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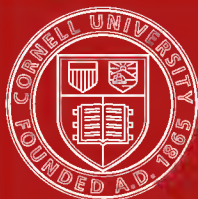


*The Gift of*

DEPARTMENT OF MICROBIOLOGY  
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# COMMON SENSE

IN

# THE POULTRY YARD.

A STORY OF FAILURES AND SUCCESSES.

INCLUDING A FULL ACCOUNT OF

# 1000 HENS AND WHAT THEY DID.

WITH A COMPLETE DESCRIPTION OF

The Houses, Coops, Fences, Runs, Methods of Feeding,  
Breeding, Marketing, etc., etc. And Many New  
Wrinkles and Economical Dodges.

BY

J. P. HAIG.

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WITH NUMEROUS ILLUSTRATIONS.

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# P R E F A C E.

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TRIFLING as chickens and eggs may, at first sight, appear, it is, nevertheless, a fact, that the output from the poultry of the United States exceeds in value that of all the silver mines therein. Therefore, whatever will add even a trifling percentage to the profit derived from our poultry must be, not only of individual, but of national importance, and it is by the hope that he might accomplish something in this direction, that the author was induced to prepare the present work.

I have put the subject in the form of a story, in the hope that some who would be repelled by a mere treatise may find the work sufficiently interesting to read it through. But although the principles and methods are strung on a slender thread of fiction, they are none the less true. Every house described, every device hereiu detailed, every method practiced, has been successfully used as related, so that the reader need not hesitate to put up coops and use them after these patterns. I have given the best practical results of years of experience, and not the mere imaginings of a theorist or a novelist.

In some of the chapters, notably that on feeding, I have been obliged to abandon the story form, and to give my results in a general form, otherwise, this chapter would have expanded into a book. And in other chapters, for the purpose of giving the practical information more thoroughly, I have frequently anticipated the course of events as they actually occurred.

I firmly believe that the methods herein detailed are the very best for all those who do not aspire to the refinements of the business—incubators, etc. While these are no doubt valuable aids to the extensive and experienced poultterer, I am afraid they are not the thing for the ordinary chicken raiser. I must confess that I have never owned an incubator, but I have entrusted eggs to men who claim to be professionals in their use, and I have not been so encouraged as to be induced to try it again, unless some new and more powerful inducements are offered. I have always been able to command enough brooding hens to meet my wants, and my success with them has been far greater than anything that has come under my observation from the incubator. But of course this is only my own experience, and under different circumstances that experience might have been very different; so that I hold that in this matter each man must decide for himself.

In the earnest hope that my readers will derive as much pleasure and profit from their poultry as I have done, I place this little book in their hands.

J. P. HAIG.

*Ferniefield, May 1st, 1885.*



## PUBLISHER'S INTRODUCTION.

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It is an old saying, and one very generally accepted, "figures cannot lie." If by this is meant that two added to two always make four, it cannot be denied. But, two and two do not always make four. Sometimes they make twenty-two, sometimes they make  $\pi$ , and sometimes they make 0, so we see that it is not the figures alone, but their position as well, that governs the general result. When Captain Bobadl proposed to exterminate an opposing army by killing them off at the rate of ten every half hour; twenty an hour—ten hours a day, two hundred men—a hundred days, twenty thousand men—the figures did not lie though the Captain did. The growth of numbers under the potent spells of the arithmetician is something marvellous. No matter how small the profit, if the number of articles on which that profit accrues is only great enough, a fortune of any desired amount may be achieved. No better illustration of this occurs than that of book publishing. If the ordinary profit on a book is 25 cents, we have only to sell ten times the number at a profit of 5 cents, to obtain twice the income; and as low prices bring increased sales, here is a road to fortune. And so strongly did this idea take possession of one publisher in this country, that he attempted to sell books at a profit of only 1 cent apiece, in the hope that by selling millions, the aggregate profits would be larger than by the usual plan. Unfortunately for his scheme, a profit of one cent is not difficult to wipe out. It does not take many spoiled copies; not many minutes wasted by clerks; not very much postage, to throw the balance the other way. At any rate the man who tried it soon found himself a bankrupt.

Perhaps in no case is the power of multiplication and the

consequent certainty of a fortune more strongly presented than in the poultry business. In the first place the number of chickens which can be raised from one healthy hen in a few years is something astounding. Let us begin with one healthy young hen; let us suppose that she and her female progeny will live for seven years, (which is greatly within bounds) and rear two broods of 13 each, every season. Let us also suppose that half her chickens are cockerels, almost all of which will be killed, except those required for breeding, and therefore let us make no account of them. Then it will be found that

At the end of the first year we have the original hen	
and 13 chickens, making	14
At the end of the second year we have	196
“ “ third “ “	2,744
“ “ fourth “ “	38,416
“ “ fifth “ “	537,824
“ “ sixth “ “	7,529,536
“ “ seventh “ “	105,413,504

Here then is a chance for a fortune. Let us emigrate to some western prairie, where we can find unoccupied land which we can use for a few years—just as do the great cattle robbers—we beg their pardon, we mean Cattle Kings—and let us take with us a single hen. At the end of seven years we will be the happy possessors of one hundred and five millions of chickens, which at the very low price of ten cents each, would make us worth over ten millions of dollars. At the end of that time, therefore, we can sell out, come east and enjoy ourselves.

Of course, in such an extravagant statement as this, the fallacy becomes too obvious to allow of its deceiving any one, although in this, as in other cases, the figures do not lie. But, when men come to talk of thousands the impossibilities seem to disappear and it does not seem that propositions which are backed by such clear calculations, and are sustained by apparently well known facts, can be anything but feasible. Thus, some man reports that, from his flock of thirty hens he has made an annual profit of thirty dollars; and

the question at once arises: Why cannot \$3,000 be made from 3,000 hens? In the first place, it is rare to find in such calculations that anything is set down for labor, the care of thirty fowls being regarded as mere pastime and occupying, we will say, only three-quarters of an hour per day. But, let suppose that our flocks increase to 600 birds—a comparatively small number. We now find that instead of three-quarters of an hour per day we have to give fifteen hours per day—a demand upon time and strength which would soon break down any ordinary man.

Somebody, claiming to have 3,000 fowls, tells us that we ought never to let a day pass without examining personally each bird, so as to see if it is in health, and he further declares that only in this way can we be sure of success. Let us see. Suppose it takes just half a minute to examine a fowl carefully; then, to examine 3,000 fowls will take just 1,500 minutes, or 25 hours, which is a *little* more time than we have ever been able to put into a day's work. The fact is, that very few people have any idea of what a thousand is, and none have any idea of what a million is. One man wrote a book of recipes, etc., and has advertised it as "A Million of Facts for the People." His book consists of about 1,000 pages; there are 53 lines to the page, and about 10 words to a line, or 530,000 words in the book, so that if his claim be well founded, every word must embody the statement of at least two facts!! It is needless to say that the claim has no foundation in fact.

The same unsound calculations which seem to infest poultry keeping are found to affect almost every other business, and success is only to be attained in any undertaking, by intelligence industry, economy and perseverance. As soon as we get beyond a very narrow limit, the influence of personal *work* becomes a trifling element, and we have to depend upon the help of human beings quite as much as upon the good qualities of our fowls. And every one knows how uncertain and unreliable most human help is.

We do not make these statements for the purpose of deterring any one from entering upon the raising of poultry on a large scale, provided they bring to the undertaking the requisite amount of

experience, skill and capital. But, without these, failure is almost certain, and we should be sorry to aid in distributing a work which would lead enthusiastic but inexperienced persons to lose what little capital they may have. As for the keeping of poultry on a small scale, that is always to be commended. Poultry are the scavengers and save-alls of the nation. The aggregate savings of the little flocks of ten to a hundred fowls that are scattered throughout the country amounts to a greater sum than the value of the cattle and horses put together, and to more than the output of our much lauded silk industry, with all its huge mills, imposing warehouses, and aristocratic mill owners. And yet, with all this, six hundred and sixteen thousand dozen eggs passed through the Custom House in New York during the months of October and November of last year—showing plainly that the market for eggs is far from being glutted. Poultry when kept in small numbers on any place can, in general find a considerable share of their food in scraps that would otherwise go to waste, and in insects, seeds, etc. They are therefore always profitable, and as pleasant as they are profitable. It is only when this and similar rural pursuits are taken up as a *business* that any danger of failure exists, and in such cases failure generally arises from the fact that those who embark in the undertaking make the great mistake of supposing that because they have a love for birds therefore they must have the ability to care for them.

# COMMON SENSE

## IN THE POULTRY YARD.

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### How it Came About.

**I**T has been said that every man thinks himself competent to edit a newspaper. With much more truth might it be said that every man thinks himself competent to invest money to advantage. And it is hardly necessary to say that in both cases a large proportion of the men who think thus are mistaken. Thousands of men have found, by sad experience, that one of the most difficult things to do is to invest money to advantage and yet securely. I never supposed that I was specially gifted in this way, but having occasion to invest the savings of many years—a small sum after all, by the way—I supposed that as good a plan as any would be to follow in the footsteps of those who might be regarded as *experts* at the business. I do not now speak of speculation or investment in enterprises which promise large results, with, of course, a corresponding risk, but of those investments which are supposed to be permanent and secure, and upon which a man may rely for a certain income for himself, or for his family if he should be taken away.

The prosperity of the country was at high tide at the time of which I write. Every species of investment promised security and a liberal income, and the values of real estate were constantly increasing. Nor did this increase seem to be a speculative one. The people were growing richer, and could afford to pay more for

home accommodation ; the number of those who wanted dwellings seemed to be constantly increasing, and consequently there seemed to be absolutely no reason why prices should ever fall. Not only were private individuals lending liberally on bond and mortgage secured by real estate, but those professional experts who are retained by vast monied corporations—insurance companies, savings banks and the like—were investing the capital of their principals in these securities. City property always commanded liberal loans, and farms in good condition were considered very desirable security. And on what is known as suburban real estate loans to a large proportion of their value could be obtained. When, therefore, my friend Brown applied to me for a loan on his new house and grounds, I had no hesitation in entertaining his proposal. He had paid \$1,500 for eleven acres of land, and had spent \$8,000 more in building a substantial and comfortable house upon it, and in improving the grounds. When, therefore, he applied to me for a loan of \$3,500, I regarded it as a very fortunate occurrence for me, and after the necessary formalities and searches had been made, I gave him my check, took the bond and mortgage, and had the latter recorded.

Brown was a Scotchman of more than usual intelligence and energy ; he was in a good business, and as his family was growing up he decided to own a place in the country. He had bought a somewhat wild piece of land near a large country town, but his taste, knowledge and skill had transformed it into a marvel of beauty, and a source of many comforts. It was situated on a hillside, commanding an extensive and beautiful view, and on the northern boundary the land rose in a rather steep and rocky slope, the face of which was covered with ferns, while along the top was a strip of evergreens which afforded a perfect shelter from the northern blasts. This rocky and ferny shelter had struck Brown's eye from the first, and decided him in choosing, or perhaps I should rather say in *making*, a name for his place. He called it *Fernie-bield*, which he told me signified in Scotch *ferny shelter*, and well did it describe the locality. The name always seemed to me quite a poetical one as well as an uncommon one, and many a pleasant hour did I spend there enjoying the romantic walks and splendid



views, but, above all, the intellectual converse of my friend Brown, who was not only a highly educated man, but a man of great natural ability.

For a time all went well. Business was good, the interest was paid promptly, and Brown even thought of reducing the mortgage. But, alas, for human hopes and plans. One of those commercial cyclones which seem periodically to shake the very foundations of society, overtook us; business became as dull as before it had been prosperous, and Brown with the rest found his income reduced beyond anything which he had deemed possible. Economy was tried on every point, and his family aided him in every way to cut down expenses and make both ends meet, but without success. There is a point beyond which economy cannot be carried, if we would continue business at all, and Brown's business expenses were actually greater than his income. As a necessary consequence he defaulted on his interest, and matters daily grew worse. He then tried to sell, but found it impossible to get even the amount of the mortgage, for real estate had probably suffered a greater reduction than any other species of property. The speculation in real estate had run high; the opinion had been universal that real estate possessed a solid and almost unchangeable value; that if it went down a little now and then, owing to local causes, it would soon rise again; and that at any rate it could never go very much below the prices at which it was held. When, therefore, those who had held these opinions saw it go down, down, and never rise; saw it go far below what they had always regarded as the lowest possible limit, they became panic stricken, and would no more have bought real estate as an investment than they would have bought Keely motor stock. And as for selling suburban residences, that was out of the question. All who could afford to buy and to live in such places were supplied, and many who had made such investments were forced to give them up, since their diminished incomes no longer enabled them to support the expenses that were absolutely necessary. The market was easily glutted, and buyers with cash were able to obtain the most beautiful and comfortable homes **almost at their own prices.**

Things looked discouraging indeed, and for two long years Brown struggled on, hoping against hope and looking for a change. But the change did not come; or at least it came so slowly that the "hope deferred made the heart sick." Meantime the interest accumulated, and the want of it cramped me, for my regular income was also diminished. I had no thought of foreclosing, and yet it would never do to let the matter run on until the property would be lost to us both. I did not hint this to Brown, but he saw it as clearly as I did, and at last approached me on the subject. The result of our conversation was that we both resolved to make a determined effort to sell it, even if it brought no more than the amount of the mortgage and interest. But after six months hard effort we found that we could not get a buyer even at this low price. Thoroughly discouraged, Brown suggested that I take the place myself. He had an offer from a western firm to take the management of a department of their business at a salary which, even if moderate, would at least enable him to live, and he suggested very sensibly that to close out by resorting to law would only involve expense without any real benefit. He had an opportunity to close out his business in the city for a sum which would enable him to get settled comfortably in his new home, and he had decided to take this course provided he could arrange with me.

To fight against the inevitable is folly. Even if I had refused to accept his offer, and had held on to my mortgage and foreclosed it by legal measures, I would have gained nothing but a loss, as the Irishman said. It seemed hard to take property that had cost over \$10,000 in exchange for a mortgage of little over one-third that amount, but both Brown and myself saw that it was not our doing so much as it was in obedience to the "inexorable logic of events." So far as I was concerned, all I wanted was the amount I had put into the investment. Brown had taken chances; I had taken none. If the property had increased in value to double its cost Brown only would have been the gainer, and so as I had no share in the possible profits it was only just that I should have no part or lot in the losses.

And so, in order to avoid all litigation and expense, Brown made

out to me a deed of the property, and agreed to give me possession as soon as the necessary arrangements could be made. I must confess that I felt no pleasure in my new property. Although it was certain that I would gain by it in a few years, yet when I saw the deep sorrow which settled over the family when they found themselves obliged to give up their beautiful home, any satisfaction which I might otherwise have felt was destroyed. In order to relieve Mrs. Brown's mind as far as I could, and infuse a hope which might console even if upheld by a very slender prop, I agreed to restore the place to them at any time within three years on payment of the original mortgage and interest to the date of my taking possession, the rent after that time being considered a full offset for the interest.

It is unnecessary to enter into further details of the change. I have given these facts in order to explain why it was that I came to select such an expensive place for a poultry experiment. I did not select it; it selected me, and though now, after some years, neither Brown nor myself have much cause to regret the change, yet at the time it was a pretty severe trial. As I have already told my readers, Brown was a man of great ability, and in his new position he rapidly made himself invaluable to his employers. Rival firms were not slow to see that the great success of the new management was due entirely to Brown, and so persistent were their efforts to secure his services that the firm he was with admitted him to a partnership, and he is now a very wealthy man. He occasionally visits us and enjoys his old home. The best of feeling exists between us, as may be readily supposed, and although he was well able to buy back the place before the limit of time had expired, he did not consider it wise to do so. He could not return to it and live in it without making an altogether disproportionate sacrifice; to rent it would be to allow it go to the dogs, and as for selling it, that was yet out of the question. There is therefore no danger that my possession will ever be disturbed.

There were quite a number of useful animals and articles on the place which were now of no use to the original owner. In order to get at a valuation of these we made out a complete inventory,

and employed an experienced auctioneer's clerk who affixed to each article the price which he thought it would bring at auction. The aggregate sum was beyond that which I cared to invest, and I suggested that the goods had better be actually sold at auction. Mrs. Brown strenuously objected to this, however, and with her woman's sense suggested that if we would dispose at private sale of some of the articles that I did not want, and deduct from the valuation of the remainder the expense of selling, the amount might probably come within my limit. Taking off auctioneer's fees, advertising, time, etc., reduced the latter sum very materially, and I bought the goods at their reduced estimate. Amongst the new acquisitions were a fine old mare (Madge she was called), an excellent cow—almost pure Jersey, though not registered—a covered buggy, spring wagon, dirt cart, harness, and the usual supply of agricultural tools. There were also over fifty hens and some pigeons, but the latter were not inventoried. At one time Brown had some very fine poultry, but during his troubles the flock ran down until now there was nothing but some fifty or sixty old hens of a rather mixed breed, and a solitary cock. At this time, however, I did not care much about the kind of poultry, and although I was familiar with the different breeds and knew a good bird when I saw it, yet I had no intention of doing more than merely securing eggs enough for family use.

All this occurred in early spring, and, of course, it was necessary that I should take possession as soon as possible, so that the ground might be put in order for spring crops. But meanwhile it was found advisable for Brown to visit his new home, not only to make arrangements for moving and establishing himself there, but also to consult personally with his employers. All this was going to take time, so I suggested that they give us possession at once and remain as our guests until they found it convenient to move. Under other circumstances this would have been anything but an agreeable arrangement, but under the present conditions it was thought best to do so. So Mrs. Brown commenced packing and soon cleared rooms enough to give us an opportunity to move in. We accordingly gave up our house in the village—a tenant having

been already found—and moved all our goods and chattels on to the place. Some were stored in the barn, others were put to immediate use, and others were stored in vacant rooms. I was enabled to aid my friends materially in packing up; the work on the place went on smoothly, and ere long it was time for the Browns to depart for their distant home. Mr. Brown had returned and finished packing. Most of his goods had been sent to the railroad depot and others stowed away in the barn until it suited his convenience to send for them. At last the day arrived when I was to drive them over to the depot, and that day I shall never forget. As may readily be imagined the children had become deeply attached to every animal and almost to every plant on the place. The horse, the cow, even the chickens, were all old friends, and the parting was painful to the last degree. But it ended at last, and we left Ferniefield in anything but a joyous mood. A short drive brought us to the neighboring station; the train rolled out of the depot and I returned to my new home—sad, it is true, but with a very different feeling from that which I had hitherto entertained. I now felt that I was absolute master and owner of the place. So long as the original owner remained I could not get rid of a feeling that I was subordinate to him. But now I was not only sole possessor but sole occupier, and after unharnessing the mare and tying her in her stall, I walked over the grounds and examined them as I had never done before.

The weather had become settled and warm, and the plants were developing with spring-tide vigor and rapidity. The garden, which had been the pride of Mrs. Brown's heart, was as yet almost untouched by spade or hoe, for the pressure of other things had prevented attention to aught except the useful. A few early vegetables had been planted, but that was all; but the old plants were springing up everywhere, as if looking for their lost mistress, and wondering where was the careful and tender hand that had always hitherto guided their wayward growth. It was late in the season to begin gardening; the buds on the vines had swollen, but the rampant growth of the previous year still hung untouched upon the trellises. Other plants showed the same neglected condition, and I turned

away with saddened steps and went towards the animals. The pigeons and hens had been the special pets of my little friend, Nettie, the fourteen year old daughter of Mr. Brown, and she had fed and petted them that morning amongst the very last things she did. They now looked upon me with a curious eye, as if to say "What are you doing here?" The horse and cow seemed to miss their former owners less, though I fancy that Madge has not yet quite forgotten her old friends, and still looks about and wonders when they will return.

Returning to the house, I sat down under the veranda to think over the situation, for, I confess, I did not feel altogether satisfied, and sometimes I doubted the wisdom of my accepting Brown's offer. Still, if the worst came to the worst, I could sell it yet for whatever it would bring, and then I would be better off than if I had forced a sale by law and diverted a large portion of the proceeds into the pockets of lawyers and sheriffs.

After making a very close calculation, and as accurate an estimate as my knowledge of the facts in the case would permit, I came to the conclusion that our expenses in our new home would be from six to eight hundred dollars per year more than they had usually been. In making this estimate I charged taxes, insurance and interest as rent; repairs I did not include, for I fully believed that the steady rise in the value of property would more than offset this item.

Our increased expenses were due to the fact that we would have to keep a man, a horse and a cow, and that the house being much larger than was really necessary for our family, would also entail extra expense in the way of fuel, help, etc. The place, too, would require to be kept up, so as to present at least a *decent* appearance, or it would soon become less valuable.

It is true that for all this we had our returns in the shape of increased advantages and pleasures, but this did not lessen the amount that had to be paid for them. I had fully allowed for the saving that might be effected by having a full supply of such articles as eggs, milk, butter and vegetables, and had even estimated certain receipts from orchard and garden as possible income; but,

after all, I had found that our expenses would be greatly increased, and how were we to meet them without interfering with other obligations that were imperative? This was the question that presented itself to my mind in such a clear and definite shape.

Two ways presented themselves: Either I must find some extra business which would yield the required amount, or the place itself must be made to yield enough to pay the deficit.

The first plan was out of the question. I had already withdrawn as much as possible from active business, and I had no idea of again saddling myself with its cares and anxieties. And to accept a subordinate position would now be exceedingly distasteful to me. If I engaged in any pursuit to make this money the business must be very congenial, and it must leave me entirely independent, otherwise it would be wiser to sell the place at a sacrifice and live more cheaply.

It seemed, therefore, that there was no alternative but to make the place produce the required extra amount. Let me therefore describe it in detail.

The house was, as I have said, larger than was necessary for a small family in moderate circumstances. It contained twelve rooms, was heated throughout with hot air, had water-tanks, bath room, water-closets, etc., etc. In short, it was as complete in its appointments as most city houses. It is with the grounds, however, the productive part, that we have chiefly to do, and therefore I shall say no more about the house itself.

The land lay along a road which led from a large and thriving village into the country. The village almost aspired to be a city, and would have been one long ago if the good sense of the majority of the inhabitants had not restrained the ambitious vanity of a few. The road ran almost straight until it reached the foot of a somewhat precipitous hill, when it turned sharply to the west and went round the foot of the mountain. My land was bounded by this road on the west and by the mountain on the north. The "mountain," as it was generally called, was a steep and barren hill about 200 feet high, reckoning from the plain at its base. Just above the base there was a rocky cliff, and above that the line of

evergreens to which I have alluded as giving the place a portion of its name. My line ran along the top of the cliff, but did not include much of the evergreens. The mountain itself seemed to belong to nobody. It was almost barren; cattle would find no pasture on it, and sheep could not be kept in that region on account of the village curs, which were constantly prowling about, and would soon have destroyed any sheep that might have been kept. It had been sold for taxes several times, but no bidder had ever taken possession and kept it. My line ran along this cliff for a few hundred feet, and then turned straight down the hillside. When half way between the cliff and the plain the line turned to the east, and ran in this direction for some distance, after which it descended to the line of the next property, and then ran in a wavy westerly direction till it met the road already mentioned. If the reader will follow this description, marking the outline on paper with a pencil, he will see that the property had almost the form of a boot, with the toe lying towards the morning sun. And, indeed, so strong was the resemblance to a boot, as seen on some plans and surveys that had been made, that it had actually been called "The Boot" before Brown bought it and gave it a more poetical name.

Such being the general "lay of the land," an account of its varying character will now be more easily understood. I say *varying*, for even on this small plot of ground varieties of heavy and light soil were found, as well as black vegetable mould. Under the cliffs the ground was mostly covered with rocky debris, which was entirely barren and irreclaimable. In spots the broken rocks were covered with sandy loam which had gradually washed out of the very thin soil above. On these spots, however, nothing grew, because they dried so very quickly, except where they were kept moist by perennial springs, several of which trickled down the cliff, their course being marked by the exuberant growth of ferns which sprang out of the rocks, growing in little pockets filled with rich black mould. A few yards from the base of the cliff the soil became richer and deeper, though still very stoney, and the further down, the better the land became. On this ground was formed the



vegetable garden. By great labor and much care the rocks had been removed, and even the small stones picked out to a great extent. A plentiful supply of good stable manure had been added, and a very rich and fertile soil was the result.

Between the vegetable garden and the house was a strip of grass land, used generally for laundry purposes, the back of the house facing this way. At the front of the house was the carriage drive, which was carried round a large oval grass plot, at one time laid out as a croquet ground. Beyond the drive was the lawn proper, and along the edge of this were numerous flower beds, while beyond that stretched an unbroken field of green grass with a few ornamental trees scattered here and there. The house was distant about one hundred feet from the road, the approach being under two rows of soft maple trees, which now gave promise of soon forming a dense leafy arch overhead.

The lawn was bounded on the south and west by an irregular row of evergreens, which gave an air of seclusion to the grounds, the land south of the evergreens being either used as a pasture field or cultivated, as circumstances might direct. This was the lowest part of the grounds and the richest.

Returning to the eastern boundary: At the point where the line, descending from the hill, turned towards the east, were placed the barns and stables, and between these and the lawn was the orchard. The toe of the boot formed a nice little paddock of about three acres, which had always been used as pasture for the horse, cow, calf, etc.

A little above the barns, and within a few yards of the eastern boundary, there gushed from the hillside a sparkling spring of as pure water as I ever beheld. The water from this spring formed a good sized stream, and flowed straight down through the grounds, passing directly into the land of our neighbor on the south. It furnished all the water necessary for cattle, and various other purposes—washing, sprinkling, etc., and was never-failing. By means of a hydraulic ram a supply was forced to a tank at the top of the house, so that the supply there was constant and abundant. For drinking purposes we used the water from a well, which was

so deep and clear that ice was a wholly unnecessary luxury, even for the care of milk and butter.

As regards the area that was covered by the several divisions which I have described, it was about as follows: The house, garden, drive, barns and barnyard covered about two acres; the lawn about an acre and a half; the orchard about half an acre, and about two acres were occupied by shrubbery and barren ground. This left the paddock of three acres and about three acres more of good tillable land. The question now was, "What can I do with it?"

My first thoughts ran to the raising of "truck," as it is called, and I studied several works which professed to give the detailed experience of men who had made money in this business. I concluded that I had about three available acres, the rest being required for the support of the horse, cow, etc. What crop should I raise? My object was not so much to establish a highly profitable business as to clear a certain amount—say \$1,000 per year—with certainty, and without an immense amount of labor and care. On reading the books alluded to, I found that in the hands of skilful gardeners, in the neighborhood of our large cities, a single acre was quite sufficient to yield this amount as profit. Nevertheless, I doubted my own ability to succeed in such an attempt. True, I had had some experience in gardening, but not as a business, and while I had no doubt about my succeeding in raising fair crops, yet whether I could do it and make it *pay* was another question. The raising of cabbages was carried on quite extensively in the neighborhood, and at a good profit, as the land seemed to suit them, and plenty of manure could be had by the car load; carrots, celery, cauliflower and one or two others generally commanded good prices, and when not saleable in our market could be sent to the city, where the demand was always good. Asparagus struck me most favorably, and I determined to put out at least one acre of this plant at any rate. I knew by my own experience that asparagus always commanded a high price, and even if the general demand fell off, *good* bunches would always sell well. The city would always take all I could raise, and after the first work of start-

ing the bed the labor required seemed to me to be less than that needed for any other crop. Moreover, my thoughts were turned in this direction because I had always believed that the land south of the lawn was particularly well adapted to asparagus. There was, in the vegetable garden, a small asparagus bed which had always yielded a fair crop, but nothing extra, and this had given the impression that the land was not specially adapted to its culture. But wandering one day about the grounds, during the previous season, I came across an asparagus stalk growing in a corner of the fence near the boundary line. I was astonished at its size and vigor. I dare not state the height to which it had attained, for few of my readers would believe me; they would certainly think that I had mistaken some other and unknown plant for asparagus. It brought me in mind of the scriptural description of the mustard plant, for verily I beheld the birds of the air lodging in its branches. So here I marked off my asparagus bed, and I have never had occasion to regret the selection.

One of the difficulties with asparagus, however, is the length of time which is required to bring a bed into good bearing condition. It was now too late to establish a bed that season, and as I had to allow the plants at least three years to become established, the prospect of returns seemed rather distant.

Up to this time I had never thought of poultry, and if any one had suggested these useful animals to me as a source of income I would have regarded the proposition with considerable disfavor. I had great faith in the profits that might be made out of a small flock of hens, and I had even speculated on the possibility of keeping poultry on a large scale successfully, but in my previous calculations the poultry had been used rather as mere concentrators than as direct sources of profit. In other words, by converting corn, wheat, clover, etc., into poultry and eggs, I believed that much freight might be saved, the fertility of the land not only maintained but increased, and thus a fair profit secured. And I believe all this to-day with even more steadfastness than I did then. But to make poultry a paying business on three or four acres, even with a few extra acres of orchard

and shrubbery for them to range over, was foreign to the previous train of my thoughts. Of course there was one branch of the poultry business that might be made to pay even on a single acre; I refer to so-called fancy or pure-bred fowls, but this was a branch of the business for which I felt myself totally unfitted, and for which, owing to certain previous disagreeable associations, I had a most intense dislike.

In previous years, wherever I had had a home with even a garden attached, I had always kept a few hens and always with success, and now as I have already stated, there were in our barnyard quite a flock—some fifty or sixty hens—left by Brown. We had even gone so far as to set a few hens, and already there were several small broods wandering about the orchard. For experience had taught me that young fowls whose flesh had been accumulated in the open air, with all the freedom of the hillsides, and the health which plenty of exercise and the ability to select natural food confers, were infinitely to be preferred to the birds usually brought to market, most of which had been confined in dirty coops for two or three weeks before being killed. It does not require one to be much of an epicure or a judge to tell the difference. I had, therefore, taken steps to raise enough for our own table at least, and thus far we had had tolerable success, though not at all what I expected, from my previous experience. The young chickens did not seem very strong, and they certainly were of no particular breed, for the flock was rather a motley one. With the exception of a few old white Leghorn hens it would have been difficult to tell what they were. Amongst the rest, however, was a very pretty Seabright bantam hen—the especial pet of little Nettie; and here I cannot forbear to digress a little and give the reader her history. This bird was the last one of a trio that had been given to Nettie by a friend, and she made me promise that when she got settled in her new home I would pack up "Bright Eyes" and send the bird to her, either by express or by some one willing to take charge of her. As Nettie was a favorite of mine, and very fond of me, I was only too glad to make the promise. The other hen of the trio had, during the previous season, hatched out seven beautiful little chicks,

and was rearing them successfully through all the perils of chicken-hood, when one unfortunate day they strayed off their own grounds on to those of the neighbor on the south, and, as there was not the best of feeling between Brown and the other man, the latter set his dog on them and killed the mother and all her brood. He then tossed the dead bodies over the fence. It was a brutal action—but no, I must not say that; it would be a libel on the brute. Brown might have shot the dog a dozen times, for the animal was frequently on his grounds without permission, but he was too much of a man to revenge himself on a dumb creature. Moreover, the dog was a very fine one, and a great favorite with others besides the wretched master whose instigations he had obeyed. Nettie was terribly shocked by the death of her pets, and the remaining birds became more than ever precious.

One day, not long after this, Brown found the dog on his grounds. He coaxed it to him and tied it up. He then wrote a note and sent it to the owner, asking him if he should shoot the dog, or if he would come and take it away. He did not reply; but his wife, a lady who had been very much chagrined at her husband's churlishness, and who had sent Nettie a beautiful mocking bird with a note of deep regret and apology, came over and begged to be allowed to take the dog home. To such a woman few requests can be denied, but my readers will not wonder that after all this we called our neighbor on the south *Nabal*.

The little Seabright rooster met an untimely fate in a different way. Pugnacious beyond all expression, he would fight anything that wore feathers, no matter what its size, color or previous condition. One day, however, Brown bought some live chickens for table use, and amongst them happened to be a thoroughbred game cock, a very handsome and powerful bird. The little Bantam attacked him as soon as he was set free from his coop. At first the game cock would hardly notice him, but the Bantam persisting in his attacks, and probably hurting the other so as to rouse him up, was killed in less time than it has taken to tell of it. Brown saw at once that the conqueror would be a valuable addition to his yard, and I suspect that this new and thoroughbred blood did a great deal to

produce the fine quality of half a dozen of the hens which I found on the place, and which were marked exceptions to the rest.

So the little Bantam hen was left alone by herself, and it occurred to me that I would give Nettie a surprise. The hen was laying, but of course her eggs were not fecundated. A friend of mine, at some distance, however, had, as I knew, some very fine Seabrights, so I drove over to his house, taking the little hen with me. I explained what I wanted and what I wanted it for, and as a matter of course I left the hen behind. In a few weeks I received from my friend ten little eggs, which I set under a quiet old hen, and in due time had nine of the prettiest, smallest chicks I had ever seen. Nettie had already written for her hen, but I excused myself on one ground and another. Now, however, I had no excuse. The hen herself had been sitting on eggs for ten days, so I drove over and brought her home, nest and all. The same evening I took away her eggs and gave them to another hen, while I slipped the nine little chickens under her and left her in darkness. Next morning she came off the nest, quite proud of her little flock and taking very kindly to them. I therefore packed her up in a nice crate, and sent her by express prepaid to her mistress, and will leave my readers to imagine her astonishment and delight.

But although the little Bantam rooster had ignobly perished in the struggle for the survival of the fittest, he had evidently left his impress on the flock. There were several hens of very small size in the yard, and their plumage showed that they were related to him. I therefore saw that if the Bantam eggs I had now setting should hatch, it would never do to keep the cocks except in a cage or aviary. They did hatch, and I had five pullets and six cockerels. Two of the pullets I kept; the other three I paired with cockerels, and the little beauties were a source of great delight to some young people to whom I gave them; the three remaining cockerels I afterwards exchanged for birds of a less beautiful but more useful breed.

### Old Experiences and New Plans.

**B**ROWN had never given any personal attention to his poultry; the selection of the stock that was to be kept was left pretty much to the servant girl, and she thought she was doing a wise thing when she killed and cooked the game cock and allowed one of his sons—a larger and more showy bird—to take his place. As the mother of this bird was of no particular breed, he, himself, was a mere mongrel, and as he was related, on the father's side, to all the young pullets of that year, the consequence was that the flock lost stamina; and this, and the fact that there was only one cock to over fifty hens, explained the small hatches—many of the eggs proving sterile.

Now, I had resolved that as soon as I got fairly under way I would make everything on the place profitable in every sense. If we grew vegetables, they must be the best of their kind and produced at a moderate expense. Carrying this rule into the poultry yard, I determined to procure a good cock from some neighbor and put him with half a dozen hens, and so raise a new flock of hens that would be vigorous and prolific. I therefore killed off the rooster and looked about for another, it being my intention to raise a sufficient number of pullets to entirely replace the old stock, with, perhaps, the exception of about a dozen hens, which struck me as being specially fitted for mothers.

I therefore visited my neighbors and examined their flocks, for the purpose of procuring such a bird but, I must say, with very poor success. The farmers, as a general rule, had allowed their poultry to breed after a sort of hap-hazard method; the consequence was that their stock, not being very superior in the first place, soon became worse; and I found that Brown's poultry, run down as it was, was better than theirs. Several villagers claimed to keep pure breeds, but, as a general rule, they were not what I

wanted, and in many cases it was easy to see that from in-and-in breeding the strain had lost stamina.

At first I felt a little discouraged, and thought my only course was to buy a setting of eggs of some vigorous strain of game birds, and raise a few roosters in this way. Of all the breeds in use the games have been bred upon the most correct principles, and, as a rule, these principles have been rigorously applied. The result is that there are hundreds of flocks of game birds throughout the country that bear the same relation to the ordinary birds that thoroughbred racehorses bear to scrubs. The breeders of game cocks know that second-class birds are of no use, and consequently those who wish to be successful are compelled to breed for health, strength, stamina and pluck. And these are the qualities that tell, whether it be in man, beast or bird. Now, it is well known that there are certain external signs, such as hardness and glossiness of feathers, shape, carriage, etc., which enable the breeder of game cocks to choose his breeding birds almost with certainty, while many of the points which the "fancier" estimates so highly he ignores altogether. I felt, therefore, that here at least was ground certain and substantial, and I almost came to the conclusion to procure such eggs. Another motive in this direction came from the fact that I knew by experience that of all fowls the game are the best, both as regards flesh and eggs. A young game cock cannot be equalled on the table—except, perhaps, by a game pullet; and the killing of a fine pullet has always appeared to me a crime which should be punished without benefit of clergy.

The chief objection to the games is said to be their propensity to fight. I have had *one* game cock in a flock, and his descendants were splendid birds, and as he had nothing to fight with he was very peaceable. Now, as a single pen of say six hens would furnish all the eggs that I needed for hatching, there would be no necessity for keeping more than one cock, so this objection would be done away with. I tried to find a good cock that I might use at once, but without success, so I procured some eggs from a noted breeder and thus hoped to be ready for next year.

Meantime I determined to get a good cock of some other



breed so as to have eggs for raising chickens at once. What breed should I get?

It is a curious fact that the books tell us very little about the breeding, and especially the crossing, of different breeds of poultry. Even ponderous octavos, which would seem from their bulk to be exhaustive, do not touch upon the subject. I was therefore left to work it out myself as best I might.

It is a well-established rule in breeding, that the male should always, if possible, be a thoroughbred. It is true that in fowls it is sometimes difficult to say what varieties are thoroughbred, and even the question, "What is a breed?" has elicited long discussions, as witness the nonsense published in the London *Field*, and quoted approvingly in Tegetmeier's large work. There is little doubt but that the different breeds now in market are thoroughbred in very different degrees. The game cock is undoubtedly the most emphatically thoroughbred bird of any that we have, and it will be difficult to find a cock of any breed that will so quickly and clearly impress his own characteristics upon a flock as will a really well-bred game cock. This quality he evidently owes to the fact that the breed is very old, and for ages it has been re-enforcing certain qualities to the exclusion of others, until now it possesses, to an extent not exhibited by any other breed, the power of projecting these qualities into its descendants, even though the mother be of a different stock.

The second rule is, that when two breeds are crossed the hen ought always to be the largest. As a general rule the small breeds are the most finely bred, and have the most highly nervous organization. This holds with all animals, including man. Who would cross a fine blood mare with a cart horse? The progeny would be worthless. Or a small, fine-boned Alderney cow with a Durham bull, or even with a scrub? While by reversing the cross and putting a large well-formed mare to a thoroughbred, a most useful animal would probably be the result, and a fine Alderney bull of a good milking strain, will probably produce a calf that will grow into a first-rate milch cow, even though the mother be a coarsely bred animal. And yet I have seen men who would not have violated

these principles in their horses and cows, and yet would put a Brabina, Cochin or Plymouth Rock cock amongst a flock of half-blood Leghorns or Hamburgs.

