Blastophaga grossorum*.



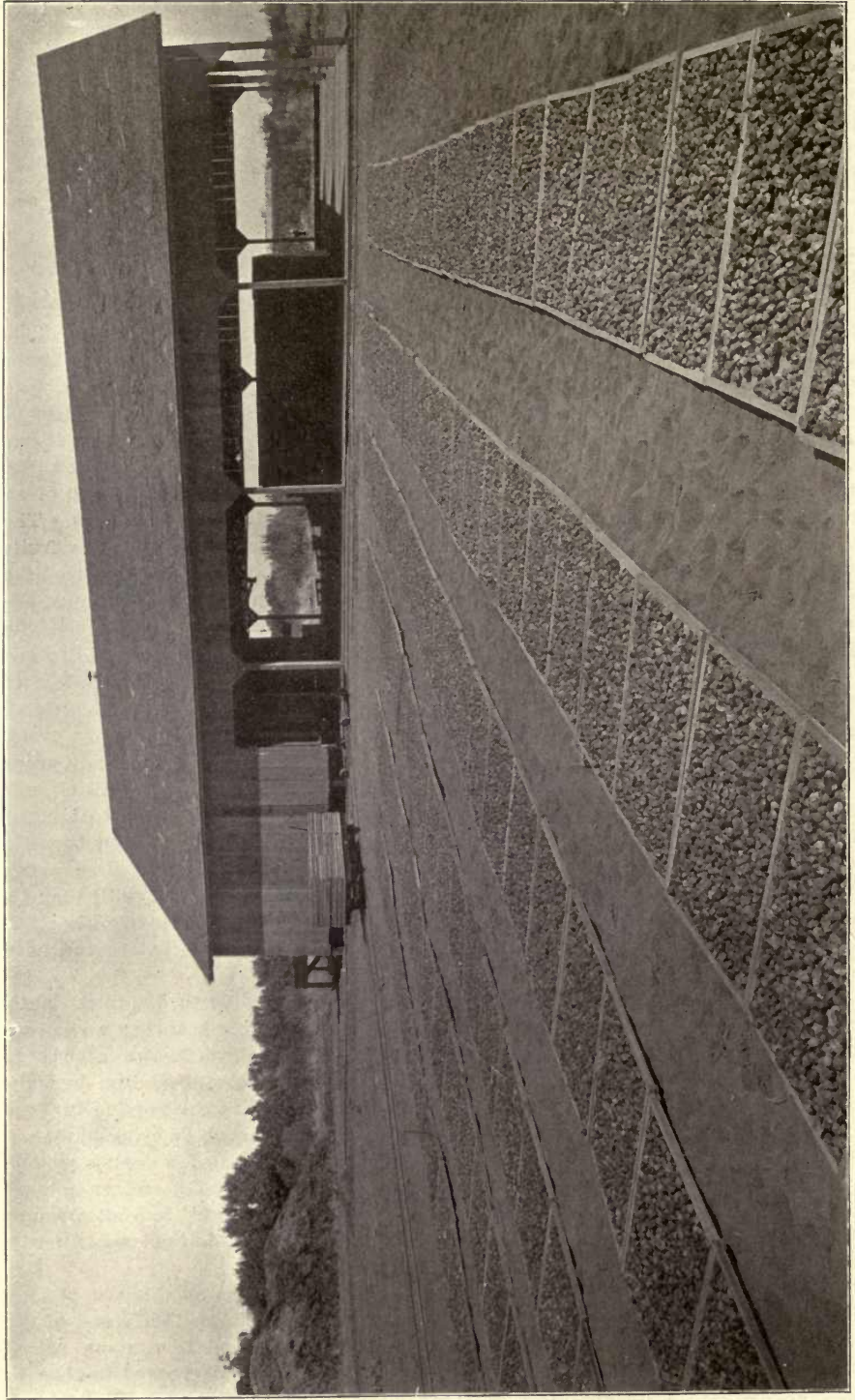
CHAPTER XIV.

HARVESTING AND DRYING CALIMYRNA (SMYRNA) FIGS.

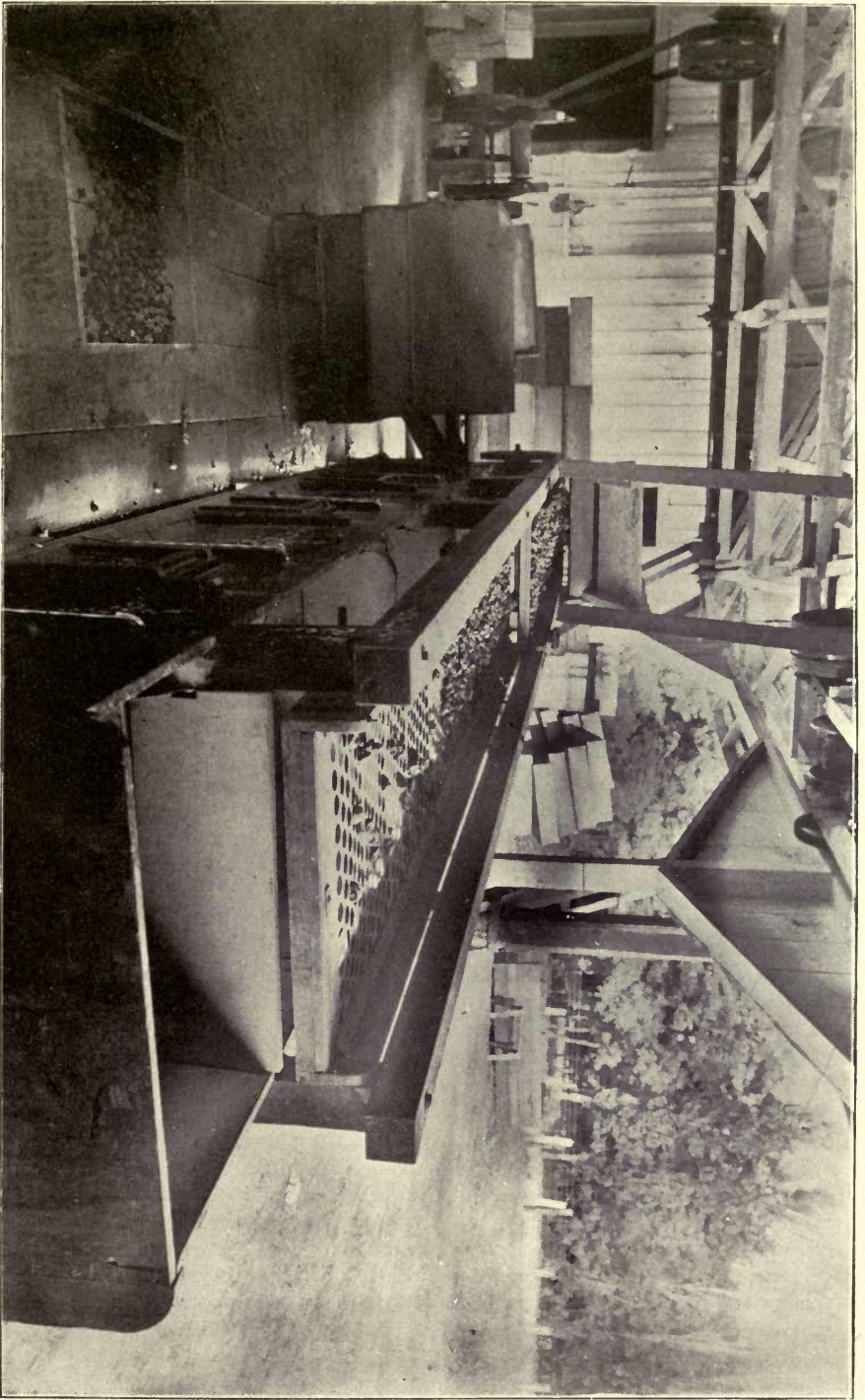
No proposition receives more careful thought and investigation by the fruit grower before he embarks in a certain line of fruit growing than what the expense will be in harvesting the crop. In California, where labor is so scarce during the summer months, a grower is certainly justified in giving this subject earnest and careful consideration. A large fig orchard can be handled at far less expense in the matter of harvesting the crop, than any other variety of deciduous fruit. One advantage it has over all other varieties is that all the fruit does not mature at the same time, but extends over a period of about six weeks; hence a few laborers can take care of an orchard. This alone is a point which appeals to all practical fruit growers. The Smyrna Fig possesses an advantage over all other figs, inasmuch that its fruits do not drop from the trees until they are practically dried. In the early part of the season, two days' exposure, and, in some cases, when it is very dry and warm, the figs will dry sufficiently in a single day. The figs commence to ripen about the middle of August, and continue to mature their fruits until the latter part of September. The trees are gone over every few days. When the figs first commence to ripen, the laborers simply pick the fallen figs from the ground into small buckets or baskets. As the season advances, the harvesting is expedited by shaking the trees. This, however, is not advisable when the figs first commence to drop, for many green figs, (that is, figs which have not commenced to shrivel), would drop off. All of such figs are valueless for drying purposes, for they have not a sufficient amount of sugar, when dried, and have an insipid and unattractive flavor, entirely unlike the figs which have reached their full maturity. It is remarkable how tenaciously the figs cling to the tree, and hang limp and shriveled, with their skins seamed, until they become dry and fully matured, before they will fall. Any attempt to pick the figs before this stage is very difficult; the succulent part will tear off before the hard stem can be detached from the tree.

