

Development of the Incubator

BY FREDERIC J. HASKIN.

The incubator is gradually crowding the American hen out of the business of sitting on her own eggs. This wonderful machine has been perfected until it can do a better job of hatching the little chicks than old biddy, their natural mother. The hen is being succeeded by the incubator, just as the needle was followed by the sewing machine, or the hand cradle by the reaper. Ninety per cent of the professional poultrymen use the incubator exclusively, for the reason that with it they can hatch chickens out of season. This means to them just what it does to the florist to be able to produce the tender flowers of summer in the dead of winter. The old hen goes hand in glove with nature, and as a consequence her season as a sifter is short. The incubator goes it alone and keeps up the pace the year through.

Hatching chickens by artificial means is almost as old as history. The art was known before the dawn of the Christian era, and has been practiced continuously in Egypt, China, and other Oriental countries down to the present day. For many years past chickens have been hatched artificially in European countries, notably in France, England, Belgium, and Denmark, but it has remained for Yankee genius to modernize and perfect the present popular-sized incubator and brooder, and to devise ways and means of hatching and raising chicks in large numbers by its use on the city lots, the village acre, and the ordinary farm.

The first incubator made its appearance in this country in 1845. A Yankee put one on exhibition on Broadway, New York. He charged a shilling to see the wonder, and out of curiosity it was well patronized, but his machine was considered a fake. Men would not believe that an egg could be hatched anywhere except under a hen, so the showman began demonstrating to prove the virtue of his invention. He would break eggs from the machine to show the different stages of incubation, and finally succeeded in convincing a good many that it was not a fraud. Time has proved that it was far from being a humbug.

It has taken years of experiment and study, and the expenditure of much money, to develop the science of artificial incubation into the successful practice it is to-day. Its promoters had to closely observe and follow the natural laws of incubation. They found that nature assisted a sitting hen by rushing the blood to that portion of the body which comes in contact with the eggs; that during certain stages of incubation the eggs shifted their position under the hen; that at the expiration of a certain period the number of these absences varying with the individual fowl and the condition of the weather; that at times the hen would rise in her nest and shake her feathers, evidently for the purpose of cooling her body and the eggs, and they also found that the eggs would sweat. These and many other discoveries gave them plenty to contend with in making a little box of wood and glass that would perfectly perform the natural functions of the mother hen.

The matter of temperature gave much trouble, and some of the experiments were unique. Thermometers were placed under sitting hens in all manner of positions to establish the varying degrees of heat during the different stages of incubation. Some of the fowls were killed and delicate thermometers thrust instantly into their hearts and other vital organs, to determine the temperature of the inside of their bodies, as well as the outside. By such bold methods the secrets of the business have been revealed from nature. All the problems of heat, moisture, and ventilation have been solved. It takes twenty-one days to hatch a chick, and the incubator authorities can tell you each day of progress and information and life of the little fowl before it comes out of its shell.

The incubators will hatch any kind of eggs, but the length of time varies in different birds or fowls. It takes a humming bird only twelve days to come through, a canary eighteen, a duck twenty-eight, a turkey thirty, and a swan forty. One authority reports that he found some snake eggs in a pile of compost, and put them into a machine. When he went to look again the bottom of the box was a squirming mass of spotted adders. The eggs of quail, pheasant, and all kinds of game birds develop readily in the improved incubator of the present time. Ostrich eggs are also being hatched successfully in Florida, Arizona, and California.

Ostrich farming has been practiced in this country since 1882, and is getting to be a very profitable business, single feathers being worth from \$1 to \$7 as taken from the bird. The owner will realize about \$100 a season from each bird. It is said the average age of an ostrich is eighty years, and that the value of matured birds averages about \$500. The incubator has made ostrich farming in this country a success when it would otherwise have been impossible, for the reason that the ostrich is a strange fowl to sit upon its eggs at night, and turn them over to the sun's rays during the day. This works all right in the warmer countries of which the ostrich is a native, but our sun is not warm enough to hatch the eggs.

