

"But that doesn't tell me how to get people to bring their prescriptions to my store, Horace," protested Mr. Hamel.

"No, indeed, it doesn't. Come back to the store and I'll show you some of the things I had to do to get my share of the prescription business. I've only been trying to explain how to determine whether or not you have in Cleartown enough prescription business worth going after."

(To be concluded)

HISTORICAL FRAGMENTS.

NO. 22. THE FUGGERS IN PORTUGAL AND SPAIN.¹

BY EDWARD KREMERS.

Every American boy and girl will possibly recall that he or she learned in his or her United States History of a Portuguese Prince Henry whose cognomen was The Navigator. He or she will also remember that six years after Columbus had made his memorable voyage to the West Indies, a Portuguese, Vasco da Gama, circumnavigated the Cape of Good Hope and discovered the all water route to the East Indies. Thus, the Portuguese were the first to develop the spice trade by way of the new route. That the King of Portugal should levy a tax of 50 p. c. of all of the spices imported and that in 1505 he insisted on the sale of all spices through his officials in order that he might control the price does not seem surprising in the light of royal privilege.

In a previous account² it has been pointed out that Germany was the best customer of Venice, so far as the Levant trade of the Queen of the Adriatic was concerned, also that the import and export trade of Germany was largely in the hands of the Hanseatic merchants. When, therefore, in 1501 the war between the "Gross-sultan" and the Republic of Venice practically put a stop to the Levant spice trade (p. 22), the Fuggers, merchants of the Hanseatic city of Augsburg, made an attempt to establish trade connections with the Levant *via* Genoa. They had already collected at Genoa large supplies of copper in which they had a practical monopoly and which they intended to send to the Orient in exchange for spices, when the first spice-laden vessels arrived at Lisbon and thus pointed the way to a more convenient route for the importation of East Indian spices.

By August 1, 1504 the factor of the Welsers, Lucas Rem, had closed a contract with the King of Portugal which allowed them, together with Italian merchants, to participate in the fleet to be sent to the Orient. In the 1505 fleet the Italian merchants (Genoese & Florentine) participated with 30,000 cruzados. (Somewhat more than a ducat.) The Welsers alone participated with 20,000 ducats and the Fuggers, Hoehstetters, Imhofs, Gossenprots and Hirschvogels together with 16,000

¹ Gleanings from Konrad Haebler, "Die Geschichte der Fugger'schen Handlung in Spanien." Page references to Socialgeschichtliche Forschungen. (Ergaenzungshefte zur Zeitschrift fuer Social-und Wirtschaftsgeschichte.) Heft I, 1897. The figures in parentheses throughout the text refer to the pages of Ergaenzungsheft 7 and are inserted for the convenience of any one who may choose to verify the statements made or to seek additional information.

² Historical Fragments, No. 21: A German diarist in South America.

cruzados. Hence, the Germany Hanseatic merchants had a greater interest than the Italian merchants. How private initiative was interfered with by the crown has already been indicated.

That copper was taken to the Orient in exchange for spices has already been pointed out, also that the Fuggers possessed practically the European monopoly in this metal. It remains to be stated that some of their principal mines were located in Hungary, that the metal was taken by boat down the Weichsel to Danzig, the easternmost of the North Hanseatic cities on the Baltic, and thence *via* sea to Lisbon. These same ships also carried grain from Poland to the Iberian peninsula. Moreover, since the Portuguese trade to the East Indies developed faster than Portuguese shipbuilding, many of the ships, especially the large ones, which were built at Danzig, carried a single cargo to Portugal and were there disposed of to merchants trading with the Orient *via* the new water route.

Pepper was the principal spice (hence pepperers) and we learn that the King of Portugal when, in 1505, he established a monopoly placed thereon a price of 22 ducats per cwt. (p. 22). We also learn that a certain Valentin Fernandez of Moravia, a printer, in 1514 had a charge of 700,000 reis for the printing of the *Ordenaçoos do reino*. Having business relations also with the German merchants, he accepted pepper for 400,000 reis and, no doubt, disposed of this spice to his German friends. It is definitely known that in the same year he thus disposed of 15 cwt. of cloves at 50 cruzados (@ 400 reis) to Michael Imhof and the Fuggers (p. 29). Again we learn (p. 30) that the King of Portugal, whose sister was married to Charles V, German Emperor, in 1527, offered (in 1521) to pay the dowery in pepper. 10,000 cwt. were to be delivered in Antwerp at the time of the September Fair (*Messe*) in 1521. He was to make two further deliveries to the Fuggers at New Years and Easter, 1522. We have previously learned (No. 20) that the Fuggers had been instrumental in the election of Charles as German Emperor and that the latter thus offered to meet part of his financial obligations to these Augsburg merchants.