After the figs have commenced to ripen freely, it is advisable to divide the gatherers into two crews. One crew goes from tree to tree giving the branches a vigorous shaking, causing all shriveled figs, which have not fallen of their own accord, to drop, while the other follows, gathering the fruit in small galvanized iron buckets. When filled, the figs are dumped into picking boxes, which have previously been distributed by a truck in that part of the orchard where the crop is being gathered. After a number of the picking boxes are filled, they are hauled to the drying ground. In a small orchard there is no need of a special drying ground, but where a large crop of figs is to be handled, a place to dry them should be selected and all arrangements should be made to have everything in readiness to handle the figs expeditiously, so there will be no hitch when harvesting actually commences.

The drying ground in the Fancher Creek Nurseries is a large open space, sloping to the south, and is admirably situated for this purpose. In the northerly end of the grounds a large open shed was built 40x60 feet. In one end is a room raised off the ground about a foot, enclosed throughout with tongue and grooved lumber, to be used for piling up the figs after they are dried, allowing them to pass through a sweat. Directly back of this room there is a large sixty-gallon cauldron set in



Drying Calimyrna (Smyrna) Figs, showing Drying Shed of the Fancher Creek Nurseries in the background. From an original photograph.



Grader for grading Calimyrna (Smyrna) Figs in George C. Roeding's Packing House in Fresno, Cal. From an original photograph.

brick. The boxes of figs, as they come to the drying shed, are piled up until several tons have been gathered, when the work of dipping and spreading out on the trays proceeds without interruption. The water in the cauldron, in which about three ounces of salt to the gallon has been dissolved, is heated up to the boiling point. A large perforated bucket is used for dipping the figs. This is attached by a rope and pulleys to a short wooden arm, hung on a pivot to the upper part of the building, one end of which hangs directly over the cauldron, about seven feet above it. The bucket containing the figs is submerged in this hot brine for about a minute, it being raised and lowered several times during this interval to allow the water to drain off and also to remove any grit or sand adhering to the figs. The figs are dipped in salt water to hasten the drying and to soften the skins; the beneficial effect of this treatment is especially noticeable in figs which have become somewhat over-dried on the trees before falling off. As soon as the figs are dipped, the beam is swung over to one side, the bucket is tilted, and the figs are dumped on wooden trays, which have been previously placed on a truck running on an iron track. These trays are 2 by 3 feet, and have a three-quarter cleat nailed all around them to prevent the figs from falling off. Three of these trays are filled at a time, being placed close together on the truck. The figs are spread out on them in a single layer, no care being taken as to the position in which they are placed, or whether they touch each other or not. As soon as one tier of trays is filled, another set is placed above them and also filled, this continuing until the trays are piled ten to twelve deep. The truck is now run out on the track to the drying ground, and the trays are spread out on both sides of the same. The drying ground should be firm and hard, the harder the soil the better. In the early part of the season, the figs distributed are not allowed to remain on the trays in the sun for much over two days. The second day the figs are turned, a very simple matter. An empty tray is placed over a full one. Two men standing at each end of the trays, by a dexterous movement of their hands, transfer the figs from the filled to the empty one. If the figs pile up when turned, they can easily be spread out again by merely shuffling them around with the hands. The trays, after two days' exposure, are piled up so the air will pass freely through them. This stacking is not actually necessary, but it benefits the figs, first in preventing them from drying out too rapidly, causing the skins to become tough and hard, and, secondly, they dry more evenly. One great mistake made in handling figs is that in many cases they are over-dried, which more than anything else is the cause of tough skins. The proper degree of dryness is determined by examining the figs in the early morning hours, before they become warm. If, when worked between the fingers, they have a slightly leathery feeling, they are sufficiently dried.

The work of sorting now commences. Many of the larger plump and meaty figs will on examination be found not to be dried sufficiently; these are sorted out placed on trays, and exposed to the sun once more until they become dry enough. The other figs are thrown into a pile in the sweat room. The piles of figs are turned over in this room every few days; meanwhile the sweating process continues, the skins of the figs become moist and pliable, and, although the figs are apparently wet, it is in reality nothing more than the sweating and curing process they are passing through. After remaining in the pile for ten days, the figs are now in condition to be packed.

During the process of drying and handling, more or less dirt adheres to the figs, so they are given another washing before hauling to the packing house. A trough, made of two-inch lumber, two feet wide, one foot deep, and from ten to twelve feet long, is half filled with cold water, in which four ounces of stock salt to the gallon has been dissolved. From 100 to 150 pounds of figs are dumped into this trough at a time. All figs which float to the top are removed first. These are over-dried, and are called "floaters." The figs which sink to the bottom are given a thorough washing between

the hands, and are then taken out and placed on large trays, 3x6 feet. The figs are piled in these trays a couple of inches deep, and are then exposed to the sun a half a day, being turned once during this time. This final exposure is made to remove all superfluous moisture from the figs.

The trays are then taken to the drying shed, and their contents are dumped into sweat boxes. A sweat box is made of one-inch lumber, is eight inches deep, two feet wide, by three feet long. The figs are now ready for packing.