Incubators are also successfully used in the care of babies prematurely born. A special kind is made with crib, automatically ventilated, resting over a hot water tank. The temperature of the interior can be kept absolutely even, which is one of the conditions under which child life is maintained. Nearly every well-equipped child hospital in the country is now supplied with a baby incubator.

The largest incubator ever built in America was a duck ranch at Stroudsburg, Pa. It was built twenty-two feet square, with an egg-testing room ten by twelve feet in size adjoining. It cost \$3,000 and held 20,000 eggs at a time. The yearly capacity of this monster hatching machine was 300,000 eggs.

With the aid of the incubator the professional poultry raiser enters into large contracts without fear of failure. A poultryman in Ohio has an agreement to furnish a Cleveland commission firm with 300 young chickens every day. It is understood that these young broilers are to weigh a pound and a half, and he gets \$9 a dozen for them. The way he manages to keep up with this big undertaking is well worth relating. He has 140 acres devoted to the use of his poultry plant. The main building is 480 feet long, and there is a row of pens 500 feet in length. He uses thirty improved incubators with a capacity of 300 eggs each. These machines are not all filled at the same time, but proportioned so that some of them will be discharging fresh chicks each day.

A large flock of Barred Plymouth Rock biddies are kept constantly on duty laying

eggs with which to stock these hatching machines, and 60 eggs are placed in them each day, including Sunday. In connection with the incubators there is a row of pens numbered from one to ninety. Each day the little chicks from the machines are turned into the first pen. They are advanced one pen each day, and when the last one is reached they are nine days old, and are ready for the market. They are herded from the incubators through all of the pens, and finally into the coops, without being touched. They are not handled until the cook wrings their necks, and dresses them for the frying pan.

A certain proportion of the eggs do not hatch, and all of them that are hatched do not live to make the trip through the ninety pens, but the percentage of loss is comparatively small. The breeder finds that the 450 eggs which go into the incubators every day easily net him \$300. The breeder of the coops, which are shipped to the city daily from pen No. 99, in order to carry out this system and meet his contract, it will be seen that the poultryman has something like 30,000 chicks constantly on hand, to say nothing of the hundreds of dozens of eggs

ing of the hundreds of dozens of eggs set up in the incubators, or the great flock of laying hens that supply the eggs. But he gets to market with his daily order just the same. This man is cleaning up a profit of \$25,000 annually, and there are many others who are succeeding splendidly at the business.

The "green duck" industry is largely dependent upon the incubator. Green ducks mean imperial Pekins, which were originally imported from China. They are raised by the thousands and tens of thousands by artificial means, fed scientifically, and marketed when they are from eight to ten weeks old. This is just before they molt their first coat of feathers, at which time they weigh from eight to ten pounds per pair. Some of them are fed upon celery seed to give them the most flavor of the famous Southern canvas backs, and are successful in that the difference cannot be detected. Separate duck ranches on Long Island, at Harrisburg, Pa., Trenton, N. J., Dallas, Pa., and elsewhere, produce annually from March to October, and in 1906, 30,000 green ducks, marketed them principally in New York and Boston. This industry is also well developed in New England, particularly in Eastern Massachusetts, where there are several ranches that produce from 20,000 to 30,000 ducks annually. Two of the largest of these are located at South Easton and Wrentham. Spoken, Long Island, is the center of a large annual production, fully 100,000 green ducks being grown each season within a few miles of this little village.

To-morrow—A Modern Poultry Farm.

GOOD SHIP ROOSEVELT.

BY RITA KELLEY.

"Betsy, let's run out into the Hudson and see Peary's ship!" Betsy Cobb jumped at her brother's words and gazed with sudden intentness out the window. She had come up to his office for a few moments' chat, and, as she felt the blood pounding into her cheeks and up to her hair, she wished poetically that she had stayed away. To the Roosevelt, itchy with her curiosity, "It's too cold," she objected, simulating a shiver. "We'll freeze getting out there."

