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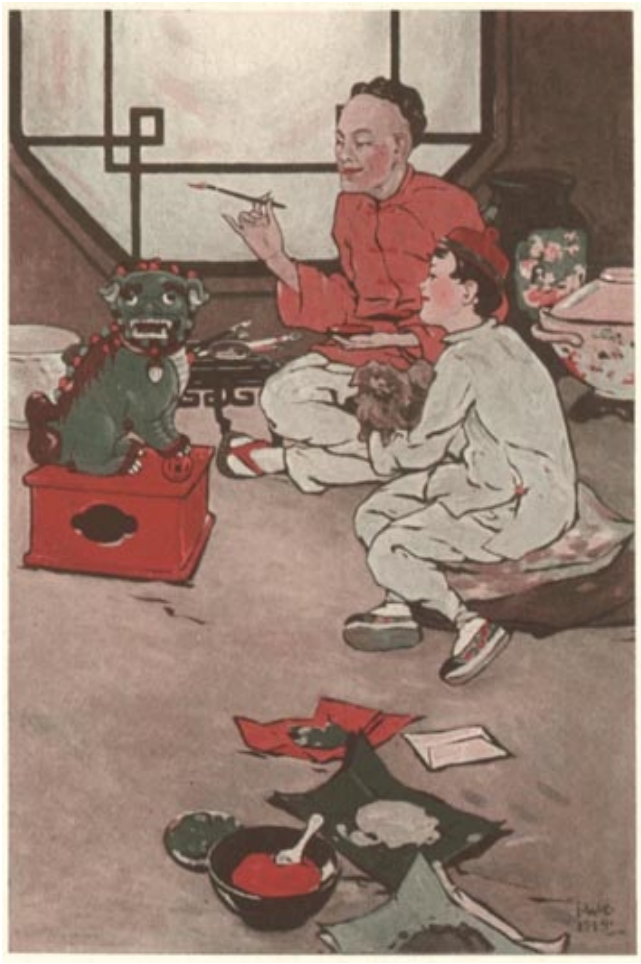

"IT WAS NO ORDINARY DOG"

The Story of Porcelain

BY

SARA WARE BASSETT

Author of
"THE STORY OF LUMBER"
"THE STORY OF WOOL"
"THE STORY OF LEATHER"
"THE STORY OF GLASS"
"THE STORY OF SUGAR"
"THE STORY OF SILK"
etc.

ILLUSTRATED BY

ISABEL W. CALEY

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1919

The Story of Porcelain

To

Margaret Huxley

this book is affectionately inscribed

THE BOWL

Some master-craftsman, maker of porcelains, to the Emperor, the Son of Heaven,
Having attained the paradise of artists, who mould in life and fire,
Fashioned this day:

A bowl blue as the iris within the sacred gardens,
Based with a low design of brown bare hills,
A pine or two new-tipped with tender needles,
With oak buds, pink and saffron,
And birds red, brown, and blue.

Into this bowl, exquisite and perishable,
The Patron of all artists heaps light and more light;
Then holding high the brimming chalice, quaffs,
And folds it in his altar-cloth of stars.

Carl H. Grabo. (*From the Nation.*)

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CHAPTER I

INTO THE WOODS

Theo Swift dropped into a chair before the blazing fire in the log cabin, and drew a long breath of delight. At last his dream had come true; he was in the heart of the Maine woods! It was a wonderful experience for a boy of his age to be his father's companion on a fishing trip. Each spring when Dr. Swift had packed his tackle for his annual vacation into the wilderness, and Theo had looked on with hungry eyes as the rods, flies, and tramping boots had been stowed away in the canvas grips, his father had said:

"Wait until you are a bit older, son, and you shall go with me."

And now that day had come, and here he was! It seemed too good to be true.

He glanced up to find his father smiling down at him.

"Well?" questioned the older man. "What do you think of the camp? Does it come up to your expectations?"

"I should say it did!" Theo managed to gasp. "It is great, Father!"

"Think you can be contented here for a month?"

"Contented!" laughed Theo.

"You won't be getting lonesome and wishing you were back in New York?"

"Not much."

"Well, I hope you'll have a good time. Certainly with plenty of fishing and tramping you should. You will find Manuel, our Indian guide, a never-ending source of entertainment; he can do everything from dressing a moose to building a canoe. There isn't a trail through these woods that he couldn't travel blindfolded. You will be perfectly safe with him; only you must do exactly as he says, no matter how silly his orders may seem. He knows the woods better than you do—or than I do, for that matter. Remember you are no longer on Fifth Avenue, where you can call a policeman or a taxicab if you get lost. This vast forest is an entirely different proposition."

Theo nodded.

"How still it is," he said softly.

"Yes," rejoined his father; "that is why it means to me something that no other place can. After the rush of the city, the jangle of telephones, the constant sight of sick people, there is nothing to compare with the restfulness of these woods."

The Doctor, who had been standing with his back to the fire, his hands clasped behind him, drew out his pipe, lighted it, and puffed a ring of smoke into the air.

"You have had a very busy year, Father."

"Yes, and I fancy there will be a still busier one ahead. Before I attack it I feel that it is my duty to get a good rest. In these war days a doctor never knows where he may be needed to

serve. Thus far my place seems to have been at a home hospital. With eight of our operating staff in France it has meant much extra work, too. Not that I am complaining of that. I am only too glad to do my bit wherever it is. But I had got to the point where I felt that the man who can give the best service is the man who does not allow himself to become too fagged. So I determined to take my usual vacation even though on the face of it it seemed a crime to devote myself to nothing but fishing for a whole month."

Theo glanced into the face of the big, earnest man before him; he felt suddenly very grown up. His father had seldom talked to him like this.

"This war," went on Dr. Swift thoughtfully, "is going to make demands on all of us—demands for money, work, and time. We should be proud to give these, for it is the first time our country has ever asked anything of our generation. We have taken unthinkingly all the benefits America has to offer—libraries; schools; well ordered cities to live in; the blessings of constant peace and prosperity. For it we have returned to the government only the slight taxes demanded for the upkeep of these things; and most of us, I blush to say, have grumbled a great deal about it, at that. As a nation we were becoming too comfortable, too rich, too selfish, too complacent. Now a crisis has arisen when the United States is asking more of us, as it has every right to do; and we should be eager to prove our gratitude for all we have so freely received. Only those who have traveled much can fully realize what a home and an education in a place like America mean. Never forget, son, that all we can do, even to the sacrifice of our lives, is none too high a price to pay for our beloved country."

"I wish I might have gone to France, Father," said Theo earnestly.

"A boy of fifteen is too young to go," returned Dr. Swift. "If you were older I should be the first to bid you Godspeed, for it is a great opportunity for service. Those who are not sharing it are missing one of life's richest experiences. It means danger, privation, perhaps death; but it means also the exercise of all that is finest in our natures—patriotism, heroism, the dedication of ourselves to a great cause. I should have been proud to have you in France, Theo. However, there is much a boy can do here and now. He can begin being a loyal unselfish citizen, and training himself to bear his part when he shall be older. Get your education first. Prepare yourself to be of value to humanity so that when your time to help comes it may find you useful and ready."

There was a moment of silence.

The great logs in the rough stone chimney crackled and snapped, and up the flue roared the blaze. Outside all was still save when the breeze stirred the giant pines causing them to give out a mighty whisper like the murmur of the sea.

It was a cozy interior over which the firelight flashed.

The log cabin had been sheathed to keep it warm and tight, and to conceal its barrenness on the walls had been tacked a few gaily colored prints. On one side of the room were several well-filled bookshelves, while on the opposite wall were racks for pipes and guns. From over the fireplace an elk's head peered forth, catching the scarlet glow from the fire on its mammoth antlers. Two small bedrooms which led out of this living-room completed the cabin. Outside stood four others built exactly like this one, and in addition a dining-cabin, cook-house, and two cabins for the guides.

Aside from this tiny settlement on the lake's edge there was not a house for twenty miles. It was a wilderness indeed!

"Are there any other people staying here at the camp beside ourselves?" inquired Theo at last.

Dr. Swift, who had seated himself before the fire, nodded.

"Yes, there is a Mr. Croyden, from Trenton, New Jersey, whom I have met here before—a splendid man, whom you will like. He is a great fisherman—comes back every season just about this time. At present there is no one else, so you will not find the woods overcrowded."

Theo laughed at the bare suggestion, then yawned drowsily.

"Nor will you be troubled by not sleeping to-night, eh, son? You look about ready to hit the pillow this minute."

"I am," replied Theo. "I never was so sleepy in my life."

"That is the Maine air."

"Some of it is the effect of the corduroy road," the boy observed with a grin.

"It is a beastly road, that carry," agreed Dr. Swift. "It shakes every bone in your body. When you do manage to get here, however, it certainly is worth the trip. Do you feel as if you could worry down a little dinner?"

"Well, rather!"

The Doctor chuckled.

"So do I. It ought to be ready soon now, for it is nearly six."

Just at this moment the sound of a horn was heard.

Dr. Swift rose promptly.

"That is dinner," he said.

"I expected a bell," Theo answered, springing up.

"Waiting for a Japanese gong, are you? Well, you won't hear it here."

Clapping a hand affectionately on his son's shoulder the elder man led the way to the dining-cabin and pushed open the door.

Upon the hearth inside another bright fire glowed, and before it stood a long roughly made table covered with immaculate enamel cloth, on which was spread a smoking meal.

A man with a pair of merry brown eyes rose from his chair as the two travelers entered.

"I am glad to see you, Dr. Swift," he exclaimed heartily, putting out his hand. "So you are back to the fishing grounds once more!"

"I certainly am, Mr. Croyden, and thankful enough to be here. I've brought my boy, Theodore, with me this time; Theo, we call him."

Mr. Croyden took the lad's hand cordially.

"I'm glad to see you, youngster," he said. "If you prove half as good a fisherman as your father the two of you won't leave a trout or salmon in these waters."

"But I'm not a fisherman at all," Theo confessed. "I never cast a fly in my life."

"You certainly have come to the right place to learn, then. Your father has been neglecting your education, I fear. I see there is something we can teach you."

"I'm afraid there are a good many things," replied Theo modestly.

Mr. Croyden regarded him approvingly.

"That's right, boy," he said kindly. "Never be afraid to learn. We all are still learning, at least I am; and I will wager your father is, too."

"A doctor is always learning," assented Theo's father.

"And a business man as well," put in Mr. Croyden. "When we no longer need to learn we can be pretty sure we are near the end of our usefulness in this world. Now suppose we begin your education, Theo, by teaching you the proper way to eat a brook trout. How would that lesson please you?"

There was a twinkle in the stranger's eye.

"Very much indeed."

"I rather thought so," was the laughing answer. "Here, Franz, help Dr. Swift and his son to some of the fish I caught to-day. They are the first of the season, Doctor, with my compliments." He made a courtly gesture with his hand. "Remember, Theo," he added, "always to open a fish up the back. In that way you can take the backbone out whole and save yourself a deal of trouble."

Theo nodded his thanks for the suggestion.

What a dinner it was!

The trout were fried to a rich bronze, and the crisp potatoes were discs of golden brown; in addition there were baked beans, smoking brown-bread, slices of creamy cheese, and a pyramid of doughnuts. At the conclusion of the meal Franz came running from the cook-house with a covered dish heaped high with pancakes.

It was only when the three campers were unable to crowd down another mouthful that they rose from the table.

"Don't you and Theo want to come into my cabin and enjoy my fire for a while?" asked Mr. Croyden.

"Why, thank you, Croyden," answered Dr. Swift; "we might make you a short call. We are off to bed early, however, so we must not stay long."

Mr. Croyden's cabin proved to be a replica of the Swifts' own cozy one, except that it was more sumptuously furnished; for Mr. Croyden, who was a hunter as well as a fisherman, had adorned both couch and floors with great bearskins, trophies of his luck.

As his guests entered he hurried forward to put another four-foot log on the fire, after which he dragged out three steamer-chairs and placed them before the blaze.

"All the comforts of home, you see," he said gaily.

"More comforts than some of us get at home," smiled Dr. Swift. "There is nothing to equal this in New York."

For a moment none of them spoke; they were watching the scarlet rise and fall of the flame.

"What a lot of company a fire is!" mused Dr. Swift.

"I know it," came from Mr. Croyden. "And did you ever think how easily we can produce it? Within the space of a second we can start a blaze. A fire was quite another problem for our forefathers who lived long before matches were invented. Think back to the time when people rubbed dried sticks together to make a spark; or later when they were forced to use flint and matchlock. It meant no end of work to capture that first light, and even then it frequently went out. How housewives struggled to keep the embers on the hearth always glowing that a new fire might be built without so much trouble; and how men carried from place to place coals enough to kindle other fires! When we strike a match and so quickly get our response of flame we do not half appreciate how fortunate we are."

"I never thought what it would mean to have no matches," reflected Theo.

"Man's discovery of the use of fire was one of the first steps in his civilization," Dr. Swift put in. "It meant that henceforth instead of eating raw food as did the other animals he could have it cooked. For man, you must remember, is the only animal who cooks his food."

"And hand in hand with the cooking came the need of dishes in which to prepare it," rejoined Mr. Croyden. "Meats could, of course, be broiled over the fire on a forked stick; but no stews or soups could be had until man invented some utensil which would contain liquid and at the same time withstand the heat of the blaze. That problem was the one that confronted all primitive races, and set them to fashioning pottery. The history of their first attempts is most interesting. Probably chance led people to the discovery that they could mix clay with water, and that it would harden in the sun. They may have seen a print of their own feet immortalized in the sun-baked mud, and caught at the idea of taking the clay for more useful purposes. Nobody knows where they got their first inspiration. But every race that has existed has had its crude receptacles for food and water.

Theo was not sleepy now; he was far too interested to think of sleep.

"Even in the Stone Age, when men lived in caves and great creatures now extinct roamed the earth, men made bowls, pots, and vases, some of which are in existence in our museums of to-day," continued Mr. Croyden. "We have, too, a few specimens of clumsy vessels made from grayish black clay which are relics of the Lake Dwellers, who fashioned their houses on piles, and set them in the middle of small lakes as a protection against wild animals and rival races of savages. Then followed what is known as the Bronze Age, and we find that the people of this era also worked with clay. Their designs showed a decided advance, too, even some simple decoration being attempted."

"All that was in Europe, I suppose," Theo ventured shyly.

"By no means," replied Mr. Croyden. "On the contrary, we have found in our own hemisphere specimens of this prehistoric pottery. In some cases baskets of twigs were woven and lined with clay, after which they were baked in the fire and the twigs burned off. Other pieces were built up from coils of clay wound round and round, and when partly hardened these were worked together with a tool in order that the cracks might be filled. All through the western part of our country have been found clay relics of various early tribes of Indians; and in some places are giant mounds in which have been buried all sorts of crude clay jugs and bowls. Since these primal peoples used for materials the natural clays and earths they succeeded in producing some excellent colors, too."

Mr. Croyden paused.

"Was the potter's wheel in use then?" questioned Dr. Swift.

"Probably not. There is no trace of it in this early work. It is not until the historic age that we have the potter's wheel, the oldest and first mechanical device mentioned in history. Mexicans, Peruvians, Egyptians, Greeks, Assyrians, Romans, Gauls, Teutons all used it."

"I have seen some of the old Mexican or Aztec pottery," declared Dr. Swift, "and it was very interesting. It was of reddish clay, and I was told it was much like the variety made in Peru. Not only were there roughly modeled dishes and jars in the collection, but also all sorts of strange clay idols. You see, instead of worshipping the gods of goodness, Theo, these early peoples thought they could propitiate the gods of evil if they worshipped them instead; accordingly they made all sorts of grotesque images, some of them very hideous. None of this clay work was glazed, of course, for at that time men had not yet discovered that they could put a glaze over the surface of objects and thus protect them and render them water-tight. It was a great pity that Cortez and his followers destroyed this early Mexican civilization, which was surprisingly advanced.

"I suppose the Peruvians had also gone quite as far if not further than the Aztecs when in 1531 Pizarro invaded South America," rejoined Mr. Croyden. "They were making some very good pottery decorated in red, black, and brown; and they must have known how to bake it, or the colors in the design would not have lasted until now."

Mr. Croyden rose to stamp out a spark that had snapped from the fireplace onto the fur rug at his feet.

"Strange, isn't it, how much of our knowledge of the ancient races has come down to us

through their clay work?" he reflected. "What should we have known of these western civilizations save through their handiwork? And when we travel across seas it is the same. Much of our acquaintance with Egyptian, Greek, and Roman life has been handed down to posterity through tiles and pottery which have served to record nations' customs and advancement. The march of the invading Roman armies, for example, can be traced by the fragments of pottery left behind them. These relics have been found in England, France, Germany, Italy, and Spain, and prove that very early the Romans made use of clay utensils for cooking their food. Even beneath the city of London old Roman furnaces for firing dishes have been discovered; and moreover, some of the very dishes themselves."

Theo seemed astonished.

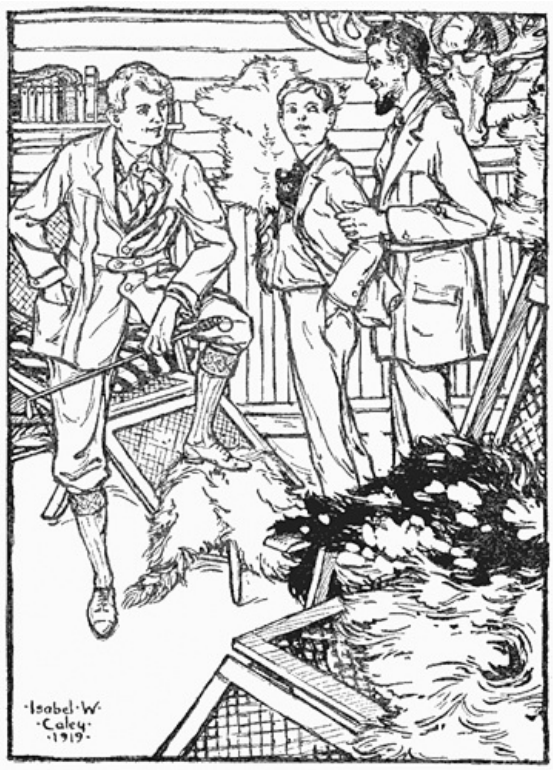
"Later the Romans made much beautiful pottery; but it was never as beautiful as that of the Greeks. Sometime, however, Theo, you should go to one of our museums and see some Samian ware, the finest of Roman clay work. The red in it is almost as vivid as sealing-wax, and it has a wonderful polish not unlike that on modern Egyptian ware. No one has ever been able to discover from what clay this marvelous pottery was made. Some historians think the ware was first made by wandering Greek artisans. The Romans also made a very beautiful black ware now known as Upchurch pottery because of the location in England in which it was found. This black color, scientists have decided, was not produced by mixing a pigment with the clay as did the Greeks, but resulted from an ingenious use of oxide of iron which, when burned by a reducing fire, turned black; the Romans also gave us Castor ware, a pottery moulded from a dark clay and having on it figures traced in a lighter color."

"Did anybody else in Europe make as beautiful pottery as the Greeks and Romans?" inquired Theo.

"Perhaps not so beautiful," answered Mr. Croyden. "Yet before we hear either of Greek or Roman we find the Egyptians and Assyrians, nations famous for their skill in the arts as well as their prowess in war, making pottery and tiles. These have been preserved to us in tombs and pyramids, for these races, you know, were accustomed to pay great honor to their dead. It was a fortunate custom, too, since by means of it much history has come down to us which would otherwise have been destroyed. Unquestionably the Saxons, Scandinavians, Gauls, and Teutons also made pottery, but their attempts were of a cruder sort. Dishes, vases, toys have been exhumed in their countries, all displaying characteristic clay designs. But no country in the world has ever equaled the pottery of the Greeks."

"Did the Greeks——" began Theo; but his father cut him short.

"See here, young man," he declared, drawing out his watch, "this is no time of night for you to be setting forth on a history of Greek pottery. You are going to bed.



"I HAD FORGOTTEN ALL ABOUT BED"

Theo rose with a laugh.

"I had forgotten all about bed," he said.

"That speaks pretty well for your charm as an historian, Croyden," observed Dr. Swift. "The boy could scarcely keep his eyes open at dinner."

"Can't you tell me about Greek pottery some other time, sir?" asked Theo.

"I'd be glad to, sonny," Mr. Croyden returned. "I never dreamed a boy would be interested in such a dull subject."

"It isn't dull when you tell it," came naively from Theo.

"That is the biggest compliment I ever had in my life," exclaimed the fisherman with pleasure. "You shall hear more of Greek pottery to-morrow if by that time you still want to. Good-night. The most beautiful thing I can wish you is that you dream of Greek vases all night long."

CHAPTER II

MR. CROYDEN KEEPS HIS PROMISE

When Theo awoke the next day the novelty of his surroundings drove every thought of Greek pottery from his mind. As he peeped out of his window he could see slanting rifts of early sunlight flecking with gold the trunks of the great pines. From the chimney of the cookhouse a spiral of blue smoke was ascending and as it rose it carried into the air with it a pleasant odor of burning wood and frying bacon.

Theo did not dally with his dressing, you may be sure; he was far too hungry, and too eager to attack the program for the day.

"Put on thick boots, son," called Dr. Swift from his room. "The weather is fine. It is an ideal morning to tramp across Owl's Nest Carry and fish in the lake beyond there."

"What time is it, Father?" inquired Theo. "I forgot to wind my watch last night."

"Six o'clock. We shall have a three mile walk, and plenty of time to get in some fishing before the sun is high. Then we can paddle up-stream to the camp at the farther end of Owl Lake and cook our lunch. How does that plan please you?"

"Hurrah!" cried Theo. "Is there a camp like this over there?"

"Oh, no. Just a lean-to which serves as a shelter, if people want to spend the night and be on hand for early morning fishing. Sometimes, too, I have gone over in the late afternoon and fished until dark, afterward turning in on the pine boughs for the night. It is only a crude little camp, but it is perfectly comfortable. You will like Owl Lake. It is smaller than this one, but it has a very pretty shore bordered with a stretch of white sandy beach.

"It must be a great place for swimming."

"It is. Just now, however, the water is too cold. Later in the season when things get warmed up it is the finest bathing place imaginable. Are you ready for breakfast now?"

"Yes, sir."

"Then you'd better run along. I will join you in a few moments. I must go first and see Manuel about the lunch."

"All right, sir."

Through the crisp morning air Theo bounded across to the dining-cabin, where he found Mr. Croyden.

A bright fire burned on the hearth and the table with its heaping plates of hot johnny-cake looked most inviting.

"Hello, youngster!" called the older man, glancing up with a smile. "How do you find yourself to-day? All lamed up after your jolt over the carry?"

"Not a bit, Mr. Croyden," laughed Theo. "I'm not lame at all. I'm just hungry."

"A perfectly normal condition. So long as you can eat I guess there is not much the matter

with you."

"Oh, I can always eat," grinned Theo. "Mother says my appetite never goes back on me."

"Well, fall to. It looks as if Franz had prepared for the worst," chuckled Mr. Croyden. "What are you and your dad up to to-day?"

"We are going to Owl Lake to fish."

"That isn't a bad beginning. It is not a long tramp, and the fish are biting well over there. I have tried it several times and had excellent luck. You are wise to start in gradually and not attempt too long a jaunt at first. There is everything in getting into training, as your father well knows."

There was a bang of the door, and Dr. Swift entered.

"Good-morning, Doctor," said Mr. Croyden. "So you and your son are to try your skill at Owl to-day?"

"Yes. That seemed to be a good starter."

"An excellent one."

"Why don't you come along with us?"

"I?

"Yes; that is, unless you have other plans. We should be glad to have you. The more the merrier."

"I wish you would come, Mr. Croyden," urged Theo.

"That is very kind of you," returned Mr. Croyden, hesitating a little. "I had not planned my day. Are you sure you want so many?"

"Three is not many. Come along, by all means," declared Dr. Swift. "Manuel says the lake has not yet been fished much and that the trout are biting well. Get Tony, your guide, to pack up your tackle and bring some lunch. I am afraid we have not enough for all hands."

Mr. Croyden sprang to his feet.

"I'll do that," he replied. "What time are you starting?"

"Just as soon as I have succeeded in getting Theo to take a little nourishment," returned the Doctor.

This task Dr. Swift evidently did not find difficult, for within a half hour the party were setting forth through the woods.

The luncheon, tackle, and sweaters had been put into a canoe, which Tony and Manuel raised to their shoulders as if it were a feather.

"There is a punt over at Owl that we can use, so we shall need only one canoe," explained Manuel as he strode along.

The carry was not a rough one, but to Theo, accustomed to the smoothness of city pavements, it seemed very rough indeed. He was continually stepping into holes or climbing over fallen tree-trunks, and although a good walker, the pace the guides set made him pant. Even Dr. Swift was forced to confess that he was out of breath and was obliged now and then to stop and rest. Mr. Croyden, on the contrary, swung along the narrow trail with the ease of an Indian.

"You will get into trim in a few days," he observed encouragingly to Theo. "I myself am always stiff and slow until I get limbered up."

When, however, Owl Lake finally came into sight both Theo and his father instantly forgot their fatigue.

There stretched the tiny sheet of water, a gem of flashing blue whose calm surface mirrored the pines and delicate birches bordering its margin.

The punt and canoe were launched, the tackle unpacked, and amid a silence broken only by the dip of oar and paddle the fishermen drifted out into the stillness.

Ah, it was a day never to be forgotten! Certainly Theo would never forget it, for it was during the first half-hour of this Arabian Night's dream that he proudly landed a beautiful lake trout, the first one he had ever caught.

From the moment he felt the tug at his line until his catch was safely in the bottom of the boat his excitement was tremendous. How the little creature pulled! How it swept away with the bait into deep water! With Manuel, Dr. Swift, Tony, and Mr. Croyden all coaching him, and almost as frenzied as he, poor Theo hardly knew where he was. But he obeyed the insistent command of: "*Play him! Play him!*" and play him he did. Even with the captive's final leap into the air the trout did not succeed in freeing itself from the hook. Keeping his prize well away from the boat that the line might not slacken Theo at last reeled in his victim.

He gasped when the feat was accomplished.

The second time he knew better what to do; and before the sun was high and the fish had ceased to bite he landed five beauties.

In the meantime both his father and Mr. Croyden had been so absorbed in watching his pleasure that they had almost forgotten their own lines, and it was not until a big land-loch struck that the Doctor remembered he, too, was fishing. When finally a lull in the sport came and the party pulled up-stream toward the lean-to, there were a dozen good-sized trout in Mr. Croyden's basket and as many more in the Doctor's.

Then came the disembarking at the upper end of the lake, and the building of the fire. Dry wood was taken from the shelter of the house, and in the clearing before the camp, on a foundation of large flat stones, the fire was kindled. It was a marvel to Theo to see how quickly Manuel and Tony made things ready. They produced a small frying-pan, greased it, and had the fish sizzling in it before you could say Jack Robinson. Then they unpacked the hampers and brought forth tin plates, knives, and forks.

