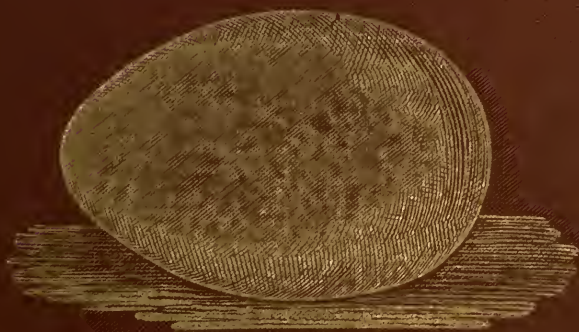


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AN EGG FARM.

The Management of Poultry in Large Numbers.

BY
H. H. STODDARD.

TOGETHER WITH OTHER PAPERS
CONTAINING THE
LATEST PRACTICAL INFORMATION.

ILLUSTRATED.



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PUBLISHERS' PREFACE.



Mr. H. H. Stoddard ranks among the first of our reliable and experienced writers on poultry literature. This volume consists of a series of practical papers from his pen upon egg raising and kindred topics. To the production of eggs on a large scale, Mr. Stoddard has evidently given close thought and attention. In these pages he provides for all difficulties, and is full of suggestions whereby labor may be saved and profits increased.

Other chapters on hatching eggs by artificial heat, farm poultry houses, poultry farming, poultry keeping as a business, etc., etc., add to the size and value of the work—as originally published.

AN EGG FARM.

INTRODUCTORY.

The tendency is for farming to become divided into specialties. It is only through division of labor that the precision and skill can be attained that becomes necessary as competition grows keener. Mixed farming begins already to stand at a disadvantage. Sheep farms, farms for milk, others for butter, small fruits, market vegetables, and so on, are accomplished facts. Eggs and fowls form such important articles of food, that they must in turn become a specialty, and be produced for the use of the great cities by extensive establishments conducted systematically, instead of in the old uncertain time-taking way of a few on each farm. The wholesale production of fowls for the table has already succeeded to some extent, but to raise eggs on a large scale is a much more difficult undertaking; and it is believed that the following is the first correct system ever published. Several joint-stock companies in England have attempted certain plans, possessing in some respects much merit, particularly Mr. Geyelin's, but some defect has prevented success; and the same may be said of numerous individual undertakings in this and other countries. The production of eggs must always be the key to the poultry inter-

est, because raising pullets for layers brings so many supernumerary cocks, that these, with the fowls past their prime, always keep that side of the market better supplied than the egg department, and therefore special establishments for raising table poultry will not in the long run be demanded.

In managing animals of any kind we must follow Nature, for she will neither follow us nor be driven. The domestication of animals was only possible at the outset by proceeding on a natural ground-work. To illustrate : man domesticated dogs that, when wild, followed one of their own number for leader, by installing himself as leader instead—so naturalists state—and the cat will never be domesticated in such a way as to follow her master when he changes his abode, because originally a solitary animal. Just so the domestication of hens was effected by building upon an original foundation. In understanding the nature and needs of fowls, it will assist if we investigate the condition and habits of the wild parent stock in India, for the nature of any species remains essentially the same for long periods. The transfer of the birds from forest to farm, has affected their life and most important habits surprisingly little. The tame fowls have the same cries of warning to each other, and other language, that observers have found them to use in their native jungles ; they still hide their nests in some corner, just as if they were selecting a nook in a thicket ; and they are attached to the premises where they live, as they and all other gallinaceous birds are to some small district, when wild. The wild jungle fowl is by no means foreign to our subject ; and in attempting to manage poultry by thousands, only a proper regard for original nature will prevent failure. According to this nature they live during the breeding season in distinct families under polygamy. Each family group has by tacit agreement a part of the forest for its beat,

and the exclusion of strangers of the same species secures privacy and tranquillity. They have their *freedom*, and in that word are comprehended the needful exercise, sun, pure air, shade, and varied diet.

Some plans upon a large scale have secured small separate flocks without freedom, and others have secured freedom without separation. Small flocks at liberty on distinct farms have been kept successfully during centuries, because the owners were unconsciously imitating the natural groups of the wild jungle fowls. But when it has been found that a flock of twenty gave a handsome profit, and the number has been increased to hundreds, with the idea of correspondingly multiplying the gains, an unnatural *mob* has been formed, the hereditary instincts violated, and laying checked. The confusion has not, however, lessened the amount of feed consumed, and pecuniary results have been the wrong way. When it is attempted to divide the number, and place them in separate inclosures, the results are still far from satisfactory. Small flocks kept yarded, may be multiplied on the same farm to any desired extent; but their wants can be all supplied only through an amount of labor that eats up the profits. In this land of high wages, the expense of attendance determines to a great extent the success of the whole project. All persons who have tried managing a number of yards, are agreed as to the great labor involved when thorough care is taken, while without such care, thrift cannot be maintained under the inclosure system.

THE PLAN OF THE FARM.

Upon our poultry farm, then, we dispense with yards, (excepting for some special purposes), and *imitate a country town*, where is stationed at every farm-yard a flock. This method we know has succeeded for *hundreds*

of years, since men became partly civilized ; so it is no new experiment, and it is based on a state of things *still older*, extending beyond the period of domestication. Across a tract of $62\frac{1}{2}$ acres, 100 rods square, run parallel wagon roads, 10 rods apart, with fowl-houses located quincunx style, every 10 rods. In this way each house is surrounded with six others, and is 10 rods to 11 and a fraction, from each. Now, when a flock is attached to

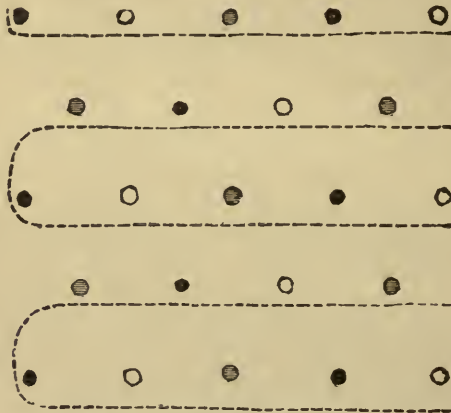


Fig. 1.—DIAGRAM OF EGG FARM.

each farm-yard in a village, and runs at liberty, the premises may be as near each other as eight or six rods even, without danger of the birds straying, ordinarily, when once fairly domiciled. This is because the neighbors' premises have a different look, and the buildings, garden, orchard, shrubbery, and fences, serve as landmarks to enable them to find their way back. To make each flock upon our tract know its home, we have three styles of buildings, so unlike in color and other respects, as to be distinguished by their occupants, and these alternate in such a way as to prevent mistakes. Here the ancient instincts of the birds are our reliance,

their powers of discriminating locality being very strong. It must be kept in mind that any faculty which was of use when the race was wild, may be definitely counted on, unless it has since been persistently bred out. The buildings are white, black, and uncolored, in succession, so that the six immediately adjoining any one, are none of them like itself. The white and black coloring are of the cheapest sort—lime-wash and coal-tar.

In the diagram (fig. 1), of a portion of the farm, the quincunx order is shown, and the position of the wagon path is indicated by the dotted lines. The alternation of the colors of buildings will be understood from the white, black, and tinted dots.

MANNER OF FEEDING.

While pursuing the experiments which led to this system, we early perceived that while a flock thus situated would stay near home so long as no person approached, when feeding them, we were followed by birds from neighboring flocks, and there was confusion. Then, so accustomed do fowls become to associating the sight of their keeper with a boon, that they will follow him from one station to another, when on his rounds collecting eggs, or attending to other matters. True, their ability to find their way back is wonderful, but fighting follows interference, and thus the quiet and order so essential to laying are impaired. Besides, frequent association of this kind will, after awhile, break down all distinction between neighboring flocks. Such a trouble would be fatal to the whole plan. The solution of this difficulty is original with our system, and the key to its success. The feeding business is the cause of the trouble, and the only reason why fowls follow their keeper. The remedy is to bring about the feeding indirectly. From earliest chickenhood the birds are brought up so as to never

perceive that the keeper has anything to do with their feed. The small coops for young chickens (on a separate part of the farm), have boxes where the feed is placed, and a simple contrivance attached, that does not admit the chickens until some time afterward. This device will be described when treating upon buildings. Adult fowls are given soft feed early in the morning in a feed-box in their house, so constructed that the keeper is not seen by them at all. All the hard grain for the day's allowance is deposited in a pile of straw outside, before they are let out of the building, and it is a day's work for them to scratch for it. This employment is very salutary to their health and spirits, and assists in keeping the flock together. The bright eye and keen faculty for prying and searching are employed, instead of the birds moping or standing listless. They feel as if everything was right and natural, and this influences laying to a surprising degree. The sight of the keeper is associated with no gift or boon whatever, scrupulous care being taken during the 15 or 18 months that limit the lives of most of the main laying stock, never to throw them, directly, a morsel of food, or allow them to see the drinking vessels filled. All motions near the fowls should be slow and gentle; they should never be frightened, and should regard their keeper with neither fear nor aversion, but with total indifference. The two points, of differently appearing premises at different stations, and indirect feeding, both being attended to, we are enabled to keep separate flocks in freedom upon one farm without yards. The method of overcoming, by use of a team, the loss of time in attendance caused by the scattering of the buildings, will be described in its proper place, as well as the ways of securing throughout the greatest economy in labor and lumber.

THE LOCATION OF THE FARM.

A location near a city secures the best advantages. An article produced daily the year through, and which is prized for being fresh, should be raised as close to a market as possible. Thus the highest rates may be obtained, the special aim being to supply the demand for better eggs than any can be that are packed and sent great distances. Under the system which now supplies to a great extent eastern cities, there is the time spent in collecting eggs from various sources, to which must be added the time for transportation, and the time they are in the dealer's hands after arrival. Then the jarring is more or less injurious, and after it, eggs will keep but a little while. They pass through so many hands, that no one in particular is responsible for the character of the article. Under our plan eggs are delivered directly to consumers, families being visited regularly once a week. The egg-route has this advantage over a milk-route, that it need not be traversed so often, only a sixth of the whole being traveled daily; thus the expense of delivery is not great. As a team must be sent to town every day to collect waste bits from the meat markets, eggs can be sent, when only a day or two laid, with no extra trouble. If disposed of at stores, an arrangement should be made with the dealer whereby they may be kept in a separate lot, and sold under the name of the producer. Consumers readily appreciate eggs, butter, or other produce that comes from a regular responsible source. When a lot is mixed with lots from other farms, its individuality is lost; if good, it may only be helping to sell the poor article of somebody else, and the producer does not reap the benefits of his pains in increased custom. No produce can be supplied to city dwellers to better mutual advantage to seller and buyer, than new-laid eggs delivered direct, the dubious ones now in the market causing much

loss and vexation. Poultry farms may be established at the west, and have the benefits of cheap land and grain; or at the south, where the season is earlier, and water transportation available. But the value of manure at the east is so great, that it is more economical to bring grain here from the west than eggs; the latter being so troublesome to send by rail. Butcher's waste, procured fresh, being almost absolutely necessary, is an important consideration in favor of proximity to a city. When it is seen that high prices for eggs depends on their being produced near by and delivered fresh, and that the *labor* is no greater to raise them close by the market, than at a distance at lower rates, with an additional deduction for transportation and breakage, we believe it must be admitted that the best place is, on the whole, near an eastern city. The site should not be far from a rail-road freight depot or wharf. The amount of western grain needed is large. Hauling this many miles by team is too costly. Enriching ground at the east by feeding out grain from the prairies, is an indirect way of importing their rich mold. Therefore, we take care that this importation is judiciously contrived. A mill near by, for grinding, is desirable. A tract of arable land may be found (though rarely), surrounded on all sides by either woods, swamps, or rocky pastures, so that there need be no danger that the fowls will stray into tilled fields of adjoining proprietors. In case such a farm could be procured, the great expense of a fowl-proof fence all around it would be saved. If the tract is unfortunately bounded by cultivated lands, then it must be so large and of such cheap quality, that a border, 20 or 30 rods wide, may be afforded to be kept in permanent pasture. The land should be upon a slope, for there must be a quick surface drainage after heavy rains; but the pitch should not be so steep as to prevent easy wagoning. A southward inclination gives a proper sunny exposure; and if there is a belt of woods on the

north to break the winds, so much the better. If near swamps, sea-marshes, or damp river valleys, the site should be so elevated as to be out of the reach of the worst raw chilling fogs. We have enumerated all the above qualifications as necessary to a site for an egg farm. Their combination with certain essentials of soil which we are about to state, make the matter of selection one of considerable difficulty. Many more important points are to be attended to than in choosing a place for ordinary farming or gardening.

THE KIND OF SOIL.

The soil should be adapted to cultivation. Those who advocate a waste tract make a great mistake, in our opinion. Every rood should be capable of cultivation, and rocky or bushy land avoided. Shade may be artificially provided at a small cost in a manner to be hereafter described. It is necessary to raise crops in order to get the full advantage of the manure. It exceeds in value that made by any other domestic animal, because it is from rich food more thoroughly digested than is the case with quadrupeds. The scrapings from the roosts might be carried to another farm, it is true, but the nearer they are applied the less labor; and the droppings where fowls range, and at every coop of small chickens, etc., are too valuable to be lost, and cannot be gathered up save by the roots of plants on the spot. In order to distract attention from the main business as little as possible, crops of the simplest management should be mostly grown, and only those that can be consumed by the establishment; grass, cabbages, lettuce, onions, potatoes, beets, and other roots, large quantities of oat or rye straw, and the balance, grains of various sorts, corn especially being always in order. The principle of division of labor, carried out to full extent, would forbid our raising crops at all, were

we able to gather all the manure and sell it for what it is really worth. But, as we have seen, much would be wasted unless there is tillage, and there is no price established for such manure; and if there were, it is under our system all immediately mixed with earth, so that the amount could only be guessed at. The quality of the soil may be poor, or worn out at the start, thus securing cheapness; but it should be of a sort that it would pay to apply valuable manure to. For the sake of the health of the birds, choose a warm, dry soil. Land which dries quickly after rains, is the kind; and another test is, whether it is ready for the plow early in spring. If it will produce peas or watermelons earlier than common, we are not far wrong. It should not be clayey or gravelly, but a sandy loam. Gravel for a subsoil, low enough down never to be reached by the plow, would be excellent, making a natural underdrainage; but gravel at the surface troubles the fowls in their rolling and dusting. A supply of white gravel for the use of the birds should be screened to a proper size at some other place, and hauled to the spot, and put in boxes for the use of the birds. The soil should answer for dry earth for the roosts and for dust-baths, the loam being of a sort easily reduced to an impalpable powder. This is important, because we depend upon pulverized dry earth all through the business, to secure the cleanliness and health of the birds with the *least possible labor*. A great deal is said in poultry books and papers about the importance of cleaning the roosts frequently. We do not clean ours oftener than once in three or four months. The labor of going the rounds daily in a large establishment, thoroughly scraping floors, and removing manure, would be enormous. We set all our fowl-houses on a ridge of earth thrown up, by plowing several times toward the center, and surround with a shallow ditch for surface drainage after heavy rains. Thus we secure dryness, *wet* being the foe that must be kept

from the fowls at every stage. Then in winter a bed of dry earth, six inches deep, is put inside the houses instead of a floor, and a couple of inches added monthly if needed. The birds may be depended upon to cover their own droppings, not only daily but hourly, when not at roost, a thick cloud of dust being raised every little while. The houses will always be freer from taint than if floors were used without dry earth, and scrubbed with soap and sand three times a day.

CROPS ON THE FARM.

As it is impossible to raise any crop on vines, stalks, or trees above ground or below it, that hens will not damage, crops are put on one-half of the ground each year, and the fowls on the other half. Movable fowl-houses are used exclusively, with the exception of some large ones for hatching-rooms. By building small, light, and low, with strong sills made on purpose for runners, the houses may be moved every spring by an ordinary team, to the section tilled the previous summer. The distance traveled in transferring 100 fowl-houses, from one 60-acre lot to another, is one-third of a mile for each building, and back with no load. The amount of labor is much less than would be involved in hauling the manure, mixed with dry earth, from the buildings. The moving is accomplished systematically; the fowls belonging to a building being all moved in one flock in a large box made on purpose, in which they are quietly entrapped when attempting to leave their house in the morning by placing it adjoining, after which the box is darkened and drawn upon runners, on which it stands, to the new station. On arriving they are immediately allowed to escape into a spare house, shaped and colored like the one they left, placed before-hand, when they are ready to commence their day as usual, the whole operation of removal occupying only a few minutes. Besides this yearly moving,

each building is moved every few days during spring, summer, and fall, its length only. Thus a fresh spot is secured, and to prevent all taint and uncleanness, as well as to keep the manure safe for next year's crops, an implement like a harrow, with teeth like a horse-hoe, is drawn over the spot where it stood. The buildings are all moved in regular order in the same direction, so as to keep the same distances apart; then back again over another strip of ground, so as to fertilize the whole lot in the course of the season. The frequent turning of the soil not only keeps it sweet, but provides what fowls are so fond of—a place to scratch for insects, and roll and dust themselves in dry weather. The crop of weeds that will constantly appear in summer must be as constantly turned under; and whatever advantage there may be in green crops for manure will be secured; thus the enriching and pulverizing of the ground will fit it for large crops. It need not lie altogether fallow either, for a few small spots may be sown thickly with lettuce, cabbages, or other plants that fowls will eat, and protected until partly grown, by movable lath-fences or wire-netting, after which they may be allowed to help themselves. Oats may be sown in strips also; and whether the fowls scratch up and eat the seed in spring, or forage upon the ripened grain, no matter. It is only necessary to compare the amount of labor spent in spading the ground in yards, to keep it fresh, with this way of using team and plow, to see the superiority of the latter method.

SUPPLYING WATER AND FOOD.

The distance once around to each station amounts to several miles, and the rounds must be made four or five times at least every day. The distance would be too great for the attendant to walk over, even if empty-handed, and transporting grain and water without a

team would be out of the question. A supply of water through pipes, connecting with each station, would be too costly, especially as they would be idle when the land was cultivated. A running stream conducted in an open ditch to each building would freeze in winter, make the ground near its banks too damp, and be in the way of plowing, moving buildings, and other operations; besides, few lots suitable in other respects can be found where the slope of ground with water supply at top admit of the construction of such an aqueduct. Each flock of

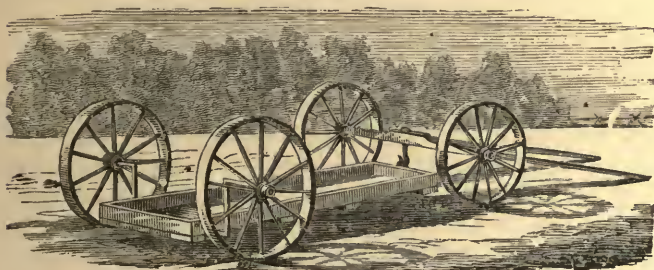


Fig. 2.—STONE CUTTER'S DRAY.

fowls needs a pailful of water daily, taking account of the evaporation in hot weather, and the necessity of emptying the drinking vessels at night in winter to prevent freezing. Such an amount of water could not well be carried by hand.