"Boah! Get on your gloves. It isn't every day that one has a chance to climb over a vessel that's been within hailing distance of the north pole. I'll just cut my appointments. What's the trouble?" She had balked flatly at the gentle urgency of her brother's hand on her arm. "I won't go," she declared.

The doctor laughed good-humoredly. "What's up? Is some fickle admirer who forgot for the first time to send you a box of candy for your birthday due out there this afternoon? Come on, it isn't every day I can run off, and it's no pleasure to go alone."

Betsy's head swam with a perspective of a chain of horrors opening up by her acquiescence, but, on the other hand, her brother's curiosity was not to be roused too much. He had a most uncomfortable habit of going to the bottom of things, and the condition of the weather; that at times the hen would rise in her nest and shake her feathers, evidently for the purpose of cooling her body and the eggs, and they also found that the eggs would sweat. These and many other discoveries gave them plenty to contend with in making a little box of wood and glass that would perfectly perform the natural functions of the mother hen.

"Well," she said, reluctantly, "I'll go. She laughed a bit hysterically. "But I'd rather be hanged."

Her brother remembered with some uneasiness that Betsy had not been herself of late. She was not so gay and fun-loving as usual, and he often caught her moaning. That was what she was doing back at the office just now, and it decided him to run away with her for a while.

"Betsy, don't you feel well?" he asked as they scrambled off a cross-town car at the ferry slip.

"Both of us! Yes! What a silly question! But, though her words were careless, she avoided his eyes and looked off down the Hudson. "You can't get across this day," she announced with perceptible reluctance. "The ice is all craked up here on the New York side so that a launch couldn't possibly get through."

"We'll hire a ferry, then," said her brother cheerfully. One thing was certain—the Roosevelt had something vital to do with her state of sulks. Good; he would probe further.

"Is there any way of getting out to the Peary ship?" he inquired of a policeman who was standing by.

"Ice is pretty bad. No boats going out of here, but maybe if you walk up to Forty-fourth street you can get on a bigger boat. They have been out once to-day, though. No ice over there, and you can hire some one to take you out to mid-stream. The Peary boat is nearer the Jersey shore anyhow," he called after the fat, round-looking physician, who had seized his sister's arm as the ferry gong sounded and was hustling her on board.

Betsy looked furtively at the vessel, lying low and gray, with her nose up toward the sky. "There was a very deep interest amounting even to fascination in her glance, but she feigned extreme indifference. Several other people were evidently on the same quest, and as the ferry neared the Jersey shore a cry of disappointment went up. Not a launch or rowboat in sight it looked very much as though those who were not good swimmers would have to content themselves with ferry glimpses of the famed land, and cameras began snapping industriously.

Again Betsy's manner became more spontaneous. "You will get out to the Roosevelt, will you, sister?" she asked, joyously. "Well, I don't envy you the swim in this temperature. Fortunately, I'm a girl, and so exempt."

"Ho! I don't know. Plenty of rowboats around here, but nowhere. You'll handle the oars all right. You are the most indefatigable croaker I ever saw."

Following the directions of a "longshoreman," he guided Betsy's lagging footsteps for five minutes across a bridge, down interminable flights of stairs, across the road to the "wood pile," and brought up before a rotten log enmeshed in ice cakes that led out to a row of decrepit old canal boats lying out of commission along the shore. A man appeared around

the corner of the little turret on top of one of the boats and asked if they could row.

"Well, I should say," the doctor shouted. And Betsy was forced to scramble up the perpendicular old ladder onto the boat, there across and down a ladder into a flat-bottomed old fishing boat at the other end. Her brother took off his overcoat and wrapped it about her carefully before he stepped ashore and fell in with the stroke of the old river man.

The doctor was studying Betsy closely. It looked to him very much like a case of the heart, he speculated as they drew near the ship. When she weakly made excuse to remain in the rowboat while her brother clambered over the ship, he was certain that the masculine reason lurked on his forehead. So Betsy, perforce, boarded the Roosevelt.