If the figs have been carefully handled they will have a tender skin, and be soft and pliable, and present a fine, glossy white appearance. The skin of the Smyrna Fig when dried is white, and to one not familiar with its natural tendency, to have this color, the inference would be that the figs had been sulphured. Sulphuring of figs is always objectionable, but it is found necessary with the ordinary White Adriatic, in order to give the skin a white color, but this gives that fig a bitter flavor, and extracts what little of the true fig flavor this variety originally possessed.

PACKING.

The Packing House for handling the product of the Fancher Creek Nurseries is located in the city of Fresno, and as the quantity of fruit to be packed is limited, the building is of modest pretensions, fully large enough, however, to accommodate the force of twenty-five to thirty men and women engaged in packing the Calimyrna Figs.

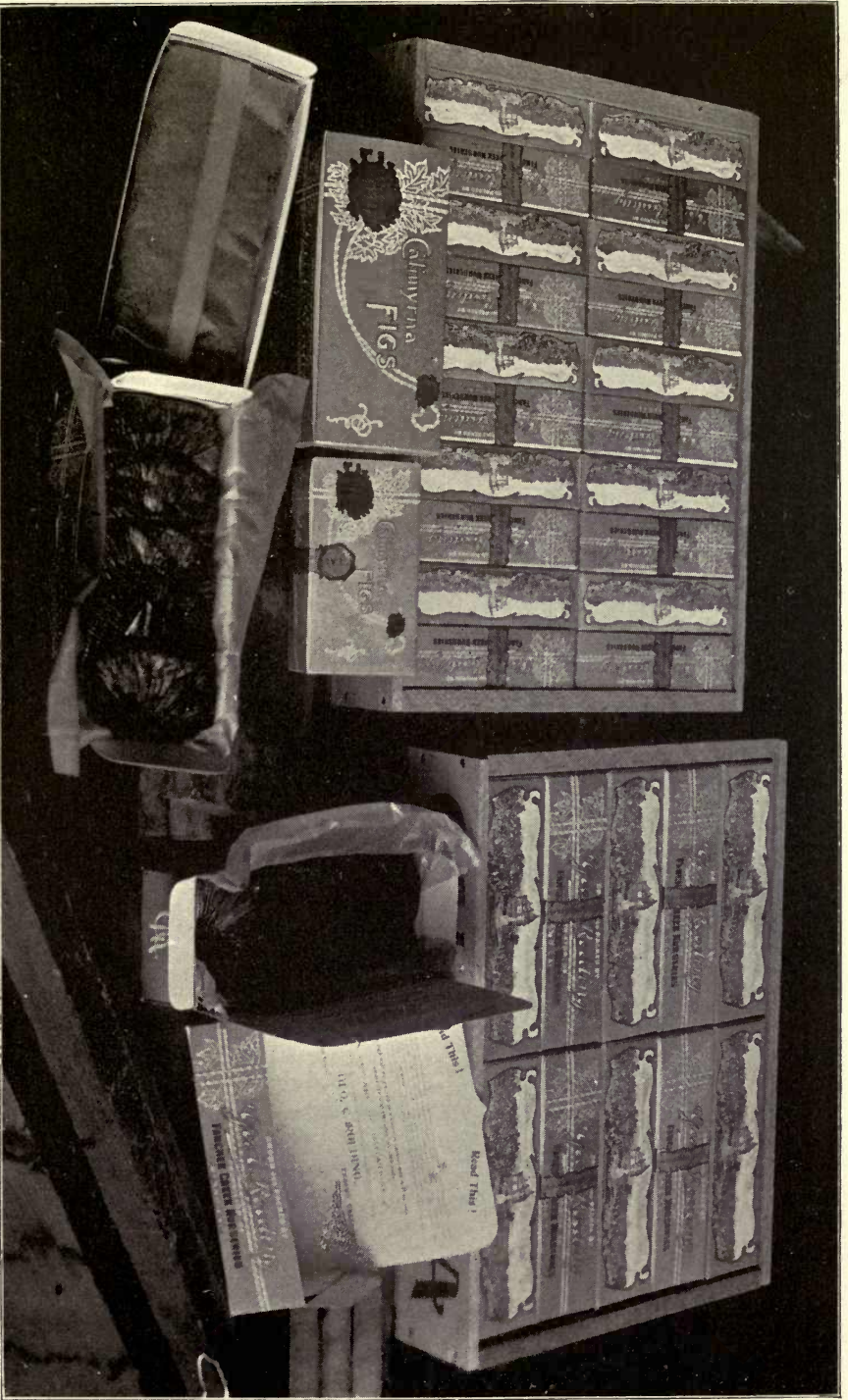
The figs are hauled in the sweat boxes to the packing houses. Here they are piled up, each box being carefully placed above the one below it to prevent the entrance of insects, which are attracted by the sweetness of the figs. The first step before packing is to grade the fruit into sizes. This is quickly accomplished by a fig grader run by power, and especially designed for this purpose. This grader consists of a series of trays, in a frame, all on the same plane; underneath are the hoppers, partitioned off to receive the several grades. The trays are made of galvanized iron, and are perforated with round holes. The first tray has holes $\frac{3}{4}$ of an inch in diameter, second one, 1 inch, the third one, $1\frac{1}{4}$ inches. The figs dropping through the first tray are designated as three-crown, the next, four-crown, and the last one five-crown. Those passing over all these trays and into the hopper at the end of the machine are the six-crown. The trays are fastened to a frame built inside of the main frame of the machine, but not touching it. This frame is supported by levers, which are so adjusted when the machine is started that it is given a quick up-and-down motion, causing the figs to pass from the trays with the small holes to the larger ones.

The three-crown figs are not packed, but are dumped loose into fifty-pound boxes, as they are too small; only the four, five and six-crown are packed in cartons. The six-crown are extra large, fine, meaty figs, and run from sixteen to twenty to the pound. Just before packing, the figs are placed in a steam chest lined with galvanized iron, and steamed. The trays used have a wire screen bottom, and hold about thirty-five pounds of figs. From three to four of these trays are placed in the box at one time. The steaming is done with a twofold object in view, viz., to heat the figs through thoroughly in order to destroy all insect life and germs, and to soften the fruit so that it can be easily handled by the packers. The packing is done entirely by women. A long table, about two feet high and four feet wide, is provided for this purpose.

The figs, when taken out of the steam chest, are dumped into small boxes, placed in front of each packer, who selects a fig, and, flattening it out between the fingers, turns the orifice end to the under side, and then with a small knife, slits the fig from the orifice to the stem end; meanwhile spreading it out to the proper width, so the sides of the figs will fit snugly into forms, which are made of hard wood and divided



Forms used in Packing Calimyrna (Smyrna) Figs in the Packing House of George C. Roeding, Fresno, Cal. Reduced from an original photograph.



How Galinyrna (Smyrna) Figs are packed: the finished product.

From an original photograph.

into four sections, each of which is the exact size of the carton into which the figs are to be packed. The first layer of figs is placed face down, so the bottom of the package when examined will present the same finished appearance as the top layer. After three layers of figs have been placed in the form, it is taken to the press, a wooden board with small blocks, which fit exactly in the forms is placed on it, and the figs pressed down into the form, thus making room for the top layer. An ordinary letter press is used for pressing the figs, it being more serviceable than a lever press, due to the pressure being exerted gradually, which could not be done with the latter. This branch of the work is in charge of a small boy, who, after pressing the figs, takes them back to the packer to be finished. As soon as a form is filled, each brick of figs is weighed; if the weight is found to be correct, it is again placed in the form, which is then taken to the packing table, the false bottom underneath is taken out, and the bricks piled up ready for wrapping. In each brick of figs, a leaf of the Bay Laurel (*Laurus nobilis*) is placed. This leaf does not affect the flavor of the figs but imparts to the package a pleasant appetizing odor when opened. The brick is next taken in hand by the wrapper who neatly wraps it in wax paper, but before so doing, the package is once more weighed, and if the weight is not correct, it is returned for repacking.