How good the meal tasted!

The great slices of bread-and-butter, with layers of creamy cheese between them, seemed a royal feast to the ravenous sportsmen; and the steaming coffee and thin slices of crisp bacon food for the gods. As for the trout—particularly the big one Theo himself had caught—well, there never was such eating!

After lunch was done the fishermen were loth to leave the sunny shelter of the cabin.

Dr. Swift and Mr. Croyden lounged on the door-sill, while Theo skipped stones in the water until his arm was tired. Then exhausted by his exertions he sank wearily down on a stump near the lean-to and remarked:

"Why wouldn't this be a good time, Mr. Croyden, to tell us some more about Greek pottery?"

"Greek pottery? Bless my heart! I thought you had forgotten all about that."

"So I had when I was fishing," confessed Theo honestly. "But I have remembered it again now."

"You are a frank youngster," laughed Mr. Croyden. "Well, let me see. You know the making of pottery was a fine art among the Greeks. They made two kinds—neither of them glazed, of course, because at that time nobody knew how to glaze pottery. The first kind was a pottery of red clay on which were placed decorations of black pigment; the other was a pottery on which they painted figures in red, afterward filling in the background around them with black. These two varieties of ware are briefly known as black on red, and red on black. The black portion of this pottery possessed a wonderful polish which came from the black pigment mixed with the clay; the red part, on the contrary, had no lustre, evidently being smoothed and polished with some hard tool after the vase was finished. These vases were very beautiful in form and design, no two of them being alike. Each was made by an individual artist who pleased himself as to the arrangement of the birds, animals, and gracefully draped figures with which he decorated it. The famous François vase at Florence is a marvelous example of this sixth century workmanship; every inch of its closely adorned surface is covered with carefully drawn figures in black, white, and purple. This particular piece was probably made by two Athenian artists, as it shows two distinct types of work. Think how fortunate we are to have had it come down to us unbroken through the tumult of the years!"

Mr. Croyden gazed thoughtfully into the fire.

"You know that at the time these exquisite vases were made the entire Greek nation was devoting itself to the fashioning of beautiful things. Sculptors were carving wonderful statues, toiling eagerly to make each piece more perfect in form; architects were rearing such buildings as the world has never since seen; and in the centre of Athens a district was reserved which was entirely occupied by the shops of potters and painters and known as the *ceramicus*. It is from this ancient word that our present day term ceramics is derived. Within this area devoted to the making of pottery the artists worked, each one reverently bending his energy to give to the world a thing which should be as nearly perfect in form and decoration as he could make it. Thousands of vases went out, many of them into the homes of rich, beauty-loving Greeks; many into the temples; and many into Athenian tombs; for the people of this nation always loyally honored their dead. In addition to these vases there were smaller articles—perfume bottles, jars for wine or water, utensils used at ceremonials in the temples; and the beautiful amphora, a vase given as a prize at the great Greek festivals, and the progenitor of the silver cups we now give the winners in athletic games. This latter type of vase had two handles and frequently its base was tapered to a point in order that it might rest in a tripod, or be thrust into the earth. At the Louvre in Paris there is a very famous Greek amphora which I hope you will see some day."

"I should like to see it," declared Theo eagerly.

"I intend you shall, son," put in Dr. Swift. "I mean to give you the chance to see all the finest things in the world, if I have my way."

Theo smiled gratefully into his father's face.

"When we marvel at the grace and perfection of Greek decoration we must bear in mind that as a spur to their artistic sense the people had beauty constantly before them. Theirs was a country of smiling skies, of blue heaven and golden sunshine; their buildings breathed the very essence of all that is highest in art; even the throngs that filled the streets were picturesque and classic in appearance. For in those days fashions of dress did not change as capriciously as they do now. A beautiful style of costume was adopted and retained, and in consequence artists had ever before them men and women who were excellent models for chaste decoration. In our time such a procedure would be impossible, as the national dress of both our men and women has become utilitarian rather than beautiful, and now has little artistic to recommend it. If we wish classic draperies and faultless styles of hair-dressing we must revert to the past for our models.

There was a silence broken only by the snapping of the fire.

"To give you some idea how much of this pottery the Greeks turned out I must tell you that at Naples there is a collection of two thousand Greek cups and vases. The Vatican at Rome has one thousand more; Florence has seven hundred; Turin five hundred; Vienna three hundred; Berlin about seventeen hundred; the Louvre at Paris fifteen hundred; and the British Museum nearly twenty-six hundred. Besides these there are some twenty thousand more scattered all over the world in private collections."

A whistle of surprise escaped Theo.

"Not all of these are equally good, however," went on Mr. Croyden. "The Etruscan work done by wandering Greek potters and by some persons rated as identical with the Roman Samian ware, is one of the finest varieties remaining to us; probably because it escaped being buried with the dead and therefore was not injured or discolored by the soil as were so many of the Greek vases found at Athens. Moreover, we must remember that not every artist who made and decorated an object excelled. Naturally some did more perfect work than others, even in the days of the best Grecian art. How sad it is that at a later period in history the work of the Greeks became less fine because the ideals of the race degenerated. Pottery makers, sculptors, and builders began to produce cheap, gaudy things which were lavishly decorated, and reflected the luxury and extravagance that had crept into the nation. From that moment the glory of Greece decayed. For it is the ideals of a country and its people that serve as guide-posts to the greatest and finest deeds. Unless each individual in a land aims at the purest and best his country will never reach holiness. It is the struggle for perfection in every field of life that results in fine art, fine men, and fine nations."

Mr. Croyden had become very grave.

Then he rose abruptly, took out his pipe, and knocked the bowl of it upon a stump.

"Well, well," he exclaimed with a swift return to his accustomed gaiety, "I think I have lectured long enough. See! Manuel has everything packed up and is waiting for us. Suppose we start back home."

But Theo was very quiet on the trip back to the camp.

He was thinking about the Greeks.

CHAPTER III

THEO MEETS WITH A CALAMITY

It was when Theo had been three days in camp that the accident happened.

Outside the cook-house stood a ladder to be used in case of fire, and as one morning the boy passed it, it suddenly came to him what fun it would be to mount to the ridge-pole of the cabin and toss a handful of tiny pebbles down on the heads of the guides as they passed through the door beneath. What a surprise it would be to Tony and Franz to have the stones come clattering down upon them; and what sport it would be to watch them as they tried to solve the riddle as to where the missiles came from!

It was a foolish scheme, and probably had Theo thought it over a second time he would have abandoned it; but he was an impulsive boy who often acted before he carefully considered what he was doing. Therefore without a moment's hesitation he cautiously dragged the ladder to the end of the cabin and, making sure that no one was looking, began climbing it. He was on the top rung and was just stepping softly to the roof when there was a snapping of rotten wood and the bar beneath his foot gave way, sending him crashing headlong to the ground.

Fortunately for Theo the cabin was a low one, and he had not far to fall; but in trying to save himself he twisted one leg beneath him, and the result was most disastrous. He felt a sudden sharp pain as he struck the earth, and when a second later he attempted to rise he discovered to his chagrin that it was impossible for him to do so. Every movement he made hurt him excruciatingly, and presently feeling both faint and dizzy he abandoned further effort.

For an interval he lay very still, ashamed to call for help; then pocketing his pride he began to yell lustily. His cries brought Franz and Manuel from the kitchen, Mr. Croyden from his cabin, and Dr. Swift from his room. Luckily it was just noontime and every one was indoors awaiting lunch.

Of what followed Theo had only a vague idea. He remembered that his father and Mr. Croyden raised him in their arms, and that in spite of their gentleness he had cried with pain at their touch. Then he had been put on his bed where his father proceeded to examine the injured leg. Every motion the Doctor made caused the boy intense agony. Afterward he had been allowed to rest, and then his father bent over him very gravely and with trembling lips said:

"Son, I've got to hurt you; I've got to hurt you a great deal. Your leg is broken, and we are miles from a hospital. I have no ether to give you, and the bone must be set. I want you to be as brave as you can and bear the pain that I must cause you. I need not tell you that I will work as gently as possible. Now pull yourself together and show me the sort of son I have. The more steady your nerve is the more it will help me, and the sooner I can finish what I must do."

"All right, Father."

"That's the stuff!" ejaculated Mr. Croyden, who was standing at the bedside. "You are a genuine Spartan, Theo."

The lad smiled feebly.

"I'll try to be."

"Of course you will! You are your father's own boy."

Dr. Swift stooped and touched the drawn forehead with his cool hand.

"I am going to leave you with Mr. Croyden for a few moments while I get some of the things I need," he said in a low tone. "Keep perfectly still and rest a little if you can. There is no need for you to worry. We will have you all fixed up within an hour. It is a clean break—a merciful thing, for we couldn't take an X-ray of it if we wanted to."

With these words he left the room.

It was some little time before he returned, and in the meanwhile Mr. Croyden sat beside Theo's bed and talked cheerily.

"Nothing like traveling with your own doctor," he remarked jocosely. "Now if my leg was broken I should have to hire some one in to see it, and it would cost me a pretty penny. But here you are miles from a settlement with your own private physician in attendance. Were you a young prince you could not be more royally cared for. Think of having one of the best New York surgeons at your beck and call here in this wilderness. You are a lucky beggar!"

Theo laughed faintly.

"As for splints—here is a forest of the finest, straightest, and strongest timber. What more can you ask? You couldn't do things on a grander scale if you were in New York City."

Again Theo smiled.

"Your father will have you comfortable as a cricket before long," went on Mr. Croyden, "and you will be all ready to start back——"

"Start back!" interrupted Theo in distress. "Oh, surely, Mr. Croyden, Father is not going to take me home!"

The older man hesitated.

"Oh, of course I have no way of knowing what your father means to do," he protested hastily. "I only imagined that you would be more comfortable at home, and would rather go. There really would not be much point in staying out the month here, would there? You see, you won't be able to get about, and your father would not like to go off every day and leave you here alone in camp."

"But Father has spent all this money to come into the woods, and he has looked forward to the trip so much!" groaned Theo. "Besides, he is very tired and needs the rest; he told me so. If he takes me back home he will miss it all! He doesn't want the vacation just for his own fun, but so

he can serve our country better if he is needed. I don't see why we couldn't stay on here just as we planned, even if I have a broken leg," was Theo's concluding plea.

"Think how stupid it would be for you to be left in the house alone.

"I shouldn't care. I could find some way to amuse myself."

"But your father——"

"He could go fishing just as he always does!" exclaimed Theo promptly. "You surely don't suppose I'd be so selfish as to make him stay in the house just because I had to, do you? You see"—Theo colored and then went on bravely—"this accident was my own fault. Father told me the other day to let that ladder alone—and I didn't. It serves me right to break my leg. If I had been in Dad's place I'd have said: *I told you so*. But he didn't even whisper it. He was just patient and kind as he always is. Can't you understand now, Mr. Croyden, that I am the one to be punished—not Dad? If we go back home it will be punishing him too, and that wouldn't be fair, would it?"

"No, not fair at all," admitted Mr. Croyden slowly.

"That is what I think," nodded Theo. "You see, I am the one to suffer."

"If you disobeyed, I guess you are."

"I did disobey.

"Humph! It was a pity."

"I'm sorry; but it is done now," said Theo soberly. "You know how you feel when you've done wrong. It's bad enough anyhow; and it makes you feel a hundred times worse if somebody else gets the blame for what you've done—somebody who doesn't deserve it."

"Yes."

"So, you see, that is why I want you to urge Father to stay on here," begged Theo. "Tell him the Maine air will do me good; tell him I'll get a fine rest keeping still; tell him—oh, tell him

anything; only don't let him pack up and go home, and have his whole vacation spoiled. If you'll just get him to stay, Mr. Croyden, I will promise not to bother, and he can go off every day and fish just as if I weren't here."

"You are a trump, Theo."

"It—it is only that I think it's square, sir," faltered Theo.

There was not time for further discussion, for at this juncture the door opened and Dr. Swift, followed by Manuel, entered.

Theo knew the moment for his boasted heroism had come.

He shut his lips tightly, and although the interval of anguish which followed forced the tears from his eyes he made no outcry. But never in his life had he experienced such pain. He did not know there was such pain in all the world.

When it was over and, faint from suffering, he lay languidly back among the pillows, Dr. Swift's stern face relaxed, and it was then Theo realized for the first time that his father, too, had been bracing himself to meet the ordeal and had also been suffering.

"My poor boy!" was all the Doctor said. "You have borne it like a man! I am proud of you, Theo."

The words were few, but the praise was at that moment very precious.

His father sat with him the remainder of the day, as well as a good part of the night, and during the wakeful hours when the boy tossed to and fro he would have ventured to speak about staying in camp had not Dr. Swift bidden him to be quiet every time he attempted to talk. The next morning, however, after the invalid had been bathed and had his breakfast the Doctor said of his own accord:

"So you think you would be happier to remain here in the woods, Theo, instead of going home."

The lad glanced up in surprise.

"Did Mr. Croyden tell you that?"

Dr. Swift nodded.

"He said you'd like to stay," he returned quickly.

"I should, very much."

"Suppose we call it settled then, and say no more about it. I am sure I have no wish to jolt you over those miles of rough corduroy road if it can be avoided. You seem better this morning. Your fever has gone down, and I see no reason why you should not get on all right from now on."

Theo smiled; then he whispered timidly:

"I just want to tell you I'm sorry I disobeyed you, Father."

His father put out his hand gently and covered the boy's two with his own.

"You have the worst of it, son. Experience is a great teacher, they say. Let it help you not to do such a foolish thing again."

Theo met his father's eyes gratefully. He still felt weak and shaken and he was thankful not to have his fault rubbed in.

During the long hours of the long days that followed the lad had many an opportunity to put his unselfish resolutions into practise. He insisted that his father and Mr. Croyden go off on the long tramps they had each season been accustomed to take together, and during their absence he remained with Franz, who was very kind to him. The Indian had a great many devices for entertaining him. Now he fashioned for the boy's amusement a miniature birch-bark canoe; now he showed him how to weave baskets from lithe twigs of alder. Sometimes he whittled wonderful whistles and toys from bits of wood; sometimes made tiny bows and arrows or snowshoes. His resources seemed never ending.

Then when night came and Dr. Swift and Mr. Croyden returned from fishing Theo was always carried into the living-room of the cabin, and while he lay on the couch before the fire he would listen to the tale of the day's adventures. This bedtime hour was the best in the whole day.

At last there came a morning when Theo awoke to hear a storm beating noisily down upon the roof. The wind was blowing hard and sheets of rain drenched the windows.

"There'll be no fishing to-day," announced Dr. Swift after breakfast. "Instead Manuel is going out over the carry for provisions, and before he goes I must write some letters for him to take. In the meantime Mr. Croyden wants to know if you would like to have him come in and talk with you for a while?"

"Like it!" was the delighted exclamation.

"I believe I hear him now. Yes, here he is. Come in, Croyden!" called the Doctor heartily. "Our patient says he will be glad to see you."

"Glad? I should say I should!"

Mr. Croyden chuckled.

"I don't know that any audience ever gave me such a royal welcome before," he declared with amusement. "How do you find yourself this morning, sonny? Able to talk Greek pottery?"

"Able to hear you talk it," Theo answered instantly.

"I am thinking of shifting my subject to-day and telling you about Chinese and Japanese pottery instead."

"That will be fine."

"Very well, we'll begin our lecture right away, since the audience seems to be assembled," observed Mr. Croyden merrily. "Not only have you a private physician but a private lecturer, you see. My, but you are a royal personage! One thing will be very satisfactory about this audience. No matter whether it likes my talk or not it can't run away."

There was a peal of laughter from Theo.

In the meantime Mr. Croyden poked the fire into a blaze and sitting down in a comfortable chair began his story.

CHAPTER IV

MR. CROYDEN'S STORY

undreds and hundreds of years ago," said Mr. Croyden, "while the Egyptians, Assyrians, Greeks, and Romans were experimenting at pottery-making, the Chinese, inside their great walled country, were busy with the same task. In fact as far back as two thousand years before Christ the Chinese were famous potters, making earthenware of such fine quality that it was difficult to tell whether it was pottery or porcelain. For the two are quite different, you must remember, Theo. It is not enough to say that pottery is thick and porcelain thin, for much of the Chinese and Japanese pottery is very thin indeed. The difference lies in the clay itself, of which the ware is made. Do not forget that. Pottery is an opaque ware composed of various combinations of clay which afterward may or may not have a coating of glaze put over it. But genuine porcelain is made from a mixture of quite different materials—a mixture of decomposed feldspar known as kaolin, and petuntse."

Mr. Croyden paused a moment.

"There are of course so-called porcelains made from other ingredients; but we call them soft paste chinas, and do not rate them as true porcelains. Only a hard paste, or kaolin ware, is acknowledged by experts to be genuine porcelain. Now all this sounds very simple. By putting the kaolin and the petuntse together in the right proportions, moulding the clay, and afterward applying to it a glaze of some sort the Chinese made their porcelain, and very beautiful porcelain it was. Some day I will tell you more about it. This porcelain was not only very hard but was semi-translucent; by that I mean that if it was held to the light one could see the glow through it. It was not, of course, transparent like glass. These two qualities of hardness and translucence help us to distinguish porcelain from pottery."

Again Mr. Croyden stopped.

"For example, Canton ware, commonly known as Canton china, is not really china at all, but is instead a fine quality of stone, or earthenware, coated over with a slip or glaze containing porcelain. Nor is the exquisite Satsuma ware china; that too is a pottery."

Theo listened intently.

"Now all this time the Chinese kept the secret of how they made their wares to themselves, not sharing their knowledge with any outside peoples. Many a nation would have given almost anything to know from what materials the beautiful bowls, vases, and dishes were made. It would have saved years and years of the toil of patient men. But the Chinese had no mind to tell any one. Instead, they went on making more and more pottery and porcelain, improving their work with each successive generation. It is amusing to recall that while our ancestors in England were barbarians, and were eating out of the crudest clay vessels or from trenchers of wood, the Chinese were enjoying the luxury of the finest pottery and porcelain."

Theo's eyes opened very wide.

"Undoubtedly the Chinese deserved the good results they obtained, for they selected their clays with extreme care; ground and mixed them most skilfully; modeled each piece with the keenest feeling for its beauty and perfection; and decorated it in a truly artistic spirit.

"In the meantime they constantly became more and more expert. They began to learn the use of colors, and to perfect them. Some of the blues or cobalts they employed have never been surpassed. One for instance is the blue used on their Nankin china, and known as Nankin blue."

"Did the Japanese make pottery too?" questioned Theo.

"Yes, but we do not know exactly how early they began to make it. Probably some of the Japanese crossed to China and there learned the art. Some think pottery-making came into Japan through Korea. However that may be, long before other countries had to any extent perfected the manufacture of glazed pottery and porcelain China, Japan, Persia, and India had turned their attention to it. As far back as 1000 B. C. the Japanese were making porcelains similar to those of China. Then followed a long stretch of years when, because of various wars between China and Japan, the art of producing glazed pottery and porcelain was lost. All those workmen who possessed any knowledge of their manufacture perished. This was the period when the Greeks and Romans were making their red and black ware which, you recall, they did not know how to glaze, and therefore had no means of preventing liquids from leaking through it."

"I wish they had had the secrets of the Chinese and Japanese!" Theo said.

"I wish so too," echoed Mr. Croyden. "As it was, they struggled along with their beautiful pottery vases through which the water percolated just as it does through a flower-pot. And so it was for a time in China and Japan. It was not until centuries afterward that the Chinese and Japanese again rediscovered the art they had lost, and by that time the Greeks and Romans were no more, newer races having taken their places. Some of the wonderful old enamel work of the Chinese, however, was never reclaimed, and rare pieces of porcelain of a kind no one has yet been able to reproduce remain to tell us of the skill of those ancient Chinese workmen."

"If the Chinese kept everything so secret how did the art of glazed pottery-making ever get into Europe?" asked Theo.

Mr. Croyden smiled.

"It was a marvel that it ever did," he answered slowly. "Of course as people traveled little in

those days one country did not know much about what another was doing. But there were wars when much booty was carried from one land to another; the pilgrimages of the Crusaders, too, helped to spread a knowledge of widely separated sections. Gradually bits of Chinese pottery and porcelain found their way into different parts of the East; and as a consequence men began to be highly dissatisfied with their red and black ware, and with the crude clay dishes they had previously thought so fine. They wanted to make white ware like that of the Chinese. But because they did not know what clays to use, or how to glaze their products, all their experiments failed. There did nevertheless appear throughout the Orient a ware of common clay over which a simple covering of white had been painted, and this slip or engobe of white gave to the variety the name of Oriental Engobe. This type of ware decorated with a conventional dull-hued design was many years later revived and imitated by Theodore Deck of Paris, one of the great French porcelain makers. But even this was not like the white Chinese ware everybody wanted so much to make."

"Did they never find out the secret?"

"Of that I will tell you some other time. It is a most interesting story," returned Mr. Croyden. "In the meantime the Moors and Arabs who had lived in the Orient had in some way learned that tin or lead could be used for enameling clay surfaces. The discovery apparently did not particularly interest them because, you see, in the East minerals were not plentiful. When, however, in the twelfth century they conquered Spain they found in that country quantities of lead and tin, and they then recalled that these could be used as a glaze for pottery. In consequence they promptly set to work making an enameled ware called Majolica or Maiolica from the Island of Maiorca. These Moors were a highly cultured race who built in Spain beautiful temples and palaces, among them the Alhambra, of which perhaps you have read."

Theo's eyes shone.

"We read about it at school!" he cried.

"I am glad to hear that," exclaimed Mr. Croyden. "Then you will remember what a wonderful structure it was. In its interior have been found many highly glazed tiles beautifully designed and decorated in colors and in gold. Within this palace, too, was found the famous Alhambra Vase, three feet four inches in height, and made in 1320. It is a piece of work quite different from anything the Greeks made, but in its way is quite as perfect. It is of earthenware, with a white ground, and is enameled in two shades of blue with a further decoration of gold or copper lustre. I speak particularly of this use of glaze because it is very important. Until people knew how to glaze their wares many of the comforts and conveniences of living were impossible. Men carried water or wine in leather gourds, or in clay vessels coated on the inside with a layer of gum to prevent the contents from leaking or evaporating."

"I should think the gum would have made the liquid taste," said Theo.

"It did. That was precisely the trouble. Beside that think of the waste. Suppose you lost half the water you needed for your journey by having it evaporate. Think in addition what it meant if a large part of your food dried up in the cooking."

Theo looked grave.

"I should not like that at all."

"Nor did your ancestors," laughed Mr. Croyden. "Well, it was to these Mohammedan Arabs, or Saracens, as they are termed, that Europe fundamentally owed its knowledge of the use of glaze, and its consequent beginning in the art of pottery-making. The Saracens did not, however, remain in Spain. There was an uprising of the Christians and they were either driven out or slaughtered, almost every relic of their civilization being destroyed. A stray temple or palace alone remains as a monument to them and this was more the result of chance, probably, than of intention. For two centuries following came an interval known as the Dark Ages, when none of the arts flourished. But before the Moors had fled from Spain the Italians who lived near at hand and whose territory the invaders often plundered had tired of their pillaging and in return had made an expedition into the Saracens' country bringing back with them to Italy some of the Majolica ware of the Arabs. When the nations began to awaken out of their two hundred years of warfare and strife, and Genoa, Venice, and Leghorn became great commercial centres, then the Renaissance came and the Italians, who were ever an ingenious people, began among other things to attempt to copy the glaze on this Majolica ware. As a result in the fifteenth century Luca della Robbia, who was both a sculptor and a potter, contrived to perfect his wonderful glazed terra cotta."

"Not the Delia Robbia who did the Singing Boys we have on the wall at school!"

"The very same. He made great blue and white enameled tiles for wall decoration too; figures of babies and children, as well as whole altars fashioned entirely from this beautiful enamel. Whether he used a plumbiferous, or lead glaze; or a stanniferous, or tin glaze, we do not know. Probably it was of tin. But the important fact is that he got a fine durable surface, very shiny and very hard, which wrought a revolution in pottery-making. If you visit Florence some time you can still see set in the walls of some of the public buildings the identical enameled terra cottas made by Luca della Robbia."

"I'd like to see them."

"Then tell your dad to take you to Italy after this war is over. We will pray that Germany may

spare these art works of the world."

Mr. Croyden did not speak for a moment; then he said:

"And while you are remembering so many things remember in addition that the word *glaze* comes from the term *glassing* or *glazing*, which means putting a coating of glass over the surface. Of course the covering is not really glass, but it is hard and shiny, and so people used to think it was. Some day I will tell you more about the different kinds of glazes."

"So it was the Italians who gave Europe its glazed pottery and porcelain," remarked Theo.

"Not alone the Italians," protested Mr. Croyden, "although they helped. Somebody else had a share in the discovery—somebody very far away from Italy. It was the knowledge of the Italians combined with the skill of this other distant nation that gave to Europe the perfect product."

"What nation was that?" demanded Theo.

"The Dutch.

"The Dutch!"

"Yes. You see at this time the Dutch were great traders, and it was while the nation was at the height of its commercial glory that the Dutch began bringing from China shipments of Chinese porcelain. Portuguese traders had also brought some of it into Europe, so in these two ways the beautiful blue and white ware we know so well was introduced to the Continent.

"The Portuguese were content to import it; they never attempted to copy either the pottery or the porcelain. But the Dutch were more ambitious. As early as 1300 they began experimenting with glazed pottery. To the knowledge of glaze which they got from Italy they added all they could find out about the making of Chinese wares. They learned that the blue color the Chinese got came from oxide of cobalt, which would melt and mingle with the glaze when exposed to a high temperature; they also learned a little—a very little, of the clay. As a result they began to turn out a blue and white pottery known as Delft, which they soon made in great quantities and sold to European nations at a much lower price than imported Chinese potteries and porcelains could be bought."

Mr. Croyden bent forward and tossed a small log upon the fire.

"This fact revolutionized daily living throughout Europe. Up to this time you must remember the common people everywhere were using square pieces of tile or wood for plates, and were eating from wooden bowls or hollowed out slabs of wood called trenchers. The more well-to-do used pewter, and kings and queens dined from dishes of silver. There was, it is true, some earthenware made in Saxony and France, but as it was of a finer and more expensive quality than Delft ordinary persons could not afford to buy it.

"At the time the Dutch began importing their Delft ware into England Henry IV was on the throne; so you see how long ago all this happened."

Mr. Croyden smiled mischievously.

"I suppose you have that date at your tongue's end," he added.

"I think it was about 1400," ventured Theo thoughtfully.