The ship was in gala dress, with many sightseers aboard. As Betsy and her brother stood on the deck clutching their hats in the stiff breeze, a young, brown, weather-beaten man, stepped up and rather shyly held out his hand to Betsy. Instantly the doctor looked at his sister. She was flushed, painfully embarrassed, and was stammering like an awkward schoolgirl. He was the man who had been in Dr. Cobb came to her rescue, chastising himself mentally.

"Haven't I seen you before?" he asked, extending his hand to her now embarrassed sister, who surmised belonged to the ship, from a certain fine manliness that is only bred of hardship and self-reliance.

The man smiled a little whimsically as he gripped the hand of Betsy's brother. "You are Betsy—Miss Cobb's brother, are you not?" Then he, too, was covered with confusion. "I beg your pardon," she is not Miss Cobb.

Betsy had turned sharply away, but her brother ran his hand through her arm and whirled her right about face. "See here, young lady," he said seriously, "introduce me to this young man. What is his name?"

To his chagrin and utmost self-reproach she had hurried her head on his shoulder, and he thought he heard something like a sob work its way out from the cloth of his coat. He could not help but look at the young Northman and unveil a romance.

The man's face was drawn with a sort of starved tenderness, and his blue eyes gazed wistfully at the golden, shiny tendrils which escaped in the wind from the small black turban and swept the doctor's shoulder. Stern repression showed in the tense mouth. His whole expressive person seemed to bespeak the pain of having lost forever a much-loved prize.

RECALLS ROSS CASE

Abduction of Marvin Lad Parallels Famous One.

BOY CHARLEY NEVER FOUND

Joseph Douglas and William Mosher, Men Who Stole Germaniown (Pa.) Four-year-old, Killed While Burglarizing New York Home—Believed to Have Murdered Their Victim.

Though nearly forty years have elapsed, the search for Horace Marvin recalls forcibly to the minds of hundreds of readers the kidnapping of Charley Ross. The name to-day is known in every household in America. Public interest at the time extended not only throughout this country, but to Europe and South America, and even to the farthest parts of Asia, as shown by letters received by the father, Christian K. Ross.

In 1874 no laws were written on the books of any State which anticipated the commission of such an offense, nor was commensurate punishment provided. After the kidnapping of the Ross boy, the legislatures of a few States passed acts defining the crime and affixing severe penalties, which have now become universal.

Charley Ross was four years and two months old when stolen from his home in Germantown, a suburb of Philadelphia, on July 1, 1874. Despite the ingenious plans of experts and detectives in every quarter, and the stimulus of large rewards, the child was never recovered.

The story, as told by his brother Walter, six years old, was that two men driving in a buggy had given candy to him and Charley on Saturday, June 27, and the boys followed, as shown by letters received on July 1. On the last occasion Charley asked them for a ride, and also whether they would buy firecrackers for him. The men took the boys into a wagon, promising to take them to the store of "Aunt Susie," a fictitious name.

Enticed Away with Candy. The children were given candy, but after driving some distance Charley began to cry and asked that he be taken home. He was pacified by being told that he would soon be at the store. On reaching Palmer and Richmond streets, in Philadelphia, Walter was given twenty-five cents, directed to a store and told to purchase fireworks. While the child was in the store, the men drove off, taking Charley with them.

Then began the search, which, though ending in the death of the abductors, Joseph Douglas and William Mosher never revealed the whereabouts of the lost child.

Persons offering a reward were placed in the Philadelphia papers, and on July 3 the following letter was received by Mr. Ross, postmarked Philadelphia:

"Mr. Ross: be not uneasy you son Charley's brother be all writ we is got him and no power on earth can deliver out of our hand, you will pay to pay us be for you get him from us, and pay us a big cent to. If you put the cops hunting for him you is only defeating you own end. We is got him put so no living power-can get him from us alive, if any approach is made to his hideout place that is the signal for his instant annihilation. If you regard his life put no one in search of him, you money can fetch him out alive no other existin power, don't deceive yourself an think the detectives can get him from us for that is the impossible, you here from us in a few days."

