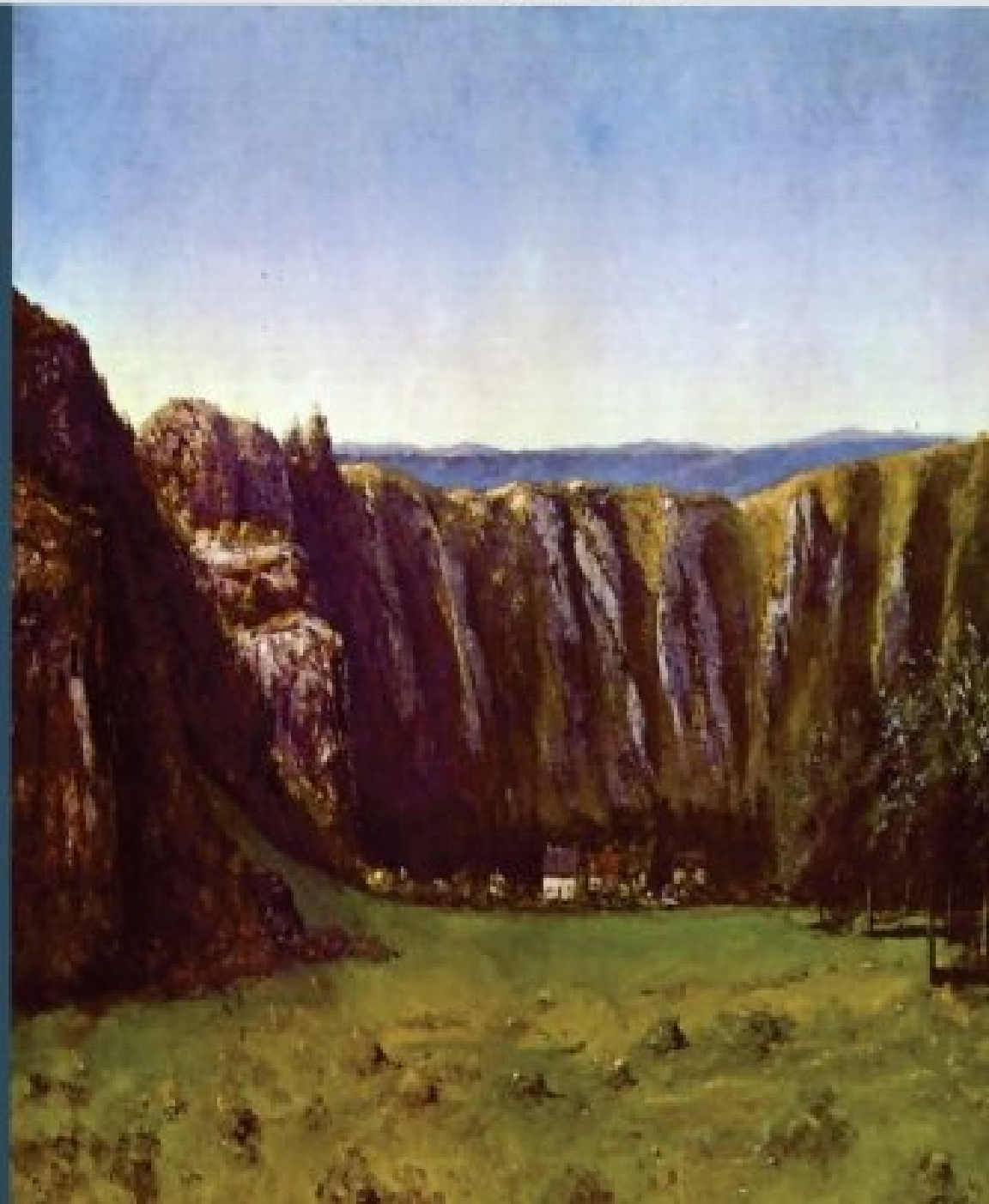
Village Improvements and Farm Villages

George E. Waring



The Project Gutenberg eBook of Village Improvements and Farm Villages

This eBook is for the use of anyone anywhere in the United States and most other parts of the world at no cost and with almost no restrictions whatsoever. You may copy it, give it away or re-use it under the terms of the Project Gutenberg License included with this eBook or online at www.gutenberg.org. If you are not located in the United States, you will have to check the laws of the country where you are located before using this eBook.

Title: Village Improvements and Farm Villages

Author: George E. Waring

Release date: October 7, 2008 [eBook #26801]

Language: English

Other information and formats: www.gutenberg.org/ebooks/26801

Credits: Produced by Tom Roch and the Online Distributed Proofreading Team at http://www.pgdp.net (This file was produced from images produced by Core Historical Literature in Agriculture (CHLA), Cornell University)

*** START OF THE PROJECT GUTENBERG EBOOK
VILLAGE IMPROVEMENTS AND FARM VILLAGES
***

Village Improvements AND FARM VILLAGES.

By

GEO. E. WARING, Jr.

CONSULTING ENGINEER FOR SANITARY AND AGRICULTURAL WORKS.

BOSTON:
JAMES R. OSGOOD AND COMPANY,
(Late Ticknor & Fields, and Fields, Osgood, & Co.)
1877.

Copyright, 1877,
By GEO. E. WARING, Jr.

Franklin Press: Rand, Avery, & Co.,
Boston.

The following papers on
Village Improvements

and Farm Villages are reprinted, with some amendments, from "Scribners Monthly." These constitute the more practical part of the book, so far as villages are concerned.

It has, however, been judged appropriate to add to them a paper on Eastern Farming, which originally appeared in "The Atlantic Monthly," and which continues the discussion of the question of village residence as a means for mitigating some of the hardships which beset the lives of isolated country families.

The wide-spread and growing interest in the topics considered makes it seem worth while to give these short essays a more permanent form.

G. E. W., JR.

NEWPORT, R.I., June, 1877.

CONTENTS.

Village Improvements	11
Village Sanitary Work	69
Farm Villages	114
Life and Work of the Eastern Farmer	159

LIST OF ILLUSTRATIONS.

Fig. 1.--Drainage of Hill-Side Foot-Path	31
Fig. 2.--Section of Road with Drains	44
Fig. 3.--Pipes resting on their Shoulders	73
Fig. 4.--Pipes resting on their Full Length	73
Fig. 5.--Grease-Trap	79
Fig. 6.--Field's Flush-Tank	80
Fig. 7.--The Emerson Ventilator	86
Fig. 8.--Diagram illustrating Manner of Sewage Disposal at Lenox, Mass.	97
Fig. 9.--Settling Basin	102
Fig. 10.--Arrangement of Absorption Drains,	105

FIG. 11.--DIVISION OF FOUR SQUARE MILES WITH CENTRAL VILLAGE 124
FIG. 12.--DIVISION OF THE CENTRAL VILLAGE 126
FIG. 13.--DIVISION OF THE CENTRAL OPEN SPACE OF THE VILLAGE 131
FIG. 14.--PRESENT DIVISION AND SETTLEMENT OF TRACT IN RHODE ISLAND 133
FIG. 15.--THE RHODE ISLAND TRACT WITH ITS BUILDINGS GATHERED TOGETHER INTO A COMPACT VILLAGE 135
FIG. 16.--PROPOSED ARRANGEMENT OF THE RHODE ISLAND FARM VILLAGE 139

VILLAGE IMPROVEMENTS.

It may be because the newness of our country and the fragile character of our early structures have prevented the accumulation of inferior, ugly, and uncomfortable houses, as the nucleus around which later building has crystallized; it may be from circumstances which have prevented the isolated residence of the better classes of our people; or it may be the result of accident. Whatever the reason, it is beyond dispute that the United States is *par excellence* a land of beautiful villages. North, south, east, and west, there are plenty of hideous

conglomerations of poor-looking houses, with an absence of every element of beauty; but there are thousands of other villages scattered all over the land, which are full of the evidences of good taste in their regulation and in their management.

As a rule, these more attractive features are very much modified by the presence of badly-kept private places or neglected public buildings, and by a general air of untidiness. Still, the foundation of attractiveness is there; and nothing is needed beyond a well-organized and well-guided control of public sentiment, to remove or to hide the more objectionable features, and to permit such beauty as the village may possess to manifest itself.

The real elements of beauty in a village are not fine houses, costly fences, paved roadways, geometrical lines, mathematical grading, nor any obviously costly improvements. They are, rather, cosiness, neatness, simplicity, and that homely air that grows from these and from the presence of a home-loving people.

To state the case tersely, the shiftless village is a hideous village, while the charm which we often realize without analyzing it comes of affectionate care and attention.

There are villages in New England, in Western New York, and all over the West, even to the far side of Arkansas, which impress the visitor at once as being homelike and full of sociability and kindliness; which delight him, and lead him almost to wish that his own lot had been cast within their shades. These are chiefly villages where the evidences of public and private care predominate, or are at least conspicuous. A critical examination would, in almost every case, develop very serious evidence of neglect,

unwholesomeness, and bad neighborhood.

Within a few years, beginning, I believe, in Massachusetts, the more thoughtful of those whose affections are centred in their village homes have united in organized efforts to make their villages more tidy, to interest all classes of society in attention to those little details the neglect of which is fatal, and to make the village, what it certainly should be, an expression of the interest of its people in their homes and in the surroundings of their daily life.

The first of these associations of which I have any knowledge (though, as such work is unobtrusive, there may have been many before it) was the "Laurel Hill Association" of Stockbridge, Mass. It takes its name from a wooded knoll in the centre of the village, which had been dedicated to public use. The first object of the association was to convert this knoll into a village park. Then they took in hand the village burial-ground, which was put in proper condition and suitably surrounded with hedge and railing. Then the broad village street was properly graded and drained, and agreeable walks were made at its sides. Incidentally to this, the people living along both sides of the streets were encouraged to do what they could to give it an appropriate setting by putting their own premises into tasteful condition and maintaining them so. The organization worked well, and accomplished good results. The Rev. N. P. Eggleston, formerly of Stockbridge, in a paper on village improvements written for the "New York Tribune," thus describes the collateral work and influences of the Laurel Hill Association:—

"Next followed the planting of trees by the

roadside wherever trees were lacking. The children, sometimes disposed in their thoughtlessness to treat young trees too rudely, were brought in as helpers of the association, while at the same time put under a beneficial culture for themselves. Any boy who would undertake to watch and care for a particular tree for two years was rewarded by having the tree called by his name. Other children were paid for all the loose papers and other unsightly things which they would pick up and remove from the street.

"Gradually the work of the association extended. It soon took in hand the streets connected with the main street. Year by year it pushed out walks from the centre of the village toward its outer borders; year by year it extended its line of trees in the same manner; and year by year there has been a marked improvement in the aspect of the village. Little by little, and in many nameless ways, the houses and barns, the dooryards and farms, have come to wear a look of neatness and intelligent, tasteful care, that makes the Stockbridge of to-day quite a different place from the Stockbridge of twenty years ago. Travellers passing through it are apt to speak of it with admiration as a finished place, and, compared with most even of our New England villages, it has such a look; but the Laurel Hill Association does not consider its home finished, nor its own work completed. Still the work goes on. Committees are even now conning plans for further improvements. By itself, or by suggestions and stimulations offered to

> others, the association is aiming at the culture of the village people through other agencies than those of outward and physical adornment. It fosters libraries, reading-rooms, and other places of resort where innocent and healthful games, music and conversation will tend to promote the social feeling, and lessen vice by removing some of its causes."

No one can drive through this beautiful old place without realizing the effect of some influence different from that which has usually been at work in country towns. One feels that it is a village of homes; that the people who live in it love it, and that it has no public or private interest so insignificant as to be neglected.

I have cited this instance somewhat at length, because it was the first, as it is the most complete, that has come to my notice. In other places, more serious work of improvement has been undertaken in the direction of sewerage, gas-lighting, &c. In fact, the present writing was suggested by frequent requests for information and advice on the more practical parts of the subject.

At the outset it is to be said that the organization and control of the village society is especially woman's work. It requires the sort of systematized attention to detail, especially in the constantly-recurring duty of "cleaning up," that grows more naturally out of the habit of good housekeeping than out of any occupation to which men are accustomed. Then, too, it calls for a degree of leisure which women are the most apt to have, and it will especially engage their interest as being a real addition to the field of their

ordinary routine of life. The sort of enthusiasm which has led to marked success in the Dorcas Society and other organized action outside of the household, for which American country women are noted, will find here a new and engaging object. This, however, is only a suggestion by the way, and one which may or may not be appropriate under varying circumstances.

If we assume, which is not altogether true, that the main purpose of village improvement is to improve the *appearance* of the village, we must still understand that the direct object of the society should not be alone nor chiefly in the direction of appearance.

What it is especially desirable that a village should appear to be is: a wholesome, cleanly, tidy, simple, modest collection of country homes, with all of its parts and appliances adapted to the pleasantest and most satisfactory living of its people. All improvements should therefore have this fundamental tendency, and every element of adornment, and every evidence of careful attention, should be only an outgrowth of the effort to obtain the best practical results. Costly park railing where no railing is needed, width of roadway greater than the needs of the community require, formal geometric lines and surfaces where more natural slopes and curves would be practically better, elaborate fountains or statuary out of keeping with the general character of the village, (the gift of a public-spirited, ambitious, and pretentious fellow-townsman,) and isolated examples, as in a church or schoolhouse, of a style of architecture which would be more appropriate for a city,—all these are obtrusive and objectionable, and are consequently in

bad taste. In so far as these or any other elements of improvement are unsuited to the conditions in which they are placed, they are undesirable; and it would be well for those having the interest of the village in charge, to adopt an early resolution to accept no gifts, and to allow no work of construction or embellishment, which is not, first of all, appropriate to the modest character of a well-regulated country village.