The most convenient wagon for our use is that sometimes kept for moving stone at quarries, and called a stone-cutter's dray, shown in figure 2. In Maine, such are used very commonly to carry timber about saw-mills, and on short routes where no stumps or stones are to be passed over, thus saving much lifting.

It is desirable that the driver should ride the ten-rod stages between the fowl-houses to lighten his labor, and that the team should trot to save time. But to climb in and out of an ordinary wagon to ride ten rods, would in-

volve more exertion than walking. Besides, the labor of lifting grain in and out will be much less in a low wagon; the water-cask may be filled and drawn from readily, and it is especially convenient in gathering dry earth. The vehicle should be built just heavy enough to support a barrel of water, five or six bushels of grain, and the driver; or when rigged for earth, the amount desired to be carried is about equal to an ordinary horse-cart load. It is not intended to be used off the premises at all, and as there are no stones, hummocks, or the like, and no deep ruts, the body is set so as to clear the ground by only 8 inches (10 inches are allowed in the Maine wagons). The body is 12 feet long, and 4 feet 2 inches wide behind, and 3 feet wide in front, the tapering shape being necessary to give a chance to turn the wagon without cramping; and the turning is also facilitated by making the axle-trees so long that the wheels track 5 feet 7 inches, or about 4 inches wider than a common horse-cart. The side-boards are but 6 inches wide—the aim being to keep as near the ground as possible—and of two-inch plank, serving as part of the body frame. Four cross-pieces underneath, fastened to the side-boards by stout clamp bolts, complete the frame; and the whole is so constructed that no part of the body projects from under the side-boards, the compactness of shape serving a useful purpose when we come to load dry earth. The rear axle-tree is made in one piece of wrought iron 2 inches square. The king-bolt should be made stout, and allowed to turn freely in the forward axle-tree. To carry eggs without breakage, a movable stand for the egg-basket, furnished with springs, can be set in the wagon. A low sled may take the place of the wagon when the season requires it.

The road may be constructed quite narrow, as there will be no occasion to pass other teams; and an easy way to raise a path sufficiently to avoid wet is, to plow a strip of ground a number of times over, always throwing the

furrows towards the center, and the rounded ridges thus made with ditches on each side is to remain in the field permanently, and may be cropped with the rest of the land if desired. The wheels of the wagon are made with very wide tires, as shown in the illustration, and must not be driven in the same track twice in succession, but used as rollers to smooth down the whole ridge, for there must be no deep ruts to cause the wagon-body to graze the ground.

COLLECTING AND STORING DRY EARTH.

To gather and store dry earth, the following plan is submitted as available not only for the poultry business, and that invaluable invention, the earth-closet, but for preparing absorbents and litter for stables and pig-pens. The best farmers are fast learning to use dry earth for all their animals, not only for the cleanliness and health of the stock, but to lighten the labor of attendance, substitute a cheap litter for straw, and save every particle of manure.

The spot of ground set apart for the dry earth harvest

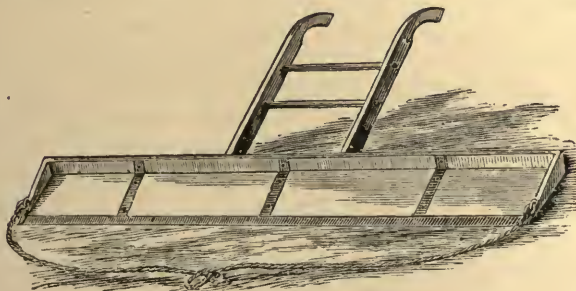


Fig. 3.—SCRAPER FOR DRY EARTH.

should be kept free from weeds and turf, and harrowed as shallow as possible, using a harrow with numerous very short teeth. The ground should not have been

plowed for a year, the object being to pulverize it only at the surface, for in this way the top soil can be better kept from absorbing moisture from below, reversing the usual maxims of tillage. There is seldom a summer without several weeks when the soil for a couple of inches is almost dry. This is the time to proceed with the work. The implements used are a wide scraper (fig. 3) 5 feet long and 10 inches wide, and a shovel (fig. 4) 2 feet 3 inches long and 2 feet wide. They are made lighter than similar ones designed to work among stones and gravel,

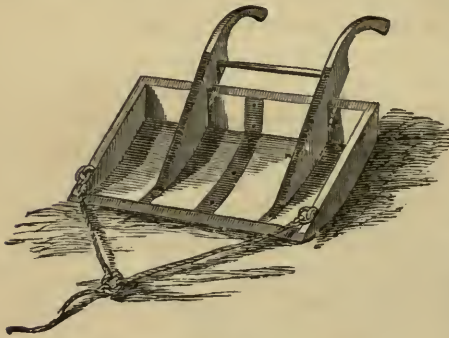


Fig. 4.—SHOVEL FOR DRY EARTH.

and both are intended to be always used in a nearly perpendicular position, and therefore the backs need not be shod for wear, as is usual with team shovels and scrapers. They are both built of wood, edged and bound with

iron. The shovel is made somewhat concave, being designed to move a pretty full load for a short distance; the scraper which only skims the surface is made straight. A rope is substituted for the iron bail for draft attachment in the shovel to make it lighter, and for the same reason the iron edge and bands are thin. The mass moved being very dry, light, and mellow, admits of a rather slight construction of the implement; and as this is to be used by backing the team at every shovelful, and pulling the shovel back by hand, as little weight as possible is desirable. The wooden rod connecting the two crooked handles of the shovel is essential, serving as a convenient handle

in backing. Now, during a time of dry weather, by harrowing your ground with the short-toothed harrow half a dozen times on a hot day, the soil will become sufficiently pulverized, and also advanced one stage in dryness. The next day—watching the weather as closely as a hay maker—hitch your horse to the scraper, and try to scrape one inch deep, no more, and gather the earth into small winrows, extending regularly across the field, the operation being like raking hay. Next make the team follow the winrows, and cock the dirt into heaps of a cart-load each. Now, you have piles of earth nearly dry, but they will not grow any drier until placed, so that moisture



Fig. 5.—PLATFORM FOR DRYING EARTH.

cannot be absorbed from below. To complete the drying, platforms of boards (fig. 5) must be provided: these are 8 feet square, and built wedge-shaped, and 14 inches high at the highest part. These are now drawn by the team upon the planks which form the sides and serve as runners, and located one by each heap with the thin edge towards it.

Attach the team to the shovel by a rope about 12 feet long, and transfer the earth to the platforms, heaping the first shovelful upon the edge next the pile to cover it, so that it may not obstruct the shovel. The platforms should be on the north side of the heaps at the commencement, so as to slope toward the south, and afford direct exposure to the sun. In two or three days of fine weather the piles will be nearly as free from moisture as if kiln-dried, if the earth has been well pulverized, for it is so loose and porous that the moisture from the bottom finds its way to the surface as fast as the latter dries. If the

weather becomes threatening, house the earth without waiting for further drying, or cover with hay-caps, according to circumstances. When ready for housing, draw the wagon close to the north side of the platform, and connect the two with a skid 5 feet \times 14 inches, with teeth projecting over the body to hold up the shovel, and let the earth drop through. The same length of rope between the horse and shovel will be needed as when piling earth upon the platforms. Figure 6 shows the manner of loading.

The flooring of the wagon, when used for carrying feed and water, consists of movable boards, which are taken

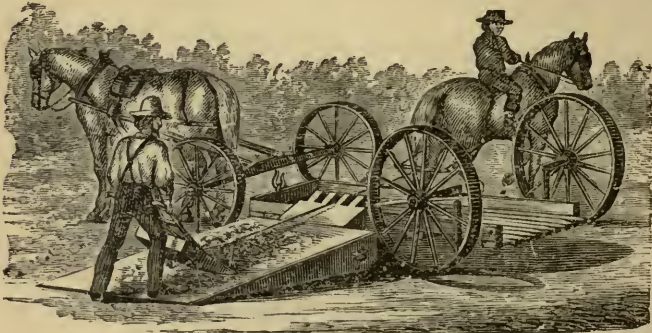


Fig. 6.—LOADING DRY EARTH.

out with the hind-board when preparing to haul earth, and 1 $\frac{1}{2}$ -inch planks, 5 inches wide, with planed edges fitting accurately, are substituted. One end of each plank projects a few inches behind the body, (fig. 7), and is so narrowed that a handspike may be inserted between the planks. By prying them up one at a time, the wagon is readily unloaded. There will not be any appreciable leakage between the planks in hauling 40 or 50 rods, and, to save travel, the earth plat should not be more than that distance from the store-room at farthest. An underground basement in the granary of the establishment is

the proper store-room, and, by driving in above, the load may be discharged through a trap-door in the floor into a capacious hopper-shaped bin. Underneath the bin should be space to drive in winter the wagon or sled, and, by pulling a slide, let the earth fall until a load is obtained to be carried to the stations. In this way the earth is pulverized, heaped upon the drying platforms, loaded upon the wagon, transferred to the bin, and reloaded, without touching a hand-shovel to it at all. The



Fig. 7.—BOTTOM OF DRAY.

wagon may be loaded with the aid of the team shovel in less than three minutes. The farmer may make an earth-bin, of the kind described, in his barn cellar under a trap in

the barn floor. The earth, upon a tract of such mellow loam as is suitable for poultry, will become, by pulverizing and drying, reduced completely to dust. The loading and unloading by team power not only saves labor, but overcomes the difficulties inseparable from shoveling such a light powder, that flies at the least wind. Of course only slight pulverization will be best in preparing dirt for the earth-closet and stable, but for poultry the finer the better. In the fall, when dry weather gives opportunity, labor may be still further saved by scraping heaps of dry earth directly upon the winter sites of the fowl-houses, and drawing as many of the latter as are rendered tenantless by the sale of the old stock upon the heaps, where the earth can remain sheltered awaiting the new flocks of pullets, and no wagon is needed at all for the earth in that case.

After the dry earth has been used in the houses through the winter, the final disposition of it must be made in the spring, as much with an eye to labor-saving as in collecting it. The fowl-houses are to be pried up to loosen their sills from the dust-heap in which they are embedded, and

drawn off to summer quarters. Then the earth, mixed with the manure, is to be first-moved with the shovel,

and scattered about the immediate vicinity, one shovelful in a place. The scraper is next used to spread the heaps, and the harrow comes last, reversing the order of gathering.

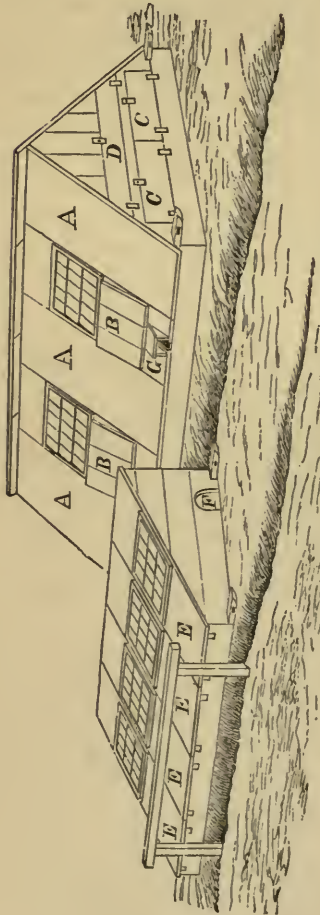


Fig. 8.—HOUSE FOR LAYERS—WINTER ARRANGEMENT.

HOUSES FOR LAYERS.

The form, proportions, and fixtures of the fowl-house for a few eggs and chickens for home use, are of small consequence, so long as the proprietor has invented something a little different from what has ever been made before, and is satisfied. But business upon a large scale demands buildings that shall conduce in the highest degree to the thrift of their inmates, and to the convenience of the attendant, while the outlay in both material and construction should be the lowest possible. The buildings

generally put up cost \$2 or \$3 for each fowl provided for, while amateurs sometimes expend \$5 or more per

head for the housing of their poultry. There are three classes of adult fowls necessary under our plan, which we designate breeders, sitters, and layers; and the latter, which are most numerous, are housed at a cost of materials not exceeding 40c. for each bird; estimates being based on hemlock lumber at \$23 per thousand. The accommodations for the breeding and sitting stock are necessarily more expensive, and there is, in addition, the cost of coops and fixtures for raising chickens enough to replace two-thirds of the adults yearly.

In a practical and economical fowl-house, we expect nothing ornamental nor complicated. There are no ingenious ventilators cheap at \$3 each, or patent nests to beguile hens into laying more or bigger eggs, or rat-proof feeding hoppers opening by clock-work, but the utmost simplicity is sought throughout.

The house used at the stations, for the layers, is shown at figure 8. It is not too large to be moved with convenience, and nothing smaller would accommodate a flock of fifty, the number to be kept at each station, with perches, nests, and sufficient ground room in stormy weather, and at the same time afford height enough to give a circulation of air over the perches, and a proper pitch of roof. It is 15 feet long, 8 $\frac{1}{2}$ feet wide, and 4 $\frac{1}{2}$ feet high at the peak. Let it be noted that any attempt to build so that the attendant may enter, either makes a stooping, slow job of every operation, from year's end to year's end, or if the house is carried high enough to allow standing upright, the weight interferes with moving, and the lumber costs too much. It is as easy to reach into a building designed for the keeper to stand outside, as to reach into a handy cupboard. To give sufficient air, the room is as lofty in proportion to the size of the birds or their breathing capacity, as a stable twenty feet high would be for cattle. It is just about as necessary for the poulterer to have a roof over his head for protection in all weathers

while at work, as in the plan the National Poultry Co. carried out at Bromley, Kent, in England, as it is for a farmer to make a shed over his land to defend his complexion from the sun while haying, and the rain while transplanting cabbages. The part of the roof on the south side at *A, A, A*, and nearly all on the north, consists of hinged doors opening to the right or left, and overlapping when closed, to shed rain. When it is desired to whitewash, throw open all the doors, thus turning the house inside out, take out the perches and nests, all built movable, and there will be no nook or cranny of the woodwork that the brush can not be made to reach with ease, and no lack of elbow-room. This arrangement of doors makes it convenient also to catch fowls upon the perches by night. The doors should shut as snugly as may be in coarse joiner work, and the cracks unavoidably left around them will afford all the ventilation needed in winter, while in summer they may be opened more or less widely, according to the weather. When it is warm, yet wet, they may be partly opened and propped up, and a board put across their edges to shed rain. It is very desirable, under any plan for henneries, to build so that while moderately tight in winter, they may be thrown open on every side in hot weather; for fowls are warmly clad, and suffer much from the heat when in buildings made, as is too frequently the case, only with reference to the cold. The doors which form the north roof project 6 inches at the ridge to keep out rain, as there is no ridge-cap. The two windows in the south roof are glazed greenhouse fashion, that is, with overlapping panes, that snow may slide from them readily as soon as loosened by the warmth inside. They are 2 feet high and 3 feet wide, and set 18 inches from the peak of the roof. A strip of tin is fastened over the upper part of the sash, and the sides and bottom of the sash overlap the roof, to be rain-proof. The shutters, *B, B*, used to darken the building

on certain necessary occasions, elsewhere referred to, are hinged to the lower part of the sash, and when opened, as in the illustration, rest upon the roof below the windows. The side sills project at both ends of the building, they are beveled runner fashion, and strengthened with iron where holes are bored to attach chains; thus the house may be drawn by either end. The sills, which receive the principal strain during moving, should be so well braced as to keep the whole building in shape. The end sills, of 2-inch plank, should be spiked upon the top of the others, flatwise, so as not to touch the ground while moving, and the side-sills, 4 inches square, should be of chestnut or oak, to be as durable as possible, for they rest on the ground during a good part of the year. The spruce rafters, 2×3 inches, which answer for studs and rafters both, should be set at such distances apart as will correspond with the width of the doors and windows which are fastened to them. A stout ridge-pole, sawn of a triangular shape, runs the length of the building underneath the rafters, and two sticks are fastened to this ridge-pole, one 5 feet from each end, and braced upon the center of the end sills to give firmness, for the covering, consisting chiefly of doors, does not strengthen the building, as in ordinary cases, where the covering is nailed to the frame. *C, C,* are doors, each 3 feet×1 foot, opening outwards and downwards, to give the keeper access to the nests, which are 1 foot square, and the same in depth, and so contrived that the hens enter them at one side from a passage 6 inches wide and 1 foot high, boarded at side and top, running the length of the row of nests, and are thus indulged in their liking for privacy while laying. The nests are tight upon the top, the outside door should fit closely, and the opening admitting the fowls to the passage be made so small that the nests will be rather dark. It is found that when nests are open to view from the main apartment, hens will, in stormy

weather, for lack of other employment, sometimes enter them to scratch for food, and thus by chance break eggs and learn to eat them, and acquire the habit of pecking at and devouring eggs as fast as laid. But a darkened nest will deter them from entering, except to lay, for which purpose they prefer a dark, low corner. There is a row of six nests running across the building at each end, making twelve, which will be sufficient, as it will not happen that more than that number out of a flock will need them at once. The passages are made so that they may be taken out with the nests for whitewashing. The end sills, of plank 18 inches wide, serve as a tight floor for the nests and passage. The perches, two in number, are 18 inches apart, and each is 18 inches from the roof, and 2 feet higher than the sills. Perches should be of $2\frac{1}{2} \times 3\frac{1}{2}$ -inch sawed stuff, the widest part up, with the upper corners rounded off a very little. When fowls not fully grown roost upon narrow perches, their breast-bones sometimes become deformed. From four to five average-sized fowls will occupy 2 feet of perch. The perches, being each 12 feet long, will accommodate a flock of fifty, and are to be placed so as not to extend over the part occupied by the nests. The drinking vessel stands upon one of the platforms formed by the nests, and upon these platforms are also shallow boxes containing gravel, pounded charcoal, and a mixture of loam, sand, and oyster-shell lime, made into an easily crumbled mortar. The boxes are 10 inches wide, and, being placed next the end wall, leave a space 8 inches wide upon the platform, for the fowls to stand upon. The drinking pail and gravel boxes are protected by their elevation from the dirt that would otherwise be thrown into them by the fowls when scratching and dusting, and are fronted by slats with openings $6 \times 2\frac{3}{4}$ inches between them. An opening is made in the end wall over the pail that is just large enough to admit the spout of a large watering-pot with-

out the sprinkler, to afford the most convenient arrangement for watering. The door, *D*, 1 foot wide, opening downwards, is for removing the pail and gravel boxes when desired, and when fastened ajar will be found more convenient for ventilation than the roof doors, when the weather is only moderately warm. Both ends of the building alike are furnished with doors.

