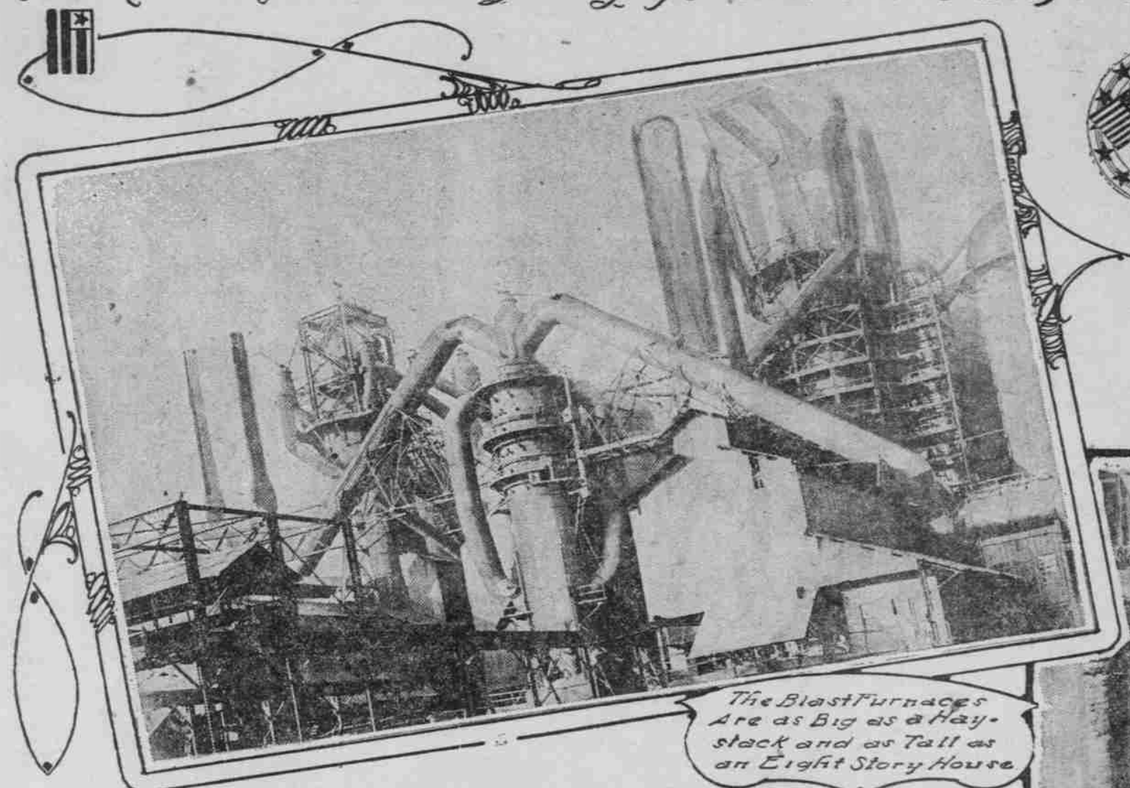
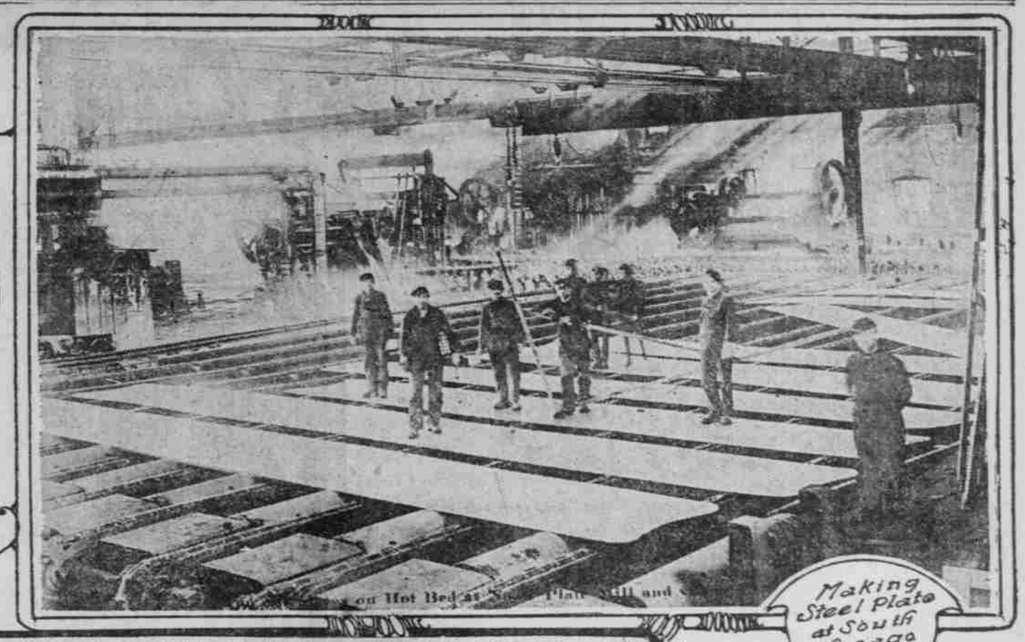
BILLIONS FOR WAR STEEL