If every public building is sufficient for its uses and suggests no undue outlay for show alone; if the roads and walks are such as the uses of the people require; if the fountain suggests a tasteful ornament and centre of freshness and coolness, rather than a monument of some citizens liberality and ambition; if the village green or park is a proper pleasure-ground for old and young; and, in short, if every thing that is done and every dollar that is expended has for its object only the improvement of the conditions of living,—then there will be needed only the element of careful keeping to maintain always the best sort of beauty that is possible under the circumstances.

No satisfactory result can be attained without organization. The work will necessarily require much money and more time in order to avoid an undue tax upon individuals. It is desirable, too, that, so far as possible, every member of the community should be interested in the work, and should contribute in labor or in money according to his means. This general interest can be secured much better through the influence of an organization in which all are interested, than by any individual effort.

The association should become the distributor, not

only of the moneys accruing from membership fees, &c., but of contributions made by citizens, or subscriptions raised by combined effort for general or specific works of improvement. It should be, in fact, not only the inciter of public spirit, but the director of public effort.

The precise form of constitution for such an association must necessarily depend more or less on circumstances; and I sketch only as a basis for discussion, the following form suggested by the regulations governing the Laurel Hill Association of Stockbridge:—

ARTICLE I.

This Association shall be called "The Village Improvement Association of ——."

ARTICLE II.

The object of this Association shall be to improve and ornament the streets and public grounds of the village by planting and cultivating trees, establishing and maintaining walks, grading and draining roadways, establishing and protecting good grass plats and borders in the streets and public squares, securing a proper public supply of water, establishing and maintaining such sewerage as shall be needed for the best sanitary condition of the village, providing public fountains and drinking-troughs, breaking out paths through the snow, lighting the streets, encouraging the formation of a library and reading-room,

and generally doing whatever may tend to the improvement of the village as a place of residence.

ARTICLE III.

The officers of this Association shall be a President, two Vice-Presidents, a Secretary, and a Treasurer, who shall constitute the Executive Committee. These officers shall be elected at the annual meeting, and shall hold their offices until their successors shall have been elected.

ARTICLE IV.

It shall be the duty of the President, and in his absence of the senior Vice-President, to preside at all meetings of the Association, and to carry out all orders of the Executive Committee.

ARTICLE V.

It shall be the duty of the Secretary to keep a correct and careful record of all proceedings of the Association, and of the Executive Committee, in a book suitable for their preservation; to give notice of all meetings of the Association and of the Executive Committee; to make all publications, and to give all public and private notices ordered by the Executive Committee, and to attend to all the correspondence of the Association.

ARTICLE VI.

It shall be the duty of the Treasurer to keep the funds of the Association, and to make such disbursements as may be ordered by the Executive Committee.

ARTICLE VII.

It shall be the duty of the Executive Committee to manage all the affairs of the Association, to employ all laborers, to make all contracts, to expend all moneys, and generally to direct and superintend all improvements which in their discretion, and with the means at their command, will best serve the public interest. The Executive Committee shall hold a meeting at least once in each month, and as much oftener as they may deem expedient.

The Executive Committee shall have power to institute premiums to be awarded for planting and protecting ornamental trees, and for doing such other acts as may seem to them worthy of such encouragement. They shall also encourage frequent public meetings of the Association and of citizens generally, both with a view to maintain an interest in their work, and for the general encouragement of the habit of meeting for discussion and amusement.

ARTICLE VIII.

Three members of the Executive Committee

present at any meeting shall constitute a quorum for transacting business; and the vote of a majority of those present shall be binding on the Association.

ARTICLE IX.

No debt shall be contracted by the Executive Committee beyond the amount of available funds within their control to pay it; and no member of this Association shall be liable for any debt of the Association beyond the amount of his or her subscription.

ARTICLE X.

Every person over fourteen years of age who shall plant and protect a tree under the direction of the Executive Committee, or who shall pay the sum of one dollar annually, and shall obligate him or herself to pay the same for three years, shall be a member of this Association; and every child under fourteen years of age, who shall pay or shall become obligated to pay as before the sum of twenty-five cents annually for three years, shall be a member of this Association.

ARTICLE XI.

The payment of ten dollars annually for three years, or of twenty-five dollars in one sum, shall constitute a person a member of this Association for life.

ARTICLE XII.

The autograph signatures of all members of the Association shall be preserved in a book suitable for that purpose.

ARTICLE XIII.

An annual meeting of the Association shall be held at such place as the Executive Committee may direct, on the fourth Wednesday of August, at two o'clock, P.M. Notice of such meeting shall be posted on each of the churches and at the post-office at least seven days prior to the time of holding said meetings, and a written notice shall be sent to all non-resident members. Other meetings of the Association may be called by the Executive Committee on seven days' notice as above prescribed.

ARTICLE XIV.

At the annual meeting, the Executive Committee shall report the amount of money received during the year, and the source from which it has been received; the amount of money expended during the year, and the objects for which it has been expended; the number of trees planted at the cost of the Association; the number planted by individuals, with the location, the kind of tree, and the name of the planter; and generally all of the acts of the Committee. This report shall be entered on the record of the Association.

ARTICLE XV.

> Any person who shall plant a tree under the direction of the Executive Committee, and shall protect it for five years, shall be entitled to have such tree known forever by his or her name.

ARTICLE XVI.

> This Constitution may be amended by the Executive Committee with the approval of the majority of the members present at any annual meeting of the Association, or at any special meeting, the notice of which shall have been accompanied by a copy of the proposed amendment, with the statement that the amendment is to be voted on at such meeting.

I have provided, in the above draft of a constitution, for an executive committee of only five members; for the reason that, while it will be comparatively easy to secure the services of this number, the duties and responsibilities of a larger committee would be so distributed that there would be too often occasion for the application of the old adage: "What is everybody's business is nobody's business." The Laurel Hill Association has an executive committee of fifteen, in addition to seven officers. This large committee (twenty-two) serves to secure the interest of a larger number of citizens; but the same thing may be as well accomplished by inviting the co-operation of citizens in the work of sub-committees, the chairman of each of which would be a member of the regular executive committee. In Easthampton,

Mass., there is a board of fourteen directors, and there are committees on sanitary matters, on setting out trees, on sidewalks and hitching-posts, &c. It would be prudent to restrict the number of members of these sub-committees to three; one from the executive committee and two from outside.

Besides special executive work, a vast deal has been done wherever improvement societies have been organized, in the way of stimulating citizens to adorn their private grounds, or at least to keep their grounds and fences in good order, removing weeds and rubbish from the sidewalk, keeping the grass well trimmed and free from litter and leaves. What most detracts from the good appearance of any village is the slovenly look which comes from badly hung gates, crooked fences, absent pickets, and general shiftlessness about private places; and it is by encouraging citizens to take a pride in attention to these minor details, that the association will do its best work. This result may be accomplished almost entirely without the expenditure of money. It is in attention to little things and in securing the co-operation of private owners,—a co-operation which will call for an inappreciable amount of labor,—that the most telling work of the officers of the society is to be done.

So far as these details are concerned, it is hardly necessary in a paper of this sort to do more than to call attention to them. They are within the capacity of every citizen, and they will naturally suggest themselves to any person who would be likely to undertake the direction of an improvement association. There are other and really more important objects looking to a certain amount of landscape gardening and engineering, on which

specific instruction may be desired, and often in cases where it will be impracticable to employ professional assistance. These are as follows:—

1. The construction of sidewalks.

2. The construction and care of roadways.

3. The supply of water, and the construction of drinking-troughs.

4. The laying-out and adornment of public squares and other open spaces.

5. The establishment of a system of sewerage or sanitary drainage, including the removal of excessive soil moisture.

SIDEWALKS.

No one thing has more to do with the comfort of those living in country villages than sidewalks which are good at all seasons of the year. Those fortunate villages which are built on a gravelly soil, with a perfect natural drainage, need little more in this direction than such a conformation of the surface as will prevent water from standing on the footway when the ground is frozen. At all other times it sinks naturally away into the earth. It is much more often the case that the character of the soil or subsoil prevents a settling away of water, or that subterranean oozing from higher ground keeps the earth throughout the spring and autumn, and after heavy rains in summer, damp, and often sloppy. Wherever the ground is of such a character as to prevent the rapid sinking to a considerable depth of all excessive moisture, there is sure to be a disagreeable condition of the footway whenever the

lower soil is locked with frost, and the surface is thawed. Even with the best drainage, natural or artificial, this condition will exist for a short time while frost is coming out of the ground; but with good drainage it is of so temporary a character as hardly to justify any expensive finishing of the surface, except perhaps in the case of the most frequented walks.

To overcome occasional sloppiness where the difficulty is not deep-seated, there is no cheaper nor better device than to dress the surface with coal-ashes. Indeed, if these are used to a sufficient thickness, they are practically as good as concrete or the best gravel. When first applied, they are dusty and unpleasant; but the first wetting lays the dust, and they soon settle to a firm consistency, and make a very pleasant walk, with the great advantage of being entirely barren, and preventing the growth of weeds and grass. If the ashes of a village are collected and screened, the cinders being used at the bottom, and the surface being smoothly dressed with the finer material, they will make as satisfactory walks, even where the use is considerable, as any other material. The color is unobtrusive, and the surface soon becomes hard enough to bear sweeping. Those who are more ambitious for effect may prefer a walk made of tar-and-gravel concrete; and this, if well made, is good, durable, and satisfactory. So far as the improvement association is concerned, it can find many ways for expending the difference of cost between ashes and concrete, which will accomplish a much more telling result.

If gravel can be obtained without too much expense, it may be used with excellent results to a depth of from one to three inches, according to the porosity of

the subsoil,—more being needed where the ground is inclined to become soft. In using gravel it is best either to screen it, using the coarser parts below and the finer parts at the surface, or, after applying it, to add a thin layer of earth, barely sufficient to fill its spaces,—to "bind" it so as to give it a firm and solid consistency. Loose and rattling gravel makes a handsome walk to look at, but an unpleasant one to walk upon. Nothing is more agreeable than well-trodden, dry, root-bound earth, as where grass has been worn away by frequent use; but this becomes at once objectionable on being saturated with rain or moistened by melting frost.

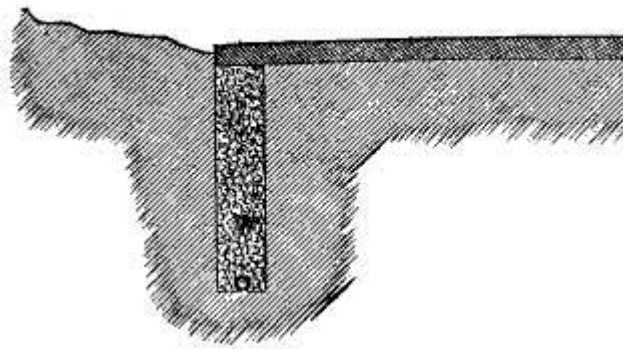


FIG. 1.

It is a common impression, that all thoroughly good foot-paths must be dug out to a considerable depth, filled with loose stones, and dressed at the top with some good finishing material; but this is not necessary even for the best work. The great point is to secure a thorough draining of the sub-stratum, so that there shall be no rising of ooze-water from below, and so that the ground shall be free from such saturation as to cause heaving during frost. This condition may be secured by a suitable draining of

the ground immediately under the walk, and by the use of a well-compacted and tightly-bound surface covering of such form as to shed or turn away rain-water. Figure 1 (p. 31) shows the cross section of a foot-path six feet wide on slightly sloping ground, where we have to apprehend an oozing of subsoil water from the land at the highest side. The centre of the walk is slightly crowning,—say one inch higher than the sides,—so that rain falling upon it will flow readily toward the grass-border at either side. To prevent the ponding of water at the sides when the ground is frozen, the surface of the walk at its edges should be well above the level of the adjoining ground; but it may be necessary under some circumstances to furnish, here and there, a channel or surface-gutter across the walk, to allow the accumulation at the higher side to escape. Rarely will deep gutters at the sides be necessary or desirable. If the walk is laid at a sufficient height to turn water on to the adjoining ground instead of receiving water from this, it will be easy to keep it dry. We will assume that the path in question is to be made over a tenacious clay soil, with a considerable oozing from the hillside,—the most unfavorable condition that can be found, especially in cold climates. The first thing to be secured is the cutting-off of the subsoil water from the hill. This may be done by digging a trench as narrow as possible,—six inches will be better than more, as requiring less filling material,—to a depth of three feet. In the bottom of this drain lay a common land-tile drain, with collars at the joints if these can be procured, and, if not, with a bit of paper laid over the joints to prevent the entrance of loose material, and to hold the pipes in place during construction. The ditch should then be filled with cinders, gravel, or coarse

sand. If stones are to be used, they should be broken to a small size,—not more than one inch in diameter,—and the loose bits should be mixed with them in the filling. Very small interstices will be sufficient to allow water to pass freely through, while if large stones are used, with large interstices, there will be danger of a washing-in of earth sufficient in time to obstruct both the stonework and the tile. The smaller the tile, so long as it is sufficient for its purpose, the better; for lengths of five hundred feet or less, an interior diameter of an inch and a quarter will be sufficient; from this to one thousand feet, use an inch and a half bore. If possible, before exceeding this length, secure an outlet for the water in the roadside gutter or some other channel of exit. The tile-drain, at a depth of three feet, will remove all subsoil water from under the walk, and all that may be delivered into the loosely filled trench at its side. The loose filling of the trench should not be carried nearer than within six inches of the surface of the ground, and should be covered with fine and well-packed earth to prevent the entrance of *surface*-water which would soon carry in silt enough to stop its action. Whatever covering is adopted for the walk itself, it must be of such a character as to prevent any thing like a free admission of surface-water. Concrete will do this perfectly; and either ashes, or gravel dressed at the top with ashes, if well raked and rolled at the outset to a smooth surface, will soon become so bound together as to shed pretty nearly all rain falling upon it. The difference in cost between a walk made in this way, and one dug out for its whole width to a depth of two feet, and filled first with stone and then with gravel and a suitable surface dressing, will be very important; and it is safe to say that the cheaper will be at least as good and durable as the more

expensive method. In all construction of sidewalks, whether public or private, regard must be had to the surface conformation, and some device must be adopted for preventing the flow of water upon the walk from the adjoining ground, and for the easy delivery of storm-water falling upon the walk itself.