During the severest weather, generally about three or three and a half months of the year, this building does not stand with sills upon the ground, but for winter it rests, as in figure 8, upon the edges of a box or bin of dimensions corresponding with the center of the sills of the building, made of planks 9 inches wide and 2 thick, like a mortar-bed with no bottom, filled with dry earth. This should be set upon ridges thrown up by the plow, as previously described, and it will be found that, by starting with the earth dry in the fall, it will not absorb moisture from the ground beneath during winter, any faster than it dries away from the surface where the fowls keep it in motion. There need be no cleaning of the house while thus arranged for winter, but about once a month an inch or two of dry earth may be added. There will be no accumulations under the perches if the birds are kept not too profusely supplied with gravel at that season, as they should be to induce them to thoroughly pulverize every portion of the manure and mix it with the dry earth, in search of the gravel which is very frequently voided. There can be no objection to saving labor by inducing the birds to perform the work of scavengers, which will give them salutary exercise, for it is not intended that they shall be deprived of as much gravel as they need, but only forced to use the same many times over. The bin, as it may be called, should be strengthened with braces across the corners, and kept from spreading by the pressure of its contents by strips nailed from side to side. After the building has been moved in spring to a new

station, the bin is to be pried up until the earth drops through, it having no bottom, and when empty it may be readily hauled by team, like a sled, to the place where it is to be used, as will be explained, in connection with chicken raising. The building is hauled on to this bin in the fall and off by taking the wedge-shaped platform for drying earth, previously figured, for a skid, and attaching the team to a rope 20 feet or more long, and using small rollers. It is a quick and not over troublesome operation, for it must be recollected that the house is not large nor heavy.

FEEDING HOUSE FOR WINTER.

During the winter, a low structure, 6 feet wide and 12 long, and $1\frac{1}{2}$ high on one side, and $3\frac{1}{2}$ on the other, seen at the left in figure 8, serves the purpose of a feeding room, and the rest of the year is used as a shelter for chickens. Its winter location is about 4 feet from the larger building. *E, E, E, E*, represent doors which overlap each other to shed rain, and when closed rest upon the highest or north wall, and open upwards and to the south, resting upon a rail attached to posts set in the ground. In each door is a window 3 feet square, glazed, as are all the windows in the various fowl-houses, greenhouse style. This feed-house is movable, being furnished with planks set edgewise, with runner-shaped ends for side sills. Inside, a feed-box, slatted on both sides, rests on cleats attached to the end walls, 20 inches from the north wall, and near the top of the room, so that dirt can not be scratched into it. It has a shelf 7 inches wide on both sides in front of the slats, on which the birds stand while feeding, and contains a trough made by nailing boards 3 inches wide to each edge of a board 5 inches wide. A door, *F*, in one end of the feed-room, large enough to admit a fowl, communicates with a similar

door, *G*, in the south side of the main building, by a movable covered passage, 5 $\frac{1}{2}$ feet long, 1 $\frac{1}{4}$ high, and 1 wide, it being like a box with a lid, and but one end, and with an opening on one side. This passage is not shown in the illustration. Every night in winter, after the fowls are at roost, the door *G* should be closed, and the window-shutters of the main building likewise. In the morning a mixture of vegetables, boiled and mashed, scalded meal, and a little meat boiled and chopped fine, is placed in the feed-trough, and the daily rations of hard grain buried underneath straw which covers the ground of the feeding apartment to the depth of 8 or 10 inches. The fowls are prevented by the shutters from looking on. Next open the passage, and in a minute the fowls will all be at the feed-box. After finishing the soft feed, the grain, consisting in part of buckwheat or cracked corn or wheat screenings, so as to make as much work as possible to find it, will be scratched for at intervals all day long. A little practice will enable the attendant to give just enough, and have none left over night.

During a few of the coldest spells, such as usually occur three or four times in the winter, and last three to seven days, and during storms, fowls prefer to remain in doors all day, but they should never, except in the morning, before feeding, be prevented from going out if they choose. Altogether there are not usually twenty days in a year during which fowls will voluntarily keep inside all day. Snow should be cleared from a plat of ground at each station, with the aid of the team, and the scraper and shovel previously described. If the winter is open and mild, have a pile of straw out of doors with grain buried under it. As soon as the buildings are moved to the new stations in spring, and the feeding-rooms are also drawn off to be used in housing young chickens, the feed-boxes are taken out, they merely resting on cleats, without being fastened, and carried to the stations, where they

stand on the ground out of doors during summer, for use each morning, feed being placed in them, out of sight of the birds, as before.

Figure 9 is an illustration of the summer arrangement; in this the feed-box is seen in the foreground, and the doors in both roofs of the house are propped up a little, as in cases of extremely hot weather. It will be found that the birds will seek the protection of a building thus

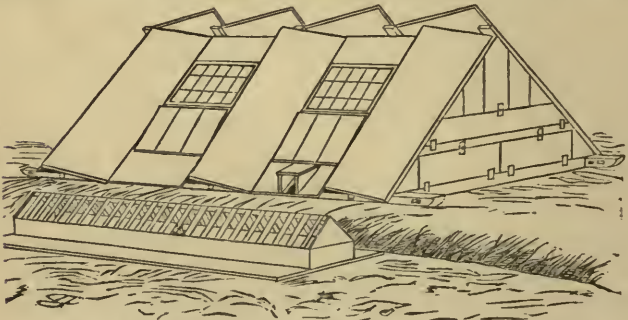


Fig. 9.—HOUSE FOR LAYERS—SUMMER ARRANGEMENT.

arranged, for shade, when the heat is severe, in preference to any other place. In summer the grain is buried under a profuse allowance of straw, by the use of a horse-rake and hay tedder, or under the soil, by means of the fine and short-toothed harrow used in pulverizing earth for gathering, as before mentioned.

HOUSES FOR SITTERS.

The stock used for hatching purposes is managed differently from the layers, and needs different accommodations. The houses for sitters, fig. 10, are near the center of the farm where the granary and cook-room are located. They accommodate 100 fowls each, are not movable, and are set upon a stone or brick underpinning, 10 inches high. They are 10 feet 4 inches from the ground to the

peak, and 20 feet long by way of the ridge, and 16 feet wide. The roofs are shingled, and the ends of the buildings covered with boards nailed upright and battened. About one-third of the roof towards the south is glazed, the windows being partially darkened as warm weather approaches. The form of these houses, like that of all in the establishment, with caves near the ground, is adapted to afford as much ground room as possible in proportion

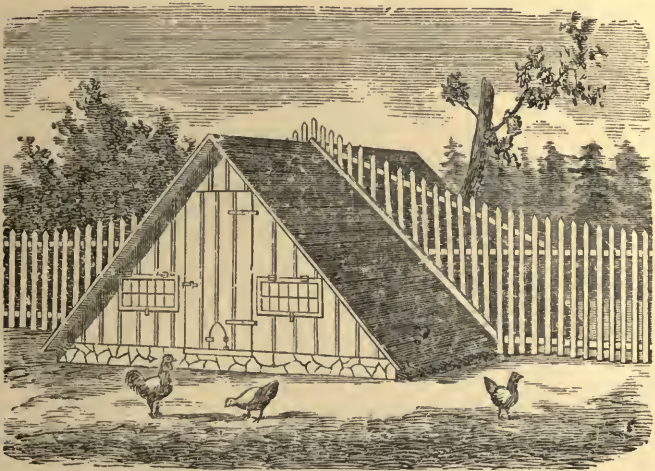


FIG. 10.—HOUSE FOR SITTERS.

to the lumber used. The roof of each house is crossed outside by a picket fence running at right angles with the ridge. This fence forms one side of the yard with which each house is furnished, and though it extends only 18 inches above the ridge of the building, the sitters, not being of a high-flying breed, will not get over it. By this arrangement exit is afforded to the fowls and to their keeper at either end of the building, into a yard which is located at either end on alternate years. The two ends of the house, one fronting east and the other west, are both provided exactly alike with doors and windows. The

large doors are $6\frac{1}{2} \times 3$ feet, opening outwards, and the smaller ones attached to them are 7×9 inches. The windows are 2×3 feet, and are hinged, opening upwards for ventilation. In hot weather the windows and doors in both ends of the building are opened wide, and to prevent the fowls escaping at the end where there is no yard, wire netting is fastened across the window casings inside, and there is an inside door of the same material hung to the stud to which the outside door is hinged. Figure 11 gives an interior view of the house. There are four perches,

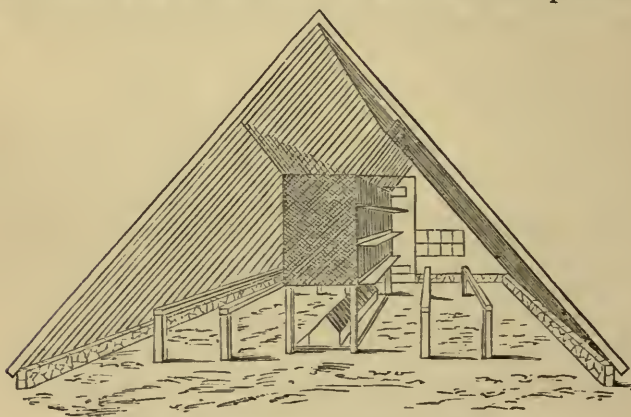


Fig. 11.—HOUSE FOR SITTERS—INTERIOR.

each 15 feet long, and of the width and thickness of those for layers. They are placed 18 inches higher than the top of the underpinning, those nearest the nests being $3\frac{1}{2}$ feet, and those nearest the eaves $5\frac{1}{4}$ feet from the center of the building. A space $2\frac{1}{2}$ feet wide at each end of the room is left unoccupied by the perches. Three tiers of nests occupy the center of the room, each tier consisting of two rows placed back to back, and running in the same direction as the perches. There are 12 nests in each row, or 72 in all, and as each nest is 1 foot square and 1 foot high, they occupy 12 feet in length. This

allows a space of 4 feet at each end of the building between the nests and the doors, and as the latter are planned of a sufficient width to admit a wheelbarrow, and the perches are made so as to be easily moved, opportunity is afforded to wheel in or out the dry earth which fills the bottom of the room nearly up to the top of the underpinning. There are nests enough so that forty or fifty hens may be set at once, and leave room for fowls that are laying. The nests are placed so that the bottom of the lower ones are 6 inches higher than the perches, this height enabling the attendant to avoid stooping, as there is much work to be done about the nests of sitting hens; while they are not so high as to prevent the fowls reaching them by flying upon the nearest perch, or as to render a ladder necessary. The nests are made so that the hens enter them at the front, where a 2-inch strip set edgewise prevents the eggs from tumbling out. An alighting-board projects $2\frac{1}{2}$ inches in front of each row of nests. The partitions at the backs of the nests are made of wire-cloth of a mesh fine enough to keep out rats, those at the sides of the same and of a coarse wire netting, alternately, for purposes described in another place. In this way the circulation of air is allowed for the health of the sitters. Sufficient attention is not generally given to this point. Fowls in a state of nature being accustomed to scratch holes in the ground under bushes, to form their nests and incubate where there is plenty of air, pant and show distress in hot weather when forced to occupy close boxes. Large doors of wire netting, with coarse meshes, not shown in the illustration, prevent the fowls roosting at the entrance to the nests at night. These doors are closed after gathering the eggs towards evening, and opened again the first thing in the morning, and are made in two parts, folding together, so that there may be room for them overhead, when raised. A piece of rat-proof wire-cloth is placed in front of a nest

occupied by a hen, engaged in hatching, and fastened by buttons, to keep out laying fowls by day and rats by night. To keep the fowls from using the upper part of the room as a roosting place, lath-work, a part of which is shown in the figure, extends from the top of the upper nests to the roof. Underneath the lower tier of nests is placed a feed-box, made like those with which the houses for layers are furnished, and others of the same construction should be placed on the ground at the ends of the perches, and at right angles with the latter. Five houses for sitters, each with its yard, will be required for an

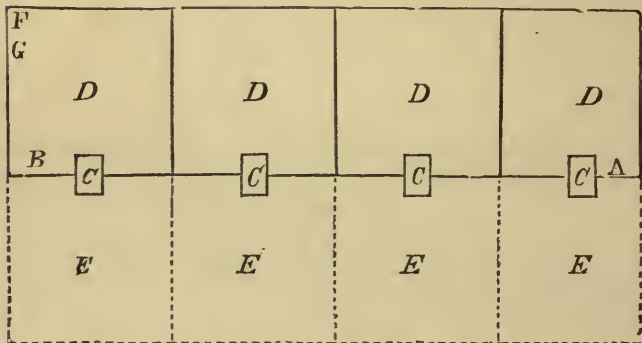


Fig. 12.—PLAN OF YARDS FOR SITTERS.

establishment of the size we are describing. The arrangement of the yards is shown by fig. 12. The fence, *A*, *B*, is made like the buildings *C*, non-movable. The fences on the remaining three sides of the yards are moved yearly. Suppose that last year the yards were located at *E*; then this year they are at *D*, and *E* is devoted to crops. A strip of ground is left untilled near the doors of the buildings for a wagon path. To keep the yards free from taint and afford scratching ground, a part of each is plowed occasionally during the season when they are occupied by the fowls. All the fences running east and west, as *F*, *B*, are composed of gates, so that by open-

ing, for instance, at *F*, *G*, through the whole range of yards, a strip of each may be plowed, and in a few days the operation may be repeated at another part of the yards.

ARRANGEMENTS FOR BREEDING STOCK.

The quarters for the breeding stock combine houses very much like those for layers, and yards like those for sitters, only both are smaller. The houses for layers are movable, with no yards; the houses for sitters are sta-

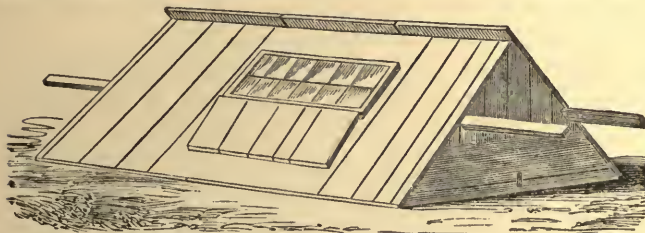


Fig. 13.—HOUSE FOR BREEDERS.

tionary, with movable yards; and the houses and yards for breeders are both movable. The breeders are kept in fives and tens, no flock ever to exceed the latter number. The buildings are of two sizes, one $3\frac{1}{2}$ feet wide, 4 long, and $2\frac{1}{2}$ high, and the other of the same width and height, and $7\frac{1}{2}$ feet long. There are no runners, and the doors are few in number, though comprising the whole roof; each house (fig. 13) is furnished with but one window, and but two or three nests are necessary, and one perch. Otherwise the houses are like those for layers on a reduced scale. They are designed to be moved by two persons, adjustable handles being attached at either end for this purpose. In this way, being without floors, they are shifted to different parts of the yards, and set on ridges of earth raised by the plow. In winter each stands upon the edges of a dust-bin of 2×8 -inch plank. The arrangement of gates to admit the team for plowing, the sta-

tionary fence at one side of the yards, and the shifting of the latter to allow tillage, are the same as for sitters, with the exception that the stationary fence is entirely detached from the houses. The movable fences for the yards of both sitters and breeders are made as follows: Pickets 2 inches wide, $1\frac{1}{2}$ inch thick, and 6 feet long, are nailed to two rails 3 inches square, and 12 feet long. At both ends of every rail, U-shaped pieces of stout hogs-head hoop-iron are fastened by screws so as to form staples through which round posts, $7\frac{1}{2}$ feet long, and $2\frac{1}{2}$ inches in diameter, pointed at both ends, are thrust, and set in the ground. The rails in the alternate sections are at such distances apart that the tops of the pickets shall be in line, and the staples not interfere with those of the

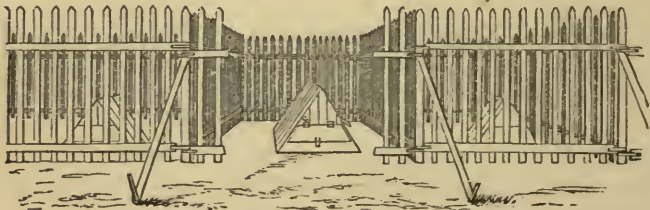


Fig. 14.—YARDS AND HOUSES FOR BREEDERS.

adjoining sections. Each post is supported so as to resist the winds to which the fences expose so much surface, by a brace upon the outside of the yard (fig. 14). This brace is made by sawing a rail stick in two, and furnishing each end with a staple like those upon the rails. The staples are fastened upon the braces in an obtuse angle, and the ends of the braces are beveled, the better to fit the posts. One of these staples passes around the post between the two staples of the upper rails, and through the lower one, which reaches to the ground, a short stake is driven into the earth, with its top inclining away from the fence (fig. 15). The gates which compose the entire sides of the yards where the team passes in plowing, are

hinged to stout posts, which are braced in a similar way. The stationary fence represented in fig. 10, and the corresponding one which forms a part of the breeding yards, are made substantially with posts of good size, deeply set in the ground, so as to stand without braces. The gates occupy a space of 12 feet each, the same as a section of the movable fence. The smaller breeding yards for five birds are 12 feet square (fig. 14); the larger ones for ten birds are 24 feet square, and the yards for sitters are 48 feet, or in each case a fraction over these figures, to allow for the room occupied by the posts; the design being to use one, two, or four gates, or movable sections, to make one side of a yard. The openings between the pickets are $2\frac{1}{2}$ inches wide for breeders; for sitters which are of larger breed, 3 inches are allowed. The pickets are nailed on the yard side of the rails, to prevent fowls alighting on the latter. The gates which divide the breeding-yards are boarded for 2 feet at the bottom, to keep neighboring cocks from fighting.

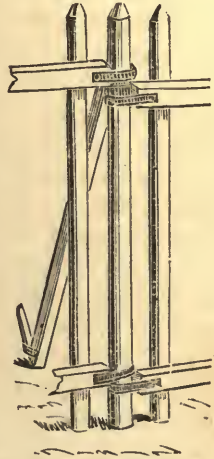


Fig. 15. MOVABLE FENCE.

FOWLS FOR LAYERS.

The layers must be of a breed that affords chickens easily reared, for success in the nursery department is all-important; they must be at the head of the list of prolific layers of fair-sized eggs. None but a non-sitting race will answer, for sitters make fully double the labor during half of the year; and the feathers must be light, because dark ones show badly when chickens are dressed. There is at present no breed that fulfills all these conditions so well as the White Leghorn. It may degenerate in time,

as other races of fowls have done, by being bred for fancy instead of utility, but it possesses now more vigor than any other non-sitting breed. Excessive wattles, comb, and tail, prized by the fanciers, are for our purpose avoided, and by selecting the most moderate combs and other appendages for a number of generations, our stock appears as in fig. 16, which, like all of our illustrations, was drawn from life. In breeding poultry, show and utility do not get on well together in the long run. To fanciers unquestionably belongs the credit of originating improved breeds, but afterwards, in fixing conventional points for the show-room, the stock is often ruined in their hands. To prevent the freezing of the combs and wattles during severe winters, they should be "dubbed" when the birds are two-thirds grown, as shown in figure 17. The operation is not so painful as might appear, and if shears are used, the blood-vessels are pinched, and but little blood will flow.