Frank G. Carpenter Visits Army of Patriots at Blast Furnaces



The Blast Furnaces Are as Big as a Hay-stack and as Tall as an Eight Story House



Making Steel Plate at South Chicago

The Furnaces Work Day and Night, Sunday and Holidays

(Copyright, 1917, by Frank G. Carpenter.)

GARY, Ind., 1917.—I have come from the iron mines at the head of Lake Superior on a vessel loaded with ore to the great steel plants here at the foot of Lake Michigan. My steamer had a cargo of 12,000 tons. She unloaded this in less than five hours and the ore is already on its way to the furnace. By the time this letter is published it will have been made into steel and will have gone out with other sister cargoes into steel rails, big guns and shells and the thousand and one other forms in which Uncle Sam is using steel in our fight with the Germans. Last year, when we were still out of the war, we sold to England and France 4,000,000 or 5,000,000 tons of steel shells and 766,000,000 pounds of barbed wire for entanglements. That steel would have filled a train of 50-ton cars as long as from New York to Chicago, and the barbed wire would have been enough to build a nine-strand hog-tight fence around the world on the line of the equator. Those were the sales of one year and of only two items. They were made when we had not yet begun to fight. Now, we are in the struggle with every atom of muscle and every bit of machinery we can command. The Government is taking the produce of the steel plants and the output will be greater than ever before. The plants are now backed by more than $4,000,000,000 of capital. Every worker in steel and iron has been drafted into the industrial Army and we have today more than 1,000,000 such men in the ranks.

Away down here at the foot of Lake Michigan are two of the biggest camps of this army of iron and steel. Although officered by the United States Steel Corporation, they are now under the Government and they are fighting the battle after the most improved methods of modern efficiency. It is to show you something of what they are doing that I have come here to South Chicago and Gary. But first let me show you how strategically the two camps are located and how well they are fitted for waging the war. They are situated on the deep waters of Lake Michigan, where the ore from the mountains of Lake Superior can be shot from the ships almost into the furnaces, where coal and limestone can be cheaply secured and where the steel products can be rapidly transported to any part of the world.

The South Chicago plant is a part of the city of Chicago. This section has about 80,000 inhabitants and the most of them are supported by the steel works. The town of Gary is just across the Indiana boundary, about 30 miles from Chicago. It has 55,000 inhabitants and there are about 12,000 men at work in the mills and the furnaces.

The South Chicago plant is that of the Illinois Steel Company. Its buildings already cover about 400 acres and it has more than twice as much more land adjoining it which will eventually be used for the works. The Gary plant belongs to the Indiana Steel Company, another branch of the United States Steel Corporation. It is already three miles long and a mile and a quarter in width and this whole territory is covered with structures that are very mountains of steel. The towers and turrets of its furnaces stand out like mighty castles against the sky and its huge buildings are filled with masess of machinery that seem to move on ball bearings. A network of railroad tracks runs in and out through the works and great pipes of steel, some of them so large that a Pullman train could pass through them without touching the walls of the pipe, wind in and out, close to the ground and high above it, carrying millions of feet of gas to the various parts of the works. I do not know the cost of the South Chicago plant, but it has run far up into the tens of millions of dollars. The machinery of the Gary plant alone has cost more than $140,000,000, and the United States Steel Coroporation is now spending millions more in connection with it.