After wrapping, the package is sent to the next girl at the same table, who places the brick in a very attractive paper carton, neatly engraved and embossed. These cartons are made in two sizes, half pound and one pound. The background is all in green. The cover has the words "Calimyrna Figs" in gold, and white embossed on it; one side of the box has a view of the residence of the Fancher Creek Nurseries surrounded by a grove of Calimyrna Fig trees and the other is embossed with the name of the grower and packer, in white and gold letters. Underneath the scroll in which this view is enclosed are the words, "Where these figs are grown." On the ends of the carton are the initials, G. C. R., embossed and worked in white.

The package now comes into the hands of another girl, who pastes a gold seal on the carton, to hold the top in place. The cartons are now finished, and all that remains to be done is to place them in wooden boxes when they are ready for shipment. These wooden boxes hold ten one-pound, and twenty one-half-pound cartons.

The fig packers are in charge of a fore lady, who watches the work of packing carefully, and sees that no inferior or defective figs are packed. She also keeps track of the work done by each packer by means of tally slips, so that the number of pounds packed can be seen at a glance by examining the form book in which a daily record of the work is kept.

The descriptions of the harvesting, curing, and packing of the Smyrna Fig elaborated in the foregoing paragraphs are based on the personal experiences of the writer. For this reason the frequent reference to his own business affairs was almost unavoidable—a condition to which he is more or less sensitive, for the reason that the text may impress the reader as a trifle egotistical in places, and this, let it be distinctly understood, was in no way a motive in their preparation. Quite to the contrary, the matter is thus given prominence with the hope that his facts and experiences may prove of service to intending planters of the Calimyrna Fig, wherever it can be established as a commercial proposition.





Packing Calimyrna (Smyrna) Figs in the Packing House of George C. Roeding, Fresno, Cal.

From an original photograph.

CHAPTER XV.

CAPRIFYING THE CALIMYRNA (SMYRNA) FIG.

This is the important function in connection with the production of the Smyrna Fig, as it is now generally conceded that no Smyrna Fig can be produced except by caprification. Not over five years ago, it was derided by horticulturists, and the inclination to ridicule the whole subject was general. That caprification was known and practiced for several thousand years is evidenced by the writings of Aristotle and Theophrastus, the latter for the first time having noted that all sorts of figs do not require caprification. To all outward appearances, the fig tree, unlike other trees, develops fruit without producing flowers. These appearances are misleading, however, for on cutting the fig open, it will be found that it contains a large quantity of inconspicuous flowers, closely grouped around the rind, which is really the receptacle for them. In the Smyrna varieties, it is essential that these flowers be fertilized to develop and perfect their fruit. Unless the flowers are pollinated, the figs fall off when about the size of small marbles. This fact draws the line of distinction between the Smyrna varieties of figs and those classed with the Adriatic* family, which mature their figs, (although they are imperfect), without the agency of the insect.

There are four distinct kinds of flowers found in figs, namely, male, female, gall and mule flowers. Male flowers are found only in the Capri Fig, and are particularly abundant in the Profichi or Spring crop. Female flowers are found in the Smyrna, or edible figs, and in a limited number in the Mammoni, or Summer crop of Capri figs. Gall flowers are found only in the Capri Fig, and are present in all the crops, Profichi, Mammoni, late Mammoni and Mamme. It is in these flowers that the Blastophaga develops and propagates its species. Mule flowers, or rather mal-formed female flowers, are found in the Adriatic type of figs, and are present in the Breba, or first crop of Smyrna Figs.

The caprification of the Smyrna Fig by the fig wasp (*Blastophaga grossorum*) is not a difficult, complicated matter, as many would suppose. When the Smyrna Figs are in the receptive stage, is the first point to be understood. This is indicated by the glossy green color of the figs, and by the creamy white color of the flowers. The next point is to be in the position to decide how many times the Smyrna trees must be caprified in order to secure a full crop of fruit.

The only crop of any importance in the production of the Smyrna Fig is the Profichi, or male crop of the wild, or Capri fig, maturing its fruits in the San Joaquin Valley in June. In counties along the coast, where the weather is cooler, the figs are much later. At Niles, on the grounds of the California Nursery Company, the Profichi figs ripen in the latter part of July, and continue to do so until late in September. This illustrates how climatic conditions, in so short a distance, (150 miles), materially change the development of the little insect. Under normal conditions, the Profichi crop on the Fancher Creek Nurseries matures the second week in June.

Two varieties of Capri figs have been found to be sufficient to carry out all the

*It has been found that the Adriatic type of figs do contain a limited number of female flowers, for fertile seeds have been developed in a number of these varieties where the Blastophaga has entered. This fact has been demonstrated by experiments made at the California Nursery Company's grounds at Niles, California, and at the Fancher Creek Nurseries.

requirements to caprify a Smyrna Fig orchard; as has been demonstrated in using Roeding's Capri No. 1 and No. 2 in the orchard of the Fancher Creek Nurseries. Capri No. 1 matures its fruits first, and this is followed in about a week by No. 2. As all the Smyrna figs are not in the receptive stage at the same time, but keep on developing figs for ten or twelve days after the first figs appear, the necessity of having more than one variety of Capri fig can be better understood. Simultaneously with the ripening of Capri No. 1, the first Smyrna figs are in the receptive stage. To know when to commence picking the Capri figs is not difficult, close observation is all that is required. When the Capri figs, from their appearance, indicate they have reached full size, they should be carefully watched. If on breaking one open, a

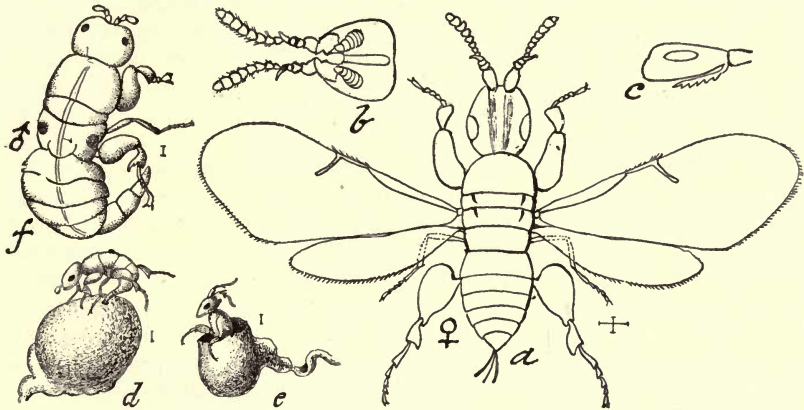


FIG. 1.—*Blastophaga grossorum*.—*a*, adult female; *b*, head of same from below; *c*, head of same from side; *d*, male impregnating female; *e*, female issuing from gall; *f*, adult male, (after Westwood.) All greatly enlarged.
Courtesy of U. S. Department of Agriculture.

number of the male insects are to be seen crawling around in the fig, it is safe to assume that the female wasp has commenced to issue. The color of the fig is no indication of its maturity, for in many instances figs, while outwardly green, are ripe, and the insects have commenced to leave, and are looking for new figs in which to deposit their eggs. Another way of determining the proper stage of ripeness is to press the fig between the fingers; if it gives to the touch it is mature and ready to be picked. After a little experience, the proper stage is apparent by the general appearance of the figs.