The layers are relied upon to produce the principal part of the income, and as they are chief in point of numbers, the detached stations where they are kept form the main part of the establishment, to which the breeding and sitting departments are merely tributary. Most of the layers must be kept only until the age of from fifteen to twenty months, and then killed for sale, and their places supplied by young pullets. This course is necessary, because the yield of eggs is greatest during the first laying season if the hens are of an early-maturing breed, and are fed high, and stimulated to the utmost, as they must be, to secure the highest profit. For though hens are still vigorous at two years, it will be found that after a course of forcing to their greatest capacity through the first season, they can not generally be made to lay profusely during the second. If we chose not to put on the full pressure of diet the first year, but to feed moderately high for two or three years, a fair yield of eggs would be afforded during



Fig. 16.—SELECTED WHITE LEGHORNS

each. But such a course would not pay so well as to keep pullets only, and maintain a forcing system constantly from the time they commence to lay until they stop, and then market them before they eat up the profits in the idleness of fall and winter. Pullets grow fast during the early part of their lives, and give a return in flesh for what they eat then. After they commence laying, their eggs are prompt dividends, and, besides, their bodies increase in weight until the age of a year or more. Young hens may be killed a fortnight after ceasing to lay, and if they have been skillfully fed, their flesh will prove excellent for the table as compared with fowls that are two or three years old. It is no wonder that there is little liking for the adult fowls the markets ordinarily afford, for they comprise many that are very old and unfit for food. But regular customers will soon approve fowls a year old, which have been supplied with the cleanest food, and brought to just the proper fatness, and delivered freshly killed and neatly dressed, and our experience proves that the families upon the egg route will order all that the establishment has to dispose of. The high-pressure mode of feeding and turning off while yet young, is then the true policy. The point is, there is a certain consumption of food to enable any animal to keep alive. The ordinary vital operations, aside from laying or increase of size, demand force, obtained through food—which is money—and we should aim to support only such fowls as are all the while giving returns in either growth or eggs. The long period of moulting and recovering from its consequent exhaustion, costs, as does the maintenance of the vital fires during the cold of winter. It is a matter of quick balancing of profits and expenses with animals, which, like fowls, consume the value of their bodies in about six months. If it is urged that the stimulating diet and unnatural prolificness will subject the stock to disease, the reply is that the regimen is not continued

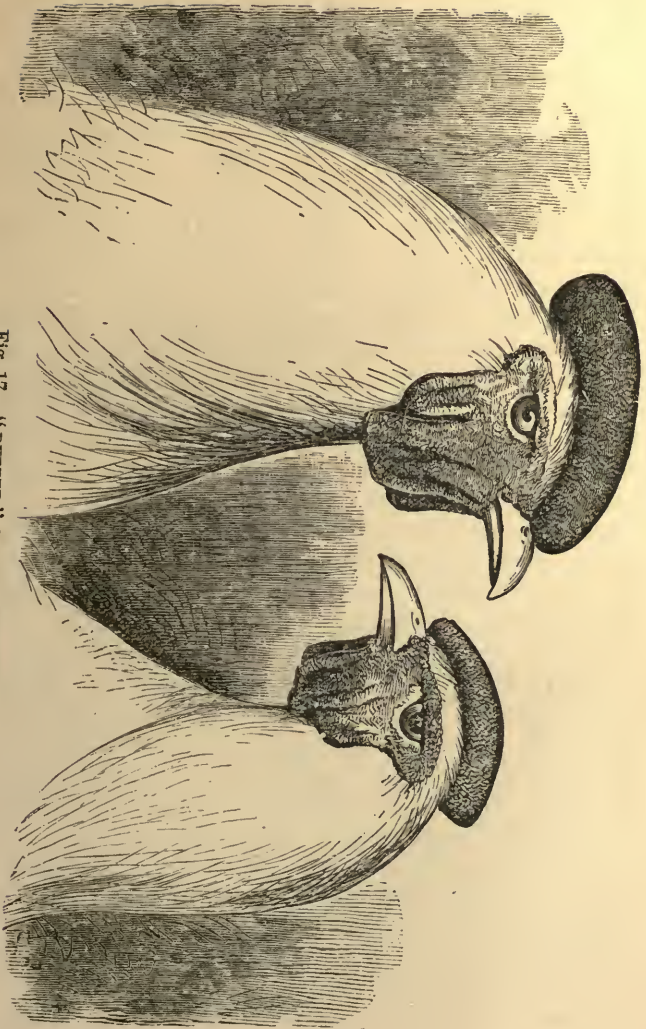


Fig. 17.—“DUBBED” WHITE LEGHORNS.

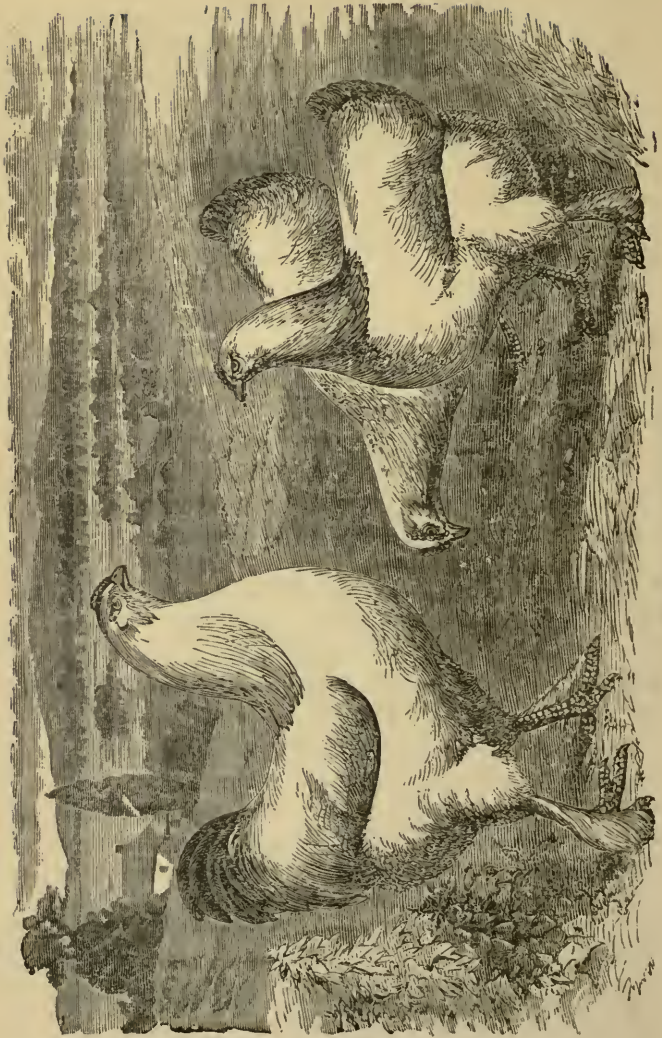


Fig. 18.—LIGHT BRAHMAS.

more than six or eight months, and in that time evil effects will not ordinarily follow, for the birds are allowed freedom, sun, and air, and special provision is made for daily exercise. As none of the fowls to which this forcing system is applied, leave descendants, no evil effects are accumulated and entailed upon the stock. The layers are from the eggs of fowls that have not been subjected to any such pressure, and during the period of their principal growth they have been given a nutritious but not especially stimulating food—like a colt at pasture. When they arrive at the laying age, they are kept like the horse—broken to work, and put to constant and severe labor, and fed as high as he will bear.

FOWLS FOR SITTERS.

The sitters are of a breed chosen for persistence and regularity in incubation, fidelity to their chickens, and gentleness of disposition. The Light Brahmas (fig. 18) are our resource, and can not be excelled for hatching and rearing. Pure bloods, however, are not used; but to give less awkwardness and greater spread of wings, they are crossed with snow-white barn-yard fowls (fig. 19). The half-bloods produced are represented (fig. 20) very accurately by the artist. They resemble the Brahmas the most in form and other characteristics, and are almost uniformly docile. The half-blood Brahmas are extremely valuable for hatching and taking care of chickens. The results of the labors of poultry fanciers in producing two such breeds as the White Leghorns and Light Brahmas are enough to compensate for all the humbug practiced by many members of the guild. The sitters are not kept at detached stations like the layers, for several reasons. One is, they should all be near together, because of the great amount of attendance necessary in connection with hatching. Then the buildings should be large enough



Fig. 19.—SNOW-WHITE BARN-YARD FOWLS.

for the keeper to enter, in order to take care of the nests and chickens, but the size of the structure and the risk of jarring eggs will prevent moving. Nor can the system of indirect feeding and no yards be pursued, for the sitters should be fed at the attendant's feet, and tamed so as to submit quietly to the handling they receive while hatching and rearing. Their yards are sufficiently large to admit of exercise, and for the same reason their dry grain is buried in the ground or under straw. In very cold weather they are confined to their houses for warmth, and are given a stimulating diet to promote winter laying, not so much for the value of the eggs as to render it certain that there shall be a considerable number of birds ready to sit in February, and many more in March. The fowls chiefly depended upon for this, consist of the earliest pullets of the previous year, and also the old hens that have been employed much of the time the preceding summer in hatching two or three broods. The prevention of laying by hatching and rearing, causes birds thus occupied to lay earlier the next season. By a little management there is no difficulty in procuring plenty of offers to sit from February to June. One half the sitting stock are kept until two years old, and of the pullets of the sitting class raised yearly, some are hatched in February and March, and some in the first week in September, the better to secure sitting at various parts of the year. Except in winter, the sitters should not be fed with a view to encourage laying, but the aim should be to keep them on as moderate an allowance as possible, and not have them become poor. Their specific purpose is incubation, and they should be made to do as much of this as possible. By uniting broods, when a hen has hatched one nestful of eggs she may be given another immediately, and if managed rightly she will not be injured by sitting a double term. Each hen must hatch two broods per year at least, and some will hatch three. In

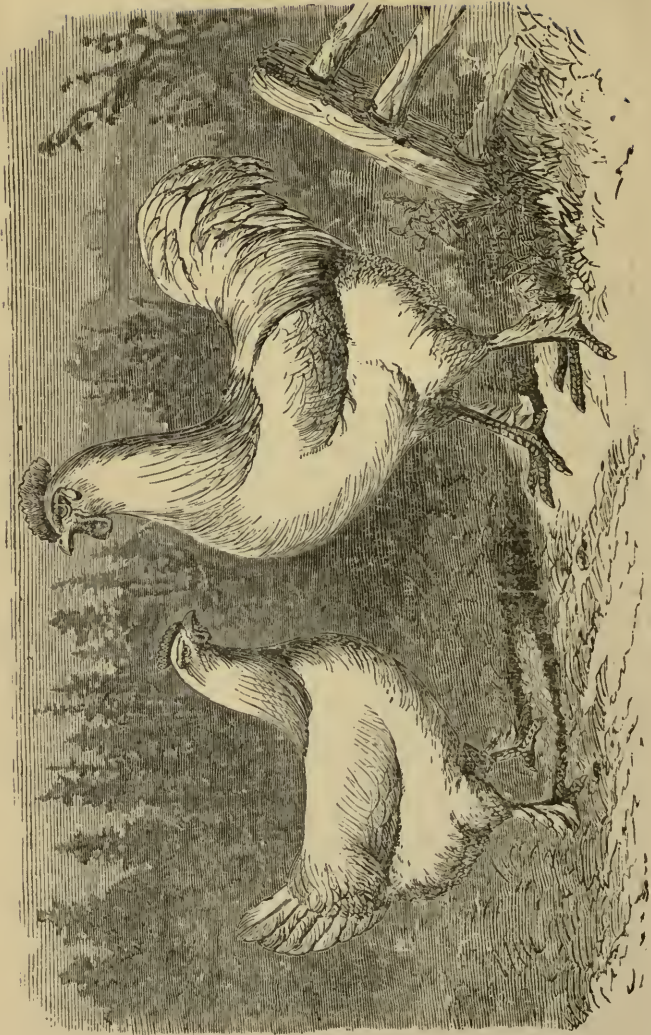


Fig. 20.—HALF-BREDS FOR SITTERS.

this way the stock of 500 sitters will produce 10,000 chickens yearly, or an average of 20 apiece.

MANAGEMENT OF BREEDING STOCK.

The proper management of the breeding stock is a very important part of the scheme, for there must annually be raised a large supply of pullets of the right quality. The profits of the establishment depend largely on the excellence of the fowls, and as they can be multiplied very fast from a chosen few, no pains should be spared to secure the very best as a source from which to stock the whole farm. There is but one way to do this, and that is to keep individual birds in experimental yards in order to test their merits, recording the degree of excellence and the pedigree of the best with as much care as would be given to breeding cows or horses.

We will suppose it is designed to produce a strain of Leghorns that shall excel in prolificness, laying at an early age, and in other requisites. Procure a pullet from A and a cockerel from B, and put them in yard No. 1; purchase of C and D one bird from each, for yard No. 2, and so on, always taking care that no specimens are obtained from any locality where disease has prevailed. The smaller breeding yards are used as experimental yards, and to allow each cock a proper number of mates, two or more half-blood Brahma pullets (whose eggs can be distinguished by their color) are added. Give each Leghorn a name or number, and enter in a book all details necessary for testing progress in improving the breed, such as weight, the age at which laying commenced, and the yield of eggs during the first year, at the expiration of which banish all but the best hens. The second year set the eggs of the reserved extra fowls, and keep the chickens produced by each pair separate from all others. At the age of five or six months, cull out the most promising pullets and cockerels, and pair them for testing and re-

ording pedigree and prolificness as before. By mating the produce of the original birds from A and B with the produce of those from C and D, finally the four stocks will become blended in one. Proceed in this manner a number of years, and when in the course of time a very extra prolific and vigorous hen has been found, which reached full size and commenced laying early, and whose ancestry have excelled in the same respects for several generations, as shown by the book, then from her eggs cocks are raised from which to breed to replenish the main stock of layers at the itinerant stations. These cocks are put in the larger breeding yards, each with a flock of ten hens, and no further accounts are kept of the prolificness of individuals.

After new stock is introduced to the experimental yards, as must be done yearly, care is taken for a series of years to avoid breeding akin, and as purchases will be made from fanciers, who to fix the conventional points have most likely bred close and impaired strength, crossing will immediately give a decided increase of vigor. Towards the last, however, when sufficient stamina has been gained, and the stations are to be stocked, close breeding is resorted to. This is to increase the yield of eggs, the philosophy of the matter being as follows: Just as a fruit tree girdled or severely root-pruned will give a profuse yield and then die, and as various domestic animals will for a short time be more prolific after removal to unaccustomed climates, so the violent attack on vitality which occurs when there is in-and-in breeding, is met by an energetic attempt of the organism to propagate in unusual numbers and thus maintain its kind. There has been much confusion on this point, for while scientific naturalists have insisted that no animal can thrive under continued close breeding, practical poultry keepers have pointed to the prolificness of in-and-in bred flocks as a proof that there was no deterioration. The fact is, indi-

vidual perfection and rapid increase are to a certain degree incompatible. Under our plan of aiming chiefly to secure great quantities of eggs, we purposely give the constitution of the birds a shock in order to increase fecundity, having first, however, carefully built up, for some years, by careful selection and good sanitary conditions, sufficient strength to withstand the assault. This course may appear inconsistent, but experiments have shown us that it is correct.

The Brahmas are bred in the experimental yards with a different basis of selection. The best sitters, and those with the shortest legs and the least black upon the plumage, are preferred. Brahmas can be bred very light-colored in a short time. The white barn-yard fowls are selected also with reference to persistence in sitting, and particularly for their ample wings. The experiments need not be carried out to such an extent with these last-mentioned breeds as in case of the Leghorns, which fill such an important part.

In the breeding and experimental yards, the fowls must be fed and managed in every respect with the greatest care. Over-fattening is to be deprecated above all other things, and may be avoided by burying all the grain to make the birds exercise by scratching. The supply of grain should be moderate; meat should be given very often in very small quantities, and the allowance of fresh vegetables should be ample. Free range would be very desirable for all the breeders, but as it is impracticable, scrupulous care must be taken to furnish artificially natural conditions. Though the birds of the laying class in the experimental yards are rated according to their prolificness, yet the test is merely a relative one, for they are not forced to profuse laying by stimulating feed.

COOPS FOR CHICKENS.

The construction of the coops for young chickens remains to be described. A chicken coop must be adapted to warm weather and cold, and especially to rains, be easily cleaned, and made rat-proof at night. The old-fashioned triangular pattern (fig. 21) secures all this, and also gives small chickens a chance to escape under the eaves from the feet of the hens. Two hens are put together with their broods, for reasons which

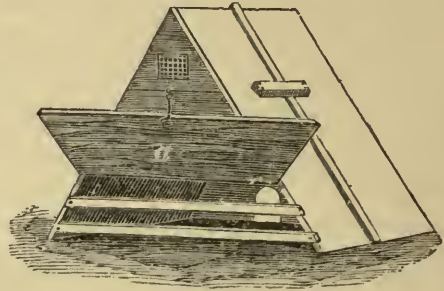


Fig. 21.—TRIANGULAR COOP.

will be given in another place. The size proper to accommodate a double brood is $2\frac{1}{2} \times 3\frac{1}{2}$ feet upon the ground, with roof 3 feet from eaves to peak. A bit of scantling is fastened to each roof for a handle. The

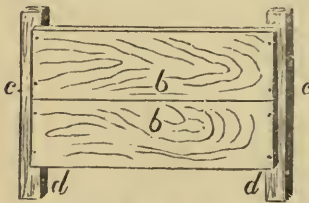


Fig. 22.—FLOOR OF COOP.

door, *a*, is hinged to open upwards. There is a small door at the rear that will allow chickens to pass, but not grown fowls. An opening for ventilation is made near the peak, and covered with wire cloth. Take inch boards, *b*, *b*, (fig. 22), and nail strongly, planed side up, to the cleats, *c*, *c*, and clinch. Let both ends of each cleat project three inches, and the outside edge of each two inches. This is the movable floor, and must be of such size that the coop shall rest entirely upon the projecting ends and edges of the cleats, then when

the doors are closed, all rain will be shed outside the floor. In figure 23, a section of the coop shows the floor in its place. When the doors are closed at night, leave the large one, *a*, ajar $\frac{1}{2}$ inch or 1 inch, according to the weather, for air, and fasten it with wooden pegs stuck in holes through the cleats, at *d, d*, which will make the coop perfectly rat-proof. Once a week, after opening the door *a*, to enable the chickens to escape through the slats out of the way, slide the coop slowly lengthwise of the cleats away from the floor, which must be scraped thoroughly; then give it a shovelful of dry earth and replace. You will always have a dry, inodorous apartment, and will not shut up chickens in close, foul air.

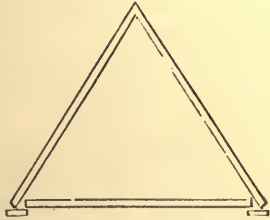


Fig. 23.—SECTION OF COOP.

FEEDING CHICKENS.