Today, owing to the demands of the times, new construction is going on at both plants. Gary is building four new blast furnaces and a great establishment for making wheels of forged steel. She is putting in 14 boilers to utilize the waste heat of her open-hearth furnaces and is installing new engine shops, new boiler shops and other works for increasing the by-products. At the Illinois steel plant they are installing electric open hearth furnaces, extending their foundries, building great gas-driven blowing engines and adding to their establishments for turning out Bessemer steel.

I despair of making you see the immensity of these mighty creations and the wonderful equipment they furnish for fighting the war. Take the blast furnaces. The Illinois and Indiana steel companies have 29, which are now blazing away night and day. They work holidays and Sundays, year in and year out, and since they have been built many of them have been smelting iron continuously for 98 per cent of their running time.

Each of these furnaces is as big around as a haystack and as tall as an eight-story house. It has four great stoves, almost as big and 20 feet higher, which heat the air blast to a temperature of from 1200 to 1600 degrees before it is forced into the furnace, and it holds a charge of about 1700 tons of ore, limestone and coke, which this heat turns to liquid. These furnaces have each cost in the neighborhood of a million dollars to build, and they would cost two or three times that if constructed today. They are the best of their kind, and those of the Illinois Steel Company alone are now turning out more than 2,000,000 tons of pig iron a year.

I shall not describe the process of smelting. The story of pig iron has often been told. The object of the furnace is to rob the ore of its oxygen and other impurities and leave only the iron. This is done by dropping alternate layers of coke, limestone and iron into the mighty towers and admitting at the bottom a hot blast, which melts the whole into one liquid mass. Of this mass the iron, on account of its weight, drops to the bottom of the furnace and the impurities of the ore and the limestone float like soapsuds on top. Then by making a hole in the furnace just above the surface of the iron, the impurities can be drawn off in the form of slag, and later on, from a lower hole the pure pig iron can go out the same way.

This process is old, but the machinery with which it is carried on at Gary and South Chicago is new. Almost all the work is done by machinery. The ore, limestone and coke are carried up in skip buckets which take less than a minute to raise their contents from the ground into the furnace. A single load is from 15,000 to 30,000 pounds, and the pulling of a lever raises this to the height of 80 feet and drops it into the furnace. It requires two tons of ore for each charge. The limestone and coke go the same way, and the furnace is practically filled with the aid of one man. The handling of the iron and slag as they come from the furnace is largely done by machinery, and iron, steel and electricity do most of the work.

Steel making is rapidly becoming an exact science and everything is tested by chemical and physical analysis. The ore is analyzed when it comes from the mine, and it is analyzed again at the furnaces. The limestone is analyzed and so is the coke, and when the pigiron flows forth a sample is taken from every 40-ton ladle and carried away to the laboratory to see that it is exactly right for the making of steel. There are more than 100 chemists at Gary alone, and there is practically an equal number at South Chicago. Their work goes on day and night and they aid in the experiments made for saving the waste as well as to the bettering of the steel.

Few people realize how closely the great industrial plants of today watch the pennies, and how much they will spend to save a fraction of a cent in a process. Last year the Illinois Steel Company spent $1,000,000 on its docks that it might save 45 minutes unloading each steamer. They will spend thousands of dollars to save cents, provided they think the saving will continue, and, at South Chicago and Gary, they are now coining millions out of the stuff that only a few years ago floated away on the air. The gas from these furnaces formerly went to waste. Today it is saved and used for heating the stoves which furnish the blast and for running the machinery of a whole plant. It goes to the boilers, where it generates steam, and to gas engines which are used for blowing air and generating electric power.