Previous experience had taught me the value of these facts and principles, and I determined to secure a purely-bred cock of either Hamburg, Leghorn or Black Spanish, and mate him with six of my largest and best hens.

If I had been smitten with the "Hen Fever" I would have been a reader of the poultry journals, and would soon have found out where my wants could be supplied; but as it was I had to hunt about for information as to where such a bird could be found.

One day I heard accidentally that there was actually a poultry farm near a village about seven miles from my place, and that the owner had several different kinds of pure-bred fowls. With the usual exaggeration of ignorance, my informant told me that he had *all* kinds; that he had thousands of chickens of every kind that could be named, and that he got enormous prices for his eggs and chickens, with much more to the same purport. I did not have a great deal of faith in the details of this account, but having nothing special to do that afternoon, I harnessed up Madge and drove out that way. It was a road over which I had never travelled before, but fortunately there was little opportunity to go astray, and ere long I found myself near the village and opposite what appeared to me to be extensive greenhouses. Inquiring of a passer by where the poultry yards of Mr. Thompson were situated, I was told that these glass structures formed part of his establishment, and of course I at once tried to find the owner. I hesitated at first whether to make my errand known at once or not. I suspected that if I told him that I had driven seven miles for the sake of buying a rooster he would conclude that I wanted the bird pretty badly, and he would charge accordingly, so I said that I had been taking a drive, and having heard that he had some fine poultry for sale I had called to look at it—all of which was strictly true.

I found that he had some very good poultry on hand, though he had disposed of most of his stock, having concluded to give his whole attention to a new breed that had recently been brought

out—the Plymouth Rocks. He was quite genial and communicative, and showed me freely over his yards, especially when he found that I was not a dealer. He also gave me a history of the place and of his connection with it, a condensation of which will no doubt interest my readers.

I learned that the place had not belonged originally to him, but that he had merely adapted the buildings, etc., erected by a former owner. This I was glad to hear, as it relieved from the stigma of ignorance or stupidity a man who was evidently intelligent and well-informed in regard to poultry, and the buildings and arrangements were evidently not those which an experienced poultry breeder would have adopted. It seems that a few years previous to my visit, the place had belonged to a tailor whose business had been just sufficient to give him a subsistence. This man was obliged to take, for a trifling debt, a small tract of rather poor land, a piece of property which did not add to his income, but, on the contrary, tended to make him "land-poor," as the expression is. But, by one of those strange turns of fortune (which certainly may be called luck) some large manufacturing establishments were erected near it; they extended until the tailor's property became a necessity to them, and he was enabled to obtain his own price. With the several thousand dollars now in his possession, he looked about for an investment, and as he was disgusted with the tailoring business, he determined to go into something else. Like many other men, during his days of poverty and struggling he had often turned his eyes toward some of the smaller rural pursuits, and chicken raising had taken a wonderful hold of his fancy. He already had a few dozen fowls, from which he derived great comfort and profit, and the golden promises which the possession of a few *thousand* of such money-producers seemed to lay before him, had often formed the subject of his day dreams, and had frequently consoled him in days of dark adversity. No wonder, then, that when his barren acres had been converted into golden nuggets he thought he saw an opportunity for the realization of all his hopes. Four acres of land on the outskirts of his village happened to be offered for sale at a very low figure; he bought them and erected the extensive glass

structures which had attracted my attention. Unused to building contracts and undertakings, he made the common mistake of laying a foundation larger than he could cover, and by the time his houses, etc., were finished, his capital was nearly exhausted. But, he persevered, bought several thousand fowls (three thousand, I think it was) and obtained his food, etc., for them on credit, in the firm faith that the eggs would more than pay for everything. On his little yard in the village, he had kept twenty or thirty hens in a small inclosure, but, then they were fed on a great variety of food, much of it waste from the household, and they were allowed an occasional run through the entire lot, so that they thrived very well. When the same dense fowl population was transferred to small coops, with no opportunity for an occasional run over a larger area, and where they were fed on grain, and nothing but grain, day after day, they soon ceased to lay eggs; the outgo continued but the income was cut short.

Moreover, the great extent of glass roofing on such a small place (for four acres is a very small chicken farm) prevented the utilization of much of the ground for culture and plant growth, and these are always essential. The enterprise was a failure; the feed bills became due, without any means to pay them, and the sheriff closed out the entire concern.

The present owner had begun in a different way. Possessed of a small independent income, but afflicted with an incurable disease, he had taken up poultry keeping as an amusement, and had devoted his attention to pure-bred fowls—chiefly the Light Brahma. These he had so improved and cared for that his birds became noted amongst his neighbors for their excellence, and he found a ready market for all the eggs and chickens he could supply. At first his prices were very low—merely the retail market rates, but having been induced to send some of his fowls to the county fair, he was awarded the first prize, and then, orders poured in faster than he could supply them, and with offers of greatly advanced prices. So he raised his terms, from fifty cents per setting, to \$1.00, and then to \$1.50, and \$2.00, and still he could not meet the demand. His poultry became a source of income, and when the tailor's

place was sold he bought it, intending to rebuild the houses and rearrange the whole affair. But when he had obtained possession he found that the buildings had been put up by carpenters who had followed the designs given in the books, and had not been guided by a man of extended practical experience in poultry keeping. So he arranged part of them as breeding houses for raising young chickens, and some of them he rented to a neighbor who used them as greenhouses. This neighbor had a small peach orchard of about five acres, adjoining the poultry yard, so he gave Thompson the right to pasture his chickens in this orchard in exchange for the privilege of using the greenhouses—a most judicious arrangement for both.

Thompson's business now became larger than ever. He soon became known to certain city dealers who had a wide connection, and they bought from him large numbers at very remunerative prices, because they knew that they could depend upon every bird being strictly as it was represented. After a while he added other varieties to his collection, being always careful to maintain the strict purity of his stock. At present he had White and Brown Leghorns, Spangled Hamburgs, Black Spanish, and he had just received a new breed which has since become famous—the Plymouth Rocks. These facts I gathered partly from his own lips and partly from subsequent information from others, but so well was I impressed with the sensible, and apparently honest character of the man, that I did not hesitate to explain to him what I wanted and to ask his advice.

After showing me over his yards and explaining his methods and describing the characters of the different breeds, he led me to a small yard where, in a series of separate pens, he had about twenty of the most beautiful Brown Leghorn cockerels I had ever seen. These he recommended as the best birds for my purpose. Mated with good common stock of fair size he guaranteed that they would produce chickens which would give satisfactory results both as regarded eggs and flesh. As his price seemed very moderate—\$2.00 for a cockerel, I paid for one, had it put in a light crate and took it with me. These crates were quite ingeni-

ous, being simply a frame covered with very cheap bagging on sides and bottom. The top was made of slats and after the bird was put in, these were fastened with nails. Thompson kept these crates on hand ready made, and he told me that they were so cheap that he could afford to give one with every bird he sold.

As I drove home that afternoon I could not help thinking a good deal about what I had seen and heard. I had always been a reader of the journals devoted to country life, and was fully aware that the attempts to raise poultry on a large scale had been numerous, persistent, and in many cases carried out with great intelligence and enterprise, and with abundant capital. And yet, so far as I then knew, all these attempts had failed, and I have not learned to the contrary yet.\* And the question then arose and pressed itself upon my attention: Is failure a *necessary* sequel to all such attempts? It argued, of course, even to my own mind, that I had a good deal of self conceit when I decided that success *could* be attained; that there was no absolute obstacle in the way, and in all the plans that had come under my observation I could see that there were glaring defects that must of necessity cause failure. Some had failed because their quarters were too cramped. I called to mind one man—and, strange to say, a medical man at that—who attempted to keep nearly 300 fowls on a space that should barely have accommodated fifty. He was thoroughly “scientific,” and fed his fowls on rations whose composition was determined more by chemistry than by common sense, and he failed.

Another, a business man in a large city, felt that he had a call to raise poultry and eggs, and so he established a poultry yard. But although (perhaps this word should be *because*) he purchased liberally of all kinds of food, and procured fowls that were the very best that the dealers would recommend he failed, and the reason was obvious. He knew nothing about poultry, and could not meet emergencies as they arose, but supposed that a hen was a machine,

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\* Since the above was written we find in a recently published work—Beale's “Profitable Poultry Keeping”—the following statement: “There is little talk now of establishing poultry farms pure and simple, which never have, and we do not think ever will, succeed.”

and that all you had to do was to wind her up three times a day with a little corn and the eggs would roll into the hopper.

These are not imaginary instances, but actual cases. Of minor instances the number is innumerable, and I myself have known at least a dozen people who have been smitten with the hen fever and have sunk money. But all this did not fully convince me that poultry could not be kept, or that *I* could not keep it profitably.

I have been told that in the famous "Warwick Woodlands," so well described by Frank Forrester, there is a poultry farm managed by a colored man who keeps 3,000 fowls and makes a handsome profit. There is also the poultry establishment of Mr. Baker, in New Jersey, in which eighty thousand dollars have been invested in houses, incubators, etc., etc. In regard to the financial success of this enterprise I am not informed. The gigantic establishments of De Sora, Don San Fuentes, etc., etc., so graphically described by Burnham, Lewis and others, are mere myths, and have no existence.

Looking back over an experience of many years I could recall my first acquaintance with the poultry yard, where the hens were always a source of ready money at times when other crops were not available. And even now I could recall from that long-past experience facts and methods which seem to be forgotten, and yet are well worthy of being kept in use. In those days there were no stolen nests—no lost eggs, and yet our poultry had free range over many acres—those places from which they were to be excluded being carefully fenced so as to keep the poultry out. Well do I remember how we depended, with a trust that I never remember to have been betrayed, upon the hens returning to their own roosts at night. Although they numbered some hundreds, and during the day spread themselves over a wide expanse, they always returned at eventide. In those days no laying hen ever left her house in the morning until she had laid her egg. It is the easiest thing in the world to tell whether or not a hen is going to lay an egg during the next twelve hours; and well do I remember our old hen wife examining each hen, and letting those without eggs go, while those that were going to lay were kept in. When a small

boy I used often to be pressed into the service of catching the hens in the hen house during the operation of "trying the hens." And the hens being always kindly treated and frequently handled were not difficult to catch.

Then, I remember, how, years ago, when we first went to house-keeping in our own home, we resolved to have fresh eggs for our table, and not be disgusted with occasional stale eggs, which prevented all further enjoyment of that meal. And so I made a small house that two men could easily carry about, and with portable fencing, almost the same as that described in this book, I made a small yard in which I kept half a dozen Light Brahma pullets, that kept us in eggs nearly the whole year round. And, I had not forgotten the success with which I raised some of the handsomest birds that had been seen in that locality—birds, to which people walking past our city lot, would give no mere passing glance, but would stand still to admire. This was the first instance I had ever seen of a movable coop designed to enable us to give the birds fresh ground whenever we desired to do so, and to raise crops on the soil which they had at the same time both enriched and defiled.

These things I looked back upon with pleasure. Not that they had been very profitable—they were on too small a scale for that—but, because I felt that I was not without a certain familiarity with the subject, and, consequently, I would probably be able to steer clear of any glaring mistakes at first.

Such thoughts occupied my mind as we jogged along, and I suppose Madge often wondered why her old master did not keep a tighter rein, and watch for her stumbling. It was dark when I got home, so I put the little rooster in Madge's stable and left them for the night.

During my waking hours, poultry occupied my chief attention. The barren soil along the cliffs; the unoccupied land on the east, the use of which I could have for the asking; the necessity for something to profitably occupy my time and effort, all passed before me in vivid and earnest thought. I saw the uselessness of this land for everything else, and its great value for a poultry range,



and the idea impressed itself upon my mind that, while poultry keeping could not be expected to lead to fortune, it might afford a very pleasant and very efficient means of adding to a slender income. But so much had been attempted in this direction, and always with failure, that, after all, I could not help regarding the project with a good deal of doubt. The "hen fever," the "poultry craze," and the "chicken mania," well-known forms of speculative dementia, had ruined thousands, and therefore I resolved to banish it from my mind. With this I fell asleep, and when I woke the sun was shining brightly through my bed-room window.

### Crying to Improve the Old Stock.

**W**AS up betimes next morning, and my first errand was to the stable, where the new cock had been left. I found him roosting quietly on the side of Madge's stall, and as he rose up when I entered, I got a very good view of him. I could see that he was just what I wanted. Plump, yet not logy; clear eye, and bright comb and wattles; firm, bright, springy feathers, that felt wiry, yet not harsh—just the opposite to the soft fluff that hangs round the necks of weakly-bred fowls; bold, erect carriage, seemingly fearless of anything. He was just the bird I had been looking for. I knew little about "standard," and cared less; a "Judge" might have cut down his "points," so that he would not score "40" out of a possible "100," but according to my way of judging he scored over "90" at least, and, joking aside, I believe he was a good bird, even according to the standard; for, as I afterwards learned, Thompson's stock was noted amongst the dealers for careful breeding. From my talk with him the day before I found that he was a judicious, conscientious breeder, and that I ran little risk of getting a bird with a bar sinister on his escutcheon. And this is an important point, for crosses are very apt to crop out in after breeding, while so various are the different shades of plumage of dunghill fowls, that amongst even common birds some are occasionally found that show many of the points of thoroughbreds. But while these individual birds may show great excellence, their progeny are sure to be mixed in color, and with every variety of shape and quality as layers and meat-producers.

Some of my friends were a little surprised that I did not select a larger breed, so that by crossing with some of my large hens I could get good-sized fowls for the table. But my experience had been that the size of the cock is not of so much importance. Some

years ago a friend had a game cock which he did not wish to part with, and yet could not very well keep, so he let me have the bird for a time. He was a very handsome, vigorous fellow, but small—less than 5 lbs. I mated him with some hens that were part Brahma, part Dominique, and looked a good deal like the Plymouth Rocks of to-day. They were fine large hens, and the progeny of these fowls and the game cock were very handsome and very large. Most of them had pencilled necks, and looked like what are sometimes called “Pheasants.” Others were of various colors, but all were well-shaped, vigorous fowls, and the pullets proved to be good layers. The cockerels were heavy and of delicious flavor. The finest became the pet of our servant girl, and as she had taken great care of the poultry I allowed her to keep him, although against my better judgment. At two years old he weighed  $12\frac{1}{2}$  pounds, and was universally admired for his fine looks, but his progeny (although breeding in-and-in was carefully avoided) were very inferior to the chickens of the previous season when the game cock was at the head of the yard.

Now, the Brown Leghorn is as nearly a thoroughbred as can be had, and as this breed is noted for laying qualities I felt certain that my choice had been a judicious one. But, like many other men, I had secured the bird without having a place to put it. To have let him loose amongst the large flock of hens would have ruined him and done the hens very little good. Where could I put him?

In one corner of the barn was a small room which had been used for a storeroom, but was now empty. It was about 10 feet by 12, with a good-sized window. So I sent to a saw-mill for a barrel of sawdust, with which to keep the floor clean, provided troughs for food and water, nests for the egg layers, and placed a stout pole, about 3 inches in diameter, across one corner as a perch. With my present experience I would not have used sawdust, but would have taken dry sand, which is far better and much cheaper, as it can be had for the cartage. Dry earth is better still on brick, stone or earthen floors, but on wooden floors it is apt to produce decay, since, no matter how dry it may be when it is put in, the

bottom of the bed of earth will become damp, and in time will rot the floor.

The nest boxes were simply small packing boxes, not less than 12 inches in any dimension. They were prepared by removing all the top or covers except about 3 inches at one edge; this was firmly nailed on, and when the box was laid on its side the strip formed a ledge which kept the straw and eggs from rolling out. Such nest boxes are cheap, easily moved, easily cleaned, and, when set with the opening about ten inches from a wall, they afford that secrecy which hens love so much.

Meanwhile, the hens in the large poultry house had been kept shut up all morning. I now examined them, selected three that I thought would mate well with the Brown Leghorn, and placed them in the room I had fixed up. As there had been no cock in the large yard for over two weeks I felt pretty sure that any chickens that might be hatched would be the progeny of the Brown Leghorn, and I also knew, from former experience, that after these hens had been with the Leghorn for a week the eggs would be fertile.

The next step was to prepare a proper coop out doors. On the place was a packing case which had been sent from the city with an organ. The organ had been sold by Brown just before he moved away, and was purchased by a party in the village, and as the case was not needed for such a short journey it was probably forgotten. At any rate it was mine now, so I removed the bottom and used the boards to increase the height of the case, and with a little extra lumber I soon had a very comfortable little house, amply sufficient for seven hens and the rooster. The door was a small affair, just enough to let a good-sized boy or small man creep in, but as the eggs were reached from the outside, and as the house was never cleaned except by moving it, a door was perhaps not a necessity.

The next thing was the fence. I made several lengths of portable lath fence, the same as that hereafter described, and enclosed a space 32 feet long and 16 feet wide at one end, and 16 feet and the width of the house at the other. The hens were large, with a

good deal of Brahma blood, so that a low fence easily kept them in; but the cock would have required a ten-foot fence, and, indeed, I doubt if even that would have confined him against his will. So I just shaved off the feathery part from the quills of one wing, and after that the height of fence necessary to restrain him was limited by his power of jumping, and which, by the way, was by no means contemptible.

It did not take long to get the new house in order. Laying plans and getting material consumed more time than did the actual work, but on the evening of the second day we had the three hens first selected, safely in their new quarters. As they had been two days in company with the cock I was satisfied that the eggs would soon prove fertile, so I selected two more hens and placed them in the storeroom, and next day I added two more, thus making seven breeding hens in all. On the fifth day I placed the cock in the out-door coop with the three hens first selected, and as soon as the hens in the storeroom had laid four eggs each, I placed them in the coop and gathered all the eggs for hatching.

The time which it takes to produce fertile eggs depends, of course, upon circumstances. If the hens are not laying, and do not lay for a week after they are with the cock, then every egg will probably be fertile. But if they are laying, then every egg that is developed to a certain extent will be sterile. After the fifth egg it is safe to depend upon them. These hens were all laying. This is an easy matter to determine, and we took care to examine the hens before selecting them. During the first seven days we got thirty-five eggs from the seven hens, and these we used for cooking. After that we set the eggs as fast as circumstances would permit.

Subsequent experiments threw this little venture entirely into the shade, but it may not be out of place at this point to give the reader the results, and this I am able to do, because I kept this little flock and their progeny separate for several seasons, having regarded it with a good deal of interest, since it might be supposed to serve as a test of the correctness of my plans and theories.

My object at this time was merely to establish a new flock of about fifty hens for my own family use, and perhaps the sale of a

few eggs and chickens every year—the sales being expected to offset, to a slight extent, the money actually laid out for feed, etc.

As already stated, I had only one rooster—the Brown Leghorn—and on taking stock I found that I had just 57 hens. After selecting seven for breeding purposes this left exactly fifty for laying. Most of my neighbors would have had five or six roosters with these hens—a useless expense, as I have found that hens lay quite as well when alone as when with a rooster.

By confining the attention of the rooster to seven hens, the bird was not exhausted and enfeebled, as he would have been if he had been put with the whole flock. The eggs were therefore more likely to be impregnated, and the progeny more certain to be vigorous. I have found, by experiment, that a single attention from the cock is just as good as a dozen, and perhaps better, provided he is in vigorous condition. Weak chickens do not come from the fact that the hens have not had attention enough, but from the fact that owing to too many efforts in this direction the vitality of the cock is lowered. Of course the influence of the cock disappears after a few days, and must be renewed, but while it lasts there is no diminution of its potency.

By selecting choice hens, and breeding only from them, I was enabled to control the kind of chickens I should have, and by keeping them in a coop by themselves I lost no time selecting eggs and trying to find out which hens laid them. It may be possible for a poultry keeper with five or six hens to distinguish the eggs of each individual bird, but where there are thirty to fifty this becomes impossible. By keeping the breeding hens by themselves all trouble in selecting eggs is avoided.

The result of the experiment was all that I could desire. We set the hens of the main flock as fast as they became broody, and in a little while we had quite a number of young broods scattered over the place. Some of the breeding hens wanted to set; we gave them eggs and let them bring out their broods. Meanwhile, four more hens were selected from the main flock and shut up with the rooster in the room first prepared. After two days he was returned to the out-door flock, which was now reduced to four, and again,

after two more days, he was replaced in the small room. Two days after that he and the hens were placed in the out-door coop.

The chickens from this cross showed wonderful uniformity. Nearly every one had a pencilled neck, the feathers being reddish with a black stripe down the centre. The bodies of the birds were a dark reddish-brown. In shape they were excellent—legs not too long and plenty of breast. They matured early, and the pullets were most prolific layers. A few showed a most decidedly dung-hill origin, evidently having “cried back” to some long prior ancestor.

Altogether we set 37 hens and raised 271 chickens—an average of a little over seven to each brood. Some poultry keepers will probably think this a poor hatch, but the reader must remember that many of the setting hens were small, and not very good mothers. Of these 157 were cockerels, which we killed, and either used or sold, and 114 were pullets, of which 90 were considered good enough to keep. At the close of the season we sold most of the hens that were in the old house and yard, together with the 24 culls. The price received was quite satisfactory, and in this way we got rid of all this old stock. In the winter we placed the 90 young pullets in the house, but without any rooster. As they were late birds they did not begin to lay as early as we would have liked, but they continued laying all through the summer months, and, in order to see what the result would be, we selected seven of the best, mated them with a Brown Leghorn from another yard, and raised enough chickens to supply us with fifty good pullets. These pullets were three-quarter Brown Leghorns, and showed their origin very clearly. They were smaller than their mothers, but were good layers.

It is astonishing how rapidly a cross can be brought back to any breed simply by using thoroughbred males. Thus—

The first cross produces half-bloods.

The second gives us three-quarter blood.

The third produces seven-eighth.

The fourth produces fifteen-sixteenths.

The fifth brings it to thirty-one-thirty-seconds, which is so nearly pure-bred that few people can tell the difference.

My experience, is, however, that after the first cross the purer the progeny is the worse it is, until we pass the fifth, at which point it again begins to improve quite rapidly.

The cross between Brown Leghorn and ordinary speckled hens is most excellent in every point except one—the plumage is a little too dark for a market bird—and as fully half our young stock will be sold either dressed or to be killed, this is a very important matter. I feel now that it would have been much better to have selected a White Leghorn cock, but as the question of marketing did not occur to me at this stage of my experiment, I made the selection I did.

In selecting the hens I had tried to pick out those that had just commenced laying after having been broody. There were several of this kind on the place; some we had “broken up,” others had brought out a few chickens, which had been taken away and united with other broods, and of some the chickens, from weakness of constitution and want of care during Brown’s moving, had entirely disappeared. I do not regard it as a settled point by any means, but I am inclined to believe that the eggs laid by a hen just before she wants to set never produce quite as strong chickens as those that she lays previously.

I have always had a fondness for a lot of chickens uniform in color, and yet, perhaps, I have been less successful in securing this than other breeder that I know of. Brown’s chickens were of all sorts, sizes and colors; pure black and pure white; mottled, red, pencilled necks, and so on to the end of the list. It was with great difficulty that I was able to pick out four or five hens that were anyway nearly alike, but I thought that next season, seeing that I must have a goodly lot of chickens from the same mother as well as the same father, I would be able to pick out seven pullets for breeding; and by getting a new cock from some other yard, so as to avoid in-and-in breeding, I would be able to gradually build up a flock that would do me credit. And here let me say a word about breeding too closely. I am perfectly well aware that a new breed cannot be established without very close in-and-in breeding. This has been the practice of all the great poultry breeders, and it



has held equally in other departments—even in insects. In the “Dictionary of Practical Apiculture” I find the law laid down very clearly under the word “Breed.” The author says:

“In attempting to establish a new breed or to improve an old one, we must, contrary to the usual opinion, pursue a relentless system of breeding in-and-in, and it is here that the skill and judgment of the expert breeder will be most fully shown. We have on the one hand the danger of weakening the constitution of our stock, and on the other, the danger of producing a lot of mongrels without any fixed characteristics. The experience of all great cattle breeders has shown that it is only by in-and-in breeding that the tendency to “cry back” can be eliminated, and these men have also shown that when sufficient care is exercised in the selection of the breeding stock, the danger of weakening the constitution is not to be feared. In this connection it should be remembered that all the well-marked native races of bees must have been produced by a series of in-and-in breedings, combined with a system of natural selection, which allowed the survival of none but the fittest—all the weak and non-prolific, and all the poor honey-gatherers being killed off during severe seasons. It is the same here as with the great herds of cattle and horses which roam at large in various countries. The most powerful and active bull or stallion obtains the leadership of the herd and breeds in-and-in with his own cousins, sisters, and even daughters, until one of his progeny, more powerful than he, displaces him in turn. But here we have the weak and feeble calves and foals selected by the forces of nature with better judgment than ever man exercised, and killed off by the inclemency of the weather as surely as ever butcher’s knife did its work.”

But my object was not to build up a new breed, but merely to improve an old flock. Therefore I could not afford to make such a study of my birds as would enable me to work out such matings as would successfully counteract the evils of in-and-in breeding. But so far as mere uniformity and excellence of the individual birds were concerned, my success was all that I could wish. By using

the purest Brown Leghorn males that I could find, I kept gradually getting nearer and nearer to pure Brown Leghorn hens, with this disadvantage, that I could not sell their eggs for hatching. It is true that they were slightly larger, and more hardy, than any thoroughbred fowls of their kind that I could get, but, on the other hand, they were not as large as a first cross between Leghorns and Brahas, or Leghorns and Plymouth Rocks. After the fifth season I discarded them entirely, and sold them to a farmer who wanted Brown Leghorns, but did not care to give the price of thoroughbreds. How they will turn out in his hands remains to be seen. I understand that he is taking great pains with them, having set off four pens which he keeps entirely separate, and uses cockerels from one, and pullets from another, for breeding, so as to avoid, as much as possible, all very close breeding, and thus keep the strain pure and in all its vigor.

For myself, for reasons which I have fully explained, I have abandoned this cross, as well all crosses from pure bred females. I get better results from females of mixed blood, than from those that are pure, but in all cases the males must be thoroughbred. The potency of the male in transmitting the qualities of his breed is in exact proportion to his pedigree; if mated with a hen of equal potency it is difficult to tell what the result will be; sometimes the hen, and sometimes the cock will govern the character of the progeny. Use hens of less potency—that is, less purity of breed; in other words, use cross bred hens, and the character of the male will be more fully developed.

### Facts and Fancies.

**T**HE balmy days of June were fully upon us, and as I sat one evening watching the increasing rows of brooding coops with their tiny population, I could hardly help dreaming of the future possibilities which they enfolded. I had already fully discussed in my own mind, the subjects of truck farming, or gardening; of the keeping of cows, and selling milk; of the raising of small fruits, and of some other branches of country work which I thought might help me out, but, after the most thorough and fair consideration that I was able to give them, I was compelled to decide that they would not suit my purpose. At the sight of so many young broods, I again reverted to poultry-keeping, and could not help running over in my mind the ordinary calculations upon which the profits of this business are based.

The usual calculation is, that a hen can be supported for one dollar a year, and that, if of a good breed, she will lay twelve dozen eggs, which sell at various prices from 20 to 60 cents per dozen. Assuming an average of 35 cents, the twelve dozen would bring \$4.20, leaving a profit of \$3.20. The manure, etc., is supposed to offset the labor and interest on house, etc., and as the hen may, in addition to all this, raise a brood of chickens, it is argued that the profit ought to be quite equal to the amount named. Now, it seemed to me that, if this were anywhere near correct, people would have found it out long ago. Still, it no doubt requires skill, tact and knowledge to produce such a result, and it is not every one that can command these. But, the point which impressed me most strongly was, that if there was any basis of fact in these calculations, then 235 hens ought to yield \$750 yearly, the amount I needed to make ends meet, and as I had already on the place nearly half as many hens and chickens as was demanded, the fact stared me in the face, that, with very little more expense and labor, the experiment might be tried.

I doubted the accuracy of both the elements of the above calculation, however. I suspected that no hen, even of the smaller breeds, could be supported on one dollar a year, unless under very special and favorable circumstances, and I also doubted the amount of the receipts. An average of ten dozen eggs from each hen of a large flock, even with a judicious selection of the birds, and with very excellent care, would be as much as could be expected. I had myself realized more than this, but the flock was small and exceptionally good. Allowances must be made for sudden invasions of disease and accident, but these I did not greatly fear.

But, even at these reduced estimates, the profit ought to be considerable, and 250 fowls is not by any means a number beyond what can be easily handled. Three, or at most, four houses, would accommodate them, and the labor would not be more than could be spared from other things by the hands already on the place.

My first thought was to see what others had accomplished in this direction, but the records were very meagre, many of the most important data being omitted. I could find only two books in market that professed to describe the best systems and methods of managing large numbers of poultry, one being the "Poultry Breeding in a Commercial Point of View," by Geyelin, and the other, "An Egg Farm," by Stoddard. Geyelin's system was altogether too artificial for my purposes, and as report said that it had not proved a success in the hands of the originator, I did not feel very much encouraged to adopt it. Neither was the system described by Mr. Stoddard adapted to my circumstances. The extent of ground and "plant" necessary to fully carry out his system was more than I could command. Moreover, I never could quite make up my mind that the system described in that book had been actually carried out in practice. It always seemed to me that Mr. Stoddard had "evolved it from the depths of his inner consciousness." And, indeed, the chief point upon which the system is based, viz., the alleged fact that hens will not stray far from their own homes unless led away, contradicted my own very emphatic experience, for my fowls have often wandered away to a distance quite equal to half the breadth of his farm.

Now, it so happened my wife had kept accurate accounts of all our income and outgo in regard to the hens, and although the conditions were not quite the same as now, yet they were sufficiently so to enable me to get at the figures I needed.

I found that in former years it had cost \$1.25 per bird for the year's sustenance. But, in this case, the cost had been diminished by various little items, such as waste from our own table, etc. But, as we had previously bought all the food, whereas now we could easily raise a considerable portion of it, these two differences might perhaps be allowed to offset each other, and I therefore put down \$1.30 as the cost of keeping one hen in food for a year. The receipts from eggs alone ought to be at least ten dozen eggs at 30 cents per dozen, which would be \$3.00, and this would leave \$1.70 for labor, interest on houses, fences, etc., and for profit.

So far the calculation was quite simple, and the data not difficult to get at, for even if I had had no record it would not have been difficult to tell what it cost to keep for a week the seven hens and a rooster which I had now cooped up, and then a very simple sum in arithmetic would have given me the information I needed. But when it came to the cost of housing, attendance, range, etc., the exact figures were not so easily got at. A dozen or twenty fowls may be housed by means of makeshifts which may be said to cost nothing, because even the labor is merely pastime, and the attendance is mere amusement. One thousand fowls cannot be cared for in any such way, and I had no data, and did not know where to look for any. Geyelin's work is very explicit on the subject, but the conditions are very unusual, while Stoddard is singularly deficient in those statements of time and cost which are so important in a matter of this kind, and which are so apt to creep into a record of actual experience.

After much thought and figuring, I came to the following conclusions:—

1. That if the cost of housing and attendance were left out of the calculations, I could make a clear profit of \$1.70 per hen.
2. That with my present help and facilities, I could take care of about 250 hens and their young. To do this work there was

part of the time of one man and a girl, and so much of my own time as was not occupied with the oversight of the rest of the place, and such other calls as are usually made upon a man in a similar position.

3. My present accommodations would enable me to care for about 125 fowls.

4. That by hiring a good, steady, elderly woman, who would give all her time to the fowls, I could easily increase the number to 1,000 birds. I proposed to oversee and direct, as well as to aid in actual work; the man would do the heavy work, and the girl could find time for a little general assistance, and as she was very much interested in the hens and chickens, she was always very willing to do so.

These points being reached, several important questions presented themselves, amongst which were the following:—1. How many birds can I keep successfully on the land that I have available for such a purpose? 2. How much extra house room must I provide? and, 3, How should I arrange the houses and yards?

I calculated that the paddock must be reserved for the horse and cow; one acre was already devoted to asparagus, so that this left about two acres of arable land, two acres of shrubbery, and half an acre of orchard, making about four and a half acres, to which might be added the barnyards for the older fowls in winter, and the lawn for small chickens in summer. How many chickens could I keep in this space?

Upon no subject did I find such great diversity of opinion as upon the extent of ground that should be given to the flocks—in other words, in regard to their range. The author of the “Egg Farm,” allows  $62\frac{1}{2}$  acres to 5,000 birds, which is at the rate of 544 square feet to each bird; Wright, the author of “The Practical Poultry Keeper,” in his own yards, allows 44 feet to each bird, and tells us that they thrive well. He also tells us that he has known of “fowls” being kept on a space of 12 feet by 3. This is at the rate of 36 square feet for several birds—say 3 to 5—or with an allowance of from 12 to 7 square feet for each.

Geyelin in his “Poultry Breeding in a Commercial Point of

View," describes his "poultry homes" intended for 6 hens and 1 cock, for breeding, or 12 laying hens, as being 21 feet by 3. This is 66 square feet to 12 hens, or  $5\frac{1}{2}$  square feet to each bird.

Warren Leland, a very successful poultry keeper, allows four and a half acres of land to each thousand birds. This is at the rate of 196 square feet to each bird.

The editor of the *Massachusetts Ploughman* allows 6 acres of rocky land to each 1,000 birds. This gives 261 square feet to each bird.

In former years I had kept twelve birds in good health and unusual productiveness in a yard 16 feet long and 8 feet wide which gave very little over 12 square feet to each bird. It is true that they were given the liberty of the whole garden occasionally for a short time, and this would of course break the monotony and enable them to gather insects, etc.

Allowing 100 square feet to each bird, an acre would serve for 435 fowls, and this seemed to me to be about the right amount to secure health and contentment. On this basis, I ought to be able to keep at least 2,000 fowls on my place—about twice the number that I at present thought of keeping. So much the better for the fowls.

As my present accommodations were fitted for at least 125 fowls, about 8 times the present amount of house-room would be required, and this was perhaps the most serious question of all, because it concerned an investment which would prove an almost total loss if the enterprise should prove a failure. Land could be devoted to other purposes, and fowls could always be sold for nearly what they cost, but chicken houses would be worth just so much kindling wood, and from even this value must be deducted the cost of chopping them up. My next step, therefore, in making my calculation was to fix upon the arrangement of my yards, and the number of birds in each house.

I searched carefully the records of what others had done, chiefly with a view to finding out how many hens had been successfully kept in one house and yard. I found plenty of descriptions of houses

calculated to hold from one hundred to three hundred fowls, but no account of the success with which the birds had been kept. I was, therefore, compelled to fall back on my own experience.

Turning back to my earliest memories connected with poultry, there was presented to me a most distinct mental picture of a rough poultry house in which over one hundred birds found a nightly lodging, and in which they laid their eggs. They thrived well; I never remember to have seen disease among them; eggs were abundant, and the labor of caring for them was not very great. During the day they wandered over a large area of farm land, but always returned at night.

Coming down to later years, I had in mind a former poultry yard of my own. We had a house which accommodated about fifty hens very nicely, but we raised about two hundred chickens from which we saved fifty pullets, and for these, quarters had to be found elsewhere. We put up a cheap house of rough boards, battened, and kept them in that. They laid well, maintained good health and proved quite profitable. But the special lesson which this later experience taught me was, that, although the two flocks wandered over the entire place (about  $3\frac{1}{2}$  acres) and mixed with each other freely, they always returned to their own houses to roost and to lay, and no quarrels were ever occasioned by the two different sets coming in contact.

I felt sure therefore that I could place as many houses as I chose on the grounds with seventy-five birds to each house, and that so long as the general range was sufficiently extensive I would find no difficulty. I therefore fixed upon seventy-five hens as the number which my houses ought to accommodate, and resolved to build one, intending to add house after house, until I had as many fowls as I wanted.

And thus, after much thought, and no little actual work in investigating the subject, I came to the conclusion that in my peculiar circumstances, and with my tastes and training, poultry was the only rural employment that offered a way out of the difficulties that beset me.



### Working Out a System.

**H**AVING decided to make the attempt to add to my income by the keeping of poultry, I set resolutely at work to arrange my plans, and work out a thorough system, so that success might be assured with at least a reasonable degree of certainty.

It was my purpose to have ultimately in my yards 1,000 laying hens. I concluded to dispense with cocks, as an expensive and useless addition, so far as these hens were concerned. Of these 1,000 hens, I intended to have, on the first of January every year, 500 birds of about nine months old, and 500 that were a year older, the intention being to get rid of the latter during the following season, as soon as they ceased to lay. This involved the necessity of raising 500 choice young pullets every year, and as more than half the chickens raised would be cockerels, and one-third of the remainder might prove culls, it was necessary that I should raise every year from 1,500 to 2,000 chickens. Allowing that each breeding hen, during the season in which I wanted to hatch my chickens, would lay 40 eggs, it would be necessary for me to have 50 breeding hens. These would have to be kept in small pens, of say 6 or 7 each, with a carefully selected cock—requiring about eight breeding pens. Allowing an average of nine to a brood I found that I should need about 250 sitting hens with accommodation for them.

As it was now nearly the first of July, it was too late to do much this season, but after mature deliberation I decided to procure during the next three or four months, about 500 young hens and thus make a fair beginning for the coming year. Next season I intended to raise my full complement of 500 pullets, so that at the end of a year and a half from this time my system would be in full operation.

The breed that I should adopt occupied my first thoughts, because on this depended to some extent the kind of houses, coops and yards that I should build.

I had had personal experience with Black Spanish, White and Brown Leghorn, Dorking, Light Brahma, Dominiques and mongrels, or so-called barn-yard fowls, but was not quite satisfied with any of them. Still it was upon these that I determined to place my chief reliance because, I would then know what I was about and all my former experience would be available. My former experience, however, had not been gained under circumstances which led to a very close consideration of the best variety for market, and as my present experiment looked to the *market* for its success, it was important that I should keep this feature prominently in view, and make no mistake. The following points occurred to me as being essential:—

1. The hens should be good layers of fair sized eggs. The color of the eggs I did not care so much about, because I was situated between two large markets, at one of which white eggs were all the fashion, while at the other the preference was for dark eggs. I found that those who preferred dark eggs did so under the impression that they were richer, while those who chose white eggs did so because they looked prettier. I also found that dealers would not give any more for one than for the other, though they would buy more freely of the eggs which they preferred.