The restrictions placed on private initiative by the Portuguese crown, as already pointed out, lead to a diminution of the Portuguese trade. Hanseatic merchants concentrated in part upon Antwerp (p. 24), in part upon Seville, Spain. In the course of time, the Fuggers maintained only a sub-factor at Lisbon who was subject to the factor at Seville. In 1558 the office at Lisbon was closed (p. 38). Indirectly, however, the Fuggers continued to do no small amount of business in Portugal. Thus, at one time (p. 40) they were in possession of Portuguese notes to the extent of 15¹/₂ million reis (= 40,000 ducats).

When Charles the fifth as Emperor of Germany in 1517 went to Spain, of which he became King as Charles I, having inherited the latter crown from his grandfather on his mother's side, *viz.* Ferdinand the Catholic, he was accompanied by agents of both Italian and German merchants. Thus, the Fuggers entered Spain, not *via* Portugal, but *via* the Netherland, *i. e.*, directly from Germany.

The Fuggers had maintained relation not only with the Emperor Maximilian, grandfather of Charles V on his father's side, but with the entire House of Habsburg. This, as well as the important financial rôle which Jacob Fugger had played in the election of Charles as German emperor, readily explains the presence of the agents of the Fuggers as well as of the Welsers when the young ruler went to Spain.

Though the Spanish Cortez tried to persuade Charles to burden the countries subject to the Habsburgs with the cost of his election as emperor, he could not avoid placing part of the burden upon Castille and Aragon in the form of Spanish concessions.

It was September 8, 1522, that the *Victoria* landed at San Lucar. She was the only one left of five vessels with which Fernão de Magalhaes (the Magellan of our U. S. histories) had set sail three years previously and had completely navigated the globe. Of commercial importance was the fact that she had discovered the Spice Islands for which Columbus had started out thirty years previously. It was claimed that these islands were outside the range of monopoly granted the Portuguese by the Pope. Though four of the vessels had been lost, the cargo of the remaining one paid not only for the cost of the entire expedition, but netted a small profit as well.

Plans were therefore perfected at once for a fleet to make the most of the new discovery. Although the Spanish spice monopoly had been restricted by the Cortes to Spanish merchants, the Germans were granted participation by the Emperor. As a matter of fact, of 16,000 ducats subscribed, 12,000 came from German merchants and of this amount 10,000 was subscribed by the Fuggers, thus giving them the privilege to send a private factor with the expedition who was to look after their special interests.

The full benefits of this East Indian trade, it was thought, could best be attained by making some port other than Seville the center of the spice industry. As already pointed out, Portugal, by its royal monopoly, had alienated individual enterprise. Most of the spices were transhipped to countries to the north. Antwerp and Brugges were the two principal ports in the Netherlands nearest the Atlantic. In order to compete with Portugal, Spain had to see to it that the German merchants would no longer have to sail by Lisbon to Seville in order to get their supplies. Coruña in Galicia was finally settled upon to be the Spanish spice port. In order to develop the new scheme, the Fuggers were requested to build a fleet of ships at Danzig and to deliver them with copper, naval stores and grain at Coruña. As in London, these men from the Baltic were known in Spain as *Esterlines* (Easterlings).

The next chapter deals with the farming out of the collection of rentals or taxes on the estates of three orders of which the King of Spain was grand master. It contains nothing about the spice or drug trade, but is mentioned here for the simple reason that the contents of chapter V, "*Almadine*," deal with a special phase of this monopoly granted the Fuggers, *viz.*, with the production and sale of mercury.