In one station at the Illinois steel plants I saw 8000 horsepower created in this way, and I went through large rooms where dynamos were running through the waste gas of the furnace.

One of the latest things in gas saving is washing this gas from the smelting in order that the iron dust in it may be saved and melted over again. In this process the gas is passed through water which washes it, the iron dust falling to the bottom in the form of a flour. It is too fine to be smelted, but it is put through processes which transform it to lumps the size of a peanut or larger. These nuts can then be turned back into the furnaces and made into steel.

One of the great problems of steel-making has been the waste which has passed off into slag or refuse of the furnaces. Until recently this has all gone to waste and you may see great mountains of it still lying about the iron works in different parts of the country. During my stay at Birmingham I saw them using this slag for making building brick and sulphate of ammonia. The latter is an excellent fertilizer, and the president of the steel plant there told me it has become a valuable by-product. Here at the foot of Lake Michigan the steel plants use their slag for making cement, and this has been done at other plants of the United States Steel Corporation. The slag, as it flows out in a mass of liquid fire from the furnaces, is dropped into water in such a way that, instead of becoming a solid rock, it turns into granules or a powder not unlike sugar. It is on about the same principle that shot are made by dropping the molten metal from a great height in the shot-tower. In this powdered form it is mixed with limestone, an equal part of lime being added, and it then becomes the very finest of Portland cement.

Continuing the story of saving the waste, the scrap iron, and even the sparks from the furnaces are gathered up and used over again. There is considerable scrap from each charge, and this is often in huge lumps. It has to be broken before it can be used, and this is done by the means of a magnet connected with the electric dynamos of the power houses. The touch of a button throws the electricity into the magnet, which, attached to a steel cable, is so dropped that it just kisses, as it were, a steel ball as high as a man. This ball weighs six tons, but it flies up with the amorous kiss of the magnet, the cable raising it to the height of a seven-story house. Then, by the touch of a button, the electricity is removed and the great weight drops on the scrap. Think of lifting so much steel that it would take 12 horses to haul it on a wagon over country roads, to a height of 70 feet, and you have some idea of the power of this magnet. The same force is used for loading the steel plates intended for our battleships. They have magnets here that would lift 15 tons of such plates and lay them on the cars as gently as you drop your baby on the pillow at night. This is so notwithstanding some of the plates are each as big as a bed quilt.

The war is rapidly increasing the by-product coke ovens. I found this so in Alabama, and it is being carried on to an even greater extent at the foot of Lake Michigan. There are by-product coke plants at both South Chicago and Gary. The Gary plant is one of the largest in the country. It consumes 10,000 tons of coal every 24 hours, and the coal is the best that can be obtained. It comes from the Pocahontas mines, the quality of which is equal to that of the Cardiff mines of England.

This coal is of about the same character as that which was formerly used in the old beehive ovens, resulting in a product of coke equal to 60 or 65 per cent of the coal. The remaining 30 per cent of the coal was lost, going out in volatile gases which dissolved in the air. It took 75 hours to reduce the coal to coke and that was the result.

Today they make coke in about one-fifth of that time, and they get 80 per cent of the coal contents of the coke, while the remaining 20 per cent is nearly all saved in the way of by-products. This 20 per cent comes out in gas, which, in the Gary plant, amounts to about one hundred million cubic feet every 24 hours. This is run through a by-product plant which takes out of the gas vast quantities of ammonia liquor and the ammonia sulphate which is now being used to increase our food supply. From this same gas also comes benzol, which has many of the properties of gasoline, and is used largely in the industrial arts. It furnishes also a certain percentage of toluol, a powerful explosive which is now used on the battlefields of Europe, and also tar and napthalene. Indeed, of all that goes into the coke plant today practically nothing is lost. The meat packers claim to save all of the hog but the squeal. The steel makers are now saving almost every bit of the raw materials, except the noise and shriek of the engines, and in the electric work of today that seems to have almost disappeared.