All the chickens destined for the itinerant stations, must, as mentioned in the first article, be fed indirectly. For two days only are they and the hens fed upon the floor of the coop. Then for a week they are fed in the



Fig. 24.—FEEDING BOX.

box given in figure 24. It has no bottom, and the top, not shown in the figure, is temporary, and composed of loose boards. Place it so that its door shall meet the

small door in the coop, having first dropped in the feed at the corner *e*, and covered the box with the boards in such a manner as to admit a little light. After a week, the chickens, being strong enough to venture some dis-

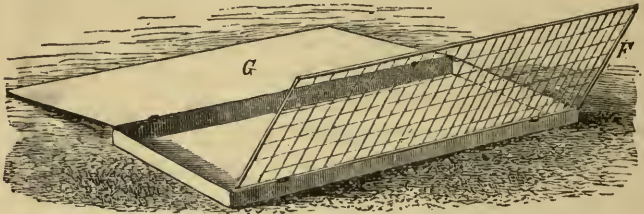


Fig. 25.—FEED-BOX WITH GRATING.

tance, are fed from a box of tin, 6 × 16 inches and $\frac{3}{4}$ inch deep (fig. 25). A wire grating, *F*, with meshes 1 inch square, protects the feed from the feet of the chickens, but admits their bills. The grating is covered at pleasure by a lid, *G*, both being hinged to opposite sides of the box. When such boxes are placed in a row (fig. 26), each filled with feed, one for each coop, with the lids down, a snap-hook is attached to a ring which is fastened to each

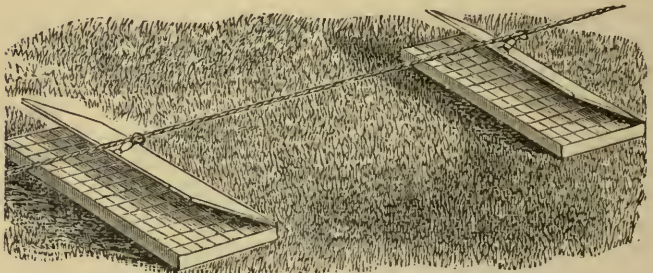


Fig. 26.—ARRANGEMENT FOR OPENING FEED-BOXES.

lid, and a wire connects with all the hooks as in figure 26. One pull opens all the lids and the chickens are at dinner. These feed-boxes are carried to the granary to be filled, using a wheelbarrow in which many may be packed at a

time. The coops are 20 feet apart, in a single row, and the wheelbarrow is rolled along the line, and the boxes, with lids closed, are put on the side of the coops near the small doors, which are shut, in order that the hens may not worry when the chickens are feeding. The hens are fed and watered in cups, fastened to the inside of the coops as high as they can reach. The cups are filled once each twenty-four hours, after dark in the evening, so as not to attract the attention of either hens or chickens. When the chickens are a month old, a part of their feed should be buried near the coop early in the morning, before they are let out, so that they may scratch during the day. Whenever it is rainy, the box used the first week for feeding (fig. 24), is resorted to again for that purpose.

The additional *time* required to feed chickens indirectly is slight, if operations are systematized. All the chickens of the experimental stock, and of the Brahma, and White Barn-yard, and Half-blood classes also, are reared at a separate part of the farm, and fed directly.

When the hens are removed from the chickens, the latter huddle together nights upon the floor for some weeks, but when old enough to perch, the box (fig. 24), is placed upon the movable coop-floor, and the coop is placed upon the top of the whole, the box being of such size that the eaves and sides of the coop overlap sufficiently to shed rain. The box has two perches permanently fastened to it, one of which is seen in figure 24. This roost is rat-proof, and a bushel or so of dry earth keeps it clean.

SETTING THE EGGS.

Vigor and thrift in chickens depend, in the first place, upon the quality of the eggs set. Those obtained from breeding stock managed as described in the preceding article, will hatch strong and healthy chickens; observing one precaution. Care should be taken never to set eggs

laid near the close of the season, when the hens have been very prolific, for such will produce chickens deficient in vigor. The production of eggs in great numbers is, in the best laying breeds, abnormal. The wild jungle fowl, in common with all birds in a state of nature, lays no more than she can cover, and this is true of domestic hens of sitting breeds, that steal their nests. It is the daily removal of the eggs by the keeper, and the supply of an abundance of nutritious food, that causes great prolificness. There are some species of wild birds that will produce from three to ten times their usual number of eggs, during a season when their food is abundant, if their nests are continually robbed. But when hens lay twenty or more per month, for several months, the eggs are impaired. This is one reason why chickens hatched in summer are sometimes so deficient in vigor, compared with those produced in early spring. For the sake of economy it is important to have as few non-impregnated eggs as possible. Over ninety per cent will be impregnated if the breeding cocks are strong and sprightly, and no more than ten hens are allowed in a flock. It is a good plan to keep two cocks for each group of breeding hens, and shut them up, alternately, one day at a time, in a small but comfortable coop, entirely out of sight of the hens. The eggs should not be kept more than a week or a fortnight before being set. Those laid the same day should be given to one hen, so that the whole brood may hatch simultaneously, for new-laid eggs hatch several hours sooner than those that have been laid a considerable time before being set.

Artificial hatching and rearing are not economical. Even if incubators should become so perfected as to be capable of hatching as great a proportion of eggs as hens, there is no way of rearing the chickens artificially, and securing ventilation, warmth, cleanliness, and room for exercise, without greater outlay in labor and building

materials than is necessary when hens are employed. Young chickens can not be kept warm enough, during cool nights, under an artificial mother, by their own heat, unless they are in a small apartment, kept so close as to produce very foul air. If good ventilation is attempted, there must be artificial heat supplied, and this needs an apparatus very nicely regulated, or the chickens will suffer from extremes of temperature. The cost of fixtures for heating, and of fuel, and of separate inclosures large enough for each brood to exercise in, would be great, and, what is of more consequence, the amount of attendance involved would make the plan entirely impracticable, except in case of high prices for early chickens or blooded fowls.

The nests of sitters should be made at bottom of damp earth, packed to a concave shape. It is not necessary to place them upon the ground, or to sprinkle the eggs with water, if this rule is followed. It is proper that the eggs should be in some way exposed to moderate dampness during incubation, as otherwise too much of the water in their composition evaporates. An elevated box furnished with nothing but dry litter is not suitable. Cover the earth with straw, bruised until pliable, and broken short. Long straw is apt to become entangled with the feet of the hen, causing breakage of eggs. It should not, however, be cut by a machine, because the sharp ends of the pieces will come in contact with the skin of the hen, or that of the delicate chickens. In very cold weather line the nest with feathers. We have successfully hatched eggs by preparing a nest thus, in a room where during part of the time of incubation the temperature was below zero. Set hens in large numbers at a time, having kept some of them upon artificial eggs until all are ready. Of course, an entry must be made in a book of the family or strain, and other particulars of each clutch.

MANAGEMENT OF SITTING FOWLS.

There are various methods of managing fowls while sitting, of which one of those securing a separate room for each will answer for a small establishment, but keeping them with the rest of the flock in a house such as is described under "Houses for Sitters," takes the least time of any, when great numbers are to be set, allowing an attendant to exercise oversight systematically and punctually. If it is attempted to keep each sitter in a large separate room, much outlay is necessary, while again, if small rooms are used, the hens are not easily made to take exercise, without which they will not thrive, especially if they sit a double term. Another objection to separate rooms is, that if feed is placed so that the hen can leave her nest to eat at pleasure, rats are baited to the spot, or if each room is made rat-proof, it will be too expensive. To feed and water individual birds in separate apartments takes much time, and if several are placed in one room, they must be looked to, or two will take to the same nest. But if surveillance is attempted, it will be handier to carry it out by placing many in a large room.

The nests are guarded against the depredations of rats by the fine wire netting as already described. The use of the coarse netting that alternates with the fine, is as follows: Half the labor of managing chickens is saved, by confining in the same coop two hens with their broods. They will agree perfectly, if well acquainted beforehand. We take a hint from nature here; such wild birds as live chiefly on the ground, sometimes incubate and lead their broods in company. While sitting, adjoining hens form a particular acquaintance through the coarse meshes of the netting, and at the same time they can not interfere with each other, or roll the eggs from one nest to another.

Without a special system of management, a consider-

able number of sitting hens can not incubate and feed in the same apartment without confusion, but by the following plan each is made to know her own nest and return to it after feeding. In the first place, the laying hens, before offering to sit, are induced to choose nests scattered evenly through the whole building, by properly distributing nest eggs and keeping half of the nests closed. The nests on both sides of the house are divided vertically into three sections, one at each end of the room, and one at the center, by painting each division a special color—the center black, and the ends respectively red and blue. The contrast assists the fowls very much in determining their places. No more than three pairs of sitters should be allowed to each division, or eighteen clutches on each side of the building. The six birds belonging in the middle division remember their places very

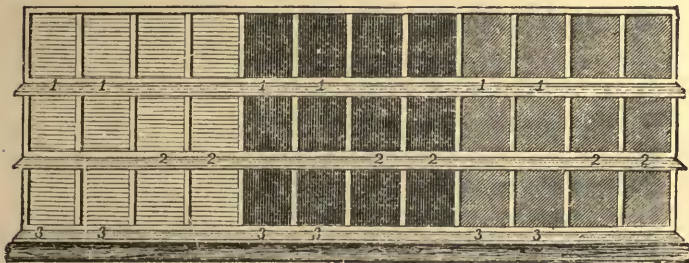


Fig. 27.—MANNER OF NUMBERING NESTS FOR SITTERS.

readily, because they are so far from either end. To prevent those at the ends from making mistakes, as soon as the laying season commences, one end wall of the room is covered with straw, or evergreen boughs, and the other left bare. All birds, wild or domesticated, possess a keen sense of locality, and a few neighboring objects enable them to recognize their nests. The nests that are used for hatching are numbered by affixing movable labels, and every sitter is distinguished by having a feather or two painted, the color showing her division, and the

position of the mark, upon her head, or body, or tail, signifying a number corresponding to that of her nest. This enables the attendant to correct mistakes by the birds (which will, however, be rare) before fastening them in daily. The colors show distinctly upon the white ground of the feathers. This plan appears somewhat whimsical, but it is simple and convenient. Figure 27 shows the numbers on a side of the room, arranged as if for eighteen clutches, the nests not numbered being for the use of laying fowls in the mean time. The shading represents the three different colors of the divisions. The sitters are assigned places two by two as above stated, and each of a pair of nests and each of the occupants receives the same number. Only three numerals are necessary to designate three dozen nests in all, in one house. The incubating hens should be fed early in the morning, before any of the others are ready to lay. Those not sitting are shut into the yard; the large doors of coarse wire-work that prevent hens from roosting on the alighting boards at night, are raised (at one side of the room only) and the pieces of wire-cloth before the separate entrances to the nests of the sitting hens are removed and placed in front of the nests frequented by the layers. Next, grain is thrown upon the ground in view of all the sitters on that side of the room, when a call to which they are accustomed will cause them to leave their nests, after which the large doors are lowered and the hens are left from $1\frac{1}{4}$ to $3\frac{1}{4}$ of an hour, according to the weather, while the poulterer is repeating the operation at the other buildings. When the hens are off, inspect every nest to detect broken eggs or anything else amiss. The sitters upon one side are all admitted to their nests at once, by raising the large wire doors, and then shut in safe from rats or the intrusions of laying hens, by the separate pieces of wire-cloth. Repeat the operation at the nests on the opposite side of the house.

TESTING THE EGGS.

Examine the eggs after the hen has been upon them ten days by the well-known method of placing them between the hands and attempting to look through them at a strong light; or a better way is to use an "egg-tester." The tester represented in figure 23 is a very simple one, which we have used with satisfaction. It consists of a

tin cup, 3 inches high and $2\frac{1}{2}$ inches in diameter, narrowed at the top, leaving a round opening large enough to partly admit an egg endwise. An oval mirror is fastened in a slanting position across the cup, by projections of tin or solder. The eye is placed opposite an opening, $\frac{1}{4}$ inch in diameter, and 1 inch from the bottom of the cup, the opening being furnished with an eye-piece.

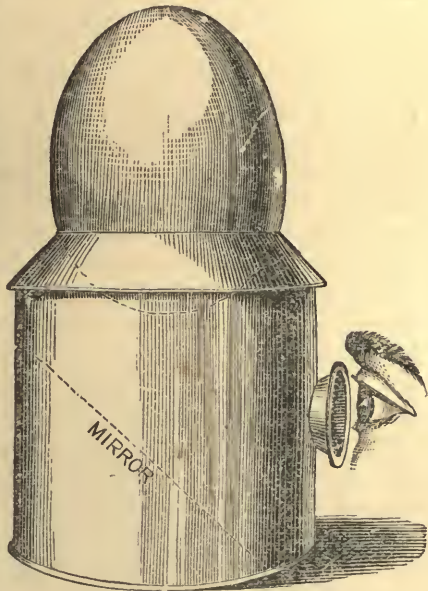


Fig. 23.—EGG TESTER.

Enough light will be transmitted through the egg to form a distinct image of the yolk upon the mirror. Return to the hen only those eggs that appear opaque or clouded: those which show clear, orange-colored yolks, being unimpregnated, will not hatch, and may be used as feed for chickens.

When hatching is progressing, remove gently once or

twice the empty shells that might otherwise overcap the unhatched eggs, but further than this do not interfere, as a chicken worth hatching will contrive to get itself hatched. Let the chicks remain in the nest 48 hours without being fed, allowing the hen meanwhile water, and a handful of dry grain, placed in dishes by the nest. When removed to the coops, put in each double brood thirty chickens—less if it is cold weather.

WINTER MANAGEMENT.

Quarters for the laying stock during cold weather are shown in figure 29. When the house is located for winter, the doors in the north roof are covered with building paper in overlapping sheets tacked on slightly so that it may be removed in spring. Straw is laid over the paper to the depth of a foot. A temporary shed is made for a rod east, and the same distance west of the building, connecting with the roof of the latter, the platforms for drying earth (figured on page 23), being used for this purpose and supported by stout rails. By turning a corner, as at the post *A*, east and also west of the building, this shed is made to inclose three sides of a court which is open to the south. The gaps in the roof of the shed at the corners, and the cracks between the platforms, are covered with straw and boards. There is nothing that fowls love better than convenient nooks where they can retreat from the crowd of their fellows, and select their own company. Confinement brings not only loss of health, but the vices of feather-eating and egg-eating. No system of diet will remove the liability of fowls that are habitually kept in-doors to learn to pluck each other. If the room is large and the flock small, there may be no risk of this, but the expense of such quarters would be fatal to success. When fowls are allowed freedom they never learn to eat feathers. If anybody wants to keep poultry under some highly artificial plan, and prevent

out-door range in winter in order to promote laying, he is welcome to do so. But nature if thwarted is sure to have her revenge, if not in one way, then in another.

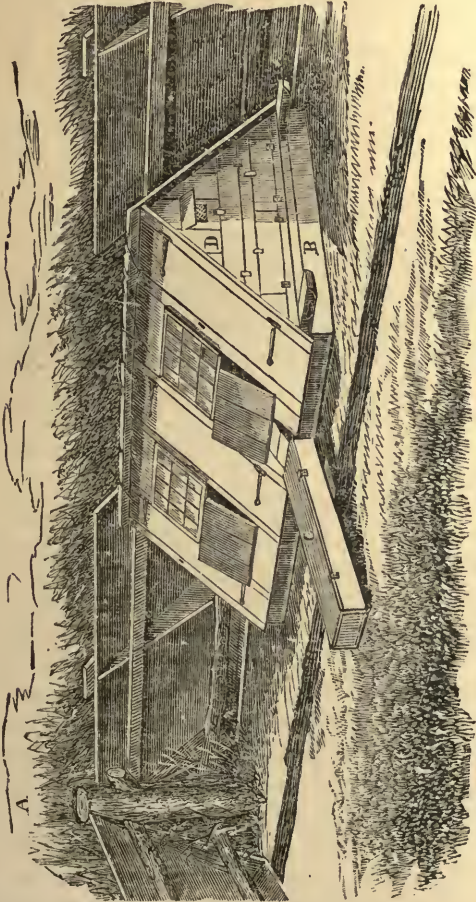


Fig. 29.—WINTER QUARTERS FOR LAYING STOCK.

Whether in-doors or out, the birds must be busily employed every day, and then they will be happy and contented, and not learn egg-eating or other abnormal prac-

tices. Without a chance to scratch in earth or straw, they will be as badly off as a rich man with nothing to do. Straw is scattered under the sheds, and on pleasant days a few handfuls of feed are buried under it, using a fork. When the weather admits, a large pile is used for a scratching-place, situated south of the feed-room, where it can be moved by the aid of a team, as stated on a previous page. The arrangements for barying grain in-doors have also been already described. The ground is raised a few inches by plowing in the fall, where the sheds are to be placed.

When the house is placed upon the dust-bin, *B*, waste strips of cloth, called "headings," obtained at the woolen factories, are used to make the joints air-tight between the two. The passage leading to the feed-room is represented at *C*. The feed-room itself is not shown in the illustration, but is given in figure 8. A small opening, *D*, at each end of the house is for ventilation, and must never be closed. A projecting cap over it keeps out rain, and wire-cloth of $\frac{1}{8}$ -inch mesh breaks the force of entering air in case of high winds, though ordinarily the current will be outward. Fresh air is admitted through the passage *C*, and as it must enter the feed-room through an outside door in the latter, and pass several angles before gaining admission to the roosting room, strong draughts will be avoided. Care must be taken during cold spells to partially close this door at night, so as to raise the temperature at the roost about 20 degrees higher than it is outside, but further than this no effort should be made to retain heat at the risk of impure air. Fowls that have free range in the daytime the year round, and roost in buildings open on all sides in summer, and partially open in spring and fall, will not be injured by an attempt to strike a balance between warmth and ventilation during a few brief periods of extreme cold.

HOUSE FOR EARLY HATCHED PULLETS.