The mercury mines of Almaden belonged to the Calatrava order, one of the three referred to above. In all probability Spanish mercury was known to the Phœnicians, the Greeks and the Carthaginians. It is known that the mines of Almaden were operated by the Romans. During the period of the Visigoth invasion the mines appear to have lain idle. That the work was resumed by the Arabians becomes apparent from the name, for *Almaden* means the mine, *al* and *maden*. In common parlance, the mercury mines were differentiated by referring to them as *Almaden del azogue*. Gradually it overshadowed all other Moorish almadens to such an extent that the name became restricted to it. The castles of Almaden and Chillon together with their mines were presented to the Calatrava-

Order by Alfonso VIII, March. 27, 1168, and came at once under the immediate charge of the Grand Master.

It was not, however, until after the discovery of the production of the nobler metals by the amalgamation process that the mining of mercury ore and mercury acquired a new importance. Previously it had been used almost exclusively for the production of cinnabar as pigment. Although the only competing mines were those of Idria (in Krain, Austria), the demand for mercury and its compounds was not sufficient to warrant extensive mining operations.

Even before Ferdinand, the Catholic, became Grand Master of the Calatrava-Order, the mines seem to have been sublet. However, very little is recorded about their operation and the business conducted. One item records that a representative of King Ferdinand at the Portuguese court sold in 1508 several cwt., for which King John paid at the 5000 mrs. for mercury and 6000 mrs. for cinnabar.

Of special interest to us is the operation of the mines by the Fuggers from 1523, the year in which Charles V, or rather in his capacity as Charles I, King of Spain, farmed out to his German creditors the collection of the rentals in the estates of the three orders, to 1645, hence for more than a hundred years.

As previously pointed out, the Fuggers had acquired considerable mining experience in Tyrol. Whereas in a previous three-year period a Spanish contractor had netted 1,700,000 maravedís, the profits of the Fuggers was estimated at 2,200,000 maravedís. The Germans were reputed to be the best miners.¹

The student of the history of commerce may well be interested in the details of the contracts between the King as Grand Master and the Fuggers. Suffice it here to point out once more that the Spanish advisers of the King naturally resented the invasion of the Germans in this field as well as in the transoceanic spice trade. Hence, at the expiration of the first three-year contract, the court made the attempt to transfer the lease to a Spanish contractor. The Fuggers, however, were prepared for such a possibility. They had in store not less than 2000 cwt. of mercury which they could place on the market in competition with that to be mined by the Spanish contractor.

The details of the mining operations may again interest the mining engineer, but scarcely the student of pharmaceutical history who is interested in mercury and its salts as items of the *materia pharmaceutica*. The latter, however, may be interested to learn how the metal was liberated from its ore. The mined ore was crushed to nut size, mixed with fine, moistened black ash and transferred to large earthenware dishes of special shape and these exposed to heat by direct fire.

The vessels were not filled completely. The mixture, spread out evenly, was covered with a layer of black ashes a finger in thickness so that a rim 2 to 3 fingers in width remained, in order that the sublimed mercury could condense on the cover of the vessel and deposit itself on the layer of ashes. Each vessel containing about

¹ This was true not only in Spain, but in the Spanish possessions as well. As late as the close of the 18th century Alexander von Humboldt states that every German who came to the colonies was regarded as possessing special knowledge of mining. This reputation the Germans had not only in Spain but apparently all over Europe. Thus the French explorers imported German miners to the copper districts of the Lake Superior region to develop mining operations. (Comp. *Agricola de re metallica* and Hoover's translation.)

27 lbs. of ore was closed with a convex cover rendered air tight by means of clay and placed in the furnace.

The furnaces resembled vaults of the height of a man. The vault-like roof had three rows of openings, six in each row. The vessels fitted into these openings so that the rim and cover were exposed. At times the covers also were covered with clay to render them air tight and to preserve heat. As a rule, the fire was started in the evening and the heat maintained for twelve hours. The freed mercury sublimed through the ashes and was deposited on the latter as liquid metal. After cooling the mercury was removed with iron spoons, washed and transferred to collecting basins in the magazines.

A furnace of 18 vessels accommodated 5 cwt. of ore and, according to the quality of the latter, yielded 30 to 80 or more pounds of pure mercury. The purest ore containing 50 p. c. mercury was not thus treated but, mixed with sulphur, exposed to heat to produce the finest cinnabar, the *vermellon excelente*, of which a yield of 50 p. c. of the ore was obtained.