"Bravo! I had no idea you would remember it. Henry IV reigned from 1399 to 1413, so you see you are nearly right. As Delft ware began to be manufactured in 1310 the art was pretty well developed by this time, and much beautiful pottery was being made. Some of the best Dutch painters were trying their hand at its decoration, and in the Museums of the Hague there are old Delft pieces painted by many of these famous artists. Most of the scenes upon them were copied from the landscapes the Dutch saw every day—windmills, ships, Dutch women in their quaint costumes, fishermen, and children in wooden shoes,—the ordinary sights, such as were common in Holland, but novel and interesting to those who lived in other places. There were, too, many imitations of Chinese ware adorned with copies of Chinese designs. Bear in mind, Theo, that all of this was pottery, not porcelain; for the secret of porcelain-making had not yet been fathomed," said Mr. Croyden impressively.

"It was glazed pottery," responded Theo.

"Exactly," nodded Mr. Croyden. "As time went on the Dutch increased and perfected their output until they became ambitious to make larger pieces. Potters began turning out small foot-stoves, vases, candlesticks, and dinner sets. One of the most amusing relics of this old Delft is now in one of the foreign museums. It is a violin perfectly modeled and exquisitely decorated. The story goes that it was one of four such instruments which were made as wedding gifts for the four daughters of a rich Dutch pottery manufacturer. It is even asserted that the instruments before being presented to the four brides were used by the musicians at the wedding festivities. I'm afraid they did not make very good music."

Theo smiled.

"Besides these fantastic things the Dutch also made tea sets, and when I say that you must realize that this was a very important fact; for up to about 1660 tea was a great novelty in England. It had but recently been introduced there by Oriental traders, and was very expensive,

selling for about eight dollars a pound—at that time a great deal of money, and even quite a price when rated by our own standards. People were very ignorant still as to its use. You have probably heard the story of the servant who, knowing nothing about preparing the new delicacy, boiled the tea leaves, sprinkled them with salt and pepper and, throwing away the liquid, served the dainty to his master in a covered dish."

There was a hearty laugh from Theo.

"As late as 1661 an Englishman named Samuel Pepys, whose diary is an interesting record of the time, writes: '*I had to-day some tea—a China drink of which I had never drank before.*' Isn't it a pity that while he was writing the little man did not also put down how he liked this new beverage?"

Mr. Croyden drew out his watch and rose.

"So you can see, Theo," he added as he stood with his back to the fire, "what it meant to have tea sets introduced into England. Of course the cups had no handles as do our teacups of to-day. The Chinese cups were in reality small bowls without either saucer or handle. Therefore the Delft teacups copied from them were made in the same way. The Chinese did not drink their tea very hot, you see, and therefore could take hold of the cup without burning their fingers; moreover, they used in their houses tables of teak-wood to which hot cups did no injury. Since, however, teak-wood was unknown in England and oak was in general use the English found that the hot cups marred their tables and later they invented saucers to go under them. Nevertheless it was a long time before it dawned on potters that they could make handles for their cups. One of the ear-marks of tea sets of early manufacture is these handleless cups. With this advent of dishes, of Delft plaques to be hung on the wall in place of pictures, and of Delft tiles, many of the common people for the first time awakened to the discovery that the interiors of their houses might be made attractive, and something more than mere shelters from cold and storm. They began buying vases and crude pottery ornaments, images of flower-girls, fishermen, and of the saints. In Holland people even hung Delft plaques on the walls of their stables. It was a new thought to have anything about which was not for actual use."

"I should think that with all this Chinese and Delft ware to copy from the English would have tried making earthenware of their own," speculated Theo.

"They did," was Mr. Croyden's prompt reply, "and of that I will tell you some other day. But there is one interesting fact in connection with these early tea sets. Remember that if ever you see in a museum or private house a tea set which you are told came over in the *Mayflower* nothing of the sort could have happened. The Pilgrims landed on Plymouth Rock in 1620, and it was not until from 1660 to 1770 that tea and tea sets became general in England. By that time the Pilgrim Fathers, and more especially the Pilgrim Mothers, were far across the ocean."

Mr. Croyden moved toward the door.

"Some one may have brought tea sets to them but they never carried them in the *Mayflower*," he concluded. "Now I have talked too much for one morning, and it is lunch time. Listen, there is the horn! And see, Theo, the rain has ceased and the sun come out."

"I hadn't thought of the weather," smiled Theo. "I had not thought of anything, I guess, but what you were telling me. You will come again, sir?"

"Surely!"

"And you won't forget your promise to tell me about English pottery?"

"No indeed, son," was the cordial reply. "You are too good a listener for me to forget."

CHAPTER V

THE POTTER WHO BURNED HIS CHAIRS

t was not for some time that Mr. Croyden again had leisure for a long talk with Theo,

 because with the return of pleasant weather he and Dr. Swift went for a three days' canoe trip up Elk River, a small stream emptying into the lake on which the camp stood. Dr. Swift had thought of giving up this excursion, because it necessitated leaving Theo for such a long time; but the boy was insistent that his father should go.

"I won't be lonesome, Father," he protested. "Franz is here, and he is as good as a vaudeville show; besides I can read, and whittle, and write to Mother. The days will pass so quickly I shall not have time to miss you. It would be too bad to have you stay in camp just for me. I have made trouble enough already."

Perhaps it was because of Theo's genuine regret for what he had done that Dr. Swift consented to carry out his original plan. The boy was intensely sensitive, and any allusion to his accident, or any interference with his father's pleasure because of it, immediately brought a shadow of distress to his face. The Doctor was quick to notice this fact; and eager, if possible, to avoid every reminder of the disaster. Accordingly on hearing Theo's plea he packed his tackle, and with a gentle word of caution to the invalid to be careful during his absence, set forth with Mr. Croyden to fish Elk River.

It was no easy thing for Theo to play an unselfish part and see them start off. How he wished that he, too, were going! But for his own folly he might have gone. Well, he had no one to blame but himself, that was certain. Therefore he put as brave a front on the matter as he could, resolving to make the best of it and be cheerful.

It was not, however, much fun to be lying there in bed during those fine spring days. From his window he could see the blue waters of the lake between the aisles of straight pines. It was a glorious world if one could only be abroad in it. Even the glimpse he had of it from his bed was beautiful. But to lie still and look out upon this alluring scene was not a satisfying rôle for an active boy. In spite of the wood-carving, the books, the writing; even despite the time Franz could spare to entertain him the hours dragged pitifully. Furthermore, now that the severed bone had begun to knit he felt restless and uncomfortable.

Hence when on the afternoon of the third day he awoke from an uneasy doze to find his father standing beside him it was a joyful surprise.

"Father!" he cried.

"Right here," came gruffly from the Doctor. "Glad to have your old dad home again?"

"Glad? Well, I guess!

"I am glad to see you again too, son. I've thought of you a hundred times. How did you get on?"

"All right, sir. Franz took fine care of me, and I found lots of things to do," answered Theo bravely. "But it is much nicer when you are here than when you're not."

His father smiled.

"You are a plucky youngster," he said huskily. "No matter how silly and childish your accident was you certainly have shown yourself a man since. Look! Here comes Mr. Croyden to see you. He has brought you a fine four-pounder, the record trout of the catch."

Theo beamed.

During the time the fishermen had been gone he had sadly missed the delicacy of fresh fish.

"Eating this trout will be the next best thing to pulling it in, Theo," said Mr. Croyden. "I only wish you might have had that pleasure, too."

"I shall be pretty glad to eat the trout, sir," Theo declared promptly.

"We shall let Franz get to work cooking it then, right away, so to have it ready for your dinner," Dr. Swift said, passing out with the fish in his hand.

After the Doctor had gone Theo looked up into Mr. Croyden's face.

"I suppose you are dreadfully tired after your tramp," he remarked.

"I? Oh, no," was the instant answer. "Why?"

"I—I—don't know," faltered Theo. "I just wondered."

"Wondered what?"

"Whether after dinner you would be too tired to come in and talk to me a little while?"

"No, indeed. I'd be glad to come," responded Mr. Croyden. "I'll come and tell you all about our trip."

"If you don't mind I'd rather you'd leave that to Dad, and instead tell me some more about china-making," Theo said naively.

Mr. Croyden seemed vastly amused at the remark.

"Bless my soul! What a boy you are," he said. "Of course I am perfectly willing to talk to you

on anything you like. Would you rather hear about china than anything else?"

"Yes, sir, just now I should," came vigorously from Theo.

"All righty, china it shall be, then! But I am surprised that you should be so much interested in it. How came you to be so eager to learn about pottery and porcelain?"

"I guess because you make it all so much like a story book," answered Theo frankly. "How did you happen to know so much about it, Mr. Croyden?"

"Why, it chances to be my business, son," Mr. Croyden replied. "In Trenton, New Jersey, where I live, we make quantities of earthenware and porcelain; more of it than anywhere else in the United States. That is the way I earn my money to come on fishing trips."

"Oh, I see! Then of course it is no wonder that you know all about it!" cried Theo.

"I know some things, but not all," was Mr. Croyden's answer. "However, since you like to hear about it I am ready and glad to tell you what I can. We will have a session on French pottery to-night, if you say so; there are some things I want you to know before we take up the making of the English wares."

"Whatever you say!" exclaimed Theo.

"Very well. I'll be back after dinner, and unless your father wants you for something else we'll have a nice evening together before your bedtime."

Mr. Croyden was as good as his word.

Theo had just finished his share of the big trout when into his room came the china merchant.

"Your father and Manuel are busy icing some fish to ship home, so here I am," he affirmed.

After dragging a steamer chair up to Theo's bedside and stretching himself comfortably in it the elder man began:

"Most of the pottery of the seventeenth century was an outgrowth of the Italian Renaissance when all the arts such as painting, wood-carving, sculpture, literature, glass and pottery-making were revived. In France the attempt to imitate Italian Faenza ware gave rise to the word *faience*, a term applied to French porcelains made both from hard and soft paste. French potters at Nevers, spurred on by Dutch and Chinese products, began to turn out a type of pottery not unlike Delft, except that the method of coloring it was reversed, and instead of having blue figures on a white ground it had white figures on a background of blue. This innovation, however, was not an entirely new variety of pottery. It still remained for France to invent its own peculiar kind of ware, and this it soon did. Nevertheless you must not make the mistake of thinking that these first attempts were very far reaching, for on the contrary they were very limited. They are significant only because they are the beginnings of that wonderful art of porcelain-making which later the French carried to an amazing degree of perfection."

There was a moment's delay in the story while Mr. Croyden rearranged more comfortably the pillows behind Theo's head.

"Is that better?" he asked of the boy.

"Lots better, thank you," said Theo gratefully.

"All right, son. Then we'll go on. Two of the most important of these beginnings are the Henri Deux ware, as it is called; and the enamel work of Bernard Palissy."

"We read about Palissy in school," put in Theo.

"I am glad to hear that, for he was one of the three men whose names have come down to us as being most vitally connected with pottery and porcelain-making. But before we talk of him I am going to tell you just a little about the Henri Deux ware, sometimes known as Faience d'Orion. Very few pieces of it now remain; but for perfection of workmanship and beauty of quality it has never been approached. Just who made it we do not know; nor do we know anything of the conditions under which it was manufactured. Only about fifty pieces of it are in existence—half of them in England and half in France; and it is from these, and from vague historic hints, that we have welded together the rather uncertain tale that I am now to tell you."

A smile of anticipation passed over Theo's face.

"Long ago there lived in France a wealthy woman named Helene d'Hengest, who was deeply interested in all the arts, and who owned a beautiful home known as Château d'Orion. Here she had a library, a rather rare possession in those days, and a librarian called Bernard. Now many persons think that it was this Bernard who was the maker of the now famous Henri Deux ware, or Faience d'Orion."

"Why should they think that?" questioned Theo.

"Well, there are several excellent reasons," Mr. Croyden replied. "One is that the ware shows traces of a book-binding tool. Book-binders, you know, use many small instruments to decorate or tool their leather. This faience was a ware of natural cream-colored clay, and upon it was tooled a flat design the hollows of which were filled in with darker clays that were afterward covered with

a lead glaze. Infinite care and pains had evidently been expended upon each piece of the ware, such pains that it must have taken much time to complete even a single article. No manufacturer could have afforded to do this, and therefore the inference had been drawn that the pottery was made purely for pleasure by some one who had an abundance of leisure. Perhaps this very Bernard, the librarian, who may have become interested in the art as a recreation, and done the work in his idle hours."

"What a funny thing to do as a pastime!" exclaimed Theo.

"No stranger than that now many persons take up metal work, wood-carving, or other of the so-called arts and crafts for diversion."

"I suppose not," admitted Theo thoughtfully.

"It certainly is possible such a thing might have happened even so long ago as the time when the Henri Deux ware was made. History offers us no aid in solving the puzzle, so we can only find an answer as best we may. The ware, however, is unique, and there is no mistaking it. Some of it bears the monogram of King Henry II, and that accounts for the name by which the product passes. There are authorities that assert the H does not stand for the king's name, but for Helene, mistress of the Château d'Orion; others declare the king's monogram was used merely to fix the date when the pottery was made. Hence you will find some china collectors calling it Henri Deux ware, and others speaking of it as Faience d'Orion; while still others refer to it as Saint Porchaire. When examining it it is interesting to notice how much finer the later pieces are than the earlier ones. Evidently Bernard, if Bernard it was, improved a great deal with practice."

It was obvious that Mr. Croyden had no more to say about the elusive Bernard, for he came to an abrupt stop.

Theo waited a second, and then remarked suggestively:

"And Palissy?"

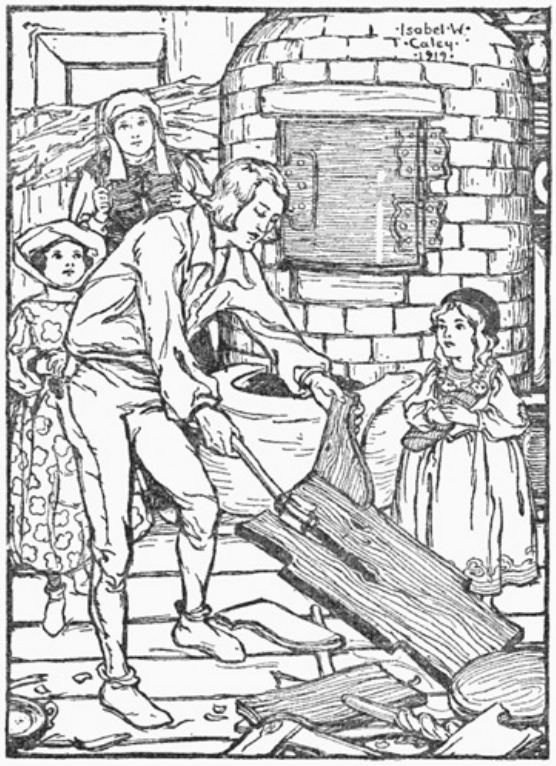
"Palissy? Oh, he was another matter altogether. What did you learn about him when you were at school?"

"Not much, I'm afraid," responded Theo with a shrug. "At least I do not remember much of it now. The teacher told us that one day Palissy saw an enameled cup of Saracen workmanship and that he was so anxious to discover how the glaze on it was made that he worked years experimenting; he even chopped up all his furniture as fuel for his furnaces."

"This is quite correct," smiled Mr. Croyden. "I see you recall a good deal. What you have told me are the main facts of the story. Palissy did work fifteen years. He used every splinter of wood he could lay hands on as fuel, and indeed burned up every particle of his household furniture, until he had not a chair to sit upon. He spent every cent he had, too, until he was so poor that he could scarcely feed his family, and owed money to all his neighbors."

"In the end did he find out how to make the enamel?" came breathlessly from Theo.

"No, not that particular kind of enamel the Moors made in Spain. That is the sad part of the story," replied Mr. Croyden. "He did, however, find out by his experimenting how to get marvelous colored enamels of another kind, and this was a very important discovery. He colored his glazes before putting them over the clay, instead of using a white enamel and then painting it as had previously been done everywhere. So you see after all Palissy did a great deal for pottery-making, since up to this time no one had ever thought of coloring the glaze itself. He made many vases, platters, and covered dishes adorned with designs in this colored enamel, often putting on the cover of a dish a fruit or vegetable in relief, tinted in its natural colors. Much of this work now can be seen in the museums of France; but it never became a distinctive type of art. What we chiefly remember of Palissy is his introduction into china-making of these hitherto unknown colored enamels.



"HE USED EVERY SPLINTER OF WOOD"

"What became of him?" inquired Theo at last. "Did he ever get any more money?"

"He had a strange life," mused Mr. Croyden. "He was a Huguenot, and at that time the Catholic party was in power, and an edict went forth that all Huguenots should be killed. Many of them fled into other countries and thus escaped death. But Palissy refused to flee, and because he was a man skilled in pottery-making, one of the things France was eager to perfect, the king wanted to retain him in his kingdom. Therefore he took Palissy under his protection, and for a long time allowed him to work unmolested in a little building in the grounds of the Tuileries. But by and by the Catholic adherents of the king became too strong even for their royal master's control, and so insistently did they clamor for Palissy's death that the king was forced to send for the potter and beg him to renounce his Protestant faith. Now by this time Palissy was a white-haired man of eighty. Nevertheless when the king told him he must either recant or lose his life he did not flinch. Fearlessly he clung to his religion."

"Did they kill him?"

"No. Perhaps it was because the people did not dare displease the king," answered Mr. Croyden. "They did, however, imprison the old man in the Bastille and there, after years of confinement, he wasted away and died. It was probably only the influence of his royal patron that prevented him from being murdered in the first place. Both the Henri Deux ware and Palissy's colored enamels brought fame to France. In 1800 at Nevers, where the blue and white ware similar to Delft was made, there were twelve factories. Then there was a quaint pottery made at Beauvais with the coats of arms of France and Brittany upon it. At Rouen, too, an extensive pottery industry sprang up, and it was to these factories that in 1713 Louis XIV, when forced to pay his war debts, sent his silver service to be melted up and replaced by a less expensive earthenware dinner set. Some pieces marked with the fleur-de-lis, and probably remnants of this set, are to be found in French museums. There were various other small potteries in different parts of France: some at Marseilles, others at Moustiers and Nancy. There were a number in Paris itself. All of these were making a more or less fine variety of earthenware. But the time was not ripe for France's greatest contribution to china-making. Of that you shall hear some other day. Now have I not told you quite a long story?

"A long one and a very good one," said Theo. "I hope you'll tell me another very soon."

"Will you never have enough of all this chinaware?"

Laughingly Theo shook his head.

"I'd like you to keep right on until——"

"Until you are on your feet again," interrupted Mr. Croyden teasingly. "Then I suppose you will promptly run off and forget all about it."

"Not at all, sir!" contradicted Theo. "I was going to say I wished you would keep on telling me about it until I got well and could go to see some of these potteries and porcelains made."

"Oh-ho! So you want to come to Trenton and steal my business away from me, do you, you young rascal? We'll see about that."

With a broad smile Mr. Croyden rose and shaking his fist playfully at Theo sauntered out the door.

CHAPTER VI

FROM VASES TO DRAIN-PIPES

During the week that followed neither Dr. Swift nor Mr. Croyden took any more long trips away from the camp. They went, to be sure, on short fishing excursions, often being absent an entire morning or afternoon; but they passed no nights away from Theo. The boy suspected that his father's reason for this decision was because for the last few days try as he would he had been unable to conceal how miserable and uncomfortable he felt. Dr. Swift, however, would not own that this was the cause of his loitering at home. He merely declared that when the near-at-hand sport was so good it was foolish to tramp ten miles to waylay some unwary and distant trout. And indeed this logic appeared to be sound, for not once did the anglers return from one of their brief tours that they did not bring with them baskets well lined with yellow perch, trout, or land-loch salmon.

As a consequence the Doctor managed to keep very close watch of his son, and Theo saw a great deal both of his father and Mr. Croyden.

The friendship of the latter for the sick lad was no empty pose.

He sincerely liked Theo—liked his manliness and his intelligence; his brave attempt at unselfishness; his boyish love of fun.

Mr. Croyden was very fond of boys and, in fact, often betrayed the circumstance that in reality he himself had never really grown up.

Accordingly he sought Theo out whenever he had leisure, and many a happy hour did the two spend together.

One day when he chanced to be sitting beside the invalid's couch Theo said:

"You told me once that there were three famous potters in history, and that Palissy was one of them; who were the others?"

"If I should tell you their names and nothing more about them it would be only so much dry sawdust," was Mr. Croyden's reply. "The only reason they were great was because of what they did; and that is a long story."

"Too long to tell?"

"Too long to put in a nutshell."

"Wouldn't you have time to tell me some of it now?"

"I might have time to tell you about one of the men, but not both; and even were I to tell you about one of them, in order to make you understand how truly great he was I should have to tell you much that happened before he began his pottery-making," answered Mr. Croyden slowly.

"I shouldn't mind that at all," laughed Theo. "The longer your stories are the better I like them."

Mr. Croyden smiled.

"Suppose, then, we begin," he said, "and I will try before luncheon to introduce you to our second great potter. But before I do this we must go back a little that you may recall exactly where we left off. While Holland was turning out its Delft ware; Italy its glazed terra-cotta; and France its Henri Deux and other enameled earthenwares, in the Low Countries and the German States a new variety of pottery with a coarse surface not unlike the porous skin of an orange was being made. This was known as Gres de Flandres, *gres* meaning earthenware. The unique feature it possessed was not so much its orange-skin surface as the surprising method by which it was

glazed. The ware itself was made on a potter's wheel often from the commonplace kinds of clay, such as are employed in making stone china; sometimes this was brown, sometimes gray, sometimes cream-colored. There was nothing original about the material employed. But afterward—then came the amazing thing! When the clay articles were put into the kiln to be fired a quantity of common salt was thrown in with them and this salt created a vapor which when it settled upon the ware fused with it, giving to the clay a coarse, porous-appearing surface.

"How do you suppose anybody ever thought of using salt?" inquired Theo.

"I do not know. Probably the discovery, like so many others, was a mere happen-so. At any rate it was a fortunate happening, for immediately this method of glazing earthenware was carried to England, where Doulton of Lambeth began manufacturing some very beautiful gres. For gres can be of exquisite beauty as well as of most ordinary type. Do not forget that. The term serves to cover those opaque earthenwares which are fired until vitrification or an external glassing results. At first all styles of gres were called Gres de Flandres, but later the single term gres was given them. You will hardly be surprised when I tell you that those past masters in the art of every kind of pottery-making, the Chinese and Japanese, have given us our finest specimens of gres, some of them having designs of imitation jewels upon them; and others decorations of beautifully colored enamels. Next to these Oriental varieties Germany has always excelled in the making of gres. There is a great scope for artistic expression in this ware, a far broader range for merit than in many others."

"So it was this salt glaze that England took up, was it?" ruminated Theo.

"Yes. You see, up to this time very little glazed ware had been made in England, for until the Dutch traders came with their Chinese and Delft wares the English had been cheerfully using, as I told you, unglazed clay, wood, pewter, and on rare occasions silver dishes. Even the ladies of Queen Elizabeth's household felt no shame to eat from wooden dishes. As for knives and forks—nobody used those! Every one ate with his fingers. Think how primitive it must have been to go to a banquet of the Lord-Mayor of London arrayed in your silk or velvet costume, and eat roasted ox with your fingers from a trencher, or square slab of wood! Yet such a procedure was considered entirely proper in those days."

Theo was much amused.

"Afterward for quite a long time dishes of brown stoneware were in vogue; and then as an improvement on those came a coarse greenish-yellow type of ware. It was about 1645 that into England strayed a few Dutch potters who began to make a reproduction of Delft pottery. In the meantime in quite another part of the country a salt-glazed stoneware of far better quality than any previously manufactured made its appearance. To this the name *porcellane* was given, and although the product was in reality simply a gres the fact is interesting because it is the first time that we have the word applied to china. It probably came from the Italian noun *porcellana*, meaning a shell, which the thinness of the new ware may have suggested; or the term may have been derived from the French word *pourcelaine*, a word used for any material from which a sculptor models his statues. We are not certain which of these theories is correct. Nevertheless we have the name, although at this particular date it was incorrectly applied."

"But the English had nothing at that time but pottery to give the name to," objected Theo.

Mr. Croyden chuckled.

"Exactly! So they shouldn't have used the term at all," he said, "because they have confused a lot of good people since then. From this period on England went steadily forward with its china-making. Earthenware of various kinds covered with salt glaze were made at Fulham, Stoke-on-Trent, and Staffordshire. It was about 1750 that the second of the great potters made his advent."

"Ah!" cried Theo, "now we are going to hear who he was!"

Mr. Croyden paused a moment as if thinking just how he should best tell the story. Then he began:

"The name of this second pottery-maker to whom the world owes a mighty debt was Josiah Wedgwood. He was a man who came naturally by his skill at pottery-making, for, not only was he himself a potter, but he also had several ancestors who had followed the trade. He was a conscientious workman of limited education, but a person to whom a thorough, careful piece of work, done as well as it was possible to do it, was a satisfaction and delight. Remember that fact, for it had much to do with Wedgwood's subsequent success. He also loved beauty of form, and probably had he been able to choose he would have turned his entire attention to making a classic type of pottery. But being one of thirteen children he was poor, and his common sense told him that there were far more necessary things to be done in the world than to give all one's time to articles that were not useful. So he put his dream behind him, like the practical fellow he was, and looked about to see what his contemporaries needed, and what he could do to aid his generation."

"I should think that if he could have made some dishes it would have helped as much as anything," asserted Theo emphatically.

"That was precisely what he decided," answered Mr. Croyden. "Accordingly he went to work to apply his knowledge of pottery to the improvement of English earthenware. First he made a kind

of cream-white pottery which he dubbed Queen's Ware in honor of Queen Charlotte; and which in spite of the fact that it boasted no decoration, became very popular in England because of its moderate price. From this simple beginning Wedgwood got money to experiment further, and work out other varieties of china. In 1773 he began his famous dinner-set for Empress Catherine II of Russia, which had upon it over twelve hundred enameled views of English estates, and for which she paid three thousand pounds. For two months before this set was packed and sent away it was on exhibition in London, where it was the marvel of every one who saw it."

"I'd like to have seen it!" interjected Theo.

"And I too," echoed Mr. Croyden. "By this time Wedgwood had money enough to carry out some of his dreams. He was fortunate in having the friendship of several Englishmen of wealth and through one of them, Sir William Hamilton, he obtained a chance to take impressions of rare cameos from Italy and Pompeii; later the Duke of Portland, who you may recall outbid him at the sale of the world-famed Portland Vase, allowed him to copy it. It was a very generous thing for an art-lover to do, and I think it must have cost the duke a wrench. It took Wedgwood a whole year to copy this vase, and when he had succeeded in doing so he made fifty more copies. The venture cost him not only his time but a small fortune as well; but it proved far from a waste of hours or money, since the feat brought to the manufacturer a familiarity with Grecian art which had its outcome in his well-known Jasper ware."

Theo glanced up questioningly.

"Surely you have seen this ware, Theo," asserted Mr. Croyden. "It comes in blue sage-green, or purple, and has upon it Grecian figures in white."

Instantly a flash of recognition came into Theo's face.

"Oh, I know it now!" he ejaculated. "Mother has a teapot of it at home."