ROADWAYS.

The great expense of Macadamizing or Telfordizing puts these systems almost out of the reach of small communities. Wherever the original expense can be borne, the subsequent cost of maintenance will be so slight, and the result generally will be so satisfactory, as to make it always a good investment. The circumstances under which these costly forms of construction may be adopted will be greatly extended if we can overcome the prevalent American prejudice in favor of *wide* roadways. Against wide *streets* there is, as a rule, no objection, though exceptional narrow and well-shaded lanes have a rural charm that will always commend them to persons of taste. A wide street, that is, broad spaces between fences, by no means implies a broad roadway. All we need in the principal thoroughfare of a busy village is such a width as will allow of the easy passing of vehicles in the middle of the road, and the standing of one vehicle at rest at each side. This will be accomplished, even in the business street of a village, by a width of roadway of thirty feet. Under most other circumstances twenty feet of roadway will be ample. This will allow of the moving of three vehicles side by side, and will give a leeway of six feet between two vehicles passing each other.

On both sides of this roadway, except for the

necessary sidewalks, the whole space to the fences should be in well-kept grass, which is the cheapest to secure, the most economical to maintain, and the most agreeable to see, of all ground covering. It is not unusual in country towns to find a width of from sixty to eighty feet devoted to a muddy, dusty, and ill-kept roadway. From one-half to two-thirds of this width is waste space, which must either remain an eyesore, or entail an undue cost for maintenance. When both sides of the street are occupied by places of business, it may be necessary to provide for some occasional driving close to the buildings for the delivery of merchandise; but this occasion will rarely be so regular as to cause any serious damage to grass. If the line of hitching-posts is placed within fifteen feet of the centre of the roadway on each side, it will be seldom that any one will drive over the bordering grass, especially if there is, as there generally should be, a well-defined gutter or well-kept grass with a curbstone border at each side.

In considering the width to be given to roadways, it should be understood that every form of road is more or less costly to make and to keep in order, and that the cost of both items is in direct proportion to the width. If to the cost of making and grading an ordinary roadway sixty feet wide, we add the capital sum whose interest would be necessary to keep this width in good repair, we shall have an amount that would go far toward the construction and maintenance of a road of the very best quality only thirty feet wide. Furthermore, while it is impossible to estimate such items exactly, and while the amount thus saved cannot be controlled for the road-making account, the saving in the wear and tear of vehicles, and in the team force needed to move heavy loads, constitutes an important argument in favor of the

best construction. The amount thus saved in the short streets of the village, where the principal traffic is over rough country roads, would not be very great, but it would enable the road authorities of the township to realize the advantage of first-rate roads and the degree to which the narrowing of the roadway cheapens construction. As a result, there would soon be an extension of the improvement over the more important highways into the country; where a well-metalled width of twelve feet would accommodate nearly the whole traffic, and where the proper application of a cheap system of under-drainage would make well-metalled roads extremely cheap to maintain.

In the island of Jersey, there are many excellent roads only six feet wide. These are provided with frequent little bays or turn-outs to allow teams to pass each other. Although such extremely narrow roads are not to be recommended, the difference in comfort and economy of teampower between these and the average American dirt road is enormously in their favor. The widest roads in Jersey, leading from a busy town of thirty thousand inhabitants into a thickly settled farming region where business and pleasure travel is very active, and where "excursion cars" carrying thirty or forty persons are constantly passing, are only twenty-four feet wide; often only of this width between the hedge-rows, the road itself being an excellent footpath for its whole width. Nowhere else in the world is the rural charm more perfectly developed than in Jersey, and no element of its great beauty is so conspicuous and so constantly satisfactory as its narrow and embowered lanes and roadways.

This, however, by the way, and only as a suggestion,

for the sake of variety. As a rule, we may at least accept much less width than is now usual for our country and village roads. Wherever it is intended to build expensive stone roads, those having the work in charge will naturally employ a competent engineer, or will at least appeal to Prof. Gillespie's work on road-making, or to some other authority. Space need not be given here to engineering details, which would require a lengthy elucidation. There is, however, a sort of road-making materially more costly at the outset than that now in vogue, but much less costly in the long-run, if we consider the element of practical value and the cost of maintenance. It depends more on fundamental principles of construction than on special processes of finishing, and will be more or less satisfactory according to the character of the soil and of the covering material available.

The great enemy of all roads is excessive moisture; and the chief purpose of all methods of improvement is to get rid of this, or to counteract its effect. As in the case of foot-paths, wherever the porous character of the subsoil, and the absence of higher-lying wet lands, is such that no accumulation of water upon or under the roadway need be feared, the greatest difficulty is at once set aside. Roads lying on such a soil may be over-dusty in dry weather. When the subsoil is temporarily impervious because of its frozen condition, they may become unduly muddy, or, when the situation is such as to lead hill-water upon them, they may be badly washed; but they are free from the great difficulties that beset all roads which for a large part of the year are underlaid by an over-saturated, compact subsoil. Where such natural drainage is secured, no artificial under-drainage will be needed. In many more instances, all that will be

required in the way of draining will be to lead away the sources of wet-weather springs, which break through the road-bed and cause deep sloughs. Where incomplete or partial artificial under-draining is needed, the need is absolute; and whether we consider the durability of the road, or the degree to which its traffic is interfered with by its wet condition, we may be confident that every dollar spent in well-directed under-draining will be invested to the very best advantage. The varying conditions of wetness, and the different sources of surplus water, must be regarded in deciding precisely how much of this work is needed, and how it should be done. Details cannot be fully considered here; but as a general rule it may be said, that where the subsoil generally is of an impervious character, and where the road is more or less wet and weeping after long rains, a continuous system of under-drains is required. If the trouble is local, here and there in spots, and is obviously caused by the breaking up of springs from the road-bed, such partial work may be adopted as will tap the sources of these springs, and lead their water harmlessly away. Gisborne, one of the best agricultural writers of England, put the case tersely and well when—objecting to the system of circumventing springs—he said, "*Hit him straight in the eye*, is as good a maxim in draining as in pugilism." It is best not to pass up at the side of a spring, and so creep around behind it to head off its water; but to drive the drain straight through it, and far enough beyond it to tap and lead away at a lower level the water which causes it. These drains, as well as all others intended simply to remove subsoil water, and not to cut off a weeping stream, are best made with common drain-tiles laid as before directed, and covered immediately with well-packed

earth. Water enters an under-drain, not from above, but from below; that is to say, as water, from whatever source, fills the subsoil, it rises therein until it reaches the floor of the drain, when it enters and is led away, just as water falling into a cask which stands on end flows off at the under side of the bung-hole when it reaches its level. Even if the cask be filled to the top with earth, the rain falling upon it will descend perpendicularly to the bottom, and will flow off at the bung only when the soil to that level has become saturated. It will descend through the soil by the straightest course, and will raise the general level. It will not violate the laws of gravitation, and run diagonally toward the point of outlet, as seems to be the general supposition when the perplexing question, "How does water get into the drain?" is first considered. When we drive a drain through a spring and into the water-bearing stratum which feeds it, we simply make it easier for the water to escape by the drain than to keep on at the higher level, and break out at the surface of the ground.

As in the case of the sidewalk illustrated in Figure 1, in cutting off a continuous weeping or ooze from higher land, it is best to introduce a vertical filling of porous material through which the water will descend and enter the drain; but, excepting this single instance, all that we need to do, so far as subterranean work is concerned, is to furnish an easy and sufficient channel for the removal of subsoil water.

What constitutes a sufficient drain is something very much less than what is generally supposed. In ordinary agricultural drainage, where the lines of tiles are forty feet apart, a well-laid tile an inch and a

quarter in diameter is sufficient for a length of one thousand feet—that is, it is sufficient to remove the water of filtration from an acre of land. If laid with only an inclination of six inches in one hundred feet, its delivery will be so rapid as to amount to more than a heavy continuous rain-fall upon this area. In road drainage, the same rule would hold true; but, as the soil offers a certain resistance to the rapid descent of water, it is best to give a means of outlet at smaller intervals; and for the best work in roads thirty feet wide or more, three drains could be used with advantage. In no case, however, need the size of pipes be larger than above indicated, if the form of the tiles is true, and if they are well joined together at their ends. Tiles of less perfect form had better be an inch and a half or even two inches in diameter; but, as a rule, they should not be of a larger size, for the reason that the amount of water that they may be expected to carry will not be sufficient to keep them prop erly freed from silt unless the flow is concentrated within a narrow channel.

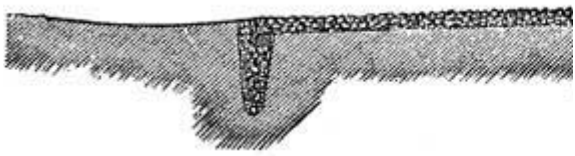


Figure 2 shows the cross section of a country road thirty feet wide, with three lines of tile-drain laid at a depth of about three feet below it. Except in case of necessity, these drains should have an inclination of not less than six inches in one hundred feet. There is no objection to their having more than this wherever the lay of the land permits or requires it. They may often have considerably less in case of need; but, the

smaller the rate of inclination, the greater the care needed in securing a true grade. The water of these drains should be collected into a single drain, and led away at intervals of from five hundred to one thousand feet. It may be delivered into a roadside gutter, or into a collecting under-drain, according to the requirements of the situation.

It is now possible to procure drain-tiles at reasonable cost in almost all parts of the country; and these are not only very much better than any form of stone drain, but they are also much cheaper in construction,—the labor of preparing and handling the stone, and of excavating the wider trench that stone requires, amounting to more than the cost of the tile, even with a high charge of transportation added. Incidentally it is proper to say that where tiles cannot be had, a mass of gravel or fine cinders, six inches wide and six inches deep, placed at the bottom of the drain, and *covered with well-packed soil*, is preferable even to broken stone or any other form of channel that would permit of the rapid running of water and the washing into the drains of even a slight amount of silt.

The removal of excessive subsoil moisture being secured, attention should next be given to the surface of the road, which should be finished with the firmest material at hand,—with the common earth of the subsoil where nothing better can be afforded,—and which should be brought to a true grade, with a *very slight* slope from the centre to the edge. For a road thirty feet wide, the elevation of the centre above the level of the edges should not be more than four to six inches, and the grade should be made on a straight line rather than on a curve. If the road is made as flat as the turning-off of surface-water will

permit, it will be travelled upon in all its parts; while if it is crowned to a high arch, as is often the case, it will soon be found that the best place to drive is in the middle of the road, and foot-tracks and wheel-tracks will soon form slight channels or ruts which will lead water lengthwise along the road, and which will cause an undue amount of wear and washing. A road may be actually flat to the eye, and equally convenient for travel at every part of its width, and still have enough lateral slope to cause water to run off from it.

It is especially desirable that no surface-water flowing from the roadside (above all, when frost is coming out of the ground in the spring) be permitted to run on to the road. This should be effectively prevented by the formation of sufficient gutters, with such outlets as will prevent ponding at the sides of the road. When it is necessary to carry the water of the gutters from one side of the road to the other, culverts should be provided; and wherever the slope of the road is sufficient to cause water to flow along it lengthwise,—that is, wherever the inclination is more than about one in fifty,—there should be frequent slight depressions from the centre diagonally toward the gutters to carry the flow away before it can accumulate sufficiently to form a washing current.

If it can be done without hauling additional material, it is always well to raise the road-bed somewhat above the level of the adjoining land, and this may usually be accomplished by throwing upon it the subsoil of the gutters. In no case should surface-soil sods or fine road-mud be used for repairs. The most serious objection to the absurd system of road-mending so common in this country lies in the fact

that the annual repairing is little more than the ploughing up and throwing back upon the roadway of the soft and unsuitable material which has been washed into the gutters.

What is said above applies especially to country roads; but it is appropriate, so far as it goes, to the better-made and better-kept roads of a village. In the case of these latter, except where the soil is naturally dry and firm, some attention should be given to the improvement of the surface; and it is to be considered whether to adopt the expensive process of covering with broken stone road-metal, or to use gravel. One or the other of these is desirable in all cases where there is much tendency to sloppiness in wet weather; but any form of artificial covering is so costly that the early efforts of the improvement association will produce a more telling result if applied in other directions. The necessary cross-walks may be satisfactorily made with coal-ashes.