Again the details of the technology, the pottery, the deforestation of the hill-sides for fuel, the cost of operation, etc., do not concern us. Anyone interested in these details may consult the original from which the data of significance to the pharmaceutical historian have been gleaned. It may be mentioned, however, that during the contract period 1547-1550, 3761 cwt. 27½ lbs. of mercury and cinnabar were sold, also 652 cwt. 98½ lbs. of sublimate. Supplies remaining at the close of the period amounted to 2549 cwt. mercury, 691 cwt. cinnabar and 450 cwt. sublimate. If added these amounts would yield quantities greater than those produced during the quadrennium, for they apparently include the left-over supplies at the beginning of that period. The annual production has been computed from other figures at 650 cwt. mercury and cinnabar and 90 cwt. sublimate.

Only little of the mercury was sold in Almaden. The principal marts in the Iberian peninsula were Seville and Lisbon. Hence it may be assumed that most of the products were sold outside of Spain, though the Fuggers possessed the monopoly for that country. Thus the accounts of 1547-1551 reveal that 2188 cwt. of mercury and 465½ cwt. cinnabar were shipped to Antwerp, Marseilles and Venice. The small gains on these transactions are explained by calling attention to the facts that 55 cwt. of both articles were lost in shipwreck, 1 cwt. was lost accidentally and 95 cwt. were captured by the French. Incidentally this brings out some of the dangers involved in the commercial transactions.

In 1550 the mines were ruined by fire and subsequently by flooding. That the Fuggers should have permitted the latter may again have been due to a policy, the details of which are of no pharmaceutical interest. Suffice it to point out that the succession of Philip II of Spain, who did not succeed his father as German emperor, naturally did not improve the status of the Germans in Spain. By way of explanation, it may be added that, whereas the Spanish crown was hereditary, the imperial crown was not and that it was the financial support lent Charles V by the Fuggers that had given these captains of industry, if this modern phrase be permissible, such a hold on Charles, not only as German emperor but as King of Spain.

Chapter VII bears the heading "Philip II, and the Fuggers (1563-1575)." It has already been pointed out that the Spanish did not love the foreigners, whether German or Genoese merchant princes, and that Philip II was inclined

to accede to the wishes of his counsellors to deprive them of their privileges. When in 1550 the mercury mine was destroyed by fire and subsequently flooded by water, the Fuggers availed themselves of the opportunity to reveal how indispensable they were. This was met by the counter move, the royal decree of 1560, which not only ended all contracts, in their original form, but practically wiped out the King's debts to the Fuggers amounting to about three million ducats.

In connection with the production of mercury, it has already been pointed out that it increased greatly with the discovery of the amalgamative process. As a rule, a certain Bartolomé de Medina of Seville has been pronounced discoverer of this process (p. 138). Apparently he first applied the process in the silver mines of New Spain, but he is not the discoverer. This becomes apparent from a letter of the *Audencia* in Mexico dated December 31, 1554 and addressed to Charles V and the Council of the Indies. In this letter it is reported that Bartolomé of Medina had come to New Spain with the complaint that the officers at Seville had refused the emigration of his German companion who understood the production of silver by means of mercury. Inasmuch as the new process was not only to improve the process of mining but also to increase the royal income therefrom six fold, the Emperor is petitioned to permit the migration of the German, whose orthodoxy seems to have been questioned, to Mexico (p. 138). Whether the petition was granted we are not informed. This much, however, we know that the amalgamation process was tried out successfully in Mexico in 1556.

During the thirteen years (1550-1562) during which the Fuggers did not operate the Almaden mines only 500 cwt. of mercury were produced. According to their new contract, the Fuggers had to produce 1000 cwt. annually (p. 142) and to turn over the entire amount to the government at the price of 25, later of 20, ducats per cwt. The government, in turn, sold the mercury in the ports of New Spain at 100 pesos (at 450 maravedis) per cwt. After two years the Fuggers produced 1200 cwt., later, 1500 cwt. and more. On 13,100 cwt. they netted $12\frac{7}{10}$ ducats per cwt.