"That is more than likely," came cordially from Mr. Croyden. "At first, however, Wedgwood did not put the white figures on this ware; he merely mixed the coloring matter with the clay and got as a result a dull, opaque ware of green. Afterward he conceived the idea of making the pottery in other colors and decorating it with the Grecian, Italian, or Roman figures of which he had long before taken impressions. As this venture took form sculptors became interested in the project and lent their aid, so that by and by an entirely original ware was developed which has come down through history as one of the significant art contributions of the age. In addition to his Queen's ware, and Jasper ware, Wedgwood also made a black Egyptian-like ware called Basalt; another variety of cream-colored ware known as Bamboo; and a kind of terra-cotta that imitated granite."

"Well, I should certainly think Wedgwood did his bit!" declared Theo.

"Ah, but this was not all he did," retorted Mr. Croyden quickly. "His most important work I have not yet mentioned."

"What was that?"

"He invented two things of widely different nature which have been of the greatest practical value to our civilization ever since. One was a hard biscuit porcelain such as is used in laboratories, and for chemist's and pharmacist's utensils. This meant far greater convenience in the mixing and preparation of drugs and medicines."

"And the other?"

"The other was the glazing of common earthenware or terra-cotta drain-pipes. This non-æsthetic product was perhaps Wedgwood's greatest contribution to his time, for it revolutionized sanitation, and was a mighty step toward better living conditions. Surely no one can say that Josiah Wedgwood did not let his art serve his generation both from an artistic and a practical standpoint."

CHAPTER VII

PORCELAIN AT LAST

rogress toward health now became quite rapid, for Theo, being a normal boy, the injured bone knit quickly, and before long Dr. Swift said:

"I have sent for some crutches for you, son, and as soon as they come I see no reason why you should not be up and about. Of course you cannot expect to go hiking off over these rough trails; but you can certainly get out of bed and move about the camp."

Theo's eyes sparkled.

"My, but won't it seem good!" he sighed.

"I am sure it will," answered the Doctor. "You have been very patient, Theo."

"Going to get the invalid up, Doctor?" questioned Mr. Croyden, who had just poked his head in at the door.

"Yes, just as soon as the crutches I have ordered from New York arrive."

Mr. Croyden looked rueful.

"That means I shall be losing my lecture audience," he mourned playfully. "You will no longer be a spoiled child, Theo, after those crutches come. We shan't serve all your meals in your room, nor give you the biggest fish in the catch. You will have to come down to common fare like the rest of us."

"You won't find me doing any fussing on that score," laughed Theo. "As for the lectures—why, I have a season ticket, and shall expect a lecture every day."

"Mercy on us!" gasped Mr. Croyden. "Do you realize, young man, that I came into these woods to rest? If I am to make pottery and porcelain with you every day I might just as well be at home.

Nevertheless it was plain that the elder man was pleased.

"Well, so long as you have secured a season ticket in advance I suppose there is no help for it," he added with a comic expression of resignation. "When, by the by, does the next lecture come?"

Theo pretended to produce an imaginary ticket from his pocket and consult it.

"The next lecture seems to be listed for this evening just after dinner," he replied gravely.

"It does, does it!" exclaimed Mr. Croyden. "Very well; the lecturer will be ready at seven sharp. I make it a point never to disappoint an audience."

With a good-natured laugh he was gone.

"I hope I don't bother Mr. Croyden too much, Father," observed Theo reflectively, after the older man was out of hearing.

"I guess you don't," answered the Doctor. "At first I was afraid you might be taking too much of his time, so I asked him; but I soon found he enjoyed these talks quite as much as you. He is a good talker, and like the rest of us finds it pleasant to discuss his hobby. I begged him to be frank and tell you whenever he was too tired or busy to talk, and he promised he would."

"He has been mighty good to me."

"He certainly has," agreed Dr. Swift. "He likes boys very much. It is a pity he has no son of his own."

"It is a shame!" exclaimed Theo. "He would make such a splendid father for some boy."

Dr. Swift nodded.

"Boys are of course a great nuisance, and they make us lots of trouble," he remarked dryly, "but they are good things to have in the house in spite of that."

As he rose to go he cast a whimsical glance at his son.

"I'll leave you this book to read," he said. "Mother sent it. And here are some letters. Here, too, is a picture puzzle which looks as if it might keep you busy for some time. I guess you won't be idle before I get back."

Theo met his eye with a bright smile.

"I guess I won't have a chance to be," he replied.

The book proved to be an aeroplane story of just the kind Theo liked; and the puzzle was so hard that he worked on it at intervals most of the day. Then came twilight and with it a game of cribbage with his father, after which he had a deliciously cooked dinner of fried perch, browned potatoes, and a marvelous three-story chocolate pie, a masterpiece of Franz's cookery.

"I think this has been about the best day yet," Theo remarked when promptly at seven Mr. Croyden drew his chair up into the firelight. "Father does plan such jolly things for me to do!

And you, and Manuel, and Franz are so kind!"

"Those of us who have our legs ought to be, that's sure," was Mr. Croyden's grim response. "It is the least we can do. In my opinion you have been a real hero, Theo. If my leg had been broken I should never have been so patient. You would have seen me storming round like a caged tiger. In fact I doubt even if lectures delivered by such a brilliant speaker as myself would have kept me still."

Theo chuckled.

"What is the subject of the lecture you are to give this evening?" he inquired with mock seriousness.

"Wasn't it printed on your ticket?"

"No, sir."

"No?" exclaimed Mr. Croyden in surprise. "A great oversight! The man who printed these tickets is a stupid fellow. I believe I shall have to discharge him and try somebody else. The subject of this evening's lecture is, of course,

Porcelain."

"Porcelain! Have we really come to porcelain at last!" cried Theo, much delighted.

"Yes, we have now finished with the potteries and earthenwares—at least for the present, and we shall begin on porcelain, the great art-work of the Chinese."

Mr. Croyden stopped to cram tobacco into his pipe.

"Already I have told you that the Chinese made beautiful porcelains from kaolin and petuntse, two clays which produced a hard, semi-transparent china," he began. "And I have also told you how for a long time they were the only nation to have a knowledge of the necessary ingredients for such a ware. I only wish I had here at this moment some specimens of the exquisite porcelains they have made that you might see them and get some idea of their richness and beauty. It is difficult to describe them in words."

"Maybe when we go home Father will take me to the Metropolitan Museum to see some Chinese porcelains," suggested Theo.

"I am sure he will," Mr. Croyden said. "And if he is too busy to do it, I will take you myself. Maybe some day we could go china-hunting together."

"That would be corking!"

"I'd enjoy it as much as you," affirmed Mr. Croyden. "We would prowl around among the different collections and look for the celebrated Nankin blue which, although not strictly speaking a porcelain, would give you a glimpse of some of the finest work ever done in a blue and white ware. Of the very early Chinese porcelains we should, alas, find no specimens, because most of these were destroyed during the wars that raged against the various ancient dynasties; but we should see some examples of what is called the Chrysanthemo-Pæonienne period."

"Jove, what a name!"

"Not such a terrible one when you think about it," returned Mr. Croyden. "Get to work with your brain and you can soon tell me what it means."

"Chrysanthe——" ruminated Theo, thinking aloud. "Has it anything to do with chrysanthemum?"

"It surely has. Go on," urged the elder man encouragingly.

"Pæonienne—I'll bet it is another flower! Peony?"

"There you have it!" came triumphantly from the china manufacturer. "It was not half as bad as it sounded, you see. Chrysanthemums and peonies—the two flowers almost exclusively used as decoration on the porcelain of that particular period. So universally was one or the other of these flowers employed, and so individual was their treatment, that the name serves to cover one of the oldest types of Chinese porcelain remaining to us. This porcelain was not so beautiful, however, as some of that which follows it; the clay or body of the ware being less fine. One can easily see that at that time the Chinese had not perfected their art. Nevertheless it is remarkable, and the flower designs on it most artistic."

"And what came next?" inquired Theo.

"Next we come to some other varieties of porcelains which connoisseurs have grouped together because of their color and called *Famille-vert*. Think out what that name means as you did the other. You have studied French at school, haven't you?"

"A little," replied Theo modestly. "*Famille* is family; and I think *vert* is green. But of course it could not mean Green Family."

"That is precisely what it does mean," Mr. Croyden returned heartily. "The name refers to the delicate color of the ware. 'Sky after a summer rain' was what the Chinese sometimes poetically

called it. It is a porcelain of wonderful rarity and beauty. Some of it even ranges to as deep hue as apple-green. One does not find much of it now, for it is a very choice and expensive variety; nor was it widely made. The ware for which the Chinese were most celebrated was the

Famille-rose."

"Rose Family!" exclaimed Theo, instantly.

"Yes. Broadly speaking the Red Family. I am glad to see you have your French so at your tongue's end. This porcelain of the Rose Family was the masterpiece of the Chinese. The word rose did not in this case refer to the flower but to the rich red tone of the porcelain. Some of it is as deep and almost as brilliant as a ruby; and neither its decoration nor its coloring can be surpassed. For the Chinese, you must not forget, were the most original and unhampered of artists. They were never content to copy flowers, faces, or figures as we do to-day. Instead they aimed to catch the spirit of the object from which they were working, and then with freedom and boldness to execute a design that should have something more than mere reproduction in it. It did not matter in the least to them if a flower in one of their pictures was sometimes larger than a man; or a boat many sizes bigger than the bridge beneath which it sailed. They were making a sort of fairyland decoration where anything they pleased was possible; it was not a world of fact. As a result they got an imaginative quality in their decoration which none of our more prosaic and literal western nations have ever equaled."

Mr. Croyden took a pull at his pipe.

"Much of their design was symbolic, and much of the coloring they used had a national significance. For example, the Dragon was a symbol of empire and power; the Dog, a sacred animal, was often used; but it was no ordinary dog. Instead it had great teeth, a curling mane, and claws like a lion. A Chinese artist would have scorned to copy a real dog, for that would not have been considered art; nor would a picture of any living type of dog be half as imposing as was this imaginary creature with its fierce teeth, mane, and claws. Sometimes the *Kylin*, a sort of stag with a dragon's head, and a symbol of good-fortune, was used. There were many other of these symbolic designs employed to enhance the beauty of Chinese porcelains, and of course to the Chinese each one had its meaning."

"It is an interesting idea, isn't it?" Theo said slowly.

"Very; and makes much of our own art seem pitifully thin. And when you consider that the colors the Chinese used also had their meaning, as did various geometric forms introduced, you can readily see how much one must study to understand Chinese—and for that matter, Japanese art; for the Japanese used much the same methods in decorating their potteries and porcelains, although of course their symbolism varied. With the Chinese green and vermilion were colors sacred to the wall decorations of Emperors' houses; red typified fire; black, water; green, wood; white, metal. Fire was also sometimes represented by a circle, and the earth by a square. All this I tell you that you may see how much thought went into everything they did. In addition certain objects were made for especial purposes, and decorated in accordance with their use. There were drinking cups for poets, authors, and government officials, each cup having an appropriate picture in the bottom. Then there were incense-burners, vases, bowls, and vessels for libations at ceremonials; there were, too, statues of the various gods. Besides these many types of workmanship the Chinese made a very thin egg-shell porcelain, the most fragile and transparent of which we now get from Japan; and a porcelain decorated with a fine, open-work design cut through the ware, and styled 'grains-of-rice pattern.' Moreover they manufactured a variety which in firing took on a crackled effect and has for that reason been christened Chinese Crackle. You see how many kinds of thing they worked out."

"I should say so!" exclaimed Theo.

"Most of the painting of Chinese porcelain was done directly on the glaze instead of underneath it, although some of the brush work was done on the clay itself before the glaze was put over it. In either case the ware required several firings, and before even such a simple article as a cup was completed it frequently passed through as many as seventy pairs of hands. Add to this the dangers risked in packing and importing, and the tumult of the many wars that racked China, and is it anything short of a marvel that so many perfect pieces of ancient make have come down to us?"

"I think it is wonderful that all of them were not broken," gasped Theo.

"It is not until 1171 that there is any mention of porcelain being seen outside of China. Then the Mohammedan Saladin sent as a present to another ruler forty pieces of Chinese porcelain. In 1487 the Sultan of Turkey gave to Lorenzo de Medici, a great art lover, a porcelain vase. After that porcelain began, as I have already told you, to find its way into Europe—first through the Portuguese traders, and later through the Dutch. What we know of Chinese porcelain applies largely to that of Japan, because for many years Japan was merely an imitator of China so far as porcelain-making was concerned. By and by, however, the Japanese Government encouraged the industry by giving money toward its manufacture, and as a result about the year 1200 the porcelains of the Japanese rivaled those of China. The Chrysanthemo-Pæonienne was worked out to a degree of perfection hitherto unknown; and the Famille-rose was also made, but not as perfectly as in China. The Famille-vert, on the contrary, was not attempted to any extent in Japan, probably because the Japanese lacked the necessary clays to make it."

Mr. Croyden paused as if reflecting, then added:

"As I explained to you, the Japanese had their symbolism of color and design as well as the Chinese; and not only did they make similar sorts of porcelain, but they subsequently invented styles of decoration of their own. They did much medallion-painting, a form of design unknown in China. They also gave to the world their wonderful Japanese lacquer, a varnish of gums that could be applied not only to wood but in some cases to porcelain. They also were the race to invent Cloisonné ware, a very difficult type of thing when made as they made it. To the surface of the porcelain they fastened a tiny metal outline of the design and afterward filled in the spaces between it with colored enamels. You can easily see what careful workmanship such a process required."

"We have a Cloisonné vase at home," said Theo soberly, "but I never knew it was made that way."

"If it is the genuine old Japanese Cloisonné it was," answered Mr. Croyden. "The Japanese also gave us the Mandarin china so highly prized by collectors. This is an interesting ware because on it we find the tiny Mandarins pictured in the decoration, wearing their little toques or caps topped with the button denoting their rank. You see when the Thsing victors conquered the Ming Dynasty of China they decreed that many of the old Chinese customs and modes of dress should give place to those of Japan. Among other things they ordered that officials wear the toque or mandarin-cap. The Chinese were, as you can well imagine, very angry; and although they wore the cap you see no little mandarins thus arrayed adorning their porcelain. But the Japanese not only immortalized these reminders of their supremacy on their chinaware, but they even took some of their mandarin-decorated porcelain to China and forced the Chinese to buy it. In most collections you will find some of this Mandarin china; but remember, although it may have come from China, it probably was not made there."

Theo smiled.

"The Japanese came in time to be great traders," continued Mr. Croyden, "and they are going to be still greater ones some day. They invented many other kinds of pottery and porcelain which they sold to the merchants of Holland. Satsuma is a pottery in which they excelled. It has a body of cream-colored earthenware not unlike Wedgwood's Queen's ware, and this is richly decorated in dull colors and gold. In order to please the Dutch traders the Japanese even painted angels, saints, and other Christian figures both on their pottery and porcelain, which proves they must have been pretty eager for European customers. At the present moment they are equally willing to cater to American and European demands, and to gratify our inartistic public by sending into our markets all sorts of cheap, gaudily decorated goods which they themselves would not tolerate. It is a deplorable fact, too, that we buy them. Now you surely have got your money's worth of lecture for to-night. If you are not tired, I am. Good-night, sonny!"

"Good-night," called Theo as Mr. Croyden passed out, "and thank you. I'm sorry you're tired. I am *not*. I could listen all over again."

CHAPTER VIII

THE THIRD FAMOUS POTTER

Theo's crutches did not arrive as soon as he expected, both because of the remoteness of the camp and a confusion in transportation.

Poor Theo! After getting his hopes up it was hard to be cheerful over this disappointment, and the courage that until now had buoyed him up suddenly began to fail.

"I just wish one of those miserable expressmen could have a broken leg and then he'd see how good it is to be laid up like this," fretted the boy indignantly.

"Oh, come, don't wish that!" Mr. Croyden protested laughing, "for if you decree that the expressmen be disabled you will never get your crutches."

"I suppose not," admitted Theo grudgingly. "But it is so irritating."

"I know that; still, it might be worse, Theo. You really are pretty comfortable, you know."

"Yes."

"You are not suffering."

"No," murmured the lad, hanging his head.

"You have plenty to eat."

"Yes."

"And the food is good."

Theo flushed, but said nothing.

"There is many a boy worse off than you are."

"Probably."

"I guess your father could show you a score of them were you to accompany him on one of his hospital rounds. Suppose, for example, you were in pain every moment, and were never to walk again. That would be a real calamity, and something to fuss about."

Theo raised his eyes.

"I know it, sir," he said instantly. "I'm afraid I have been pretty grumpy and cross."

"No. Until now you have been most patient—phenomenally patient for a lad who loves to be doing something every minute. It is precisely because you have done so well that I'd like you to hold out a little longer."

Theo's lip quivered; then suddenly his scowl melted into a mischievous smile.

"I believe, Mr. Croyden, that you are as good at preaching as you are at lecturing," he observed gaily.

Mr. Croyden nodded his head.

"You are one of the few persons, Theo, who appreciate me at my full value. I am really a very gifted person if only other people suspected it. In return for your recognition of my talents I have half a mind to favor you with another of my celebrated lectures this very instant."

"I wish you would," came eagerly from Theo. "But aren't you going off fishing this morning?"

"No. Your father and Manuel are going to fish some secret trout hole, and they did not invite me. You see, your father's guide and mine are the best of friends until it comes to trout holes; then they are sworn enemies. Manuel won't tell Tony where he finds his five and six pounders; and Tony won't tell Manuel. Yesterday Tony actually led me nearly half a mile out of my way so Manuel should not see where we were going. He wanted to throw him off the scent, and I guess he did it, too. This rivalry between fishing guides is very common and sometimes, I am sorry to say, it is less good-natured than here."

"It seems very silly," Theo remarked.

"It is the same old question of protecting the source of one's income. Governments as well as individuals have to confront the problem. You remember how the Chinese tried to shut every one out from knowing how they made their porcelain?"

"Yes, indeed. And you never have told me yet how the European nations found out the secret."

"Until now we had not come to that story," replied Mr. Croyden. "But to-day it chances that that is the very tale I have in mind to tell you."

Theo rubbed his hands, and with a contented smile settled back against the pillows prepared to listen.

"As I told you," began Mr. Croyden, "about 1518 Portuguese traders brought Chinese porcelains into Europe; and following their lead the Dutch imported the same goods in even greater quantities. Everywhere people marveled at the beauty of these wares just as you would have done if up to that time you had never seen anything but crude clay dishes. The whiteness of the porcelain seemed a miracle, and on every hand people were eager to make such china themselves. Especially eager were the rulers of the different European countries, who were clever enough to see that such production would greatly increase their national fame and prosperity. Now there chanced to be a Prussian by the name of Böttger, an alchemist, who because of the wars had fled for safety to Meissen. He was a man well-versed in the composition of minerals and chemicals, and in consequence Augustus II, who was at that time Elector of Saxony, sent for him, and asked him to join his other skilled chemists, who for a long time had been busy experimenting with clays in the hope of discovering how the Chinese made their porcelain. This was no unusual thing, for chemists of most of the other countries were working feverishly in their laboratories at the same enigma."

"Doesn't it seem funny?"

"As you look back on it, yes," answered Mr. Croyden. "It is almost tragic when you consider the time, patience, and money that went into these experiments—most of them failures, at that."

"Did Böttger fail too?"

"I am coming to that," replied the story-teller. "While mixing various combinations of clays Böttger and his associates came upon a hard pottery clay which was neither white nor translucent like the Chinese, but which nevertheless was nearer that ware than anything they had previously succeeded in making. In 1708 some dishes were made from this material, but they were not very satisfactory. After that Böttger tried again. You see he was not a person who was easily discouraged. The next time he got a white ware, but it was not thin; instead it was thick and ugly. He now had the hardness and the whiteness, but not the semi-transparency and fine texture of the Chinese porcelain; and although he tried repeatedly he was unable to fathom the secret of these qualities."

Theo waited while Mr. Croyden stopped to rest.

"The one thing Böttger needed he did not know where to find and that was——"

"Kaolin!" cried Theo.

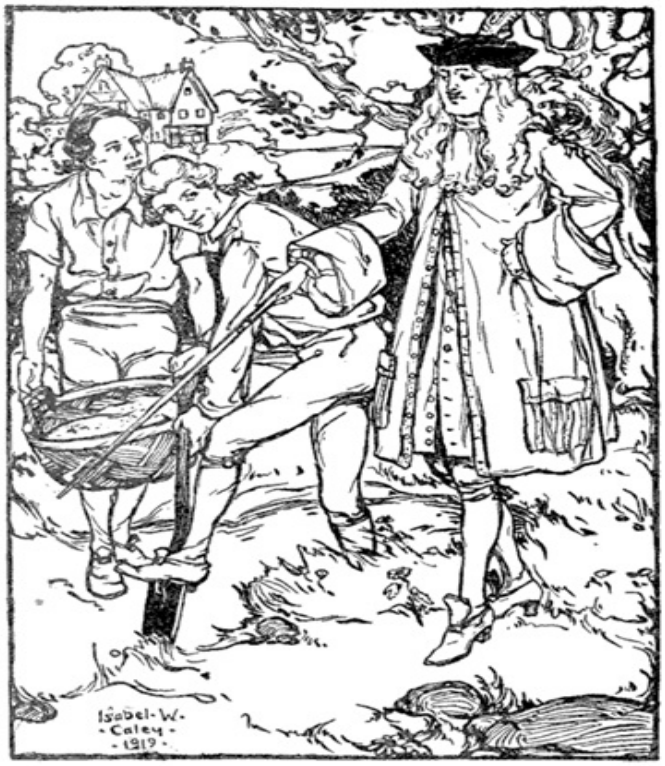
"Exactly," assented Mr. Croyden. "What a pity it is that you could not have shouted the magic word in his ear as lustily as you have in mine. It would have saved poor Böttger no end of worry and hard work. However, even if he had heard the name it probably would have conveyed nothing to him, for no one in Europe had ever heard of kaolin.

"I suppose it is a Chinese word."

"Yes. The name was taken from the Chinese mountain of Kailing, where the first kaolin, or decomposed feldspar, was found."

"Now please go on with the story," urged Theo.

"Well, one day it happened that a rich Saxon iron-master was taking a ride, and as he went along his horse's foot stuck in the soft clay at the roadside. As the rider glanced down to see what the trouble was he was amazed to discover that the clay was white, and being a business man the thought instantly came into his mind that here was a way to make some money. At that time all the nobles of the Court wore powdered wigs, and the quick-witted iron-master said to himself: 'I will get some of this clay, sift it very fine, do it up in packages, and sell it for powdering the hair; thus I will make my fortune.' Accordingly his servants dug some of the clay, and after it had been carefully sifted through cloth, he put it upon the market as a new wig-powder. Now in those days the more well-to-do persons had several wigs or at least two, in order that while the one was being worn the other might be sent away to the hair-dresser's to be curled and powdered. Therefore, in the course of time it chanced that Böttger's servant, like others, sent away his master's wig to have it freshened up. When it came back it was beautifully dressed and was powdered with some of the iron-master's new powder. It looked very fine indeed, and Böttger had no fault to find with it until he took it up to put it on his head; then he observed that it was strangely heavy. 'What's this!' he cried to his servant. 'What have you been doing to my wig, rascal?' Terror-stricken the servant protested that he had done nothing. Böttger carried the wig into his laboratory that he might examine it more carefully, and he soon came to the conclusion that the weight of the article lay in the powder. He therefore shook it off and set to work to analyze it. What was his surprise to find the powder a white mineral substance of which he knew nothing. You may be sure he was not long in tracking down the hair-dresser and learning from him where he got his new powder. Next he went to the Saxon iron-master and bought from him a great quantity of the stuff, after which the chemist shut himself up in his laboratory to try out the new material. Think how excited he must have been! And think how much more excited he was when he found that this mysterious white clay was the substance for which he had so long been searching!



"HIS SERVANTS DUG SOME OF THE CLAY"

"Kaolin?" gasped Theo.

"Kaolin!"

The room was very still; then Theo stammered hurriedly:

"And what happened next?"

"Well, you can imagine the joy the discovery brought; but it was a carefully stifled joy, for with all his delight Böttger was far too discreet to allow his wonderful discovery to travel outside the confines of his laboratory. When the Elector Augustus was told the news at his Dresden palace near by he was wild with delight, and immediately began building a great porcelain factory at Meissen. By 1715 there was enough of the new ware ready to be put on sale at Leipsic; and thus our beautiful porcelain, dubbed Dresden ware in honor of the Saxon capitol, came into being. The first that was made was plain white with a decoration of vines and leaves in low relief. Later some of the dishes were made with a perforated border in imitation of the Chinese and Japanese 'grains-of-rice' pattern. Afterward the potters attempted the use of blue in a vain attempt to reproduce Nankin Blue ware."

"I guess the other countries were pretty sore when they found Saxony had learned how to make porcelain," put in Theo.

"They were greatly agitated, my son," laughed Mr. Croyden. "They begged, bribed, and schemed to find out what the new clay was; but all to no purpose. The works at Meissen were guarded day and night, and every person employed in the factory was compelled to swear to keep the great secret. Men were cautioned they would be shot should they divulge the process. *Be secret to Death* was the motto of the manufactory, and that meant not only that they never should tell anybody all their life-long; but if threatened with harm they should prefer death to betraying their trust. They must even endure torture itself rather than open their mouths. Some histories go so far as to say that in order to secure absolute secrecy only the deaf and dumb were allowed to transport the clay."

"I don't see but they were just as selfish as the Chinese."

"Quite as selfish, alas!"

"What became of Böttger?"

"I am sorry to say he never did much of anything else that was praiseworthy. Sometimes too much success spoils people. But he had done his work, and a great work, too, in launching this vast industry. When he died he left behind him a group of thriving factories. After his death the artists at the Meissen works gradually abandoned copying Chinese and Japanese designs and began inventing decorations of their own, using both gold and an increasing variety of colors. They also began to secure the aid of sculptors, among them the famed sculptor Kändler who modeled statuettes of saints, animals, birds, and persons in much the way the Dutch had done. These figures or groups, however, were more finely executed, and were beautifully colored. As the makers of them became more expert larger figures were attempted until some of them were life-sized."

"Goodness!"

"It does seem absurd, doesn't it?" agreed Mr. Croyden. "It is a childish impulse to want to make everything as big as one can make it. Nevertheless in a land where much of the population was Catholic you can readily understand how these gigantic figures readily found places upon altars in the churches of Europe. All might have gone well with this great porcelain plant had not the Seven Years' War arisen just at this time, lasting from 1756 to 1763. During this period Frederick the Great, the grandfather of the present Emperor of Germany, went into Saxony, stopped the royal factories at Meissen, and took the workmen as captives to Berlin."

"But——" began Theo indignantly.

"Such things are the issues of war," said Mr. Croyden gravely. "We cannot uphold them, nor cease to deplore their injustice. We can only pray that a day may come when the envy between nations will cease, and when each country shall respect its neighbor's rights in a truly Christian spirit. Then we shall have a world for which we shall not need to blush, and which will really be civilized."