The letter was the forerunner of others of like character. Mr. Ross keeping up the correspondence with the hope of securing a successful clue. In the meantime a reward of \$20,000 was offered for the recovery of the child and the arrest of the abductors. The regular detective forces of the larger cities were working with unusual and constant zeal.

Amateur detectives who had their own theories were pursuing them with unwearied ardor, but no approach whatever had been made to a solution of the

enigma, and every one was in entire ignorance of the hiding place of the kidnapers.

The last letter from the abductors, postmarked Philadelphia, was received November 6, 1874, and in it they intimated that for three months they had been trying to steal another child and demand a ransom compared with which \$20,000 required the father of Charley would have seemed insignificant. On November 17, an arrangement was made to pay the kidnapers at the Fifth Avenue Hotel, New York, but the money was not called for. The kidnapers evidently were afraid to come to the hotel, notwithstanding the boldness they assumed. The search for them was continued with unabated activity. On several occasions, the detectives were close on their tracks, and at one time they entered a suspected saloon to find that the men had left about an hour before. So hard were they pressed by the officers that they were forced to visit mainly almost wholly out of the water, visiting only at night and in the most secret way.

Soon they were brought to distress and suffering, and under these circumstances resorted to burglary.

Killed While Robbing House. While trying to rob the house of I. Holmes Van Brunt, Bay Ridge, Long Island, both men were killed by a shotgun in the hands of Mr. Van Brunt. One was instantly killed, and the other lived about two hours. Water was given the wounded burglar, and after drinking it, he said:

"Men, I won't lie to you; my name is Joseph Douglas, and that man over there is William Mosher. It's no use lying now; Mosher and I stole Charley Ross from Germantown." When asked why they stole the boy, he replied: "To make money."

He was then asked who had charge of the child, to which he replied: "Mosher knows; ask him. God knows, I am telling you the truth. I don't know where he is. Mosher knows." He remained conscious until about fifteen minutes before his death, denying any knowledge of the child's whereabouts until the last.

The search was continued for years, but without avail, it finally becoming the settled conviction that the boy was killed.

The Leather We Eat. From the Milwaukee Sentinel. "And then," said the arctic explorer, "I ate my leather belt."

"Pooh, what of that? Every mother's son of us eats a pair of shoes a year." The explorer frowned.

"This," he began, "is no laughing—!" But the scientist interrupted him—

"I am not jesting, sir. I speak the solemn truth. What is leather? Is it not albumen and tannin? Well, when you add milk to your tea or coffee the tannin of the one and the albumen of the other unite, and leather results. The leather is in minute particles. Nevertheless, it is there, and it goes."

"All who drink tea or coffee daily," the scientist concluded, "consume in a year enough leather to make a pair of shoes."

The explorer sneered. "To resume," he said, "I then ate the lining of it." &c.

Development of the Incubator

BY FREDERIC J. HASKIN.

The incubator is gradually crowding the American hen out of the business of sitting on her own eggs. This wonderful machine has been perfected until it can do a better job of hatching the little chicks than old biddy, their natural mother. The hen is being succeeded by the incubator, just as the needle was followed by the sewing machine, or the hand cradle by the reaper. Ninety per cent of the professional poultrymen use the incubator exclusively, for the reason that with it they can hatch chickens out of season. This means to them just what it does to the florist to be able to produce the tender flowers of summer in the dead of winter. The old hen goes hand in glove with nature, and as a consequence her season as a sifter is short. The incubator goes it alone and keeps up the pace the year through.

Hatching chickens by artificial means is almost as old as history. The art was known before the dawn of the Christian era, and has been practiced continuously in Egypt, China, and other Oriental countries down to the present day. For many years past chickens have been hatched artificially in European countries, notably in France, England, Belgium, and Denmark, but it has remained for Yankee genius to modernize and perfect the present popular-sized incubator and brooder, and to devise ways and means of hatching and raising chicks in large numbers by its use on the city lots, the village acre, and the ordinary farm.