It is even more easy in a village than in the country, to have the grades of all roadways so regulated as to shed rain-water falling upon them, and to have them so furnished with side gutters so as to prevent water from the roadside from running on to them. The simplest way to effect this, and the neatest way too, is to make gutters outside of the line of the road, say six inches deep and eight feet wide, these being at once sodded or sown with grass and grain to give an early protection against washing; made on such a shallow curve, they will afford no obstruction to any system of mowing that may be adopted, while their great width will give them sufficient capacity to carry away the water of considerable storms.

The work of construction having been duly attended

to, it is no less important to provide for regular and constant care. Any rutting that comes of heavy traffic in bad weather should be obliterated either by raking, or, better still, by filling the ruts with gravel or ashes. If such work is attended to immediately on the occasion for it arising, the amount of labor required will be very slight; for it is especially true with reference to roads, that "a stitch in time saves nine." If the filling of ruts and wheel-tracks be done in time, the serious damage that comes from guttering flows of water lengthwise along the road may be almost entirely avoided.

The mere cleaning work of both the roadway and roadside grass spaces, it will be easy to induce children to perform for slight rewards and encouragement. The daily removal of bits of paper and other rubbish will have an excellent effect on the general appearance of the village. In the autumn the removal of the fallen leaves will call for something more than children's work; but ordinarily this source of cheap labor will be found sufficient if properly directed.

PUBLIC WATER SUPPLY.

As a field for encouragement, rather than as an object for the expenditure of the association's funds, the furnishing of an ample supply of water is entitled to very early consideration. Not only is the question of public health very seriously involved in the water problem; but as a mere beautifying element an abundance of water, to be obtained without labor, will have a very telling effect by the facility it gives for preserving the fresh appearance of lawns and shrubbery, and for the cultivation of flowers and

vines.

Regarded from the horticulturist's point of view, the climate of pretty nearly the whole of this country is simply detestable. We may arrange to withstand very well the severity of our northern winters; we expect an entire shutting-up of all garden industries, and long cold seasons are an accustomed matter of necessity: but we have never yet learned to accept with patience the almost annual destruction of our lawns and gardens and flower-beds by scathing drought. No public water supply available for an ordinary village would suffice to overcome the effects of a dry season over the whole of even a small homestead; but we may hope to secure enough to keep one or two small sprinklers flowing steadily through the hot months, and so keep a little grass measurably green, and preserve a semblance of life and beauty in flower-beds and delicate shrubbery. It is very rarely that it will be possible to supply water enough in a whole week to equal in its effect a half-hour's rain; but the difference between towns where even the small amount of water is available for the garden and those which are hopelessly given over to drought shows how much may be accomplished in this direction even with limited means.

As in the case of road-making in any thing like a complete and thorough manner, the providing of a water supply must necessarily be directed by professional advice. Although the simpler principles of hydraulics are sufficiently understood, and although it would be quite within the ability of a number of the more intelligent men of any village to secure and distribute a satisfactory amount of water, the cost of doing such work in an experimental way by persons unaccustomed to its details, as compared

with the cost of doing it under the direction of an engineer whose natural judgment and capacity are supplemented by experience and skill, would be without doubt far beyond the fee demanded for his services. In this case, as in many others connected with public and private works, it is always bad economy to save the cost of proper knowledge. Very likely—perhaps indeed very generally—the actual performance of the work, the buying and laying of the pipe, and all that, can be as cheaply done under home direction as under that of a public contractor; but the making of the plans—the deciding upon the source of the supply, upon the means for securing a sufficient head, the sizes of the pipes, the location and construction of fire-plugs, and all the minor details of the work—will be more or less economical, according to the skill, experience, and capacity of the person who directs it.

The sources from which water may be obtained are various. Often enough water of the best quality may be procured by driven, dug, or artesian wells; but, whenever this course is adopted, the wells should be located far enough away from the village, or on land sufficiently high, to make it impossible that there shall be any fouling of the water-bearing strata by the filtration from barn-yards, privy-vaults, or cesspools. Generally, water so secured will have to be raised to an elevated reservoir by some mechanical force. If the demand is to be a large one, and if the community can afford the cost, the most reliable plan will be to use steam-power for pumping; but in smaller places, and where economy is a great object, wind-power may serve an excellent purpose.

If a stream of pure water is available at a sufficient

height, it may be led directly to the reservoir, or its current may be used to drive a water-wheel sufficient to do the pumping. In a majority of cases there will be found at no great distance a stream capable of supplying the water needed throughout the dryest season of the year, but not entirely free from organic impurities. In such cases it is often feasible, by excavating a filtering sump or pump-well at a little distance from the side of the stream, and at a sufficient depth below the level of its bed to secure a supply tolerably purified by filtration through the intervening earth. The distance at which this sump should be placed from the bed of the stream will depend on the character of the soil. The more porous this is, the greater should the distance be. This question as to the source from which the water is to be taken is one which, more than any other, calls for experienced judgment.

Frequently the conformation of the surrounding country is such that, even where there is no constant stream, it is possible by the construction of dams to pond an amount of water, to be furnished by surface washing, sufficient to supply the demands of the longest drought. In this case, as in all others where reservoirs are used, it is important to have a good depth of water, and not to allow, even toward the edges, any considerable shallow area. So far as possible, the depth should be everywhere great enough to prevent vegetation, and in all the shallower parts the surface soil should be entirely removed. As a rule, there should be a depth of at least fifteen feet of water, except near the very edges of the pond, and as much more than this as circumstances will allow.

The distribution of water for private use is a simple

question of construction; but, as a matter of taste, too vehement a protest cannot be entered against the common misconception as to what is desirable in the way of public fountains. An instance in point is furnished by the public drinking-fountain in Newport. Some years ago there stood at the foot of the Parade a grand old stone bowl, hewn out of a solid block of granite, and filled by a pipe leading from a copious spring. This was a good, sensible, substantial drinking-trough, perfectly adapted to its use, unpretending and handsome. Later, a public-spirited gentleman, desiring to leave a monument of his regard for the city, gave a considerable sum to be used in providing a suitable drinking-fountain at this point. Those who had the control of the fund lacked either the good taste or the courage to refuse to expend it. The result is that this granite horse-basin —one of the best of its sort—has been removed to an obscure position; and there has been erected in its place a wretched cast-iron combination of bad architecture and bad statuary, such as form a conspicuous defacement of the public squares in Philadelphia, where they serve the double purpose of furnishing water to the people, and advertising a cheap clothing establishment. The one compensation for the violation of good taste inseparable from these constructions is to be found in the fact that they must, sooner or later, lead the public to realize the absolute unfitness of cast iron for monumental and decorative uses. With the artistic influences which are now so active in the instruction of the American people, it is not perhaps unreasonable to look forward to the day when all of these piles of pot-metal shall be relegated to the scrap-heap, and when less offensive fountains shall take their place. We may even hope to see the iron statue and its stove-

like support which supplies water to the horses of Newport condemned to the foundry, and its solid old predecessor restored to the position which it ornamented for so many years.

A wide margin may be allowed for the exercise of taste in the arrangement of village fountains; and where private munificence enables the expenditure of a considerable sum, a good amount of exterior decoration may be admissible: but it should always be borne in mind that so much of the outlay as is needed for the purpose should go to secure a good artistic design. Especially should the use of cast iron be avoided, as being from every point of view, and under all circumstances, whether in the shape of cast-iron dogs or deer, or attempts at the divine human form, absolutely and entirely inadmissible for artistic uses. Better a dug-out log horse-trough, overflowing through a notch in its side, as an ornament to the best-kept village green, than the most elaborate pitcher-spilling nymph that was ever cast in an iron-foundry. So far as the mere construction work of public drinking-fountains and horse-troughs is concerned, not much need be said except in connection with the overflow. In cold climates, there is apt to be from all such structures a spilling of water which covers the ground for some distance with ice. This may be avoided by carrying the overflow by a vertical pipe descending through the body of the water by some well-protected channel directly into a drain in the ground, at a depth beyond the direct action of frosts. If the stream is constant, this depth need be nothing like that to which frost penetrates into the soil,—for the constant movement of the water will prevent its freezing, even if covered only a foot deep, though to something more than this depth it will be desirable

to have the metal pipe enclosed in a larger pipe of earthenware, giving a space of enclosed air.

Where there is no public supply of water, it is better in most cases (considering the nearness of wells in villages to cesspools and privy-vaults), to depend entirely upon cisterns. In our climate, where rain is abundant during a considerable portion of the year, the water falling upon the roof of any house, if properly collected and stored, is ample for the whole supply of the family which that roof shelters. This water as it falls is ordinarily free from any impurity that can affect its taste, and from every source of serious fouling; though, after a long-continued drought, it is well to divert and discharge upon the surface of the ground the first ten minutes' flow of a shower, so that the impurities of the air and the dust of the roof may first be removed. After this first dash, lead to the cistern all that follows. Even with this precaution, the water will be more agreeable for use if filtered. There are numerous systems for making filters in cisterns, but no other is so simple nor so durable and satisfactory as the separation of that part of the cistern from which the suction-pipe leads by a wall of brick and cement. It is simply necessary to build a wall of brick set on edge (two and a half inches thick), so as to include about one-quarter of the area of the bottom, sloping it back so as to terminate against the side of the cistern at a height of from four to six feet. This wall should be so well cemented at its joints that water can only pass through the material of brick, and for strength its form should be slightly bulging. A wall of this sort, measuring say six feet at its base, and rising to a

height of six feet at its highest point, will transmit an amount of water sufficient to supply the demand of the most constant pumping that any domestic use can require.

SQUARES AND PUBLIC SPACES.

As a rule, the open spaces in a country village are subject to no other criticism than that of neglect; but the exceptions are not rare where an attempt at improvement has resulted in a sort of cemetery look that gives any thing but a cheerful, pleasure-ground aspect.

There is not much danger that persons who are enthusiastic for the improvement of the town in which they live will err on the side of too great simplicity. The public squares and parks of large and wealthy cities are regulated and maintained at great cost and under skilful and artistic management; and they cannot fail to strike country visitors as being in all ways desirable. So indeed they are. They are a chief element of the city's beauty, and, from an æsthetic point of view, their influence is the best to which its people are subjected. But their beauty and their æsthetic influence are both the result of a well-directed expenditure of large sums of money. It is quite natural that an enriched manufacturer or merchant, proud of his native village, should be ambitious to perpetuate the memory of his benefaction by providing for some corresponding decoration of its public green, and that he should attempt to reproduce there, on the smaller scale proportionate to the circumstances, the sort of magnificence that he has seen in the city park. If left to his own sweet will,—as he often is if he is willing

to spend money for the public benefit,—he will, unless a rich man of the rarer sort, succeed only in producing a conspicuous imitation.

A park-railing of artistically-worked wrought-iron will be represented by a cast-iron substitute of much more elaborate device; and there will probably be "piled on," here and there, an amount of cheap ornamentation which at the first glance will have a certain imposing effect. In the matter of planting there may be an amount and variety of foreign shrubbery and sub-tropical plants, which, under proper care, would be of great value and beauty, but which, with the neglect to which they are doomed in their village home, are quite certain to abort. In fact, we may expect to see, what indeed we may now see, in painful degree, in many of our smaller towns, a halting attempt at the outside show of the city park, which, in the absence of those elements of artistic selection and appropriateness to the conditions which are to prevail, develop, as time goes on, into an ignominious failure.

The trouble is, that, in all expenditures of this sort, we are apt to begin at the wrong end. In the making of a park, every step that is taken, whether the park be large or small, is a costly one; and, if taken in their reverse order, every step is a wasted one. The chief reason why the final decoration of a city park is so satisfactory is that it is only the crowning work of many processes which have had the best and most careful attention from the outset. The wrought-iron grille, the architectural fountain, the bronze statue, the delicate trees and shrubbery, and the smoothly-finished walks and drives, depend for their success upon a vast amount of costly fundamental work, and a provision for constant skilful care, which have cost

a deal of money, and which look to a large permanent outlay. The elaborate fence must stand on no unstable foundation; the fountain must be only the ornamental central point of artistic and well-kept lawns and approaches; the statue must stand amid appropriate surroundings; and all but the simpler native vegetation must have its suitable soil, and be insured its needed protection and care at all seasons. The degree to which these more ornamental features may be given to the village green with any hope of satisfaction will depend almost entirely upon the thoroughness with which it has been prepared to receive them. Could the enthusiastic members of the improvement association be brought face to face with the cost that is needed for quite hidden fundamental work in order to prepare their green for the more elaborate artistic decoration, they would be deterred at the outset from attempting any thing so ambitious. Could they know the cost of the mere work of grading and subsoil cultivation, under-draining, manuring, laying the deep foundation for foot-paths, and securing that perfect growth of grass without which all park-like ornament is robbed of half its value, they would set their faces resolutely against all propositions on the part of public-spirited citizens to veneer their unprepared grounds with misplaced exterior adornment.

If money enough can be provided to do the work thoroughly well from its very foundation, then of course nothing more is needed than that its direction be placed in accomplished hands; but unless this is fully assured, if—as is nearly always the case,—economy is the first thing to be considered, then the rule of action is fully stated in two words, *simplicity* and *thoroughness*.

Avoid all fantastic ornament, and all decoration of every sort, that would be appropriate only to work of a more complete and substantial character. Let whatever is done be done in the most thorough way. If the ability is only enough to secure good grass, then do every thing that is necessary to furnish the best conditions for the growth of grass, make suitable provision for its care, and attempt nothing further. Good lawn-like grass surfaces, crossed only by foot-worn pathways over the turf, will be more beautiful and more satisfactory than will poor grass and cheaply made and ill-kept walks.