Now, it was my purpose to secure as many private customers as possible; these I proposed to furnish with eggs direct from my yards, thus saving all middlemen's commissions, and sending the surplus to the general market, only when it became inconveniently large. I therefore trusted to the fact that eggs which were *guaranteed* to be not more than one to three days old would command a ready sale whatever the color.

2. Since a poultry yard of the size of that proposed must depend upon its own resources for raising young fowls, and since fully half the young birds thus raised would be cockerels, for which the market would be the only outlet, it was necessary that whatever breed I adopted should be a good table fowl. That is to

say, they should mature early, reach a good size, and present a fine appearance when dressed. This excluded all dark varieties, such as Black Spanish, Minorcas, Black Hamburgs, Javas, etc. These varieties rarely look well when dressed. On the other hand full grown, and well-conditioned birds of the Light Brahma variety always look well, but the young birds look "leggy" and poor. The Leghorns look well and mature early, but are too small. Dominiques mature early and look tolerably well when dressed. At this time the Plymouth Rocks had not been generally introduced, or I should certainly have used them, as I have since done. In the common strains of this breed, the cockerels are generally light and the hens dark.

And here let me note the absurdity of the fancier's rules, which demand that for exhibition purposes the cocks and hens ought always to be as nearly of the same color as possible. To a sensible poultry man, the fact that the cockerels are always light and the pullets always dark is one of the greatest advantages and for these reasons: In the struggle for existence the dark will always supersede the light. White fowls never have the stamina of the dark ones, and perhaps it was a knowledge of this fact which led me to select the *Brown* Leghorn in my recent experiment. Now the dark hens of the Plymouth Rocks, are to be kept for breeders and layers and with *them* strong constitutions are of the utmost importance especially for winter layers. But, if the cockerels were dark, it would be a great drawback in marketing those that must be killed, and fortunately the cockerels in *common* strains are quite light.

And let me here add in favor of the Plymouth Rocks, that they reach a good size, and if reared in a good run, have a most excellent flavor. As layers, the hens do not equal the Leghorns and Hamburgs in summer, though they are quite the equals of these famous breeds during winter, and as I have had an average of 137 eggs per year from a flock of thirty Plymouth Rocks, it is evident that they are not so very far behind the best.

But, not having the Plymouth Rocks that season, I was forced to adopt some other breed, and weighing carefully the good and

bad qualities of all the breeds with which I was acquainted, I decided for the present to adopt a cross-bred fowl for laying and marketing. The cross that I now selected was that between a White Leghorn cock and a Light Brahma hen. I also resolved to experiment with crosses between White Leghorn and Spangled Hamburgh cocks, and Light Brahma and Dominique hens. Of the cross between the Brown Leghorns and good common hens I already had a large number.

Having decided what kind to get, the next question was, Where can I get them? Five hundred fowls is not a large number for a poulterer to handle, but is so large that it would be difficult to secure that number of select breeding birds at moderate figures. Three methods suggested themselves to me: 1. To procure pure bred birds from reliable dealers and stock my yards at once. 2. To procure eggs from pure bred fowls and hatch them in an incubator and by the aid of common hens. 3. To buy a sufficient number of common hens—say four or five hundred—and cross the best of them with pure bred cockerels, thus gradually raising up a flock that would be especially adapted to my wants.

The first plan was out of the question on account of the expense. On corresponding with a large number of prominent dealers I found that I could not secure *fair* birds for less than \$2.50 each. This would make the flock cost \$1,250—a sum greater than I cared to invest in hens at that stage of the experiment, though I now look upon a stock which is worth four times that figure as a really good investment.

To the second plan there were equally strong objections. To produce 500 pullets would require the incubation of, at least, 2,000 eggs, allowing for cockerels, infertile eggs, loss of chicks, and culls. Now, dealers in pure bred fowls asked from \$1.50 to \$7.50 per setting for eggs; \$3.00 was a usual price, but taking the lowest figure, \$1.50 for 13 eggs, they would have cost \$231 for eggs alone. The incubator and its attendant would have cost a considerable sum, and the only immediate return would have been from the sale of young cockerels, which in such numbers would only have brought the price of dressed poultry. But the most

serious objection was, that at that time, I knew nothing about incubators and therefore the risk was too great.

I was therefore compelled to fall back on the third plan which was to purchase common hens in open market, and build up my flock by degrees. The great advantage of this plan was that the risk was small, since I could at any time get as much, or more, for my stock than I paid for it, provided it was judiciously selected in the first place, and well cared for afterwards. I could, also, secure a few pens of choice pure bred fowls at no very great expense, and from these I could raise small flocks which would enable me, not only to improve my stock of laying hens, but to carry out my experiments of crossing, etc.\* I therefore, resolved to buy a sufficient number of fowls in open market, using in their selection all the skill and knowledge of which I was possessed, and taught by former experience, the great danger of introducing even a single diseased fowl into a large flock, I determined to subject every lot to a most rigorous quarantine before giving it the freedom of the place.

But, in this case, it was necessary to provide accommodations for the birds before they were bought. It was well enough to buy one rooster before I had a coop to put him in, but it would not do to buy 500, or even 100 hens, without first erecting proper houses and fencing in suitable yards. I estimated that I would need at least six large houses and yards for layers, and eight small houses and pens for common breeders, besides at least three or four pens for small flocks of such pure breeds as I might wish to keep for the sake of improving my stock. I intended to begin with White Leghorn and Light Brahma, and I felt very strongly inclined to give the Spangled Hamburgs a trial. It also occurred to me that in my miscellaneous purchases I might find some special strain or variety that it would pay to preserve. I therefore set out to build one

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\* It is surprising that we do not see more flocks of fowls bred for special circumstances when we consider the ease with which a large flock can be raised in a short time from even a single hen. A flock of 50 to 75 in one season, from a good hen quite fit to bear a second brood, is nothing wonderful and in the second year's brood may be increased to a thousand provided a sufficient number of coops and yards are provided to hatch and rear the chicks.

house and yard of each of these models and try it fully. I knew well enough that the first of July was in some respects a bad time to begin poultry keeping, but I also knew that I had much to learn, and that it was more easy to experiment during the warm days of summer and early fall, than during the frosts of winter. Indeed, I afterwards found that if I had put off making a beginning until late in the fall, I would have lost just a year.

Meantime our little broods kept coming out and were gradually being dotted all over the grounds. The warm nights and pleasant days made it easy to provide shelter for them, and they were so far apart that, at first, we lost very few chickens by their straying into other coops than their own. I felt greatly encouraged, for things went on swimmingly, but after a time I found that the business of rearing chickens is not altogether made up of successes.

### Houses: Building.



MORE than a quarter of a century before the time of which I write, I had built and used movable chicken houses, and was greatly prejudiced in their favor. At first, therefore, I decided to have all my houses movable, so as to avoid any necessity for cleaning the floors. If made movable, the ground on which they stood, might be cleaned by simply plowing it and planting crops. But, on working out my plans, I soon found that houses which would be readily portable, would be too small for my present purpose, and that if made large enough and movable at the same time, they could not be properly fixed up so as to resist the winter's cold without a great deal of trouble. Moreover the glass lean-to shed, upon which I set so much value, would be a very difficult thing to move without taking it all apart.

Of course I might have adopted houses built on a model which would allow me to take the entire house to pieces, move it to its new location, and put it together again. This, however, would take too much time and labor, so I decided to make my large houses stationary and with sufficient capacity to hold 75 to 100 fowls each. The houses and glass sheds were to have clay floors, which I intended to clean frequently, and the yards were to be moved from front to rear, or from side to side, as might be found desirable.

For breeding pens I would need a smaller house—one that would accommodate comfortably seven fowls—six hens and a cock. For such a small flock, a large house, unless artificially warmed, is cold and cheerless, and to warm a house for seven birds would be a waste of fuel and labor. I therefore decided to make the breeding houses small and very warm, but this could be done and still have them easily portable.

In addition to pens for strictly breeding purposes, I would need

occasionally a small pen for experiments, or to keep a cock by himself, or to keep two or three hens that I wished to test. The ordinary breeding houses and yards would, however, answer all these purposes very well, and I determined not to multiply models and patterns if I could help it.

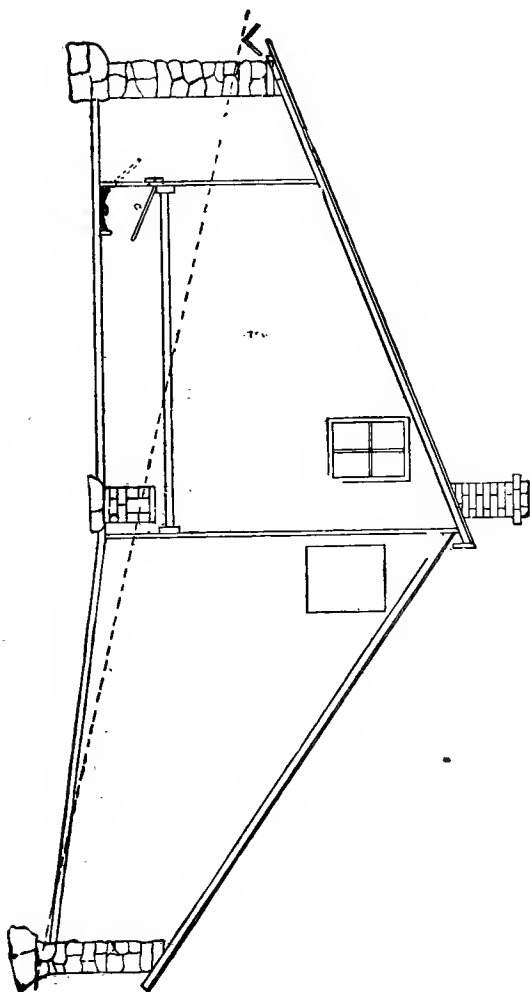
My first work, therefore, was to design suitable houses of these two kinds; and to construct one of each as a model. If this model worked well, then more could be made like it, and by making only one of each, I left myself an opportunity to introduce any improvement that experience might suggest. Fortunately, I had as a study a very excellent model, though one that was rather too elaborate for the end that I now had in view.

Amongst other buildings erected by the former owner, was a poultry house of moderate dimensions, and no great cost, but the most perfect in its design and appointments that I have ever seen, and I have examined some very costly ones. It was intended as a "family" poultry house, calculated for fifty hens and able to accommodate an additional one hundred young birds during the fall and winter, while they were waiting to be drafted into the fattening coops. Mr. Brown told me, that it was designed by a friend of his, an engineer of considerable talent and broad scientific knowledge, and he placed in my hands the drawings, specifications and descriptions, so that I might fully understand its construction and the best method of managing it. It certainly differed radically from all the poultry houses described in the books (and I have quite a collection of works on the subject) and as the designer gave his reasons for everything he did, it was easily seen that in every point it adapted itself to the nature of the fowls, and to the dictates of true science. I will, therefore, give a detailed description of it, and to make this more clear will add an engraving.

Just behind the barn and on the edge of the woodland there was a very pretty knoll the slope of which was quite steep, 1 in 4, as our engineering friend put it. The slope faced directly south, and the house was built on the side of this knoll, the enclosure stretching along the wood. The house itself was 16 feet by 14, and contained 100 lineal feet of roosting-poles which gave an average



FIG. 1.—SECTION OF POULTRY HOUSE.



of about 8 inches each, to 150 birds. In the engraving, Fig. 1, I have given a "section" of the house, that is to say, if the reader will suppose the house to be sawed across in the middle, it would present the appearance shown in the cut.

In the figure, the natural slope of the ground is indicated by the heavy dotted line. The back wall and also that on the north side are built of stone, of which there is an abundance on the place. The back wall was 5 feet high in stone, and the front wall of the house proper was of matched boards and 9 feet high. The roof also, as well as the south end were of matched boards. Parallel with the back wall, and 2 ft. 6 in. from it, ran a light partition extending to the roof, so as to provide an alley way on this side. In this partition, however, was a long horizontal opening, closed by several doors or traps, 12 inch wide, and hinged as shown at D. The object of this was to allow of the inspection of the nests and the removal of the eggs without the necessity of going into the house. The nests were on the floor, and consisted of a good thick bed of the fine grass used for packing glass-ware. The front of the nests was a simple board 5 inches high and the nests were protected from defilement by the slanting board c. The roosts were rough poles cut to the same length as the width of the house, and flattened on two sides at each end. They were supported by cleats nailed fast to the walls, two cleats forming a wedge-shaped recess in which the poles rested firmly and securely. Nothing annoys fowls more than a *rolling* perch; a *rocking* one they can get along with, as when they roost on the branches of trees, but to a perch that rolls over they cannot cling with any confidence. The plan shown in Fig. 2 makes a fastening which is as firm as the wall itself, and yet all the roosts may be picked up in a few seconds and laid aside while the floor is cleaned.

The only glass used in constructing this house was the small window of four lights, shown in the end view, and this could be covered on wintry nights, so as to prevent the escape of heat from the building. The greatest mistake in poultry architecture is the use of too much glass in the houses. We see houses with glass fronts, glass roofs, glass sides, and windows wherever there is

a chance to get them in. Now, it is quite true that on bright, sunshiny days such houses are very warm; indeed during bright sunshine the air in such a house will often rise to summer temperature while the thermometer outside is nearly down to zero. The glass acts as a "heat-trap"; the sun's rays pass freely through, and warm up everything on which they fall, but the heat from the interior does not pass out through the glass so readily, as its intensity is greatly lowered. The consequence is that more heat passes in than can pass out, and the whole house becomes warmed up. But, as soon as the sun's rays are cut off by clouds or night, there is no more heat passing in, while the out-going heat is as much as ever. The house then becomes rapidly cold, and the fowls will be frost-bitten in such houses when they would have escaped if kept in an old lean-to or even in a large cask. Therefore, if we would keep our fowls warm during cold winter nights, without too great an expenditure of fuel, we must shun glass and keep them in houses with thick walls and roof. This does not seem to be understood by the designers of poultry houses, and even where a glass shed is merely attached to the house proper, they make the opening leading from one to the other so large that the two might as well be in one.

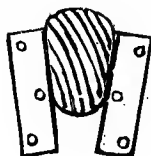


Fig. 2.

The designer of the house we are describing knew better. He made his house complete in itself and quite tight. Even the holes through which the fowls passed from the glass shed to the house were provided with doors, which could be shut from the outside by means of a cord. In cold weather, there is no danger of not enough ventilation. A keyhole, on a cold winter night will admit air enough to fully supply the wants of three men, and the cracks in the best made poultry house will always give *air* enough. As for the carrying off of foul exhalations from droppings, etc., the best plan is to neutralize all such by means of proper absorbents. Fully impressed with these facts, the designer made his house close and with walls prepared so as to be the best of non-conductors. Of course the stone walls always maintained a moderate

temperature, and wherever the walls consist of boards they were carefully lined with tar paper. This lining was applied by first nailing to the walls strips an inch thick. The paper was then tacked to the strips, and thus a dead air-space was enclosed between the wall and the paper. This, as every one knows, forms one of the very best of non-conductors, provided the air does not *circulate* in this space. To prevent this the strips were placed horizontally—not vertically, as is usually done, and thus all up and down currents were prevented.

But, in order that the full benefit of a glass house might be had for clear cold days, there was a glass shed, the same length as the house, but only twelve feet wide, built against the south side. This was constructed in a very simple, but very efficient manner, as follows: The wall on the east side was stone, about 30 inches high, and after that of boards. The front was of stone, and the west side of boards. The rafters were narrow inch boards, tongued as if for matched stuff; and these were placed just so far apart that the glass lay snugly between the tongues. The glass was then puttied in, beginning at the bottom, and allowing each light to over-lap the one below it. From such a roof snow slides off as soon as a thaw comes, and it is very cheap. Large ventilators, which could be opened or closed at pleasure, were placed in the east and west sides, as outlined in the figure, and in the front wall (that facing the south) there were openings whereby the fowls could go out and in, to the large enclosure; or to the open fields, when it was so desired. Directly over the front wall of the glass shed, and running the entire length of the house, was extended a wire netting which effectually prevented the fowls from getting on to the roof and yet was almost invisible, so that it did not detract from the appearance of the building. The outside of the south wall of the house proper, (that which formed the north wall of the glass leanto) was painted a very dark reddish brown. This enabled it to absorb the heat of the sun's rays, whenever they fell on it, and this heat they imparted to the air, so that even on cold days the air in the shed was quite warm so long as the ventilators were

kept closed. When the ventilators were opened a very strong current was established at once.

In such a house, without any further additions, hens would have done well the whole year round, and with 100 birds on the roosts we doubt if one of them would ever have been frost-bitten. Under the glass shed our hens found dryness and warmth on bright days. A few barrowfulls of dry earth placed in one corner furnished one of the very best dustbaths—such a one as fowls do not ordinarily get during winter—and when dry warm days came, they could go out and enjoy themselves in the open air. But the designer was not satisfied with this, and therefore he provided means for procuring artificial heat during very cold weather. In this, as in everything else, he studied efficiency first, and economy afterwards, but in all cases the latter received due attention.

Warmth, during the cold months of fall, winter and early spring, is well known to be a most important point in the keeping of poultry for eggs, and the one most frequently neglected. Breeds, food and cleanliness are all essential, but without warmth they will be merely wasted. Much can be done by the construction of the houses in which our poultry are kept, and if the house be small, the birds will keep each other warm, and little danger need be feared on the score of ventilation during the cold seasons of the year. Much has been written on ventilation, and the general principles are perhaps sufficiently understood by most people, and yet, but few have any *practical* idea of the subject. Those who have not studied it experimentally have no idea of the great difference which a slight change of temperature makes in the ventilating power of an opening. On warm days, when the temperature outside is nearly the same as that of the inside, the air has scarcely any motion out or in, and we might leave small cracks or wide ones without any danger of “drafts.” Under such circumstances, if we want to change the air in a house rapidly, we must open large windows, or even remove the whole side of the house, and so convert it into a shed.

But, in very cold weather, all this is changed. The inside of

the house is then warmer than the outside, from several causes. It may be that the walls and floor are giving off the heat they took in during warmer weather, or the birds themselves warm up the air, or heat is derived from some artificial source. In any case the greater the *difference* between the outside and inside temperatures, the more rapidly will the cold air try to get in and displace the warm air. Hence, the closeness with which this house was built, so that in winter these drafts might be stopped, while in summer, by opening the window and the large ventilator at the other end, and removing the straw or leaves from under the roof, a free current of air would be established.

In addition to the earth-heat derived from the bank in which the house was built, and the warmth of the fowls themselves, the heat required for cooking was utilized in the following manner: On the outside and near the front of the house was arranged a 15 gallon boiler or kettle. It was "set" in brick with a large grate beneath it, and the smoke and hot gases were carried through a horizontal brick flue which passed across the house along the front wall and about six inches from it, as seen in the engraving. The chimney was on the opposite side of the house, as shown. The brick setting of the boiler was enclosed with a small wooden porch provided with a door, and there were openings from this porch into the building, so that the heat might be allowed to pass in when desired. These openings could be tightly closed by shutters when this was thought best. In order to start the draft through such a long horizontal flue, the bottom of the boiler was lower than the floor of the house, the whole path from the porch to the front of the glass house being made lower also. In this way no difficulty was found in getting the flue to draw, especially as we always commenced the fire by burning a lot of brush, which gave a large flame and quickly heated the air all through the flue and chimney. There was also a flat piece of sheet iron which we used as a blower. This brought the opening into the fire-place as low as possible. When the fire was once started the draught was excellent.

Now, as a horse, cow and several pigs were kept on the place,

besides the fowls, it was found very advantageous to have a large kettle for cooking their food. In doing this the flue in the poultry house was thoroughly heated, and from the large amount of material it contained, this heat was not all gone until morning. A sheet iron pipe would have cooled in ten minutes; this remained warm for as many hours, and since the cooking had to be done anyway, all the heat thus saved was so much clear gain. The food was cooked but once a day, the fire being started after dark. The animals then had a warm supper, (except the chickens, which had whole grain) and the kettle was again filled and allowed to stand till morning. Even after a cold winter's night the contents of a well covered 15 gallon kettle will be warm in the morning, and every animal on the place can have a warm breakfast.

It will be seen that the flue runs close to the front wall, and consequently crosses the path of the chickens when they come in to roost. Two passages were therefore made through the brick work and under the flue so that they might go out and in at will.

The floor was a solid plate of *adobe*, constructed by first spreading over the ground a thick layer of coarse gravel and broken stones, and then covering this with moistened clay which had been well worked. The clay was then beaten solid and forced down amongst the gravel and its upper surface was smoothed off. When dry it was so firm and hard that a blow from the heel of a coarse boot made no impression on it. This floor was covered with dry earth finely powdered. Dry earth at once absorbs the droppings of the fowls, and prevents their becoming a nuisance. Every day or two the surface is well raked over so as to mix the droppings with the dry soil, and a thin coating of the same fine earth is scattered over the surface. Fifteen minutes suffices for this operation, and when the accumulated earth and droppings are wanted for any of the crops, they can be easily removed and the whole house cleaned.

The entrance to the house was by means of a door on the west side, opening directly out of the alley way that ran along next the back wall, and just behind the nest boxes. This brought the roof rather low, perhaps, but we never found it inconvenient, and the

lower the roof, the better for the hens in winter. The roosting place was reached by a passage from the alley way, and there was a small opening (about 2 feet square) through the wall, through which dry earth could be thrown in, and the soiled earth removed. This opening was of course provided with a substantial shutter.

The shed was entered by a separate door, which served, not only as an entrance for the attendants, but as a way through which clean and soiled earth might be passed.

Such were the construction and appointments of this model poultry house. I made a careful study of all its features and workings, and found in it the germ and suggestion of my future buildings.

My first efforts were directed towards simplifying and cheapening the structure. The house could not have been called an expensive one; indeed, when compared with many that I had seen, it was a cheap affair, but when multiplied by fifteen (the number that I expected to build), the cost was too much. And, besides, it was larger than I needed. I expected to get rid each year of all my surplus stock before very cold weather set in, so that each house would have to winter only its complement of 75 hens. For this purpose 60 feet of perch or roosting poles would be ample, and this could easily be put into a space  $8 \times 14$  feet—just about half the size of the large house. Moreover I determined to do away with the passage at the rear of the nests, and allow the latter to be entered directly from the outside. If poultry was to be made a *business*, somebody would be on the ground all the time, and consequently there need be no fear of sneak thieves.

I therefore designed my houses  $8 \times 14$  feet on the ground, and quite low—partly to save lumber and partly to economize heat. After making careful working drawings of all the parts, I sent to the mill and procured the necessary lumber, and my man and myself went to work. As we were both unskilled, to a certain extent, we adopted very simple, and what carpenters would probably call, absurd methods. Instead of making a frame, we sunk four posts in the ground, sawed them off to the right height, connected the



tops with pieces of scantling and nailed pieces of the same scantling between them at the proper places. The rude frame thus constructed was covered with cheap matched lumber placed vertically, and the roof was formed of the same material and covered with tarred paper. There was one small window at the end, and the whole of the interior, except the door to the nests, was lined with tarred paper in the same way as the large house, and as the board cover to the nests fitted snugly to the walls, both along its edge and ends, the amount of cold that got in by this way was but small. The roosts and other arrangements were the same as in the large house. The figure on page 70 will give a clear idea of the construction of this poultry house, which, when finished, was snug, strong and tight.

The front, which was 8 feet high, was placed facing the south, and against it was built a shed, but instead of a roof of glass, such as was used for the large house, I contented myself with two sashes such as are used for green-houses or hot-beds. The advantage of these was that no ventilators were needed—the sashes themselves serving for ventilators when the weather was warm. At the season at which the house was built, there was no need of this glass covered shed, except for rain, and for that a common board or brush shelter would have answered quite as well as one that was glass covered, but I wanted to test the working of a complete house before I went on to multiply them, and so I finished the entire structure—glass shed and all. Keeping poultry at certain seasons and under favorable conditions is mere fun. When the air is balmy and the fields are green, almost any shelter will answer for even the most tender little chicks, but when the storms of winter and early spring are upon us, and snow, sleet and frost cover the earth, then even the old birds find it hard work to maintain their existence. These difficulties I had fully experienced in former days, and I knew that while comfortable houses were a necessity, roomy sheds were no less essential. For this reason I had put a cheap roof over the manure pile, so that on wet and stormy days the hens might have a dry, warm place in which to

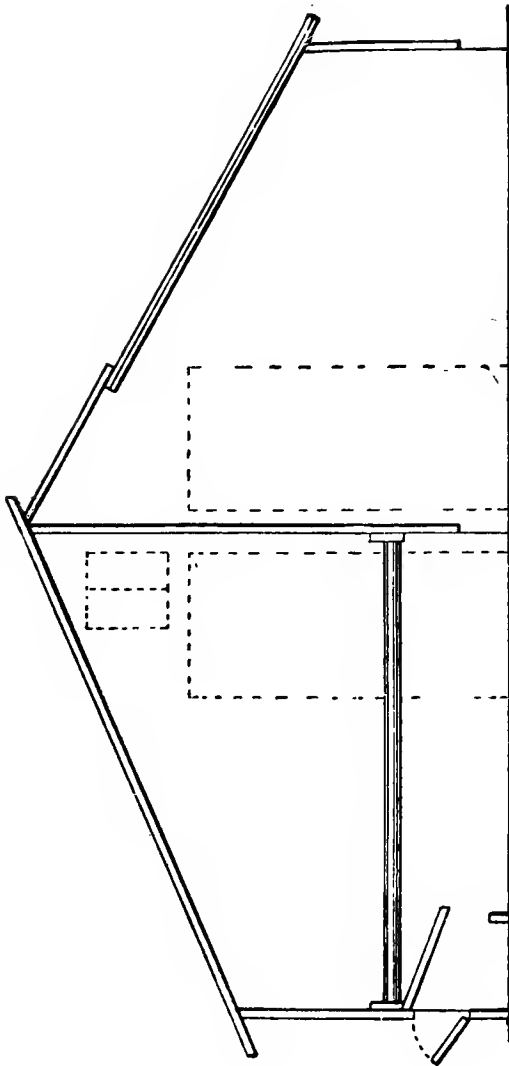


FIG. 3.—HOUSE FOR LAYERS.

roll and scratch ; but although this might serve very well for fifty hens, it was but a meagre allowance for five hundred, not to speak of a thousand, or, as I hoped to have at times, 3,000. I therefore saw that each yard must have its own shelter and its own sheds. The glass-covered shed served on very cold days for a dusting place, and a sort of warm room, but it was not large enough to accommodate 75 fowls. I therefore felt that a plain shed, open to the south, and enclosed on at least the rear and one side, would be almost a necessity, and so I put up one that was 10 feet long and 8 feet wide. The height at the back was 2 feet and at the front 6 feet. During the summer, when the sun was nearly vertical, this afforded a nice cool shade at noonday ; and in winter, when the sun was low, even at noontide, his rays lighted up every part and made it warm and dry. On wet days the hens used these sheds very freely, and so much comfort did they seem to take in them that I put up two for every house. These, with the glass shed, gave nearly four square feet of shelter for every bird, and to this I attributed a large part of my success.

After the house was finished, the next thing was to surround it with a proper fence, stock it with hens, and test its working. This I did, and I could find no point in which the house itself could be improved without greatly increasing the cost. Of course I could not, at this season, test it for cold weather, but I had no misgiving on that point. I had successfully kept fowls during severe winters in worse houses than this.

The only point in regard to which I did not fully test it was in regard to the number it would hold. The market price of hens was rather higher than I thought they were worth. I therefore contented myself with thirty birds, which I purchased in the market and transferred to this yard. After ten days I gave them their liberty, and although they roamed all over the place during the day, and mixed with the old stock freely, yet they always returned to their own yard at night, and I believe very few of them laid away. One or two hens stole nests in the shrubbery, and as there was no rooster amongst them the eggs proved worthless, so that

the hens lost their labor and we lost the eggs ; but the amount lost in this way was but small, and became gradually less. I was perfectly satisfied with the work thus far, and would have at once turned my attention to the construction of breeding pens if my thoughts had not been directed to another branch of the business, as I will detail in the next chapter.

### Broods Increase and Trouble Begins.



**H**EN, under ordinary conditions, a hen steals her nest and brings out a brood, the owner rarely has much trouble with the chickens. The mother cares for the eggs, generally hatches out a goodly proportion—often the entire lot—leads her young progeny along hedgerows and through coppices, and brings to the barnyard a fine lot of strong, healthy little birds. And even when the farmer's wife sets her dozen hens in different nooks and corners, and lets them wander at will along the roadsides and through the orchard, there is rarely any trouble. The hens easily keep so far apart that there is no danger of their babies getting "mixed up," consequently there is seldom any danger of their fighting, or of chickens getting killed by straying to the wrong coop. At first, therefore, we had no trouble to speak of. We lost some chickens from different causes, but this always happens; one got its leg broken by being caught in the cleft of a split board, and another had a fracture from a small stone which was loosened by the scratching of a hen and rolled down a bank. In both cases a good cure was made by simply wrapping the broken limb with a narrow strip of muslin which had been smeared with very thick paste. The paste soon dried, and held the bones firmly in position until they had united. In both cases the chickens became useful fowls. In another case, however, the little thing wandered off and was not seen until it was too late. The leg healed up, but the foot was turned the wrong way, and the poor little chicken found it difficult to walk, and impossible to scratch. But some one has said that everything—even evil—has its uses, and as an instance he names diseases, without which he claims that we could not have wise and learned physicians!\* So this poor little

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\* To which some irreverent Phillistine has replied by asking, which, in this case, was the good, and which the evil?

lame chicken had its uses, for it taught us how implicitly the lower creatures will confide in us if kindly cared for, especially when they are in a measure helpless. This helpless lame one had no fear of humanity; it would stand quietly and allow us to pick it up, expecting to be carried where fresh grass might be had, and as it fed out of our hands and looked up in our faces it seemed to look upon us as its natural protectors. Some one has said that to the dog, man appears as God, and, in truth, it may be so. To this little chicken we no doubt seemed an all-powerful Providence, from whose hands came food, and who provided shelter and protection. She grew to be a good-sized hen, and laid almost as well as those that were perfect in their limbs.

But when our broods multiplied, so that lawn as well as barn-yard was dotted quite closely all over with them, then trouble began. The chickens would run to the wrong coops and get quickly pecked to death; the hens would fight, and in their struggles the chickens would be scattered and sometimes seriously hurt. Another difficulty arose: Amongst so many coops the hens seemed to lose the power of finding their own individual dwellings; two would try to get into one coop, and then fighting and destruction of the chickens would follow. By the time we had forty coops occupied we had our hands full, and more too.

I suppose that if the grounds had been of far greater extent, so that the coops could have been placed further apart, this difficulty would not have arisen. But to avoid it, the space occupied must have been enormous.

Now, it is well known that one of the great secrets in the rearing of strong, healthy chickens is the giving of freedom and all that it implies. Open air, grass to pick, leaves to scratch, dry earth to dust in, and ant-hills to explore—these are what go to make healthy chicks and vigorous fowls. But if the mothers fight and kill each others progeny when this freedom is allowed, what are we going to do?

The present broods had been hatched in all sorts of contrivances and make-shifts. Old barrels laid on their sides; boxes with and without bottoms; old dog houses; a heap of broken straw laid in

a corner, and half protected by a short board laid slanting against the wall; an old basket with a piece of sacking partially covering it; these, and such as these, had been utilized as the occasion arose. After we had used up such loose odds and ends as came to hand, I bought a lot of cheap barrels, which had no heads, and fixed them up as follows: A square hole was cut in the side, as shown in Figure 4, and the hoops were carefully fastened by means



Fig. 4.

of a few wrought nails, which were neatly clinched, so that they might hold firmly and yet leave a smooth surface. The barrel was placed on the ground open end down, some fine grass or broken straw placed inside and moistened, and the eggs laid on this. A sitting hen was then put on the eggs, and the opening covered with an old sack. The hen would rarely return to this nest for the first few times, after she had left it for food and water, but by placing her back once or twice she soon learned which was her own nest, and returned to it regularly. The darkness seemed pleasant to her; the roomy barrel above gave her plenty of air, and, altogether, these nests were as good as any that we had for single nests.

After the chickens were hatched we kept many of them in the old "tent" or triangular coops—a form which is, perhaps, one of the oldest and one of the best where there are not many broods: It has several advantages; it sheds rain perfectly, keeps the hen confined and allows the chicks to roam, and when the chicks return they can get away from the trampling of the hen by retreating under the corners. But it is a mistake to suppose that the young chicks of several broods can be placed close together and allowed to roam about. They will get into the wrong coops, and then we betide them unless the hens are very old and motherly. At any rate, our time was sadly broken up and our tempers sorely tried by hens that would not allow strangers in their coops, and after a few weeks' trial of this system the loss was so great that necessity compelled the invention of something different and more systematic.

I saw that a hatching room and brooding house would be a necessity, and I set out to plan and construct them. By the time I had fully realized the necessity for all this, however, and was prepared to go to work, most of our chicks were so large that they were past the most dangerous period. The dangers we have detailed are most fatal to chicks about a week old—just when they can run about freely and yet do not know enough to run away from danger. But as it was my intention to hatch considerable numbers of chickens in the near future, I concluded that I had better experiment a little and get my system into good working order, so as to be fully ready when the time of necessity came.

First, then, for hatching. Although it was the poorest time of the year for bringing out chickens (the end of July), yet I had several hens wanting to sit, and I thought I could afford to risk a few eggs and chickens for the sake of learning by actual experience.

At first, I thought of building a small house specially for hatching purposes, but after thinking the matter over I decided to experiment in a room, or rather two rooms, that were in the barn, and so were ready to my hand. One of these I had already used as a temporary pen for a rooster and hens, the other opened into it, but



had only a clay floor. The latter I decided to use for a hatching room, while the other was to be used for a feeding room.

The hatching room was 12 feet by 10. This gave 44 feet length of wall, and as I could have two rows of nests through the middle, I estimated that I could have between fifty and sixty hens sitting in it at one time. Of course, in order to crowd this number into such a small room, it would be necessary to have nests made on purpose; old barrels, boxes and baskets would never answer. The nests might be made either fixed or movable, and the latter had many advantages. Fixed nests would soon get infested with vermin, and could not be cleaned except by clearing out the entire house, and this might not be always convenient. So I set to work to devise a simple, portable nesting box that would give each hen her own nest separate from all the others; from which she could not escape when once she was in; which could be easily cleaned, and which would give the birds plenty of air. This was how I did it.

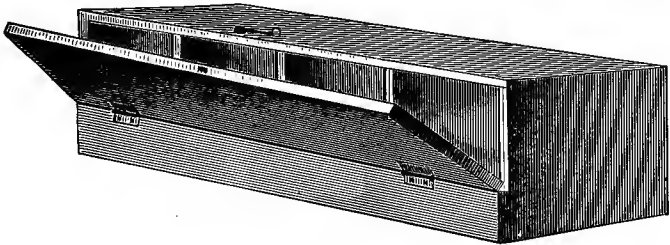


Fig. 5.

I made a box, or rather a crate (for it had no bottom or front), 4 feet long, 14 inches wide and 14 inches high. Fig. 5 shows a perspective view of this box with the door partially open, and Fig. 6 gives a section of one of the compartments. The top of the box is entirely covered; there is no bottom, so that the nests rest on the ground; across the front, at the lower edge, is nailed a strip 4 inches wide, which not only serves to strengthen the whole, but keeps the eggs and straw from falling out; along the lower edge

of the back is nailed a strip 5 inches wide which answers the same purposes as that at the front, and in addition has the door hinged to it. The door consists of a single board which is hinged to the back strip, and when raised up may be hooked to the

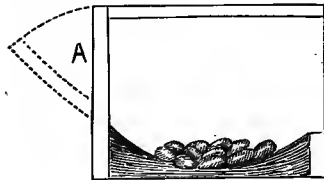


Fig. 6.

top. In very warm weather, instead of a hook, we use a loop of cord, which is so long, that, when slipped over the peg or nail in the top, it still allows the top of the door to stand out one or two inches from the edge of the top of the box. This allows plenty of ventilation, and to prevent the loop from slipping off the peg, thus allowing the door to fall down, we push a rough wooden wedge between the door and the top of the box, so as to keep the cord taut. There are four compartments in each box, each nearly 12 inches wide, and when such a nesting box is placed within two or three inches of a wall, the hens have plenty of air, and yet are securely held as prisoners. Two boys can carry these boxes anywhere, so that they can be easily taken out to be cleaned.

I made seven of these boxes, holding twenty-eight hens. Along one side of the room I placed three, and along the middle I placed two rows of two each. The middle rows were placed back to back—that is, with the open sides facing each other and about five inches apart. Between them was placed a board 8 feet long and 14 inches wide, which completely concealed the birds from each other and yet left sufficient space for ventilation.

Every evening I looked over the laying nests and other places which the hens were most likely to adopt for nests for sitting, and marked such hens as were decidedly broody. I had learned by experience not to trust a hen on her first attempt to sit, for some-

times they will sit for one or two nights and then abandon the nest. But a hen that has occupied a nest for three consecutive nights has probably made up her mind to incubate, and may be depended upon. Such hens I transferred to one of the compartments in the hatching room, gave her a setting of eggs and shut her in. Over the compartment was tacked a card on which was written the date, when set, the kind of eggs, and the date when due. By pursuing this course, I very soon had every compartment filled with faithful sitters.

At first, I let all the doors down every morning and waited until the hens returned. Some of them delayed coming off for some time, others came off at once. The same diversity appeared amongst them in their habits of returning. At this time of the year a few minutes did not make much difference to the eggs. With the thermometer at  $80^{\circ}$  even one or two hours did not signify, but during February, with the thermometer down to zero, it would have been fatal to the unhatched chicks. It is true that the hens would probably return sooner in very cold weather, but probabilities would not answer my purpose. Could I *control* this matter completely without too much labor? I determined to try. I therefore attended to this part of the work myself, so that I might learn all about it. The hens were regularly let off at seven o'clock in the morning, and if any delayed to come off voluntarily they were lifted off. All were driven into the outer room, so that they might feed and defecate. All who have had anything to do with sitting hens know what a horridly offensive smell is emitted by the retained *fæces* of a sitting hen. Therefore every precaution was taken to have this confined to the outer rooms, the floor of which was well covered with dry sandy earth. A hoe stood conveniently in one corner and at once enabled me to put an end to any nuisance. The ventilation was of course ample. Food and water stood in convenient troughs and dishes, and the hens were never allowed to go outside. In this way no trouble in catching them was ever experienced. When they had been out half an hour, they were driven back to the hatching room, and allowed to return to their nests. Many of them did this without guidance or assistance, and this was so much trouble

saved. Others tried to get into the wrong nest—one already occupied by another hen; it was easy to notice this, pick up the wanderer and place her in the first compartment that came to hand. Others seemed reluctant to go on; these we caught, placed them in a box and shut them up.