As it is now, they have here at Gary 560 of these great by-product ovens, and they expect to increase this number to 700, so many that it will will require 12,500 tons of coal per day to operate them. In the past the coal went into the beehive oven in a lump. It is now crushed to a powder or flour, so fine that the grains will pass through a mesh of 90 holes to the inch. After crushing it is carried into the furnaces by conveyors and it drops automatically into the oven. When the oven is full it is so sealed that it is impossible for the air to get in or the gas to get out. It is then in a huge steel box, about which a blazing heat of 1200 degrees Fahrenheit plays. It takes this heat to release the gases of wich the by-products are made, and to transform the coal to coke of just the right quality for the making of steel.

And now let me tell you something about the soldiers of this great branch of our industrial army. As I have said, there are more than a million iron and steel-makers now in the ranks and they are among the most efficient of our troops here at home. There are more than 250,000 men in the employ of the United States Steel Corporation alone, and here at the foot of Lake Michigan they have 20,000 or 30,000 working away in the plants I have described. A large number of the men are foreigners, many being Russians and Poles. They are nearly all patriots, and they are subscribing liberally to the Red Cross funds and the liberty bonds. When the Y. M. C. A. raised its first war fund of $3,000,000, $3000 was expected from South Chicago. The matter was brought before the employes of the Illinois Steel Company there, and it was suggested that each of them give the pay of one hour a month for the term of eight months. Nearly every employe promised to do this, and the result was that they raised $26,000 instead of $3000. The 12,000 employes of Gary have also done more than their share, and this is true of nearly every branch of steel workers all over the country.

Modern Poultry Culture

Never in the history of poultry keeping has the necessity of rigidly culling the flocks been more imperative. It is not only a business proposition, but a patriotic duty that all feed be conserved. Any poultryman who maintains a flock of fowls which does not make the most of its feed is adding a burden to himself and a burden to the cause for which we are fighting. Edison says: "Each man must work a little harder and produce a little more to make up for those that are gone." This advice should be applied to the poultry flock, too.

BY M. L. CHAPMAN,
Judge, Breeder and Writer.

WE must get rid of the "slackers," and by so doing we are not only cutting down the consumption of grain and releasing labor for more productive employment, but we are helping to swell the meat supply, which is becoming seriously low. Severe culling will not work any hardship on the poultry keeper. It will increase his profits and improve his flocks. Culling will permanently remove the "slackers" from the breeding flocks, so that future generations will be more productive. It will also force home the lesson that a few hens, well selected, are the most profitable.

The selection of pullets for layers depends upon their vitality and vigor. If they lack these qualities they had better be sent to the fattening pens. Late-hatched chicks which are only partly grown have no place on the present poultry plant. These pullets will not lay before Spring, and then only in a desultory manner. They lack the constitutional vigor necessary for heavy egg production, and it must not be forgotten that egg production is a heavy drain upon the constitutional vigor of the fowl. Besides, the pullet intended to produce large numbers of eggs must be so constituted that it is able to eat and assimilate large quantities of food.

Shape Tells Tale.

Constitutional vigor cannot be measured, but it has a close relation to the shape of a fowl. By shape is not meant those characteristics which separate our birds into breeds and varieties, but a general conformation that is adaptable to pullets of any breed or variety.

Those nearest standard weight should be selected. There are many reasons why those that are oversized or undersized should not be chosen. The former are inclined to be inactive and non-productive. Undersized birds should be rejected, as their tendency is downward so far as size is concerned.

From a careful selection as to size and stamina, it is well to select the pullets for individual perfection. From some standpoints the head of a specimen is not considered very important, but from other viewpoints it is extremely so. The head is not only a fine index to the general health of the specimen, but it shows alertness and general vigor which are so essential. If the head is small and refined it usually indicates lack of vitality.

Reliable Head Points.

The best specimens should possess a medium-size head, with short, stubby beak, indicating strength. The beak should be fairly well curved. A short face, short from the eye to the end of the beak, is best. The face should be broad between the eyes, with comb set fairly well upon the head, and rather thick at the base. The eye should be large, bright and snappy and should protrude like a ball. The face should have character in its appearance, with plenty of color.