"Did the Saxon workmen have to make Dresden china in Germany?"

"Yes. Works under the patronage of the Emperor were opened at Berlin, and here porcelain was made, the profits of which went to the Royal Treasury, the workmen being paid very little indeed. Much of the ware manufactured the monarch kept for his own use; and much of it he gave away whenever he wished to make a fine present to his friends. But so lavishly did the Saxon potters use the deposits of native clay that later the supply became poorer in quality, and as a consequence the body of the later Dresden was not so perfect as that made at Meissen. For this reason collectors set great value on the early Dresden work, that made between 1731 and 1756; also on the figures modeled by the sculptor, Kändler."

"Did the works at Berlin continue?" inquired Theo, who had become absorbed in the story.

"Yes," replied Mr. Croyden. "You see, even before the capital at Dresden was captured by the Germans and the Meissen workmen carried off, attempts had been made in Prussia to manufacture porcelain from ordinary stone. Several private business concerns as well as various individuals had put their money into the enterprise and had even met with some success. But this ware was manufactured on no very extended scale. Now, however, the Emperor was determined that his venture should succeed. Not only did he bring to Berlin the workmen and the clay, but he even sent forth the edict that no Jew in his kingdom should marry until he had purchased an entire supply of porcelain from the Royal factories. As most of the Jews were rich this law assured their master a wide sale for his product. That they did not wish to spend all this money for china and resented the order troubled him not at all. Most of these unlucky Jews bought their expensive porcelain sets only to sell them afterward to other customers, and thus get them off their hands. In this way much of the early Berlin Dresden ware found its way into Russia, where rich Russian Jews were glad to buy it. After repeated improvements the Berlin porcelain came in time to be as fine as that made originally at Meissen; and not only were the Meissen works reopened under German patronage, but the State also established another factory at Charlottenberg.

"Now, do not forget, Theo, that all this early Meissen or Dresden porcelain, as well as that eventually manufactured at Berlin, was made from hard paste, or a combination of clays resulting in what we call true porcelain. Later on I shall tell you much about soft paste wares, and about bone china. None of those varieties, however, ranks as real porcelain. Remember that only the hard paste products are genuine." Mr. Croyden paused a moment, then added: "And while we are speaking of this period in history you may perhaps be interested to know that it was a workman who escaped from Meissen into Austria who started in Vienna the art of making porcelain from hard paste."

"True porcelain," remarked Theo, who had profited by his lesson.

"Just so, son. Work in porcelain-making had been going on in Austria since about 1717; but it had been done in a small way by private individuals, who had only small capital to put into it, and who had met with little success because the ware they had turned out had been thick and muddy in appearance. In 1744 the Empress Maria Theresa purchased these works, and from that time on they began to prosper. You see, the monarchs of those days could make almost any industry a success if they once set out to do so. Not only had they the capital to back their undertaking but they could compel their subjects to patronize the venture."

Theo laughed. "I see."

"Therefore by 1785 the Empress's china factory was a very busy place which was supplying with porcelain not only Austria, but also Turkey. In 1796 Lamprecht, one of the leading animal painters of the monarchy, was decorating this ware with wonderful pictures of stags, hounds, horses, in which work he excelled. But because of the Mohammedan law that no copies of living creatures could be used for designs the Turks refused to purchase these dishes. Hence Vienna, eager to retain the Oriental trade, was forced to change its artistic trend and make instead porcelains adorned with arabesques and geometrical figures. At the present time," concluded Mr. Croyden, "there are extensive pottery and porcelain factories throughout Germany and Austria-Hungary, and much of our finest ware comes from these countries. Were you to study history you would find that many of these factories sprang up from small beginnings, and that

amid the turmoil of European strife they had a stiff fight for existence."

"I think I never considered before the effect of war upon anything but persons," remarked Theo musingly.

"Alas, the destruction war wages against human life is bad enough," answered Mr. Croyden. "But see, too, how it retards the arts and industries of the world. May the day be not far distant when nations shall find a more Christian and intelligent method of settling their differences, and when wars shall cease forevermore!"

CHAPTER IX

THE ROMANCE OF FRENCH CHINA-MAKING

he next day when Mr. Croyden put his head in at Theo's door to say good-morning he found the boy sitting up in bed eating his breakfast and his first remark was:

"How long did it take France to find out how to make porcelain, Mr. Croyden?"

The manufacturer laughed.

"I declare if you are not beginning this morning just where you left off last night!" he exclaimed. "What kind of porcelain do you mean, hard or soft paste?"

"Oh, any kind."

"You have not forgotten the vast difference between the hard and soft ware, have you? I should be discouraged if you had."

Theo shook his head.

"I don't believe you would let me forget even if I wanted to," he replied with an impish chuckle.

"I certainly shouldn't," smiled Mr. Croyden. Then he added more seriously: "Soft paste china, or pâte tendre, as it is called, was made at St. Cloud as early as 1695, and some of it was very beautiful. Such ware looks more creamy and is not so cold and harsh to the touch. It is, however, much more fragile and for that reason, although a great deal of it was manufactured, the industry never became a wide-spread success. Later soft paste was also made at Chantilly, Vincennes, Limoges, Paris, and a number of French cities. Even the celebrated Sèvres ware, the finest thing in china-making that France ever produced, was at first made from soft paste. This is easily understood when you recall that at the beginning the only clays the French knew anything about were pâte tendre clays. It was not until kaolin was discovered in 1765 and taken from the section about St. Yrieix that hard paste, or pâte dure, was made in France."

"I see."

"Nevertheless the French people got wonderful results from their pâte tendre, and became wildly enthusiastic over the pieces the china-designers turned out. And well they might for the French were an inventive, art-loving people who certainly got fine results from their early china-making. To understand the place art occupied at that time you must remember that the Court was a centre for all those who were interested in beautiful things. The King was ever on the lookout for what was novel or artistic, and ready to give it his patronage; and whatever the King patronized became the fad among the rich, idle courtiers. So when the King turned his attention to the new art of china-making its success was assured; as a matter of course all the rest of the fashionable world did the same."

"It was a good fashion."

"A very good fashion. Often a monarch's patronage of arts and letters called public attention to a praiseworthy production that might otherwise live unrecognized for years. I sometimes think that in our day it would be a fortunate custom if more persons of influence would give thought and money to elevating the arts to their rightful position of dignity. The old custom of placing

artists and scientists beyond the stress of financial worry is not a bad one. Such persons are benefactors of the race and should be endowed that they may work more freely. That is practically what the kings and emperors of the past did for some of our great writers, artists, and inventors. That is in reality what King Louis did for the newly-born china-industry. When between 1740 and 1750 a company was formed at Vincennes to make pâte tendre, the King himself contributed to the venture 100,000 livres for its encouragment."

"How splendid!"

"It meant prosperity for France if the undertaking succeeded, so the act was not perhaps as unselfish as it seems; however, such a donation was of course a great spur to the workmen, who immediately began making not only dinner-sets and ordinary dishes but all sorts of fantastic and beautiful things. They fashioned colored statuettes, vases of fanciful pattern, and an abundance of most exquisitely modeled flowers. How such fragile products as these latter could be fired without injury was a marvel. Among other presents which the china-makers gave to the Queen was a vase three feet in height containing a bouquet of four hundred and eighty of these flowers, each one carefully copied from nature. These china flowers promptly became the rage. Two bouquets of them, each costing 3,000 livres, were made for the King and the Dauphin; and these remain to this day in one of the French museums. The work of this period all reflects the nation-wide enthusiasm for these china flowers. Statuettes were made with a central figure surrounded by them; there were shepherds and shepherdesses seated beneath arbors or trellises covered with the daintiest of vines and blossoms; figures of court ladies at whose feet masses of lovely flowers seemed growing. You can see some of this work in our own museums, and I am sure you will agree with me that it is little short of miraculous. The Art Museum at Boston has three very fine specimens of these early French ornaments, and there are others to be found elsewhere."

"I am going to hunt some of them up when I go home to the city," affirmed Theo.

"That's right! See all you can of the beautiful things the past has given us; you never will be sorry," declared Mr. Croyden. "Now you can imagine with a background of such progress at china-making, what a furore and transformation followed when kaolin was discovered. Pâte dure was far more desirable than pâte tendre, for it was much less breakable. The works at Vincennes where Sèvres china really had its birth were now moved to Sèvres itself, where the art of porcelain-making was gradually perfected. The plant was not far from Versailles, where the Royal palace was, and the industry immediately came under the control of the King.

"Then there was excitement indeed! Money was poured in lavishly that the infant venture might have every chance to grow. The King ordered beautiful gardens to be made about the factories, and not a week passed that he and Madame de Pompadour did not visit the works accompanied by a train of nobles and ladies of the Court. Madame de Pompadour, herself something of an artist, often touched up the decoration on a bit of china that pleased her fancy. Professional artists also lent their aid, their designs ranging from the shepherdesses of Watteau to copies of Chinese and Japanese scenes. Flowers, cupids, garlands, landscapes—never was such a diversity of decoration attempted as during the reigns of Louis XIV and XV. As a result the output became very overdone and ornate. Fortunately for art, Louis XVI had better taste. Instead of continuing this garish type of design he procured a collection of Greek vases to serve as models for his workmen, and as a result the product came back to a more classic and less florid style."

Mr. Croyden paused.

"With all this beauty in the body of the porcelain itself, and all the wonder of the modeling and painting, you must remember that throughout the period the chemists employed were making great strides in the use of pigments. No little science was necessary to find colors that would stand the intense heat necessary for firing this hard paste. You know of course that most of the mineral pigments used to decorate china do not look at all the same after they have been subjected to a high temperature as they look before. Many colors which fire out to exquisite tones look quite ugly when applied to the biscuit clay. Both chemists and artists have to be skilled in the knowledge of how these paints will react under heat. So when I say the Sèvres workers reached a richness and harmony of color never before known in china-making you can imagine how much patient experimental labor probably preceded this triumph of art."

Theo's eyes had not left the story-teller's face for an instant.

"It was not as if the painters used only a touch of color here and there," continued Mr. Croyden. "Much of the ware was designed with a solid color that covered the body, small spaces being reserved for medallions in which there were heads or landscapes. The gilding, too, was very heavy, and sometimes in combination with it imitation gems were used. At the present time a color known as Rose du Barry brings the highest price in old Sèvres. Other famous colors in which the French china-makers excelled were Bleu Roi, which was made from cobalt——"

"King's blue," murmured Theo.

"Bleu Celeste, a turquoise blue made from copper——"

"Sky blue!" put in Theo.

"There was also a rare canary yellow; an apple green; a fine tone of violet; and a bright red that had not been seen before in the china world. So intense was the interest in the Sèvres

factory that even when the French Revolution came and every relic of royalty was destroyed by the hooting mobs, the Sèvres works were not touched. You see in what a magic realm the old Sèvres ware had its being. We call everything dating up to 1800 *Old Sèvres*, and you will probably find it so marked in both public and private collections."

"Is Sèvres ware still manufactured?" questioned Theo, stumbling timidly over the French word.

"Yes," answered Mr. Croyden, "there is a modern Sèvres, much of the success of which is due to Alexandre Brongniart who was both a geologist and chemist, and who was the director of the Sèvres factories from 1800 to 1850. He did much to perpetuate the industry and keep up its standard. During his time no piece with an imperfection in it was allowed to go out from the factory."

"Was Sèvres the only famous ware the French people made?"

"It is undoubtedly the most celebrated," replied Mr. Croyden, "but there are now many other fine porcelains made in France. For example at Limoges, where in 1775 pâte tendre was made, there is a very extensive porcelain plant founded in 1840 by David Haviland, an American, from which quantities of pâte dure or genuine porcelain for the American market are annually turned out. Much of the other French china, however—dainty, exquisite, and artistic as it is, is pâte tendre. It is of course sold in quantities, but it is very perishable. There is also a so-called porcelain made from a mixture of clays and phosphates—a ware known to the trade as *bone china*. But of course this variety is not real porcelain. You see that much of what we call porcelain is not porcelain at all when you judge it by this strict standard. It is nevertheless very useful, and a hungry boy like you can manage nicely to eat his breakfast off it and be quite as happy. Now give me your tray and I'm off. There will be no more china-making to-day, you young scoundrel! See how long you have cajoled me into lingering already. You almost made me forget that I was going fishing."

With a friendly pat on the boy's shoulder Mr. Croyden disappeared.

CHAPTER X

HOW THE ITALIANS MADE CHINA

or the next few days Theo was in no frame of mind to talk porcelain or any other serious subject, for his new crutches came, and after Dr. Swift had adjusted them the boy was like a bird freed from its cage. He could not, to be sure, go far from the house; but even to clump up and down the veranda and the plank walks that connected the cabins was a joy. How good it was to get about once more! But, alas, the pace at which the convalescent moved was a constant source of alarm to all who beheld it. Before the expiration of the first day Theo had acquired such skill and speed that he hopped about like a sparrow. There was no such thing as stopping him. He felt bound, however, on his father's account to use some caution, and the realization that he had already caused trouble enough was a potent factor in restraining his fearlessness. Each day saw a gain in his condition, and it was evident that before long the injured leg would be as good as new.

Yet the exasperating hardship of having still to remain a captive in the camp had to be endured. In the meantime the date for the return home drew nearer and as the hours of the vacation shortened Theo's determination that his father should enjoy every possible moment of the time increased. So he was plucky enough to be as careful as he could, and while the Doctor and Mr. Croyden fished he invented for himself such amusements as were practical within his own more limited confines.

Perhaps, although he did not appear to notice this, Mr. Croyden fathomed the lad's unselfish intention more completely than did any one else. However this may be, certain it was that in spite of his sorties from the camp the merchant contrived to devote a part of every evening to Theo, whose father was occupied in writing a medical paper to be read before some convention on his return to the city. To these evenings with Mr. Croyden the lad looked forward eagerly. They were

the bright spot in the day. The talks the two had together usually took place in Mr. Croyden's cabin before the open fire where the china-makers could converse freely and not disturb Dr. Swift. Such a genuine friendship between the boy and the elder man had sprung up that it would have been difficult to tell which of them anticipated this bedtime hour the more.

"Do you realize, Theo, that we shall not be having many more of these talks?" observed Mr. Croyden one evening as they sat cozily ensconced before a roaring blaze. "The last of the week we shall be starting back to civilization—to starched collars and cuffs, and the rush and hubbub of city life. For you I suppose it will mean school again; and for me it will be a matter of wading through a mountain of business correspondence that has been accumulating while I have been away. We shall miss these cozy evenings together, shan't we?"

"I certainly shall, Mr. Croyden," answered Theo earnestly.

"Well, I do not mean they shall die out altogether," Mr. Croyden affirmed cheerfully. "My plan is to have you come over to Trenton and make us a little visit when you get stronger. Would you like to? We'd go all over the china factories, and you could see porcelain made at first hand. What do you think of the scheme?"

"I'd like it better than anything else," cried Theo instantly.

"It's settled, then," replied Mr. Croyden. "I fancy your father and mother will be willing to lend you to me for a little while. You see, Mrs. Croyden and I both enjoy young people very much and we have none at home. We are particularly fond of boys, and like nothing better than to borrow one now and then. If you come you run the risk of our forgetting to return you; but I guess your parents will see to that," he concluded with a merry laugh.

"I rather think they will," replied Theo with a smile.

"Trust them for that," said Mr. Croyden. "You'd make no mistake to go back, either, for you have a mighty fine father, sonny."

"Father's—well, he's *all right*!" declared Theo tersely but emphatically. "So is Mother! You must meet Mother some time. She's a peach!"

"The vacation has done your father a world of good, Theo," reflected Mr. Croyden, looking into the embers. "Do you realize how much better he looks? He is much less nervous and tired."

"I hope so, sir," came heartily from Theo. "I have wanted so much not to spoil his vacation, for he needed it badly."

"I am sure you have not spoiled it," put in Mr. Croyden quickly. "You can consider that in sending a doctor back to his job in A 1 condition you have done your bit to help the war. Doctors are among our most useful and necessary men."

"I know it," Theo returned. "Mother and I are tremendously proud of Father. We feel he is doing a lot of good in the world. I guess now I'll feel that way more than ever for I never knew what it was to be sick before."

There was a long pause, broken only by the velvety rustle of the logs burning in the chimney; then Theo remarked abruptly:

"Aren't you going to tell me anything about china to-night?"

"Do you wish me to?"

"Of course I do; that is, unless you are too tired."

"I'm not tired at all," responded Mr. Croyden. "I thought you might be the tired one."

"I!"

"Not bored?"

"Not so you'd notice it."

"All right, then; only you'll have to let me think a minute," said Mr. Croyden. "Where did we leave off?"

"You had been telling me about Sèvres ware and other French porcelains."

"Oh, yes! Now I remember. Well, as you can imagine, after kaolin was discovered the secret gradually leaked out, and everybody went to work at making china. Kings, emperors, and princes; nobles of high birth, all took up the art with zest, spending great sums of money on fabriques, as the porcelain factories came to be called. In Florence Francis, one of the Dukes of the Medici, built a tiny laboratory in the garden of the Boboli palace and there made a rude ware, some of it hard paste and some of it soft. This was even before the St. Cloud works were opened, and certain historians say that this was the first true porcelain made in Europe. At a much later period (about 1735, to be exact) the Ginori family, another titled Italian household of wealth and position, owning estates just outside Florence, took up porcelain-making, even sending ships to China for the necessary clay. Fancy it! And to show you how highly this industry was esteemed I will add that the Marquise himself superintended his workmen and helped in manufacturing this Doccia ware, as they styled their output."

"Did this happen during the Renaissance?" inquired Theo timidly. "It sounds as if it might have.

Mr. Croyden nodded, cordially, much gratified by the lad's understanding.

"That was just when it happened," he said. "In the meantime, at about the same period, a beautiful soft paste called Capo di Monte was being made down in Naples under the patronage of Charles IV—the Charles who afterward became Charles III of Spain. Like the rest of royalty this King became absorbed in china-making—so absorbed that he went frequently to work in his factories himself, and each year held a sale of his products at the gates of his palace; whenever a piece was sold a record of it was made and later the name of the purchaser was reported to the King."

"I suppose he, too, made the nobles buy his china," laughed Theo.

"I am afraid he did," agreed Mr. Croyden. "At least it was a fact that he showed especial favor to those who did buy it, which was practically the same thing. I think I forgot to tell you that the French kings also forced, or perhaps I should say expected, their courtiers and ladies to purchase Sèvres ware. It was a custom of the time."

"I think it was a rotten custom!" ejaculated Theo wrathfully.

"Certainly it was not a desirable thing. In our day we should call it graft. Still at that time there were plenty of people who were only too anxious to keep their heads on their shoulders, and who would have been glad to buy almost anything in order to do so. Doubtless they considered a little porcelain a small price for their lives, and were glad to win the favor of a capricious monarch by purchasing it. King Charles was no worse than all the rest. Later, when he became ruler of Spain, he took many of his Italian workmen there with him, and as a consequence in 1821 the Naples fabrique was closed; many of the moulds, as well as much of the outfitting, was sold to the Doccia works. As a result Capo di Monte was afterward imitated in Doccia hard and soft paste; but the original ware which is of value to collectors was that made at Naples. It is very difficult to distinguish this variety, for the Doccia people even copied the King's trade-mark."

"I suppose people could do that then," ventured Theo.

"Oh, yes. There was nothing to protect an invention as there is now," replied Mr. Croyden.

"Did King Charles continue to make porcelain in Spain?"

"Yes, he had a palace called Buen Retiro and here he established fabriques that continued to thrive even up to the time of King Ferdinand in 1780, and would probably have prospered much longer had not the Napoleonic wars come and the French destroyed the factories."

"And what became of the Doccia works in the meantime?" queried Theo.

"I am glad you asked that question," answered Mr. Croyden, "for I had not finished speaking about the Doccia fabrique. It was unique in its management. You know in our day how much we hear of proper factory conditions? Doubtless you have seen mills where there are neatly graded lawns, flower-beds, and perhaps a recreation ground. We consider such mill-owners very progressive and speak of them with keenest approval. Yet in our enlightened times such things are none too common. Now it is interesting to know that this Ginori family who founded the Doccia porcelain works were far in advance of anything we yet have done for our employees. Not only did they have lawns and gardens for their workmen, but they also had a park; a farm where vegetables were raised for the common good; a school for the workmen's children; an academy of music where all could go to concerts; and a savings-bank in which earnings could be deposited. What do you think of that for progressiveness?"

The boy's eyes opened wide.

"I guess we're not so civilized as we think we are," he remarked soberly.

"We are not the only people who ever lived—that's sure!" retorted the Trenton man grimly. "As you can well imagine, the men under the Ginori were very appreciative, and as a mark of their gratitude for all this kindness they set to work and made for the Ginori chapel beautiful porcelain monuments as a tribute to the dead and gone Ginori nobles. They also made a marvelous high altar all of porcelain, with magnificent candlesticks, fonts, and statues—a wonderful embodiment of their skill as well as their devotion."

"It must have taken some clay!" exclaimed Theo.

"I guess it did," Mr. Croyden assented. "Aside from this work the output of the Doccia fabrique was largely imitative. They made so many copies of Sèvres, Capo di Monte, and Majolica that it soon became a great problem to tell the real from the imitation, and this has caused collectors no end of trouble."

"Was no other porcelain made in Italy?"

"Yes, as far back as 1515 pottery, as I told you, was made in Venice; and with the discovery of kaolin Venetian merchants imported the true clay which did not exist in Italy, and manufactured both hard and soft paste. But the industry was never a success because the expense of getting the material was so great. In 1753 the Germans, because of the cheapness of Italian labor, tried

making porcelain there, thinking that they could furnish their own clays at slight cost. But the scheme was a failure. There was, however, some imitative work done later by a potter named Cozzi which was very good. But Italy has never excelled in china-making as she did in the making of glass because she had not the material to do any very extensive work. There has, to be sure, been a scattering of porcelains turned out—some from Turin; some from Treviso; and some from other cities. But aside from the Majolica pottery, and Delia Robbia's terra-cottas, Italy has not made any distinctive contribution to the china-making art. Still she has done so much in almost every other art that she should rest content. One cannot excel in everything."

"Some of us never excel in anything," laughed Theo.

"Some of us excel in falling off roofs and breaking our legs," chuckled Mr. Croyden teasingly. "And some of us excel in being very patient about it afterward," he added, patting the boy's shoulder affectionately.

CHAPTER XI

OUR ENGLISH COUSINS

ll too soon the time came when grips had to be packed, tackle stowed away, and the campers start out over the carry to meet the train that was to take them to New York. The trip was a long and tedious one of two days' duration. Nevertheless our travelers did not find it wearisome. On the train were papers and magazines in plenty, and whenever Dr. Swift went into the smoking car Theo always found Mr. Croyden near at hand and willing to talk.

"And when Mr. Croyden is around no place could be dull or stupid," affirmed Theo to his father.

"I believe I shall begin to be jealous of Mr. Croyden, Theo," laughed Dr. Swift good-naturedly. "I am coming to fear that if you go to visit him as he wants you to, you never will come back home."

Theo smiled.

"You can't lose me so easily, Dad," he answered. "Just the same, I know if I do go and visit the Croydens I'll have a bully time. But I'd like to wait until I get rid of these crutches so I won't be a bother to anybody."

"That is wise. I should not feel easy if you started out on a visit before you were quite well," replied Dr. Swift. "However, it won't be long now before you can cast your crutches into the rubbish heap. In the meantime your own family can have a visit with you. I rather fancy your mother will be thankful to have you home again; she has been pretty anxious about you. No mother likes having her boy where she cannot get to him when he is ill."

"But you were there, Dad."

Dr. Swift smiled into the eyes that met his.

"Yes, I was there, to be sure," he assented. "But a doctor is not necessarily a good nurse."

"I don't see how anybody could be a better nurse than you, Father."

The Doctor shook his head.

"I'm afraid I did not fuss much over you," he answered. "At least I did not smother you with attention the way your mother would have done. You got no spoiling from me. I expect, though, that when your mother gets hold of you she won't be able to do enough for you. I can see her to-day flying round the house ordering all the things you like to eat, and getting everything ready for your coming. I shall have no attention at all."

Theo beamed.

"You will have all the attention you want, and more too, Dad, I guess," he remarked drily. "Probably a string of patients as long as this car will be waiting to pounce on you the minute you set foot in New York."

"I expect so, son. However, I shall not begrudge that sort of a welcome now, for I feel like a fighting cock.

"You really are rested, aren't you, Father?"

"I am like another man," was the vehement reply. "I was about all in when we went into camp. Thanks to you and Mr. Croyden I have had a fine chance to pull myself together and prepare for whatever comes next. You have been very thoughtful and unselfish, Theo, in leaving me free to get all I could out of my vacation. It has meant everything."

"I wanted to help you, Dad."

"You've certainly proved that, my boy. I've appreciated every bit of it."

A quick glance passed between the two.

They understood each other very well, Theo and his father.

"Here is Mr. Croyden," observed Theo. "He has been getting off some mail and telegrams."

"That is precisely what I must do," declared the Doctor rising. "I'll leave you to have one of your china-making talks while I am gone."

As the Doctor passed through into the next car Mr. Croyden sauntered down the aisle and dropped into the seat he had just vacated.

"There," announced the merchant with a satisfied sigh, "I have done my duty. I have sent off three telegrams and a lot of letters. How funny it seems to get busy after being so idle! Next week will see us all back at the grind, I suppose, and rushing about as if we had never been away."

"Are you sorry?"

"No," was the hearty response. "I like to play when I play; but I like also to work. I enjoy my business very much. It is an interesting and useful one, and I like to think that in my small way I am helping to furnish the world with things that are necessary, and tend toward comfort and convenience as well as toward beauty. People cannot get on without dishes—you and I have proved that."

"Not unless we all go back to being savages," said Theo humorously.

"We shall not do that, I hope," returned Mr. Croyden gravely. "Each century should see the race farther ahead—a more honest, kindlier, Christian nation. That is the motto we must bring with us out of this war. Not more territory, more money, more power; but truer manhood and purer souls. If the conflict does this for our people all the sacrifice and loss of life it has meant will not have been in vain. Out of the wreck a better America should arise, and we each must help it to arise—you as well as I, for we need not only good men and women but good boys and girls, if we are to have a fine country."

"A boy can't do much toward it, I'm afraid," Theo said.

"On the contrary, a boy can do a great deal," replied Mr. Croyden. "It is the boys of to-day who are going to be the men of to-morrow; and there is no such thing as suddenly becoming a good man, any more than there is such a thing as a seed suddenly becoming a full-blown plant. Everything has to grow, and grow slowly, too. So if you wish to be a wise, honest citizen who will help forward this glorious country we all love so much, you want to be setting about it right now, you and every other boy. And you want to go at the work earnestly, too, for you will be a man before you know it.

"It looks a long way off to me now," mused Theo.

"Such things always do; but time flies pretty fast. You will find yourself in college the next thing you know; and after that you will be beginning to plan your career. What are you going to be, Theo?"