If something more than securing the best grass is possible, then let the next expenditure be in the direction of paths, applying to the construction of these the principles set forth in what has hitherto been said about sidewalks. In the case of level walks, with imperfect means of drainage, it is often desirable to secure the better foundation that is given by filling in to the depth of a foot or more with small stone.

Whatever may be the natural character of the soil, unless always well drained by a porous subsoil, the first step toward establishing a good lawn is to secure perfect underdrainage. Establish a good outlet at the depth of three and a half or four feet below the surface at the lowest point of the area to be drained, and then, selecting the necessary lines for main drains, lay out parallel lines (thirty feet apart at a depth of three and a half feet, or forty feet apart at a depth of four feet) to include the whole area, and on these lines lay well-constructed drains of small

open-jointed tiles. Cover these tiles with the most compact earth that has been excavated, and, after filling to a depth of one foot, tramp or ram this earth tightly. Then fill the rest of the trench, heaping over the lines any excess of material that may need the settling effect of heavy rains to work it into place.

The next step is to reverse or thoroughly mix the whole soil to a depth of at least fifteen inches. This work can be completely done only with the aid of hand-shovelling, but the aid of the plough will greatly facilitate it. Its purpose is to secure such an admixture of the organic matter of the surface soil with the more compact material of the subsoil as will make it sufficiently porous and fertile for the easy penetration of roots. It is best that this work should be done in autumn; and, if the land is level, that the freshly raised subsoil should be left exposed in its rough and lumpy condition—without harrowing—to the frosts of winter. If washing is to be apprehended, then sow the ground thickly with rye, harrowing in the seed only roughly. If the seed is sown early enough, the growth will be sufficient to protect the surface from washing. During the winter, let the whole surface be heavily covered with stable-manure,—the more heavily the better, as there is no limit to the amount of coarse manure that may with advantage be used for the establishment of permanent grass. In the spring, as soon as the ground is dry enough to work easily, plough in the manure with as shallow furrows as will suffice to cover the most of it; then harrow repeatedly, bringing the surface to as true a grade as possible, and sow it heavily with a mixture of Rhode Island bent grass, Kentucky blue grass, and white clover. As soon as the seed is well sprouted, showing green over the whole ground, roll the area repeatedly and thoroughly until

it is as smooth and hard as it is possible to make it. As soon as the grass has attained the height of three inches, let it be cut with a lawn-mower, and let the cutting be repeated at least weekly throughout the season of rapid growth, and as often as necessary until the end of autumn.

If paths are to be made, it will simplify matters to make them after the grass has become well established, supposing only a good surface footway of ashes or concrete to be needed; for the small amount of excavation necessary under either of these systems may be scattered over the grass spaces without injury. But if the more thorough system is adopted of underlaying the walk with a foot or more of stones, then the work, except the final dressing of gravel or ashes, should be done in the autumn, or, in any case, before the final preparation of the soil for seeding.

Concerning trees and ornamental shrubbery for parks and open spaces, it is not possible to give detailed directions here, beyond recommending, as in the case of roadside plantations, that, unless the work is to remain permanently in the charge of an experienced gardener, with the necessary appliances for the care and protection of the more delicate specimens, the arrangement and the selection should be confined to the more hardy and vigorous trees and shrubs which experience has shown to be adapted to the climate and soil of the locality.

For roadsides, and largely in parks and village greens, the world offers no tree that can compare in dignity and grace with the broad-spreading American

elm; though, for the sake of variety, and for the sake of an earlier effect, many other trees may be added.

VILLAGE SANITARY WORK.

It is a recently recognized but an old and universal truth, that human life involves the production of refuse matters, which, unless proper safeguards are taken, are sure to become a source of disease and death. The danger is not confined alone nor chiefly to that element of household waste which is most manifestly offensive, but in almost equal degree to all manner of organic refuse. It is true that fæcal matters are often accompanied by the inciting agent of the propagation of infectious diseases. For convenience, and as indicating the more probable means for disseminating infection, we may call this agent "germs." It has not yet been demonstrated with scientific completeness that a disease is spread by living germs whose growth in a new body produces a corresponding disorder; but all that is known of the circumstances of infection, and of the means for preventing it, may be fully explained by this theory. Typhoid fever, cholera, epidemic diarrh[oe]a, and some other prevalent diseases, are presumed by the germ theory to be chiefly, if not entirely, propagated by germs thrown off by a diseased body. So far as these ailments are concerned, there is therefore a very serious element of danger added in the case of fæces to the other evil effects which are produced by an improper disposal of any refuse organic matter. That any one or all of these diseases can originate

from the decomposition, under certain circumstances of fæcal matters, is not clearly determined. There is, however, good reason for believing that one common effect of the gases arising from improperly treated matters of this kind is to debilitate the human system, and so to create a disposition to receive contagion, or to succumb to minor diseases which are not contagious.

The same debilitating effect and the same injurious influences often result from the neglect of other organic wastes. The refuse of the kitchen sink is free from fæcal matter; but it contains, in a greater or less degree, precisely the kind of organic material which has gone to make up the more offensive substance. If its final disposition is such as to contaminate the water that we drink or the air that we breathe with the products of their decay, the danger to life is hardly less than that from the decomposition of fæcal accumulations.

It is proposed now to set forth, in the simplest way and without much discussion of principles (which may be studied elsewhere), the methods and processes by which village households and communities may be protected against the influences that come from an excess of soil-moisture, from damp walls, and from imperfect removal or improper disposal of organic filth.

We will assume that a village has a water supply sufficient to admit of the use of water-closets in all houses, and to furnish a good flushing for kitchen sinks, &c. A necessary complement of this work—indeed, it should properly precede it—is the establishment of a system of sewers by which all of this liquid outflow may be carried safely away. It

would be out of the question in a small or scattered community, especially where roadways are unpaved, to establish any system which should include in its working the removal of surface water. The moment we undertake to make sewers of sufficient capacity to carry away the storm water of large districts, then we enormously increase the scale and cost of the work.

So far as the removal of house sewage alone is concerned, the work need by no means be very costly. If a tolerable inclination can be given to the line of sewers,—say a fall of one in two hundred,—a six-inch pipe will have a capacity quite up to the requirements of a village of two thousand inhabitants using one hundred gallons of water per day per head. It will, however, be safe to use a pipe of this size only when it is true in form and carefully laid, so that there shall be no retarding of the flow at the joints from the intrusion of mortar, or any other form of irregularity. Unless the joints are wiped quite smooth, the roughness remaining will serve as a nucleus for the accumulation of hair, shreds of cloth, and other matters which will hold silt and grease, and form in time a serious obstruction. Nothing smaller than six-inch pipe should be adopted for a street sewer. Unless the work is to be most carefully done, for all but the branch lines, for a population of five thousand, or less according to the fall of the sewer, it will be safer to use eight-inch pipes. These pipes must be laid with great accuracy as to grade and direction. All corners should be turned with curves of large radius and regular sweep, and with an additional fall to compensate for the increased resistance of curves. The weight of the pipe should not be supported upon the sockets (see Figure 3), partly as a question of strength, and partly because

any irregularity of form or thickness of the socket would change the inclination of the sewer. The bottom of the trench being brought exactly to the required grade, let there be dug out a depression greater than the projection of the socket, the pipe resting upon its finished bottom for its whole length. (See Figure 4.) Too much care cannot be given to the thorough filling with cement of the space between the socket and the pipe inserted into it; the whole circle being well flushed and wiped, so that there may be no possibility of leakage.

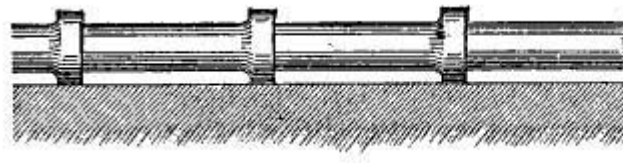


FIG. 3 PIPES RESTING ON THEIR SH(

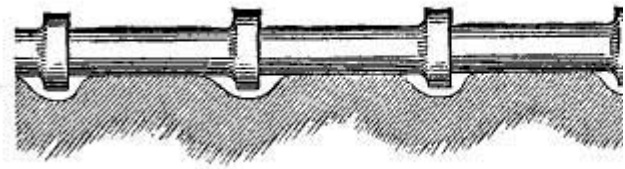


FIG. 4. PIPES RESTING ON THEIR FUL

The objection to leakage is twofold: sewage matters escaping into the soil might contaminate wells and springs; and it would also rob the flow through the pipes of water needed to carry forward the more solid contents. The continued efficiency of these small drains for carrying away the solid or semi-solid outflow of the house is dependent very largely upon the presence of sufficient water to create a scouring current. While eight-inch pipes are admissible as a safeguard against imperfect laying, they are liable to the grave objection, that, where the service to be

performed is greatly less than their capacity, the stream flowing through them will not be sufficiently concentrated to carry forward the more solid parts of the sewage. Up to the limit of their capacity, six-inch pipes properly laid are greatly to be preferred, as insuring a deeper stream which will more generally attain the velocity of three feet per second, needed to move the heavier constituents of the sewage. The difference in cost between six-inch and eight-inch pipes will be sufficient to cover any extra cost of the most careful workmanship. However much attention may be given to the cementing of the joints, it will be impossible to prevent the running into the pipes of a certain amount of mortar; and the workman should have a swab or a disk of India rubber of the exact size of the bore of the pipe, with a short handle attached to its middle, to draw forward as each joint is finished, and so scrape away any excess of mortar before it hardens.

Wherever it is, or may probably become, necessary to attach a house-drain or land-drain, there should be used a length of pipe having a side branch, oblique to the direction of the flow, to receive such connection. The location of these branches should be accurately indicated on the plan; and they should be closed with a flat stone or a bit of slate, well cemented in place.

It will at times be necessary to use larger conduits than even an eight-inch pipe. Up to a diameter of fifteen inches, it is cheapest to use pipes, but for eighteen inches or more, brick-work is cheaper; and at that size—a considerable regular flow of water being insured—the slight roughness of brick-work offers no serious objection. The use of oval or egg-shaped sewers will rarely be necessary under the

circumstances that we are considering; but there may be exceptional conditions where the covering-in of a brook, or storm-water course, cannot be avoided; and in such cases the volume of water may vary so greatly that there will at times be a mere thread of a stream, and at times a torrent. Here the oval form is the best, as concentrating a small flow within a narrow and deep channel, and still giving the capacity needed for exceptionally large volumes. All bricks used for sewers, man-holes, &c., should be of the very hardest quality, and true in form. The general rule is to be kept in mind, that the thickness of the wall of a brick sewer should not be less than one-ninth of the inner diameter; that is to say, that up to a diameter of three feet the thickness of the wall should equal the width of a brick,—four inches. This applies to circular sewers only: the oval form, being less strong, calls for a wall of a thickness equal to one-eighth of the largest diameter.

Connecting drains leading from houses to the sewer are to be made at private cost; but they should be made in accordance with plans furnished by the public authority, and by a workman acceptable to that authority.

The householder might be permitted to take the responsibility of the finishing of his drain, but for the fact that the working of the public sewer calls for the largest amount of water in proportion to the amount of solid matters that it is possible to secure, and thus makes it imperative that this drain should be absolutely tight, so that the liquid parts of the house outflow shall not trickle away through its joints, leaving only the more solid parts to flow into the public sewer.

Properly graded and smoothly jointed, a four-inch pipe will carry more water than even the largest boarding-house or country hotel is likely to discharge. There is, however, a tendency in all house-drains to become filled in the early part of their course by the accumulation of grease and solid matters caught in the grease. Where no form of grease-trap is used, there is a certain argument in favor of the use of six-inch pipes for the upper part of house-drains. The use of a grease-trap, however, should always be insisted upon; and with its aid these obstructing matters will be retained, and the outflow may be perfectly carried by a four-inch pipe.

So far as the public sewer is concerned, it makes little difference what is the size of the house connection drain through the greater part of its course; but the junction with the sewer should, under no circumstances, where six-inch sewer-pipes are adopted, be more than four inches. I should even insist on four-inch connections with an eight-inch sewer. Through neglect, or by reason of improper management, many kinds of rubbish find their way into house-drains; and a four-inch opening will admit as many of these into the sewer as it will be able to carry away. If, by reason of bad construction or neglect, an obstruction is to be caused at any point, it should be in the drain, which the person responsible for it must cleanse or repair.

The grease-trap referred to above may be any form of reservoir which will retain the flow from the kitchen sink until it has time to cool, when its grease will be solidified, and will float at the surface. The outlet from this trap should be at such a distance below the surface of the water, that there will be no danger of its floating matter passing in with the

discharge. A very simple device for this purpose is shown in Figure 5. From a trap of this sort the flow is constant whenever additions are made to its contents.

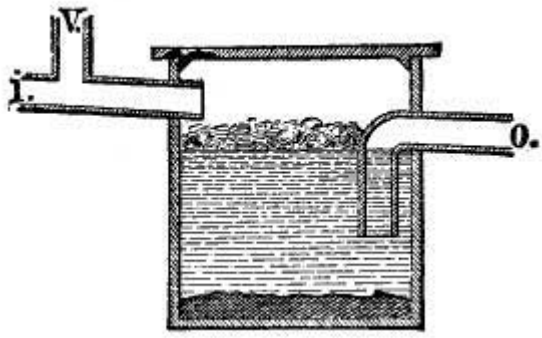


FIG. 5.—GREASE-TRAP. I, Inlet; V, ventilator; O, outlet.