Outside of the work of caprifying, there is no extra expense incurred in growing the Smyrna Figs, over the ordinary varieties. The first distribution of Capri figs, containing the *Blastophaga*, is made in small wire mesh baskets, which have been previously hung in the Smyrna Fig trees. From five to six figs are placed in each basket. The Capri figs are knocked off the trees with light bamboo poles, gathered in buckets, and are then taken by a crew of men, and the figs are distributed through the orchard, commencing at one point and giving each tree its quota of figs.

All the Profichi figs do not contain insects, but if the supply of insects from the Mamme crop is sufficiently large, and the weather has been favorable, it is difficult to find a Profichi which does not contain galls. Two classifications of figs have been named by Mr. E. A. Schwarz, of the Division of Entomology, viz., polleniferous and insectiferous; the former being without insects, some of which drop off before reaching maturity, while others of the same class, although they mature their staminate flowers, are of no value for the reason of there being no insects in them to transfer the pollen. The latter, (insectiferous figs), are full of galls, mature their fruit somewhat later than the polleniferous, and are easily distinguished by their

firmness. In my opinion there would be no polleniferous figs at all, if there was a sufficient supply of insects to pollinate the Profichi figs in the spring. This condition is brought about mainly either by the shortage in the supply of insects, or is caused by the Profichi figs passing beyond the receptive stage before the insects enter them. All the wasps do not emerge from the Capri figs at the same time; the flight continues for several days after the figs are suspended, usually taking place in the morning as soon as it commences to get warm, and continuing for about an hour. The insects continue to issue daily from the figs, until they become dry, when the insects still remaining inside, perish. Before entering the Smyrna Fig, the wasp crawls all around it, carefully examining it, and if not satisfactory, flies to another fig. The number of Capri figs which should be placed in a Smyrna Fig tree depends largely on the size and age of the tree, and the condition that the Smyrna Figs are in when the distribution is being made. A five year old tree should have about twelve to fifteen figs placed in it, increasing the number of Capri figs at the rate of three figs for each additional year. After all, no fixed number can be laid down as to the quantity of figs necessary for a tree, except in a general way, for it is one of those cases where experience is the safest and most reliable guide.

The baskets, in which the figs are placed from time to time during the period of caprification have been found to be a valuable adjunct in expediting this work, for in using them, the Capri figs can be much more quickly distributed than where it is necessary to first string the figs before distributing them. The baskets alone, however, would not answer the purpose, and the use of raffia to suspend figs in various parts of the trees must also be resorted to. The method of doing this is to gather the figs early in the morning, as soon as it is daylight, and dump them in a pile under a tree. The work of stringing is very simple, a piece of raffia, into which a darning needle has been threaded is used for this purpose. From twenty to twenty-five figs are strung on each piece, and every fifth fig is held in place by a half hitch. These strings, before the figs are distributed, are cut in pieces with five figs each, and carried out into the orchard on short poles. The strings are thrown up into the trees, the workmen, as far as possible, getting them into the shady parts. After an interval of four to five days, another distribution of the figs should take place, and this should be followed by another distribution, if young figs are found to be making their appearance on the trees. Too many insects may cause trouble, so many of the female flowers becoming fertilized, that, when the fig commences to ripen, it splits open, a very objectionable feature, but which can easily be avoided in using good judgment in the number of figs suspended in the trees.

It has been suggested that the labor of hanging the Capri figs in the Smyrna trees could be avoided by having the Capri figs distributed throughout the orchard. This is true enough, but there is one point to be considered in following this plan, and that is, that all the trees close to the Capri figs will be fertilized too heavily, resulting in some of the figs bursting open just about the time they mature. There is no doubt in my mind that this oversupply of insects in the figs is the cause of this difficulty, for the Smyrna Figs growing close to the Capri figs at the Fancher Creek Nurseries, are full of split figs, while in other parts of the orchard where the Capri figs have been distributed in the regular way, split figs are a rarity.

The remarkable change in the appearance of the Smyrna Figs within ten days after they have been fertilized, is one of the most interesting features in connection with this subject. The caprifigged figs are readily distinguished from those which the insect has not entered by their healthy green color, absence of ribs, and their firmness. The unfertilized figs have an unhealthy, yellowish green color, the ribs are distinctly outlined, and, when pressure is exerted, they collapse. As the caprifigged figs develop and expand, the unfertilized ones cease to grow, shrivel up and finally drop from the trees; therefore a month before the crop matures an estimate of about what it will be can be easily made.

LIFE HISTORY OF THE WASP AND HOW IT PROPAGATES.

It must be borne in mind that the Capri figs and Smyrna Figs are entirely distinct in their characteristics. The Capri figs merely serve as a home for the insect, and stand in the relation of males to the Smyrna Figs, which produce only female flowers. During the season the Capri figs produce from three to four crops, the number varying under different climatic conditions. In our fig orchard four crops matured annually since the establishment of the insect. The first crop appears in March and ripens in June, and is called the Profichi; the second is called the Mammoni, and commences to push out in the form of small buttons in June, and is in the receptive stage in July, maturing in the latter part of August, and early in September, when a new crop of figs appears on the trees, called the Second Mammoni, or third crop, which the insects enter in the same manner. The fourth in October. In the San Joaquin Valley, this crop is the final crop. The fact of the matter is, however, the last two crops, Second Mammoni and Mamme, are so closely interwoven, it is very difficult to make any distinction. In some seasons where the frosts do not occur until December, insects can be found to be issuing even as late as this; but this is the exception rather than the rule.

To properly understand the manner in which the insects propagate it must be borne in mind that the Capri fig is a hollow inflorescence, the greater part being lined with gall flowers, which are ready to receive the egg deposited by the Blastophaga fully six weeks before the male or staminate flowers, occupying a limited zone near the eye of the fig, mature. The propagation of the fig wasp takes place in the following manner:

The overwintering Capri figs mature from the latter part of March, and continue to ripen until late in April. The wingless male wasps make their appearance first; they gnaw their way into the galls where the females lie, using their powerful mandibles for the purpose, and impregnate them, and then perish within the fig in which they were born. The winged female then escapes by widening the passage made by the males, leaves the fig and enters the Profichi crop of figs, then in the proper stage to receive the insect. This crop develops on the old wood, and is about the size of a marble when in the receptive stage. The ostiolum, or orifice, appears to be closed, but the insect with the saw-like projection under the thorax, cuts its way in through the scales, losing its wings in the operation, which may be seen later adhering to the scales, like two iridescent rays. Once inside of the fig, it crawls around and deposits its eggs in the gall flowers; one egg is deposited in each flower between the nucleus and the integument of the ovaries. After having performed this function, it perishes within the fig to which it has entrusted its offspring. In consequence of the puncture made by the wasp the flowers in the fig enlarge after the manner of a gall, in which the wasp embryo develops. Shortly after this development, a marked change takes place in the caprifig, it turning a dark green color, becoming firm and hard, and presenting a fine, healthy and vigorous appearance. Six weeks later the fig ripens, and at this time the male or staminate blossoms are mature. The insect develops in the same manner in this crop as it did in the Mamme crop, but the female in its passage out of the fig gets its body and wings covered with pollen, and if the fig from which it issues, has been previously hung in the Smyrna Fig trees, it enters the young female figs, then in the proper state of maturity to admit its entrance. Laden with pollen obtained in its outward passage from the Capri fig, it fertilizes the female flowers. It crawls around in the fig, making frantic efforts to find a depository for its eggs, but the formation of the flowers is such it is unable to reach the ovaries with its ovipositor. Although it fails to propagate the species, it carries out a two-fold purpose; the figs thus entered contain fertile seeds and mature into beautiful, luscious fruit. If the fig has not been removed from the Capri tree, it enters the young Mammoni figs, deposits its eggs in the gall flowers, and fertilizes the few female flowers to be found in this crop.