The first incubator made its appearance in this country in 1845. A Yankee put one on exhibition on Broadway, New York. He charged a shilling to see the wonder, and out of curiosity it was well patronized, but his machine was considered a fake. Men would not believe that an egg could be hatched anywhere except under a hen, so the showman began demonstrating to prove the virtue of his invention. He would break eggs from the machine to show the different stages of incubation, and finally succeeded in convincing a good many that it was not a fraud. Time has proved that it was far from being a humbug.

It has taken years of experiment and study, and the expenditure of much money, to develop the science of artificial incubation into the successful practice it is to-day. Its promoters had to closely observe and follow the natural laws of incubation. They found that nature assisted a sitting hen by rushing the blood to that portion of the body which comes in contact with the eggs; that during certain stages of incubation the eggs shifted their position under the hen; that at the expiration of a certain period the number of these absences varying with the individual fowl and the condition of the weather; that at times the hen would rise in her nest and shake her feathers, evidently for the purpose of cooling her body and the eggs, and they also found that the eggs would sweat. These and many other discoveries gave them plenty to contend with in making a little box of wood and glass that would perfectly perform the natural functions of the mother hen.

The matter of temperature gave much trouble, and some of the experiments were unique. Thermometers were placed under sitting hens in all manner of positions to establish the varying degrees of heat during the different stages of incubation. Some of the fowls were killed and delicate thermometers thrust instantly into their hearts and other vital organs, to determine the temperature of the inside of their bodies, as well as the outside. By such bold methods the secrets of the business have been revealed from nature. All the problems of heat, moisture, and ventilation have been solved. It takes twenty-one days to hatch a chick, and the incubator authorities can tell you each day of progress and information and life of the little fowl before it comes out of its shell.

The incubators will hatch any kind of eggs, but the length of time varies in different birds or fowls. It takes a humming bird only twelve days to come through, a canary eighteen, a duck twenty-eight, a turkey thirty, and a swan forty. One authority reports that he found some snake eggs in a pile of compost, and put them into a machine. When he went to look again the bottom of the box was a squirming mass of spotted adders. The eggs of quail, pheasant, and all kinds of game birds develop readily in the improved incubator of the present time. Ostrich eggs are also being hatched successfully in Florida, Arizona, and California.

Ostrich farming has been practiced in this country since 1882, and is getting to be a very profitable business, single feathers being worth from \$1 to \$7 as taken from the bird. The owner will realize about \$100 a season from each bird. It is said the average age of an ostrich is eighty years, and that the value of matured birds averages about \$500. The incubator has made ostrich farming in this country a success when it would otherwise have been impossible, for the reason that the ostrich is a strange fowl to sit upon its eggs at night, and turn them over to the sun's rays during the day. This works all right in the warmer countries of which the ostrich is a native, but our sun is not warm enough to hatch the eggs.

Incubators are also successfully used in the care of babies prematurely born. A special kind is made with crib, automatically ventilated, resting over a hot water tank. The temperature of the interior can be kept absolutely even, which is one of the conditions under which child life is maintained. Nearly every well-equipped child hospital in the country is now supplied with a baby incubator.

The largest incubator ever built in America was a duck ranch at Stroudsburg, Pa. It was built twenty-two feet square, with an egg-testing room ten by twelve feet in size adjoining. It cost \$3,000 and held 20,000 eggs at a time. The yearly capacity of this monster hatching machine was 300,000 eggs.

With the aid of the incubator the professional poultry raiser enters into large contracts without fear of failure. A poultryman in Ohio has an agreement to furnish a Cleveland commission firm with 300 young chickens every day. It is understood that these young broilers are to weigh a pound and a half, and he gets \$9 a dozen for them. The way he manages to keep up with this big undertaking is well worth relating. He has 140 acres devoted to the use of his poultry plant. The main building is 480 feet long, and there is a row of pens 500 feet in length. He uses thirty improved incubators with a capacity of 300 eggs each. These machines are not all filled at the same time, but proportioned so that some of them will be discharging fresh chicks each day.