Figure 6 shows the invention of an English engineer, Mr. Rogers Field, which has the effect of retaining all of the outflow from the kitchen sink until it is entirely filled,—say thirty gallons. When filled, any sudden addition of a few quarts of water, as from the emptying of a dish-pan, brings into action a siphon whose entrance is near the bottom of the tank; and this siphon rapidly discharges all of the contents above its mouth in a flow having sufficient force to carry forward not only any solid matters which it may contain, but also any ordinary obstructing accumulations in the drain below. The soil-pipe, carrying the discharge of water-closets, should not be delivered into the flush-tank, but at a point farther down the drain, so that any solid matter it may deposit shall be swept forward by the next action of the flush-tank. The more often the flush-tank is filled, and the greater the proportion of its water to its impurities, the more efficient will be its action.

Therefore the slop closet waste leading from the upper story, and even the outlet pipes of bathing-tubs, may with advantage be delivered into it.

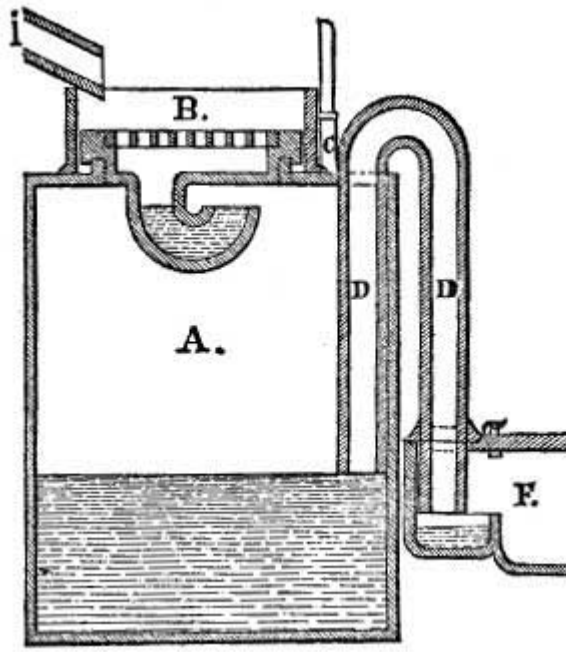


**FIG. 6.—FIELD'S FLUSH-TANK. A, Receiver; B, grating; C,
F, entrance to drain; I, delivery from s**

Although the flush-tank may receive no fæcal matter, and even though the housemaid's sink may not deliver into it, it will contain in the discharge from the kitchen alone an amount of organic matter which will produce offensive and dangerous gases by its decomposition. To provide for the safe removal of these gases, a ventilating pipe should be carried up to some point not near to any window or chimney-top.

From the time the sewers are ready for service no accumulation of fæcal matter or other organic

household waste should be allowed to remain in the village. All old vaults and cesspools should be filled with earth, and disinfected by the admixture of lime with the upper layers of the filling. The use of water-closets in all houses should be made imperative; and the construction and arrangement of soil-pipes and of all outlets should be regulated by the health authorities.

It is not worth while here to discuss the details of the construction of water-closets and other interior plumbing work, except with reference to soil-pipes and such drains as may deliver the outflow of soil-pipes to the public sewer. The soil-pipe should be of cast iron, carefully jointed with lead, not less than four inches in diameter, and carried by the straightest course possible up through the roof and generally higher than the ridge-pole. Its open top must not be near any window, and if within ten feet of a chimney it should be at least one foot below the level of the top of that chimney. There should be no trap in the soil-pipe, and no trap in a private drain between the outlet of the soil-pipe and the sewer. The reasons for this rule are twofold:—

1. No matter what amount of water may be used for flushing out the soil-pipe, its sides will always be more or less coated with organic filth; and, however slight this coating, there will be a certain amount of decomposition. The decomposition of all such matters must be rapid and complete, not slow and partial. A necessary condition of complete destructive decomposition is an abundance of atmospheric air to supply the oxygen which complete decomposition demands. If the soil-pipe is closed at its top, or if it is obstructed by a trap in the lower part of its course, there can be no such circulation of

air as safety requires.

If there is an opportunity for the free admission of air from the well-ventilated sewer to feed the upward current almost constantly prevailing in a soil-pipe open at both ends, the gases resulting from the decomposition will be of a different and less injurious character than where the air is confined,—and by the mere volume of air passing through the pipe they will be so diluted that even were they originally poisonous their power for harm will be lessened.

The gases formed by the decomposition of organic matter in the sewer itself, or in the soil-pipe, have a certain expansive force which is greatly increased by the elevation of temperature, caused, for example, by the discharge of hot water into the pipe or sewer. If the soil-pipe is open at its upper end this expansion will be at once relieved; but if the top of the pipe be closed there will always be danger of the forcing of the feeble barrier offered by the ordinary water-seal trap of a branch pipe leading from a wash-basin or sink. Then, too, the sealing-water of the trap readily absorbs any foul gases presented at its outer end, toward the soil-pipe, and gives it off in an unchanged condition at the inner or house end. Such traps retard, but do not prevent, the entrance of sewer gases into the house. Water-seal traps which are unused for any considerable time are emptied by evaporation, and thus open a channel through which the air of the soil-pipe may find its way into the house.

It is usual in modern plumbing to relieve the pressure of gas in the soil-pipe by what is called a "stench-pipe." This is a pipe from one to two inches

in diameter, leading from the highest point of the soil-pipe to the outside of the roof, where it is bent over to prevent the entrance of foreign matter, or is closed at the top and perforated with holes to allow the gas to escape. This small stench-pipe is inadequate for the necessary work. It is very important that there be the freest possible channel for the movement of air; and nothing will suffice for this save the continuing of the pipe, at its full size, to its very outlet. Indeed, angles and bends in a pipe by increasing friction form a serious obstruction.

The arrangement of the soil-pipe here indicated, although excellent and efficient, is susceptible of further improvement by the use of a ventilating cowl or hood at its top. There are many forms of such cowls in use which are effective whenever there is a sufficient current of wind; but most of them require a certain force to bring them into action, and when this force is absent they usually retard the flow they are intended to increase. This is true of a recent invention known as "Banner's ventilating cowl," which so long as the wind blows is a most effective device. When the air is perfectly still, however, it offers by its curved air-way a certain resistance to the current, and in the case of baffling winds and flaws the air may blow directly into its opening.

Among the various inventions of this sort nothing seems so free from objection as the old arrangement known as the "Emerson" ventilator, shown in Figure 7. This gives a straight outlet, protected by a disk far enough above it not to prevent its delivery of air; and it becomes an effective suction cowl, with the least movement of the wind from any side or from above or below. No eddy caused by the angles of gable roofs can give it a backward draught; and if a

pipe armed with it be held toward the strongest gale a puff of smoke blown into its other end will be instantly drawn through. As the patent for this invention has run out, it is competent for any tinsmith to make it, and it is a common article of manufacture.

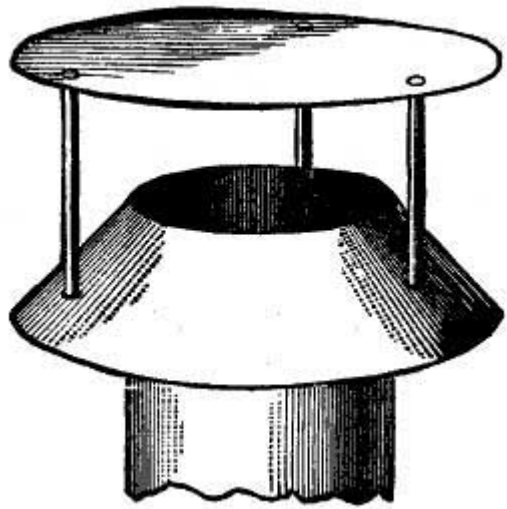


FIG. 7.—THE EMERSON VENTILATOR.

2. What is said above concerning the ventilation of the soil-pipe from end to end relates to the interest of the private owner. The interest of the public gives an equally strong argument in its favor. The sewer should be as far as possible removed from the condition of an "elongated cesspool." There must be no halting of its contents, and no deposit of filth or silt at any point. Within the shortest time possible, every thing received into the sewer must be passed on and delivered at its outlet. Still, however perfectly this may be accomplished, there will always be a certain adhesion of slime to the walls of the sewer;

and this slime must always be in a state of decomposition, a constant source of offence and possible danger. The only way to avert this danger is to give the sewer such a thorough ventilation that the decomposition shall be rapid and safe, and that the resultant gases shall be at once diluted with fresh air.

This may be measurably accomplished by the simple ventilation of the sewer itself, through open-topped man-holes; but such ventilation is less effective in the case of small sewers than of large ones. In the case of either large or small sewers, it will be vastly increased if we compel every householder who makes a connection with the sewer, to carry a drain and soil pipe, nowhere less than four inches in diameter, from the point of junction with the main line to the open air above the roof. Where houses are near enough to make the use of a public sewer advisable, the aggregate of these soil-pipes, having almost constantly an upward current, will make such a draught upon the sewer, to be supplied by a downward current through the man-hole covers, as will maintain a perfect and continuous ventilation.

Important as it is to secure the proper arrangement and construction of sewers and house-drains, it is still more important to provide for the safe disposition of the sewage.

We must begin at the outset with the understanding that all sewage matters not only are of no value to the community, but that it will cost money to get rid of them.

There is hardly an instance, after all the efforts that have been made, of the *profitable* disposal of the outflow of public sewers. The *theoretical* value of the wastes of human life is very great, but the cost of any method for utilizing them seems at least equally great. The question of cost is so much more important (to the community) than the question of agricultural value, that the practical thing to do is to make such disposition as will cost the least, while fully meeting the best sanitary requirements.

So far as village sewage is concerned, there are three means open for its disposal: to discharge it into running water or into deep tide-water, to use it for the surface irrigation of land, or to distribute it through sub-irrigation pipes placed at little distance below the surface of the soil. Experiments are being made with more or less promise of success in the direction of the chemical treatment of this liquid so as to purify its effluent water, and retain in a solid form, and in combination with certain valuable added ingredients, all of its undissolved impurities. None of these processes can as yet claim consideration in regulating public works.

The cheapest way to get rid of sewage is to discharge it into a running stream or into tide-water. So far as the community itself is concerned, this is often the best way; but there will very often arise the objection that the community has no moral or legal right to foul a stream of which others make use in its further course. Where the amount of water constantly flowing is very large, and where the discharge is rapid,—any given part of the sewage reaching the open air within a few hours from the time of its entering the pipes,—and where it flows in moving water for a considerable distance before reaching

others who may have occasion to use the stream, no practical danger is to be apprehended. But where the sewage is more foul, more sluggish, or exposed in the open current for a shorter time, the danger may be serious. The pouring of sewage into tide-water is always admissible where floats show that there is no danger of a return and deposit of solid filth; but the delivery at all stages of the tide, in the immediate neighborhood of salt marshes and mud flats, and in land-locked harbors, is to be avoided.

Where an unobjectionable natural outflow cannot be provided, the irrigation of agricultural lands affords the best relief. The action of vegetation, the oxidation which takes in the upper and well-aërated layers of soil, and the well-known but not yet fully explained disinfecting qualities of common earth, are effective in removing the dangerous and offensive impurities, and in converting them into a more or less important source of fertility. Precisely how far this system may be available during winter, it is not easy to say. While the earth is locked with frost, there must be very little, if any, infiltration; but, as an offset, the action of a low temperature upon the sewage matters will clearly be antiseptic; and it is only necessary to provide against an undue washing away of the surface of the ground during thaws, and against the flowing of the sewage beyond the proper limits.

Generally in the neighborhood of villages it will be easy to find lands over which the delivery may be carried on throughout the year without objection. The sewer, or some form of covered channel, should lead far enough from any public road to avoid offence. From this point it may be led by open gutters to the land over which it is to be spread,—or

rather through such a system of surface gutters as will enable us to deliver it at different parts of the field, according to the requirements of the crops, and so as to use fresh land at frequent intervals, leaving that which has been saturated to the purifying processes of vegetation and atmospheric action.

The gutters having been made, it is easy, by the use of portable dams,—of thin boiler-iron, like broad shovels,—which may be set in the course of the flow, to divert the current into any branch channel, or to stop it at any desired part of this channel. All the gutters having sufficient descent to lead the sewage rapidly forward, it is usual to set a dam near the far end of the gutter, and allow the sewage to overflow and run down over the surface until it has reached as far as the formation of the ground and the quantity of the liquid will allow it to spread. This portion having received its due amount of the liquid, the dam is moved to a higher point, and the overflow is allowed to spread over a second area. In this way, step by step, we irrigate all that may be reached by a single gutter. Then the moving of the dam in the main line turns the water into another gutter, and this is proceeded with in like manner. In practice it is found best to begin the overflow at the farthest end of the lowest-lying gutter, working back step by step until the higher parts of the field are reached. It would be better that there should be land enough to require the irrigation of any given area not oftener than once in one or two weeks. The amount required for a given population cannot be determined by any fixed rule,—so much depending on the amount of water used *per capita*, and on the absorptive character of the irrigated soil. In the case of villages, one acre to each five hundred of the population would generally be found ample.