Figure 30 represents a house for the earliest hatched pullets that are expected to lay more in winter than the others, and are, therefore, sheltered at greater expense. Winter laying depends more on breed, age, feeding, and health, than upon warm rooms. Heat is necessary to productiveness, but a fowl kept in full vigor and good appetite by exercise, will be warm where a dull, mopish

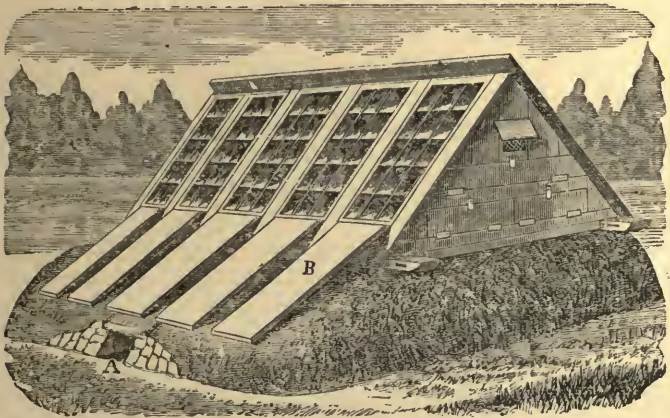


Fig. 30.—HOUSE FOR EARLY HATCHED PULLETS.

one would shiver. It will not pay to build expensive fowl-houses, and the arrangement we are about to describe involves as much outlay as is advisable, in order to secure warmth, excepting for some special purposes. A mound of earth, nearly circular, and 25 feet broad at the narrowest point, is raised by scraping with the team. It should be $3\frac{1}{2}$ feet high at the center, and slope gradually to a level with the surface of the field. Upon this mound a cellar is dug $7\frac{1}{2}$ feet by $14\frac{1}{2}$, and 3 feet deep, the bottom being 6 inches higher than the average of the surface beyond the mound. The cellar is walled substantially with stone, laid in cement, and floored with the

latter material. Stations furnished with such cellars are upon a part of the farm where there is a gentle slope, and, wherever necessary, a tile drain is put under the foundation of the walls. The floor of an underground fowl-house must always be a little higher than the adjoining field, not on account of drainage alone, but for ventilation. No room is fit to be occupied by stock that cannot be ventilated at bottom. In this cellar the walled passage at *A* admits air within 8 inches of the floor, which is covered with dry earth to that depth. The walls are topped with plank-sills, upon the outer edges of which the runners of the itinerant building rest, caulking being resorted to as in the previous case. It will not answer to house fowls in such a place unless there is plenty of glass above, and the south roof, therefore, contains five long windows, instead of two short ones, as in the other cases, each door being furnished with one. There is a shutter, *B*, to correspond with each window. Otherwise the house is of the usual pattern, and the winter sheds and feed-room are attached to it, though omitted in the figure so as to show the embankment plainer. The house and mound have a bleak look in the illustration, but the sheds will make the whole sheltered and cosy. The usual boarded passage (not shown in the cut), connects the feed-room with the tunnel at *A*. There are sunny days enough in winter to keep the earth-bed inside perfectly dry, and the air will be no damper than in an unglazed apartment entirely above ground. Straw mats of the greenhouse pattern are used at night upon the north roofs of all the buildings for about two months in winter. The amount of solar heat accumulated during a clear winter's day in a pit roofed with glass is surprising, and this is to be retained as long as possible, always remembering, however, to give ventilation its due. Summer and winter the admission of air must be gauged by every change of wind and weather. It is one of the ad-

vantages of business upon a large scale, that operations which it would not pay to attend to with one flock, may be afforded where there are many.

The buildings are kept over the cellars only in winter, and are drawn on and off the sills above the walls by the use of small rollers, and a horse attached to tackle. The cellars must not lie idle after the houses are moved, but be roofed with the platforms for drying earth, and a few movable greenhouse sashes, and used as a shelter for chickens.

SHELTERS FOR FOWLS AND CHICKENS.

The stations when arranged for winter should preserve

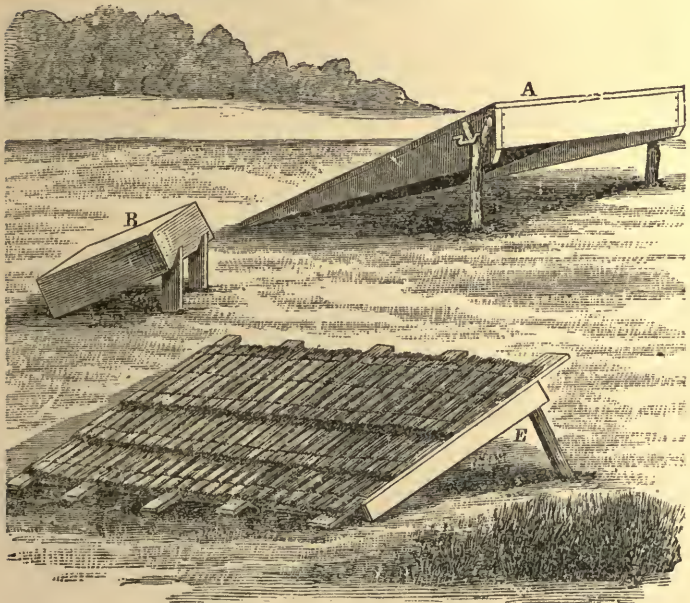


Fig. 31.—SHELTER FOR CHICKENS.

the dissimilar appearance mentioned in the first article, so that the fowls may be able to distinguish their own

houses. Each building being colored in summer unlike those immediately adjoining it, the plan is carried out in winter by coloring the sheds attached to each house like itself. By using a very wide brush, the lime-wash, or coal-tar, is applied in a short time.

In addition to the sheds above described, other protection against the weather in winter is provided by adjust-

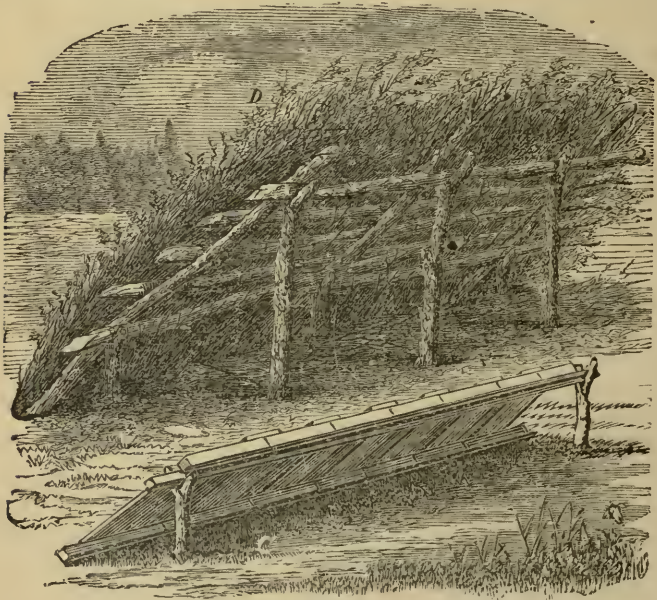


Fig. 32.—TEMPORARY SHELTERS.

ing some of the earth platforms as seen at *A*, (fig. 31), and the basement part of the chicken-coops are propped up, *B*, and covered with boards, and the floors to the same are arranged as at *C*, (fig. 32). In the same cut, *D* represents a shade for chickens in summer, made of the rails used in winter for the sheds, covered by straw from the north roof of the layers' houses, with brush or corn-

stalks added to keep the wind from blowing it away. Shade for the laying stock is provided by taking the winter dust-bins and propping them in a slanting position (*E*, fig. 31), and nailing slightly a few boards across, and thatching with the mats used in winter upon the houses. This contrivance is drawn upon the ground, by the team, occasionally, so as to never be very far from the building when the latter is shifted, and some of the platforms are moved about for the same purpose when not employed in the dry-earth harvest. By using earth platforms at one station, straw-mat screens at another, and movable booths of evergreen boughs at a third, neighboring premises are made to look unlike. In this way all the various fixtures in the whole establishment are kept in use summer and winter, and chickens and grown fowls are sheltered from sun, wind, and rain under structures that afford a great deal of *ground room*, which is what counts, yet they are low like the houses, and, therefore, made with but little lumber.

THE KINDS OF FOOD.

When poultry are kept upon a large scale, they can obtain but few insects, for the latter are attracted and supported by vegetation, of which there is next to none near the adult fowls, though care is taken to rear a part of the chickens among growing crops. The ample grounds around each station house, and the areas enclosed by the yards for sitters and for breeders, give space to secure cleanliness and exercise, but that is all. As far as affording insect-foraging is concerned, a paved court in a city, or a continuous rock, would be about as good. Ground room out of doors, upon our farm, whether inclosed in yards or not, is solely for air, sun, and exercise. These secured, it matters not whether there is more or less space, so long as there are no insects to be procured. We hear much about the number of fowls proper to an acre of

ground ; some say 50, and others 100 ; but in order to give 100 a good forage, they should have the range of no less than 4 or 5 acres, containing grass and a variety of other crops. Now, if we give up as impracticable, as we must, pasturage of this sort, and afford nothing but a field entirely bald, save for a few patches of clover and such other vegetables as may be plucked when young and tender by the birds, under such circumstances one acre is as good as four. We go further, and say that 15 or 20 rods of ground, and the grain for the fowls buried to induce exercise, will answer the purpose better than an acre without such an artificial provision of natural conditions. But the feed, which must be all brought to the fowls, costs in money if purchased, or in labor if raised upon the cultivated part of the farm. In fowl-keeping upon a small scale, where one flock has for a range as large a portion of a farm swarming with insects as they choose to travel over, food is obtained for nothing. The food for fowls is more expensive than that of any other live stock in proportion to the value of the animals themselves, necessitating economy in its choice. There are many things "good for" fowls, but we must use principally those only which supply all the needful nutritive elements, and are at the same time the cheapest.

There are three classes of articles in which the natural and indispensable diet of fowls consists ; grains or seeds, green plants, and insects. Corn and wheat-shorts should be the main reliance to fill the first division ; boiled potatoes and raw cabbage in winter, and newly-mown grass in summer, are the most suitable vegetables, and chandlers' scraps and butchers' waste, procured fresh, are the most economical animal food, excepting near the coast, where clams and various sorts of fish can be obtained at a trifling cost. While depending mostly upon the above, because they are the best and cheapest, a great many other things must be given occasionally for the sake of

variety, such as oats and buckwheat, both ground; rye, barley, wheat, brewers' grains; various vegetables, such as carrots, beets, and yellow turnips, boiled and thickened with corn-meal or wheat-bran; raw onions chopped fine; and for animal food, sometimes young calves may be obtained from milkmen at a low price, and the carcasses boiled and fed. It must be an invariable rule to give every bird, whether young chicken, layer, sitter, or fattening for the table, a portion in each of the three divisions—grain, fresh vegetable, and animal food—every day in the year. It has been asserted by some that there is no substitute that can fill the place of insects for poultry. We say that beef and mutton are as much better, as oats are better than grass for horses, of which much work is demanded. A partridge or wild jungle fowl can produce her normal number of eggs from forest fare, but not such quantities as are laid by a White Leghorn or Houdan. Two-thirds of the grain fed must be ground. The natural mill of a fowl's gizzard, containing hard gravel for mill-stones, is capable of grinding all sorts of grain perfectly, but at too great an expense of muscular exertion which, though involuntary, is severe, and employs force that had better be used for growing eggs or flesh. One-half of the feed for both grown birds and chickens is cooked, because more easily digested, and because less is needed. We should cook it all only for the fact that a part raw is preferred by the fowls.

BUILDING FOR STORING AND COOKING FOOD.

The building which contains the cook-room must also store the grain and vegetables where they will be handy, and dry earth is kept at the same place, because in connection with other apartments a receptacle may be most economically constructed, which shall admit of labor-saving in the unloading and reloading of so heavy an article.

The south elevation of the granary and cook-house, figure 33, shows the manner of making a "side-hill barn" on nearly level ground, the object being to drive the wagon containing dry earth to as high a point in the building as possible. The drive-way is made of masonry and earth, excepting near the building, where a wooden bridge is substituted, shown also in figure 34. A corresponding drive-way at the north end, shown in figure 34, enables the team to pass out without backing. The dotted lines in figure 34 indicate the floors *A, A*, which follow the inclination of

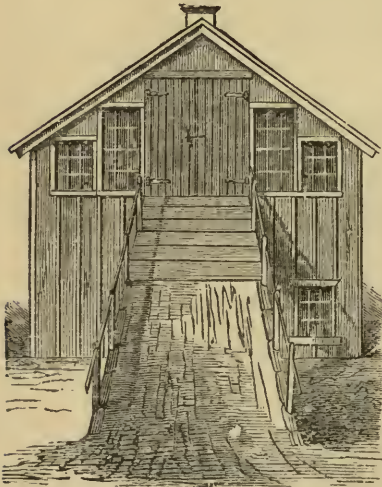


Fig. 33.—SOUTH ELEVATION.

the drive-ways until the level space *B* is gained at the center, where is a trap *C*, through which the earth falls into a hopper-shaped chamber, as mentioned under "Collecting and Storing Dry Earth." For filling the corners there are additional trap-doors at *D, D*. This chamber or bin slopes at the bottom, the position of a part of which is shown by the dotted lines *E*,

E, which converge at the point *F*, where is a slide-door, through which the contents are discharged to be carried to the stations, the wagon being backed for the latter purpose through the doors *G, G*. West of the room, where the dry earth is discharged into the wagon, is a bin for potatoes, etc., built of thick stone walls, to prevent freezing. This bin is filled from above by driv-

ing a load of roots to the floor *B*, and allowing them to slide down an inclined plane. The cook-room, with

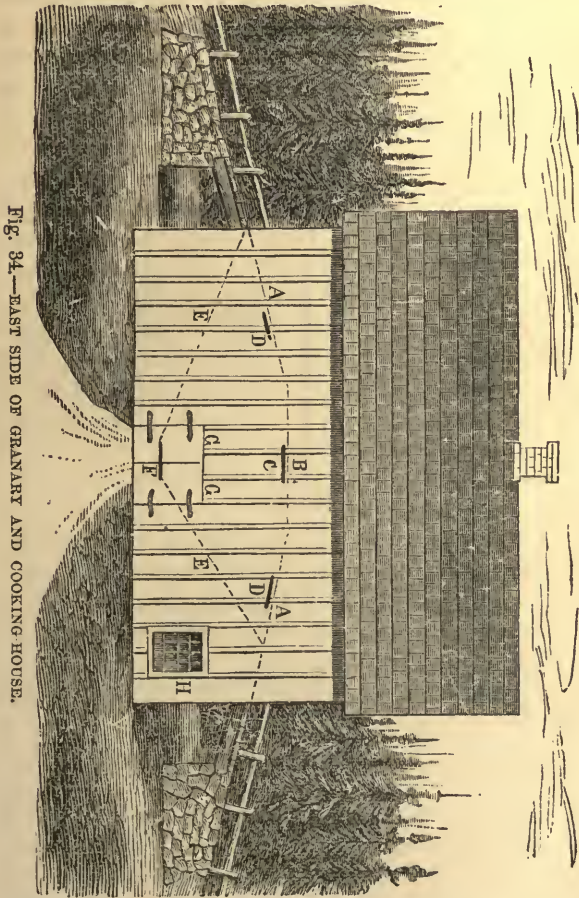


FIG. 34.—EAST SIDE OF GRANARY AND COOKING HOUSE.

which the window *H* communicates, occupies the north part of the lower story of which figure 35 gives a ground plan. *I*, cook-room with its outside (north) door *J*. *K*,

grain-bin entered at the door *L*. The root-bin is at *M*, and entered at the door *N*. The cook-room is used in winter as a place in which to dress fowls, and contains also a work-bench with tools. The cooking apparatus is at *O*. There is no chimney proper, but only a chimney-top supported by strong timbers near the peak. A brick

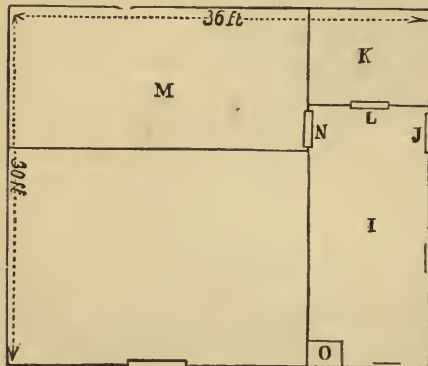


Fig. 35.—GROUND PLAN.

flue rises from *O* perpendicularly as far as the eaves, terminated by an ordinary stove-pipe, which conducts the smoke to a large drum in the upper room, and from thence to the chimney-top. In this way the garret is warmed

to accommodate in February a few of the early chickens. As shown in figure 33, the south wall of this nursery apartment is well glazed. Enough late fall chickens of the half-blood sitting variety are raised to tenant it during December and January. The dimensions of the building are 36 by 30 feet, with 18 foot posts.

MANAGEMENT OF YOUNG CHICKENS.

In keeping poultry on a large scale, there is no one thing more important, or more difficult to manage, than the chicken department. A failure in the yearly supply of pullets, with which to recruit the stock of layers, would be fatal to the whole plan. It is quite an easy matter to raise nearly every chick of a hardy breed, when there are but a few upon an extensive range, but it is the

reverse when we are desirous of rearing several hundreds upon an acre, and there is, practically, no insect forage at all. If there are persons who consider the occupation of a poulterer as "small potatoes," believing that it needs less thought and skill than to manage a cotton-mill, or mercantile establishment, or horses and cattle even, let them try once to raise chickens by the thousand, without losing money, and find the need of keeping their wits as sharp as in more pretentious kinds of business. Yet, all difficulties may be surmounted by thorough management.

To have strong chickens, it is necessary in the first place to avoid, in the main, breeding akin, and to keep the breeding stock in a condition as near to normal as possible, securing for them sun, air, and exercise, and avoiding a pampering diet. The greater the number of eggs produced by a fowl, the less vitality there will be in each, therefore the first only of a laying should be set. Early chickens are the most certain to live, and this is because force is stored up in the parent before laying commences, sufficient to endow the first eggs or chickens with plenty of vigor, while later the abnormal or artificial prolificness impairs the eggs. In spite of the uncongenial weather, March-hatched chickens are stronger than those produced in April, and the latter in turn are reared with greater ease than those hatched in May. But after attending to the above considerations, the chickens being hatched and assigned quarters, their lives then depend chiefly on their diet. Of course, they must be kept clean, dry, free from vermin, and protected from other enemies, quadruped and biped, and be allowed space for exercise in the sun and open air; but all these things will not suffice, unless animal food is artificially provided as a substitute for the insects they would obtain if there were but few chickens on the premises. Butchers' meat, such as calves' and sheep's plucks, are even better than insects, provided they are fed plentifully, yet

only a very little at a time, and care is taken to alternate with grain and green vegetable food. Chandlers' greaves may be used for chickens if very nice and sweet—the article varies much in quality. They are very cheap feed, cheaper than the fresh bits from the butcher, but not as good for chickens as the latter. There must be constant vigilance in supplying animal food regularly and systematically. The young of birds in a wild state are given an animal diet, even in cases when, as they reach maturity, they live upon seeds. The young of our domestic birds can not thrive upon grain and vegetables alone, no matter how nicely prepared, because such things can not be digested and assimilated fast enough by them, to meet the great demands for nourishment caused by their rapid growth. Nature has provided that the young of all birds shall mature and become fledged with wonderful rapidity, in order that the period of their helplessness, when they are liable to be preyed upon by numerous enemies, shall be short. The formation of the coat of feathers which succeeds the downy covering with which they emerge from the shell, demands a quick and certain supply of nutritive materials, and in the case of domesticated species the young are obliged at the same time to nourish the growth of bodies which, owing to the artificial treatment man has subjected their parents to for many generations, tend to an abnormal size. The fledging period is a critical one, and the feeding from the time of incubation until the wing and tail feathers are fairly developed, should all be contrived with a view to assist the digestive organs in changing just as much easily assimilated material as possible, into an abundance of good, rich blood. It will not do to wait until the time of the most rapid feathering, and then begin to allow a generous diet, but the systems of the young chicks must be prepared in advance, by being stored with nutriment in every cell and tissue.