The success of this system was complete. The time required to attend to the hens was small; there was no danger of the hens going wrong when the attendant was absent; no danger of eggs getting chilled; no danger of hens remaining too long on the nest without being fed. It is evident that it made no difference whether each hen returned to her own compartment or not; so long as each compartment had a hen, it was all that was wanted. It is true, that if the hens had had different periods to sit, it would have made some difference, but I saw that, in that case, I could readily classify them, say, into one, two and three week hens, and let each class out by itself. I was, therefore, perfectly satisfied with my system, and resolved to make preparations for carrying it out on a larger scale.

But when the chicks were hatched the work was only half done—perhaps not even that. The next thing was the care of the young chickens. Of course I wanted a system which would work not only in fine summer weather, but during cold, damp days and with large numbers of chickens—not less than two hundred and fifty broods. Long before the chicks were due, therefore, I set to work to devise a system which would meet my needs, and as usual I turned to the books to see what others had done. I found plenty of coops for single hens and their broods; indeed, the inventive genius of poultry keepers seemed to have expended its whole energies in this department. The number of such coops that I found figured was simply astonishing, but as I had enough of my own, many of which had never been figured anywhere, I did not want them. I was surprised, however, to see that while nesting boxes and other arrangements for *hatching* chickens in large numbers received a great deal of attention, very little information was given in regard to their after-treatment in large numbers. I almost came to the conclusion that most of the “practical” men had got

“stuck” at this point, and failed to carry their experiments any further. But this was just the point that interested me; I could readily hatch out chickens in any numbers, and, under my own system, with very little trouble, but when it came to rear them the problem underwent an entire change. The fact that I had had a pretty good training in the difficulties of the case encouraged me in the belief that I could achieve success. So far as the broods now in the hatching room were concerned, I did not feel uneasy, for by the time that they would be off, the older ones now on the lawn would have wandered off to the shrubbery, and I had enough single coops to take care of twenty-eight broods. It was the next season to which I looked forward with anxiety.

I saw, after very little consideration, that each brood must be kept by itself, and that for the first four to six weeks it must be confined to its own coop. I therefore set to work to devise such a coop.

The first question that presented itself was in regard to size. How much room does a hen and say twelve chickens require until the chickens are, say, six weeks old?

On this point I could find very little information, and I had never kept chickens in such a bird cage before. I thought, however, that a coop 5 feet long, 15 inches wide, and 13 inches deep, ought to hold them, and I adopted this as the size of my experimental coop. It was evident, however, that by using light lumber, not more than half an inch thick, five or six of these coops might be made in one block, and thus nearly half the lumber would be saved, while the whole coop would still be movable. I therefore procured a few half-inch boards of cheap stuff, 10 feet long and 6 and 7 inches wide. Two of these boards put together would make just the right depth—13 inches.

Having cut the boards in two I made a box, without bottom or top, 10 feet long, 5 feet wide, 13 inches deep, and divided into six equal parts by means of divisions running across it. Across one end, and 12 inches from the edge, was nailed a strip 3 inches wide. To this was hinged a board 12 inches wide and 10 feet long, so that 15 inches of the rear ends of all the divisions were tightly

covered. The 12-inch board could be lifted up so as to expose all the divisions. The other part of the top of the coop was covered with wire netting of one-inch mesh. The part under the board cover had a bottom or floor of light wood, and the passage between the net-covered and the board-covered portions could be closed by a sliding door. For the purpose of feeding, etc., there was also a hinged door 8 inches wide at the opposite end from the brooding apartment. By raising this up food could be introduced in saucers or other vessels.

This simple coop could be easily moved to any part of the grounds. If empty it was simply picked up and carried off. If there were broods in it they were first driven into that part which had both top and bottom and closed in by means of the sliding doors. The entire coop, hens, broods and all, might then be carried to any place. Thus we set them down on the grass and they could pick to their heart's content. When they had soiled this spot we moved them to another, and towards evening we washed the grass thoroughly with water, for which purpose I had a simple watering cart made. It consisted merely of a barrel mounted on wheels and furnished with a short piece of hose.

I was surprised at the ease with which we cared for broods and raised them with the aid of these coops. My man said that it was as easy to take care of twelve broods in these coops as to care for one in the ordinary way.

We kept food constantly before them, but varied it at least four times a day, so that they did not become disgusted with its constant presence. As they could not get out to pick up worms and insects, we took good care to see that they had plenty of meat and crushed bones. For drink they had chiefly buttermilk. Our cow was in full flow of milk and we churned twice a week. We also bought all the buttermilk that one of our neighbors could spare, and I never saw anything make chickens grow like this feed. In the morning they had bran mixed to a stiff dough with buttermilk; at 10 A. M. they had chopped meat—waste scraps from the butcher; at 2 P. M. they had ordinary "feed," and corn meal made into a dough with water; at 6 P. M. they had cracked corn. Buttermilk

they had before them all the time. I never saw chickens thrive better than ours did under this treatment.

For feeding I bought a lot of chipped saucers at the crockery store for a cent apiece. These chipped pieces are unsaleable, and quantities are thrown away by every large importing house. By offering to take *all* they had for a month I got them at a very cheap rate.

I made but two of these coops before trying them, and by the time I had fairly tested the system the other broods were so far advanced that they did not need them. I kept them in the common tent coops and similar contrivances, fed them well, and they thrived apace. My motto was that every chicken I could raise brought me nearer to the fulfilment of my ambition—the possession of 1,000 laying hens. The twenty-eight broods averaged nine chickens each when they were one week old. I divided them into broods of about fourteen each, and the ease with which this could be done in my new coops, showed me that the advantages more than balanced the cost.

### Preparing for a Start.



ALL this preliminary work had merely been for the purpose of educating myself in the best mode of managing and handling chickens in flocks which might be multiplied to any extent. I was perfectly satisfied with my house, hatching nests and brooding coops; it only remained to arrange the places for the houses, put them up, procure the hens and go to work.

First of all, then, about the location of the houses. If I had studied neatness and order, I would probably have placed them in a symmetrical row, so that they might look as if some person of "refined taste" had had the ordering of them, and many a scolding I got from my wife for the hap-hazard way in which I scattered them over the ground. But to have arranged them in a row would have rendered impossible one of the main objects I wished to attain, viz., the possession by the fowls of a sense of ownership of a distinct home. By placing a house in a corner by itself, putting a fence around it and confining its quota of fowls to this yard for a few weeks, I felt that I could easily "domicile" each flock by itself. After this, so great was my faith in the desire of the fowls to keep to one roosting place, and in their power to find their way back to it, no matter how far they might stray, that I had no hesitation in allowing them their freedom over the entire place. Of course it was necessary to prevent their trespassing on the property of others, and in order to insure this, I proposed to fence in those portions of the grounds that were not naturally protected. Thus, on the north the ground was left open, because there was nothing but barren rocks above me on that side. On the east there was a piece of woods in which they could do no possible damage, but rather good by destroying insects. The owner was an absentee, and the land lay in commons, so I had no hesitation about letting the hens go there occasionally, as it was impossible for them to do any actual damage.



But on the south side I had my very agreeable neighbor, with whom Brown had had so many quarrels. As I have already stated, his land along my line was unimproved woods, left just as it came from the hand of Mother Nature, and it would have been impossible for the hens to do any harm there. Knowing my man, however, I erected a fence along the whole of the division line and a little beyond, so as to prevent any possibility of the hens "turning the corner." As I was anxious to have this fence perfectly secure against even my best fliers, I used wire netting three feet wide, placed on a tight fence 2 feet high and surmounted by a single wire raised 10 inches above the wire net. This excluded everything. The little chickens could not get through the tight fence, and the wire on top very effectually prevented the hens from flying over. They always aimed for the top of the wire netting, and striking against the single wire, which was almost invisible, they fell back into their own grounds, and arose wiser if not happier fowls.

On the west there was a public road, and I have never known our hens to cross it, especially as our own orchard and garden lay between their houses and the land on the other side. While the garden crops were growing, the garden was fenced in with portable fence, which was removed in the fall, so that the birds might pick up the waste. In the orchard they were always supposed to do a great deal more good than harm.

It was very obvious that by giving each bird the range of the entire place it had a freedom and a chance for exercise which it could not have in a small yard. A thousand fowls on four acres, each bird having the entire range of the whole place, are far less crowded than 250 birds on one acre, and these again are less crowded than ten birds would be on 1-25th of an acre, just as a man confined to a single house is more of a prisoner than any one of a million of men confined in a large city, about whose streets he can wander at his pleasure, his "range" being bounded by miles. But if this city were divided up into squares—one for each inhabitant—and every man was confined to his own square, the prison life thus forced upon the people would be unendurable. If my present stock of poultry were divided off into small lots, each lot in a pen

by itself, I am satisfied that the number of fowls now on my place would completely destroy all the grass and "vegetables" thereon in a very short time if they were kept constantly on it. Not that they would eat it, or even scratch it up, but they would trample it down, and their droppings would so defile it as to breed disease and ruin. But my hens spend three-fourths of their time under the feeding sheds and in the dust baths, and in bright dry weather they improvise dust baths for themselves all along the northern and eastern line, where the land is light and the aspect sunny. And all along the line the bushes are so planted, or, when the bushes were there already, so thinned out as to form little sunny nooks and alcoves, as it were, where they are completely sheltered from wind and always find a dry dusting spot. At first, I found the tendency very strong to scratch up the ground and make a great hole just at the trunk of the young trees, thus injuring them very seriously. This I soon stopped by laying a few good sized flat stones on the ground around the trees. I also trimmed up the evergreens on the south and east sides, so that the sun could get under their branches and dry the ground and the fallen pine needles. This was no doubt a barbarous proceeding in the eyes of all landscape gardeners, but the hens enjoyed it.

The grass land is heavy, and they go there only to feed on the grass and insects, but their eagerness for green food led them on to the grass land so often, that I found it necessary to provide other food, and to keep it in good condition. This point gave me a great deal of trouble. The problem was to keep a plot of green food of some kind constantly fresh and attractive to from 1,100 to 3,000 fowls—allowing them to "pasture" it at will. After carefully studying the different plants with which I had had experience, I could think of but two that would answer my purpose—Rye and Clover. Clover was my favorite, but it was difficult to keep a supply all the time; rye made a good preparation for the land for clover, and at the same time furnished green food during early spring, and even during the winter when the weather was open. The trouble with rye was, however, that it did not seem to stand the tramping, etc., of the birds. It is true, that I could fence them

out at times and feed them with cabbage, and I did so with good results. In winter I use clover hay cut very fine in a hay cutter, steamed and mixed with meal of corn and oats, ground together. I have been told that I cannot grow clover many years, however; that in time my land will get "clover sick"—whatever that may mean—and the plants will die off. Perhaps this is so, but as I see no signs of such a calamity at present, I shall not trouble myself. "Sufficient for the day is the evil thereof," and when my land refuses to grow clover, I will try something else. I am now experimenting with the Southern Cow Pea and with Prickly Comfrey, and I think that if necessary I may possibly be able to do without clover, but as yet it is the best plant I have found—requires the least labor in proportion to the amount of valuable green food obtained.

I therefore set out to provide a plot of very rich green food for my hens, and I laid off a strip 200 feet long and 75 feet wide along the edge of the paddock, to which I have already alluded. This I proposed to plow up in the fall, manure heavily and sow to winter rye. The following spring it would be top-dressed and sowed to clover, so that after the rye was gone, its place would be supplied by another plant. This plot of land I intended to fence in, and I also intended to run two dividing lines of movable fence across it, so that I could feed it off in strips of about 48 feet wide. Thus, after the plants had got a fair start, the fowls would be admitted to a strip at one end, 48 feet wide. As soon as this strip showed signs of giving out, the fence would be moved, the hens excluded from the 48 feet on which they had been feeding, and another 48 feet would be given them. I chose 48 feet because this was the length of three fence panels each 16 feet long.

I found that it took three weeks for the hens to clear off such a plot, and that by the time the rest of the plot had been gone over, the grass and clover had become taller than was necessary. We sometimes had to mow it and give it to the cattle. Whenever a good rain came shortly after the fowls were shut off a plot, the growth was very rapid, and we took the hint; and if a dry

time ensued, we sprinkled it heavily with water, which was by no means a laborious operation.

I now arranged the location of the houses; one was already up, and I made arrangements for putting up seven more immediately, so that I might procure my fowls. In arranging the location of the houses, however, I found that it was difficult to supply them with water, and experience had taught me that good water is one of the most important things in the care of all kinds of live stock. The only water on the place was the well, and the spring from which a stream flowed directly into "Nabal's" grounds. I worried a good deal over this, and had almost determined to sink another well and procure a wind-mill, when, by a singular episode, I was relieved from all trouble on this score.

### An Episode.

**M**EANWHILE the season was gliding past, and the first days of August were fully upon us. Everything looked well, the crops were good, the animals in good health, and we were all enjoying country life, or would have done so, had it not been that my wife's health failed, and she showed strong symptoms of a malarial attack. At this I was rather surprised, for the atmosphere was so clear, the water so pure, and everything apparently so conducive to health, that when our family physician told me that it was a veritable attack of marsh fever, my heart sank within me, and I said to myself, "Is it possible that no region is free from that scourge of our country?" The hired girl, too, showed symptoms of an attack; she was a strong, fresh-looking girl when she came to us, but she had fallen away wonderfully both in health and looks, and now showed constant signs of weariness, against which she bravely fought in vain. My own health continued unaffected, but then I believed myself to be ague-proof.

I was sorely puzzled over this new development. The land all round us was pure and wholesome, and yet I was convinced that some unseen marsh must be the source of our illness. The Browns had never been troubled in this way, but then the present season had been unusually hot and dry, so that ponds which in other years had been filled with clear, wholesome water, were now stagnant and putrid. But none of these ponds lay near us, and so the problem remained unsolved.

One day, however, when passing along the lower part of my grounds, I heard some ducks quacking and making that peculiar noise which ducks do when they stick their bills in mud. Like a flash it struck me that here was the cause of all our troubles, and in an instant I was on the other side of the fence on an exploring expedition. I saw enough to convince me that there would be no

health at Ferniefield until that little marsh of a quarter of an acre or so had been drained, and I also saw coming towards me with hurried step the irate proprietor.

"What do you want here?" he asked in his loudest and most churlish tones. "Don't you know you are trespassing?"

"I want to see you," I replied very quietly. "I see that the hot weather has reduced this pond to a marsh, and it has given chills and fever to my wife and servant, and endangers the health of my children, and I have come to ask you to drain it."

"Get off my premises. I want none of your sneaking here. I don't propose to drain my ponds for you or any man."

"Pardon me," said I, "I will go if you wish me to do so, but if I go away under present conditions I may return in a way that you will not like. If you object to drain the marsh, for it is not a pond, yourself, will you allow me to do it at my own expense?"

The answer was too rough and savage to repeat, and I left him, but not until I had used my eyes to good advantage.

Now, the origin of this pond and marsh, as I afterwards learned, was as follows: The land which was now the source of malaria had in former years been quite dry, and was underlaid with a deep bed of clay. But on the grounds of Ferniefield, gushing from the bosom of the mountain, there was the beautiful spring which I have already mentioned, and which yielded as much water as would fill a two-inch pipe. The spring was almost unvarying in its flow. Wells might go dry and streams shrink, but this little spring always seemed to be full. Not many years back, however, it had flowed across Ferniefield in a diagonal direction, and the old water-course was still visible throughout its entire length. But a violent "thunder spate" had sent a torrent down the hillside—a flood the like of which no inhabitant could remember—and this flood had passed over the spring, and opened for it and for itself a new and wider channel, through which the waters of the rivulet had ever after flowed. Formerly they had flowed *past* "Nabal's" property; now they flowed directly into it, and he had taken advantage of this fact and constructed costly ponds and fountains, which were supplied by this new accession to his property. Now, if he had been

a wise man, knowing that the spring arose on my land, he would have met me more than half way, but being a churl he was likewise a fool.

I had three plans open to me whereby the nuisance could be abated. 1. I could apply to the Board of Health; they would very quickly rectify matters if they did their duty. 2. I could commence a civil suit for damages, and procure an order from the court to abate the nuisance. 3. I could abate it myself *at once* by turning off the water. I chose the latter course, partly because it was the speediest. A good spade in the hands of a stalwart man generally goes straight to the point, and knows nothing of the "law's delays." First of all, however, I consulted a lawyer of great experience and sound knowledge in regard to my rights in the case. I was informed that I had a perfect right to restore the water to its original course, and, moreover, that inasmuch as it arose wholly on my land, I had a right to do what I chose with it.

I at once employed three good stout laborers, and we went to work and cleared out the old channel most effectually. It had been entirely filled in in some places; these we dug out and re-opened. Amongst the property which Brown left with me, but which I did not purchase, merely held awaiting his order, was one of Gurley's Architectural Levels. This admirable little instrument enabled me to make sure of my course, and I found that when the water passed off my land the bed of the stream would be so low that there would be no possibility of bringing it back to Nabal's property except by means of a force pump. So we worked away, and in forty-eight hours I had the old channel cleaned out, and the present one very effectually filled up. As the sparkling stream dashed over the pebbles and rushed into its old bed I could not help thinking of my little friend Nettie and her murdered pets. I knew that thousands of dollars had been spent on the ponds and fountains of our unneighborly neighbor, and that these were now all useless. The fountains were now nothing but dead lumps of iron and dead blocks of stone, and the pond, instead of being "a thing of beauty," would be a noisome, stagnant pool, sickening and disgusting its owner, until in self-defence he would be obliged

to drain it. Truly, Nettie was well avenged, and I did not feel sorry.

But I knew that for a week or two, things would get worse instead of better, so I sent my wife and children off to a distant relative, and gave the girl a vacation, telling her to stay away until I sent for her.

It was not long before our friend missed the water, and rushed up to my door in a perfect rage. He wanted to know how I had dared to change the natural course of a running stream, and threatened all sorts of vengeance. I quietly ordered him off the premises, telling him that the spring was mine, and I could do with it what I pleased. He refused to go, telling me that I could not put him off. Of course he meant physically, which was quite true, but there were others on the premises that could. It was to me a matter of no consequence how long he staid; he could not undo what I had done, and I felt satisfied. So I simply shut the door in his face and walked into the house. I knew that if he did any damage he could be made to pay for it.

After a few minutes he walked away, and next day I received a letter from his lawyer, notifying me that if I did not restore the stream to what he called its proper channel, he was instructed to begin suit at once. As his adviser had the reputation of being a very able lawyer and a perfect gentleman, I thought it best to call on him and explain. He was evidently a little surprised when I gave him the facts in the case, though, with a lawyer's caution and shrewdness, he would not acknowledge that his client had made a mistake. Next day I received another letter, asking me to call if convenient. I made it convenient. The lawyer explained to me the great expense to which his client had gone to fit up his place, the beauty of which was greatly marred by my action. He stated that his client had directed him to institute a suit for damages, but wishing to avoid trouble he wanted to know if I would not restore the water to its former channel, provided guarantees were given that no nuisance should be allowed. I positively refused. I told him that I wanted the water for my own use, and that I would not trust his client under any circumstances. In due time I was served with



the papers in the suit, and also a notice to show cause why I should not be "enjo'ned" from diverting the stream, as they put it, but I noticed that the attorney in the case was not the one with whom I had had an interview. He had evidently advised his client not to enter the suit. It cost me a small retainer to my lawyer, who put in an appearance for me, but the case was abandoned and I never heard any more of it.


One most gratifying circumstance through all this fight was the sympathy and good feeling extended towards me by all the neighbors. These rude dwellers on the hillsides had little sympathy with any man that "put on airs," and when it went so far as to make his neighbors sick, they were "down" on him, as they expressed it. This little episode brought me into closer connection with the people around me than anything else could have done.

The stream now flows through my neighbor's ponds and fountains, but "Nabal" is not my neighbor. "Nabal" was so deeply chagrined over his defeat, that he took matters greatly to heart. He who had lorded it so over all the hillside was now beaten. But worse than that; securities which he considered as sound as United States notes went from above par down to the tens. He sold out, and the loss so curtailed his income that he could not maintain his country-seat. He disposed of the property at a great sacrifice, and another now occupies his place. That other is a "Nabal" only in one particular; he has a most excellent wife.

When I gave Nettie an account of all this she was greatly pleased, although she felt very sorry for "Abigail."

We divide the water between us; there is enough for both when properly managed. And so it came to pass that a never-failing stream of clear, pure water flows past my coops and through my yards, and this I regard as one of the most important of the many items which go to form the elements of my success.

### **Yards and Fences.**

Y first thought was that fences, except for the breeding pens, would be an unnecessary expense, seeing that the birds were to be allowed the range of the entire grounds during the greater part of the season. I soon found, however, that I could not dispense with a well-fenced yard around each house, as it would be necessary at times to confine the birds to their own domicile for various purposes. The most important of these was the training of the hens, so that each might know its own roosting place. I had found, in former years, that when a few hens and a cock were confined for some weeks in a breeding pen, and became accustomed to roost in there, it was almost impossible to change them, except by a repetition of the same process. On one occasion we had about twenty hens whose roosting place we wished to change. For several weeks we carried them nightly from the old to the new house, and at the end of that time fully two-thirds of them returned to the old place. I then shut them up, day and night, in their new quarters, for about three weeks, and we had no more trouble. Now, every season we would have 500 young pullets to accustom to a new roosting place. They would be divided into lots, each lot would be placed in its own house and yard, and fed there and compelled to roost there, and I knew that they would almost all come back after they were given their liberty. In this way, and this only, could I obtain the benefits of the system which I had adopted.

But, in addition to this, there were various other occasions on which a well-fenced yard would be of great advantage. Thus, every fall the young cockerels would have to be separated and placed by themselves, and various other necessities would arise. Movable fencing was therefore a necessity, or at least a great convenience.

The permanent fence round the yard already on the place was made of what are called "shingling laths," the pickets being 9 feet long (an 18 foot lath cut in two). These laths are 1 inch by  $1\frac{1}{2}$ , and may be obtained of certain lengths—12, 14, 16, 18 feet, etc.

Of portable fencing there were various kinds described in the books, but the choice lay between the simple lath fence I had used years ago and a fence of wire netting. The great objection to the latter, however, was its cost. It is very neat, almost invisible, and for small runs answers admirably. But it costs  $1\frac{1}{2}$  cents per square foot, which on a running foot 7 feet high, as is necessary for most of the non-sitters, amounts to  $10\frac{1}{2}$  cents per running foot. The 16-foot panels which I used cost about half that sum per foot, or less than a dollar each, and the labor of putting up the lath fence is greatly less than that required for the wire netting. I had two kinds of lath panels; one for fences where there were birds only on one side, and the other for division fences where birds were on both sides.

The engraving, Fig 7, shows the style and construction of an ordinary panel. There were three horizontal rails, consisting of shingle laths, each sixteen feet long. These laths being  $1 \times 1\frac{1}{2}$  inches, were placed with their edge towards the upright plastering laths. This gave a greater depth of wood for the lath nails to sink into, and also greater strength against the bending of the fence sideways by wind or the pressure of birds flying or running against them. The wind, however, does not seem to take much hold of such a fence, although they act as valuable shelters. The two lower rails were connected by a diagonal brace which was firmly nailed to to each rail at the end. The diagonal was simply an 18 foot shingling lath, cut to the right length and the proper shape at the ends.

The end slats were also made of shingling lath—a 16 foot lath cut in two. They were laid flat against the horizontal rails, and nailed firmly with wrought nails, which were clinched. As the length of an ordinary lath is 4 feet, and as the ends of the laths lapped past each other on the middle bar only a very little, the fence lacked only an inch or so of being 8 feet high. The upper laths were

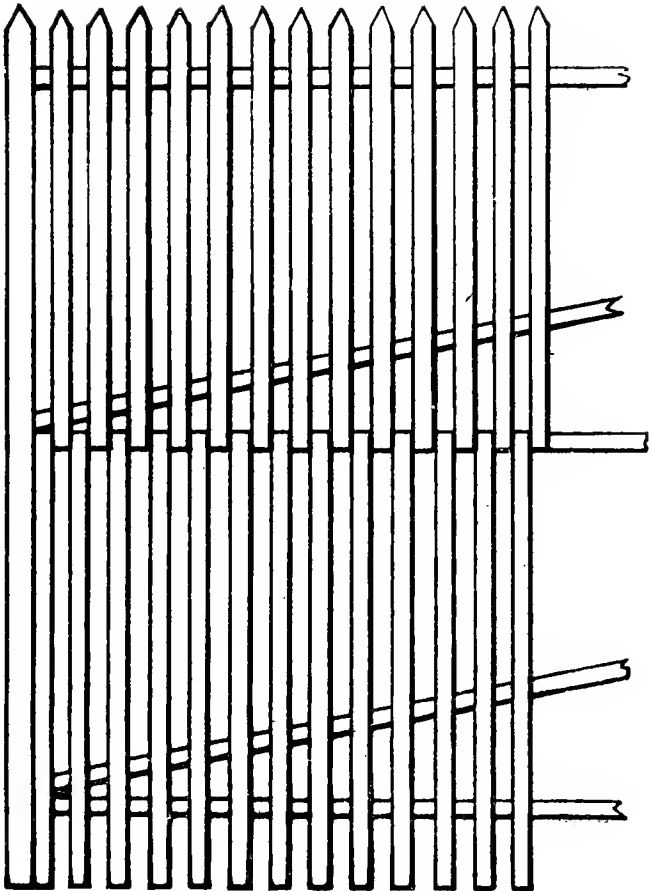


Fig. 7.—PORTABLE LATH FENCE.

pointed, so as to prevent any bird that might fly on to them from resting there. None of our birds, however, have ever got over these fences, as we are in the habit of trimming the quills of the wings of our Leghorns and Hamburgs.

When my man made the first few panels, he pointed the lower laths also, and placed their tops several inches above the middle rail. This formed one of the best traps for chickens that I ever saw. They would jump up, their heads would slip into the wedge-shaped opening between the laths, and there they would hang by the neck. I lost several fine hens in this way, until I had the tops of the lower laths sawed off square.

At first we had some trouble, owing to the tendency of some of the lath to split. We soon remedied this difficulty, however, by wetting the lath. When thoroughly wet they are not easily split.

The lath were pointed by means of a draw-knife and a carpenter's wooden vise. A small circular saw would no doubt have done the work better.

After the panels were completed, they were placed against some straight fence or wall to dry, which they did very rapidly. They were then painted with crude petroleum, and panels so treated have been in use five years without showing any sign of deterioration.

Such panels are very strong. I have heard complaints of lath fences being weak and liable to be broken down by the birds, in which case, of course, mischief would result. In my own yards no breakage has ever occurred. I have no doubt but that if a cow or a horse were to attempt to pass this fence they could succeed, but that any bird short of an ostrich could break it down I do not believe. I have seen heavy birds—birds weighing twelve pounds—throw themselves against this fence in their fights without producing any bad effect on it, and even good-sized dogs have rushed against these fences without injuring them. It will be seen that the lower rail is about a foot from the bottom, so that the shock given by dogs and birds comes at the strongest part of the fence, and the diagonal brace is also a great help against any local blows. I have therefore come to the conclusion that lath fences that break down easily must either be badly constructed or made of very

poor materials. A great point is to place the rails flat, so that a good size nail may be driven wholly into solid wood.

With a supply of panels like this, and a proper number of stakes or posts, a yard can be put together in a very short time. The first thing, for those who are not used to the work, is to roughly lay out the yard, marking the corners with small stakes or markers. If there is to be a gate, the place where it should come ought to be marked, and the house ought to be in position before the yard is laid out. My houses had strong "screw eyes" at the corners where the fence joined them, and to these the outside picket of the first panel of fence was tied either with strong cord or with wire.\* The panel was then held in position, and a hole made with a crowbar just at the place where the post should be set. The post or stake is then driven into the ground to a depth depending upon the character of the soil. This work is done by means of a wooden mallet or maul with a long handle. We made the mallet ourselves out of a piece of a tree, using an old hoe handle for a handle. With such a mallet a man or stout boy can drive a stake 3 inches in diameter into the ground so deeply that no common animal can push it over. The untied end of the first panel is then placed against one side of this post, and the end of another panel against the other side, and both are tied to the stake either with tarred cord or soft wire. The second panel is then placed so that it and the first panel form a straight piece of fencing, and the point where the second post should come is marked with a crowbar or "hole opener," as we call it. This hole opener is of peculiar shape. It consists of a long bar of iron or steel, with a pear-shaped ball at the lower end, as shown in Figure 8. Such a crowbar, if pointed with tempered steel, can be driven two feet into hard ground with great rapidity and ease, while a common crowbar would require hard and protracted labor. The heavy point is first driven in, and the bar rocked a little in two or three directions. It is then raised and again driven into the hole with as much force as possible, and again rocked. This operation is repeated until the

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\* The wire that comes off baled hay answers very well for this purpose, and may be had for almost nothing from those that use this kind of hay.

hole is deep enough, and it is surprising how rapidly the work can be done. We always started the holes in this way, but in soft spots it is best to drive the stakes wholly with the mallet.

After a little practice it becomes unnecessary to mark off the boundaries of the yards. The eye becomes a good enough guide for the direction, and the panels being all 16 feet, the size can be told at a glance.

When there is to be a gate, the gate is treated like a panel, except that the tie which serves for the gate does not tie the panel next it. The gates were made just like short panels, but there was a diagonal brace above as well as below. The gates were quite light, easily lifted and moved, so that no hinges were used. The tie was made of several turns of wire, instead of two, as used for the panels, and one of those three-cent wire hooks and eyes, of good size, was used for a fastening. This was not as convenient as a proper hinge, but it answered every purpose for the breeding pens. The gates for the large stationary yards were, however, made more substantially. The gate posts were nicely squared, and the gates had a special picket for receiving the hinge. This picket was made of so-called inch boards (nearly 7-8ths thick), 3 inches wide, and carefully selected for soundness and strength. Loose butt hinges were used, and as the post was held upright by the panel on the other side there was no sagging, and the gate always worked smoothly.

There was another form of panel used for division fences. In division fences, that is, fences between two yards, it is necessary to have the lower part close, so as to prevent fighting. This was done by nailing half a lath between every one of the lower row of laths. These laths did not quite fill up the space, but the openings were so narrow that no fighting could occur. The half laths were firmly nailed to the lower rail, and a line of selected lath was run horizontally about 2 inches below the top of the half laths. These horizontal laths were nailed to the half laths, and also to the others, with small wrought nails that clinched. These division panels

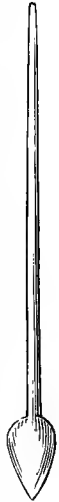


Fig. 8.

were surprisingly strong. We doubt if any animal, short of a horse or a cow, could have broken them.

The panels were easily and rapidly made by using proper facilities. Four posts were sunk in the ground, so as to make the legs of a sort of bench 16 feet long, 8 feet wide, and the usual height of a workbench. Along the front a good plank 18 feet long was laid. It was braced in the middle by nailing it to the edge of another plank 14 feet long. Of course the latter plank was on the under side, and, as it presented its *width* against any force tending to bend the upper plank, the bench was pretty stiff. Two pieces of plank, each 8 feet long, were laid across the end posts, so that the bench was a sort of skeleton affair closed on three sides, the other side being open, and the middle also quite free. Six feet from one end of the bench two other posts of the same height were set, and across the top was laid a plank 8 feet long. This was intended to support the panel when it was shoved off the large bench when nailing on the top row of lath. Having the material all handy and prepared, the three rails were laid down, their ends resting on the end planks of the bench. The two stout end pickets were then nailed to them, the proper position of the rails being shown by a rod, properly marked. All the panels were, therefore, precisely the same. This framework of the panel being now held square, the diagonal brace was cut to fit accurately, and then firmly nailed in its place. Then the first lath was nailed on, a thin board, 6 inches long and  $1\frac{1}{2}$  inches wide, and having a block nailed to its upper surface to serve as a handle, being laid between it and the first picket so as to get the space right. The rail into which the nails were being driven rested on the long plank, and all the laths were nailed at one end before an attempt was made to nail the other. Then the middle rail was laid on the plank and the other ends of the lath nailed to it. Then the diagonal brace was laid on this plank and the lath nailed half way up. The panel was then turned round, and standing between the top and the middle rail the upper half of the diagonal was nailed.

Everything was now finished except the nailing of the lath to the upper half. The panel was strong enough to resist much bend-



ing when laid flat and supported in the middle, but to avoid any bending I had put up the support previously described. The workman now stood between the top and middle rails with the end of the panel resting on the end plank of the bench. The first top lath was nailed at both ends and the panel shoved along. As a matter of fact, however, the plank was 12 inches wide, so that three lath could be nailed before moving the panel. This process was carried on until the space between the last picket and the lath became too small to admit the workman, when he stepped out and nailed the last half dozen lath without difficulty.

I have been astonished to see how quickly an expert workman can nail up a panel. I had one workman whose labor on the panels did not exceed 18 cents each, and yet he was earning fair wages.

It is also surprising to see how rapidly those who are accustomed to this kind of work can move one of the breeding yards and houses to another spot. The process is as follows:

Catching the hens: To do this they are all driven into the house, gently but quickly, through the ordinary hole that admits them. An empty crate is then placed with its open door against this hole and the hens are easily driven into the crate, which is closed and allowed to stand where it is until wanted. The wires or cords fastening the panels to the house on either side are cut. It does not pay to spend time untying them. A sharp knife for the cord, or a pair of cutting pliers (found in every hardware store) for the wire does the business instantly. Two men then pick up the house by the handles and walk off with it to the new location. As the house has no bottom or floor except the ground, the old nests and all the dirt are left behind. The house is then properly located, and to those who have done the job before, that is all the marking off that is needed.

The panels are then all cut loose and laid across two poles, each about ten feet long and lying on the ground about 34 inches apart. These poles serve for a hand-barrow, and the panels must be laid so as to balance. As soon as a load is laid on, two men pick them up, using the ends of the poles for handles, and carry them

to the new place. When there are four men at work, it is better to place the poles further apart (say 6 feet) and lay on twice the load. There is then one man to each end of the poles.

The posts or stakes are then drawn out of their holes by means of a lever and chain. A lever, 12 to 15 feet long, is used, and a small chain or stout rope fastens it to the post. Of course the lever is horizontal, and is supported at the short end by a block of wood, so as to prevent it from sinking into the earth. A lift on the long end brings the post up so far that it is generally quite loose, and can be drawn out by hand.

All this is done with a rapidity that would astonish those who are not accustomed to such work. The process of putting the fence up again has been already described.

My first undertaking, therefore, was to construct a sufficient number of fence panels to enclose yards for seven houses for layers, and ten breeding pens. I saw that *this* could not be done in time by working at it "at odd spells," so I hired a carpenter and two assistants and set them at work on the houses and fences.

### Breeding Pens.



HAVE already described the simple pen in which I placed the Brown Leghorn cock and seven hens. It answered its purpose admirably, but having but one box of the kind there used, I could not make any more like it. Nor, indeed, do I think I would have done so, if I had had them, as I felt sure that I could improve upon it. Again, therefore, I ransacked the poultry books, and general works on architecture. I even found books specially devoted to this branch of building (it scarcely deserves the name of architecture) and I studied them, but after all I found nothing that seemed to meet my presents wants so well as the small movable houses I had used a quarter of century before. They were made of matched boards, and entirely without flooring. They were 4 feet 6 inches long by 3 feet 6 inches wide. The front was 5 feet 6 inches and the back 4 feet high. There was a door 20 inches wide and 4 feet high at one end, and a small window consisting of a single pane of glass  $8 \times 12$  at the other. The latter might be covered during cold nights with a shutter, which was attached just below the window by small hinges, so that during the day time it could be turned down and at night it could be turned up, so as to cover the window, when it was held in place by a small button.

There was a hole in the front, through which the birds entered, and this hole could be covered by a board placed on the inside and sliding over the opening.

There were two roosts, made of young trees, each 3 inches in diameter and 3 feet 6 inches long. They were placed so as to divide the ground space equally. This gave 84 inches of roost—sufficient for ten fowls of the largest size. The roosts were movable and when it was deemed desirable to enter the house, they could be lifted out without trouble. At the same time they were

perfectly firm, being held in V-shaped spaces between cleats—the same as those used in the large house.

The nests, or rather nest boxes, were a part of the house. In the figure is shown a section of the house, where it will be seen that the nests form a row along the back, being covered with a slanting board. The nests are simply a little fine marsh hay laid on the ground. The hay and eggs are kept in place by a 4 inch board which runs along the front of the nests. Each nest is a compartment by itself, divided off from the one on each side of it by a board which reaches up to the under surface of the slanting-board. Indeed, the latter rests on the tops of these division boards. The nests are accessible from the outside, so that the poultry keeper need never enter the house. The way to get at them is to let down the board which runs across the entire back of the house, and is hinged to the stationary board below it. Both the side door and the door giving admission to the nests are provided with hasps, so that they may be locked by means of one of those cheap cast iron padlocks known as "jail locks." Such a contrivance is proof against sneak thieves. A burglar would break the whole house up in half a minute, so there is no use in putting on strong and costly locks.

Along the front is a row of pickets, to prevent the birds from flying over. The pickets are 16 inches long, being simply laths cut into three parts.

On each corner there are handles consisting of pieces of boards shaved into such a shape as to be easily grasped by the hand. They are firmly secured to the front and back by means of wrought nails, clinched. Four stout boys have no difficulty in picking up one of these houses and moving it wherever it is wanted. Indeed, two men can do it.