"I don't know, sir," was the uncertain answer. "I'd just like to do something that really needs to be done; something that people cannot get on without."

"That is a splendid ambition," came heartily from Mr. Croyden. "I thought perhaps you'd be thinking of taking up your father's job."

"I be a surgeon!" gasped Theo.

"Why not?"

"Oh, because I'd be no good at it," the boy said. "I should never know what to do with sick people. I'd be scared to death. It seems to me now that I would rather go into making something; but I do not just know what."

"You want to be a business man, eh?"

"That is what I'd rather do.

"Humph!"

There was an interval of silence; then Mr. Croyden said:

"Well, if when you are through your education, Theo, we are out of this war and you are still of the same mind, you come to me. Who knows but you might end your days in my factories?"

The boy's eyes sparkled.

"Croyden and Swift—how would that sound?"

"It would sound all right," chuckled Theo, "but I am afraid the sound would be the best part of it. Why, I'd never be able to learn all you know about china if I lived to be a hundred years old."

"Aren't you learning things about china right now? Haven't you already learned about the pottery and porcelain of almost every nation under the sun?"

"I have liked to have you tell me about it," replied Theo modestly.

"Well, isn't that making a beginning?" queried the pottery merchant. "We have discussed the china output of almost every country, haven't we?"

Theo reflected.

"All the big countries except England."

"How did we happen to leave England out?"

"I guess you did not have time to get round to England," answered Theo. "Still all the time isn't gone yet, you know; you might tell me about England now."

They both laughed.

"I believe you are something of a diplomat, Theo," observed Mr. Croyden. "You are either a diplomat or you are a schemer. Sometimes it is very hard to tell the one from the other. In either case you seem determined to give me no peace, so I fancy I may as well tell you about English porcelain and have done with it. If I do not do it now I shall have to do it some other time, I suppose."

"I suppose you will," came delightedly from Theo.

"Well, here goes, then!"

The elder man settled back into a comfortable position and Theo wriggled contentedly into the opposite corner of the seat.

"As you can well understand," began Mr. Croyden, "the discovery of kaolin set England as eagerly to experimenting at porcelain-making as it had the other nations. Contrary, however, to other countries the English Government lent no helping hand to the industry, offering neither money nor inducements to those who would take it up. Therefore only those persons who were sufficiently interested in the new venture, and could afford to make the attempt with their own capital, dared go into it. Fortunately there were at hand some of these ambitious manufacturers. Their early experiences are interesting not so much because of the quality of their work though much of it was good, as because they were the forerunners of later workers. The paste they used was not as fine as that of the Chinese or Japanese; or in fact, that of the early Dresden or Sèvres ware. Gradually, however, it became better, until now—although England turns out almost no true porcelain, that is, the scientifically blended kaolin and petuntse clays—she makes some of the most beautiful and durable china manufactured anywhere.

"What is it made of?" inquired Theo, much puzzled.

"Different combinations of kaolin clays and phosphates; a ware which in the porcelain trade is known as bone china," replied Mr. Croyden. "The phosphate of lime that is mixed with the kaolin renders the body of the ware more porous and elastic. On such china the glaze does not blend with the body and become an actual part of it as is the case with a true porcelain, but on the contrary is an outer coating which can be scratched through. But bone china is very strong, and does not chip as does a more brittle variety. For that reason where wear and durability are desired it is often preferred."

Mr. Croyden stopped a second.

"When I tell you these facts you must not think I am crying down the English wares," he said. "I could show you beautiful varieties of English porcelain. I merely wish you to understand that it has not the qualities of the Chinese, Japanese, Sèvres, Dresden, or even the more modern Limoges ware. But what it loses in delicacy and translucence it makes up in strength, and perhaps after all strength is as desirable as any other quality."

"Didn't the English ever make any real hard paste china?" asked Theo.

"It is said that between 1730 and 1744 they did make some; and this product is supposed to be the only true porcelain ever made in England. It was manufactured at Stratford-le-Bow, and where do you think the clay for it came from? Strangely enough from our own State of Virginia.

You can imagine the expense of bringing the clay across the Atlantic. This ware known for convenience as Bow became very popular. The first of it was hand-painted, but later the designs were transferred, and the product became cheaper. Not only were tea sets made, but also a great number of china figures of birds, animals, and shepherdesses; there were even some statuettes of celebrities of the time, which remain as an interesting record of the costumes of the period. Owing to the fact that much of the Bow china was unmarked it is frequently confused with the soft ware made at Chelsea, which was also of early English manufacture."

"Did the Bow factories continue?" asked Theo.

"About 1775 the Bow works were merged with those of Derby; and in 1784, the Chelsea fabrique was also absorbed by the Derby company. Derby china, especially Crown Derby, you must remember, is one of the finest of present day English wares. About 1777 these factories came under the patronage of King George III, at which time the term Crown Derby was bestowed on the product."

"Then an English king did help in English porcelain-making after all!" exclaimed Theo.

"To a certain extent, yes," answered Mr. Croyden. "The English nobility, too, patronized the royal factories. The ware was so beautiful perhaps people were only too glad to do so. There were plates with deep borders of solid rich color, frequently adorned with heavy gold work; and there were vases, pitchers, and bowls of magnificent hue. In fact, the use of blue and gold was brought to a greater perfection in this ware than ever before, and it established for the makers a wide-reaching reputation. Possibly this reputation might have remained preëminent had not the short-sighted manufacturers begun to sell at a lower rate their imperfect pieces, or seconds. Great quantities of these flooded the market and immediately the fame of the ware decreased."

"What a pity!"

"Since then this erroneous policy has been corrected in so far as has been possible; but the blot on the history of the Derby porcelain remains, proving that a firm that values its standing should never allow imperfect products to go beyond its doors. William Cookworthy, who, by the way, made the Bow china and who lived at Plymouth, England, in 1760, finally discovered deposits of true kaolin at Cornwall, and of this material made some more true porcelain; but unfortunately much of it was injured in the firing. His workmen did not understand the difficulties and dangers of exposing the ware to the extreme heat. But this Plymouth ware held an interesting place in the development of English china-making.

"Did the Plymouth works grow and become larger?" asked Theo.

"Alas, much beautiful porcelain, copied to a great extent from Chinese and Continental wares, was made there, but the expense of turning it out was so great that poor Cookworthy sunk a fortune in the enterprise. However, the venture was not without its fruits, for out of the Plymouth fabrique developed that of Bristol, and later that of Shelton, or New Hall. All of these plants manufactured hard paste chinas. At Bristol in 1774 a wonderfully fine tea and coffee set was made for Edmund Burke, the renowned English orator. In the meantime all over England small fabriques were springing up. At Pinxton, Swansea, Coalport, Liverpool and Rockingham; most of these factories made soft paste chinas. Then came an innovation. One of the most perfect of English porcelains, known as Spode, was produced by combining with this type of paste pulverized bones."

"Bones!"

"Yes. It seems a strange idea, doesn't it? But it was a great discovery, and one that has been generally adopted and used ever since by the principal china-making firms of England. The bone element, or phosphate of lime, as it is more properly termed, imparts both strength and elasticity to the china. Minton ware, first made in 1791 and now extensively manufactured in England and sold throughout the china-buying world, is one of these bone chinas. It is a great favorite because of its durability as well as its beauty. There were in addition many other very fine chinas made in England—far too many of them for me to enumerate. One was the Lowestoft, made from about 1756 in soft paste, and in 1775 in hard. Much of it is in imitation of the Chinese, although some was decorated with roses, and some with landscapes or coats of arms. As it had no mark upon it it is now difficult to be sure of the genuine ware. Moreover, a large amount of the white porcelain, it is said, was sent from China to Lowestoft to be decorated, and therefore the body of it is of Oriental and not English make. Worcester is another of the celebrated soft paste chinas, which at first copied Oriental designs, and later branched off into imitations of Dresden or Sèvres wares. It is still made and widely sold."

"It seems as if a great many of the English wares were copies of somebody else's work," remarked Theo.

"I am afraid they were," owned Mr. Croyden. "England was not rich in originality of design. The work of Wedgwood is the only distinctively inventive contribution made to the china-making art. However, the English bone porcelains are very beautiful, and though they are not genuine feldspathic products they are highly esteemed and in demand everywhere. Now you must own, Theo, that I have given you a pretty complete outline of the pottery and porcelain-making of the European countries. Holland and Belgium, as I have told you, lack both clay and fuel and therefore had not a fair chance to compete with the other nations; but they did make some little porcelain. Sweden also turned out a little. Denmark gave a real contribution to the world in its

Copenhagen ware, a type of white porcelain decorated beneath the glaze in cobalt. The fabrique for making this china was opened as early as 1760 but it never paid, and in 1775 the Government took over the works and it became a royal factory where women of rank and position joined the artists in designing and decorating the porcelain. The undertaking, however, proved so expensive that in 1876 the factories went back into private hands. But the porcelain has become world-famous and holds its place in the list of the distinctive chinas of the art universe. Look up Royal Copenhagen some time, and see how beautiful it is."

"I will," nodded Theo. "But in all this china-making did Russia do nothing?"

"Russia made her try," Mr. Croyden said. "Peter the Great was an ambitious ruler who traveled the Continent over to see what other countries were doing in the way of commerce and manufacture. When he returned from one of his pilgrimages he made the people build a new commercial and industrial centre—St. Petersburg, now Petrograd. Here he set his subjects to making all sorts of artistic things such as he had seen in Europe, especially brass, copper, and silver articles. From 1744 to 1765 under the Empresses Elizabeth and Catherine II a little really fine hard paste was produced. It was a porcelain in imitation of Dresden; but there never was very much of it manufactured. A little Russian porcelain was also made at Moscow and Poland. The Russians never excelled in pottery and porcelain-making, however, as they did in metal work."

Mr. Croyden rose.

"See," he said, "here comes your father! That means that we must bid good-bye to china-making for to-day. I fear we shall have to say good-bye to it altogether, too, for by to-morrow morning we shall be getting into New York and separating for home. But you are not to forget, Theo, that I want you to come to Trenton the first minute you are rid of these crutches. Then I shall tramp you through my factories and you shall see how all this porcelain we have talked of is made."

"I shall be mighty glad to come," responded Theo.

"I must leave it to your father's discretion, then, to notify me when he thinks you are able to make the visit," added the merchant, turning to Dr. Swift who had just joined them. "You just telephone me, Doctor, when you think you can spare this boy of yours; will you?"

"You are very kind, Croyden."

"Not a bit! Not a bit!" protested Mr. Croyden. "I shall want to see Theo, and I am anxious to have Mrs. Croyden meet him too. I only wish we had a boy just like him; then I'd have somebody to leave my business to."

He drummed on the window moodily.

"Who knows but I may be coming to help you make china one of these days, sir," suggested Theo half jokingly.

The man wheeled sharply.

"I wish I thought you would," was his quick response. "If at the end of your college career you find yourself with any such notion, sonny, you'll be very welcome."

With an affectionate glance at the boy Mr. Croyden strode off into the smoking-car.

CHAPTER XII

THEO MAKES A PRESENT

There was great rejoicing when Theo and his father reached home. It seemed as if Mrs. Swift could never do enough for her boy. The whole house was turned upside down to make him comfortable, and on the dinner table were all his favorite dishes.

"To see your mother, Theo, anybody would think you were a fragile invalid just out of

the hospital rather than a husky young camper returned from the woods," growled the Doctor. "My dear," he continued, addressing his wife, "Theo hasn't had as much attention as this in all the time he has been ill. Croyden and I have not pranced round after him, I assure you. He has had to brace up and bear his troubles like a soldier; and he has done it, too."

"I suppose soldiers do have to be pretty patient," remarked Theo meditatively. "I never thought before how hard it must be for them when they are hurt."

"It is one of the great tests of courage," said Dr. Swift. "We all are liable to think of soldiers only when the drums are beating and the flags flying. Then it seems a very easy and pleasant thing to be a soldier. But there is much more to it than that. A great deal of drudgery is attached to a soldier's life, and frequently a great deal of suffering. One of the tests of a hero is to be patient when there is nothing to do but await orders, or perform some menial and uninteresting task, or lie tossing on a sick-bed. Then you find out very quickly the sort of stuff your man is made of. Those who fight are not the biggest heroes. Often the noblest and most helpful men are those who themselves are not only cheerful under monotony and dullness, but aid their comrades to be so. Therefore, Theo, when you took it upon yourself to bear your troubles in the Maine woods bravely you proved you had the first essential of a good soldier."

Theo flushed with pleasure.

"That is why we cannot have your mother undoing your virtuous deeds," continued the Doctor whimsically. "We must make her realize she has a man and not a baby to deal with. Theo is no invalid, Louisa. On the contrary, he is going right to school to-morrow."

"Not with those crutches!" protested Mrs. Swift.

"Why not? He has the term to finish, and certainly you would not have him flat out on his job when the end is in sight. It is only a few weeks to the last of June. The fishing trip was a vacation; and if he got more vacation out of it than he calculated," went on Dr. Swift with a twinkle in his eye, "why, so much the better. He is that much to the good."

"I'd rather finish my school year, Mother," rejoined Theo.

"Well, apparently it is two against one," smiled Mrs. Swift. "Your father is, of course, a far better judge of your condition than I. Broken bones are in his line. But do be careful, son, and not go skipping on and off cars when they are moving, or doing things that are going to worry me."

"Rest easy, Mother. I'll promise not to take any chances," Theo replied promptly. "I am far too eager to get well. It is no fun to be hobbling about. Besides, I want to be in trim to go to the Croydens as soon as school is over."

"Your father says Mr. Croyden was very kind to you while you were in camp."

"He was bully!"

"It would be nice if you could do something to show that you appreciated it," observed Mrs. Swift vaguely.

Instantly Theo caught at the suggestion.

"I wish I could!" he declared. "Can't you think of something, Mother?"

Mrs. Swift paused a moment.

"It would be of no use to do anything unless it was something you did yourself," she said at last. "Of course your father and I could give you the money to buy a present; but after all that would be our present and not yours."

"Oh, a gift we bought would not be of the slightest use," cut in Dr. Swift. "It would spoil the whole idea. Either Theo would have to purchase something with his own money——"

"I have only saved a dollar out of my allowance," interrupted Theo dubiously.

"Or he would have to do something, or make something, for Mr. Croyden," concluded the Doctor.

"I don't see what I could do," mused Theo.

"You couldn't make anything, son?" asked his mother.

"Nothing good enough," responded Theo, shaking his head.

"Don't they teach you how to make anything at school?"

"No, sir."

"All head and no hands, I suppose," retorted Dr. Swift scornfully. "That is the way with our modern educational system. It is a poor plan on which to bring up a boy. I wish I had realized it before. Louisa, why didn't you see to this?" blustered the Doctor.

"You picked out Theo's studies yourself, my dear."

"I?"

"Certainly. You took the outline and checked off the things you wished Theo to take this year."

"You did, Father," put in Theo.

"When did I do it?"

"Oh, one day when you were on your way to a hospital meeting," answered the boy. "You were in a hurry, and you stood out in the hall and marked the list with your fountain-pen."

"Then I am heartily ashamed of myself," confessed Dr. Swift candidly. "I had no right to do anything of the sort. I should have sat down and put some thought into the matter. Do you suppose it would be too late, son, for you to change your course of study this term?"

"I shouldn't want to change it much, Dad," replied Theo. "I'd be sorry to give up any of the things I am taking, for I have worked hard at them and it would be discouraging to have my time all thrown away. But perhaps now that I am knocked out of athletics I might put those extra hours into something else. Some of the boys take sloyd."

"The very thing!" exclaimed the Doctor. "Manual training is just what we're after. You would enjoy it, too."

"I don't know whether I would or not, Dad," returned Theo frankly. "I never was much good with tools. I like athletics better."

"That is because you have never learned to use tools properly," said his father. "Where do you suppose I'd be now if I hadn't started out when I was a boy to tinker round a farm? That's where I got my manual training, and there isn't a course in the country that can equal it. I had to use my brains, too, as well as my hands, for very often the things I needed were not to be had and I was forced to make something else do. It was a great education, I can tell you! What skill I have at surgery I attribute largely to that early training. Now we'll set right to work to remedy this lack in you, son. I'll see your principal to-day and arrange for you to begin sloyd when you go back to school."

Theo made a grimace at which his father laughed.

"If you don't like it you can at least take it as a medicine," remarked the Doctor with a grin.

Dr. Swift was as good as his word, for when Theo returned to school the following day he found that in addition to his other work he was expected to spend an hour each morning in the carpenter's shop, a realm toward which he had always maintained the keenest scorn. It seemed such a foolish thing to learn to saw and drive nails! What was the use of taking lessons? When a board was to be cut what was there to do but take the saw and cut it? It was easy enough. As for driving nails—that feat required no teaching.

But to Theo's amazement it needed only the first lesson to demonstrate to him that these superficial conclusions were quite wrong. It was one thing to cut a board haphazard; but quite another matter to cut it evenly, and on a ruled line. Nor was the driving of nails as simple as he had supposed. At the end of the first hour Theo, feeling very awkward and clumsy, and rubbing a finger that had been too slow to get out of the path of the hammer, left the workshop.

"I never dreamed it would be so hard!" he muttered, viewing his bleeding knuckle with chagrin.

The lesson of the following day did not prove much easier, and its difficulties aroused the lad's fighting spirit.

"I am going to learn to saw and drive nails properly if it takes me the rest of my life!" he declared resolutely. "The very idea! Why, some of those little chaps in the sloyd room can chisel and plane like carpenters. I'll bet I can do it, too, if I stick at it."

Therefore it came about that instead of missing tennis and basket-ball as he had expected, Theo became completely absorbed in his new interest—so absorbed that his father soon began to fear that his studies would suffer. Early and late Theo was at his bench with his tools. He tried faithfully not to slight his books, but there was no use pretending he did not enjoy his carpentry. He was making a footstool now, a little wooden piece with turned legs which he was to stain with orange shellac and give to his mother. Already he had finished a square tray and a handkerchief box. When the stool was completed he was preparing for a more ambitious enterprise, a thing he longed yet hesitated to venture upon—a wooden bookrack for Mr. Croyden.

It was to be made from oak, not from the ordinary pine wood on which, up to this time, he had been working; and it was to be a much more elaborately finished article than anything he had undertaken. He had delayed beginning it until the closing part of the term in order that he might have the benefit of every atom of training he could get before he made the first cuts in the wood. As he now framed his plans for the making of the gift he smiled to think how impossible such a project would have been a few months ago.

"Dad was right!" he affirmed. "Training your hands is just like training any other part of your body. The longer and more regularly you keep at it the more expert you get. Sloyd is no different from rowing, or football, or tennis."

With the help of his instructor he drew his design, measured his pattern, and sent for the wood.

Then, impatient to begin work, he waited.

Mr. Croyden's birthday he had learned came the last part of June, and as on that date school ended he had only a short time to make his present. Not only must the pieces be cut and nailed together but there was all the finishing, glueing, and varnishing. In addition an interval was also necessary for drying. Therefore it was imperative that he set about his task as soon as possible.

Yet day after day went by and the wood did not come.

Theo was almost beside himself.

First he was merely impatient, then angry, then discouraged.

It was not until he had about given up hope of being able to complete the rack that the wood arrived. The pieces were beautifully grained, and when Theo beheld them he could in his mind's eye see the bookshelves shaped, smoothed, and rubbed down. He must finish the gift if he toiled nights as well as days! It is doubtful if ever a boy worked as hard or as anxiously as did Theo during the next two weeks. And as his creation took form how happy he was! He cut the three shelves, shaped the ends of the rack, and under his teacher's direction carved on a jig-saw the simple ornament which was to decorate the top. Never in his whole life had he enjoyed making anything so much. Then came the day when the final coat of oil was applied and there was nothing more to do but wait until it dried. But the work had required more time than Theo had anticipated, and therefore it was not until the very afternoon before Mr. Croyden's birthday that the shelves were dry enough to be packed. Dr. Swift's motor came to the school that day to get Theo, and the boy himself proudly carried his masterpiece out to the car and put it inside; then springing in he called to the chauffeur to drive home. Arriving at his own abode Theo leaped up the brown stone steps with quick stride and rang the bell; then as he stood waiting for the door to be opened a sudden recollection overwhelmed him. In his eagerness to display his handiwork to his parents he had entirely forgotten his crutches! They were at school, and he now remembered he had not used them since morning.

His father laughed heartily when Theo told him this.

"I guess that means you can do without crutches from now on, son," the Doctor said.

"Does it mean that I may go to the Croydens', Dad?"

"I should say so," was the ready response. "I will call Mr. Croyden up on the telephone and find out when he wants you to come. What a joke it would be if you should go to Trenton and carry your bookrack with you!"

It subsequently proved that there was more truth than fiction in this jest, for in answer to Dr. Swift's inquiry Mr. Croyden announced that he happened to be coming into New York that very day in his car, and if the Swifts were willing he would carry Theo back with him.

"That will be the very thing!" exclaimed the boy in delight. "We can do the shelves all up so he won't guess what they are, and I can take them right along. Then they will be safe at Mr. Croyden's house and I shall not run the risk of the expressman being late. You know expressmen always are late. Think how long they were getting my crutches to Maine."

Accordingly the shelves were packed with greatest care in many soft papers so they would not be scratched, and afterward they were wrapped in a stouter outside covering. When the parcel was tied up no one would have suspected what was inside, and Theo viewed the mysterious bundle with satisfaction.

"Mr. Croyden will think that for a small boy you travel with a good deal of luggage," chuckled the Doctor.

"Maybe he won't have room to take it," Mrs. Swift rejoined.

Theo's face fell.

"He must take it," he said, "even if I walk to Trenton myself."

But there was room, plenty of it, in the big touring car.

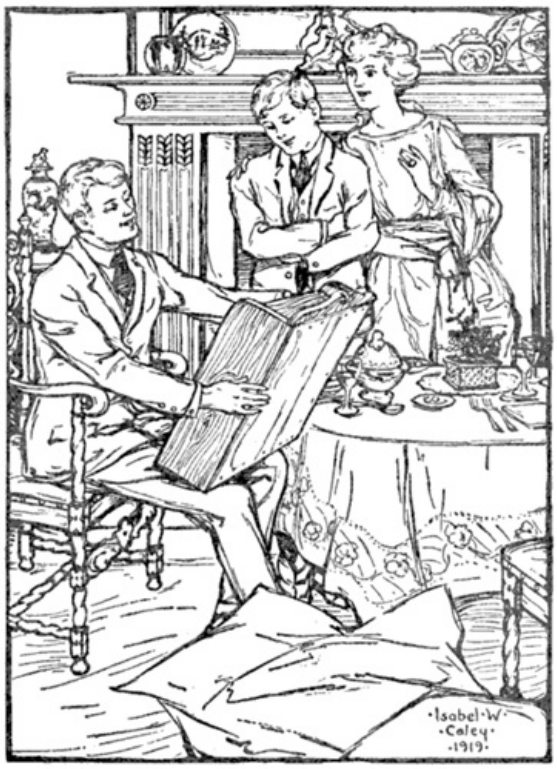
Mr. Croyden did, to be sure, comment teasingly about the lad's extended wardrobe, and ask how many dozen suits of clothes he had brought with him; but he made no objection to taking either the bundle or the suit-case.

And when that night just before dinner Theo slipped into the dining-room and placed the shelves beside Mr. Croyden's chair no boy could have been happier. The only person happier than Theo himself was the man who received them.

"My, but this is a present!" exclaimed the merchant. "And you made them all yourself? I can hardly believe it. Why, they are beautifully finished! And isn't it a queer thing that only yesterday I told Mrs. Croyden I must buy some bookshelves for my office? You remember, don't you, Madeline?"

Mrs. Croyden nodded.

"Those were his very words," affirmed Mrs. Croyden, turning to Theo. "He said it only at breakfast. I believe it was mental telepathy, Theo.



"THIS IS A PRESENT"

Theo beamed.

He had really succeeded then in giving Mr. Croyden something he wanted! That was pleasure enough.

CHAPTER XIII

THE TRENTON VISIT

lthough originally planned to be of only a week's duration, Theo's visit to the Croydens stretched on into the second week before any one seemed to realize it. Ten days passed and still the lad had not been to the porcelain works—one of his chief aims in coming to Trenton. Each morning at breakfast Mrs. Croyden presented so many delightful plans for the day, and was so eager to have Theo accompany her to the golf club, the tennis club, or for a motor ride, that the hours sped by and night came only too soon.

For Mrs. Croyden was a marvelous comrade for a boy, a strange mixture of youthfulness and maturity; of feminine charm and masculine freedom from conventionality. She loved boys and understood how to be one with them, and in consequence the friendship that at first had extended only to Mr. Croyden Theo now stretched to include her. Nor did the stretching demand effort. Who could have resisted the sweet wholesome interest of this fascinating woman with her soft brown eyes, her quick sympathy, and her girlish love of sport?

As the days fled by a tie of real affection strengthened between them, and Theo found himself talking with an amazing freedom of his dreams and ambitions; of his chums; and of his life at home. To all these things Mrs. Croyden listened earnestly, now and then putting in a word of interest or encouragement. Sometimes in the evening Mr. Croyden joined in these talks; and sometimes all three of them abandoned life and its problems and went to the theatre, or to a moving picture show.

"I declare, Theo, I don't know how we are to do without you when you go back home," exclaimed Mr. Croyden one night at dinner. "It will leave a big hole in the house, won't it, Madeline?"

Mrs. Croyden nodded and a shadow passed across her face.

"I wish we might borrow Theo for a long, long time," she sighed wistfully. "But I suppose your family would not listen to that, laddie."

"I'm afraid not," Theo answered. "Mother seems to be getting a little impatient as it is. She thinks I've been gone a pretty long time."

"Long? Nonsense! Why, you've only just come," Mr. Croyden said emphatically. "Up to now you have been visiting Mrs. Croyden. You haven't been my guest at all. Haven't we got the porcelain works ahead of us? That will take the best part of another week."

"Then I am afraid I'd better be getting at it," laughed Theo, "for Mother writes we're to leave for Lake George the middle of July."

"Mercy on us!" blustered Mr. Croyden. "I don't see how you can. The middle of July? That settles it. There must be no more kidnapping Theo for golf or tennis, Madeline. From now on he is to be my guest. Understand that."

Mrs. Croyden bowed her head with amusing meekness.

"It shall be as you say, my lord," she answered. "But are you expecting to take Theo to the factory every moment of every day?"

"I don't know," was the grim reply. "That will all depend on how rapidly he learns the business."

There was a general laugh.

"How long has it taken you to learn it, Mr. Croyden?" questioned Theo mischievously.

"Me? Oh, about thirty years."

"Then at that rate I see I shall not get to Lake George this season," returned the boy with a smile.

"Oh, I'll be easy with you this first time," Mr. Croyden answered. "I cannot afford to kill you or get you frightened, or you never will come again."

"I guess you needn't worry about my not coming again," Theo retorted. "I have had far too good a time."

"I am glad of that," the elder man asserted heartily.