FEEDING AND SHELTERING CHICKENS.

For the first few days after incubation feed the yolks of eggs *slightly* cooked by being dropped in hot water, not spoiled by being hard-boiled. Mix these with an equal quantity of the crumbs of corn-cake, made by baking a dough of Indian meal and milk. As soon as the chicks are a week old, begin gradually to substitute boiled plucks and livers, run through a meat-cutter, in place of the egg-yolks, and the Indian meal may be cooked as

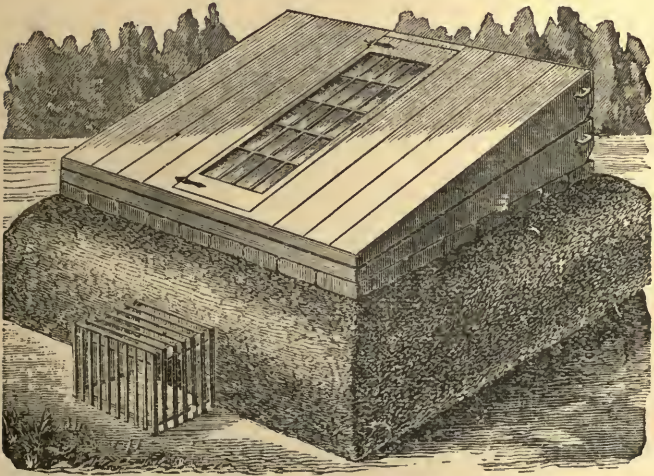


Fig. 36.—QUARTERS FOR EARLY CHICKENS.

a thick mush, and to stimulate appetite by variety, add sometimes wheat-bran and ground oats. Also, cracked corn and wheat screenings, raw, may be introduced. All they will eat of tender grass, chopped fine, and boiled potatoes, nicely mashed, should be given. The grass may, of course, be discontinued when the birds are strong enough to pluck it for themselves. Skimmed milk should be the sole drink until the birds are two months old, at least. There is nothing that will so promote thrift. It

contains just the elements needed, and in a very available form.

The adult fowls designed for breeders should be fed sparingly, and forced to literally scratch hard for a living. The sitters must be fed a stimulating diet in winter and a rather low one in summer, and the fowls of the main laying stock should be crowded all their lives without any intermission by plying them with a diet growing richer and more stimulating, because containing a greater pro-

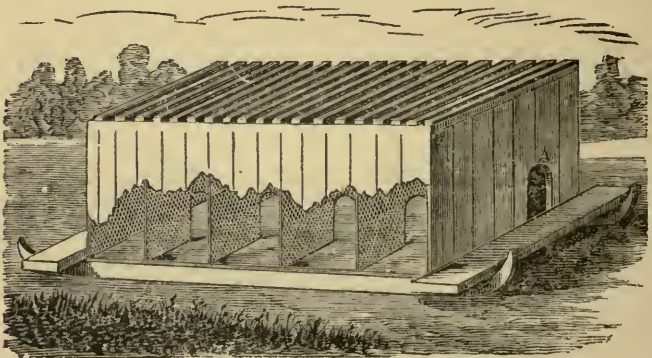


Fig. 37.—PEN FOR MOVING FOWLS.

portion of chandlers' scraps, the older they become. Cayenne pepper is the cheapest and best stimulant, with ground mustard and ginger for a change. Begin with a very little, and increase the quantity gradually.

The chickens of the classes of breeders and sitters, which should be reared under the most favorable auspices possible, are housed at scattered stations in the cellars vacated in early spring by the early-hatched pullets (see figure 30), and so have the advantage of a wide range. The cellars are covered by the earth platforms, a glazed sash being temporarily hinged to one, for a door. The platforms are laid two deep, to make sufficient pitch as shown in figure 36. When the chicks are old enough to

run in and out of the underground passage, they are confined at first in a lath pen, until they have learned the way, and afterwards allowed to go where they choose, the hen being confined to the cellar. Figure 37 represents a pen used in moving fowls. When it is put in the place occupied by the feed-room at the end of the passage (see figure 8, page 26, and figure 29, page 65), the fowls are baited into it, the door *A* corresponding to an opening in the side of the end of the passage. The partitions in the pen separate the flock into squads, to prevent too many fowls huddling together and trampling each other during moving, at which time a covering should exclude the light. Chains may be passed around the ends of the cross-piece for draught.

ADDITIONAL BUILDINGS.

Two buildings remain to be described. Figure 38 represents a hospital, that is, a building that can be used as such in an emergency. It is 14 feet wide, 60 feet long, and 8 feet high at the peak. There is a passage $2\frac{1}{2}$ feet wide, running its whole length the north side, which communicates with the twelve rooms into which the building is divided by wire partitions. The glazed roof is upon the south side. There is an outside door (not shown in the figure) in the north wall, opposite the chimney, for convenience in attending the fire. The building is warmed by coal, a fire-chamber of brick, and a boiler and hot-water pipes being used. It is injurious to animals to breathe the fumes that will escape when it is attempted to warm a room by passing a smoke-pipe through it, leading from a coal-fire, unless the chimney is quite high, causing a strong draft, which is one reason for preferring hot water, and another is that the risk of overheating is not so great (for water can not be heated above a certain temperature), and a third reason is that less fuel is need-

ed with hot water than without. The original cost of hot-water fixtures is double, it is true, but they are kept in repair with hardly the expense of a cent, and cause a saving of full half the fuel. The ventilator at the top of the building has immovable blinds at its sides; and horizontal doors at its bottom, opening upwards, and closing by their own weight, moved by means of cords and pulleys, regulate the egress of air. At the north side of the

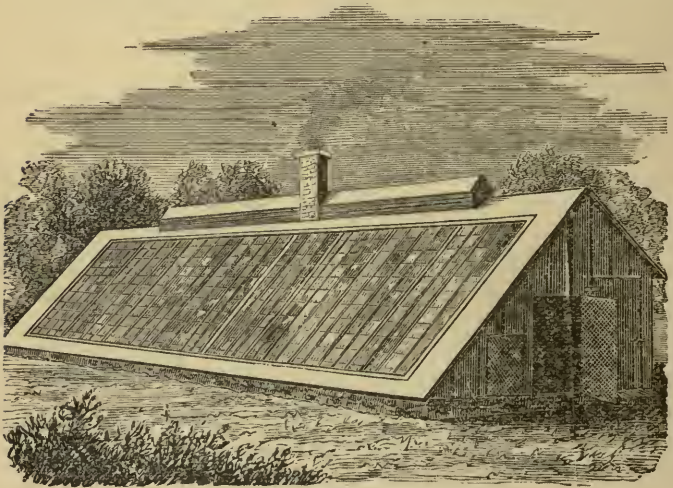


Fig. 38.—HOSPITAL FOR EGG FARM.

building are a number of small windows, covered with ordinary adjustable blinds, for the admission of fresh air, and in summer the doors at both ends of the structure may be opened, as in the illustration, and the windows in the roof should be partly curtained. This building is used for early chickens and numerous other purposes, it not being expected to have much occasion to take care of sick fowls, for the true plan is to prevent disease by inducing constant exercise by scratching, by allowing sun, air, good food, and breeding from vigorous stock.

The office and "watch-house" (fig. 39) contains a room below for a business desk, and above are sleeping apartments. Lights should be kept burning all night, to show thieves that vigilance is maintained. Dogs, small and great (in doors and out), are valuable aids (accounting for the kennels in the figure), but in the day time they should be yarded in a strong inclosure made on purpose,

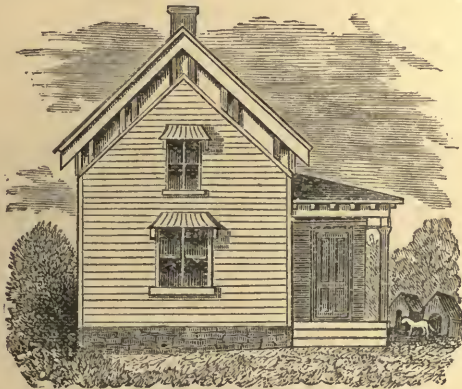


Fig. 39.—OFFICE AND WATCH-HOUSE.

or chained where they can not frighten the fowls. The eggs designed for hatching are kept in a closet on the first floor, so situated with respect to the fire (maintained day and night in a small base-burner coal stove during cold weather), as to be kept at a constant and even temperature of about 50 degrees.

GENERAL CONCLUSIONS.

A tract of land, 100×100 rods = $62\frac{1}{2}$ acres, will contain ten rows of houses for the laying stock, arranged on the quincunx plan, ten in a row, as stated under "PLAN OF THE FARM." These one hundred buildings will each contain 50 birds, or 5,000 in all. In addition there must be 500 of the sitting stock, and 500 at the breeding and

experimental yards, or a total of 6,000. The 5,000 layers comprise 3,000 yearlings, and the rest are two-year-olds. To replenish the laying stock, there must be raised 7,500 chickens yearly (for three out of five are cocks and inferior pullets to be rejected). To replenish the sitters and also the breeders—in the latter class much “weeding out” being necessary—2,500 chickens more must be raised. That is, about 10,000 chickens must be reared annually.

Now, when fowls are kept under the ordinary system pursued by the family living in a village—by which we mean that there is a fowl-house and yard to accommodate a flock, and then, if the number is to be increased, another yard is made, and so on—one man can take care of 600 fowls without the aid of a team. He can take off all the produce in the cars, and distribute to his city customers from a basket carried upon his arm; can spade up the ground in the yards, *keep the fowls out of mischief* by setting them at work scratching, clean the houses regularly, prepare the food, build a fire, and cook for his charge every day, giving a variety, meat, vegetables, pounded shells, etc., and *keep his stock young* by raising enough chickens, so as to have on hand 400 pullets every autumn, after killing the supernumerary cocks and inferior pullets. But one man can not take care of more than this, and do it well, under the ordinary domestic or small-scale plan. If he attempt to manage 1,000 or 1,500, market their produce, raise the needful number of chickens, etc., he will slight the work, and so sure as it is slighted, there will be loss. He can keep 600 adult fowls, and make \$600, and no more. If he is not skillful, vigilant, patient, and persevering, he will not make that. We mean reckoning ordinary market rates for produce (not selling live fowls, or eggs for hatching, at high rates), and supposing that he raises some early chickens, but only as many as may be while distributing his labor even-

ly throughout the year, and allowing the value of the manure to exactly offset the interest upon the land and buildings, and the repairs and depreciation in value of the latter.

We have kept accurate accounts for five years, and though we have in one year cleared \$2 per head on *an average*, and sometimes on single flocks as high as \$2.75 per head, yet it is unsafe to count on more than \$1 per head profit upon each adult fowl, all losses and expenses considered. Now let it be remembered that the skill and incessant care and industry necessary to clear \$600 in the case supposed above would, employed at some other business, earn \$800 or \$900, for *a bungler can not keep fowls as a business*, and we see why it is that during the past fifteen years so many persons who have tried to enlarge their poultry business on the ordinary "family fowl-house and yard" plan have failed and quit in disgust. What is needed is the reduction of the amount of labor. This must be accomplished by employing a team in every operation where it can be done, and by using movable buildings. The movable houses and no yards (necessitating the system of indirect feeding) are the central features relied upon in our "egg-farming" to crowd down labor to the *minimum*. All the other features are subordinate.

Five hands (with two horses) can attend to the whole establishment of 6,000 adult fowls, and the excess of produce over feed will be \$5,000 for the laying stock of 5,000 birds. Nothing is said about any income from the breeders and sitters, they are supposed to be as much a necessary evil as anything; or about income from crops or manure, that being an offset, and a fair offset, as our experience and laborious accounts show, against the interest on land and buildings. The help can some of it be of the cheaper sort—boys of fifteen, if intelligent and steady. One hand worth \$800 at the top of the scale (there's no use in reckoning a princely salary at *any* rural occupation), the

“right-hand man” at \$700, No. 3 at \$600, and two apprentices at \$350 each, and there is \$2,800 for labor, to which \$400 must be added for the maintenance of team, including wear and tear of vehicles and harness, and sundries. As our eggs are only partly hatched, we can't count all the chickens, but our readers have a right to figures enough to get a fair understanding of our enterprise.

There are only three systems of fowl-keeping possible. There are many modifications of these, it is true, but to one genus or another of the three following they may all be referred.

One is the highly artificial or bird-cage plan of Mr. Geyelin as detailed in his “Poultry-Keeping in a Commercial Point of View,” a book which is, after all, one of the most valuable repositories of information for fowl-keepers ever written. But the cage plan fails, because there is not enough exercise for the birds, and altogether too much for the attendant.

Another is the ordinary plan of the villager or the fancier, given in poultry books and agricultural papers in endless variations of one tune, and that tune a “house and yard adjoining.” A good plan for the family who make no account of the labor involved, and who have odd bits to spare from their table, or for those expecting to sell blooded fowls or early chickens at high prices (minor branches in which a *few* can and do make fortunes), and a good plan too for getting a start in operations on a large scale, but a money-losing plan if it is attempted to supply city markets with table fowls and eggs at ordinary market rates.

The remaining one is that pursued by nature before fowls were domesticated, and the one under which they have been mainly kept since, during a period antedating history and continuing to the present; by giving them their freedom in the daytime and a shelter by night.

Nature gave a thicket for a roost; the farmer, from the barbarian down, gave a shed—that is about all the difference. Spite of neglect, the farmer's poultry at large is more free from disease than that kept yarded under average management. As the wild fowls need no attendant at all, so by arrangements as near like theirs as possible the least labor is demanded. Fend off storms and wind and the summer sun by the simplest shelter that can be made, dodge the labor of house-cleaning by plowing and moving buildings, and make the mutual antagonisms of neighboring flocks take the place of yard fences just as among wild jungle fowls, and the maximum of thrift and the minimum of labor and expense will be secured.

Our ambition has been and is to demonstrate, not how to raise blooded fowls nor mainly early chickens, capons, or any other article with a view to high prices, but to change one *staple*, grain, into another, eggs, by the most economical method possible. The industrial problems which concern the masses are the most important.

SUPPLEMENTARY ARTICLES.

Besides the very complete series of articles by Mr. Stoddard, we present in the following pages some accounts by other writers, of attempts to raise poultry in large numbers. Though these plans are less thorough and extensive than those given for the Egg Farm, it has been thought best to introduce them here, to add to the completeness and value of the work.

A FARM POULTRY-HOUSE.

The engraving (fig. 40) here given, represents a combined roosting, sitting, and laying-house, which the writer found very convenient, and in which he has kept 150 hens and hatched out nearly a thousand young chickens. The main part of the building, the roosting-house, shown in the engraving at the left hand, is 12×16 feet, and 12 feet high at front, and 8 feet at the rear, with a sloping roof. The floor is of earth, a row of bricks being partly bedded into the earth, and pine scantling, 4 inches square, laid upon them, with the ends halved and jointed together. These form the sills of the building. In building, the boards were nailed to these sills, commencing at the corners, and scantling of 2×4 inches nailed to them for plates. The building was then boarded up, rafters of inch-boards were let into the front and rear and nailed, sheathing of inch-boards and a roof of shingles was then put on, a door was fitted, entrance holes with fly benches two feet from the ground were made, and a roosting-ladder of sassafras poles, on which, by the way, we never

saw any lice, completed the whole. The whole was put up in two days. To this was added the open shed, seen

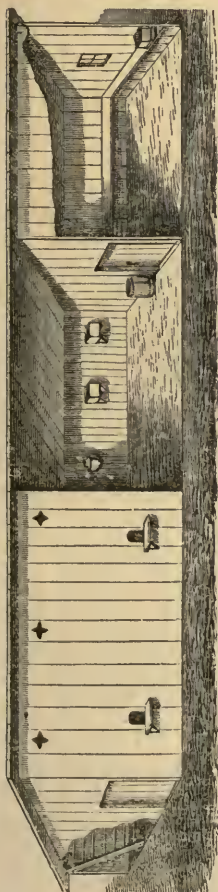


Fig. 40.—POULTRY-HOUSE WITH LAYING, SITTING AND ROOSTING APARTMENTS.

in the center, and the sitting-house, shown at the right, built in the same manner, each of the same size, making the whole 48 feet long. Nests were provided in the open shed and in the roosting-house, all of loose boxes covered with crude petroleum inside and out. When a hen "set," the box and its occupant were removed at night into the sitting-house, and placed on the shelf which is fixed around it. There she was kept shut up, but carefully attended and watched, until the chicks were hatched, when she remained as long as was agreeable, the chicks being removed as they appeared, and fresh eggs put under her. In this way some hens brought out two or three broods before their patience was exhausted. This house was cleaned out at night, fresh food and water and sand for baths were put in, and in the day-time it was kept very quiet. When a hen left her nest, which rarely happened, she was taken out and another quietly put on.

This may be done readily with Dorkings or Brahas that are kept tame and used quietly. The house was white-washed twice during the season, and on the whole was all that could be desired. The roosting-house had ventilators

cut at the upper part, and by not allowing any nests to be made on the ground, skunks and other vermin were not encouraged, and committed no depredations. The size of these buildings may be changed to suit the needs of a flock of any smaller number, or another set of buildings may be added if the flock should be increased.

POULTRY FARMING.

There is something alluring in doing things upon a large scale. The desire to possess a thousand fowls has enticed many men to go into poultry farming as a special business, and indulge in dreams of an easy and comfortable business if not of wealth. Unfortunately in nearly every case which has come to our knowledge, there has been failure, at first disappointment, then disgust and sickness of heart from the hope deferred, rather than from any inherent impossibility of keeping a thousand fowls as easily as a hundred. It would seem as though a person who could successfully manage one small flock could care for several with equal success, but in reality few persons manage a flock of a hundred fowls with complete success. There are deaths, sickness, vermin, losses of eggs, hidden nests, and the loss of broods, depredations of hawks, owls, skunks, or cats, and all the other ills from which poultry suffers by reason of neglect or want of skill in the great majority of small flocks; but because of the small value involved nothing is thought of these losses. We always hear, however, when a man fails in his endeavor to manage a poultry farm. The cause of the frequent failures is not the impossibility of succeeding, but the want of the care, skill, and patience necessary for success. With these qualifications, a suitable locality, and a proper arrangement of buildings, we know of no reason why poultry keeping for eggs and chickens should not be made profitable with the use of a moderate capital.

We know of a case in which it was successful so far as it was carried, and have no doubt that it might have been indefinitely enlarged with equal success.