The inside of the house—sides, ends and roof—are lined with tarred paper, nailed to cleats one inch thick, which are fastened to the house as detailed in our description of the large house. This makes the house very warm, and the matched boards make it perfectly rain proof. To protect it from the weather it was coated

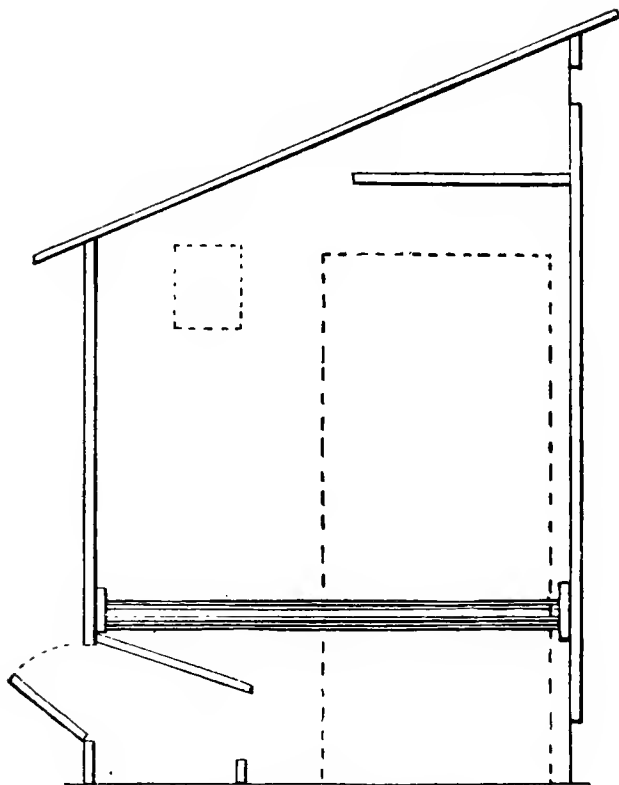


Fig. 9.—HOUSE FOR BREEDING STOCK.

with crude petroleum laid on like paint. Of all the preservatives that we have ever tried, this is the cheapest and best.\*

Another important point—ventilation—was not forgotten. In cold winter weather, very little ventilation is needed, and I depended largely upon the cracks round the door and other openings to supply it. But cracks and openings are bad things, and to have left a crack at the bottom, and made a hole at the top, would have passed such a current of cold air over the fowls as might have produced frozen combs and wattles. To avoid this, three holes—2 inches in diameter—were made along the front—that is at the highest part of the house. Under these holes was placed a thin board shelf, 14 inches wide, and during cold weather the space between the shelf and the roof is packed with straw. This, of course, puts a complete stop to all currents, but every chemist knows that through such porous packing the foul air will pass off by a process of “diffusion,” and pure air will enter from the outside even against a considerable current. Moreover, the straw acts like the “regenerator” in Ericsson’s first caloric engine, and absorbs the heat from the outgoing air to give it up to the incoming.

I have described the house, as we finally made it. Before committing myself to a particular pattern I made one myself, and having surrounded it with a yard of portable fencing, I put seven hens and a cock into it and tried it for a couple of weeks. I found a few points to modify in my first model, but the final outcome was as I have described and was very satisfactory.

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\* Crude petroleum may be obtained at a very cheap rate by the barrel, and is easily applied. If too thick and sticky it may be thinned with benzine or gasoline. When using it, great care must be taken not to allow a light to come near it, or the whole house would be in a blaze. We painted our houses outside and in before we lined them with tarred paper, and one of them got pretty badly scorched, by a workman, who struck a match near one to light his pipe. It was a windy day and he stuck his head in to get shelter for the match. It was the only time any one struck a match near these houses, as he got badly burned, the petroleum having been thinned with gasoline. After a few days the volatile matter passes off, and the petroleum sinks into the wood, rendering it hard, durable and very difficult to set on fire. Crude petroleum is death to insects. It will be a long time before houses painted with this material will be infested with lice.

### Making a Start.

**H**AVING completed my plans for houses, pens and fences, and made one of each, so as to test its working and convenience, I set to work to construct a sufficient number of yards to hold 500 birds, together with those, old and young, already on the place and coming forward. I intended to send all the old fowls and culls to market, as soon as it would be advisable to do so, and after some inquiry and a comparison of old market reports, I believed that the best time to sell would be the spring. Thus, I found that during the preceding fall what are known as "fowls" sold for 12½ cents per lb., while in the spring they had brought 20 cents. On a hen 6 lbs. weight, this allowed 45 cents for her keep during the winter, and as many of the hens, if properly cared for, would lay during, at least, part of the time, it was evident that spring was the most judicious time to sell. As I proposed to buy about 500 hens, and as I had about 60 on hand and expected to have 300 or 400 young pullets out of the broods now on the place, I calculated that I would need, at least, eight houses, and about ten breeding pens, in addition to those now on hand. So I made my calculations, ordered the lumber, and kept the carpenter and his assistant at work.

I was anxious to take advantage of the market at once, and to procure my hens before cold weather came, so that I might not only have them in good health when I got them, but be able to get them into good condition to withstand the winter. I also wished to *quarantine* every lot that I purchased in market; that is to say, I wanted to keep it by itself for a few days before letting it run with the others. While the breeding pens were under way, therefore, I interrupted the work and had a large shed put up. It was 40 feet long and about 16 feet wide, and was constructed in a very simple manner. Stout posts were sunk at the four corners,

and lighter posts between at distances of 8 feet. The back row was only 3 feet high, and the front row 8 feet, and rails of scantling were nailed along the top and also near the bottom at the back and ends. To this scantling rough boards were nailed vertically, and narrow strips were tacked over the joints. The roof consisted of boards 18 feet long, with the joints covered in the same way. These boards were supported in the middle by a suitably arranged beam, so as to bear the weight of any ordinary snowfall, as I intended to leave this shed up all winter. Eight roosting poles ran from end to end, being placed as near the back as possible, and all on the same level, so that there might be no fighting for the highest place. About half an acre of grass land was enclosed around it by means of the movable fence. When a lot of fowls were purchased, they were first placed in one of the breeding yards, or in two yards if the number was large. If no disease showed itself in a week they were transferred to the large yard around the shed, and kept there until the houses were finished. If disease had shown itself, I was prepared to "stamp" it out by well-known methods—the slaughter of the birds and the disinfection of the house and yards—but fortunately I had no occasion to resort to any such measures.

I was now ready to go into market and buy my hens. For several days I visited the dealers' stands without seeing anything that suited me, but at last perseverance was rewarded, and I found two crates containing some very nice common hens—compact bodies, bright eyes, red combs, and with feathers hard and clean. There were twenty-two birds in one crate and seventeen in the other, but several of them were cocks. I tried to buy the hens only, but found that at wholesale prices I had to take the entire lot or none. I therefore bought them all and sent them to my yards. They weighed 159 lbs., or a little over four pounds each. The cocks (of which there were thirteen) were separated and placed in a pen by themselves, while the hens of each crate were kept separate and placed in pens. I tried to sell the cocks by the crate, but found that the loss was considerable. Birds which cost me fifteen cents per pound would only bring twelve cents when I tried to re-sell them. As I did not want this first lot anyway,



however, I sold them for what they would bring, and let them go. But even on this basis I found that it paid better to buy the entire crate than to ask the dealer to let me pick.

Next day I found a crate of beautiful White Leghorns. There were seven pullets and nine cocks. They brought no more than the most common stock, and I bought them all. The dealer said that he had no doubt that if he had marked them up, and offered them as breeding stock, he could have secured a far higher price for them, but then the expense and trouble of keeping them in the narrow quarters of a city store would have more than offset the increased price. His rule was, therefore, to sell all such stock at regular market prices and at the earliest possible moment. I found out afterwards that they came from a party whose strain of Leghorns was really good. The birds were very fine, and I concluded that the cockerels were good enough for my breeding pens. I also found another crate of large birds of somewhat mixed blood, but very handsome, and apparently very healthy. In this crate, strange to say, there were no cocks, so that I regarded the purchase as a very happy one.

On talking with the dealers, I found that the crates were filled in various ways. Sometimes a farmer or country gentleman, wishing to lessen his stock, would fill a crate with fowls and send them in. Most generally these lots were the culls of the yard, and presented a sorry appearance, but occasionally, where the owner had fine blood in his stock, the crates were filled with pure bred, handsome birds. Crates of the latter kind were rare, but I managed to secure two such crates of Dominiques, one of Light Brahmans, and one of Brown Leghorns, besides the crate of White Leghorns already mentioned. Other crates were filled by hucksters, who bought up fowls from farmers and others, put them together in lots of fifteen to twenty-five, and offered them for sale on the streets. Buying such crates was a good deal of a lottery; frequently two or three very good birds would be found mixed with a lot of the veriest trash, and sometimes a country henwife would have a lot of sick chickens, and they would find their way into these lots, the owner being anxious to sell them and get the money before the birds

died or wasted away. I generally gave such crates the go-by, but on one or two occasions I made some fine additions to my yards.

I pursued this course until I had secured 537 hens and about 300 cocks. The birds, as purchased, were carefully looked over, and all that seemed to be in the slightest degree out of health were placed in quarantine in one of the yards, and kept there until I was certain that all was right. I was very fortunate, however, and did not lose a single bird.

The mongrel cocks were placed at once in large coops and liberally fed—soft food forming a large part of their diet. Two weeks of such treatment made a great improvement in most of them, but on some of them it had no effect whatever. They were killed, dressed and sent to market as fast as they could be got ready, and brought fair prices, but I doubt if the results paid for the time, feed and labor expended. If I were to stock another yard in the same way I would send the cocks to market at once and get rid of them, charging the loss to the cost of the hens.

I was now ready to take stock. I found that I had 537 hens, which cost me to date \$302.23 for birds, food, etc. This allowed for the money received for the cocks sold, but I had on hand a small quantity of food (perhaps \$15 worth) the cost of which is included in the \$302.23, and which I have not taken into consideration.

The hens were a motley lot. When a number of hens of even pure-bred fowls of different varieties are mixed together, they are apt to have a mongrel look, while even a lot of real mongrels, provided they are all nearly alike in size, shape and color, may present a very attractive appearance. My first work, therefore, was to sort them into lots that were tolerably well mated.

Out of all the cocks, I saved only a few White Leghorns, a Spangled Hamburg and three Dominiques. I was satisfied that they were sufficiently pure and good to enable me to experiment with them. Meanwhile, I obtained from different noted breeders, one Dark Brahma, one White Leghorn, one Spangled Hamburg, and three Light Brahma cocks, and I set aside the ten small coops to accommodate them, and two White Leghorns, one Spangled

Hamburgh and one Brown Leghorn, from my general purchases. Then, beginning with the Dominiques, I picked out all the best hens that I could find of this breed, and when I got through, I found that I had three very respectable breeding pens of this variety. Indeed, I confess, I was somewhat surprised to find them so good, and as the cocks were all first class, I looked forward to having come excellent results.

I then took the pens containing the Spangled Hamburgh cocks. I did not find a single hen to match, so I filled each of them up with four of the best Dominiques I had left and two very fair Brahma pullets. In this case, too, I had no reason to feel dissatisfied.

Next came the White Leghorns. There were quite a number of very excellent Leghorn hens amongst my purchases, so I filled one coop with the best I had. This was a very handsome pen. In the other pens I placed Dominiques and Brahma hens. I had great faith in this cross and resolved to give it a fair trial.

With the Brown Leghorns, I did not have such good luck. I had no Brown Leghorn hens that could be called pure, and my Dominiques were now getting down to culls. However, I made up two of the best pens I could, and awaited results.

The ten pens drafted sixty hens from my flock. With those I had at first and what were left of the 537 hens I bought, I had just 523 left over. The problem now, was, to dispose of these birds.

My experience has been that to change the roosting place of a hen is a difficult matter. A setting hen is a stubborn thing, but she is gentleness itself, compared with a hen that is determined to roost where she is not wanted. I have never been able to change the roosting place of a hen, except by shutting her up in her new coop for two or three weeks, and even this plan does not always work. Of course, when a hen is removed to such a distance that she loses all knowledge of her locality, she may be made to roost anywhere. This was the condition in which my hens were at this time, so that all I had to do was to sort them into lots of about 75 each, place each lot in its own house and yard, and leave them

**there** for two or three weeks. At the end of that time **they were** to have the freedom of the entire place.

For the first lot, then, I carefully examined my flock and selected 75 birds, all as nearly alike as possible, and as near like Dominiques as I could get them. We now tried to transfer them to their own coop, but in so doing some serious accidents occurred—one fowl had a leg broken, and another had a wing dislocated before we had captured a dozen. I acted as looker on, while younger and more active legs and hands did the work of catching. The young men that I employed were not rough or thoughtless in regard to the pain inflicted upon animals, but I could see that to handle four or five hundred birds, catching them by hand, was a task that no one could perform without great risk of accident to the fowls. I therefore ordered the wounded birds killed and stopped all further proceedings. The men were set at work on the next house, while I went to town to procure a good net. In my younger days I had had considerable experience catching fish with a landing net, and I felt that with a good instrument of that kind I could catch any fowl in my flock, without ruffling a feather or hurting a limb. So before I went I told the carpenter to get me out a pole of the lightest but straightest grained pine he could find, 7 feet long,  $1\frac{1}{2}$  inches in diameter at the butt and  $1\frac{1}{8}$  inches at the top. When I returned I brought a bag net, 30 inches in diameter at the mouth, but very considerably less at the bottom, and 40 inches deep. I also had a tough, dry hoop pole which was passed through the upper meshes of the net and then tied firmly to the pine pole. It was, in fact, a huge landing net with  $1\frac{1}{4}$  inch meshes, and I proceeded to try it. Selecting a bird, I walked gently up to it, and by a sudden movement, I placed the net over it and had it. If I had used a *bag*, the bird would have dodged under the hoop but as the net seemed to offer no obstruction, the bird ran right into it, and was caught. It was no trouble at all, and thereafter I needed no help in catching the fowls. But I found that after they were caught it took too much time to carry **each** bird singly to its new yard. I therefore had a transfer coop

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made. It was simply a light but strong frame work, two feet high, four feet long and three feet wide.

The bottom was closely slatted, and the sides and top were made of lath cut in two and nailed on. In the top was a door which lifted up and through which the fowls were dropped. This door was close to one side, and when we wished to give the birds their freedom the coop was placed on its side, the door opened, and the birds allowed to run out. I could easily put twenty hens into it, and two men could then carry it to any part of the grounds. I soon filled it, carried it into the new yard, and gave the birds their liberty without a single accident.

By this time, however, the hens had become pretty wild and somewhat difficult to approach. I therefore arranged some portable fence, so as to make at one corner of the large yard a small enclosure somewhat of the form shown in Fig. 10.

At the corner, *a*, the two fences ran quite close to each other; at *b* the space was much wider; at *c* the outside fence and the portable fence came together again, and another length of fence stretched from *c* to *d*, so as to make a wide throat to the enclosure. It was easy to drive any particular fowl into *d*, and when once there it could be driven through *c*, where a boy stood with a pole and kept those that were in from coming out. If some got in that were not wanted it was no matter, as they need not be caught. When enough were in it was easy to close the passage at *c*, and by means of the net select the birds that were wanted. It is possible that other poulterers have better methods of catching birds than this, but I have not seen any. Where there is but a small number of fowls together it is an easy matter to catch any one at night on the roost, and I have done this very often. But where 75 hens are to be selected and caught out of 500, and

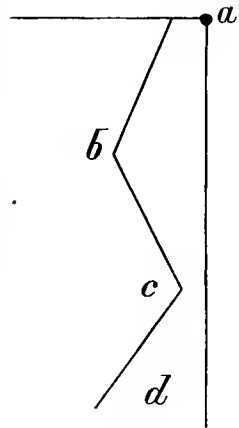


Fig. 10.

carried to a new coop, the hand net saves a great deal of trouble to the owner, and many a twisted leg and wing to the birds.

The first yard made quite a respectable appearance after all. Although I had found it difficult to complete my third breeding pen of Dominiques, yet when I had got together all the hens that *resembled* Dominiques they formed a very handsome flock, their very numbers seeming to cover and excuse any slight irregularity.

The second yard I filled with birds that were as nearly white as possible. Amongst them were quite a number of pure Leghorns and some very light Brahmas. Most of them, however, were evidently mere mongrels. After I had sorted out 75 white birds of pretty good quality I had nearly 30 white ones left, but many of them were quite inferior.

Those for the third yard were selected to match, as nearly as possible, a hen which was in the lot that I found on the place, and which my little friend Nettie used to call Dame Parten. She resembled somewhat a Brown Leghorn, and was a most excellent hen, though rather small. She laid a good-sized egg and plenty of them, and she herself we had placed in a breeding coop with a Brown Leghorn cock, but we adopted her as a model for yard No. 3, and we succeeded in getting over 60 hens that nearly resembled her. Rather than break the uniformity of the yard, I let it go with this number.

It now began to be difficult to find enough birds that would match in color to fill any one pen, so I adopted a somewhat different plan. I now matched them for size and shape.

The hens that were originally on the place were of all shapes, sizes and colors, but as they knew the old coop, and the old coop only, as their home, it was not best to try and make a change. I therefore let them remain as they were, merely adding enough birds to make up 100—a number which I considered it possible to accommodate comfortably. The hens that I selected were the best of odd colors. Some of them were very handsome birds, but the lack of uniformity told greatly against their appearance.

In making up the other yards I now began with the poorest. I picked out all the smallest and least promising of the birds that

were left and put them together. The remainder were then simply divided amongst the other yards according to size.

Towards the last I found it necessary to use the movable fencing used for the large yard. I therefore finished all the houses and put a yard round one of them. All the fowls not already provided for were transferred to this, and then the large yard was dismantled, the fence taken down, nests, etc. consigned to the manure heap, and the fence posts pulled up. With this material at hand it was easy to enclose the other yards in a few hours, so that the birds were not kept very long in confined quarters.

The birds seemed to take kindly to their new homes, and as the entire place was new to them all, at the end of four days I let one lot out and gave them the freedom of the place. Every one returned to its own house—perhaps because they could not go anywhere else. Next day I let another lot out. After four days I let two lots out together, and as soon as all the lots had been out I opened all the gates and gave them all their freedom. When this had been done and the birds, on a fine day, were scattered over the place, I was considerably surprised at the small show that they made. The place looked as if it could hold ten times as many with great ease. This seems to be always the feeling when a thousand or less birds are seen together. The flock does not appear as large as we expected.

### Under Way at Last.—More Help Needed.

**T**HE enterprise was now fully under way. More than half the laying stock was on hand; a goodly number of young chickens were coming forward for next year, and I felt that twelve months from the time of which I write I would have my poultry farm in full working order, and that the question of success or failure would have been decided. Already we began to get some returns in the shape of eggs, although, of course, the number was small—about six dozen per day from all our hens. Still this was quite as much as I expected, for experience has taught me that hens which have been worried and frightened, and probably kept on short allowance of food and water while passing from the hands of the seller to that of the purchaser, cannot be expected to lay for some time. Hence, I have always found that for the time being, other things being equal, birds reared on a place are much more valuable *for that place* than those that are purchased. After a time, however, the birds pick up and begin to lay, and it is just possible that the stoppage caused by moving may throw the laying period into a later and more profitable season. This was my case precisely. The hens kept laying more and more as the season grew later and eggs grew dearer, and this was, of course, to my advantage.

A great deal of nonsense has been written about egg laying which it would be well if poultry breeders would get out of their heads. One of the most erroneous and yet most plausible theories is that advanced by Geyelin in his book "Poultry Breeding in a Commercial Point of View." He gravely tells us that "it has been ascertained that the ovarium of a fowl is composed of six hundred ovulas or eggs; therefore, a hen, during the whole of her life, cannot possibly lay more eggs than six hundred, which, in a natural course, are distributed over nine years in the following proportion :



First year after birth.....	15	to	20
Second " " .....	100	"	120
Third " " .....	120	"	135
Fourth " " .....	100	"	115
Fifth " " .....	60	"	80
Sixth " " .....	50	"	60
Seventh " " .....	35	"	40
Eighth " " .....	15	"	20
Ninth " " .....	1	"	10

It follows that it would not be profitable to keep hens after their fourth year, as their produce would not pay for their keep, except when they are of a valuable or scarce breed."

This theory is evidently a mere modification of that popularly held in regard to seeds. Many believe that the huge oak lies coiled in miniature in the acorn, and that the process of growth is a mere *unfolding*. It is needless to say that in the sense here expressed this is untrue. And so with the ovaries of the hen. Geyelin's theory is that even in the little chick the future eggs all exist in microscopic embryo, and are merely "unfolded" as the months roll by. No man, having a sound knowledge of physiology, could hold any such opinion. The same power which originated the most microscopic of the egg-embryos that we see in the ovaries of a laying hen, when we kill her and cut her open, exists with all its potency in every healthy hen, and may go on developing new eggs *ad infinitum*, provided other conditions do not interfere. These conditions are the exhaustion produced by rapid egg-laying; the decay of all the powers by age; the accumulation of fat when the bird is highly fed, and its weakening when food is stinted; these and similar causes limit the number of eggs produced by any one hen, and not the fact that her store of embryo eggs is exhausted. Hence, the number of eggs laid by different hens varies very much; some are quickly exhausted by a small number, others go on laying freely, and it is for the poulterer to determine what the character of his flock shall be in this respect.

The hens now in my yards were in pretty fair condition. Some of them were, evidently, quite old and showed no signs of moulting; some of the younger ones were already beginning to moult. I took care that every morning they all had a liberal feed of rich soft food, and instead of the number of eggs that were laid decreasing, they actually increased—an unusual thing for this season of the year. But this involved extra work and care, and I soon saw that more help was needed to do the birds justice.

In restricting the number of fowls the first year, I was guided, in a measure, by the amount of help at my disposal. My own time I considered equal to half that of one man; the servant girl rendered us some valuable assistance, and the man gave perhaps one-third of his time to the poultry. With this amount of labor at command, it was difficult to give more than ordinary care to the number of fowls on hand, together with a few broods, so that I felt the need of some person who would give his whole time to carrying out the details of the work, while I devoted myself to superintendence, marketing, etc. Having a stout man to do any hard work or heavy lifting, it occurred to me that an honest, careful woman would prove the best assistant, if I could find one willing to do the work.

I made quite an extended inquiry, and had a great many offers, but without any favorable results. The objections to those who applied were obvious and numerous, and I was about to give up in disgust the idea of employing a woman, when I received a visit from the pastor of a German Catholic church, in a neighboring city. It seems that he had heard of my want, and that amongst his parishioners was a woman of about forty-five, who had come to this country a few years ago, from Switzerland, with a husband and step-daughter. The husband had died and the daughter had got married, and the poor woman was alone in a strange land. In this country, those who are willing to work need rarely be idle, and she found enough to do at odd jobs to keep her fully employed, but she wished to find a home where employment would be permanent. On inquiry, I found that she had been accustomed to work out of doors, when she was in Europe; she was strong, healthy

and had been accustomed to the care of animals. Her pastor recommended her very highly for honesty and steadiness, so I gave him what we thought would be her expenses in coming to see me, and arranged a time when she should meet my man with the spring wagon. She came and after she had seen the coops, houses and yards, and had her duties fully explained, she thought that she would like to try the place at any rate. So I engaged her and set her to work at once, sending my man that afternoon for her trunk, etc.

Her duties were to be the care of the fowls of which she was to have entire charge under my directions. The man was to perform certain definite portions of the work, such as cleaning out the houses, cracking corn for the young chickens, grinding bones and oyster shells, carrying food and water, and similar jobs, and of course when the coops were to be moved and work of that kind to be done, she was not expected to do much. But I found that that she was as strong as an average man, and a great deal more willing, so that it was impossible to prevent her helping us with everything. Her name was Margaret and she proved indeed a "pearl," and to her faithfulness and intelligence much of the success of my experiment was due.

As soon as she came she entered earnestly upon her duties. The various yards were kept open or shut, as required, with great regularity; the breeding coops were visited regularly, the eggs removed and the nests kept in good order, and all the birds, old and young, were carefully fed. She did not profess to know anything about the different kinds of food, and had no special notions about feeding and management. She had fed her chickens in the old country upon whatever she could get, and occasionally gave them a little pepper and old mortar pounded up, but beyond this she had no nostrums, and was ready to do anything that I told her. This made her invaluable, for it left me free to be guided by my own knowledge, and assured me that my plans and experiments would not be secretly thwarted by some one that thought she knew better than I did.

I fully realized that the financial results of my present stock,

would depend, somewhat, on the way they were managed, as regards feeding. I looked upon the birds now in my possession as a mere means to secure a better flock next year, and therefore I had no hesitation about getting all I could out of them, and as soon as I could. After that I proposed to let them go.

If I had known much about their ages and qualities, I would probably have adopted a different principle in separating them into lots. I would have put those of the same age and the same time of moulting together, but as I had no information on this point, I was obliged to employ an entirely artificial classification. Hereafter, however, it would be easy to have all the hens in each yard of the same age, and they could be disposed of at once and together.

In talking with poultry keepers, I find the most diverse opinions prevalent in regard to the requisites for securing an abundant supply of eggs. Many hold that it is entirely in the breed; others place more dependence on the kind of food that is given.

I could not change the breed of birds now in my possession, but I could regulate their feed carefully, and I resolved to pay great attention to this point. My opinion was then and is now, that the best breed in the world will not give satisfactory results without special attention to the feed, but I also believe that a great deal of good food is wasted on worthless fowls.

### Feeding.



SOME writers tell us that the hen is a mere machine for producing eggs—taking in corn at one end and turning out eggs at the other. Although this is rather a coarse view of the subject, there is a good deal of truth in the statement; and therefore it is very obvious that a hen cannot produce eggs unless her food is of the right kind, as well as right in quantity. Now, chemistry enables us to tell exactly what is wanted to produce an egg; it is simply the materials of an egg, and by chemistry we can easily find out what these are. Almost any ordinary food will keep a cock in good health and condition, but unless we give our hens the right kind of food, the supply of eggs will grow less. To produce an egg the hen must take in the material required for an egg, and unfortunately there is no form of food which will exactly represent an egg and no more. Now, whatever is over is waste, and must be got rid of, and if there is too much of this waste the system gets clogged up and disease or unfruitfulness is the result. Thus, if we feed our hens nothing but corn, in a short time they will become so fat that they become diseased, and egg laying ceases. But, if for part of the corn we substitute other forms of food, such as flesh, bones, cotton-seed cake, clover, etc., the number of eggs produced is greatly increased. All experience confirms this, and in our experimental coops we have seen it proved over and over again.

What, then, are the materials required to form an egg? In addition to the carbon, hydrogen and oxygen, which are found in large proportions in all forms of food, there is needed principally nitrogen, phosphorus, sulphur and lime. It is not difficult to supply plenty of these at a cheap rate, and in good form, if we only know how. Instead of a dissertation on chemistry, however, let us have a talk about eggs, and see what is needed for the different

parts, these being the shell, the white and the yolk. The shell of the egg is made up chiefly of carbonate of lime. Our readers will find a full analysis in any work on organic chemistry, but with this we need not concern ourselves at present. The practical question is: Can our fowls get a sufficient supply of this material in their ordinary food, and if not, where can we find it? It is more than probable that those birds which are not fed by man, obtain in drinking water a large porportion of the lime used in the formation of egg shells. Almost all the water of streams, ponds and wells contains a small percentage of lime. And where the number of eggs is not large, lime in sufficient quantity may also be obtained from ordinary food. But where we want eggs in large numbers, it will not do to depend upon theses sources, and lime must be supplied as a regular article of food. It will not do to give the caustic lime used for whitewashing, however. We have known fowls to be killed by eating such lime. The lime must be rendered "mild" as it is called, by exposure to the air for months or years. Hence old mortar answers well, and all the better from the sharp gravel which it contains. By mortar we do not mean plaster or "hard finish," but the mortar used for building. A pile of this, if placed in one corner of the yard, will be constantly frequented by the hens.

Another excellent source of lime is found in oyster shells. They supply not only lime, but a small percentage of phosphorus\* as well, and the fowls pick them up greedily. They can generally be had in any quantity for the asking, and are easily reduced to *coarse* powder or roughly broken by a hammer or stamper. In using a hammer, the best way is to place a heap of the shells in a shallow box and hammer them—the hammer having a long handle—or they may be pounded with a pestle made like a pavior's rammer. This is a very efficient way. Or, if the fowls have access to a wagon road leading through the grounds, the shells may be simply laid down thickly all over the road way. The wheels and hoofs soon break them up and they make a very good surface to the road.

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\* Vide Watt's *Dictionary of Chemistry*, article *Oysters*.

These are all makeshifts, however. The best way to reduce shells to powder is to pass them through a mill made for the purpose. Such mills are manufactured at Easton, Pa., by Wilson Bros., for \$5.00 each, and will easily grind enough shells in ten minutes to supply twenty hens for a week. A large portion of the shells is reduced to a very fine powder, and this should be sifted out and kept by itself. The coarse chips are greedily picked up by the fowls, while the fine powder may be mixed with their cooked food in the proportion of a gill of powder to a gallon of food.

We have seen writers in the agricultural journals recommend *burnt* oyster shells for fowls. Oyster shells consist almost wholly of carbonate of lime, and when burned this is converted into caustic lime. To give a fowl solid pieces of caustic lime to swallow is not a very prudent proceeding, to say the least of it.

Another important source of lime is bones. Bones contain both lime and phosphorus, and form one of the very best additions to our poultry food. The directions usually given for using them, however, are exceedingly wasteful. Most writers direct us to *burn* them, so that they may be pounded easily.\* To burn bones that are intended for food is a good deal like burning corn and feeding the ashes.† We prefer fresh bones, which are fed either cooked or raw. To cook them we fill a good-sized pot with water, put in the bones with as much flesh on as possible, and let the whole simmer gently, just as if making soup. When thoroughly cooked the bones are taken out, and the "soup" is made into "mush" with Indian meal. Such mush is very nutritious. The flesh is now cut from

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\* Since bones are composed chiefly of phosphate of lime, with a very little carbonate, they are not rendered caustic by being burned, and consequently the objection which holds in the case of burned oyster shells does not apply to them. The process of burning is simply a wasteful one.

† Parched or charred corn is, however, a very different matter. One of the best tonics for fowls, especially if they show a slight tendency either to constipation or diarrhoea, is charred corn. We have a large kettle, which we bought for old iron because it was cracked, in which we occasionally parch corn for our chickens. The kettle was roughly "set" in brickwork by our man, and the chimney is simply two lengths of old stove pipe, the whole being out of doors. A wooden cover keeps rain and snow out of the pot. A fire of brush soon heats the kettle so that it will char corn. Half a bushel is then poured in and constantly stirred until it is quite dark—partially burned, in fact. The chickens eat it greedily, and we feel certain that it does them good. Of course we feed but small quantities of it. Occasionally, however, we find chickens that will not touch it. In that case moisten it and roll it in "feed."

the bones, and the latter are passed through a Wilson mill. This grinds them up into a coarse powder, which may be either fed directly or mixed with the cooked food. As a general rule, the quantity of fine powder is not very great, and as the moist bones are difficult to sift we let the chickens do the sorting. They are greedy for bones or any animal matter, so we throw the ground bones into shallow boxes or troughs, and after they have eaten all they can pick up we dump the rest into the kettle of cooked food and stir the mass thoroughly.

There are several establishments that grind bones and offer the "bone meal" or "ground bone" for sale. Most of this stuff is intended for manure, and is fit for nothing else. It is made from bones of all kinds—most of them so putrid that they "smell to heaven." Such material is, of course, totally unfit for food for animals. Some manufacturers, however, profess to prepare bone meal expressly for food for cows and poultry. The bones are fresh, they are ground at once, and the meal is thoroughly dried, so that any adhering flesh is prevented from putrifying. Some samples that we tried were quite sweet, and the fowls relished them and thrived on them. Other specimens seemed to make the birds sick very quickly, causing diarrhoea, drooping, and general ill health. We found, however, that a thorough boiling for at least an hour rendered them quite wholesome, probably by destroying the putrefying agents. But in all cases it is best to get sweet fresh bone meal, and the best test for these qualities is to fill a saucer with the stuff, moisten it thoroughly, and see if it remains sweet after the lapse of two or three hours. Fresh meat will hardly putrify, even in a warm room, during an hour, but if it has been tainted already, and then dried so that it gives off no smell, and merely *appears* fresh, this test will generally bring out its evil qualities. Of course it should be kept in a moderately warm room; if exposed to a temperature below the freezing point it will not develop its evil features. The only simple and handy test that we know of is a good nose. A good nose is a most invaluable piece of chemical apparatus, and those who spoil it with snuff, tobacco, etc., do not realize what they lose.

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There is also found in market a very clean, fresh ground bone which is made from the bones after they have served the bone boiler, who subjects them to boiling under great pressure, and thus extracts every particle of fat and soluble matter. Such bones furnish phosphate and carbonate of lime, and not much else. Where ground bone of this kind is used the birds should have a good deal of flesh during the winter months, when they cannot get insects and worms.

Passing from the outside towards the centre of the egg we next come to the white, which is a well-known glairy liquid, consisting chiefly of what is called by chemists *albumen*, which is merely the Latin for *whiteness*. To produce the white of one egg per day the hen must be fed with material which can be converted into that substance, and this must be furnished in a somewhat concentrated form. The question then comes up: Where can we find this in the cheapest and most available form? On referring to any good work on organic chemistry we will find that the different grains, etc., are valuable from this point of view in the following order:\*

Decorticated Cotton Cake.....	41
Linseed Cake.....	28
Beans.....	26
Uncorticated Cotton Cake.....	25
Malt Dust.....	23
Peas.....	22
Wheat Bran.....	14
Oats.....	13
Clover Hay.....	12
Wheat.....	11
Barley.....	11
Indian Corn.....	10
Brewer's Grains, as ordinarily sold.....	5

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\*This table differs materially from those given in most poultry books, but it will be found to embody the most recent and accurate conclusions of science, and since I followed its indications the results which I have obtained have been markedly improved.

On looking over this table it will be seen that the foods ordinarily given to hens are not exactly those best calculated to produce eggs. Even wheat, which is usually thought to be one of the very best egg-producing foods, is lower in the scale than clover, and costs much more. The oats named in the table are the heavy English oats. Whether an average American sample would give as good results we cannot say. Oats have never been a favorite food with us, except for very young chickens, though in Great Britain they are very highly esteemed for this purpose. Cotton cake, when it can be had, is most excellent, and either cotton or linseed can be had in most places. In my locality cotton-seed cake is not known in market, but linseed cake, reduced to meal, is common. Of course these "cakes," from which the oil has been expressed, are comparatively poor in heat producing elements, when compared with corn, wheat, or barley. The true way, of course, is to mix them, as we shall describe when detailing our practice.

Last of all, we come to the yolk or yelk. This is a rich, oily emulsion, containing a liberal supply of phosphates. It also contains sulphur in a state in which it is easily set free, as is seen by the action of eggs on silver.

As is easily seen the egg contains within itself all the material necessary for the building up of a perfect bird; bones, flesh, feathers, claws, and every part of the complete animal is found in an undeveloped condition in the egg.

Such being the theoretical requirements, it was evident that if there was any truth in the principles accepted by chemists, I must provide these materials abundantly, and of course in the cheapest manner consistent with the health and vigor of the fowls.

For the great staple food—that which to fowls is the staff of life—the various kinds of grain are ordinarily the most convenient, and, perhaps, when we take into consideration the peculiar digestive apparatus of the fowl, such forms of food are indispensable. Amongst the *purchased* food, therefore, grain of some kind must always form a large part, and I was, unfortunately, so situated that I could not always take advantage of those opportunities which in other localities present themselves for getting damaged grain,

sweepings, etc., at a low rate. What is known as "refuse" grain or screenings, I found to be the poorest purchase that could be made. But in some localities, especially near great grain transporting centres, slightly damaged grain can be had at quite a cheap rate, and, if it has not lain too long, and is properly cared for when received, it is quite an economical article. It matters very little what the kind of grain is; every kind of grain contains enough fat, heat and force producing elements to keep the fowls in good health, and the necessary materials for eggs I could readily find in much cheaper and quite as good a form.

And by grain I mean *whole* grain—not ground. Meal, flour and grain that has been reduced almost to a pulp by steeping and fermentation, will not answer as a steady diet for fowls. This, I soon found out for myself, by experience, but others have discovered the same thing long ago. Ask any one who is in the habit of fattening poultry, and he will tell you that nothing adds to the weight of fowls like cooked meal, but that if confined to this diet for more than two or three weeks, the animals begin to lose flesh as rapidly as they took it on, and finally they fall sick. When fowls are taken from a wide range and penned up for fattening, the first effect is to make the birds lose flesh. The cause of this is evidently the excitement and worry produced by the unusual confinement. As soon as this wears off, and the birds become reconciled to the new condition of things, they begin to take on fat rapidly. And here lies one great difference in value, in different individuals and breeds, as regards fattening. Some become speedily quieted down and quietly take to their food and rest. They doze away their time and grow fat. After a while, however, their digestion becomes impaired. The soft food causes no action of the gizzard, its secretions fail, and the bird begins to lose flesh. It should then be killed at once. For ourselves, however, we have an intense dislike to coop-fattened poultry. No bird that has been penned up for weeks and fed on soft food can equal in flavor the flesh of one whose juices have been freshened by hillside breezes and the fresh seeds, grasses and insects of the roadside and copse.

And we have never found any difficulty in getting our birds fat enough for our own taste and that of our friends.

In estimating the actual value of different kinds of grain for feeding purposes, we must remember that it is weight only that tells. One hundred pounds of one kind of grain may *measure* greatly more than one hundred pounds of another kind, and yet be greatly inferior to it in feeding value. Thus, as an egg producer, 100 lbs. of oats would be better than 100 lbs. of corn in the proportion of 13 to 10, but a bushel of corn would be more valuable than a bushel of oats, because it would weigh nearly twice as much, thus more than making up for the larger *percentage* of egg-forming ingredients contained in the oats. Indeed, I found that, taken as a whole, corn was usually the cheapest grain in market, and in buying, therefore, I confined myself chiefly to corn. I found that when it was supplemented with other matters which were not expensive it was probably the best. But corn alone did not answer well. The hens got fat and ceased laying. What I wanted, therefore, was phosphates and albuminoids; and the best and cheapest source of these, when they had to be purchased, was flesh and bones, and clover. I therefore made an arrangement with one or two butchers for a supply of bones and refuse meat, and continued to let the fowls have some of it for "dessert" at least every other day. The small bones were simply cleaned of their flesh with a knife, so far as it could be done without too much trouble, and then chopped with a cleaver into pieces that would go in the mill. The Wilson mill ground them rapidly and thoroughly, and when offered to the fowls it was fun to see them rush for the feast. The meat from the bones, and also other pieces of waste flesh, were passed through a chopping mill, which cut them into small pieces, so that a fowl could not drag off a large lot at once and run all round the coop chased by its companions—each one trying to steal a piece from another. This happens only when the pieces are too large to be immediately swallowed. Nothing of the kind happened with meat cut by means of our chopper. The fowls swallowed it readily, each one got its just share, and all were happy.