There are several instances of the successful use of a much smaller area than is here indicated, by the use of intermittent downward filtration. The most noted success in this direction is that at Merthyr-Tydvil in Wales, a large mining town, where the allowance is only one acre to each two thousand of the population. There are two filter-beds of light loam over a gravelly subsoil thoroughly underdrained with tiles at a depth of six feet. One of these beds is cultivated with some crop like Italian rye-grass, which bears copious irrigation; and the other by some crop like wheat, which, in the absence of irrigation, will thrive on the fertility left over from the previous season. The volume of sewage is very great, but the action of the six feet of earth in removing its impurities seems to be complete; the water flowing out from the drains having been proved by analysis to be really far purer than the standard fixed by the Rivers Pollution Commission.

It is an important condition of this system that the sewage, where its quantity is small, shall be stored in tanks until a large volume has accumulated, and that it then be rapidly discharged over the soil. There is no objection to an actual saturation of the ground, provided the soil is not of such a retentive character as to be liable to become puddled, and so made impervious. The tanks being emptied, the flow ceases until they are again filled. During the interval, the liquid settles away in the soil, by which its impurities are removed. Its descent is followed by the entrance of fresh air, and the oxidizing action of this, accompanied during the growing season by the purifying effect of the growing crop, leads to an entire decomposition or destruction of all organic matters.

The third system—the distribution of sewage through irrigation-pipes laid at a depth of ten or twelve inches below the surface of the ground—has its efficiency attested by numerous instances in private grounds. I have adopted this system for disposing of the sewage of the village of Lenox, Mass., where there was no other means available short of cutting an outlet, at great expense, through a considerable elevation. This method is an extremely simple one, and is available in every instance where even a small area of land lying slightly below the level of the outlet is to be commanded. The arrangement of the sub-irrigation pipes is easily made: Suppose that in land having an inclination of about one in two hundred, occupied by grass or other growth, a trench be dug twelve inches deep, that there be laid upon the bottom of this trench a narrow strip of plank to insure a uniform grade, and that upon this plank is laid a line of common agricultural land-drain tiles, say two inches in diameter. However carefully these tiles may be placed, there will be at their joints a sufficient space for the leaking out of any liquid they may contain; the tiles being laid either with collars around the joints, or with bits of paper laid over them, to prevent the rattling in of loose earth during the filling. The excavated earth is to be returned to its place, well compacted, and covered with its sod. Suppose this drain to have a cross-section equal to three square inches, and a length of one hundred feet, its capacity will equal about sixteen gallons, or a half-barrel. If this amount of liquid be rapidly discharged into the drain, the inclination being slight, it will at once be filled or nearly filled for its whole length, and the liquid will leak away in tolerably uniform proportion at every joint along the line, and will saturate the surrounding earth. The

plan adopted at Lenox, and recommended for all small villages which cannot secure a better outlet, is simply a multiplication of these drains to a sufficient extent.

A description of the manner in which the Lenox work is arranged will illustrate the adaptation of the system to its circumstances. As circumstances vary, the adaptation must be modified. (See Figure 8.)

The main outlet sewer delivers at a distance of about one-half mile from the last junction with a branch sewer. It is a six-inch pipe five feet below the surface of the ground, and it delivers into a flush-tank like that shown in Figure 6, but having a capacity of about five hundred cubic feet. This tank stands at the upper side of a field having an inclination of seven in one hundred. There is a branch from the main sewer, above the tank, supplied with a stop-cock, by which, in case of need, the sewage may be carried on down the hill without going into the tank. The outlet from the chamber below the siphon leads off in another direction down the hill, and has a stop-cock and a branch which will allow its flow to be diverted. The discharge of this diverted stream and the discharge through the branch of the main above the tank, both deliver into a horizontal surface gutter to be well grassed, and lying at the top of the land to be irrigated. By this arrangement, should repairs become necessary in the tank, the flow may be turned into the gutter; or, should it be desired for any reason to use the outflow of the tank for surface irrigation, the second branch outlet will deliver it into the same gutter, where, the outflow being uniform along the whole length of five hundred feet, the stream will pass in a thin sheet off on to the

descending ground. The hill-side, immediately below the gutter, is brought to a true grade and covered with grass. As its inclination is much greater than would be admissible for sub-irrigation drains, these are laid *obliquely* in parallel lines at intervals of six feet from one end to the other over the whole graded slope. These drains are connected at their upper ends with the direct outlet-pipe leading from the siphon chamber. They have an aggregate length of about ten thousand feet. The method of operation is as follows: —

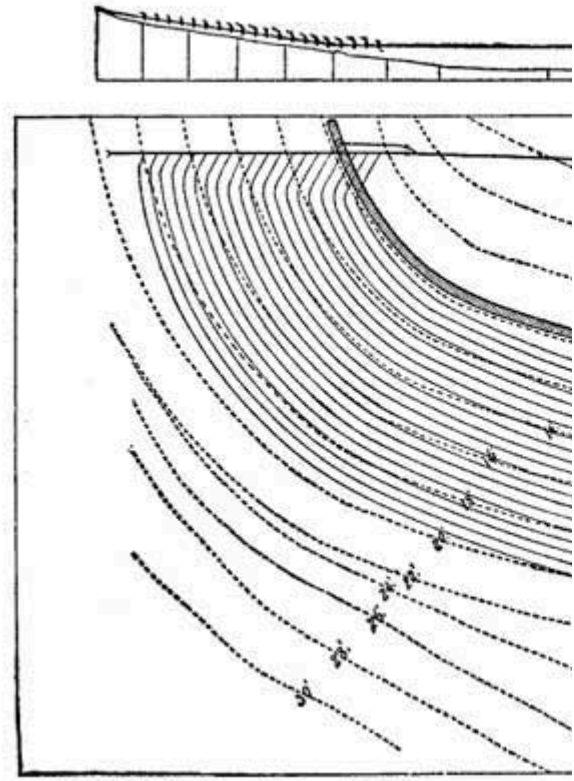


FIG. 8.—DIAGRAM ILLUSTRATING MANNI

The capacity of the tank is supposed to equal about two days' discharge, or about thirty-five hundred gallons; and the whole capacity of the drains is about half that of the tank, so that the rapid emptying of the whole volume into them will insure their being pretty thoroughly filled from end to end. This arrangement will provide for the saturation of the soil about once in two days, and will leave a sufficient interval between the periods of saturation for the thorough dispersal and aëration of the filth.

The extent to which this system will be interfered with by frost, it is impossible to say. This will probably be less than would be supposed, for the reason that the ground would often be covered with snow, and that the sewage will have sufficient warmth to exert considerable thawing influence. Whenever the discharge of the liquid through irrigation pipes is shown to have become obstructed by freezing, it will only be necessary to divert the flow, and turn it into the surface gutter to be distributed over the ground.

It is possible that in this case, as in the one which has been under my observation for six years past, there will be no interruption of the working because of cold; but, should the interruption become serious, I shall propose the planting of evergreen trees in parallel rows midway between the drains. The protection that would thus be afforded, both by the trees and by the drifting snow which they would gather, would probably keep the ground free throughout the winter. Incidentally to the chief advantage of this system, there will be, so long as the land is in grass, quite an addition to its product.

There are hundreds of villages, with and without a water supply, where the houses are too scattering and the street lengths too great to make it advisable that the cost of any form of public sewerage should be assumed. In all such villages, the public authority or the active influence of the village improvement association should be exerted to secure a regular and systematic adoption of some more perfect system for the private disposal of household drainage than is usual. Fortunately, the best system is the cheapest.

No form of cesspool, no leaching vault, and no cemented tank, should be allowed under any circumstances. Neither should there be permitted any form of the old-fashioned out-of-door privy with a vault. Every household should be supplied with water-closets or well-arranged earth-closets, to which reference will be made below.

The foul water discharge of kitchen sinks, or of whatever form of slop-sink is used for the water of bedrooms, should discharge into a flush-tank, and should be led from this by a tightly cemented four-inch drain to a tight settling basin in the ground beyond. If water-closets are used, the soil-pipe should deliver into the drain between the flush-tank and the settling basin. The settling basin should be constructed as shown in Figure 9; and this, as well as the flush-tank, the soil-pipe, and the connecting drains, should be amply ventilated. The outlet from the settling basin should be carried by well-cemented vitrified pipes (four-inch) to the connection with the subsoil irrigation pipes. The flush-tank discharging at each operation of its siphon about thirty gallons of liquid, two hundred feet of drain, unless the soil is very compact, will dispose of the whole discharge with sufficient rapidity. The tank being emptied, the

flow ceases; and within a very short time the drain becomes empty of its contents, which are absorbed by the sponge-like action of the earth, and are subjected to the combined influence of the roots of plants, and of the concentrated oxygen contained among the particles of the soil. They will soon have their character entirely changed, so that the earth will become purified, and will be ready to receive the next discharge from the tank. In the case of my own drains, after five years of unremitted use, the gradual accumulation of bits of grease and more solid matters obstructed the drains, and there appeared undue moisture about their upper ends. All that was then necessary was to re-open the trenches, and remove, wash, and replace the tiles. This operation cost, for a length of two hundred feet, less than three dollars.

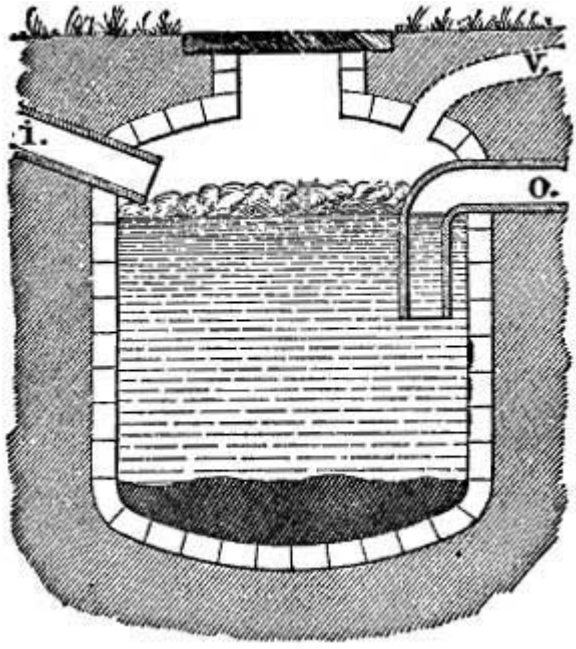


FIG. 9.—SETTLING BASIN.

For any ordinary household of six or eight persons, where the water-closet is not used, two hundred feet of drain of this sort will be sufficient. If there are water-closets, it may be well to duplicate the length; and, to provide for the necessary connections to lead the liquid to the drains, we may assume that in all five hundred feet of length will be required. The cost of two-inch tiles at the works, in small lots, and where collars are furnished, is about three cents per foot; and we will suppose that transportation will increase the cost to five cents per foot, making the cost of this item twenty-five dollars. The strips of board (three inches wide) will cost, at a very liberal estimate, five dollars more, and the cost of digging and laying not more than another five dollars; so that the establishment of this means of disposal, under the most liberal allowance of prices, will not exceed thirty-five dollars. Ordinarily, especially where neighbors combine to buy their material in larger quantities, it will hardly exceed one-half of this amount. This, be it understood, is for a complete and permanent substitute for the expensive and nasty cesspool now so generally depended upon in the country.

A piece of ground fifty feet square, having ten rows of tile five feet apart and fifty feet long, will suffice for even a large household with an abundant water supply. For the better illustration of the arrangement of this system, I give in Figure 10 a plan for the work in the case of a lot fifty feet wide, with a depth of open ground behind the house of somewhat more than fifty feet. The leaching drains may safely begin at a distance of even ten feet from the back of the house, requiring for the whole a clear area of only

fifty feet by sixty feet. With small households, the length of drain may be very much shortened. In my own case, where water-closets are not used, the total length of irrigation drain is, as before stated, only two hundred feet.

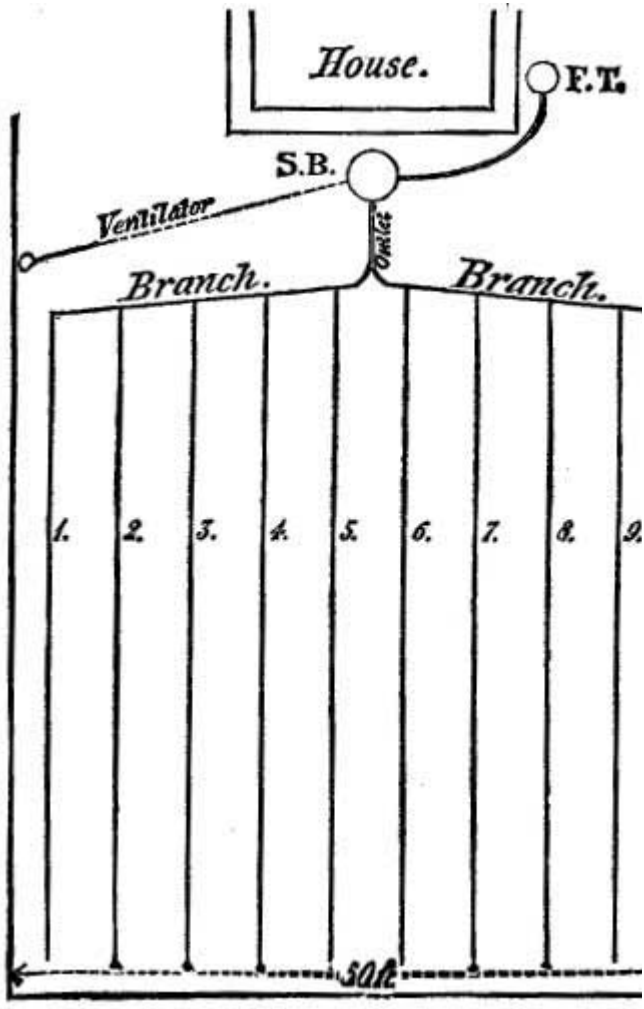


FIG. 10.