The neck should not be too long, but fairly short and well curved. This denotes strength in a fowl, and the curving neck should be so set that it brings the head well back over the breast, giving the pullet a thick-set, heavy appearance. The wings should be short, well tucked or tightly held against the body. The back should be broad and straight, not only broad across the shoulders, but the breadth should be caried back to the tail. One of the greatest weaknesses in birds is the narrowing of the back from the neck to the tail. Avoid the arched back or the long, narrow back. The back of the pullet is one of the best methods of determining her future usefulness and is very important in making a selection. The back virtually forms the framework of the body. The reproductive organs are just below the back, and as it is essential that these organs should have plenty of room to perform their functions, this portion of the pullet should be long as well as broad. It is not desirable that the length should be in greater proportion than the breadth, thus giving it a narrow appearance. And it should not be understood from this that a short, wide back is preferable to the long, narrower one.

The tail should be well spread and carried at a pleasing angle, not too high nor too low, and it should be of medium length.

The breast of the pullet is exceedingly important. It should be deep, full, rounded and broad. Avoid those birds which have sharp, narrow, slender-looking breasts that have a flat appearance from the junction of the thighs. Nor must a pullet with a full crop be mistaken for a full-breasted and desirable pullet. The full, broad, rounding breast is an excellent indication of individual vitality.

Capacity for Food.

The body of the pullet practically includes those portions of the specimen exclusive of the back and breast. In other words, the sides and underline, including the rear portion called the fluff. In the body we must look for length and depth in the same manner as the back governs the breadth or thickness. The side view of a bird must show a body extending well back from the junction of the thighs and continually dropping, so that if carried much further it would strike the ground. Looking from behind, the body should get wider as it drops, so that it is at its greatest width at the point extreme lowest and farthest back. It is not to be taken from this description of the body that pullets which have baggy or sagging abdomens are desirable, for such pullets usually break down early in their career. The underline of the pullet should be inclined to sag, however, rather than be narrow and short. Great capacity is necessary, also room for food and productive organs if the great production looked for is to be realized.

The legs should be fairly short, heavily made and set wide apart. Such legs are evidence of sturdiness and vigor. The toes should be strong and straight, with good, heavy nails for a covering.

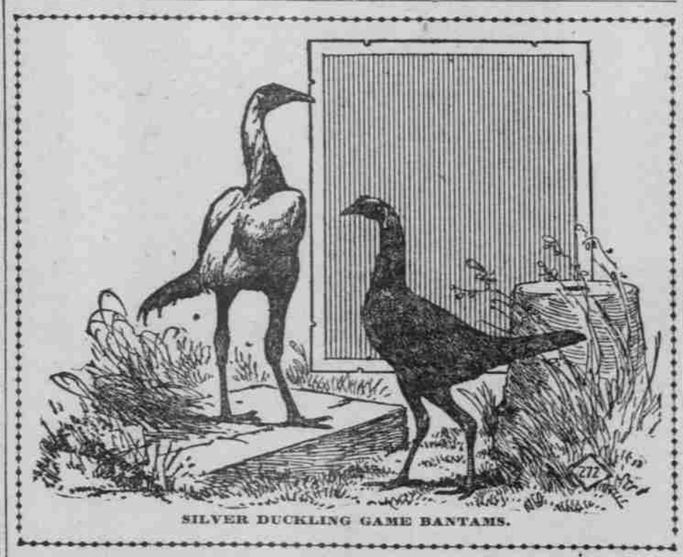
Cull the pullets that have a long, slim back, crow or snake head, sleepy eyes, long neck, narrow chest, wedge-shaped back, pinched tail, long, slim legs and toes, extremely narow or shallow abdomen, or one with a deformity of any kind. Those which have had any serious sickenss should also be rejected.

Avoid Unnecessary Disturbances.

Pullets should now be in their laying quarters. It does not do to shift pullets to Winter quarters when they are laying or reddening up for laying, as such a procedure is very liable to check or retard them, according to their condition at the time, and so account for the loss of eggs at a time when they are at their highest market value.