A large flock of Barred Plymouth Rock biddies are kept constantly on duty laying

eggs with which to stock these hatching machines, and 60 eggs are placed in them each day, including Sunday. In connection with the incubators there is a row of pens numbered from one to ninety. Each day the little chicks from the machines are turned into the first pen. They are advanced one pen each day, and when the last one is reached they are nine days old, and are ready for the market. They are herded from the incubators through all of the pens, and finally into the coops, without being touched. They are not handled until the cook wrings their necks, and dresses them for the frying pan.

A certain proportion of the eggs do not hatch, and all of them that are hatched do not live to make the trip through the ninety pens, but the percentage of loss is comparatively small. The breeder finds that the 450 eggs which go into the incubators every day easily net him \$300. The breeder of the coops, which are shipped to the city daily from pen No. 99, in order to carry out this system and meet his contract, it will be seen that the poultryman has something like 30,000 chicks constantly on hand, to say nothing of the hundreds of dozens of eggs

ing of the hundreds of dozens of eggs set up in the incubators, or the great flock of laying hens that supply the eggs. But he gets to market with his daily order just the same. This man is cleaning up a profit of \$25,000 annually, and there are many others who are succeeding splendidly at the business.

The "green duck" industry is largely dependent upon the incubator. Green ducks mean imperial Pekins, which were originally imported from China. They are raised by the thousands and tens of thousands by artificial means, fed scientifically, and marketed when they are from eight to ten weeks old. This is just before they molt their first coat of feathers, at which time they weigh from eight to ten pounds per pair. Some of them are fed upon celery seed to give them the most flavor of the famous Southern canvas backs, and are successful in that the difference cannot be detected. Separate duck ranches on Long Island, at Harrisburg, Pa., Trenton, N. J., Dallas, Pa., and elsewhere, produce annually from March to October, and in 1906, 30,000 green ducks, marketed them principally in New York and Boston. This industry is also well developed in New England, particularly in Eastern Massachusetts, where there are several ranches that produce from 20,000 to 30,000 ducks annually. Two of the largest of these are located at South Easton and Wrentham. Spoken, Long Island, is the center of a large annual production, fully 100,000 green ducks being grown each season within a few miles of this little village.

To-morrow—A Modern Poultry Farm.

GOOD SHIP ROOSEVELT.

BY RITA KELLEY.

"Betsy, let's run out into the Hudson and see Peary's ship!" Betsy Cobb jumped at her brother's words and gazed with sudden intentness out the window. She had come up to his office for a few moments' chat, and, as she felt the blood pounding into her cheeks and up to her hair, she wished poetically that she had stayed away. To the Roosevelt, itchy with her curiosity, "It's too cold," she objected, simulating a shiver. "We'll freeze getting out there."

"Boah! Get on your gloves. It isn't every day that one has a chance to climb over a vessel that's been within hailing distance of the north pole. I'll just cut my appointments. What's the trouble?" She had balked flatly at the gentle urgency of her brother's hand on her arm. "I won't go," she declared.

The doctor laughed good-humoredly. "What's up? Is some fickle admirer who forgot for the first time to send you a box of candy for your birthday due out there this afternoon? Come on, it isn't every day I can run off, and it's no pleasure to go alone."

Betsy's head swam with a perspective of a chain of horrors opening up by her acquiescence, but, on the other hand, her brother's curiosity was not to be roused too much. He had a most uncomfortable habit of going to the bottom of things, and the condition of the weather; that at times the hen would rise in her nest and shake her feathers, evidently for the purpose of cooling her body and the eggs, and they also found that the eggs would sweat. These and many other discoveries gave them plenty to contend with in making a little box of wood and glass that would perfectly perform the natural functions of the mother hen.

The matter of temperature gave much trouble, and some of the experiments were unique. Thermometers were placed under sitting hens in all manner of positions to establish the varying degrees of heat during the different stages of incubation. Some of the fowls were killed and delicate thermometers thrust instantly into their hearts and other vital organs, to determine the temperature of the inside of their bodies, as well as the outside. By such bold methods the secrets of the business have been revealed from nature. All the problems of heat, moisture, and ventilation have been solved. It takes twenty-one days to hatch a chick, and the incubator authorities can tell you each day of progress and information and life of the little fowl before it comes out of its shell.