The propagation of the wasp in the following crops of Capri figs is the same, the only noteworthy difference is that the Profichi crop is the only one developing an abundance of male flowers. Hence, this is the only crop essential to the Smyrna Fig, for it is the only one in which the male blossoms reach a perfect state of maturity, and without which no Smyrna Figs can be produced.

CHAPTER XVI.

A SCIENTIFIC VIEW OF THE FIG WASP.

The following life history of the *Blastophaga grossorum*, or fig wasp, is from the pen of Dr. L. O. Howard, chief of the Division of Entomology of the Department of Agriculture, at Washington. It is here given in its complete form, because it tersely and graphically deals with the whole subject from the view point of an experienced, economic entomologist, and can therefore be considered reliable and in keeping with all the facts bearing on the case.

LIFE HISTORY OF BLASTOPHAGA.

"So far, we have referred to the life history of the fig-caprifying insect only in the most general terms. The illustration (fig. 1) which is given of the insect in the early part of this article is a copy of an old one drawn by the famous English entomologist, Prof. J. O. Westwood, and which was published in the Transactions of the Entomological Society of London, 1882, plate iv, in part. It is an interesting figure, and illustrates rather well the difference between the male and the female. It shows the peculiar mouth parts of the female, which enables her to gnaw her way through the tough seed-like gall, and shows also the male in the act of fertilizing the female, and the female in the act of issuing from the gall. It is, however, incorrect in some of the rather important structural details, as will be seen by comparing it with fig. 2, here given, which has been drawn under the writer's supervision from living specimens reared at this office and in California. The entomologist will at once note especially the difference in the details of the thorax in both males and females, and especially will the difference in the length of the abdomen of the male be seen.

The male is always wingless. It has no ocelli, and its compound eyes are greatly reduced in size. The fact that the male rarely leaves the fig in which it has hatched might almost be inferred from these facts of winglessness and partial blindness. When this wingless male issues from the seed-like gall in which it is contained, it seeks a female gall in the interior of the same fig, gnaws a small hole through its cortex, inserts its extremely long, almost telescopic, abdominal extremity through the hole, and fertilizes the female. The female subsequently, with her powerful jaws, gnaws the top of the gall off and emerges, crawling around the interior of the fig and eventually forcing her way through the ostiolum, almost immediately, seeking for young figs, which she enters, and should the fig entered prove to be a Capri Fig, lays her eggs at the base of as many flowers as she can find, and then dies. Should the fig entered, however, be a Smyrna Fig, either through the fact of the Capri Fig from which she issued having been hung in the branches of a Smyrna Fig tree, or from the fact that she has flown to an adjoining Smyrna Fig tree, she walks around among the female flowers seeking for a proper place to oviposit, discovering eventually that she has made a mistake, but, nevertheless, probably trying to find a proper place for oviposition by thrusting her ovipositor in here and there. It is this futile, wandering search, covered as her body is with pollen from the Capri Figs, that produces the extensive and almost perfect fertilization of the entire number of female flowers."

THE EGG.

"The egg when seen in the ovary is very long and slender, but when found in the fig it is less than three times as long as broad, almost regularly elliptical in shape, white and slightly shining, with a delicate petiole of about one and a half times its length. On dissecting a flower into which the egg has been inserted by the female *Blastophaga*, it will be found to have been pushed in transversely to the axis of the flower nearly to the center, with the petiole reaching out to the cortex. Its dimensions are, length, exclusive of petiole, 0.092 mm.; width, 0.046 mm."

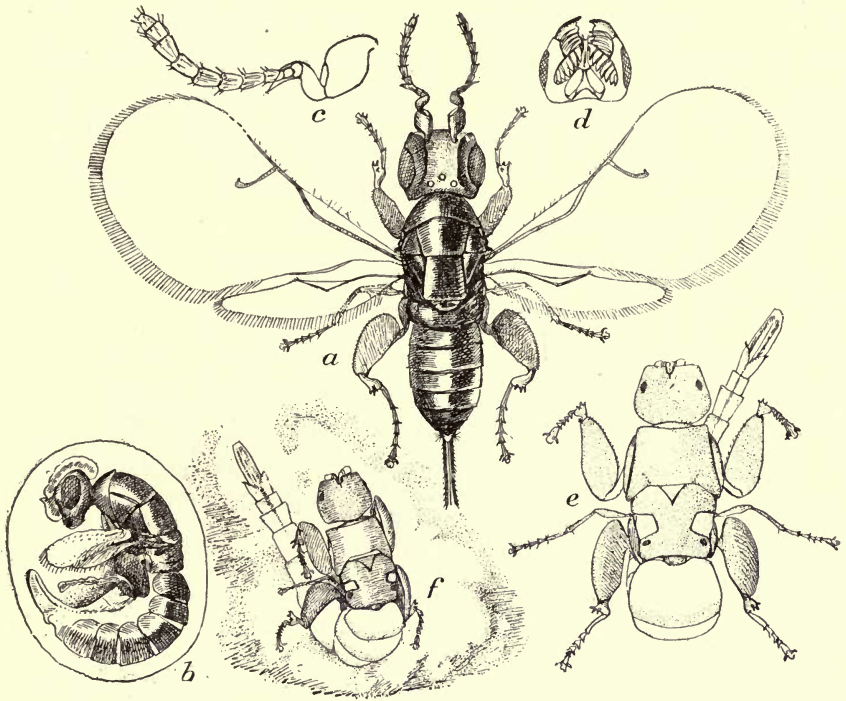


FIG. 2—*Blastophaga Grossorum*—, *a*, adult female with wings extended, seen from above; *b*, female, not entirely issued from pupal skin and still contained in gall; *c*, antenna of female; *d*, head of female from below; *e*, adult male; *f*, the same — all greatly enlarged.

Courtesy of U. S. Department of Agriculture.

THE LARVA.

"The young larva is a delicate little creature curved upon itself and showing no visible segmentation. It takes many days development of the Capri Fig before the larva becomes visible with certainty without the most careful observation under a strong lens. The first sign which indicates that one is watching the larva and not the sap in the gall is the visibility of two brownish spots, which are without doubt the mandibles of the larva. When these spots become visible with a very powerful hand lens (one-fourth inch Tolles triplet), the larva is more than two-thirds grown and the segmentation of the body has become noticeable. It is a very difficult thing to dissect the larva out of the gall without crushing it, but it can be accomplished with care by the aid of dissecting needles. No casting of the skin has been observed. With the growth of the larva the gall at the base of the male florets becomes hard, and greatly resembles a seed, turning light brown in color."