"And I, too, Theo," murmured Mrs. Croyden. "Do not forget that you have given us far more pleasure than you could possibly have received. Mr. Croyden and I are often very lonely for a son like you. It has been a boon to have you here. That is why you must not let this ambitious husband of mine tire you all out by setting you too strenuously at porcelain-making," she added playfully. "Is it to-morrow that you plan to drag Theo forth on this crusade to the factory, my dear?"

Mr. Croyden glanced up at the words.

"Yes, to-morrow morning. I shall take Theo down to the works with me directly after breakfast," he answered. "You better get to bed early to-night, son, so to be prepared for the worst."

"I shan't waste any worry about the trip," grinned Theo as they rose from the dinner table.

It was a warm night, and the three strolled out on the veranda, which overlooked the green of the country club.

"I suppose," Theo remarked, "nobody has any idea when pottery and porcelain were first made in America."

"Barring out the pottery of the Mound Builders, the American Indians, and the early clay work done in West Virginia I imagine our modern china was first introduced into America at Philadelphia," Mr. Croyden said. "At least records would indicate that to be the case. Between 1760 and 1770 potteries sprung up there and thrived so lustily that Wedgwood noted their success and urged the English government to check them lest they injure English trade. At these Philadelphia factories hard porcelain with a good quality of glaze was turned out; also much blue and white stone-china in the form of jars, butter-pots, bowls, and plates. Some mortars and pestles such as Wedgwood himself made were also manufactured, so what wonder that he was disturbed at the thought of losing the monopoly? In a letter to a friend he speaks of pottery being made in the Carolinas as well, and declares it would be a great calamity were the colonies to begin making their own dishes."

"The idea!" burst out Theo.

"It was business," replied Mr. Croyden. "Of course England would far rather ship her wares to

America and collect the revenue than to have the colonists learn to do without her. For a long time, as the early papers assure us, crates of Queen's ware and the coarser brown earthenwares, as well as quantities of stone-china continued to be shipped to America, and advertised for sale. In the meantime, however, the new settlers were contriving to make earthenware jars, jugs, flasks, mugs, and teapots of their own, and supplemented by the pewter dishes they had brought with them from England, they were managing to get on very well without outside aid. Not only was salt glaze pottery manufactured in Philadelphia along with a small amount of real porcelain, but in such Connecticut towns as Norwalk, Hartford, and Stonington experiments with earthenware were also being made. By 1810 the Secretary of the Treasury reported great progress in the manufacture of Queen's ware, and it is evident from what he says that by this time the coarser varieties of earthenware were being very generally manufactured; he also mentions four factories for the finer types of porcelain-making."

"I think we did pretty well to get to making so much chinaware in such a short time," Theo observed.

"We did do well for a new country," agreed Mr. Croyden, "but you must remember we had the whip-lash of necessity at our backs. The wares imported from England were very expensive, and dishes we were forced to have; especially the simpler utensils for household use. People made their own butter, and needed crocks to keep it in; they needed jugs for milk or water; bowls for cooking. Of course no growing country could continue to import such every-day articles from across the sea. Therefore, although England tried very hard to cater to American tastes and demands by sending over blue and white stone-china decorated with American views, and even pitchers adorned with portraits of Washington, the American Eagle, and the names of the thirteen original States, we did not allow ourselves to be tempted away from our undertakings, but went right on increasing our own manufactures."

"Bully for us!" cried Theo.

"So I say!" rejoined Mrs. Croyden with spirit.

"It was the only thing to do," admitted Mr. Croyden. "We kept at it, too. In 1829 a factory was opened in Jersey City which although not a success was the forerunner of New Jersey china-making. The industry was also taken up in Bennington, Vermont, where the first Parian marble statues ever made in America were produced. Baltimore was the next city to adopt the china trade, and afterward Trenton. Most of this output was thick white graniteware, Rockingham, and stoneware; some of it was decorated, but most of it was plain white. It was useful and durable, but very clumsy and heavy. Subsequently the china industry localized itself until now, while there are many factories scattered through the country, New Jersey supplies about twenty-four per cent. of our china, and Ohio forty-two."

"How did those States happen to elect themselves to make so much china?" inquired Theo.

"Deposits of clay originally governed the matter," replied Mr. Croyden. "Then there was convenient transportation for goods, a sufficient fuel supply, and an abundance of labor in the vicinity—all elements in deciding where factories are to be established. Many of our potteries, however, are not located with these ends in view. Instead, chance has dropped them down in the most remote spots. Some are the outgrowth of tiny plants founded long ago before manufacture developed into the science it has since become."

"I see."

"It would be interesting to trace, too, the varieties of ware that come from specific districts, for usually there is a reason behind each type of product. For example in Ohio and West Virginia they have an abundance of red clay which is used not only to make red earthenware, but also to coat the outside of casserole serving dishes, bowls, and tea and coffee pots. You must be familiar with the kind of thing I mean."

"Like our hot-water jug at home," cried Theo instantly. "Red and shiny outside, and white inside."

"Exactly," nodded Mr. Croyden. "On the other hand many factories make only the heavy, indestructible china used in hotels and restaurants. This variety is a business in itself. The ware is non-absorbent and is considered very hygienic. Toilet sets as well as dishes are made from this especial sort of clay. So you see each plant has its own particular specialty which has been decided largely by the native clays at hand. Here at Trenton we turn out some of the finest porcelain manufactured in America. In quality it equals the English if not the French wares, and it needs only the foreign trade-mark to give it its deserved prestige. But our people, alas, have not arrived at the pitch of patriotism where *Made in America* has become the popular slogan. I hope this war may elevate the motto to its rightful place.

"Perhaps by the time Theo gets to making china things will be different," ventured Mrs. Croyden.

"If I thought so I should be very glad," came earnestly from her husband. "We have all the necessary clays here in our own soil; the only one we need to import is black clay. What is now most necessary in all our industries is intelligent, trained, ambitious, and appreciative workers. It is a great reproach to us that here in the United States we have so few schools to educate workmen for their craft. Before the war Austria had eight schools to teach pottery-making and

Germany twenty-two. Even England had several. And in the meantime what are we doing here in America? Aside from a few arts-and-crafts potters who of necessity must work on a very limited scale we are training no pottery-makers. We should establish schools for such things if we wish to keep abreast of the time, and compete with other nations."

"Theo can attend to that, too," laughed Mrs. Croyden.

"We have cut out quite a program for you to work out in the future, haven't we, lad?" said Mr. Croyden, relapsing into jest. "On the strength of it I suggest that you trot along to bed to get rested up so to be ready to undertake it."

Theo rose and with a merry good-night they parted.

CHAPTER XIV

THE BEGINNING OF THE PORCELAIN PILGRIMAGE

In accordance with Mr. Croyden's plan Theo and his host stepped, the next morning, into the waiting motor-car and were whirled to the porcelain factory.

As they rode along the boy remained silent until he saw Mr. Croyden lay down his paper; then he asked:

"How many persons in the United States do you suppose are employed at pottery-making, Mr. Croyden?"

"A great many," was the reply. "Before the war there were about thirty-three thousand.

Theo gasped.

"Why, I had no idea of it!" he exclaimed.

"It takes a vast number of workmen to manufacture all the clay products turned out in America. Remember dishes and ornaments are not the only things made. The industry is classified, and covers white earthenware, or the better qualities of imitation porcelain used by those who cannot afford the real; this branch of the work alone takes up about forty per cent. of the entire output. Then there is the genuine porcelain for table and decorative use; the porcelain necessary for electrical purposes; stoneware, or the commoner household articles found in the kitchen comprising yellow ware, Rockingham ware, and red earthenware; and in addition the great quantities of sanitary ware for plumbing, drain-pipes, and tiling. Of all these varieties of porcelain the hardest in quality, and the only one absolutely non-absorbent, is true porcelain. Therefore it is the cleanest to use. Kaolin being simply decomposed feldspar, and the glaze applied to it being practically pure feldspar, the product is merely a mass of feldspar melted in the fire until all the metals it contains except platinum are eliminated. Such a composition is of course far too brittle and delicate for ordinary use even did not its expense prohibit our introducing it into the kitchen; but could we substitute it for the cheaper wares it would be much more hygienic—a factor persons are liable to forget when purchasing china."

"I never thought of that," said Theo.

"The general public does not," replied Mr. Croyden. "Still, now that I have explained it, you can readily understand it. Another thing that is not ordinarily considered is that porcelain-making is not as healthful an occupation as we wish it were. Those who work in the glazing department, where powdered flint and lead are used, inhale the dust and in consequence are sometimes subject to tuberculosis or lead poisoning just as painters are."

"Can't something be done about it? That seems a dreadful thing."

"It is a dreadful thing, and we are constantly trying to better working conditions and lessen the danger. Yet if you were to examine the details of other industries you would find that few of them are entirely free from undesirable results. Almost every line of manufacture has its peculiar risks," returned Mr. Croyden. "I do not mean for a moment that for that reason we are justified in

closing our eyes to the dangers. I merely mean it is a fact. What we are trying earnestly to do is to find a substitute for lead glaze. Could we succeed we should eliminate a great proportion of the trouble."

"I suppose that would mean finding a different kind of enamel," mused Theo.

"Precisely. And you recollect how long it took to discover those enamels we are now using," answered Mr. Croyden. "It is a good problem for some clever man, so bear it in mind. It is just such puzzles as these that have raised up our inventors, and those who in one way or another have perfected modern industry. Few who have contributed to this cause stumbled upon their devices for the labor-saving or convenience of mankind. Almost all such discoveries were called forth by a great need, and were the result of hours and hours of patient experiments in laboratories or workshops. Therefore when we pass through a factory and see a process advancing easily from stage to stage we should never forget those who toiled with brain and hand to perfect each of its tiny details. Often some very insignificant but vital part of a machine may represent the lifetime of an unknown fellow-being who did his part in giving us a more perfect whole."

Theo glanced up quickly.

"I thought usually a machine was invented by one person," he said.

"Occasionally it is," admitted Mr. Croyden. "But more frequently our modern machinery is a growth—the product of many minds. Year after year defects have been eliminated, and improvements introduced. Machines every part of which represent the thought of a single individual are rare. Most machines are composite photographs of the ingenuity and thought of many inventors."

The elder man paused, then added whimsically:

"Sometimes I feel like taking off my hat to a delicately adjusted and intricate piece of machinery it is so human and such a monument to the men who conceived it."

The boy looked grave.

"If more people felt about machinery and about work as you do, Mr. Croyden, they would have more respect for our industries as well as for the men who run the machines."

"It should be so," was Mr. Croyden's instant reply. "A factory that turns out a completed product is like a watch. You know that unless every wheel of the watch turns; unless every minute rivet and screw is in its place and doing its part we get no perfect result. It is just as important a service to be a wee screw in that organism as to be something larger and more conspicuous. So it is with each workman in a factory. He performs his part—often, alas, a small and dull one too, I am afraid; but viewed from the standpoint of the completed product that man with his humdrum task is as worthy our respect as is any other member of the working staff. Without somebody to do precisely what he is doing we should get no satisfactory result.

"It is just team-work!" put in Theo.

"That's it—team-work; team-work and nothing else. And just as in athletics some men better adapted for batting, catching, running, and kicking are singled out for the posts of fielder, shortstop, or tackle but contribute equally to the game, so it is with the men in a factory. Some day the world is going to accept that creed and pay to every human being a living wage; not, perhaps, because what he is doing is skilled or difficult; but because it is indispensable and we cannot do without that particular rung in the labor ladder. Some one must fill that post, and he who does it should be respected and compensated because he is necessary to civilization and to our national prosperity."

Mr. Croyden caught his breath and then laughed in confusion.

"The idea of my giving you a lecture on the labor question, Theo," he said flushing. "I always get hot on the matter, for it is one of my hobbies. Next time when you hear me getting started just slow me down and let me cool off. You see it is pretty close to my heart, because I have been attempting to work out some of its difficult phases here in my own mills. I am trying to pay to each of my men enough so he can live decently and contentedly. It does not seem fair to pay them all alike, since some are skilful enough to do more work, and work that is more difficult than others. But each should be able to live comfortably on what he earns. That is my idea of fairness toward the working man; and that is the scheme that I am trying to carry out here."

The car stopped abruptly before a great doorway and Mr. Croyden got out.

"Having heard my views you are now to have a chance to see how imperfectly my dreams have been realized," he said smiling. "I am far from satisfied with present conditions in my factory. But every day we are conscientiously trying to make things better, and some day I hope we shall reach our goal."

Theo followed him into the hall.

It was interesting to notice that as the man passed along he exchanged a word or two with every employee he met, calling many of them by name, and in some cases adding a question concerning the wife or baby at home. That the men liked their employer there could be no

question. His manner toward them was one of unaffected interest and friendliness, and was entirely free from patronage or condescension. His private office, too, was of the simplest type, being neatly but not lavishly furnished. Evidently what was good enough for his men was good enough for him. There were, however, in the two great windows several boxes of blossoming plants which made the room fragrant.

"I am very fond of flowers, Theo," explained the mill-owner after he had greeted his office force and introduced his guest. "It is my weak spot—my one big extravagance. This room has just the exposure for plants and we keep the boxes filled the year round. The boys have nicknamed the place *the conservatory* and the jest has stuck until nobody thinks of calling the place anything else. If you were to ask a man to come to the office he would have to scratch his head and think; but if you told him he was wanted in the conservatory he would land here double quick. Isn't that so?" concluded Mr. Croyden, turning to the others.

Every one smiled and nodded.

Mr. Croyden hung up his hat and motioning Theo to do the same turned to encounter a pile of mail that lay on his desk.

"Bless my soul, this is too bad!" he exclaimed. "Don't tell me that to-day when I had planned to make a tour through the factory Uncle Sam has come down on me with all this stuff!"

He glanced ruefully at the letter lying topmost on the heap; then at the second one.

"I am afraid these will have to be attended to, Theo," he said with regret. "Should you be dreadfully disappointed if I were to turn you over to some one else for a part of your factory pilgrimage?"

"No, indeed, sir."

"I am sorry, but I guess that is what I shall have to do," declared Mr. Croyden. "You can make a start, and later in the morning I will try to join you myself."

He touched a bell.

"Send Marwood to me," he said to the boy.

"Mr. Marwood is a splendidly informed man, Theo; and more than that, he is a delightful one. You will enjoy him, and I have a notion he will enjoy you. He likes boys—has three of his own, lucky fellow! Ah, here he comes now. Mr. Marwood, this is my young friend, Theo Swift of New York."

The boy put out his hand shyly.

The eyes that met his were of the kindliest blue; and the face they illumined was ruddy, wholesome, and alert.

Instantly Theo decided that since Mr. Croyden himself could not be his guide he had at least provided a very pleasant substitute.

"Theo wants to see everything there is to be seen, Jack," continued Mr. Croyden. "Tote him all about and answer all his questions; and above all be thorough, even if you do not cover very much ground during the morning. I want the processes carefully explained, for this boy may be a china-maker himself some day. If I do not join you before noontime bring all that is left of him back to the conservatory so I can take him to lunch."

Mr. Marwood laughed, and so did Theo.

Then they passed out.

"Good luck!" called Mr. Croyden after them as he turned to take up his mail.

CHAPTER XV

HOW PORCELAIN IS MADE

e'll go to the slip-house first where the clay bins are," Mr. Marwood said to Theo, "that you may start at the very beginning of things. That is where the cars run in and unload the raw material."

They walked down a long corridor and rang for the elevator.

As the car shot to the basement Theo noticed a change in the appearance of the factory. On every floor they passed there was a hum of machinery and a glimpse of endless rows of china dishes; they stood on shelves; they covered tables; they were stacked one within another upon long counters.

"Some dishes, eh?" Mr. Marwood laughed, reading the boy's thought.

"I never saw so many in my life!"

"You will see many more before you are through," remarked his companion.

The elevator brought up with a jerk.

"Here we are!" exclaimed Mr. Marwood. "At least this is our way into the slip-house."

He led Theo through a passage and across a court into the adjoining building.

Here a white powder covered everything. Men who hurried by in overalls and caps were dusty as millers, their hands being coated to the finger tips with dried clay.

Mr. Marwood stepped forward into the long, cement-floored basement and pointed to the tracks embedded in it.

"It is on these tracks," he said, "that the cars come in and deposit their contents in the bins. The bins are of a pretty good size, you see. They measure about sixteen by thirty-two feet, and each one will hold eight car-loads of clay. After the different kinds of clay are unloaded and placed in their respective bins, the proper combination for specific varieties of porcelain must be weighed out and mixed in the 'blungers,' as we call the mixing tanks. Now this body formula, or clay combination, is not entrusted to the ordinary workman. It is kept secret. Therefore we have on the trucks that carry the clay between the bins and the blungers what we call charging-scales, which weigh automatically each ingredient in the compound without betraying it to the loader."

"That is pretty clever," replied Theo.

"Yes, it is a very ingenious device," Mr. Marwood agreed. "The blungers in which the clay is mixed are over there. You can see them—those great machines near the centre of the floor. They are heavy steel tanks lined with vitrified brick, and in the middle of each one is a revolving contrivance, with steel arms and teeth that grind the clay up very fine and blend it thoroughly. While it is being mixed in this way water is added to it, and also a certain amount of powdered oxide of cobalt to whiten it."

"Just as we put blueing in clothes," Theo ventured.

Mr. Marwood assented.

"This cobalt has already been pulverized and sifted most carefully, so there will be no particles in it, and so it will readily dissolve. After the clay mixture has had this mauling—for I can call it nothing else—the blunged compound, or slip, flows in liquid form into the sifter machines where it is strained through silk gauze or else a mesh of fine copper wire."

"I shouldn't think you could ever strain such stuff," Theo declared.

"The sifters do get very hard wear," answered Mr. Marwood, "and are the machines most liable to get out of order. They become clogged. Our sifters are self-cleaning. By that I mean they have an attachment which removes the waste obstructing them. Nevertheless, even with this improvement they still bother us at times. If you watch this sifting machine carefully you can see that the method is one of sliding the slip back and forth until it is forced through the straining ducts."

"And then what becomes of it?"

They walked on and stopped before another machine.

"This is a rough agitator," explained Mr. Marwood. "Into it is pumped the liquid slip you just saw strained, and afterward this is brought in contact with a series of horseshoe magnets which extract from the mixture every atom of iron."

"Iron?" repeated Theo.

"All clay has metals in it," continued Mr. Marwood. "Should you leave any of these in a pottery clay they would cause you much trouble, for when the ware was fired the metals would melt and discolor your porcelain. Sometimes this happens with cheap chinas. I dare say you yourself have seen dishes that are specked with yellow, or have stains here and there. Sometimes you can also detect bluish particles. That means the cobalt has not been properly ground or sifted. In less expensive wares such defects are frequent. But there is no excuse for them when making fine

quality porcelains."

Theo listened attentively.

"After this iron has been extracted," went on Mr. Marwood, "the slip passes into smooth agitators, where it is simply kept well stirred in order that the heavier ingredients in it may not settle to the bottom. Then the liquid is forced by means of a slip-pump into the filter-presses, and it is now that you begin to see an approach to the clay used for shaping dishes. Up to this point the slip has been only a thick creamy substance. Now the filter-press squeezes this through canvas bags until after having been pressed between iron plates you get your cakes of smoothly mixed clay of about the consistency of putty. Each cake is of regulation size, and it is supposed to be an inch-and-a-quarter in thickness, and to weigh forty-two pounds."

"The clay is now ready for use?" Theo asked.

"Practically so," was Mr. Marwood's reply, "although before it can be sent to the jiggermen to be modeled it must pass through the pug-mill to be made more plastic and workable. It is here that it gets its final kneading, all the air bubbles in it being eliminated by a series of steel knives."

"I must say it is pretty thoroughly prepared," smiled Theo.

"It has to be," was Mr. Marwood's grave reply. "Each of these details is an important factor in the making of high grade porcelain, and should any of them be omitted we should get no flawless ware. It was this infinite care in preparing clay that gave to China, Japan, France, and Germany their perfect results in porcelain-making. If we would equal what has been done in the past we must be just as painstaking, and neglect no detail. As a nation we Americans are far too prone to dash ahead and expect results all in a minute. We do not like to mount a stairway step by step; we wish to shoot to the top in an elevator. Now you cannot manufacture porcelain, or for that matter anything else, in such a fashion."

"I know it," replied Theo. "Dad says we hurry so much over the little things that we turn out quantities of poorly made goods that are just hustled through instead of being carefully finished."

"Your father is right," Mr. Marwood admitted. "It is far too often quantity and not quality with us. Just so long as men are paid on the piece-work system we shall not better the condition, either. It stands to reason that a man who is rushing to make as many objects of one kind as he possibly can in an hour is not going to take the pains to finish them very carefully. His daily bread depends on his hurrying. Not a second can be lost. It is an unfortunate labor condition, and one that I hope to see remedied some time."

The elder man smiled.

"But we must not take time now to go into labor problems," he added. "In our day they are absorbingly interesting and one might spend hours discussing them. What we all are eager to do is to see them readjusted until they shall be fair to all parties."

"That is what Mr. Croyden wants," put in Theo.

"I know it is. He is heart and soul in this mill and his employees. All the time he is working to improve conditions here. Now we must go on, or we shall not get anywhere. To return, then, to our clay; it is now ready to be carried to the floor above on elevators and handed over to the potters."

"Are the ingredients for the glaze prepared in the same way?" Theo inquired.

"Partially so. The formula for the frit and glaze is also a secret one. Usually the frit, a material similar to glass, is crushed to powder beneath stone rollers called chasers. Water is then added and the compound turned into the grinding-mill where it is ground for an entire day. Sometimes, however, a different process is preferred and the material is put into a kiln and melted instead. In either case it must finally be worked into a smooth liquid which can be strained through fine lawn. It is then sent to the agitators and constantly stirred until it can be pumped into the storage tanks in the dipping-room."

"That is just what I wanted to know," said Theo.

"Any more questions?

The boy shook his head.

"Not now, thank you."

"Then as we have finished here shall we go up to the clay-shop?"

"Yes, I am ready," Theo affirmed. Then as if confronted by an afterthought he asked:

"Is the porcelain made here bone china or ——"

"Spar?" put in Mr. Marwood as the lad hesitated.

"I don't think I understand."

"Feldspar."

"Oh, then I know," cried Theo. "I did not realize you classified porcelains as bone or spar."

"We do," was the quick reply. "Our finest grade of porcelain has little or no phosphate of calcium, or ground bone, in it. But it is in consequence very costly, and therefore to meet the demands of the market we also manufacture a porcelain slightly strengthened with a bone element. Nevertheless this is composed of such a wonderfully blended body that it is as exquisite as any of the most beautiful English wares. Personally I prefer it to a pure feldspathic china.

"My questions are all answered now," laughed Theo. "Shall we go up to the clay-shop?"

They rang for an elevator and stepped in.

"Next floor, O'Keefe," said Mr. Marwood to the operator. "I am going to teach this lad how to make dishes."

CHAPTER XVI

DISHES, DISHES EVERYWHERE!

lay," began Mr. Marwood as they went along, "can be shaped in any one of several ways, you know: either by throwing; by turning; by pressing it into hollow moulds; by shaping it by hand over another type of mould; by pressing it into flat ware such as platters and plates; by making it by machinery over moulds as is done by hand; by casting it into the desired form; and by compressing it."

Theo looked puzzled.

"The list sounds like a long one," Mr. Marwood went on smiling into the boy's troubled eyes, "but when you understand the processes you will find that it is all much simpler than it seems. Before we begin to investigate any of these methods, however, I want to say just a word about the moulds over which, or inside of which, the ware is sometimes shaped; for moulds are a very important feature both of pottery and porcelain-making."

"What are the moulds made of?" was Theo's first question.

"I am glad you asked, for that is the vital matter," Mr. Marwood replied. "Many materials have been tried with varying degrees of success—plaster-of-Paris, alabaster, steel, gun-metal, and brass. Of course what is necessary is a strong, firm, absorbent material. Clay moulds break too easily, and also become saturated with water and lose their shape; metal moulds, on the other hand, while most useful in making wares decorated with fine, raised designs such as the Wedgwood figures, fail to seep up the superfluous water. Therefore plaster-of-Paris has proved the best medium for the purpose. Not only does it retain its form, but it also takes up a certain proportion of the moisture from the clay that is moulded inside or outside it."

"I understand," Theo nodded.

The elevator stopped and they stepped out into a vast, well-lighted room, gray with clay-dust and thronging with powdery workers. At benches, before revolving wheels, and beside turning-lathes toiled busy workmen with white, clay-coated hands.

"We will start our program with the potter's wheel, the oldest of pottery modeling devices," said Mr. Marwood. "It is a very simple contrivance, you see—just a round piece of board set horizontally on top of a revolving spindle. As the disc turns the potter shapes the clay with his fingers, building it up to the desired height and moulding it to conform to the profile, or pattern, he keeps beside him. This profile is of wood or steel, and gives the elevation of the object in actual size. As he works the potter constantly consults and measures it. Pieces made in this fashion are known as thrown ware. All the finest potteries, as well as some of the most expensive porcelains, are made in this way. However, it is a costly process and rather slow, for a piece thus shaped must have the entire attention of a single worker. If we were to make all our china by this method I do not know where we should bring up. It would take us a decade, and cost us a great deal of money. But by this means the most artistic results are obtained. It was in this fashion that the Greeks modeled their matchless vases, and you can now see why no two of them

were alike. Each potter put his soul into the thing he was making, and as he had endless time at his command he worked with utmost care to perfect his product. This was all very well in a warm country where life was simple; demands few; and where there was not the tension of present day living. It was a matter of no concern if the artist made only a few such vases in a lifetime. He had the patronage of the rich, and was sure of being taken care of. But to-day, alas, we face a different problem.

"IT IS A COSTLY PROCESS, AND RATHER SLOW"

"We surely do," agreed Theo.

"Therefore, here in America only a small proportion of this thrown ware is made. Such art potteries as the Roferno and Sicardo wares, seen chiefly in private collections and museums, are thrown; also some of the Grueby, Rookwood, and Cincinnati varieties—all very beautiful American potteries. In addition to these exquisite home products The Dedham and Paul Revere potteries made near Boston should be mentioned, for although of less costly type they are doing much to set a standard of perfection of form, choiceness of coloring, and fitness of design. All these wares are distinct contributions to the art world. Of course certain wares are made by a modification of this throwing process. Large pieces, for example, frequently have to be thrown in several parts, fastened together, and afterward finished. Some pieces the thrower shapes over a plaster-of-Paris mould; and some he shapes inside the mould, reversing the process and pressing the clay against its confining surface. The danger in thrown ware comes from an uneven pressure on the clay resulting in a lack of solidity; the pieces are not always equally firm at all points and in consequence sometimes crack.

"Can pieces of any design be thrown?" inquired Theo.

"No, only round pieces such as cups, mugs, vases, jars, or bowls. In other words, only circular pieces. Frequently, too, these are only started by the throwing process and are finished by some other means such as turning, for example."