In the case referred to, the farm was a tract of cheap land, rough, hilly, and with too many large stones in the soil for cultivation. There was some young, second growth



Fig. 41.—HILL-SIDE POULTRY-HOUSE.

timber upon the hill-side and a spring broke out near the foot of the hill. Excavations were made in the bank, and log houses built therein, all but the front being covered with earth. The houses were 18 feet long by 12 wide, and about 6 feet high to the eaves. The roof was of rough boards, and a large ventilator placed in the center of it. The arrangement is shown in the engraving, figure 41. The soil, of coarse gravel, and very dry, was left to form the floor of the houses. Roosts for one hun-

dred fowls, and boxes for nests were put in each house, and in the space of twelve feet or thereabouts left between the houses, some places were fitted for nests with logs and earth. The houses were whitewashed inside and outside. The water of the spring was brought in a half-inch lead pipe near to the houses and ran into a trough. Two hundred hens were kept in the two houses without any trouble, and were free from lice and all disease when we last saw them. They had a range over seventy-five acres of ground, which was only partly in a poor sod, the rest being gravel or sand with a plentiful growth of blackberries and dewberries. Corn, barley, oats, and wheat screenings were used for food, and the young man who owned and managed the farm was well satisfied that he could add more houses year by year until his hill-side was fully occupied, and still succeed. The warmth of the underground houses kept the hens laying through a greater part of the winter when eggs were selling at a high price. The fowls were of the common barn-yard kind, which were purchased from the neighboring farmers, but they were all pullets of the previous year. To this fact, as well as to the care and tact with which they were managed, the success was probably in a great measure due. To the numerous inquiries relating to this business we would say, that if some such plan as this were followed upon a piece of cheap land near a village or city which would furnish a market for fresh eggs in the winter at not less than twenty-five cents a dozen, and for early chickens at not less than twenty-five cents a pound, with proper care, close attention, a watchful eye, and quiet patience with the wayward flock, a reasonable profit might be made out of a moderate investment.

POULTRY-KEEPING AS A BUSINESS.

There is more fascination than profit in poultry-keeping for those who know but little about it. The work seems to be very light, the fowls are supposed to be docile and easily managed, and the general idea is that there is nothing to do but scatter some corn upon the ground two or three times a day, and gather the eggs and market the fowls as fast as they grow fat. The numerous letters we receive, asking for information about poultry-keeping and the profits of it, are in great part from persons who possess this idea. For instance, one correspondent asks how many fowls will support a family of six persons, as though it was a matter of figures, and only necessary to procure a certain number of fowls and a house, and start them laying eggs and producing chickens to secure a permanent income. Now it is quite safe to say that any person who knows so little about the trouble and risks of poultry-keeping as this, would fail in it and lose his money, unless he should start with a dozen or two fowls, and go through an apprenticeship to the business. For a certain class of persons, poultry-keeping is a very appropriate business, and may be made profitable. Those who are possessed of plenty of patience and perseverance, kindness and gentleness of disposition, a scrupulous love of order and cleanliness, a habit of close observation and quick perception, and a ready tact in finding out the cause when anything goes wrong, and in quickly remedying it, will generally succeed in keeping poultry; while those not so endowed will generally fail, and should never attempt it. Again, one must be able to justly appreciate both the difficulties and advantages of his location, such as the character of the land and its surroundings, the supply of food and the available markets. It would be folly to keep fowls on the borders of a forest or the margin of a swamp, on account of the vermin which such places shelter; it would be a

great advantage to be located near a number of summer boarding-houses, where there is a good demand for eggs and chickens, or near a large city, where early plump chickens sell sometimes for 75 cents a pound, and where cheap food in the shape of various kinds of offal can be procured. A want of the knowledge that will enable one to seize upon all the advantages that may offer, or to avoid all the difficulties presented, will be fatal to success. The

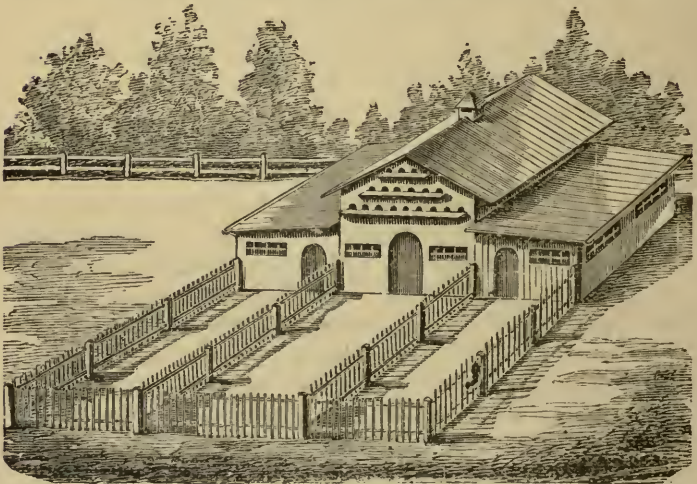


Fig. 42.—POULTRY-HOUSE FOR RAISING CHICKENS FOR MARKET.

kinds of buildings needed will greatly depend upon the character of the ground. A building suitable for a flock of poultry kept for business and profit, where the available ground is of small extent, is shown in figure 42. The building of which this is a sketch is in the centre of a plot of land of less than two acres, which is divided into two portions, one being in grass and the other cultivated with fodder corn, rye, potatoes, or other crops. The house has two entrances, front and rear, so that the fowls may be turned into either part of the plot. It consists of

a central building, with a wing upon each side. It is built of boards, and covered with Johns' Asbestos Roofing, which has the effect of discouraging the presence of lice by its strong tarry odor. The central apartment has three roosting poles on each side of the middle passage. From this apartment there are holes leading to rows of nests in the side apartments. These are appropriated for sitting hens, and for a room for packing eggs and also a hospital for sick fowls, which are separated from the others until they are cured. When a hen is found sitting at night, she is shut off from the central apartment, and the nest opened to the side one. Above the central part of the building is a loft for keeping pigeons. The crops raised are for food or shelter for the chickens, and to encourage the presence of insects, upon which the young chicks may feed. Sheltered by the rows of corn-stalks, or the stalks of rye or potatoes, the chicks are safe from hawks, which will not swoop down upon them, except in clear ground. The coops are kept in this part of the plot, being moved daily to fresh ground. The chickens are kept busy scratching in the loose soil, and there are few potatoes raised but what are scratched out and eaten by them. This furnishes them with employment and with some wholesome food, and it is for this purpose alone they are planted. The owner of this small chicken farm is a gardener and florist, and his wife manages this part of the business, producing every year two or three hundred pairs of chickens for market, besides eggs and old fowls.

ARTIFICIAL INCUBATION AND BROODING.

Extraordinary progress has been made in the construction and management of artificial incubators and brooders within the past few years. Now-a-days the percentage of eggs hatched by them is fully equal to that hatched by hens as ordinarily managed. Now and then, indeed, a hen steals her nest and hatches every egg; but for every brood so hatched, no doubt, two full nests of eggs may be found in the bushes with every egg addled and lost. These stolen nests are peculiarly liable to accident. Skunks, than which no more useful animals exist on many insect-infested farms, make it their especial business to hunt out these nests. Most farm dogs enjoy a fresh egg as well as the most fastidious city customer. Crows, though less fastidious and discriminating, break up many a hen's nest. There is also a long list of vermin of various kinds, besides the average "hired man," all of which are fond of eggs, and the depredations of which essentially reduce the percentage of eggs which hatch when left to nature and the instincts of the maternal bird.

In the incubator those eggs which are either not vitalized, or in which the vitality has been essentially impaired before the hatching process is begun, may be removed on the third to the fifth day. Their removal makes room for others, so that the incubators may be kept working up to their full capacity. This is a great gain, especially as these eggs are uninjured for cooking purposes and find ready sale at ordinary market prices. Besides, eggs which die after the first process of development begins may be discovered and removed on the tenth day, and in some cases later. These, too, are not lost, but when well boiled are excellent food for the young chicks. Finally, eggs which develop to the full extent and which fail to hatch on the

twenty-first to twenty-third day, may be cooked and utilized as food for older chicks or fowls ; so that really none are absolutely wasted.

In regard to artificial brooding there is no question as to its economy. There are numerous plans, as there are numerous incubators, but in whatever way chicks are hatched, artificial brooding may be employed. It is best that the chicks should never know a mother's loving care. The old hen's first gift to her brood is lice. Within a few hours after they leave the shell every chick, if left under the hen, will have more or less lice upon it, while if removed at once, even before they are dry, and placed in a good brooder they will be entirely free and will remain so until they begin to associate with mature fowls. In the brooders the little things have all that they need, and are liable to get no harm. If well cared for, supplied with proper food, moderate warmth and good ventilation, they will be more healthy, grow faster, meet with fewer accidents and by a large percentage become superior fowls than those brooded under hens. They are exempt from the ordinary diseases of infancy, "the pip," "gapes," etc.

INCUBATORS.

It becomes an important question which incubator to use. Of course we all want the best—but which is it? There are a few suggestions to be made in this connection which will probably insure satisfaction.

First—Select some standard style ; because after an incubator has been some years before the public we have reason to believe that a substantial company, firm or business man is behind it ; and that the faults of the first construction will have been remedied ; and that there is not only business responsibility on the part of the makers, but experience, and the results of the use of the machine by others—a sure way to learn its faults, and indicate better construction.

Second—Select one of simple form, easily understood, having no complicated or delicate mechanism.

Third—Select one thoroughly made, substantial, neat, with close joints, large capacity for heat (for instance, a large water-tank, which undergoes changes of temperature very slowly), and

Finally, one recommended by responsible persons with whom you can communicate.

It is always best to be deliberate in making choice of such an article ; and one may almost always find some of almost any standard kind in use by practical people where they may be seen ; and if not, then parties may be communicated with by letter (return postage).

Persons situated away from towns where incubators are used or sold, and away from the lines of railway or express, may construct incubators for themselves, with only the help of a tinsmith and a carpenter, which will do excellent work. The plan recommended by Mr. P. H. Jacobs is as follows :—Have a closed tank made by a tinner, of galvanized iron or zinc, measuring fifteen inches wide, thirty inches long and twelve inches deep, having also an inch tube eight inches long rising from the top, and a tube of the same length for a brass faucet near the bottom of one end. Now prepare a wooden box of inch stuff tongued and grooved, which shall hold the tank, the sides and ends of which shall extend nine inches below the bottom of the tank which is fastened in the top of the box by four iron rods passing crosswise under the tank. It is important that there should be several rods to support the bottom of the tank level, as the weight of water will be considerable, and the tendency of the bottom is to sag or bulge. Immediately under the tank the egg-drawer is placed. This is three inches deep and has a bottom of muslin stretched tight from side to side and supported upon thin slats of wood let into the ends. The cleats upon which the egg-drawer runs and is supported,

must be fastened in, and a three-inch opening made in the end opposite the faucet, close under the tank, for the drawer to slide in and out.

The arrangement, as so far completed, is set upon a platform just six (or better eight) inches wider and longer on all sides than the tank. The tank being 15×30 inches, the platform will be $6 + 15 + 6 = 27$ inches wide, and $6 + 30 + 6 = 42$ inches long. The tank-box, with the egg-drawer space and the open space below, which is used as a ventilator, is placed in the middle of the platform and fastened there securely, after boring four one-inch holes and setting in tin tubes to come up within two inches of the egg-drawer.

This platform is the base or bottom of a tight box to be built around and six inches distant from the tank on all sides. The egg-drawer shuts flush with the outside of this case, and the space between the two cases through which the drawer slides is boxed. The boards are nailed to cleats or posts in the corners, and the top is put on by screws so that it may be removed if necessary. The whole space between the tank case and the outer one is now filled with dry sawdust, and it is best to take some pains and obtain spruce sawdust as being nearly odorless. The ventilator space below the egg-drawer is to be filled with sawdust to near the top of the air tubes, and six inches of the front of the egg-drawer is also packed. This apparatus is set up upon blocks or legs, so that the air has free access beneath, and is thus completed.

In use the tank is to be filled with boiling water and the temperature carefully watched, the thermometer being laid in the egg-drawer. It will be twenty-four hours before the incubator will have an even temperature. If it is found to be below 110° a little water may be drawn off and hot water added. After it is held stationary at about this temperature for a day or two the eggs may be put in and these will bring the temperature

down to the normal heat of the hen's nest—namely, 103°. A pan for water is placed in the ventilator space and is emptied by a rubber tube siphon, and the water renewed daily; besides it is well to have one or two moist sponges laid upon the eggs in the drawer, as they indicate the amount of moisture present. The egg-drawer must be taken out once every day and allowed to cool down to 70°, and while the drawer is out it is well to close the opening to prevent cooling the incubator. Before returning the drawer the eggs must be turned half over, and to know this they should all be marked on opposite sides. The last week they should be sprinkled with tepid water daily—but this is not necessary when the sponges remain moist.

To maintain the temperature, all that is necessary is to draw off a pail of water and add one of boiling water as often as may be necessary. In cold weather and in an exposed situation this may need to be done three times a day; but under ordinary circumstances once or twice a day is all that is required. The changes of temperature in this incubator go on very slowly; the influence of a kettle of hot water not being noticeable for three or four hours; and herein is the safety and excellence of the apparatus. There is no machinery, no lamp, no automatic arrangements, but it depends for its usefulness upon its simplicity and its bulk.

BROODERS.

Of these there are many excellent ones, and it is usually more convenient to buy them than to make them. Still one may be made much on the same principle as the incubator. (A large close tank with one opening, closed by a screw cap at one corner, and having a thick jacket of felt entirely covering it except at the screw cap.) This is set on a slight incline, so that small chickens can get

their backs against it at the lower end and larger ones at other points. A fringe or curtain of flannel in several folds hangs down from all except the front or upper edge, where the air and breath of the chicks can pass freely away. This is placed in a box having good ventilation but protected from drafts, and the front of the box should have several panes of glass set in it for light, while access is given the chicks as soon as they are old enough to other compartments and open yards for feeding, etc. The temperature of the brooding apartment should not be higher than 100° when the tank is filled for the night. In filling, lift the tank, pour off the water as necessary and add boiling water, being careful not to wet the felt, and if it becomes wet to dry it thoroughly. If preferred, a faucet may be put in for drawing off the water without lifting the tank.

A SITTING PEN FOR HENS.

We have for several years used enclosed sitting pens for hens, like that shown in the engraving, with much satisfaction. Success with poultry depends wholly upon the convenient and effective management of the brood-hens and the chicks. When hens cannot help it they will do as their owners wish, and there is then peace, comfort and prosperity in the poultry house. These pens are built around a part of the poultry house kept specially for the sitting hens. Each one is four by four feet, and three feet high; it has a hinged lid, which can be thrown back against the wall when it is desired, for attendance upon the hen. The front is covered with wire netting. The nest, shown by the removal of one side of a pen, is a box about sixteen inches square, open in the front, and having a very low piece to keep the nest in it, and to permit the hen to step in and out. When it is necessary the nest is closed by placing a piece of board

in front of it. This is done for a day or two when the hen is restless after having been put in the nest. When she is settled down the board is removed. Each pen is supplied with a feeding dish and water cup, and is littered with sawdust. It is attended to every evening by lamp-light; the feed and water are renewed, and the droppings are removed—a pail and small shovel being

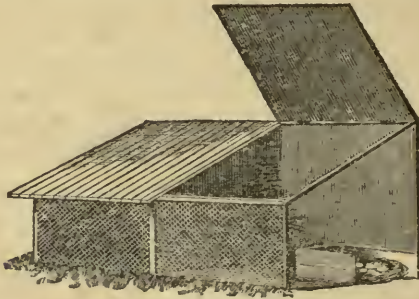
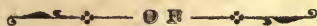


Fig. 43.—SITTING PEN FOR HENS.

kept in the house for this purpose. A pail of water and another of feed are carried to the house every evening. The hens are thus kept undisturbed during the day, although they are visited regularly to see that all is right. Each hen is separate and cannot see the others, and the house being partly darkened and kept warm, the hens are quiet and comfortable and mind their business satisfactorily.

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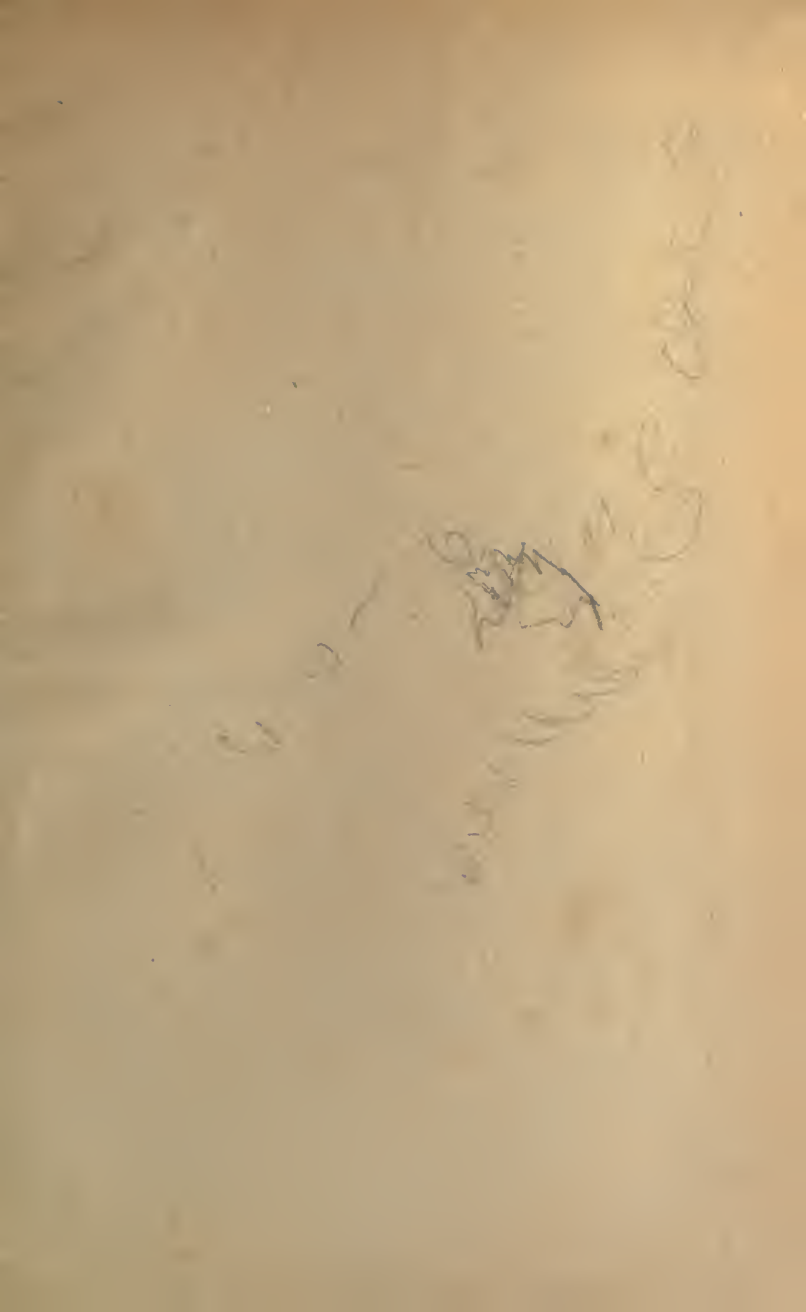
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