Perhaps the cheapest form of flesh that I was able to obtain was

young calves. In my district the farmers carried on dairying to a considerable extent, and as milk was too valuable they did not care to raise any calves, except promising young heifers. And as it was a criminal offense to sell very young calves, they were compelled either to keep them until they were some weeks old or knock them on the head and bury them in the manure heap. When it became known that I would give from fifty cents to a dollar apiece for them, at any age, I had as many as I could use, and this at a time too when they were needed—that is, just as my spring chickens were coming forward. The bones of these young calves are easily cut up—indeed, our meat chopper sufficed for much of them—and an ordinary calf made two very nice desserts for 500 birds.

But in addition to these articles fowls need green food. My laying flocks, which were allowed to wander over a large range, did not suffer for want of this in summer, but during winter I found it necessary to give them a regular and abundant supply, and at first I fixed upon the cabbage as the best vegetable for my purpose. At first I did not succeed very well in growing cabbage, the land not being rich enough, and the former owner not having paid sufficient attention to the saving of manure. Mrs. B. was so neat and orderly that the sight of a lawn coated with manure in the spring would have thrown her into hysterics, or some other womanly nonsense, and she would gladly have allowed all the manure to be given away, merely to get rid of the sight and smell of it. As may be readily supposed, therefore, the arrangements for saving manure were none of the best. My views, however, were very different. Brought up in a country where the motto was “No manure, no crops,” I looked upon the manure pile as one of the most important things about the place, and to me a grass field covered with a rich coating of manure was by no means an unsightly object, because the intellectual beauty of the “eternal fitness of things” was more agreeable than the sight of a plot of ground thinly occupied with starved plants. One of my earliest “jobs,” therefore, was to construct a good manure bed. This I began by staking off a piece of ground thirty feet by forty. The soil from this plot was removed, so that I had a pit four feet deep along one of the 40 foot sides, and

sloping up to the surface on the opposite side. Along the 30 foot sides the ground was cut nearly perpendicularly—the angle being only sufficient to keep the banks from caving in. The whole bottom was then puddled, and rammed hard and smooth with a rammer. The manure was thrown into this as fast as taken from the stable and cow house, and to it was added all such things as old nests, leaves, etc., etc.; in short, every kind of material that is valuable in making manure. It was astonishing what a pile we had accumulated by spring. The pit was not only full, but heaped up above the general level, and all except a few inches on the top was thoroughly rotten and fit for the land. It may easily be imagined that with so much purchased food of the richest kind coming on to the place the land was soon fit to grow anything, and after a year or two my vegetable crops were entirely satisfactory. But for the first two or three years I was compelled to buy my cabbage. Now, cabbages in that part brought a very high price though they could be grown very easily, and even at very moderate figures were about as good a paying crop as could be found. It was here, as everywhere else, however—it cost a good deal to sell them. I saw this point, and thought that perhaps I could make some of my neighbors see the point too. So I approached one of them, an intelligent young farmer and asked him what he would undertake to let me have 3,000 late cabbages for next season. He at once named eight cents, which was about the figure they had brought in the market near us last season, when cabbages were pretty dear. I at once pointed this out to him, and suggested that as he ran no risk of losing the sale, and would lose no time in peddling them out, but would simply have to grow them and allow me to cart them away he ought to be able to sell them much cheaper. But he could not see it; cabbages were worth so much in market, had been sold for that, and he did not see why he should not get the market price. As for my taking them away, that did not matter much to him. There would be but a few loads anyway, and his teams might as well haul cabbages as stand idle. Of course such a price placed them beyond my reach, and I at once turned my attention to something else. But as the previous year had been an

exceptionally good year for selling cabbages, and the price was very high, everybody planted a patch this year, and several of my neighbors planted quite extensively. The result was that the market was overstocked, and I bought my neighbor's cabbages *and had him deliver them* for less than I had offered him in the spring, \$35 per 1,000. When he drew the last load and got his pay for them, he remarked that he was done with cabbage growing; would never grow another one except for his own use. I then asked him what he would grow me the same quantity for next year, I to take them away as wanted? He said he would think the matter over and let me know. In a few days he came to me and offered to grow 3,000 heads for the same price that I had offered him the year before—\$42 per 1,000. I closed with him on the understanding that all the heads were to be good saleable heads, any poor ones to count at the rate of two for one. This gave me a head of cabbage for every bird I raised that year, and I found it none too much. But this is anticipating.

Meantime I had determined that if I could not grow cabbages I would grow something else, and I fixed upon clover. Experience had shown me that this plant formed one of the very best foods for fowls, and as it could be made to produce a very heavy crop per acre I believed it to be one of the most profitable. Thirty-five bushels of corn, which, at 58 lbs. to the bushel, would give 2,000 lbs., may be considered a fair yield for an acre. I have raised four times this amount of dry clover from an acre, and the percentage of egg forming elements in the clover is greater than that of those in the corn.

I therefore resolved to raise clover as an egg producing food and as green food. There were some other plants that suggested themselves, but as clover and I were old friends, and as I saw several vigorous plants growing on the place, I felt sure that I could grow clover, and I did not care to try any "side" experiments at this stage of my venture. I had neither the time, the money, nor the inclination.

The reader may, perhaps, have noticed that in speaking of my manure pile, I said nothing of the hen manure—by far the most

important article on the place. In order to fully explain my plans and the reasons for this admission it will be necessary to digress a little

It is a well known fact, that many of the parasites and diseases which afflict man and the lower animals, are propagated and disseminated chiefly, if not wholly, through their excrements, and in many cases the parasite adheres to the vegetable which forms the food of the animal, and is swallowed with it. A curious instance of this is the fluke, which is so fatal to sheep that are fed on marshy ground. The fluke is a parasite whose history we may trace from the time when it makes its home in the snail; the snail crawls out on the damp grass and is swallowed by the sheep. In the body of the sheep, the parasite matures, forms its eggs and discharges them—a single fluke originating as many as 40,000 eggs. These eggs are carried by winds, rains, the hoofs of animals and other means into ponds, ditches, etc., where each one develops into a free-swimming embryo, that, after some changes, passes into the body of a snail, there to pass through further changes, and again take up its journey through the circuit of its existence. From this it is obvious that a single “rotten” sheep—that is, one afflicted with flukes—is capable of infecting an entire field, and of carrying disease and death into a large flock. The same is true of a diseased chicken. In the chicken the “gapes” are known to be caused by a parasite. The eggs of this parasite, passing through the chicken fall on the ground and are picked up by other chickens when they are taking their food or swallowing gravel. The same is the case in regard to true chicken cholera. This disease is caused by minute organisms which infect the intestinal canal of the chicken, and which are voided in millions in the excrements of birds so afflicted. It is easily seen that any other chickens feeding on such soiled ground, or eating the green plants grown thereon, will become infected in the same way. And, yet, one writer actually tells us that chickens should be made to scratch over their own excrements and pick out the gravel contained therein, so as to save the trouble and expense of providing fresh gravel!!



In all my chicken raising, disease has been my great dread, and perhaps it has been on account of my dread of it, that I have succeeded so well in avoiding it. With me the "ounce of prevention" has been always greatly preferred to the "pound of cure." I believe that, for man, it is exceedingly dangerous to eat raw vegetables that have been raised on ground manured with night soil, or sewage, or even the excrements of pigs, and it is my belief that many obscure cases of disease in our large cities arise in this way. And if possible, I would never allow any animal to feed directly off ground that had been manured with the excrements of others of its kind.

Especially is this true of chickens. The proper crops to grow on ground that has been manured with night soil or sewage are the cereals—wheat, barley, oats, rye, etc. Lettuce, cabbage, turnips, etc., should never be grown on such ground.

The reader will now appreciate my reason for keeping all the chicken manure by itself. To utilize it I determined to grow corn, while my stable manure I applied to the clover crop. It was evident that while these minute but destructive parasites might readily adhere to the moist and succulent clover, or even to the foilage of corn grown for soiling purposes, they could hardly reach the kernels of the corn. The washing rains of spring, the scorching suns of summer and the drying winds of autumn, would give them but a slight chance compared to that which they would have on the moist clover, always moist from its proximity to the ground.

And, here came in one great advantage of the portable fence. I could plow up a corn patch of any size and allow the chickens to revel amongst worms and grubs to their heart's content. Then it could be fenced in, planted to corn and cultivated until the corn was high enough to admit broods of small chickens which were easily colonized in it. As soon as the corn was harvested, the fence was removed, and the hens allowed to pick up all that was left and rummage the whole patch for bugs and worms.

There is no manure, that I know of, that will produce a better crop of corn than will hen manure. We always had plenty of it, and we tried to put in as much corn as possible, for in addition to

the grain for our fowls, we had the stalks for the cow, and the cobs for kindling—a most useful article in our position, and there is no better kindling than dry corn cobs.

My experience with the artificial foods, or so-called “egg-foods,” has been so limited that I have little information concerning them to give the reader. At one time I tried 25 lbs. of an egg food that is extensively advertised and highly recommended, but the results did not warrant me in repeating the experiment. It must be borne in mind, however, that it is exceedingly difficult to determine questions of this kind. The individual characteristics of the members of any flock may have quite as much to do with egg production as has the food given to them, and there are so many other conditions which it is exceedingly difficult at all times to observe or to control, that the results must always be somewhat uncertain. The experiment in my hands was not carried out with that attention to details that would preclude all error. The way I did it was this: I selected two coops and yards of exactly the same size and similar location. I then chose fourteen hens as nearly alike in age, size, breed and general appearance as possible. This flock was then divided into two lots of seven each, the best hens being drafted alternately for each coop, just as boys used to be drafted under their several captains for some contest. The best went into coop A; second best to coop B; third best to A; fourth best to B, and so on until all were drafted. These two lots were then fed and treated in all respects as nearly alike as possible, except that one lot was fed with egg food, and the other had what was supposed to be an equivalent in wheat bran. The experiment was continued until 25 lbs. of the food had been used. At first the fowls that had the egg food produced considerably more eggs than the others, but after a time they fell behind, and at the end of the experiment the two flocks were very nearly even.

The conclusion that I reached was that “egg-food” consists chiefly of stimulants, and that the use of these, beyond a very limited extent at the beginning of the season, is an injury rather than a benefit to the hens. The high price of most of the “foods” in market precludes their use as *food*, while for a stimulant we have never

found anything better than a little red pepper. Even this, however, we used sparingly with our laying flock, and still more so with our breeders; warmth, both in the way of food and housing, together with good nourishing food, are the best stimulants, and if the breed of fowls is right, they will, under such conditions, satisfy any reasonable person.

The water used on the place was of the very best quality—clear, cold, spring water, with just enough mineral matter in it to remove the bad effects of rain or snow. It came, of course, from the spring which I have already described, and as a general rule the fowls got nothing but this water to drink, but when confined in very small coops and yards I used the famous Douglas mixture with great satisfaction. This consists of

Sulphate of iron.....	1 lb.
Sulphuric acid.....	2 oz.
Water.....	4 gallons.

The sulphate of iron was dissolved in the water, the sulphuric acid added, and the liquid put up in quart bottles kept tightly corked.\* A teaspoonful of this mixture to a pint of good water seemed to have a most excellent effect.

I found, however, that by lessening the sulphuric acid to one ounce, and adding two pounds of soluble phosphate of lime, I got a mixture that was far superior. The phosphates that I used were those sold by the Rumford Chemical Works, of Providence, R. I., and being intended for consumption by human beings, were no doubt more expensive than was necessary. I presume, however, that if a demand should arise for this compound, the firm named could furnish it at a price which would render its use profitable.

One of our great difficulties in feeding was the distribution of the

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\* Sulphate of iron, when exposed to the air, is apt to absorb oxygen and probably ammonia. The iron, which is the really valuable part, then becomes insoluble, and is not taken up by the fowls, but adheres to the sides of the vessel. Hence, the reason for keeping it in small packages securely corked. The use of the sulphuric acid is simply to keep the iron in solution. If the iron rust be mixed with scalded bran, meal, potatoes, etc., it will be eaten and will do the birds good. Too much of it is injurious, but a teaspoonful of red iron rust in the food of six large or ten small fowls once or twice a week is very good.

food; some hens would get more than their share, others would get less. I was astonished to see the difference between fowls in this respect. Take any two dozen fowls, throw down a pint of corn, and after it has disappeared examine the crops of the birds and you will find that half of it has been picked up by half a dozen fowls—the remaining half being divided amongst the other eighteen. Still worse is this in cases where the birds are called off the perch by throwing down food. Some wide awake, early risers will get all they can eat, while others will remain on the perch and get nothing, or they will come down in such sleepy fashion that breakfast is over before they are ready.

After a good deal of observation I found that the more widely the food was scattered the better was the chance of each individual bird. I therefore arranged it so that when grain was fed it was sown broadcast over a considerable space, and when the food was soft it was placed in a great many small dishes or troughs, so that weak birds were never in danger of being crowded away by the stronger ones.

It is very evident that if there were no objection to giving every bird *all* that it would eat, the matter could be arranged very simply. All that we would have to do would be to keep food constantly accessible to the fowls in well-protected feed boxes and the work would be done. And this, indeed, is the method adopted by many. One book on poultry, now before me, has page after page devoted to the description of self-acting feeding hoppers, and dozens of amateurs that we have met have pointed with pride to feed boxes of marvellous ingenuity and utter worthlessness—"made with their own hands," and supposed to be a convincing proof of their title to the honor of being considered skilful poultry keepers. Observant poultrymen have long since found out that hens may be altogether too fat to lay; that they must be kept on such a scale of diet as will maintain them in constant activity—always ready for more, like *Oliver Twist*. In fact, one of the secrets of successful poultry keeping consists in striking this golden mean between excessive fatness and starvation. A very excellent system, one which has been in vogue for many years, though frequently described by

recent writers, and often claimed as original by them, is to mix the grain with cut straw, leaves, or other light rubbish, and make the hens "scratch for their living." It is a most excellent plan, but requires special arrangements to make it succeed in practice. All such scratching grounds must be protected from rain, snow, etc., and must be separate from the dusting baths. My feeding grounds were simply sheds, cheaply constructed of stout poles and thatched with evergreen boughs, obtained in thinning the belt of evergreens which protected our northern boundary. If properly laid, such a roof is almost perfectly rain-proof, and the birds can always find plenty of room. In summer, therefore, we relied upon these feeding places, of which there was one to every 100 hens. In locating them we chose the most barren and driest places we could find, made them a good size, and liberally strewed them with chaff, pine shatters, leaves, etc. The food strewed on these places was generally cracked corn or whole wheat; anything of a smaller or darker grain was apt to be lost, while whole corn was too easily found, and at any rate I did not feed much whole corn, except on winter evenings and very cold days.

The feeding sheds were placed so as to face south-south-east, so that they always caught the early morning rays, and by afternoon they were partly in shade. The early rising hens always made for these places the very first thing, as soon as they had their liberty, but we found that this would not do; these early risers would clean the whole food out before the others got a chance. All the hens, therefore, were kept in their own yards, until the entire flock had come off the roosts, and to expedite this, a little grain was scattered on the ground and the birds called to it. As soon as all were down the gates were opened, and those that wanted further feed scampered off to the sheds. They lay about these sheds and scratched, went to the dust-baths, rummaged the leaves for insects and wandered about freely until evening, when they were again fed all the grain they would eat. This was our usual summer routine, and it was very rarely that they did not return to their proper houses to lay. In addition to the nests in the houses, we had special boxes scattered over the grounds for

their convenience, but we did not get many eggs in them. Ninety per cent. of the eggs were laid in the houses.

In winter the programme was, of course, considerably varied. When the snow was deep many of the sheds were inaccessible, but when the ground was clear they were all frequented during the day. Instead of sending the hens off hungry to their feeding grounds, however, I gave them soft feed, well cooked, and consisting of corn meal, bran, ground oats and rye, flesh, bone dust, finely powdered oyster shells, etc. Of course the proportion of the latter ingredients was small. A little salt, and sometimes a little red pepper were also mixed with the food. This was made into a very stiff paste, being, in fact, worked like baker's dough, and was then placed in troughs, which were made in very simple fashion

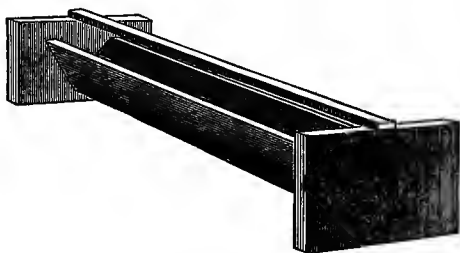


Fig. 11.

by nailing two narrow boards together along the edges, and closing the ends by means of two square pieces, as shown in the engraving, Fig. 11. In order to prevent the birds from getting their feet into these troughs and defiling the food, I nailed a strip across the top as shown in the figure. It answered the purpose admirably. All our birds, without exception, would rush for these troughs, so that even the slowest feeders got their share. They then went to scratching in the feeding sheds of their yards, and in this way got plenty of exercise.

When the snow was on the ground, and no green food was to be had, we hung cabbages all around the sheds and let them peck away at them. We also mixed some very finely cut dried clover with their feed. By passing it through a feed cutter and also through a mill, we got it down almost to a powder.

### Fall Broods.

**I**N many departments of agriculture, it is a good rule to find out what others are doing, and then do the opposite. If everybody is planting potatoes, then plant no more than you need for your own use; if nobody is setting out cabbages, set out all you can. Now the great bulk of the chickens that are raised in this country are hatched in May and early June; too late to bring the highest price for spring chickens, and yet so early that by next season they will have eaten more than they are worth.

While sitting in the shade of our porch one afternoon, I recalled an experience which I had had a few years previously. We, at that time, occupied a beautiful place of about  $3\frac{1}{2}$  acres, and kept a number of hens. Of course we did as others did, and every spring we raised enough chickens to supply our table during fall and winter, and to furnish pullets for next year. One day, late in September, one of our hens came into the barnyard leading fifteen beautiful chicks. She had stolen her nest and hatched this brood, and as she led them up to where we stood she seemed to say, as plainly as if she had spoken in good English, "Is not that something to be proud of?" Well, I thought it was. So I fed the little flock, gave them a nice warm berth in the stable, and made every provision to bring them up. Several friends who called to see us, and who professed to be well versed in chicken lore, advised me to kill them at once. They never could amount to anything, they said; the cold weather would come before they were fledged, they would probably die, and if they should survive, they would only be scrubs; therefore better kill them now and be done with it.

Killing animals in cold blood, merely for the sake of getting rid of them, is not my forte. I have killed a good many animals

in my time, but to deliberately kill a nice little flock of chickens, and throw them in the manure heap was a kind of killing rather different from anything I had ever done before. So I let them live; their food, poor little things, did not amount to much, and for the present, at least; they seemed supremely happy. They grew apace; when the cold weather came, the mother abandoned them, but we stretched an old blanket on a frame which supported it about three inches from the floor, and they crept under this and kept warm. We gave them specially rich food and all the tid-bits from the table, but the older chickens robbed them, so I made a coop with a hole through which they could easily pass, while the older ones could not, and we placed the food under that and they could eat whenever they wanted to. We lost five by various accidents, but when I went to the stable on Christmas morning to give my animals a Christmas greeting and a Christmas breakfast, there were ten as fine young birds as I ever saw—four cockerels and six pullets. They thrived well in spite of the cold weather, and in March the pullets began to lay, and kept on laying when eggs began to grow scarce and other birds ceased. The cockerels were plump and delicate—far different from the previous spring birds, which had now become somewhat rank and tough. At this time common poultry was selling for 20 cents per lb.—30 per cent. higher than it had brought in the fall—but for these birds we could have got more. And so I concluded that the best paying brood on the place—that which had given least trouble and had brought most profit—was the brood that came from the stolen nest.

Now, I had noticed that several hens in the different houses wanted to sit, so I decided to hatch out three or four hundred young chickens this fall and see whether or not the operation would be a profitable one.

I therefore filled out my former hatching room with hatching boxes, similar to those previously described, and gradually filled them up with hens. I managed to place in it twelve boxes, holding forty eight hens. In expectation of the young broods, I had a lot more of the brooding coops made so that I could care for the chicks under any circumstances.



As I had taken great pains with my breeding pens, and the weather had been quite favorable, the hatches were, what I called, very good. They averaged nearly ten to each hen, giving me 473 chicks. These I divided amongst thirty seven hens, giving an average of thirteen chicks to each.

Our system of caring for the chicks was as follows: The date of setting and the date when due being clearly marked on a card tacked to each nest, there was no room for mistakes. When a hen was due she was not removed from the nest for food, but was allowed to sit until she came off of her own accord. I allowed very little meddling—the only thing that was permitted being the removal of the empty shells. Young chickens need no attention for twenty-four hours after they leave the shell, and if left forty-eight hours they will not suffer. This is no doubt a wise provision of nature, whereby the birds that do not come out as soon as the others are not left to be chilled. When the hen led the young brood off, they were fed with cracked corn,\* from which all meal and dust had been carefully sifted. An hour or so after this they had all the chopped meat they could eat with plenty of clear water. At this time we unfortunately had no milk, and could not get any conveniently. This was a mistake, as I soon found, and ever afterwards I contrived to have plenty of milk on hand when I expected to hatch out many broods. But on water, corn, meat and bones they throve very well. When set on the grass, they could pick plenty of green stuff, and by the time the weather got too cold, they were able to peck at a cabbage with good effect.

A favorite morning food was made by scalding horse feed, allowing it to stand until stiff, and working it into stiff dough with more dry feed. This they ate greedily, and throve well on it. I found that by keeping the hens from wandering about and leading the chickens with them, the latter got along much better. Meat

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\* Most writers advise soft food for the first meal. I have found that we have better success when we use a hard food. The young chickens naturally do not find soft food; they need something hard and solid to excite the gizzard to action, and after that give them the richest and most nutritious food possible.

scraps well chopped up seemed to be quite as good as insects. We also gave them liberally of fresh ground bones, which we prepared ourselves in one of the Wilson mills. This was before these manufacturers had brought out their small mill for grinding fresh bones; but by cooking the bones thoroughly they were easily scraped clean and ground up, and the soup was mixed scalding hot with feed into a stiff dough which was fed to old and young.

Before very cold weather came these chickens were well feathered and quite large. I found occasional customers, at good prices, for a pair of cockerels for some invalid, and though this was an uncertain market, yet I was surprised at the number that I sold in this way. When spring came I went to a noted restaurant in a neighboring city and induced the proprietor to put up a sign:

**"FALL REARED CHICKENS—TENDER AND DELICIOUS,"**

and in a few weeks they were all gone.

I kept the pullets by themselves until the end of February. With an unusual degree of forgetfulness, I had neglected to prepare two yards for them in the fall when the ground was soft, so there was nothing for it but to keep them in a loft during the very cold months. I had 187 of them, and they were rather a mixed lot, as I had taken the eggs just as they came from the breeding pens without much care in selecting them. But early in March some of them began to lay, and I saw that it was necessary to get them into regular houses and yards with proper sheds, etc. I therefore had two more of our regular houses put up. I had plenty of fence panels, but I could not drive stakes as the frost was not yet out of the ground. So I tied the panels together, and put them up zig-zag fashion, like an old Virginia rail fence. I found that they stood quite firmly, and answered every purpose for a temporary expedient. I then divided the pullets into two lots, and put one in each house, and fed for eggs. During the next month or so they did not do any better than the other hens, if as well. But after that time they went on increasing, and when eggs

began to grow scarce, these two pens supplied us with twice as many as any other pens containing the same number of birds.

I was therefore very well satisfied with my experiment, and every year since that time I have always raised a large number of fall chickens. I now keep them in a large house until the price of the old fowls goes up. I then sell the latter, and replace them with the young pullets.

### Our First Winter.

**I**N northern climates it is the wintering of his stock that tests the ability of the stock raiser, and decides his profits, and this whether it be cattle or poultry. A few dozen hens can easily be kept in a lean-to shed next the cow stable or barn, and they may be kept warm and well fed and prove a success. Every shed on the premises will be frequented by the birds, which will thus find plenty of shelter and dry spots without any necessity for the owner putting up special buildings, but, when the number of fowls is large, these resources fail, and the usual results of crowding and discomfort make their appearance. I had had a very unpleasant experience in regard to this matter at one time, when, after raising two or three hundred chickens, I attempted to winter them, without providing the necessary shed room. I had, therefore, been careful to attach large commodious sheds to all my houses, and to make the access to these sheds so convenient that the fowls would have no snow and sleet to pass over in order to get to the feeding grounds and dusting baths beneath them. I also allowed the large temporary shed to remain, as I knew that it would be a great boon to the young chickens until they were properly disposed of.

The nights had now began to get chilly, and frosts had come with the October days. Our latest broods were too delicate to stand the chill autumn night air, though on bright days they enjoyed basking in the sun. We still kept many of them in the wire-covered brooding coops, but to the older ones we had given the liberty of the place. I provided very warm comfortable places for them to nest at night, although most of these were rather of a make-shift character. My standard coop for this purpose, however, one that I could obtain easily in any quantity, consisted simply of one of the cheap barrels used for packing apples, etc. This was

laid on its side and steadied with stones or blocks on each side, and the open end was covered to within four inches of the ground with a curtain made of the matting that comes round tea-chests. This matting can be had for almost nothing at the tea stores, and three thicknesses of it make a screen that is impervious to wind, rain and snow. These barrel coops were placed in different spots about the grounds, but always where the shelter was good. On wet and cold days the little flocks used to stay in them a large part of the time. Food and water were placed near them, and with the number that I now had, it was not very difficult to attend to them. On bright sunny days it was no trouble at all. On rainy days it was rather an uncomfortable job. I had heavy rubber boots and a rubber coat, and I provided similar garments for Margaret, so that she could always keep dry, and we managed to get along, but I saw that if my experiment of fall broods proved a success, I would have to erect a cheap board house with green-house sash in the roof, and attend to the chickens in that. One writer ridicules the idea of protection being required for the attendant, but he seems to forget that human beings are not made of cast iron, and that even chickens suffer from wet and cold.

The early hatched chickens were now full grown, and the cockerels gave us unmistakable hints that it was time to separate them from the pullets. So I had some more portable fencing made, enclosed the large shed, and kept them in that. They were well fed on rather fattening food, so as to prepare them rapidly for market, and we got rid of them as soon as possible by methods which the reader will find detailed in the chapter on *marketing*. To the pullets we allowed the range of the place, but we found that although the nights began to grow cold, and even after snow came, they would persist in roosting in trees and on fences, and it was almost impossible to get them into the houses. Night after night we carried them into a house and placed them on the roost, but next night they would be found in their own place the same as ever. The worst of it was that they were excellent fliers, so that none of our fences would keep them in.

I got over this difficulty by catching them one by one, shaving

off the feathery part from the quills of one wing, and placing them in the old house where there was most room. We had to lock up the entire flock for ten days, but at the end of that time when we let them out we had no trouble.

I was anxious to leave the poultry at liberty as long as possible, so though November brought wet and dreary days and a few flurries of snow, yet the chickens did very well. Many of them moulted and consequently stopped laying, but I was surprised at the number of eggs that we got every day. The number of hens on the place was a little less than 600, and of these two-thirds must have been laying for many days; we got twenty and twenty-five dozen eggs. At this time it was our practice to shut the hens in every night, and keep them in until late in the morning. As soon as they were let out, they had a warm feed of dough made by scalding a mixture of corn meal and oil-cake, and adding a little of the siftings of ground oyster shells, and a little red pepper. At noon they had wheat, as much as they could eat. At night a good feed of whole corn. On fine days they had free access to the patch of clover and grass, and on wet days they had cabbages, as much as they could eat. Twice a week they had all the meat and ground bones they would eat after their dinner of wheat.

Under this regimen they thrived well, and became very bright and vigorous. The egg crop increased to thirty dozen per day, and as eggs were bringing a good price (35 cents per dozen) we much more than paid expenses. At this time (Nov. 25th) we had on the place over 1,200 head; some of them, however, quite small. The feed cost about \$4 per day, besides labor, and the returns were over \$10, so that the result was on the whole quite satisfactory. As we were disposing of our cockerels quite rapidly, the amount of food required was also lessened.

This experience, however, was somewhat exceptional. Under ordinary conditions the egg crop would have kept growing less and less until the revival in February and March, and it was evident that under the stimulus of more liberal feeding than they had been previously accustomed to, and also the influence of red pepper and

bones, their latent powers were being developed. How long they could stand this, however, was a question.

Real cold weather did not set in until after the middle of December, and then it was ushered in with a rather heavy fall of snow. This prevented all access to green stuff growing in the fields, and confined the hens to their houses and sheds. And here the glass roofs came into play with striking effect. While all was cold, wet and dreary outside, these glass covered sheds were dry and warm. We made a stout snow plow, and with Madge's aid we opened up paths all round the place, so that Margaret could reach every house without any trouble.

As there was but little outside work for the man now, we kept the boiler going all the time, and we ground up bones quite liberally. As the birds were somewhat crowded, we picked out a few that we thought the poorest, and fattened them up, and got rid of them. We also got rid of the last of the cockerels, except the very young ones, and in this way we made more room for the rest. But in spite of all our efforts and extra feed, the egg crop diminished; the cold snap produced a remarkably sudden and great change in the birds, and our receipts frequently fell from thirty to less than ten dozen. But, as the number of eggs produced grew less, the price increased; forty, fifty and at last sixty cents was reached.

Thus far our fowls kept in good health, but then, as we well knew, the worst was to come. It was the cold of February and March that I dreaded worst.

In the large houses the hens kept very comfortable. But in the breeding pens the birds began to suffer with the cold of January. The snow left us about the 8th of January, and we had some very fine weather about that time. In a few days, however, it grew cold again, and was much more severe than it had previously been. The birds in the breeding pens, having no glass sheds, were compelled to go out in the open air whenever they left their coops, and the combs and wattles of the hens got frozen, so that laying entirely ceased. And as I was very anxious to get eggs from these coops, so as to be able to raise some very early pullets, that would

lay next winter, I confess I was taken quite aback at this new obstacle. Indeed, so serious was the difficulty, that I almost gave up all hope of success that season.

It was an awkward predicament to be sure. What could be done?

I saw at once that all hope of intelligent crossing and breeding from these hens was at an end, so far as early chickens this season were concerned. I, therefore, decided to rearrange some of my yards, and make up one almost entirely of laying hens; and in this I put several of my best cocks. I know that this is not an advisable system, but I could not very well do otherwise. To have more than one cock in a coop is very unwise. They prevent each other from paying attention to the hens and this causes many of the eggs to prove unfertile. But I could not very well help it, and so I had to arrange as best I could.

The neglect to provide for my breeding stock was my first great blunder, and the one that did more than anything else to retard my progress. It was a mere oversight; I knew better, but I did not realize the necessities of the case.

The laying hens, placed in one of the large houses with glass shed, etc., soon supplied us with eggs for setting, and as we always had hens ready to set, we soon had our early broods under way. Of course they would be a mixed lot, but as they were all good, we had considerable hope of fair results.

So far as our sixty breeding hens were concerned, there was nothing for it but to give up one of the warmest houses to them, and keep them in that. So I picked out the most convenient house, distributed the hens amongst the other houses, and transferred all my breeders to their new house. They were left there without any cock until they began to lay again freely, which was not till late in February. Meantime I put up small glass covered sheds against the breeding coops, made everything still more snug and warm, and, in short, made the small coops as much proof against the weather as the large ones. I then gradually transferred the hens back to them, and although I did not raise my earliest chickens



from the eggs of my best hens, yet I was able to get several very fine broods in April and May.

It is a well known fact that a hen that gets her comb or wattles frozen, will cease to lay until the sores are healed. I found that fowls with rose-combs, as they are called, were much less liable to freezing than those with large single combs, and one of my greatest objections to the Brown Leghorns, is their enormous combs, which are not only long, but very thick and fleshy. But I found that a young bird that had been "dubbed," as the cock-fighters call it, stood the frost much better than even the rose-comb. After the first winter, therefore, I "dubbed" all my fowls—that is to say, I cut the combs and wattles off with a pair of shears. The pain cannot be very great—not nearly so much as the large sores caused by being frost-bitten, and the operation is easily and quickly performed. A single cut removes the entire comb, and the wound is then dusted with a powder made by roasting one part of sulphate of iron, and three parts of alum in an old pot. This mixture is then reduced to a fine powder, and kept in a closely corked bottle. A little is put in a small box, and used as wanted. It is an old and famous styptic (a medicine for stopping bleeding), and was in great request amongst the warriors of old, who were often compelled to be their own surgeons. Care must be taken that it does not get into the eyes of the birds, or bad results will follow.

While hens frequently stop laying in very cold weather, it was long ago proved by Reaumur that mere warmth will not induce a hen to keep on laying during winter. In laying, as in all similar physiological processes, a period of rest is needed, and without this ordinary breeds of hens cannot lay. Knight proved this law, even in regard to plants, and showed that if we want to force plants successfully, we must first give them a season of rest, and this may be done by shading, cold and dryness. I have always thought that a large part of my success in getting eggs the first winter, was due to the fact that the hens stopped laying after I got them, and hence had their needed rest at that time.

That cold alone does not prevent hens from laying was clearly shown this spring. In February and March the weather was

colder and more severe than during any other time, yet it was during this period that we got most eggs from the hens that were on the place when I got it.

As the season wore on, the eggs to began to increase again, but the price fell until it scarcely paid for the tear and wear of the hens. The price got as low as 16 cents per dozen, so that it took 25 dozen to pay for feed alone.

When the first days of April came and the snows of March had disappeared, we were all impressed with a feeling of great relief. The birds could again wander over the entire place, and the *prospect* of green food and plenty of insects was encouraging, even if the reality had not come. Our losses had been but slight, considering the motley composition of the flock—all ages, sizes and conditions. We lost twenty-six old birds—a little over four per cent.—and this, I thought, was not a bad showing. They died with various symptoms—all evidently caused by severe weather. In the matter of chicken diseases, I do not profess to be an expert. When one of my birds shows signs of ill-health, we place it in warm quarters, give it pills made of cayenne pepper, butter and bread, and then feed it on soft food and clean water. If it improves (and they generally do) in three or four days, all right. If not we chop its head off and bury it where the other chickens cannot get at it.

The farmers, and especially the "suburban" residents, now began to buy chickens for laying, and paid good prices for them. They thought in this way, to save the labor and cost of wintering them, and perhaps they did. But I had no objection to sell those of my fowls from which I had taken as much good as I was likely to get, and so I made up a few crates selected from the different houses, and in this way I reduced my stock very considerably. The broods of last spring and summer were now laying, and the fall broods were coming on quite rapidly, so I thought it as well to dispose of some of the least valuable of my stock.

### Nests and Nest Eggs.

**T**HE nest of every bird is primarily designed for hatching and rearing its young. The use to which we put the laying nests is not one designed by nature. This being the object, the bird likes seclusion, and always plays at "nest-hiding" when it can get a chance. No one ever found a stolen nest exposed to the full glare of observation; it is into dark corners and out of the way places that nature leads the bird. And yet I have seen otherwise intelligent men place the nests of their laying hens so that they were fully exposed to view.

During the height of the laying season the nests in the houses did not give the birds quite room enough, and I never like to see two birds on one nest, so I had an extra lot of the hatching boxes made and placed them in the sheds and against fences, but at such a distance from the latter that the hens could walk in between the box and the wall and so reach the nest.

To examine these nests, or to collect eggs, it was not necessary to go in front of the boxes; all we had to do was to let down the hinged board and everything was within reach. If, on first opening the door, a hen was seen on the nest, the door was gently closed again, and she was left to her own meditations.

In making nests for both the laying and sitting hens, we used a fine kind of grass or hay that is used for packing glassware, and can be obtained in moderate quantities from almost any crockery store. Common straw is too coarse; if chopped short the cut ends irritate the hen, and if left long her feet get entangled in it, and the eggs get broken. Pine shavings make a fair nest, and the turpentine keeps away lice. But fine grass, dusted with sulphur, cannot be excelled.

The nests of both our laying and sitting hens were made directly on the ground, or, if on a floor, a sod with the grassy side up was

placed on the bottom. On this was placed a layer of fine grass, and the whole well dusted with sulphur. As soon as the chicks come off, the nests should be removed, and either burned or buried deeply in the manure heap. The sod keeps the eggs damp, but if on a floor it gets too dry, and after a time the eggs should be sprayed with water when the hen is off. Our spraying apparatus consisted of a pan of water and a small whisk broom. Some wis-acre has asked: "Who sprays the eggs of the wild bird and the stolen nest?" to which sapient conundrum the answer is obvious. The hen herself does it. Wild birds rarely make nests until the grass begins to grow and the morning dews begin to fall. Then when she leaves her nest it is generally in the early morning, when nocturnal enemies have retired, and while as yet the animals that prey during the day have not come forth. She steals along through the grass, fearful of being observed, picking up stray seeds, worms and bugs, and when she returns the eggs may not have been sprayed, but she has been, and that amounts to the same thing.

Concerning nest eggs great differences of opinion exist. We have heard successful poultry keepers ridicule them most unmercifully, and we have known others of equal experience who believed them to be of great advantage. Our own view is that hens will not lay quite as many eggs without nest eggs as with them. It is true, when the egg is fully formed, the hen must lay it or lose her life. So that if hens are confined in small pens, and are thus prevented from laying away, nest eggs would seem to be really of little or no use. But hens, as is well known, have a strong propensity to lay in each other's nests, and wherever there is an unoccupied nest with one or more eggs, there will the nest egg be laid. Therefore, where the hens have considerable range it is always well to place nest eggs in the nests. We have known a hen to lay regularly in a nest with a nest egg in it, and then to forsake this nest when the nest egg was removed. But we believe that nest eggs have a further use. It is well known that in the case of wild birds, egg laying may be stimulated to a great extent by the presence of one egg and the removal of all the others. The high-holder, which usually lays but four eggs, may be thus stimulated to lay fifteen; why may not

this principle hold good in the case of the common hen? We believe that it does, and our rule has been to have plenty of nests, each provided with a nest egg, and to remove all eggs, as fast as this can be done without disturbing the hens.

What shall we use for this purpose? Some poultry keepers use any old or stale eggs that may be on hand—a very filthy and foolish habit, as such eggs when broken defile the nests and disgust the hens. To disgust such owners by any amount of filth would of course be impossible. Some English writers recommend a small lump of chalk, and this is no doubt very good when chalk is easily procured, but, unfortunately, it was not available in my neighborhood. At first, therefore, we used the common white glass nest eggs, and during warm weather there can be no objection to such eggs except on the score of cost. Dealers ask from three to six cents for them, and this is altogether too much to pay for nest eggs, though perhaps glass ones cannot be sold for less. In cold weather, however, the hens seem to dislike them. They easily become very cold, and being comparatively poor conductors of heat they are very chilly to the touch. Our little German maiden thought, therefore, that she would get up a better nest egg, and so she emptied a few shells of their contents and filled them with dry corn meal. This would have answered admirably if the rats and mice had not soon found them out and destroyed them. Perhaps if she had used sawdust the rats would have let them alone. But any kind of powder is bad, although the device was a very ingenious one. We were therefore driven to adopt another plan. We made a very small pinhole in one end of an egg, and in the other end we cut a hole three-eighths of an inch in diameter. The contents were blown out of the egg through the large hole, and the shell was then filled with plaster-of-Paris properly mixed with water. As soon as the plaster hardened we had a most excellent nest egg at a cost of less than half a cent, for it must be borne in mind that the egg itself could be used for cooking purposes.