THE PUPA.

"The male and the female pupae each occupies a greater portion of the interior of the gall, and the advanced female pupa, almost ready to emerge, presents the appearance indicated in fig. 3."

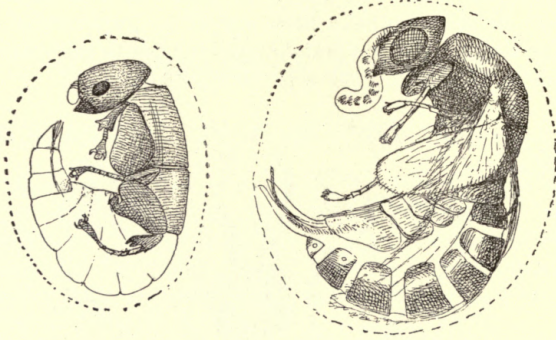


FIG. 3. Male and female pupa in galls,— enlarged.

Courtesy of U. S. Department of Agriculture.

DURATION OF THE EARLY STAGES.

"This is a point upon which it is very difficult to secure exact data. It seems certain that more than fifty days are given to the larval stage. Oviposition takes two days, or perhaps longer, and the last larval stage with the pupa stage, and what may be termed the immature imago stage, lasts only a few days. All of the long intermediate period is occupied by the immature larval stages unless there should prove to be a prolonged egg state, which is improbable. These three stages seem paralleled by the three outwardly visible changes undergone by the fig, and which have been described in preceding paragraphs. The first swelling of a freshly stung fig, about four days after the entering of the insect, probably marks the hatching of the egg. The long intermediate stage of slow, almost imperceptible growth, is identical with the duration of the larval stage, and includes also the pupal stage. The final and sudden expansion of the fig always marks the issuing from the galls (but not from the fig) of the male imagos. In the hibernating generation the duration of the final stage is greatly prolonged. On March 15, Mr. Schwarz found the insect in fallen overwintering figs as larva, pupa, immature imagos, and occasionally mature male imagos, and this lasted until March 28 or later. The same state of affairs was found in figs sent to the writer by Mr. Roeding as early as February. It seems probable that before a sudden drop in temperature occurred at any time subsequent to the middle of October the insect would hibernate in the several different stages. With the growth of the larva the gall at the base of the male florets becomes hard, and greatly resembles a seed, turning light brown in color."



CHAPTER XVII.

PRODUCTION AND MARKETING.

PRODUCING QUALITIES OF THE SMYRNA FIGS.

The Calimyrna Fig produces two crops annually, the first one maturing in June, called the "Brebass," which are produced in very small quantities, only a few scattering specimens are found on some trees, while many trees develop no fruit at all of this crop. The figs are quite large, of lemon yellow color, acute pyriform, with long necks. The seeds are large but quite hollow, and the fruit possesses but little flavor and is entirely unlike the regular crop following. Commercially, it has no value. The Smyrnas bear as regular and heavy crops as the varieties belonging to the Adriatic class. There are rarely years when even partial failures occur, and where the necessary precautions are observed to have a good supply of the Mamme, or winter Capri figs, the possibility of failure is very remote. The only expense incurred in growing Smyrna figs over and above the ordinary varieties is the matter of caprification. This is not worthy of serious consideration when the value of a crop of Smyrna figs is compared with the Adriatic varieties. All other expenses are proportionately less; the figs dry quicker and require less processing in order to make them marketable.

Leaving out the fact that the Smyrna Fig is superior in every sense of the word to the ordinary figs, that it commands more than double the price in the markets, there is still another even more important point in its favor, viz., it rarely sours, a fact which has been fully demonstrated where the Smyrna Figs were growing in adjacent rows to the White Adriatic. This latter variety is inferior enough to begin with, but when it is still further made unpalatable by the fruits souring on the trees, making them unfit for consumption, this alone, were there no other consideration, should be good cause to discard the Adriatics in favor of the Smyrnas.

Success in every line of fruit culture can only be attained by having the best; it costs no more to grow a good variety of fig than a poor one, the same care, the same intelligent thought must be brought into play, but what a difference in the results; one goes begging for a buyer; the other is placed on the same equality with the imported fig, and will sell in competition with it. Is it worth while to waste time, patience and money in growing a fig, which, to begin with, cannot be considered in the light of a merchantable article? The whole success of Smyrna Fig culture rests on the successful and permanent establishment of the Blastophaga, which is an accomplished fact.

MARKETING CALIMYRNA FIGS.

California figs, unlike her other fruits, have always been regarded with disfavor at home in the eastern states. They sold only because they were cheap, and in some seasons even this factor of cheapness did not add to their being in demand. California horticulturists, particularly the pioneers, passed through trying ordeals in marketing their fruits, whether green or dried. It was necessary to educate the Eastern jobber that this State must be recognized as a fruit section, and that the prejudice against home products must finally give way to reason. It required the expenditure of thousands of dollars and a dogged persistence on the part of the

growers to do this; but success finally crowned their efforts, and they have attained a reputation, and created a demand for these goods far above expectations. There is no denying the fact that fig growing possessed no commercial importance until the Calimyrna was successfully produced and marketed. It was difficult to convince Eastern buyers that there was a difference, but today they are ready to admit it, and they do not hesitate to give the Calimyrna the praise it deserves. They now admit that their sweeping declaration that California could never produce good figs must be modified.

Smyrna Figs, enjoying a wide reputation, are exported to all parts of the world, and nothing has done more to create a name and reputation for Smyrna than its figs. No wonder the industry has been so carefully guarded; its loss means much to the people of Smyrna, and her growers engaged in its culture. Our intelligent efforts, improved machinery, and more cleanly methods of handling the fruit must in the end win in the markets of the world. The culture of the Calimyrna Fig will not be confined to limited areas, because it finds congenial environments throughout an immense scope of country on the Pacific Slope. Once let its culture become established on a commercial footing, and we will command the markets of the world. Just as surely as the sun rises and sets, so surely will the Calimyrna enter into competition with the mother fig in Asia Minor, and in the end drive it out of the field. This has been the case with other lines of dried fruits, where they have entered into competition with the products of the Old World, and the same results will in the course of events follow with the Calimyrna Fig. American push, energy and the inclination to surmount every difficulty, no matter how great it may be, must in a short time redound to the growers of Calimyrna Figs; they may not have the experience in the matter of marketing their goods, but this will keep pace with the industry as it grows and increases in importance.

No fruit adapts itself to such a variety of uses as the fig, and leaving out the matter of export, an important factor of course, the home consumption must increase enormously, for the fig can be crystalized, preserved in cans, pickled, the poor and defective figs can be distilled or manufactured into coffee, so that this product in the variety of its uses, has a field before it, equalled by no other fruit.



CHAPTER XVIII.

A CALIMYRNA FIG ORCHARD AS AN INVESTMENT.

In this age of keen competition and strenuous life, the first question that will suggest itself to the person investigating the fig question, with a view to planting an orchard, is apt to be, "Well, what is there in it?" To fully answer this interrogation means to go into the entire commercial phases of the new industry,—which obviously, under many and diverse conditions, is almost beyond the ken of human knowledge to answer accurately and specifically. So many factors which are purely local in character and environment surround and hedge about each individual orchard and locality that it is out of the question to lay down hard and fast rules, or make specific statements calculated to be reliable in every case, and a safe foundation on which to premise the final commercial results to be anticipated from the planting and development of a Calimyrna Fig orchard. Broadly speaking, however, a few basic principles may be laid down, which will bear scrutiny, and are of themselves so self-evident and vital in character, as to almost remove all questions of risk and doubts as to the future of the fig in America, and its profitableness as an orchard crop to all who may venture to plant and properly handle the trees and their product.