On Jan. 1, 1573 the mining contract was renewed for another 10 years: The Fuggers were to furnish 1700 cwt. per year and to receive 30 ducats per cwt. (p. 146). In return for this renewal, the Fuggers were to give the government an immediate credit for one million ducats. The mining operations were improved to such an extent that the Fuggers were able to turn over the contracted amount of mercury during the first few months of the year, hence could produce a much larger quantity than stipulated by contract (p. 153). In this connection the author calls attention to one of the troubles the Fuggers had to contend with, one that had nothing to do with the animosity of the Spanish toward the Germans, *viz.* an industrial disease, the *Quecksilber sichtigkeit*. Operations were reduced during the hot months, hospital facilities were provided, convalescents were employed at other tasks, etc., but a complete remedy there was not. The student of the history of pharmacy would glean something about the medicaments employed, but on this aspect the author remains silent. The local archives rather than those of the house of Fugger may possibly shed light on this subject (p. 154).

In connection with the mercury operations, we learn that the Fuggers improved silver mining in Spain (p. 155), also that the introduction of the reverberation furnace enabled them to operate 40 cwt. of ore with the same amount of fuel that was formerly required for 7 cwt.; with depletion of forests an important factor.

The balance of the chapter deals largely with the efforts on part of the Spanish Council to deprive the Fuggers of their concessions and finally with how the Fuggers made themselves indispensable to the King by loaning him 200,000 ducats to be used in paying the mutinous soldiers in the Netherlands.

Chapter VIII, entitled "Die spaeteren Jahre Philip's II," deals first with the climax of the house of Fugger and then with the beginnings of its downfall due to family dissensions in Augsburg. But little of special interest to the pharmacist may be gleaned. Thus we learn that during a decade 23,947 cwt. of mercury were produced representing a value of 700,000 ducats, half of which was net profit. We are also informed that a new twelve-year contract from 1582-1594 was signed; that the Fuggers were the bankers of the Spanish ambassadors, more particularly at the German imperial and the French courts and that advances of 100,000 ducats to these Spanish officials were regarded as something ordinary. Further that they did the banking business for other Spanish officials and that Cardinal Granvella trusted them more than either the Genoese merchant bankers or his own countrymen. Of international political schemes involving great sums of money that reveal the rivalry with the Dutch merchant marine and the early development of English shipping we are told, but inasmuch as these involve Polish grain to be sent to the Iberian peninsula and not spices, these accounts have but a general interest and involve nothing pertaining to the history of our materia medica.

The two remaining chapters afford even fewer pickings. We do learn, however, that between 1604 and 1614 as much as 39,416 cwt. of mercury, valued at 404 million maravedis were produced netting 166 million maravedis or 442,000 ducats, (p. 203) also that the expulsion of the Moors deprived the mines of some of their best workmen (p. 205). Again the attempt to take the mines away from the Fuggers in 1613 was not successful and according to the new contract they had to deliver 4500 cwt. annually in place of 3000 cwt. (p. 205).

The Fuggers had always paid their workmen every Saturday and that community depended on these regular payments. Philip IV at the beginning of his reign, made the attempt to regulate state finances by asking the Fuggers to assume responsibility for the monthly payroll of 50,000 ducats. In spite of their protests they had to assume this burden. The result was the ruin of the Spanish business. Before long they had borrowed 2¹/₂ million ducats. Their assets were about as large but could not be collected from the government and others (p. 209).

A general summary in connection with the winding up of the Spanish affairs reveals the fact that from 1563 to 1641 the Fuggers delivered 253,154¹/₂ cwt. of mercury to the government. Assuming that 1000 cwt. of mercury enabled the production of 1 million ducats of silver, the amount of mercury recorded corresponds to a silver production of 253,154,500 ducats of silver. Inasmuch as the government received the double tenth, *i. e.*, one-fifth thereof, its income from this source amounted to 50 million ducats. No wonder the Spanish kings refused to lend an ear to their counsellors who wished to deprive the foreigners of the control of the mercury mines. In 1639 another disastrous fire occurred in the mines. These were turned over to a royal manager in 1647 (p. 221). The new management did not produce as much as the Fuggers; it did not pay the workmen promptly, so these deserted. For a century the mine produced but little. It was only when taken over by the Rothchilds that the former output was again reached.