The plaster used for this purpose may be obtained at any paint store. The proper way to mix it is as follows: Pour into a bowl as much water as you think you will need to fill the egg-shells you

have prepared, and shake into it the powdered plaster until the whole is like good cream. It should be just thin enough to pour very easily. Before mixing the plaster, everything should be in readiness, as the mixture sets, or becomes quite stiff in a few minutes, and consequently it should be used as soon as mixed. Prepare the egg-shells by blowing them as we have described, and then paste a small piece of paper over the small hole. This should be done long enough beforehand, to allow the whole to dry. Place the eggs in a pan of sawdust, earth, sand or ashes, so that they will stand firmly with the large hole up. Then mix the plaster, and with a funnel, made of tin, or even of card, or stiff paper, fill all the eggs as quickly as possible. If the plaster is too thin, it may shrink in the eggs, and leave a vacancy at the top. Watch for this and keep filling up.


Afterwards, however, we adopted wooden nest eggs as being still better. Such nest eggs can be turned out of any soft wood for a few cents per hundred, and when dipped in whitewash and dried, they form the best nest eggs to be had. If first soaked in a strong solution of carbolic acid and then whitewashed and dried, they will effectually drive away all vermin from the nest.

Wooden nest eggs can be made by any wood turner out of the cheapest and lightest wood. Willow, chestnut, poplar, etc., are all good. An expert wood-turner can make three or four a minute, and any boy can turn up very good ones in the cheap little lathes that come with scroll saws. A few dozen nest eggs would be a nice Christmas present for any friend that has hens. The wooden eggs should be dipped in common lime whitewash, and allowed to dry. As often as they get dirty, souse them in a pail of whitewash, tumble them about with a stick and spread them on the ground to dry, first laying down some old newspapers to keep them clean.

There is a small variety of gourd, the fruit of which is almost exactly the size and shape of an egg. Such little gourds make capital nest eggs, and they are now cultivated by some poultry keepers for that very purpose. They, too, may be cleaned by whitewash.

We made it a rule to keep nice clean nest eggs in every nest, and the wooden eggs had this advantage, that they were so light, that, even in the dark, they could be readily distinguished from the real eggs. On one occasion, when we were using glass eggs, we were surprised at the enormous number of eggs reported as being laid by our half dozen hens—something like two to each hen—and our hired girl was in ecstasies. *She had collected the whole contents of the nests—nest eggs and all!*

### Marketing.

S the mild days of spring approached, eggs began come in quite rapidly—thirty and forty dozen per day—and it was necessary to find some method of getting rid of them profitably. I tried to sell all I could to private parties, and the rest I was obliged to get rid of at the stores, though the price was at this season very low—even down to 18 cents per dozen. As I expected next year to have twice the number of hens in my yard, and to get more than twice the number of eggs, it was necessary to get up a system of marketing which would relieve me somewhat from the danger of glutting the stores, and I saw that this could only be done by offering extra inducements in the way of freshness, neatness and convenience to the consumer.

I had always had a great horror of “middlemen” and “jobbers.” As a general rule they are mere parasites on the body social, standing between the retailer and the producer, and fleecing both. I concluded, therefore, that I would have nothing to do with them. I found, however, that the “egg business” was in a most singular state. The retailer paid almost as much for his eggs as he got for them, and those large establishments (restaurants, hotels, etc.) offered prices a good deal less than the groceries paid. At first I was puzzled over this condition of things, but I soon saw through it. The hotels and restaurants in our large cities never buy fresh-laid eggs. When I could get forty cents per dozen for eggs in the groceries, they offered twenty and twenty-five! What eggs could they buy at that price? Chiefly imported eggs, brought from Belgium, Denmark and Germany, where money is so scarce amongst the wretched inhabitants that their crops are sold for whatever they can get. No wonder that such eggs differ widely in flavor from what are called country eggs. I have always been suspicious of eggs in restaurants, but since my investigations,



when I was trying to find a market for my own eggs, I have never touched an egg in a restaurant.

On the other hand, the grocers gave the country people full value for eggs, because they expected to pay for them in trade, although, perhaps, such a condition was not always expressed. A country woman comes to the grocery with a few dozen eggs; she sells them for *money*, it is true, but she turns right round and buys her tea, coffee and sugar at the same place, and the bill for these probably exceeds the amount she receives for eggs. One who did not buy as largely as she did in proportion to her sales could hardly be expected to meet with the same favor.

The marketing of the eggs was therefore a problem that gave me a good deal of anxiety. I finally resolved to work up a local trade, if possible, and secure regular customers, who would be supplied with my best eggs, guaranteed to be not over two days old. The following is the plan which I ultimately adopted, and am now carrying out. The first season our methods were of necessity rather slipshod and imperfect, and it is unnecessary to detail them.

I had a few boxes made, twenty to begin with, each holding three dozen eggs. As our eggs were quite large, the boxes were 8 inches long, 6 inches wide, and 8 inches deep. They had a nice lid, and a wire handle or bale, which folded down over the box and out of the way when packed in the spring wagon. On the top of the lid was a label, a copy of which will be found on the following page, and in each crate we generally placed a few spare labels, loose, as circulars.

The price was given by writing it in the blank. When the price was changed a slip of paper was pasted over the old price, and the new price written thereon. This was some trouble, it is true, but I believe it paid in the end.

The following is a copy of the label:

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## FRESH EGGS

FROM

# FERNIEBIELD POULTRY YARDS.

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*Each egg is stamped with the date on which it was gathered, and is guaranteed to be not over two days old when delivered.*

*As these eggs have not been fertilized they will not hatch, and will therefore keep longer than ordinary eggs.*

*The utmost care has been taken to obtain the very best breeds of fowls, and to so feed them that the eggs will be of large size and of the finest flavor.*

*A tainted egg in our crates is simply an impossibility.*

### ORDERS SOLICITED.

*Eggs suitable for hatching supplied on application. Postal cards addressed to*

**J. P. HAIG**

**Ferniebiel**

*promptly attended to.*

*Prices according to the market rates. This week the price per dozen is .....*

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I also had a neat little rubber stamp made, with the following inscription:

EGGS FROM FERNIEBIELD.

*Jan. 5, 18...*

The date was changeable, and with this stamp a boy could mark the eggs at the rate of about five per minute, or three and a half hours to 1,000 eggs.

At first the new system was the subject of a good deal of laughter and quiet ridicule. This very ridicule and laughter helped me, however. I went to a number of the best families in town, and left a crate containing one dozen eggs, with the following note which I had manifolded on a gelatin pad :

“I take the liberty of leaving with you a few eggs, the quality, etc.; of which you will find fully described on the enclosed circular. If, after trying these eggs, you are pleased with this method of absolutely insuring your table against the presence of a stale or tainted egg, I shall be pleased to receive your orders for any quantity, however large or however small. Please preserve the crate, which will be called for. Our system is to leave the crate with our customers, exchanging full for empty ones when we get orders. Trusting that you will pardon this intrusion, I remain, etc.”

Now, when we lived in the village we were supplied with eggs by our milkman, a very honest, careful fellow. Yet with all his care it had sometimes happened that a stale egg would slip into the lot—obtained, I suppose, from some nest that had been overlooked. Under our system it was difficult for such nests to exist, and when we did find eggs in a stolen nest they were broken, cooked and fed to the chickens\*. In this way we could absolutely *insure* our customers against stale eggs, and every one knows how a single stale egg will spoil the breakfast of a dozen people.

The idea took, as I thought it would. When we called for our crates we found in every one an order, of which the following may be taken as a sample :

“Having tried your eggs we like your system very much. Please bring us 3 dozen on Monday. MRS. J. ROBINSON.”

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\* We knew that they could not hatch, and so it would have been a waste of gallinaceous time and effort to leave them with the hen. But hens that steal their nests generally bring out strong clutches. We therefore placed in the nest a sitting of good eggs, and we were always rewarded with a lot of fine strong chicks.

At first these orders seemed a small business, and we were compelled to sell our surplus eggs at the stores, but we had faith that our customers would increase rapidly, and we were not disappointed. The novel mode of putting them up, the large size and excellent flavor of the eggs, and the fact that every egg was guaranteed, all combined to increase our business, especially as the prices were not higher than those asked by the best grocers. Eggs could be had much more cheaply than from me, but not *fresh* eggs from respectable houses. The loose circulars were distributed freely as a novelty; postal cards began to come in, and visitors soon began to make their appearance at our yards to examine the poultry of which they had heard so much. My twenty crates were nowhere, and I at once gave an order for 250. Before I received them I had orders for over three hundred dozen eggs, for which I had no crates. I therefore bought a lot of cheap but pretty little baskets, and here again the gelatin pad came to my rescue. I wrote a short explanation and apology for not sending a crate, and tied it to the handle of each basket.

I made it a rule never to expose *guaranteed* eggs in the stores. I sold eggs to the storekeepers, but unstamped or with the stamp washed off. For this reason I used a greyish kind of ink for stamping the eggs, and it was so prepared that a sponge and a little warm water obliterated the stamp completely. I never could quite remove the *stain*, and these stained eggs soon became known to buyers and were preferred—partly because they were larger and partly because they came from the now famous Ferniefield yards. And although an “egg is an egg,” and large eggs and small ones sell for the same price, yet I found that most housekeepers had a decided preference for large eggs, and that small ones would remain unsold long after the large ones had been bought up.

I sold eggs for hatching purposes too, and as it was known that I had very superior fowls, I had a good many orders. But this subject placed me in rather a difficult position. Everybody thought that the eggs from my laying hens would produce pullets as good as the mothers, and when I advised them not to buy these eggs, they thought that my reason for so advising was that I did

not want to sell—that I wanted to keep the breed to myself. When, therefore, they found that eggs which were fresh and certainly from my yards, could be had in the stores, they felt jubilant over the supposed fact that they had outwitted me. Remember that these people had not seen my labels and circulars. I have since learned that quite a business was done in my eggs for hatching purposes. Indeed, I had several orders from grocers which I filled without hesitation, and it always puzzled me to know why men should take a roundabout way of getting these eggs, when they could have come to me and got them without any trouble.

But alas! the eggs never hatched! And then it became current report that I applied a certain chemical to the eggs to prevent their hatching, and there was the proof in the curious stain found on each egg!! It is often in business as in lovers' walks; people prefer a crooked and roundabout road to a straight one.

Some of my neighbors, however, took a different course. They came to me frankly, and said that they would like to get rid of their present stock of fowls, and get some from me if I would sell them eggs or fowls. I at once explained to them that my laying fowls—my best hens for practical purposes, and those that gave the eggs which I furnished to my customers—were cross-bred birds, and that they could not keep up the breed, as a breed, but that I was perfectly willing to let them have eggs every year to keep their yards up. I also explained that these eggs actually cost me double what my marketable eggs cost; that I had to raise or buy specially fine cockerels every year, and keep the breeding pens carefully attended to. That my price for such eggs, eggs giving a first or second cross, was just double the market price, whatever that might be.

Some of them saw the reasonableness of the system, and bought eggs from me quite freely. Some tried to breed again from the birds thus raised, but it is needless to say that their flocks did not show the same uniformity and excellence that they did the first year, and every succeeding year they became worse.

My sales of pure-bred fowls were very limited. To carry on a successful business in this branch, requires careful management,

special plant and considerable advertising. I did not know enough about it to warrant me in going into it extensively, and besides that, I did not want to let anything interfere with my main experiment; but as I always had more pure-bred fowls and eggs than I wanted for my own use, I had no objection to selling the eggs at fair prices. I charged \$2.00 per setting for my choicest eggs, and as I always purchased a few choice breeding birds and raised a few first class cockerels every year, this price was not high. I always had in my yards cockerels that had cost \$10; young birds from these certainly ought to have been worth \$2.50, which was my standard rate. And I readily got it, for Madame Rumour exaggerates everything, and it was soon bruited abroad that I was such a fool as to give \$50 or even \$100 for a cock, and that whatever money I had would soon be all gone at that rate. When the yards became a success, the word "fool" was left out, and I was called "an enterprising fellow" and a thorough judge of poultry, who was determined to have the best, even if it cost a hundred dollars. In all which the followers of her aforesaid Ladyship were greatly mistaken, but, nevertheless, it helped to sell my eggs and birds, so that I have no special reason to complain, and have no intention of suing anybody for slander or libel.

As soon as the crate system became fully known, I had orders for all the eggs I could produce, and none were left for sale in the groceries. By-and-bye, however, my production began to fall off, and this was the critical period in the business. It is true that, as production fell off the price was raised, and so the number used was slightly less. A crate which in the height of the season lasted but three days, now lasted four or five, but, even then, the demand did not fall off as rapidly as did the supply, for my customers were of a class that cared but little for a few cents more or less per dozen for eggs. If they chose eggs they had eggs, whatever might be the market price. Now, in failing to supply these customers, I ran great risk of losing them, for most of them had a high sense of their own importance, and indeed, I suppose some of them thought that if their support were withdrawn Ferniefield would be sold at auction. I therefore prepared a circular explain-

ing why I could not, at this time, always supply as many eggs as were wanted, but promising to divide, *pro rata*, with all my customers. I assured them that in quality and freshness there would be no falling off, and ended by suggesting that, while there could be no substitute for Ferniefield eggs for table purposes, others might perhaps be used to good advantage for baking, etc. This plain statement held all my customers, but I made a firm resolution that if I lived I would have eggs as plentiful in December as in April, and my progress towards that very desirable consummation has not been inconsiderable.

To save my customers as much trouble as possible, I procured a quantity of postal cards with my address printed thereon, and on the side appropriated to messages was an order in blank, as follows:

Deliver ..... dozen eggs on ..... to  
 (Name) .....  
 (Street and No.).....

These cards were left with all our customers, so that if at any time they wanted eggs they could have them, and, as I had a box in the post office and always called there, eggs could be had every morning by simply leaving a card at the post office early enough. I never sent the wagon to town without a few extra crates to supply this casual demand.

The marketing of the surplus chickens gave but little trouble. For the prime table chickens, which we sold during the fall and winter, we found customers enough amongst those who bought our eggs. From some, we had regular orders to deliver one or two pairs of dressed chickens every week, on certain days, and it did not take many such orders to clean out our entire stock.

The old hens, we found it most profitable to sell in open market. They brought a certain rate per pound, and were pretty sure sale. We could not sell them to our regular customers as dressed chickens, and neither would we sell them to those who came to us wanting laying hens for a poultry yard, and stating

exactly what they wanted. But, when sold in market, without any representations as to character or quality, we had no hesitation about taking the highest price we could get.

The stock that required the greatest care in selling, was our very early chickens. They were worth most—weight for weight—sometimes bringing as high as seventy cents per pound. We found that there was considerable difference in the quality of these very early chickens, according to the kind of food given to them and the manner in which they were kept. We did not force ours as rapidly as some breeders did; we fed more cracked wheat and corn—particularly wheat—and less meal. The birds, therefore, showed firmer flesh, and did not waste as much in the process of cooking, and the flavor was higher. Our birds soon became known to the keepers of a few of the first class restaurants in the city, and we could always dispose of all we had at good prices. They were altogether the most profitable stock we raised, and after we got fairly under way and had our houses, coops and yards fixed up for them, they were not difficult to raise.

We sold a few of them in the village, but not many. Very few of the villagers—even those who were comparatively well to do—cared to give 75 cents for a little chicken weighing a pound and a half.

But, in the city, this price was not thought extravagant. Chickens heavier than a pound and a half did not sell well, perhaps, because people suspected that they were simply old chickens of a small breed. We, therefore, tried to bring them to this weight as rapidly as possible, and as soon as we saw that they were large enough, we sold them out. We soon learned to estimate their weight, by the eye, quite accurately.

We found a great difference in the rapidity with which different breeds reached this size, and still greater differences in the appearances of the different breeds at this age. The great egg layers—Leghorns, Hamburgs, etc.—had to be kept too long; Brahmans, Cochins, etc., looked sprawly and skeleton-like; a cross between the two matured rapidly and looked “splendid,” as the little girls say.

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## Vermin.



ALL during the summer and fall we never saw any parasites on our chickens, though perhaps this was because we did not look for them. One day, however, we were horrified to see a number of lice crawling over the eggs of a hen that had left her nest for feed. The hen had been set about the end of January, so that the weather was quite cold and the fowl did not seem to use the dust bath as freely as during warmer weather. When we caught the hen and examined her she presented a sorry sight; lice all over. What was to be done?

First of all, we put the hen in a barrel with a little fine straw, for the present, and placed her in another building. The eggs were then removed from the nest one by one, wiped, and put in a clean basket. Fortunately we had another hen just ready to sit. She was carefully examined, no lice were found, and so we placed the eggs under her. The old nest, box and all, was then taken away, carried to an open place, dusted with sulphur and set on fire. When that fire died out there were no lice in that nest, and the slightly charred box was as good as new.

Our attention was next given to the hen. She was carefully dusted with insect powder and returned to the barrel, a fresh setting of eggs being placed under her. Next day she was again dusted, fed and placed in a clean barrel with clean straw. She was too weak to make much resistance to these changes, and settled down on the eggs very peaceably. The barrel in which she was first placed was carried out doors, the straw dusted with sulphur and set on fire. We had the most orthodox faith in purification by fire and brimstone.\*

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\* A recent writer expresses a doubt in regard to the efficacy of sulphur, but as he tells us to "put two or three pounds of brimstone or sulphur in an iron pot, in such a way as not to endanger the building; apply a match; shut it [the

After the third dusting the hen seemed to be quite free from parasites, but still weak. We knew, however, that the powder would not injure the *eggs* of the vermin, and so in a few days we might expect a fresh brood. We therefore kept dusting and feeding plenty of nourishing and easily digested food—oat-meal mush, meat scraps, milk, etc. The hen thrived, and we soon had the upper hand of the vermin. As, however, it would have been asking too much of her to sit double time, we gave her half a dozen chickens, and placed her eggs under a fresh hen. We now greased her with a mixture of lard and sulphur. This did not injure the little chickens, but might have injured the eggs. She was not troubled with parasites after that.

This incident taught us a lesson. After that we always examined our fowls with a special eye to lice. It is true that we rarely find them, but it is also true that hens are at all times liable to suffer from them if they get weak and unhealthy. They then neglect to take their dust bath regularly and thoroughly, and although I am no believer in spontaneous generation, yet I am pretty sure that lice will make their appearance if the hens fall off in health and strength.

The hen that gave us so much trouble was a pure Light Brahma that had been recently bought, and in every case in which lice have made their appearance in my yards it has been in the case of fowls brought from other places. And I have found them on birds that I have obtained from dealers of high standing. With these men,

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house?] closely, and let it burn slowly," we conclude that he has never tried it. Sulphur in large quantities cannot be set on fire by applying a match, as those who have used it for fumigating or bleaching purposes know very well. The old bee-keepers used to dip heavy paper or stout shavings in melted sulphur, and burn these, and this is a very good plan. Or the sulphur may be thrown on a small heap of shavings or straw, and when the latter is fired the sulphur will burn too. The plan adopted by bleachers is, however, the best and safest. Take a heavy iron vessel, the shallower the better, and put the sulphur in it. Heat this over a fire (out of doors, of course) until the sulphur melts and easily takes fire on the approach of a light. Then place the vessel in the house and let it burn. Sulphurous acid or the gas from burning sulphur is the most deadly agent known. Persian insect powder, carbolic acid, and other destroyers of the lower forms of life, are nowhere at all compared with it. It is the only thing that is relied upon by the National Board of Health as a perfect destroyer of the germs of yellow fever, and if properly applied, no living thing—whether it be bird or beast, insect or disease germ—can possibly escape. But we must use enough of it, and the sulphur must be burned, not merely vaporized.

however, space is a matter of great moment, and they are apt to keep their birds confined in close quarters. And if lice once get a foothold under such conditions they are apt to spread. Whether or not it would be possible to absolutely stamp out lice from any yard I do not know. I have come very near it several times, so near that the most careful search failed to show a single parasite on any of the birds; but when cold weather came, and any of the birds failed to take their regular bath, lice would again appear.

The best remedy that I have found is insect powder, and where this is not handy, lard and sulphur may be used on laying hens, whose eggs are not to be hatched, as in this case there can be no objection to it. It is a general belief, however, that grease will prevent eggs from hatching. I have not tried it myself, and as there seems to be some doubt on the subject, I have not cared to risk it on valuable eggs. Major Cock, in his little book, published about 1843, tells us that he has "known eggs laid in Hamburg to be hatched in New Jersey, by covering them with lard and taking care not to handle them roughly." This is contrary to the general opinion. But for sitting hens the Persian insect powder answers admirably.

Mixing sulphur with the soft food given to fowls is also not only an excellent preventive of lice, but a capital tonic.

But the great means of preventing vermin is good health and plenty of dry earth for a dust bath. So long as fowls can roll in dry ashes or earth, lice cannot multiply.

There is but one kind of parasite on fowls, and this is peculiar to gallinaceous birds. It cannot thrive on other animals—not even on ducks or geese, far less on horses, cows or pigs. I have often heard it said that if poultry are kept in a stable the horses will get lousy. This is very likely to be the case, because any man who will keep his poultry in his stable is probably so slipshod that his horses will run down in health and so become lousy. But the lice from the hens will never remain on horses or cows.

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## Enemies.



WE lost but few chickens by disease, but the battle against winged and four-footed enemies was constant. Large hawks took off some of our best hens—hens that we thought were perfectly safe, on account of their size and strength. Cats would come miles to steal our little chickens, and weasels and skunks killed a few. But the greatest enemy was the common rat, and he was, also, the most difficult to circumvent, if we except certain bipeds who were evidently possessed of all the cunning and none of the honesty, that ought to distinguish humanity.

The hawks were not very troublesome, that is to say, they did not kill many. We shot them without mercy, whenever we had a chance, but I must confess they did not always give us a good chance. As for traps on poles and all such contrivances, we found them perfectly useless, so far as these marauders were concerned, though we sometimes caught birds that we would rather have seen escape. I, therefore, had them all taken down and depended upon constant vigilance and a good breech-loader. I chose a breech-loader, because it could stand with the cartridges ready prepared and tied in a bag to the trigger guard, and thus be almost as ready as a loaded muzzle-loader, and the latter, when standing in a barn, is altogether too dangerous. I kept a muzzle-loader at first, but, on one occasion, a carpenter, who was at work on the place, picked it up, discharged it through pure meddlesomeness and nearly killed a fellow workman. After that, I adopted the breech-loader. I generally used very heavy shot, so that we might be able to do execution at long ranges, and I studied carefully the rules for "loading so as to kill" laid down in a little work called "Shooting on the Wing," and found them admirable, so that the hawks and crows began to consider our

locality rather unhealthy. Occasionally, when a hawk was seen sailing over the place at a great height, we fired a shot at him from a rifle, taking good care that the bullet went in a direction where it would do no damage. We never succeeded in hitting a hawk in this way, but they did not seem to like the whiz of the bullet, and speedily took their departure for safer regions.

They did not seem to like to attack the poultry in the small breeding coops, probably taking the coops for some kind of trap. Amongst the large flocks we placed a few game cocks, and the hawks did not trouble us much after that.

Only on one occasion did the pole traps serve a good purpose. One morning in the fall we were awakened by a tremendous commotion in the yard—dogs barking, ducks quacking, hens cackling, and all the signs of some terrible calamity. On looking out of the window I saw that one of our pole-traps had caught a large owl by the feet, and his cries and motions had attracted an immense number of crows, hawks, etc. Hastily donning a few garments, I seized my breech-loader and a belt of cartridges, and rushed down stairs. Getting quietly into the barn, I opened a narrow side door and commenced firing. At every shot I brought down a hawk or a crow, and at first the firing did not seem to deter those that were left. Even after I had picked off a hawk from within a few feet of the owl, tumbling him head over heels to the ground, another would make a swoop, just as if nothing had happened. Of course, I took care not to shoot too close to the owl, and in a short time the ground was strewed with birds. Then they began to get wary. The crows were the first to abandon the field, and after them the hawks went too. As it was, however, I had a piece of rare sport, and revenged myself on enemies that, otherwise, I never could have reached.

I have heard it said, by old poultry keepers, that hawks will not attack poultry, if there are guinea hens around. I know nothing of the accuracy of this statement, but it certainly is "important if true."

Against most four-footed vermin, including cats, we found that a good Scotch terrier was the best defence. We had cats of our

own, and they were never injured, neither did they attack the little chickens, but strange cats generally came to a speedy end at the hands, or, rather, the teeth, of our dogs. And it was curious to notice how thoroughly acquainted the dogs and fowls became. If a strange dog came into the yards, there was a commotion at once, and all the hens were up in arms, but our own dogs might go about amongst the flocks, and quite close to a hen and her brood and never disturb them. Weasels and skunks were not very common. The latter is said to be a very useful insectivorous animal, but it is out of place in a poultry yard. It kills chickens, and should, therefore, be killed. When we had any indication that a skunk was around (and our noses were a pretty good indication of such an occurrence) a little vigilance and a charge of snipe shot generally prevented all damage.

But, for all four-footed creatures, the best preventive is a good trap. The trap must, of course, take them alive, or it will be liable to destroy some of the animals belonging to the place, and it must be large enough to catch a small dog, and sufficiently sensitive to be sprung by a weasel. I, therefore, had four large box traps made, and took great pains with the tables and triggers, making the latter myself out of fine tempered steel. These traps were distributed about the place, baited with a little meat. At first we caught our own dogs and cats, but they soon learned to give the traps a wide berth; the hens were not so easily taught, and would persist in being caught, when the traps were set during the day. We, therefore, set them only at night, and in them we caught; strange dogs, cats, rats, weasels, squirrels and snakes, but never a skunk.

But although we occasionally caught a rat in this way, these rodents were too cunning to be caught in any numbers in such a contrivance. And as poison was out of the question, we found it very difficult to guard against their depredations. Of course the dogs did a great deal to protect the chickens, but they could not be everywhere, and at night the rats would actually take the young chickens from under the mother's wings. We felt ready to adopt any remedy, however cruel. In fact, no one can look at the mean,

cruel, cunning and ferocious face of a rat and hesitate about destroying him by any possible means. The loss of an occasional chicken would always rouse up my ire, and after such occasions I would vow vengeance against the whole race. A few would be shot; one or two would be trapped; but the work was too slow and uncertain, and we would fall back upon the dogs and cats. Finally the rats increased to such an extent, and became so bold, that one night they carried off an entire brood of my most valuable chickens. I thought, then, that it was time to do something.

I then built a small house, 8 feet square and 6 feet high, with just enough roof to shed the rain. It was made of inch stuff, and had a door but no windows. There was a good floor, covered with old tin roofing that I got for almost nothing. The tin was carried about six inches up the sides.

This house was filled with straw, in which was placed some wheat, corn, etc., and a handful or two of meal was also scattered over the straw. On every side was a hole .3 inches in diameter, which entered just above the tin. Four men could easily move this house to any part of the grounds. The first night we placed it near the coops in which the young chickens were kept and awaited results. The rats soon found it out, and, as we could easily see by their tracks, made it their home. A remorseless war was then carried on against them in every other part of the premises. Tobacco smoke was blown into their holes; their breeding places were disturbed; their runs were filled with broken glass, and life made as uncomfortable for them as possible in every place except "Rat Castle." There they were left in peace and quietness. At the end of a week, however, we went over the ground again, and drove tobacco smoke into every hole we could find. This was done by means of a piece of rubber hose and one of the most powerful "smokers" used by bee-keepers. With one of these smokers and a few feet of rubber tubing we could, in a few minutes, fill all the space between the floor and the ground, and between the wall and the lathing of any building, and drive the smoke out at holes twenty feet away. The effect of this tobacco smoke was most surprising. We know of no animal that can stand it.

The rats and mice left the premises on the double quick, and many of them fell a prey to the dogs and cats that were on the watch, keenly enjoying the fun. But no tobacco smoke had ever been allowed to profane "Rat Castle," and thither they all ran. We could hear them fighting and squealing inside, and when we got through with the other buildings we just closed the four little doors of the house and they were all prisoners. Then we changed our tactics. Instead of tobacco we used sulphur, and by means of a simple furnace, made out of an old pot, with a wooden cover, and using our "smoker" as a bellows, we soon filled the little house with sulphurous acid—a most deadly gas. Being determined to make thorough work of it, we blew in gas at the bottom until it passed out in a steady stream at the top. We then closed every opening up tightly, and left the house till next morning. When we opened the house next day we found one hundred and fifty-seven rats in it—every one dead!! I thought, then, that this piece of work paid me for the expense and trouble of the house, etc. It was nearly a year before another rat was seen about the premises, and we have never been badly troubled with them since.

The reason for building the house was this: If I had killed the rats in their holes and runways in the barns and outhouses, which I might perhaps have done by means of sulphurous acid gas, they would have putrefied where we could not get at them, and this would have been insufferable. On the other hand, if we had driven them out with tobacco, and had not provided a retreat for them, we might have killed a few, but the greater part would have escaped only to return after a little while. The plan that I adopted obviated both these difficulties.

My reasons for covering the floor and a few inches of the sides with tin was this: A rat will never gnaw his way out into the light; but if the floor had been left unprotected they would have cut their way down, and would have burrowed in the ground and underneath the floor. When the final act in the tragedy came these rats might have escaped. As it was, we made a clean sweep, and destroyed or drove away every one. One hundred and fifty-seven rats make quite a pile. What could we do with them? Bury



them? That would be waste. We passed them through our meat chopper and cut them up, bones, meat, hair and all. Since rats are the great trichina-carriers, it would have been dangerous to feed this meat to dogs, cats or pigs, but to fowls it is perfectly harmless. But to make sure, we boiled it thoroughly in our large pot, exposing it in four lots to a boiling temperature for four hours. At the end of that time every trichina, if there were any present, must have been as dead as the rats themselves, so we just made the soup into mush with a little corn meal and fed it to the chickens. The rats had eaten our chickens, and now the chickens ate the rats—a just retribution.

As we have already stated, from that day to this we have never been troubled with rats, and the "rat-house," as we call it, serves very well occasionally for an extra coop; of late, however, we have been told that one or two rats have been seen about the place. If they get troublesome we will set "Rat Castle" in operation again.

When it is necessary to use poison instead of other means, great care should be exercised in the selection of the kind of poison, and in the methods of using it. Arsenic, whether in the ordinary form of "white arsenic," or in the various patent mixtures that are sold, such as "Rough on Rats," should never be used. The reason is very simple and obvious: Arsenic, no matter into what combination or form it may pass, is always poisonous. A rat or a mouse poisoned with arsenic will, if eaten by a cat, dog or chicken, still act as virulently as ever, and cause sickness or death. There is another poison, however—phosphorus—which loses its poisonous qualities when it becomes oxidized, and hence is far safer. Phosphorus is poisonous only in the pure state; when in combination it is generally harmless, and frequently very wholesome. There is as much phosphorus in a pound of bones as would poison a whole flock of chickens, but when fed in the form of bone or phosphate of lime, it is quite the reverse of hurtful. Indeed, when bones are properly dissolved they form one of the most pleasant and wholesome drinks for human beings, as is seen in Horsford's Acid Phosphates, so generally used.

Now, when phosphorus is eaten by an animal it soon becomes

oxidized and rendered harmless, but when arsenic is so eaten it never loses its virulent character.\* Phosphorus paste, properly prepared for poisoning vermin, is sold by most chemists, and the recipe for preparing it may be found in any good book of receipts.

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\* An account of the different poisons, and the proper antidotes for them, when accidentally swallowed by human beings, or by the lower animals, will be found in "What to Do in Case of Accident." The book is issued by the same house that publishes this volume.

### Early Chickens and High-Priced Eggs.



TO get in December those eggs that are usually laid in May, is one of the oldest problems in the "Chicken Business." If we could only get the hens to accommodate us in this respect, the making of a fortune would be an easy thing. But out of every 1,000 eggs that are produced during the year by an ordinary flock, it will be found that

45	are	produced	in	January.
56	"	"	"	February.
132	"	"	"	March.
176	"	"	"	April.
150	"	"	"	May.
96	"	"	"	June.
87	"	"	"	July.
54	"	"	"	August.
83	"	"	"	September.
84	"	"	"	October.
26	"	"	"	November.
11	"	"	"	December.

Consequently, while eggs bring 50 cents per dozen in December, they fall in price to 18 to 20 cents in May. What can be done to effect a change in this respect?

At first sight, it would seem that the advent of cold weather is the chief cause of the stoppage in the production of eggs, and to test this, Reaumur kept his hens in artificially warmed houses and tried in this way to get eggs in winter. But he failed. We might have expected this when we observe that one of the coldest months, March, is also one of the most prolific. Others have hoped by stimulating food to make the hens keep up egg-laying. We have

tried it, and met with a small measure of success, but food alone will not accomplish a great deal.

Others, again, depend upon the breed. It is well known that some breeds—Leghorns, Hamburgs, etc.—are known as summer layers, while the Asiatic fowls—Brahmas, Cochins, etc.—are winter layers. There is a good deal in this, but not enough to turn the tables.

Others try to get eggs in winter, by raising very early chickens, and this is the most efficient method of all, provided other conditions are favorable,

The fact is, that it is useless to depend upon any one or two of these conditions; we must bring them all into play if we would have eggs in winter. We must have hens of a suitable breed; they must be properly housed and fed, and they must be of the proper age. A failure in any one of these conditions will be fatal to success. These three things are like food, clothing and air to a human being. No amount of clothing will make up for want of food, and no amount of food will enable us to do without air. We must have all three together if we would keep in good health.

As regards the best breed, I had long ago made up my mind that a cross between the Hamburg or Leghorn and some heavy Asiatic fowl was altogether the most promising in this respect, and in making up my breeding coops, I had this in view, though not quite as clearly as I would have done, if at that time I had had more experience. When I came to fairly face the problem of producing eggs in December, I mated White Leghorn and Spangled Hamburg cocks with good hens having a large proportion of Asiatic blood. Some of the latter were pure Brahma, others were apparently Cochin crossed with Dominiques, and I found that I got better results from these crosses than from any other breed.

Raising chickens in January is troublesome work, and unless the poultry breeder has good facilities and considerable experience, the outgo will exceed the income. Of this I was well assured, but I resolved to try the experiment.

There were plenty of hens wanting to sit. After their summer crials and autumn laying they had stopped producing eggs, and wanted to take the next step in hen-life. So we cleaned out the rooms that we had formerly used for hatching, and packed into it as many nest-boxes as it would hold. We succeeded in placing 12 boxes, containing 48 hens, but as the weather was cold, we gave each hen only 10 eggs, making 480 in all. This was not quite enough, so I placed 10 more boxes in different parts of the stable, and filled them all with hens. With these 40 hens we expected to have some trouble, but we thought, that, as they did not have much temptation to run about at this time of the year, we might be able to control them.

It was during the progress of this experiment that I found out the mistake I had made in not taking better care of my breeding hens, so I was obliged to take such eggs as I could get. By making temporary arrangements with greenhouse sash, and by selecting some of the best laying hens from the general flock, and putting them with suitable cocks, I managed to secure eggs enough to gradually fill all the nests; but of course the hens were not all set at the same time, and some of them had been brooding for some time before they were set. The latter circumstance was unfortunate, as hens that have brooded for some time before eggs are placed under them are apt to leave their broods too soon. Our success in managing the sitting hens was, however, very fair. They were attended to every morning; fed and watered, and then shut up until next morning. We had three lots which had to be let out at different times; the chickens of the first lot was due the first week in February; those of the second lot during the second week, and those of the third lot during the third week. It made no difference whether the hens of the same lots returned to the same nests or not, but it was important not to mix the lots. We had very little trouble, however. It took about two hours to two hours and a half every morning to attend to the sitting hens, but all this time was not occupied. After the hens had been driven into the outer room, the doors of the latter were locked, and the attendant had a good half hour to devote to other work while the hens took their

food and drink, and dusted themselves in the dry earth and ashes provided for them.

Our first little chicks found themselves in a "cold, cold world" when they burst their shells. But the old hens kept them warm, and during the first thirty-six hours they were kept shut up under their mothers, the only attention that the hens got being the removal of the empty shells. At this time of the year one of the greatest mistakes that can be made is to get the chicks out of the nest too soon. They need warmth and rest, rather than food and exercise, for when they leave the shell they have just had a full feed of the richest food, and, as any one can see, nature did not intend that they should run about immediately after leaving the shell. Partridges and some other birds do this, but chickens never. We have lost many chickens by meddling with them too soon; never a one by letting it alone. On the second day, however, we took the hens off the nest, placed the chicks on the floor, and offered them cracked wheat and warm milk. The latter they drank quite greedily, and the wheat they soon learned to pick up. After they had been fed they were returned to the old nest for the present.

The weather at this time was very cold—occasionally down to zero—and it was hard work to keep the little things warm. We had 88 hens sitting; these would probably produce 600 chickens, and I intended to give each hen 10 chickens, so that 60 brooding coops would be needed. I found that the coops we had used during the fall would take up too much room, and, as they would require a house to cover them, I might as well divide the house itself up into coops. Having all this in view, I had put up a rough board shed, 40 feet long and 10 feet wide. It was just high enough to allow one to pass easily up the middle. The roof was of matched boards, except where six greenhouse sash were inserted to admit light. The floor was divided off as follows: A walk 16 inches wide was left through the middle, and the spaces on each side were divided into 30 compartments each, making 60 in all. The divisions were simply boards 14 inches high, and the compartments were covered with wire netting of 1-inch mesh. Four stout stakes were driven into the floor at the end of each di-

viding board and next the middle passage. These stakes held the dividing boards in place, and the end boards stood between them and could be easily lifted out; in fact, they formed doors to the compartments. To keep the house warm I banked it up with leaves, which were kept in place by brush, and I put in an old cook stove with a lot of old pipe which ran the entire length of the building. This kept out frost, even in very cold weather. At night the sashes were covered with old matting.

As soon, therefore, as we had a few clutches out we arranged this brooding house, started the fire, and got it well warmed up. In this we were aided by a few days of bright sunshine, so that when, one afternoon, we put ten hens with their chicks, amounting to 100 in all, in ten of the compartments, they seemed to be enjoying a summer atmosphere. The broods now began to come out very rapidly, and we soon had one side of the house full.