Since every man is the maker of his own fortune and career, the question of "What is there in it," is largely one of personal initiative, exploitation and development along intelligent lines, backed by a determination to win. In lieu of this fact, let us take a cursory glance at the question, carefully noting its salient features, and see what the conditions really are that lead to the conviction that the Calimyrna fig will not only create a revolution in fig culture in this country, but become the nucleus of a new industry, calculated to add more to the horticultural wealth of the sections adapted to its culture, than any other one thing that has transpired in a decade, not even excepting the introduction and development of the Washington Navel orange.

The first thing to be considered is the cost of land. This again is subject to local environment and personal preference. As to preference, in this respect the fig is no more exacting than the olive, and much less so than the orange or the stone fruits. Lands adapted to its culture in the great Sacramento and San Joaquin valleys are to be had all the way from \$20.00 an acre and upwards; these, for the most part, are contiguous to markets. In more remote sections the cost is even less, while in the southern counties it is quite apt to be a trifle higher. Where irrigation is essential some allowance must be made for water advantages. For the most part lands suitable to the Calimyrna Fig are apt to be had for less than those adapted to the apricot, the walnut, or the citrus fruits. This fact is also emphasized by the fact that it has a wider range as to climatic conditions.

The cost of planting a Calimyrna Fig orchard need not be great; indeed, it can be accomplished for about the same cost as the creation of an olive grove, or a peach orchard. Figures and data on these points being so much a matter of individual means of procedure and local conditions they are here purposely omitted, as any reference to the subject in this direction would not apply to two orchards alike, even if in the same neighborhood.

The expenditure of time, labor and money in bringing a fig orchard into bearing is purely nominal. All that is necessary, is to thoroughly plow and cross-plow the ground once a year; cultivate well during the growing season; pruning is but sparingly necessary, and hence is a matter of small cost; irrigation—where necessary—is also of no great expense, because only required once during the summer season, even in periods of scant rainfall.

The Calimyrna Fig comes into bearing at about four years from the time of planting, the Capris coming in at about the same time. No attention must be given to the little fig wasp (*Blastophaga grossorum*), after once established, in order to secure fruit. To start them in a new orchard all that is necessary is to secure a few of the winter or Mamme figs, containing insects and suspend them in the Capri trees. This crop of figs can be transported for thousands of miles and even if four weeks or more in transit would arrive in prime condition. From March 10 to April 1 is the best season to forward colonies. If the orchard has been given intensive culture and intelligent care, the yield at four years from planting should be about twenty pounds per tree, dried. This crop, at present prices (November, 1902), possesses a commercial value in the Fresno market of 8 cents per pound. Allowing for the fact that the Adriatics at the same period brought only 3½ cents per pound, dried, further comment is uncalled for. Of course prices are bound to fluctuate from year to year, and as the acreage increases the tendency will be to lower prices. The Calimyrna being so much superior to all other sorts as to render them almost unsalable when the supply shall prove sufficient for the demand, it stands to reason that it will always command a higher price; when to this is coupled the fact that it can be produced as cheaply as the Adriatics, it would seem that its commercial supremacy was assured beyond a doubt.

As the orchard increases in age, the volume of product will also be enhanced in a corresponding ratio. When from eight to ten years of age, the trees should average 100 pounds, dried, to the tree, and under favorable conditions should be much heavier. With much less favorable conditions as to culture and intelligent care, the Smyrnas yield even more than this, so that this is rather a conservative statement. At fifteen years the yield will be about 200 pounds, dried, to the tree; at twenty years, 300 pounds.

The cost of harvesting, curing, and delivering the crop in the sweat boxes to the packing houses in Fresno, will not exceed one cent per pound; in the case of the late crop of the writer, the cost was a trifle under this figure. Thus it will be seen that the Calimyrna Fig has everything to commend it to the consideration of intending planters.



CHAPTER XIX.

ECONOMIC AND ORNAMENTAL VALUES.

THE CALIMYRNA AS A BORDER TREE.

The Calimyrna Fig tree has other uses and values beyond being merely the inhabitant of an orchard. Its fine shape, clean trunk, exemption from disease and injurious insects, together with its beautiful foliage and spreading head commend it for planting as a border and avenue tree. When to these advantages we add the commercial value of its fruit, it becomes almost the tree to plant for this purpose. Singular as it may seem, it does remarkably well when planted in this way, particularly if set some distance from other trees and afforded ample room in which to develop a vigorous root system, calculated to support its wide spreading head, and density of foliage. Indeed, when so planted under these conditions it often does better, both in habit of growth and in yield of fruit, than when situated in an orchard. These advantages have been strikingly exemplified in the Fresno district wherever the fig has been planted as a border tree around vineyards or aligning some of the leading public roads. Clean and handsome, affording protection and a commercial product, it can be commended as a tree of great value for these purposes.

These considerations also render it of peculiar interest for ornamental planting in the home grounds, and of special value to the small orchardist. Requiring little or no care when so planted, it is a matter of unalloyed pleasure to the tree lover, and a source of fruit supply to the culinary department of every well-regulated household. The simple method by which the fig crop is harvested, viz., dropping to the ground, and then only requiring gathering, makes the Calimyrna Fig a desirable commercial product to grow in a small way. Thus the man with a small acreage cannot only sit under his own vine and fig tree, but his children can gather and market the fruit, while peace and contentment, based on a positive source of income, casts her benign influence over a home so happily situated.

THE ECONOMIC USES OF THE FIG.

It is probably safe to assume that fully ninety per cent. of the people know of the Smyrna Fig only as a luxury, in its dried and cured condition, just as they buy it of their local grocer or confectioner. In large measure this is excusable, because fully seventy-five per cent. of the annual output finds its way to the vast army of consumers as an article of food coming under the head of table delicacies. Its economic value however, is much more varied in the realm of an enlightened domestic household economy. The method of "working up" a crop extends beyond the drying and curing of the fruit. Excellent jams and marmalades are made with the fig, retaining all the dietary and nutritious principles and flavor of the cured Smyrna Fig of commerce. The inferior fruits, those small in size, of bad formation and bruised, can be worked up in this way. The really best specimens can be used for crystallizing, and will undoubtedly become a regular feature of the confectioner's trade. For culinary purposes, particularly in pastry cooking, the Smyrna Fig has a

wide usage, will be a feature of every bakery catering to the constantly growing demand for the better grades of table delicacies in the way of baked products. For saucés and preserves, it is indeed a fruit calculated to delight the housekeeper and give zest to any meal of which it is served as a dessert.

In the practice of medicine the Smyrna Fig occupies a unique position, and must be regarded as the equal of the olive in certain ailments to which poor humanity is more or less subject. The fruit either cured or fresh, acts as a mild and gentle laxative, calculated to regulate the functions of digestion, and assimilation, without any of the disturbing elements of more radical remedies. As a matter of fact, people of sedentary employment should make the Smyrna Fig a regular article of diet.

In certain ailments, the leaves and the acrid sap of the green growth have a medicinal value.



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