"What is turning?" asked Theo.

"Surely you have seen a turning-lathe, Theo," asserted Mr. Marwood. "Here is a turner just opposite us. You will notice he has a lathe that goes by steam. The vase on which he is working has previously been roughly formed on a jigger—a revolving mould over which a sheet of clay has been pressed and quickly shaped. After such a piece has been dried to a leather hardness the turner takes it in its crude and uncompleted state and by running his lathe over it planes down the surface to a smooth, even thickness. Sometimes, too, by means of one of these lathes milling-tools are used to cut designs around the neck or base of the article. The rough edges are then sponged and before the piece is thoroughly dried handles are put on if desired. Here in America turning is the process very generally employed for finishing articles begun by the jiggermen."

"And now about hollow ware—how do they make that?"

"Hollow ware is pressed by hand," answered Mr. Marwood. "The process is used for pieces that cannot successfully be made by any other means—such things, for example, as soup-tureens and large covered dishes. The idea is to press the clay over or into moulds so it will be the exact shape required. Of course this necessitates the making of pieces in sections. The two sides of a vase are moulded separately, for instance; also the bottom. Then the parts are pressed firmly

together and held in place by strings or thongs of leather until securely joined. Afterward the base is inserted in its proper place. The inside seams are then leveled and sponged away, and the mould sent to the drying room. Later it is returned; the outside seams moistened and smoothed; the moulded handles put on; and the piece is ready to be decorated and fired. It is a difficult ware to make, for unless the workmen are skilled at giving the clay an even pressure it is liable to be thicker in some places than others. Sometimes, too, if the seams are not strongly united the article will crack. It demands a strong, even touch. Remember that hollow ware is pressed from the outside; and that flat ware is just the opposite, and is pressed from the inside. The top surfaces of such things as plates, platters and trays are thus formed, their outer side being shaped by hand or by a jolly, which we shall see presently."

Mr. Marwood passed on through the crowded room until he suddenly paused beside a workman at another machine.

"This," explained Theo's conductor, "is a jigger. There are two machines very commonly used in the United States for shaping the cheaper wares: one is a jigger, a device of this type; and the other a jolly, an invention very similar in construction but having a tool attached that forms the outside, or bottom of the piece, the inside of which has previously been shaped by the jigger. You may recall that I spoke of the jigger; and told you how a revolving mould was inserted into it, and how afterward a sheet of clay was laid on the outside of this mould and rapidly shaped. The jolly, on the other hand, is used for making such things as covers, the top surface of which has already been moulded. The profile set in the jolly-lever makes the bottom. That, as I told you, is how we get the base of our plates. For certain articles the jigger is preferred; for certain others the jolly; but the aim of both is the same, and the workers at the machines are all called jiggermen. After an article is taken from the jigger or jolly it is dried and carried to the turning-lathe to have its surface smoothed and finished."

"And does it take all these men to run a jigger?" whispered Theo, pointing to the moving figures that hurried to and fro.

"An organized group of men is employed at each machine," answered Mr. Marwood. "First there is the *clay-carrier*, who must bring the material to the workmen; then there is a second man called the *batter-out* who takes from the carrier the piece of clay cut into the proper size, and after laying this on a block gives it a strong blow with a plaster-of-Paris bat to flatten it for the jiggerman. When making simple objects such a man can give the article quite a start even with one stroke. You can see that some such beginning must be made before the jiggermen can handle the material."

"How much does the bat weigh?" demanded Theo, instantly interested.

"About fifteen pounds. It is not very heavy, but the batter wields it with considerable force. After the article has thus been approximately shaped, and the jiggerman has completed it, a mould-runner must carry the freshly modeled piece to the stove-room to be dried; and on his backward trip bring with him two other articles that are already dry. These he takes off the moulds, leaving the dry piece to go to the finisher, and the mould to the batter-out. The fourth man in the team, or crew, is the *finisher*. His duty is to smooth the rough edges of each article with a damp sponge, or a tool of flat steel. After this process is completed the jiggerman's crew is through with its part of the work and the goods go to the greenroom to be counted, and if perfect accepted by the foreman. Most jiggermen hire their own helpers, as it is simpler for them to do so. Formerly only round articles were made by the jiggermen—such things as cups, plates, bowls, etc. But now oval, as well as round dishes, can be made on a jigger, although elliptical wares are not turned out this way to any very great extent, other processes of shaping being preferred for objects of this type."

"You spoke, Mr. Marwood, of casting some wares," remarked Theo.

The older man smiled.

"You have a good memory, my boy," he said. "I did mention casting. It is an independent process, and shapes of great variety can be fashioned as well as ornamented in this way. By the casting method, too, we are certain of getting articles of uniform thickness. We can even make very thin objects by this means. But the process is destructive of moulds, and therefore has its flaws. The success of the plan is entirely dependent on the mould's absorption of the moisture in the clay; otherwise the method of casting could not be applied to potteries or porcelains. As the clay is compressed the water is squeezed out of it, and this the mould must take up, or the clay would never dry and retain its shape. You can understand that, I think."

"Yes, sir."

"The last of the processes of which I wish to tell you is die-pressing. Here we take a very finely ground clay dust; moisten it a little; and fill a die, or steel mould, with it. This die we then put into a screw, or hydraulic press, and squeeze it under an intense pressure with the result that the piece is shaped very solidly. We use this process for making small, complicated objects such as those employed for electrical purposes. They are brittle and delicate and have to be manufactured with extreme care."

"Are plumbing supplies made this way?"

"No, indeed! Sanitary pieces are too large to be turned out in such a fashion. They are made

by hand, being first built up inside enormous moulds. We can employ only the most skilful workmen on this task because the goods are difficult to make. Such a thing as a porcelain bath-tub involves a great deal of clay, and therefore were it to be damaged we should lose much expensive material." Mr. Marwood took out his watch. "Now, there you have all the various ways of shaping clay ware! Its decoration and firing is another story, and far too long a one for us to attack to-day. We must be back at the conservatory at one o'clock for luncheon. Evidently Mr. Croyden got too deeply snowed under to join us, so we shall have to hunt him up. Confess you are hungry."

Theo's eyes twinkled.

"I believe I could eat something if I were urged," he admitted.

"So could I," rejoined Mr. Marwood heartily. "I am starved. We will find Mr. Croyden right away. It has been a good morning, hasn't it, Theo?"

"Certainly I've enjoyed it," exclaimed Theo.

"And I too," agreed the older man.

CHAPTER XVII

THE DECORATION OF CHINA

ext morning bright and early Theo and Mr. Croyden were off to the factory, and once more the boy found himself consigned to the care of Mr. Marwood. This was no hardship, however, for the two got on excellently together, and Theo was only too glad to coöperate in any way he could with Mr. Croyden, whom he knew to be very busy. Therefore with this new friend as pilot the pilgrimage through the china works was resumed at precisely the point where it had been left the preceding day.

"This morning," Mr. Marwood said, "we will turn our attention to the decoration of porcelain, which I think you will find quite as interesting as was its making. There are almost as many different processes to decorate the ware as there were methods of shaping it."

"Which one are we to begin with?" questioned Theo eagerly.

"I think we'd better start with printed designs. Were you ever in Washington, Theo?"

Theo glanced up in surprise at the irrelevance of the inquiry.

"Yes, sir."

"Good! What were some of the places you visited?"

Again the lad regarded his conductor curiously.

What had his trip to Washington to do with the decoration of china, he wondered.

"Oh, I went to the Capitol, of course," he answered, "and to the White House, and the Congressional Library; then Dad took me to the Smithsonian Institute and to the Bureau of Printing and Engraving, and ——"

"Stop!" cried Mr. Marwood. "I now have found out exactly what I wished to know. So you have seen bank notes engraved?"

"Yes, sir."

"You remember then how the design is cut on a copper or steel plate?"

"Yes, indeed," came promptly from Theo.

"I am very glad of that, for it is precisely this method we use when we print designs on china. The difference is that the designs on our money are printed in ink, and those we transfer to our porcelain are done with mineral colors; nor are our plates so finely made. However, the idea

underlying the processes is identical. The color is applied to the metal plate, and what is not retained in the engraved depressions of the design is carefully scraped away. Then on a kind of paper expressly prepared for the purpose the picture is made, and while it is moist it is placed against the ware and rubbed in with a piece of soft flannel. When it is awkward to handle the design as a whole it is cut into sections and pieced together on the china itself."

"Does one person do the whole thing?

"No. It is the duty of one worker to arrange the design and see that it is in the right place; and the task of the next one to rub it in with the flannel and soap. Then after the china has stood for some time it is put into water and the paper sticking to it is floated off, leaving the colored print on the porcelain."

"Is it done before the ware is fired?" asked Theo.

"Sometimes it is done on the biscuit ware before it is glazed, and sometimes on the glaze itself. It all depends on the result the decorators wish to obtain. If printed before the porcelain is glazed it is called under-glaze printed ware, and must be put through a kiln, which will take the oils out of the print; if done on the glaze it is fired in order to burn the colors in and blend them with the frit."

"It must be hard always to get the designs where you want them," observed Theo meditatively. "I used to trace patterns at school sometimes, and often they slipped and made the spacing wrong.

"That is one of the difficulties our designers encounter, too," replied Mr. Marwood. "Sometimes you will see pieces where the spacing is not equal, or where a border does not join. That indicates inaccurate placing of the pattern, or an incorrect estimate of the space."

"I don't wonder they get it wrong sometimes," declared Theo. "It isn't so easy. I remember once decorating a card for Mother with some decalcomania pictures. It was mighty hard to get them where I wanted them."

"Decalcomania?" exclaimed Mr. Marwood. "We do that kind of work here too. In fact, a great many of our most beautiful gold borders are transferred to the ware by that method. I see you will be quite at home, Theo, in our decorating department."

"I guess you would find me a pretty poor hand at it," laughed the lad. "My fingers would be all thumbs."

"Possibly at first. It is very fussy work, I must admit. But the processes are at least easy for you to understand. Another type of decoration that will interest you is that employed when we wish to put bands of solid color around the edges of plates or dishes; also when we wish to color their entire surface. We call it ground-laying. Now how do you suppose we do that?"

Theo thought a moment.

"I can't imagine," he said at last. "Of course you could not get the color even with a brush."

"No," answered Mr. Marwood. "We must first apply to the space we wish to color a peculiar kind of oil, and afterward dust over this moistened surface a finely ground metallic color."

"Which sticks only to the oiled part!" Theo exclaimed, quickly.

"You have the idea. Then the superfluous powder is blown off, and when fired the dust fuses into a solid liquid color, giving us a smoothly laid band of red, blue, green, or what you will; or perhaps a dish of solid tone if that has been the intent. We do not use this method for every type of flat color work, however, because when the powdered color blows about the workers are apt to inhale it, and it is very bad for their health. Therefore when it is possible we tint the china by hand, which can be done if the color is a delicate one and spreads smoothly; or we color the clay itself."

All this time Theo and Mr. Marwood had been passing through the factory and going from one building to another; now they entered the decorating department.

"First I want you to see our air-brush process," Mr. Marwood said.

He led the way to an ingenious machine which by means of compressed air was spraying a fine jet of color over the surface of a porcelain plate. In some places this color rippled away into a faint tint; in others it settled into an area of a deep rich tone. By the aid of stencils the effect produced was of an exquisitely shaded ware, and Theo watched the work with delight.

"I think this air-brush process is the most interesting one I have seen," the boy cried.

"It certainly is fascinating to watch, isn't it?" agreed Mr. Marwood. "I could stand here all day; but I fear we must go on, for we still have much to see. Let us go over to where those girls are gilding. Some of them are putting a fine gold line on the china, and others are doing elaborate designs in gold. The work of the next group is to gild the handles of cups and dishes."

They passed on and stood beside the workers.

"That does not look like gold!" exclaimed Theo, who viewed in astonishment the chocolate brown pigment that the girls were using.

Mr. Marwood laughed.

"All gold looks like that," he said, "before it is fired and burnished. In fact, all the mineral colors used to decorate glass, pottery, and porcelain look very different when they are put on from what they do after they have been subjected to the heat. That is the wonderful part of working in oxides and metallic colors. The beautiful hues we see on china or glass are the result of years of experiment. Never forget that. All china decorators have constantly to bear in mind the effect of a high temperature upon their colors. What would be attractive on the unfired clay might emerge from the kiln a very ugly product indeed. We must reckon on this fact."

Theo nodded.

"It must make the decoration of china a great problem," he said.

"It does. However, decorators have now learned pretty well what to expect. A certain carmine, for example, fires out violet. Many other shades fire lighter or darker than when applied, and allowance must be made for them. The girls who paint china become very skilful in estimating the changes in colors. These who are working beside us are doing the finest sort of porcelain decoration—faces, figures, and flowers. Those across the aisle are doing a vastly different type of work. They are putting coarse, sketchy flowers on the cheaper ware. Some of them, you will observe, are filling in designs that have either first been printed, or transferred by the decalcomania process, and must afterward be finished by hand. The girls supply the dabs of color that are needed to complete the pattern."

"It looks easy.

"It is not highly skilled work," answered Mr. Marwood. "Some of our methods, however, are far less skilled than this one. What would you say, for instance, to decorating china with a sponge?"

"A sponge? Painting with a sponge?"

"Not exactly painting," protested Mr. Marwood. "It is not quite that. We do, nevertheless, for our cheapest ware use a fine-grained sponge cut in the shape of the desired design. This we dip in color and with it impress a pattern on the clay as we would with a rubber stamp."

"I should think you would use a rubber stamp and be done with it," replied Theo.

"It would not hold the color satisfactorily," explained Mr. Marwood. "But we do use the stamping method for inexpensive gold ware. We also imprint the firm name or trade-mark on the bottom of our porcelain that way before it is glazed; so we do some stamping, you see. Of course stamping is only for the cheap wares. The finest porcelain is hand-decorated—or at least the major part of it is.

Theo was silent; then he said:

"Suppose after all the work of preparing the clay, and shaping and decorating it, the piece is broken when the final glaze is put on?"

"That tragedy sometimes occurs," responded Mr. Marwood. "Often, too, a piece with many colors and much gold work on it has to be fired several times, and is therefore in jeopardy more than once. In addition to these risks you must remember the number of hands through which an article passes from the time of its moulding to its final arrival from the glost-kiln. A delicate piece of ware is in peril every second. It may be dropped and broken; chipped in handling; its clay body may crack when exposed to the heat; the colors in the decoration may fire out unsatisfactorily; or at the very end there may be a defect in the glaze."

"Great Scott!" gasped Theo. "Why, I never should expect to get a single perfect piece of porcelain."

"On the contrary, we get a great many," smiled Mr. Marwood. "They are almost all perfect. The imperfect piece is the exception. But each piece represents untold care. We sometimes laugh at the old adage of a bull in the china-shop, but let me assure you that a poor workman can do almost as much damage in a porcelain factory."

Mr. Marwood drew out his watch.

"I believe we shall now have just about time before luncheon to go down to the kilns," he observed presently. "Should you like to?"

"Indeed I should."

"There is not much that we can see, I am afraid. However, we may be able to catch a glimpse of some of the ware being packed in the saggers."

"What is a sagger?"

"It is a large clay container in which unfired pottery or porcelain is packed while it is passing through the firing process. These large clay vessels have come into general use as the best thing for the purpose. They stand the heat and at the same time are less liable to break or chip the goods than are containers of any other material. We make them ourselves here in the mills. In fact, there is an entire section in the clay-shop devoted to nothing but sagger making. Special

machinery grinds and mixes the clay; special men fashion by hand the great containers; while other men do nothing but work in the wad-mills where rolls of clay to cover the top of the saggers and protect the unfired ware from smoke are made."

"Don't the clay saggers ever break?" questioned Theo.

"Sometimes, alas!" admitted Mr. Marwood. "When they do the china in them must be rescued from the kilns and put into new saggers. The old saggers are then broken up; the clay in them ground and sifted; and after being moistened again and mixed with fresh clay other saggers are modeled."

"Is the same sort of clay sagger used for the glazed as well as for the unglazed wares?"

"No. For the glazed china we generally use glost saggers that have been covered on the inner side with a coating of enamel."

All this time as they talked they had been passing through the mill and they now entered a low hot building where a series of brick ovens with arching tops covered the floor.

"Here," said Mr. Marwood, "are the firing kilns. After the ware has been brought here in baskets it is very carefully packed in the saggers, and the saggers in turn packed in these great brick ovens. Before they are put in the kilns have to be cooled so the heat to which the ware is subjected may increase gradually."

"But it must take forever to pack all the saggers into the kiln," declared Theo as he viewed in consternation the interior of one of the waiting ovens.

"It takes a long time—about five hours," answered Mr. Marwood. "Porcelain requiring a shorter firing is placed near the front of the kiln, so it can be removed if necessary before the rest is taken out. After the kiln is filled the men brick up the door of the oven and start the fire. There the china bakes from forty to sixty hours. The length of time required depends on the sort of ware being fired and the temperature of the kiln. Then the opening is unsealed and the cooling process begins.

"Do they wait until the saggers and their contents are cold before they take them out?" asked Theo.

"No, indeed," was Mr. Marwood's reply. "That would take too long. Often we are in a hurry to get the goods out and the ovens cooled for the next lot of porcelain; frequently, too, we want the ware so that we may continue work upon it. Therefore we begin the drawing while the oven is still very hot—so hot that the men are stripped to the waist and wear only overalls, shoes, and thick gloves. The kiln drawers are never forced to draw out the saggers, however, when they are intensely hot unless they wish to do so. The law protects such workers and specifies at just what degree of temperature the work is to become optional. Not only do these men draw the ware, but they also empty it from the saggers as well as put it into the baskets in which it is carried back to the factory and inspected, further decorated, or packed for shipping."

Mr. Marwood waited a moment, then added:

"In some foreign countries a tunnel kiln is used instead of an oven like this. It is supposed to require less fuel. It is a long tunnel with a track through the centre over which little cars laden with ware are propelled by machinery. The heat is graded in such a way that it is most intense in the middle of the kiln. The ware starts at one end of this tunnel where the temperature is quite low, travels toward the centre where the heat is highest, and then comes out at the other end of the tunnel through a diminishing heat. In this way it cools gradually. They say, however, that such a method is more successful for biscuit (the unglazed china) than for the glost. Here in America where fuel has always been plenty we have stuck to our old-fashioned brick ovens in spite of their expense. I am afraid we are not a saving nation."

"Father says that after this war is over we shall have to be more saving," said Theo.

"I believe that too," confessed Mr. Marwood. "We never have learned to figure things down to the lowest cent. We shall have to do it; and it won't hurt us, either. On the contrary, it will be a good lesson. If each of us would use the least possible material in the home, the factory, and the office we should save an amazing amount in a year."

"I think we ought to do it," affirmed Theo soberly.

"So do I," rejoined the elder man. "Many manufacturers have already come to finding uses for stuff they previously considered waste. They are using up their by-products, thereby not only enriching themselves but giving to the world things that are needed. It is an interesting and ingenious problem. If we were to employ the same principle everywhere we should find it well worthy of our brain power. Now shall we go back and hunt up Mr. Croyden, or have you still questions to ask?"

"I have a thousand questions," laughed Theo, "but I don't think you'd better stop now to answer them. Mother says I always do have questions; she says no sooner am I through with one than I am ready with another."

"So long as they are intelligent, thoughtful questions I am sure no one minds answering them," Mr. Marwood replied. "How else are we to learn? The man who is ashamed to ask

questions and confess he does not know is worth little in the world. When I spoke of questions, however, I meant questions about china-making."

"Oh!" exclaimed Theo. "No, I don't think I have any more questions about porcelain except to ask you how the glaze is put on the biscuit ware."

"That certainly is an intelligent question, and one I shall be only too happy to answer," Mr. Marwood said. "We could go down into the dipping sheds if we had more time. But perhaps since there is not I can tell you about them and it will do almost as well. To begin with, these sheds have cement floors because the glaze, or slip, spatters all about and dries upon them. It is therefore practically impossible to keep wooden floors clean, and we do not wish our workmen to inhale any more of the dried flint dust than is absolutely necessary."

"I remember hearing about that," Theo said.

"The glaze material is ground up while dry and very carefully sifted," went on Mr. Marwood. "Afterward it is mixed with water; colored, if a tinted glaze is required; and then pumped into tanks where it is kept well stirred. When ready the ware is dipped into this glaze and again fired. This time, however, it is a more difficult matter to pack it into the saggers since it must neither touch the sides of the sagger nor come in contact with any other piece."

"I never thought of that," owned Theo. "Of course, now that you speak of it, I can see that when the glaze melts and fuses with the clay it would show any mark."

"Exactly."

"It must be an awful job to keep each piece separate."

"It demands extreme care," returned Mr. Marwood. "We use all sorts of little clay devices to support the ware, and keep it in place while it is in the saggers."

"Does it take about the same length of time to fire the glazed porcelain as for the biscuit?" inquired Theo.

"No. The glost firing usually takes only from twenty-four to thirty-six hours. Afterward any bits of glaze projecting from the china or clinging to it are chipped away with a steel tool and the piece is examined. If free from flaws it goes either to the packing room to be shipped, or back to the factory, in case additional decoration is to be put on over the glaze. You may recall that I told you that there was an over-glaze and an under-glaze method of decoration."

"Yes, sir."

"Are your questions answered now?"

"I believe they are, thank you."

"And you can now make china without trouble—whatever kind you like best?"

"I shouldn't want to start doing it to-morrow," chuckled Theo. "I think I should rather begin on earthenware."

"You would have to go to some other mills, then," smiled Mr. Marwood. "We make no C. C. ware here."

"What is C. C. ware?"

"Ask Mr. Croyden," replied Mr. Marwood. "You see, we have a little joke about it. His name is Charles Croyden and sometimes in jest we call him C. C. Now C. C. ware (an abbreviation for cream-colored) is one of the cheapest of the white earthenwares. When first manufactured it used to be of a pale yellowish tint, but now it is made in white. Nevertheless its quality has not been materially improved. As Mr. Croyden manufactures only the finer grades of chinas it is a favorite quip of ours to call him C. C."

Theo laughed heartily.

"I will ask him about the C. C. ware some time," grinned the boy.

CHAPTER XVIII

THEO'S GREAT CHOICE

heo was as good as his word.

That noon as he and Mr. Croyden sat at luncheon he remarked mischievously:

"You did not tell me, sir, that you made C. C. ware here."

Mr. Croyden raised his eyes quickly and laughed.

"So they passed that joke on to you, did they?" he said. "C. C. ware indeed! You young rascal! I have half a mind now not to send to your mother that blue vase you admired so much."

"That blue vase! The one with the girl's head on it?" cried Theo. "Are you really going to send it to Mother?"

"If you behave yourself I am," came grimly from the older man. "And if she will let you come and visit us again some time."

"Oh, Mother'll be crazy over that vase. It is a corker!" exclaimed Theo. "I can tell her how I saw them making it."

"You shall carry it back to her then, since you think she will like it," declared Mr. Croyden. "That is unless you would rather select as a present a piece of C. C. ware," he added humorously.

Theo smiled and shook his head.

"Or maybe you would prefer a bit of Samian ware, or jet ware, or Rockingham ware, or yellow ware, or stoneware, or ironstone china, or white granite, or Queen's."

"Jehoshaphat! Are there all those kinds of earthenware?"

"Yes, and that is not the full list, either," replied Mr. Croyden. "We have a great many kinds of crockery, and as each variety has its cheaper as well as its more expensive grades, it makes an almost endless number of styles. The better types of white earthenware are made from carefully selected and well mixed clays, and more nearly approach porcelain, of which they are imitations. Often their design is quite good and in consequence they fill a large place in many a modest home. Indeed, although we ourselves do not go in for such chinas we respect a well-made piece of earthenware, for the making of good earthenware is an art in itself. Many a rule attends its successful manufacture. For example, the bottom of a heavy piece must not be too thick, or it will crack, because a tremendous strain comes on the base when the clay begins to dry and shrink. The sides pull from every direction, and therefore the bottom must be sufficiently thin to be elastic, and sufficiently thick to be strong. And that is only one of the problems to be faced by pottery and earthenware makers. So you see they, as well as we, have troubles."

"I guess no business is without its troubles," observed Theo.

"No business that is interesting," answered Mr. Croyden. "It is getting the better of such difficulties that gives zest to manufacture, making it a constant field for man's fertile brain. I think the old Italians were right when during the golden days of Venetian history they recognized the intellectual status of glass-makers, silk-makers, and the like; and accorded to such men the same honors they did to those of noble rank. For, after all, the noble was only what chance had made him; while the skilled artisan was what he had made himself—a far more creditable thing, to my way of thinking."

"And to mine!" agreed Theo.

"I am glad you feel that way," Mr. Croyden said, "because I am anxious to have you view this industry not alone from its technical but from its larger aspect. Did I not believe that I was doing something more than just the humdrum task of making dishes I should speedily become discouraged and decide my labor was not worth the strength I am constantly putting into it. But every honorable industry is far more than that. It is a monument to the men who conceived it and to those who little by little developed the wonderful machinery that makes it possible. Each perfect product it turns out voices the skill, patience, and faithfulness of scores of workmen. More than that, an industry is the weapon of the wage-earner—the means by which he and his family are protected from want and unhappiness. Hence every conscientious manufacturer performs a double service to mankind: he gives to the world something that it needs, and he furnishes his fellow-man with a means of livelihood. Regarded in this light it is no unworthy calling to be a manufacturer."

"I think both the man at the head of the firm, and the men who share in the work are doing their bit," put in Theo.

"The one is dependent on the other," affirmed Mr. Croyden. "It is a matter of equality. In fact, it would be hard to tell which of the two is the more indebted to the other—the employer or the employee. It is in this spirit that I try to run this great plant. I blunder, it is true; I suppose we all do that. But I sincerely believe labor should have an honored place, and so far as I am concerned I give it one. If I had a boy," Mr. Croyden's voice faltered, "If I had a boy," he repeated

more firmly, "he should be brought up to touch his cap to the laborer as well as to the capitalist; and he should be made to feel that the trade school is as praiseworthy a place as is the college. The two simply furnish different types of education."

Theo acquiesced.

"Your father and I represent these two types," continued Mr. Croyden. "When you grow up you will have to choose which of them you will follow. I know you will choose wisely and well. But you must never forget that it is the ideal behind what you do that transforms a calling from a gray, dead, monotonous vocation into a glowing, living, interesting career. You can be a routine doctor, seeing only the dull round of aches and pains; or you can be the Great Physician who continues God's work of healing on the earth. As for the manufacturer—in this field, too, you can be the mere money-getter who crowds down and ignores those who have helped him to amass his wealth; or you can be the profit-sharer and co-worker. It all rests with yourself. It will not be the fault of the task you choose but the littleness of your vision if you dwarf your life and find your horizon small."

Long afterward Theo Swift remembered those words, and when on his twenty-second birthday he entered the Trenton mills, there to be trained to assume a partnership in the business, it was with the aim that as a captain of industry he would serve his generation.

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