The care of these chickens involved a good deal of labor. It is true that it was not labor of a very hard kind, nor did it require a great deal of intelligence to follow the rules which I laid down. We had very few sick chickens; indeed, we lost more by accidents than by sickness. To give an historical account of our method of management would occupy too much space, but the following will be enough to guide the intelligent reader.

The great points in rearing early chickens are suitable food and warmth. The latter condition involves *dryness* as a special feature; animals that are kept dry can resist a good deal of cold, but if once the feathers get wet and matted the bird becomes cold and chilled, and it does not take much to chill the life out of a young chicken. To keep the chickens dry we found to be one of our most difficult tasks. If a saucer of milk or water was placed in the coop for them to drink they were sure to get into it, and the hen would upset it and make the whole compartment wet and uncomfortable. The poultry stores keep on hand fountains like large bird fountains, by which this difficulty may be in a measure avoided, but these fountains are too expensive, are difficult to clean, and where milk is used they require too much to fill them. So for milk I used saucers, which I protected with a netting of wire; for water I used

large soup plates, in which I placed an inverted bowl filled with water. The bowl was first filled with water, the plate placed on the top, and the whole quickly turned over. The water was now retained in the bowl by atmospheric pressure, and gradually descended as the chickens consumed it. To get sufficient depth of water in the plates I chipped a piece out of the edge of each bowl.

When milk was used, and we had not a wire protector for the saucer, we simply inverted a small bowl and placed it mouth down in the latter.

The food that we used during cold weather, was plain, but nutritious. For the first day or two, cracked wheat given dry (see page 14 ), and milk to drink. Then, in the mornings, they had a mixture of bran, corn meal and ground oil-cake. The oil meal was thoroughly scalded with boiling water, and allowed to stand some time, when it formed a thickish soup. This was then worked into a stiff dough with a mixture of equal parts of bran and corn meal, and fed to the chickens in small lumps. This mixture we found to be exceedingly nutritious. As the chickens had no access to gravel, I had a small quantity washed and sifted, and we kept a little wooden tray full of this material constantly before them. They seemed to enjoy picking it.

Every day we gave them a very little meat and some finely chopped cabbage. For both they were very greedy. Cracked wheat we kept before them all the time. We preferred it to corn, though it cost a little more. On this feed they kept in good health and grew rapidly.

One of the greatest difficulties in the care of chickens is the watching of individuals. It is impossible to give attention to each single bird; they are attended to in small flocks, and an individual of this flock may get quite sick before even a very faithful attendant notices it. Still, by watchfulness, a good deal was accomplished, in this direction, and we kept two or three old and very motherly hens for the express purpose of taking care of weak and sickly chickens. About half of those that we transferred to these hens came through all right. When a chicken is very sick, the most profitable and merciful course is to kill it at once.



The plans that I have described gave us better results than I had ever had before with chickens in winter. It is true, that, previously, I had only raised a few clutches, mere for experiment than anything else, as it does not pay to fuss with one brood of chickens in winter. It is just as easy and far more profitable to attend to a hundred.

Out of 880 eggs, we hatched 637 chickens and of these we brought 543 to maturity. In April and May they were worth 75 cents to \$1.00 per pair, making, at least, \$250. The food had cost very little, but as it had been taken from the general stock, I am unable to give the exact figures.

We sold the cockerels and the culls of the pullets, and this paid for all labor and expenses, and left a handsome profit. We had 150 very fine pullets left, and they supplied us with many eggs during the following winter.

The success of this experiment led me to repeat it the same season. As soon as the hens were all off the nests, we had the hatching room thoroughly cleaned, fresh dry earth put down, new nests, etc. Then, calculating the time when our brooding house would be vacant, which we placed about April 1st, we filled the boxes again with sitting hens. If we had had sufficient brooding room, we could easily have brought out three or four sets of broods from our hatching house, but as it was, we could only manage two during the very cold weather. But this was enough to show the profitable character of the system, and next season I tore down the temporary structure that had served us during the first winter, and put up a cheap but substantial house.

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### Retrospective.—Profit and Loss.

**I**T has been said by high authority, that in Agriculture, he who buys 5 per cent. too high and sells 5 per cent. too low, loses his entire profit. If this be true, it shows that the profits in most agricultural pursuits are not as large as some would have us believe, and indeed, it is the opinion of those who are best informed on the subject, that the wealth of our farmers does not come from profits arising after the manner of those from mercantile transactions or contractors' undertakings, but is simply the wages of labor, close economy having been exercised in disposing of it. And so I found that a good share of the outcome of my poultry yard was due to me as wages for the labor I had performed. When, therefore, about the first of the year, I began to calculate where I stood, I was a little surprised at the extent of my investment, and at the very considerable part which was due to the labor of my own hands, for I had far exceeded the proportion of my own time which I had first allotted to the enterprise, and instead of *half* time, as I had at first calculated, I found that I had given to it pretty long hours.

While my beginning had actually been made in June, the first season had really closed with December, so far as that year's stock was concerned, so that when early in January I turned my attention to the hatching of new broods, I felt that I was entering upon another season's work, and was really commencing a new year in the poultry yard as well as in the calendar. But since it was the *yearly* results that interested me most, and as my experiment commenced in June, I have regarded the years as beginning in that month.

The first season I regarded more as a sort of apprenticeship, than as a fair sample of what the business would be, but on examining the accounts, and allowing a fair value for stock and per-

manent plant, I felt that I had not lost anything. It is in the valuation of the stock and plant, however, that the fallacy of most statements in regard to financial undertakings lies concealed. If we only have the opportunity to adjust this feature, it is easy to show a good balance sheet, and this may perhaps be one reason for the prevalent tendency to "water" stocks. If the stock of any enterprise has doubled in amount, it would seem to the unsophisticated, that the property has actually doubled in value while in fact it may have depreciated. A very slight addition to the valuation of each of 3,000 chickens would change the balance from the loss side to that of profit, and this is easily done *on paper*.

In the preceding pages, I have given my plans, methods and many of the ultimate results. To give a minute detail of all the haps and mishaps would swell this work into a large volume, and I will, therefore, merely offer a summary of my progress each season, and give the balance sheet of the third year, at which time I had my yards and system fully under way.

On the last day of December of my first year, I found that I had more than half the number of hens that I had set out to keep, and in addition, I had a great many birds that might be converted into cash as soon as the spring came. It was not, therefore, a difficult matter to make the number up to 1,000 first class hens during the next six months. My earliest hatches of the following season gave me 150 good pullets; from my second hatch, at the end of March, I had 213, so that I needed only about 150 more to complete my quota. These were raised in May without any special effort, so that when the 10th of June came again, I had 1,000 good birds, though, of course, one half of them were quite young. Besides these, I had a large number of cockerels and culls, which could be disposed of in the fall.

The supply of eggs usually begins to fall off towards the end of May and the first of June, but my fall-reared pullets were now in the full tide of egg-laying, and as I was now just commencing my new system of crate-delivery, this came very opportunely.

Although the supply of fresh-laid eggs undoubtedly diminishes

after May, the price does not rise very rapidly. This is probably owing to the fact that the demand falls off somewhat during the early summer months, but after a time the price adapts itself to the supply, and it was to meet this state of things that I depended upon my fall broods.

During the spring, I sold off all the old fowls and all the culls, reducing my stock very considerably, and making room for the young pullets. These I endeavored to colonize in lots having special characteristics—each lot being placed in its own house, so that a record might be kept of the results derived from it. Thus in one house and yard we kept pullets which were a cross of White Leghorn and Light Brahma, and of a certain age, and no other birds of a different kind and age were admitted to this yard. This made the numbers in the different houses vary, it is true, but it enabled us to get the real average results from the different breeds and crosses, and this was what I wanted.

Early in the second season, I erected enough houses to make up seventeen, besides the old house and the breeding coops. The latter were all brought together and a glass shed erected in front of them. This shed was divided into as many compartments as there were coops, and the yards radiated in a fan-shaped form, from the coops as a centre. In this way the coops and sheds sheltered each other, so that the hens were kept comfortable, and many of them kept on laying well on into the winter. But with all my efforts, I found it impossible to get enough eggs of the second cross to supply my needs for my very early hatches, and so I was obliged to use those of the third cross. But by using a thoroughbred male of a different strain, I succeeded very well. The amount of eggs to be had from these breeding coops, however, is merely a question of management, and after the second season I was not troubled on this score. And since I obtained a good strain of the Plymouth Rocks, I have had no trouble at all. The Plymouth Rocks are comparatively a new race, and have not a great deal of potency. The hens, mated with vigorous White Leghorn cocks, give remarkably fine results, and we are always able to get as many early chickens of this cross as we need.

Some of the early hatched pullets began to lay in September, and they were all laying by October, so my supply of eggs kept up very well into the winter. I placed 125 of these pullets in the old house, which was kept warm by the fire used to heat the large kettle. For the purpose of testing the possibility of keeping these pullets laying during the winter, we gave them the utmost care and attention, and they repaid us very well. So that by the end of the second December I had attained the object at which I had aimed, and not only had my 1,000 hens, but had found that they actually yielded me a profit, as against interest, labor and food. The profit may have been small, but still it was on the right side of the ledger, and the extent of it was a mere question of judicious management.

The third January came with brighter prospects, as we had greater experience, more skill, and better facilities. Our hens of the fall broods, and even some of the very early hatches of the preceding January ceased laying and showed a disposition to sit, and this was also the case with many of our choice breeders. So we got our hatching room and brooding house in order, and prepared to raise a goodly lot of little chicks. In this we succeeded without difficulty; the hands knew just what to do, and under my supervision it was thoroughly done. I found it no "half-day's" work, however, but that full time was demanded. There is no eight-hour law in the chicken business.

It was this season that I regarded as the test of the soundness of my plans and of the possibility of actual success. Fortunately for me real estate had again improved in value, and I found that if my scheme for eking out my income proved a failure I could at least dispose of the place without loss, and curtail expenses by moving into a smaller house. During this season, therefore, I kept very careful and accurate accounts of all expenditures and receipts, and the following is the balance sheet of this season:

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## EXPENSES.

Interest on cost of buildings, plant and stock fowls.....	\$120.00
Labor Account—1 woman at \$15.00 per month and board... 310.00	
1 boy at \$2.00 per week and board.....	200.00
Man—half time.....	250.00
Food—900 bushels of corn at 56 cts.....	504.00
800 bushels wheat at 87 cts.....	696.00
2,000 lbs. oil cake meal.....	37.50
2,000 lbs. corn meal at \$1.25.....	25.00
2,000 lbs. wheat bran at \$1.10 per 100.....	22.00
3,000 cabbages.....	126.00
Meat, bones, calves, etc.....	57.00
Fuel.....	15.65
	<hr/>
	\$2,363.15

## RECEIPTS.

Eggs, 116,197 or 9,683 doz.....	\$2,557.48
“Broilers”.....	383.75
“Fowls”—or old hens.....	287.25
Cockerels and inferior pullets.....	473.75
Pure bred cockerels.....	27.50
Eggs of thoroughbreds.....	123.50
	<hr/>
	\$3,853.23
Expenses as above.....	2,363.15
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Profit.....	\$1,490.08

At the close of the year (June 10th) I had 1,126 hens in the laying yards; 439 young pullets, and between 700 and 800 young chickens. The old hens and the “broilers” had all been sold off, thus reducing my stock to a minimum, and consequently making the feed bills of the year appear quite large in proportion to the actual number of birds on hand. But it must also be borne in mind that the food here charged had reared and fattened the cockerels of the previous fall. The prices of both the wheat and corn are very considerably less than the market rates, simply because I happened to procure a considerable quantity of both in a slightly damaged state, but perfectly good for chickens.

In addition to the food charged in the bill as such, however, there was a considerable quantity which was really represented in the labor account. Thus we had about 120 bushels of corn of our own raising, besides milk, potatoes, turnips, clover, grass, some

sun-flowers, etc., etc., and the chickens picked up during the year a great deal of food in the shape of seeds, insects, worms, etc., off the cultivated land. None of this could be taken into the account, and yet it was all of importance, but it is very obvious that whatever it cost is fully represented in the charges for labor and interest.

It was amusing to notice the eagerness with which the chickens followed the plow, especially in grass land newly broken up. Such land would be full of the larvæ and pupæ of cock-chafers or May-bugs, and the way the chickens, old and young, feasted on them was gratifying on two accounts: The chickens were fed and the insects were destroyed.

The first year we were on the place the cow had a very beautiful heifer calf, which we raised. This calf was now a cow in full milk, and consequently our supply from the two cows was considerable, though none too much. We churned all the milk except the small quantity used in the house, and fed the buttermilk to the young chickens. It paid better than selling the fresh milk at market rates. This was an important item, but is fully covered by the charges for labor and interest. While the feed bill may appear heavy, the labor account probably appears light, for in addition to the hands named in the statement there was my own labor, which amounted to fully as much as that of any man that I could have hired, and the house girl gave us a great deal of assistance in preparing food and in other ways. And perhaps I have underestimated the amount of work demanded from the man, though, as I would have had to have him anyway, his wages might be fairly left out altogether so far as my particular object was concerned. But in a thoroughly organized poultry establishment, run as a special business, his whole time would have to be charged to the poultry.

The same is perhaps true in regard to the horse. Her keep and expense of shoeing, harness, wagon repairs, etc., would all have to be charged to the expense account, if poultry were the sole source of income; but as it was, I obtained nearly \$1,500 per year that I would not otherwise have had, and this so turned the balance in favor of Ferniebiel as a residence, that I have no present intention of leaving it.

### Conclusion.

**H**AVE now given the reader a history of my methods failures and successes, and I have endeavored to answer practically the question: Can a living be made from poultry alone, the entire dependence being upon eggs and fowls sold at ordinary market rates? My experience tells me that it can be done by any one that has the capital, industry and knowledge that are needed. The market for eggs and table fowls is always good; better sometimes than others, but still always remunerative. Stocks may go up or down; banks may break and business men may fail; but old Mother Earth always pays her dividends promptly. And the amount of business done in eggs and poultry is so large—over \$265,000,000 per annum—that there is no danger of the business being overdone. Ten thousand new poultry farms could not perceptibly affect the market.

If reasonable care be taken, there need be no danger of disease carrying off our flocks and ruining our prospects, and we know of no other accident that can greatly imperil our success. But there are certain points upon which we must insist, or failure will be certain.

In the first place, the individual must be adapted to the business. It is no child's play to take proper care of a thousand fowls, and if that number is doubled or trebled very good executive ability will be needed. The care of a small flock may prove a profitable and pleasant pastime for invalids and ladies who have no employment, but, unfortunately, a small flock will not yield the owner a living, and a large flock will require not only the care, but the labor of a strong man, and of one who is not afraid of exposure to storms and cold. Do what you will, there will be times when sudden storms will overtake some of your poultry, and if you are too delicate to take care of them, good-by to profit.

But industry, strength and hardihood are not the only requirements. Many a man, who bears amongst his neighbors the reputation of a Job for patience, will fail when he attempts to tackle an old hen that persists in sitting where she is not wanted. Kindness,



patience and thoughtfulness are qualities which cannot be dispensed with. And, moreover, the successful poultry keeper must have a taste for the business and a fondness for animals. If his duties are performed as a mere matter of duty, and not *con amore*, we would not give much for his chances.

The next requirement is abundant capital. In a book published a year or two ago, in which various occupations are described and recommended as suitable for women, the writer names \$300 as the amount of capital required for a poultry establishment! Three hundred dollars would no doubt set up a very nice poultry yard for some one who got her *living* from other sources, but we venture to say that if any woman, having \$300, puts that amount into poultry, and depends upon them for a living, she will fail. My experience tells me that \$3,000 is nearer what is required, and with less than this at command success cannot be attained. We assume, of course, that the person who undertakes the business intends to make a *living* out of it, in which case he will have to give his whole time to it, and consequently will have to get his support out of it (or out of his capital) from the start. Less than 1,000 hens would not give even a moderate living, and they alone would be worth \$1,000. It is true that hens may be bought in market for much less, but we speak of that we know when we say that 1,000 *such* hens will not yield a living to their owner. The hens must be select birds, and are most cheaply and satisfactorily raised by the poultry keeper himself.

A thousand hens cannot be housed properly for less than \$1.00 each. Unless properly housed the results will be on the wrong side of the ledger. This, therefore, requires another \$1,000.

Food must be bought by the car load, not by the bushel, and cash must be paid for everything. Any other system will so cut down the profits that the result will be anything but satisfactory.

To do this needs a *working* capital as large as that named by the writer referred to. Now, if to the requirements we have named we add the cost of living until the returns come in freely, the rent of the land and the cost of improving the same, it will be seen that our demand for \$3,000 is not by any means extravagant.

I am aware, of course, that with persons who already have some other business, and merely wish to work gradually into poultry keeping the case is different. Such a person might begin with 100 fowls, and by investing the profits from these in new houses and more fowls, he might soon work up to a business of respectable dimensions. And this would certainly be a very judicious course, as experience would be acquired just as it was needed. But by the time the poultry yard is yielding a fair living, the owner will find that he has invested in it a sum not far from the amount named, and I am very much mistaken if he would take that amount for his establishment.

Another error commonly made is in getting the wrong kind of land, and too little of it. Although I managed to succeed tolerably well with 1,000 laying hens on about nine available acres, yet I am satisfied that less than an acre and a half to each hundred fowls is not good economy. On less than an acre it is difficult to carry out that proper rotation of crops that is absolutely necessary, and the fowls, from want of range, do not acquire that vigorous health which I found so desirable. Less than fifteen acres for one thousand birds is not desirable. Attempts have been made to keep poultry in comparatively small coops, but it has never paid, except in the case of fancy birds, where time and labor were no-object.

The land should be all capable of cultivation, and should be as productive as it is possible to get it. Heavy clay and light sand are to be equally avoided; the former because the birds rarely keep in good health on such soil, and the latter because it is so unproductive. A good deep gravelly loam is the kind to select. Such land does not remain wet long after a rain, and it retains manure and gives good crops. If we allow fifteen acres of such land to each 1,000 fowls, we can raise on it a very large proportion of all the food that is needed. It is supposed that five acres are occupied by coops and yards, and ten acres in cultivation—growing clover, corn, cabbage, etc. Under our system of high cultivation and abundant manure the corn ought to yield at least 40 bushels to the acre, or 400 bushels if the whole were devoted to this crop. This would be about half the corn required. But since clover and cabbage give larger yields than corn, and as a portion of the ground

will be in these crops, the proportionate amount of food raised would be increased.

It is often difficult to find land at a moderate price near the market, and it will require good judgment to strike the happy mean between land that is very cheap because it is a long way from market, and land that is so near market that it is very valuable. In the latter case the temptation to confine the fowls to small yards is very strong, and is sure to result in evil. Land suitable for poultry raising ought to be had for \$100 per acre. A higher price than this will load down the enterprise too heavily with interest on capital. At this figure it should be all under cultivation, and should not be in any sense run down. Some have recommended wild land for poultry keeping. By this is meant land that is covered with brush or rocks, and is so poor that it will not pay to cultivate it. Such land may be obtained very cheaply in some parts, but would make a very imprudent investment. We must bear in mind that the manure from 1,000 fowls is worth a good deal per annum, and on such poor land it is all lost, whereas if the land be good the increase in the crops due to this manure will soon pay for the entire investment.

At the same time, if there should be a piece of such wild land laying close to the yards, and for sale at a low figure, it would not be a bad investment, as it would form a grand range for the birds. It would not yield much, but then the young birds would scratch in it and find plenty of insects—just the thing they want. The best use to make of such land, would probably be to plant it in timber. The fowls would keep down the insects. Whether some kinds of vines or fruit trees, might not be grown on it with profit, would be a question worth considering.

In previous pages, we have stated that money made from the sale of pure-bred fowls, must not enter into our calculations. There can be no objection, however, to the poultry keeper turning an honest penny in this way. If he would keep his own stock up, he must rear pure bred birds, and as he will always have more than he will care to keep, it would be foolish in him not to get the best prices possible for them. And, if he will confine himself to two or at the most three pure varieties, and take great pains

with his stock, he may soon acquire a reputation for these breeds that will bring a handsome sum annually into his pocket. But he must bear in mind that the breeding and selling of fancy fowls, as they are called, is a somewhat speculative business. Fashion seems to have more to do with this matter than has real merit, and the bird which would have brought a large sum yesterday, and which has cost much to rear, may be unsaleable to-day.

In closing these pages, allow me to say that they have been written as much with a view to warn people of the difficulties ahead, as to encourage them to go into poultry keeping. The tendency to adopt some one of the various minor rural pursuits as a business is decidedly on the increase, but we see everywhere, that, where one succeeds, ten fail. That this is due to the character of those who go into it, and not to the nature of the business itself, is easily seen from the mere fact, that one succeeds, but we hold that one of the greatest wrongs and injuries that can be inflicted upon the struggling classes, is to present a dazzling picture of success, claiming that *any one* may attain it. And yet we see daily paraded in various journals, the promise that if a person will only get a few good hens, and take care of them, he may soon build up a business that will lead to fortune. And these promises are backed by such an array of figures and statistics, that there seems to be no possibility of disputing them. The eager but inexperienced novice is, therefore, led to invest his time and money in a business of which he knows nothing, and in which he finds out, when it is too late, that failure is the rule and success the exception.

Of one thing I am satisfied: Experience on a small scale, with a few dozen hens, although undoubtedly valuable, will not enable any one to undertake poultry-keeping on a large scale at once. The difficulties as well as the opportunities which arise when a large number of fowls are kept, are entirely different from those which present themselves on the small scale. But those who will bring an ordinary degree of intelligence to the work, and who have the qualifications we have already named, may soon acquire the necessary experience and skill, and they will find that where there is capital, industry and common sense in the poultry yard, there is money in poultry-keeping.

# Useful Instructive Books

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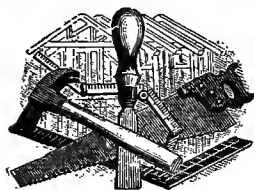
Books on other subjects in preparation.

Any book sent postpaid on receipt of 25c., or five for one dollar.

## Industrial Publication Company

16 Thomas Street,

NEW YORK



**Carpentry;** A Practical Manual edited by JOHN BLACK. 92 pages; illustrated by 100 engravings.

This book treats on the principles of the subject; the strains in the various members of framed structures; joints of various kinds; simple roofs, king-post roofs, queen-post roofs, hip roofs, roofs covering buildings of irregular plan, Mansard roofs; properties of timber; flooring and timbers for supporting same; trussed beams; partitions, from simple examples to elaborate examples of trussed partitions; method of deadening sound, etc., etc.

**Practical Joinery.**—Edited by JOHN BLACK. 92 pages; illustrated by 130 engravings.

A book that points out the best methods in the various departments of joiner's work, such as mouldings, classic and Gothic; tongue and groove joints, dowel joints, miter joints, lap joints, dove-tail joints, mortice and tenon joints; cutting timbers, making doors, paneling; hanging doors and windows; skylights; laying down floors; hardwood floors; construction of niches, etc. Woodworking machinery; picture frame making, and instructions on how to use the diagonal scale.



**The Steel Square.**—By F. T. HODGSON. 48 pages; illustrated by 38 engravings.

This work is intended as an elementary introduction for the use of those who have not time to study the larger works on the same subject. The book shows how some difficult problems in carpentry and joinery are simplified and solved by the aid of the carpenter's steel square, together with a full description of the tool, and explanations of the scales, lines and figures on the blade and tongue, and how to use them in everyday work. Showing how the Square may be used in obtaining the lengths and bevells of rafters, hips, girders, braces, brackets, purlins, collar beams and jack-rafters. Also its application in obtaining the bevells and cuts for hoppers, spring mouldings, octagons, diminished styles, etc.





### Scaffolding.—Edited by JOHN BLACK.

90 pages; illustrated by 45 engravings.

The subject of the erection of proper scaffolding for various purposes is practically treated in this book. A short history of ancient scaffolding is given, together with directions for erecting ordinary bricklayers' scaffolds, ladders; shoring and needling for supporting buildings; cranes, lifts, hoists, traveling cranes, transporters, cable railways; repairing steeples and tall chimneys; descriptions of various schemes and aids that will give a fund of practical information to every one called upon to erect scaffolding at the least cost in time and money.

### Hints and Aids in Building and Estimating. A hand-book for every one engaged in the erection and repair of buildings. 36 pages.

This useful little book gives hints and prices; tells how to measure; explains building terms, together with a number of tables; schedule of architects' charges and form for building contract; form for making estimates; cost of doing work; work a man will do; diameter and height of chimneys; weight of various roof coverings; painting.

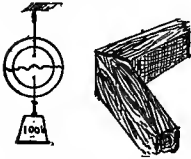


### Cements and Glue.—A practical treatise

on the preparation and use of all kinds of cements, glue and paste. By JOHN PHIN, author of "How to Use the Microscope." 58 pages.

Every mechanic and householder will find this volume of almost every-day use. It contains nearly 200 recipes for the preparation of cements for almost every conceivable purpose, amongst which are recipes for waterproof cements, hottle cement, cap cement, fireproof cement, various

glues, rubber cement, iron cement, ivory cement, leather cement; to cement glass, stone, etc., to metal; different kinds of paste, etc.



### Plastering.—Edited by JOHN BLACK. 90 pages; illustrated by 40 engravings.

This book contains quite a fund of information of a plain and practical character. A short history of the craft is given and then, in order, the materials and methods are described. The art of plastering is described, also the tools used, etc. Other chapters treat of various cements and their uses; lime and cement mortars; methods of outside and inside work; decorative plastering and details; stucco coloring and plaster painting; fixing tiles, mouldings, scagliola, fibrous plaster and other plasters; making a scagliola column; making mouldings in fibrous plaster; use of asbestos in the making of fireproof plaster, etc.



### Concrete.—By FRANK JAY. 94 pages;

illustrated by 38 engravings.

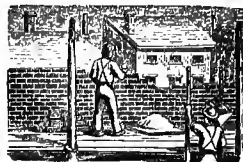
The extensive use of concrete at the present time makes this little manual "fill a long felt want." It is written by an expert of many years' experience in concrete work. The various methods now in vogue are described. The following is a synopsis of the contents: Historical; materials; aggregates and proportions; building in concrete; apparatus for erecting buildings; floors, joists and wallings; concrete paving and flooring; methods of construction; comparisons of different systems; fire resisting qualities; pavings *in situ*; moulds for concrete work; making artificial stone; coloring and hardening; armored concrete; manufacture and use of concrete for dams, breakwaters, etc.; use of concrete in building walls, piers, columns, floors, chimneys; building armored concrete beams, etc., etc.



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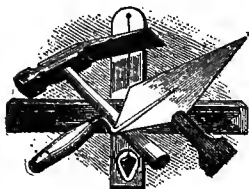
**Bricklaying.**—Edited by JOHN BLACK. 88 pages; illustrated by 100 engravings.

This book is not intended as a text-book but as a guide to the best practice. The instruction is given in simple, clear language, and the following points are treated: Classes and kinds of bricks; bonding for foundations and walls; plasters; piers; window openings; arches, their setting out and construction; bridges, their development and construction; flues, fireplaces and chimneys; oriels and bay windows; stops; quoins, cornices, gables; ornamental brickwork; fixing tiles; general memoranda, etc.



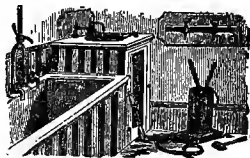
**Masonry.**—Edited by JOHN BLACK. 94 pages; illustrated by 80 engravings.

This little book deals with the operations of masonry in a thoroughly practical manner, describing the various materials, the preparation of surfaces, building of all sorts of walls and foundations of various kinds; varieties of masonry; openings; arches; buttresses; domes; vaults; together with a short history and simple directions about drawing. The numerous illustrations show how stones are cut and dressed, showing ashlar, hammer or pick dressing, chisel dressing, rubbing; chamfered stones; to produce a perfectly plane surface; winding surfaces, etc.



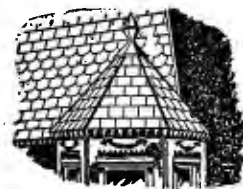
**Plumbing and Tinsmiths' Work.**—Edited by JOHN BLACK. 92 pages; illustrated by 80 engravings.

This little book deals with roof-covering; roof work; gutters; covering flats, platforms, dormers, ridges, etc.; finials; pipes; the storage and supply of water; delivery and control of water; elementary sanitation; soil pipes, closets, baths, traps; lead lining for sinks; development of surfaces so as to get the cuts for elbows, angles, etc.; how flashings should be put down; snow boards; principles of water supply; drinking water supply; float tanks; hydraulics, etc.



**Slatting and Tiling.**—Edited by JOHN BLACK. 93 pages; illustrated by 50 engravings.

Many buildings now have slate or tile roofs, and this book gives concise information about the various points, such as a history of many roof coverings from the earliest times, also of modern roof coverings, tiles, slates and slating; tools used by roofers; preparation of the roof; different kinds of roofs; description of various forms of framing; more about tiling; how to lay slates; copper and lead roofs; soldering irons, etc.; zinc roofs and concrete roofs; the use of expanded metal, etc.; comparison of different roofing materials; thatched roofs; measuring up slating, tiles and other roof covering, with remarks on different methods of measuring.



**Decorating.**—Edited by JNO. BLACK. 95 pages; illustrated by 15 engravings.

The subjects treated in this practical book are as follow: Theory of colors; color blindness; the decoration of churches, libraries, dining, sitting and bedrooms; history and application of glass painting; stained glass in decoration; scene painting; carving in wood and stone; stencils; metal work in decoration. tile decoration, frescoes, plasters; sanitary decoration of the house, etc. The hints contained in this book will be appreciated by the practical painter and decorator, as well as every householder who desires to have his home neatly and tastefully ornamented.



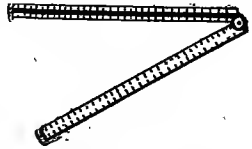


### Home Handicrafts.—A Practical Guide for Amateurs. 92 pages; illustrated by 60 engravings.

This book will be appreciated by every one who takes advantage of their spare hours to construct or decorate some detail of their homes. The following synopsis of the contents will show the wide range of subjects: Tools, materials, planing, workbench, mortise and tenon joint, halved joint, half lap joint, simple doors, nut buildings, kitchen table, saw horses, picture frame making; gluing, lathing, whitewashing, paperhanging, painting, window boxes, soldering, table fountain, renewing sash lines, rustic railings, meat safes, bicycle racks, green-house work, constructing sun-dials, making a drawing-board, French polishing, kennels, dovescots, poultry houses, useful recipes, etc.

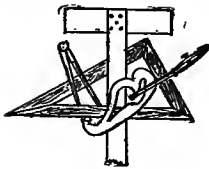
### The Slide Rule and How to Use It. 30 pages. By F. T. HODGSON.

This is a compilation of explanations, rules and instructions suitable for mechanics and others interested in the industrial arts. Rules are given for the measurement of all kinds of boards and planks, timber in the round or square, glaziers' work and painting, brick-work, paviors' work, tiling and slating, the measurement of vessels of various shapes, the wedge, inclined planes, wheels and axles, levers, the weighing and measuring of metals and all solid bodies, cylinders, cones, globes, octagon rule and formulae, the measurement of circles, a comparison of French and English measures, together with much information useful to carpenters, bricklayers, glaziers, paviors, machinists and other mechanics.



### The Engineer's Slide Rule and Its Applications.—By WILLIAM TONKES. 35 pages.

A complete investigation of the principles upon which the slide rule is constructed, together with its application to all the purposes of the practical mechanic, such as multiplication, division, extracting roots, powers of numbers, measurement of various plane and solid figures, estimating the weight of various materials, geometrical problems, proportion, change of gears for screw-cutting, calculations on levers, etc. Possessed of either of the above books and a good slide rule, mechanics might carry in their pockets some hundreds of times the power of calculation that they now have in their heads, and the use of the instrument is very easily acquired.



### Drawing Instruments.—By AN OLD DRAFTSMAN. 48 pages; illustrated by 20 engravings.

A treatise on drawing instruments, with rules for their use and care; dividers, compasses, ruling pens, bow instruments; special forms of instruments; how to handle them; drawing boards, paper, tee-squares, triangles, curves, scales, thumb-tacks, tracing paper and cloth, inks, pencils, protractors; useful memoranda and data for every owner of drawing instruments.

### Painting and Varnishing.—Edited by JOHN BLACK. 94 pages; illustrated by 20 engravings.

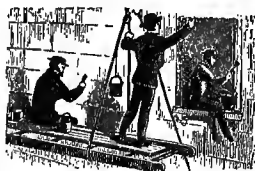
A practical manual treating on materials, principles of color, mixing paints, preparation of surfaces, distemper, decoration, hints on dealing with customers, hints on the use of brushes, what colors to use in different rooms, etc.; varnishes and varnishing; recipes for making various kinds of varnish; graining, graining to imitate oak, mahogany, satin wood, walnut and rosewood; marbling, white veined, dove colored, red, green, jasper, black and gold, Florentine, Sienna, etc.; inside painting and decoration gilding, sign writing, lettering, alphabets, stencils, monograms, etc.; outside painting brickwork, metal work, etc.





**Hints for Painters, Decorators and PAPER HANGERS.** — Prepared with Special Reference to the Wants of Amateurs. By AN OLD HAND. 60 pages.

A most useful book treating on the preparation of surfaces, materials used as bases and vehicles, white lead, linseed and other oils, driers, coloring paints, mixed paints, operations, taste in color, general remarks on graining, miscellaneous receipts, paper-hanging, cleaning paper-hangings, varnishing paper, making paste; useful hints, tables, etc., for estimating cost of work and materials which will prove of great value to the beginner in the painting business.



**Success with Recipes.**—A practical guide to success in the use of recipes, formulæ, etc., with hints on chemical and mechanical manipulation. Intended as a supplement to all books of recipes. By JOHN PHIN. 44 pages.

While it is an undoubted fact that many of the recipes published in the ordinary collections are erroneous, either from original blunders on the part of the authors, or from mistakes in copying, failure in the use of others frequently arises from defective information and vicious methods on the part of those who attempt to put them into practice. The object of the present book is to give such hints and cautions as will enable the worker to secure success where success is possible, and where the products are intended for sale it gives valuable advice as to the best methods of putting them on the market.

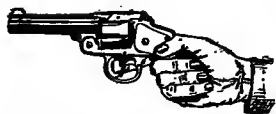
**Useful and Precious Minerals.**—How to find them; how to test them and how to estimate their value by simple methods and easily obtained appliances. Intended for the use of non-experts. Edited by JOHN PHIN. 72 pages; illustrated by 4 engravings.

This book was prepared to meet the wants of the non-expert so that they may, by simple tests, know if their "find" is valuable or only useless dirt. To this end the book gives general hints on the examination and testing of minerals; distinguishing characteristics of minerals; a simple method of finding specific gravity; scale of hardness, malleability, color, luster, crystallization, chemical composition; prospecting or searching for minerals, etc.



**How to Become a Good Mechanic.**—Intended as a practical guide to self-taught men, telling what books to use; how to begin; what difficulties will be met; how to overcome them; in a word, how to carry on such a course of self-instruction as will enable the young mechanic to rise from the bench to something higher. By JOHN PHIN. Second edition, revised and greatly enlarged. 68 pages.

This book is not a text-book, but rather a guide to the use of these books. The author briefly outlines a course of study for mechanics who wish to advance themselves. The notes and instructions given are of a kind that appeal directly to the good sense and reason of the young student, and cannot fail to act as a stimulant to greater efforts in obtaining the knowledge sought. The difficulties which may be expected by the student are dwelt upon, and valuable suggestions as to the proper method of overcoming them are given.



**The Pistol as a Weapon of Defence,** in the House or on the Road. 50 pages.

This work aims to instruct peaceable and law-abiding citizens in the best means of protecting themselves from the attacks of the brutal and the lawless, and it is the only practical book published

on this subject. Its contents are as follows: The pistol as a weapon of defence; the carrying of firearms; different kinds of pistols in market; how to choose a pistol; ammunition, different kinds; powder, caps, bullets, copper cartridges, etc.; best form of bullet; how to load; best charge for pistols; how to regulate the charge; care of pistol; how to clean it; how to handle and carry it; how to learn to shoot; practical use of the pistol; how to protect yourself and disable your antagonist.

**Shooting on the Wing.**—Plain directions for acquiring the art of shooting on the wing. With useful hints concerning all that relates to guns and shooting, particularly in regard to the art of loading so as to kill. To which has been added several valuable and hitherto secret recipes of very great practical importance to the sportsman. By AN OLD GAMEKEEPER. 88 pages; illustrated.



This book tells how to choose the gun, about ammunition, gun cases, how to load the gun, how to clean it, how to handle and how to carry it, how to learn to shoot, finishing touches, useful hints, recipes and miscellaneous matter. The book contains a novel and most valuable feature found in no other work on this subject. This is a series of graduated lessons by which the self-taught young sportsman is enabled to advance step by step from such easy marks as a sheet of paper nailed on a fence to the most difficult trap-shooting and the sharpest snap-shots.



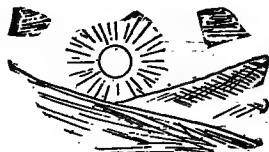
**What to Do in Case of Accident.**—A book for everybody. 96 pages.

This is one of the most useful books ever published. It tells exactly what to do in case of accidents, such as severe cuts, sprains, dislocations, broken bones, burns with fire, scalds, burns with corrosive chemicals, sun-stroke, suffocation with foul air, hanging, drowning, frost-bite, fainting, stings, bites, starvation, lightning, poisons, accidents from machinery, gun-shot wounds, etc., etc. It ought to be in every house and workshop,

for young and old are liable to accident, and the directions given in this book might be the means of saving many a valuable life.

**The Sun.**—A familiar description of his phenomena. By Rev. THOMAS WILLIAM WEBB. Author of "Celestial Objects for Common Telescopes." 80 pages; illustrated by 17 engravings.

A book for every one interested in Nature, as it simply and fully describes the sun, tells about spots, eclipses, etc., in a very attractive style, so that the ordinary reader who does not understand astronomy may thoroughly comprehend and enjoy the subject.



A reading of this book will give a fair idea of the wonderful universe of which we are a part.

**Rhymes of Science; Wise and Otherwise.**—By OLIVER W. HOLMES, BRET HART, INGOLDSBY, Prof. FORBES, Prof. J. W. McQ. RANKINE, Hon. R. W. RAYMOND and others. 66 pages; illustrated.

A collection of scientific rhymes that will form pleasant reading for any one interested in science.