The incubators will hatch any kind of eggs, but the length of time varies in different birds or fowls. It takes a humming bird only twelve days to come through, a canary eighteen, a duck twenty-eight, a turkey thirty, and a swan forty. One authority reports that he found some snake eggs in a pile of compost, and put them into a machine. When he went to look again the bottom of the box was a squirming mass of spotted adders. The eggs of quail, pheasant, and all kinds of game birds develop readily in the improved incubator of the present time. Ostrich eggs are also being hatched successfully in Florida, Arizona, and California.

Ostrich farming has been practiced in this country since 1882, and is getting to be a very profitable business, single feathers being worth from \$1 to \$7 as taken from the bird. The owner will realize about \$100 a season from each bird. It is said the average age of an ostrich is eighty years, and that the value of matured birds averages about \$500. The incubator has made ostrich farming in this country a success when it would otherwise have been impossible, for the reason that the ostrich is a strange fowl to sit upon its eggs at night, and turn them over to the sun's rays during the day. This works all right in the warmer countries of which the ostrich is a native, but our sun is not warm enough to hatch the eggs.

Incubators are also successfully used in the care of babies prematurely born. A special kind is made with crib, automatically ventilated, resting over a hot water tank. The temperature of the interior can be kept absolutely even, which is one of the conditions under which child life is maintained. Nearly every well-equipped child hospital in the country is now supplied with a baby incubator.

The largest incubator ever built in America was a duck ranch at Stroudsburg, Pa. It was built twenty-two feet square, with an egg-testing room ten by twelve feet in size adjoining. It cost \$3,000 and held 20,000 eggs at a time. The yearly capacity of this monster hatching machine was 300,000 eggs.

With the aid of the incubator the professional poultry raiser enters into large contracts without fear of failure. A poultryman in Ohio has an agreement to furnish a Cleveland commission firm with 300 young chickens every day. It is understood that these young broilers are to weigh a pound and a half, and he gets \$9 a dozen for them. The way he manages to keep up with this big undertaking is well worth relating. He has 140 acres devoted to the use of his poultry plant. The main building is 480 feet long, and there is a row of pens 500 feet in length. He uses thirty improved incubators with a capacity of 300 eggs each. These machines are not all filled at the same time, but proportioned so that some of them will be discharging fresh chicks each day.

A large flock of Barred Plymouth Rock biddies are kept constantly on duty laying

eggs with which to stock these hatching machines, and 60 eggs are placed in them each day, including Sunday. In connection with the incubators there is a row of pens numbered from one to ninety. Each day the little chicks from the machines are turned into the first pen. They are advanced one pen each day, and when the last one is reached they are nine days old, and are ready for the market. They are herded from the incubators through all of the pens, and finally into the coops, without being touched. They are not handled until the cook wrings their necks, and dresses them for the frying pan.

A certain proportion of the eggs do not hatch, and all of them that are hatched do not live to make the trip through the ninety pens, but the percentage of loss is comparatively small. The breeder finds that the 450 eggs which go into the incubators every day easily net him \$300. The breeder of the coops, which are shipped to the city daily from pen No. 99, in order to carry out this system and meet his contract, it will be seen that the poultryman has something like 30,000 chicks constantly on hand, to say nothing of the hundreds of dozens of eggs

ing of the hundreds of dozens of eggs set up in the incubators, or the great flock of laying hens that supply the eggs. But he gets to market with his daily order just the same. This man is cleaning up a profit of \$25,000 annually, and there are many others who are succeeding splendidly at the business.

The "green duck" industry is largely dependent upon the incubator. Green ducks mean imperial Pekins, which were originally imported from China. They are raised by the thousands and tens of thousands by artificial means, fed scientifically, and marketed when they are from eight to ten weeks old. This is just before they molt their first coat of feathers, at which time they weigh from eight to ten pounds per pair. Some of them are fed upon celery seed to give them the most flavor