Before shifting to Winter quarters such pullets as have not begun to lay should be carefully examined to make sure that they are healthy and free from insect pests. Any birds showing traces of sickness should either be disposed of or placed by themselves and given special attention. Such birds, with care, may pay if retained as egg producers, but they should not be tolerated in the breeding pen.

Feeding the backward pullets wet mashes in the morning and then allowing them free range during the middle of the day will hurry them along. See that they go to roost with a full crop and that it is empty in the morning. There is no better practice than that of the operator making a late trip to the poultry-house and examining the birds regarding their capacity or inclination for food. An early morning visit will be repaid if the pullets are examined regarding their digestive ability. The extra time put in upon the smaller number of pullets will be amply repaid by the increased production.



SILVER DUCKLING GAME BANTAMS.

RIVALRY among fanciers of game bantams is keen, and breeders of this variety devote constant study to the improvement of their birds for exhibition purposes. They strive constantly for increased length of legs and necks, some fanciers even confining the birds in yards surrounded with boards so that they have to stretch to see out. Others place the food so high that the birds have to stand on tiptoes to reach it, and then spend hours training them to stand erect in the exhibition coops.

Thousands of dollars have been spent by fanciers in importing Silver Duckwing Game Bantams and in breeding this variety, which is one of the most attractive of Game Bantams. The female is unobtrusive in its soft gray plumage, but the rich greenish black and silver white of the males contrasts sharply with the grass or soil of the lawn or breeding pen. Game Bantams mature much more rapidly than large fowls, and may be hatched after the last cold days of Spring and be fully matured before the first cold days of Autumn. Much stress is laid on their smallness, and the weights set as standards for males are 20 to 22 ounces, for females 18 to 20 ounces. The combs of the young males are cut off with special scissors, a process termed "dubbing," and much rivalry exists as to the fancier most proficient in this art.

HOW GOBBLER STRUTTED

Grandfather Frog Satisfies the Curiosity of Peter Rabbit.

People's Home Journal.

One day while Peter Rabbit was slipping about in the Green Forest he discovered a big bird, the biggest bird Peter had ever seen, going through the strangest antics. When Peter Rabbit is puzzled he goes to wise old Grandfather Frog for enlightenment. He did so this time.

"Chug-a-rum!" exclaimed Grandfather Frog, opening his big mouth very wide to laugh at Peter and his excitement. "That was Tom Gobbler; he was doing all that for the benefit of Mrs. Gobbler, who was hiding in the brush. Big Tom is the most conceited fellow in the Green Forest. He dearly loves to strut. He is just like his father and his grandfather and his great-grandfather. The Gobblers never have gotton over strutting since Old Mr. Gobbler, the first of the family, got the habit."

"Tell me about it. Please, Grandfather Frog, tell me about it," begged Peter. "How did old Mr. Gobbler get the habit?"

Grandfather Frog chuckled. "He got it from admiring his own reflection in a pool of water," he said. "You see, in those days—way back when the world was young—people had more time to form habits than they do now. With plenty to eat and litlte to do, they had more time to think about themselves. Old Mr. Gobbler soon discovered that he was the biggest of all the birds in that part of the great world where he lived, and this discovery was, I suspect, the beginning of his vanity.

"Then, one day, as he was walking along he came to a little pool of water. It was very clear and there wasn't a ripple on the surface. There, for the first time, Mr. Gobbler saw his reflection. The more he looked the better he liked his own appearance. He spread his tail just to see how it would look in the water. Then he puffed himself out and strutted.

"There is nobody to compare with me,' he thought, and strutted more proudly than ever.

"After that he used to steal away every day to admire himself in that little pool of water. He tried new ways of strutting and puffing himself out. After a while he was no longer content to admire himself. He wanted others to admire him. At the first chance he began to strut and show off all his grand airs before Mrs. Gobbler. At first she paid no attention to him. At least that is the way she appeared. She would turn her back on him and walk off into the bushes. This made old Mr. Gobbler very angry until he discovered that she would tip-toe back and watch him admiringly when she thought he didn't know it. That made him strut all the more."