The earth-closet was invented by the Rev. Henry Moule, vicar of Fordington, in England, more than ten years ago. Its progress in England has been considerable, and its introduction there has resulted in a profit to the company undertaking it. In this country it has met with less general favor. Two companies with large capital, after expending all their resources, have been obliged to abandon their attempts to build up a profitable business. Having been actively interested in the enterprise from its inception, and having given constant attention to the merits of the system, I am to-day more than ever convinced that the solution of one of the most difficult problems connected with country and village life is to be sought in its general adoption. The public reports of sanitary officers in England, who have investigated the subject to its foundation, fully confirm every thing that has been claimed by the advocates of the earth-closet, unless perhaps in connection with the incidental question of the value of the product as a manure.

The only thing which now deters the authorities of some of the larger manufacturing towns of the North of England from adopting the dry-earth-system as a means of relief, under the sharp exaction of the law that prohibits their further fouling of water-courses, is the belief that the labor of bringing into the town the enormous amount of earth required to supply such an immense number of closets, and the labor of removing the product at frequent intervals, would be so great as to constitute an insurmountable obstruction.

Prof. Voelcker, in a paper published in the Journal of the Royal Agricultural Society, shows pretty conclusively that even the use of the same earth four

or five times over, although perfectly successful in accomplishing the chief purpose of deodorization, fails to add to it a sufficient amount of fertilizing matter to make it an available commercial manure. Extended experience in small villages and public institutions seems to confirm his view, that, if the earth-closet is to be adopted by towns, they cannot depend either on farmers buying the manure, or undertaking the labor of supplying and removing it. It is estimated, that, for a population of one hundred thousand persons, there would be required seventy-five tons of earth per day, to say nothing of heavy refuse matters which would be thrown into the closets, and would increase the amount to be removed. Even the quantity required for a village of a few hundred inhabitants, if it were to be brought in and carried out, would entail a considerable cost for handling.

I have recently concluded an experiment of six years' duration, the result of which seems to show that this objection to the adoption of the earth-closet system may be set aside, or at least reduced to such proportions as to make it unimportant. In the autumn of 1870 I had brought to my house, where only earth-closets are used, two small cart-loads of garden earth, dried and sifted. This was used repeatedly in the closets; and, when an increased quantity was required, additions were made of sifted anthracite ashes. I estimate that the amount of material now on hand is about two tons. We long since stopped adding to the quantity, finding that the amount was ample to furnish a supply of dry and decomposed material whenever it becomes necessary to refill the reservoirs of the closets.

The accumulation under the seats is discharged

through simply arranged valves into bricked vaults in the cellar. When these vaults become filled,—about three times in a year,—their contents, which are all thoroughly decomposed, are piled up in a dry and ventilated place with a slight covering of fresh earth to keep down any odor that might arise. After a sufficient interval these heaps are ready for further use, there being no trace, in any portion, of foreign matter nor any appearance or odor differing from that of an unused fresh mixture of earth and ashes. In this way the material has been used over and over again, at least ten times; and there is no indication to the senses of any change in its condition.

A sample of this material has recently been analyzed by Prof. Atwater, at the Connecticut Agricultural Station at Middletown. The analysis shows that it contains no more organic matter than Prof. Voelcker found in fresh earth prepared for use in the closet,—say about two hundred pounds,—nearly all of which organic matter it undoubtedly contained when first made ready for use. In my case, there was an addition, at a moderate calculation of at least, 800 pounds of solid dry matter during the six years' use by an average of four adult persons. Prof. Voelcker's analysis showed that the unused earth contained about twelve pounds of nitrogen. Prof. Atwater's analysis shows that my two tons contained only about eleven pounds of nitrogen. By calculation, the 800 pounds of solid dry matters added in the use of my material contained 230 pounds of nitrogen.

Doubtless the constitution of Prof. Voelcker's sample was somewhat different from the original constitution of my own; but practically, except perhaps for the addition of a trifling amount of residual carbon remaining after the decomposition,

they were about the same; and, after being used ten times over, the whole of the 800 pounds of organic matter added, including 230 pounds of nitrogen, seem to have entirely disappeared.

It becomes interesting and important to know what has become of this added matter. That it was absorbed into the particles of the earth, is a matter of course; and the result proves that after such absorption it was subjected to such a chemical action of the concentrated oxygen always existing in porous dry material as led to its entire destruction. Porous substances condense gases—air, oxygen, etc.—in proportion to the extent of their interior surface. The well-known disinfecting action of charcoal—the surface of the interior particles of which equal from fifty to one hundred square feet to each cubic inch of material, and all of which surface is active in condensing oxygen—is due not simply to an absorption of foul-smelling odors, but to an actual destruction of them by slow combustion, so that the same mass of charcoal, if kept dry and porous, will continue almost indefinitely its undiminished disinfecting action.

The earth used in the closet is a porous material, sufficiently dry for the free admission of air or of oxygen. The foulest materials when covered with dry earth at once lose their odor, and are in time as effectively destroyed by combustion (oxidized) as though they had been burned in a furnace. The process is more slow, but none the less sure; and it is clear that in the case of my dirt-heap the foul matters added have thus been destroyed. The practical bearings of this fact are of the utmost importance. Earth is not to be regarded as a vehicle for the inoffensive removal beyond the limits of the town of

what has hitherto been its most troublesome product, but as a medium for bringing together the offensive ingredients of this product, and the world's great scavenger, oxygen. My experiment seems to demonstrate the fact that there is no occasion to carry away the product from the place where it has been produced, as after a reasonable time it has ceased to exist, and there remains only a mass of earth which is in all respects as effective as any fresh supply that could be substituted.

The quantity necessary to be provided can be determined only by extended trial. My experiment proves that the amount needed does not exceed one thousand pounds for each member of the household, and that this amount once provided will remain permanently effective to accomplish its purpose.

With a suitable public supply of water for the purpose, and with a suitable means of disposal, nothing can be better and nothing is more easily kept in good condition than well-regulated and properly ventilated water-closets. Where these are available, with enough water for their flushing, their use is to be recommended. Where there is not sufficient water, there a well-regulated system of earth-closets seems to be imperatively demanded. By one process or the other we must prevent the fouling of the lower soil, and the consequent tainting of wells and springs, and the ground under houses and adjoining their cellars. With a system of sub-irrigation pipes which deliver foul matters into earth that is subject to the active operation of oxidizing influences, we need fear no contamination of the deep and unaërated soil. It would be better, however, where this system is used for the disposal of the outflow of soil-pipes, to avoid the use of wells. As a general

rule, it is safer not to use for drinking purposes the water of any well near a house or a stable: practically, it is better not to use wells at all as a source of water for domestic supply. Filtered cistern-water is greatly to be preferred.

FARM VILLAGES.

"God made the country, and man made the town."

Cowper's view of the charm of country life as compared with life in the town is a very natural one. The same view suggests itself to every cultivated denizen of the city who finds himself in the country on a beautiful June morning, or under a warm September sun, or during the time of brilliant autumn foliage, or when the sun sets with a warm glow, gilding the clean, bare boughs of November trees, or when the whole countryside is covered with spotless snow, or when grass and leaves and buds and birds first feel the awakening warmth of spring. The scene is full of a charm and a novelty which appeal to him most strongly; and he believes, for the moment at least, that nothing could make him so entirely happy as to spend his life away from the noise and confusion of the town, and amid such scenes of rural peace and beauty. Filled with this enthusiasm, one builds with reference to a magnificent view, and without regard to the practical inconveniences of the site, fancying that true happiness requires only a continuance of the novel charms which have enraptured him.

The cultivated countryman, too,—one who has learned to use his eyes, and to see what nature has to offer him,—appreciates even more thoroughly, if not so keenly, the never-ending and ever-changing interest by which he is surrounded. His admiration and enthusiasm, however, are tempered by familiarity with some disadvantages of country life, —just as the romantic house-builder finds on closer acquaintance that, magnificent though a hill-top view may be, a hill-top residence is not without its grave drawbacks, nor free from annoyances and practical objections which too often throw a veil over the most majestic outlook.

A blue-sided, white-capped mountain, reflected in a broad, placid, shimmering lake, and framed between fleeting clouds, graceful trees, and verdant lawn, is beyond compare the strongest inducement and the best reward one can offer to a visiting friend; but vile roads, distant neighbors, discontented and transitory servants, and all the thousand and one obstructions to the machinery of domestic life, soon blind the eye of the unhappy householder to the beauty which lies ever before him, until at last the one great good thing which commands his constant thought is that romantic and pecunious friend who shall come some happy day to purchase his estate.

There is another class, and a very large one, whose opinion concerning the godlike character of the country it is our especial purpose to consider here. The farmer and the farmer's family may or may not be cultivated persons. Cultivation does not come by nature; and the incessant and increasing duties of farm life leave one, however well disposed, but little time and but scant strength for æsthetic study. The farmhouse is the centre of the home life and of the

homely thought and feeling of its inmates. The farm on which one has been born and bred is the centre and standpoint from which he regards the world without. All those more tender emotions which are common to our nature, and which attach themselves to the home, find their development on the farm as well as in the town. Sentimentally considered, it matters little whether the object of these emotions be on the farm, in the wilderness, in the village, or in the city. Fortunately, man is by no means a creature of emotion alone; and the satisfaction and good of living are less a matter of feeling than of activity, industry, and intelligence. The place in which one lives is more or less satisfactory in proportion as it facilitates and encourages the better and more useful living.

Just as the citizen feels the attractions of the country, which are so novel to his town-bred taste, so the countryman finds a charm in the novelty of the town. As one is led toward the quiet and solitude of the fields and woods, so the other is drawn by the life and interest of the community.

As a rule, at least in America, where the facilities for pleasant country living are far less than in England, the countryman who goes to town is less likely to wish himself back on the farm than is the town-bred farmer to long for the comforts and conveniences of his former condition.

"Man is a social animal," and the aphorism is especially true of his wife and daughter. As the lives of the wife and daughter are much more confined to the immediate surroundings of the domicile than is that of the man himself, so the question as between town and country should be considered more

especially with reference to them.

There is a certain amount of truth on both sides of every question; and the one which we are now considering is not to be answered by a decision in favor of the heart of a great city, or of the entire solitude of an outlying farm. As is so often the case, its solution lies between the two extremes. If one may be permitted to imagine the conditions best suited to the perfect physical, intellectual, and social development of the human being, one would naturally think of a small town or a large village where society is sufficient, where the facilities for instruction are good, where communication with the large centres is easy, where the conveniences and facilities for household economy are complete, and where the country with its beauty and quiet and freshness is close at hand,—where one feels on this side the influence of a complete social organization, and on that the sweet breath of mother earth.

Unfortunately, these imaginings can never be freed from the practical bearing of the bread-winning and money-making interests. Men must live, not where they prefer to live, but where their interests compel them to live. The town and the country have their mutual economic duties by which their life must be controlled. All that we can hope to do is, on one hand, to ameliorate the hardness and solitude of country living, and, on the other, to bring the citizen into nearer relation with the invigorating fields and woods and boundless air of the country.

Devising no modern Sybaris, where all possible good of life may follow from the unaided operation of a perfect social and industrial organization, I propose to confine myself to the simple question of the best

practical development of village life for farmers. The village or its immediate vicinity seems to me to offer the urbanist the nearest approach to the country that is available for his purposes; and in like manner village life, so far as it can be made to fit his conditions, offers to the farmer as much of the benefit of town life as the needs of his work will allow him to obtain. If those who now seek the pleasures of retirement in costly and soul-wearying country-seats would congregate into spacious and well-kept villages, and if those who now live in the solitary retirement of the mud-bound farmhouse would congregate into villages, we should secure far more relief from the confinement of the town and a wider-reaching attractiveness in agricultural life; this latter leading to the improvement of our farming by a solution of that long-mooted problem, "How to keep the boys on the farm."

Nearly everywhere on the Continent of Europe those who are engaged in the cultivation of the land live in villages. An observation of the modes of life and industry of these villages has led me to consider whether some similar system might not tend to the improvement of the conditions of our own farmers, and to the amelioration of some hardships to which their families are subjected.

In Europe, as here, the methods of living have grown from natural causes. There it was a necessary condition of agricultural industry, that those who tilled the soil should be protected by the military power of their lord or chief; and their houses were clustered under the shadow of his castle wall. The castles have crumbled away, and the protecting arm of the old baron has been replaced by the protecting arm of the nation.

The community of living, which grew from necessity, having proved its fitness by long trial, is still maintained; but there seems to have been no general tendency toward the formation of such little communities here. Save in a few exceptional cases,—as in the old villages of the Connecticut Valley, where protection against Indians or safety from inundation compelled the original settlers to gather into communities,—the pioneer built his cabin in his new clearing, and, as his circumstances improved, changed his cabin for a house, and his small house for a larger one, and finally established his comfortable home in connection with his fertile fields. This method has been adopted throughout the whole country; and the peculiarly American system of isolated farm-life has become almost universal throughout the length and breadth of the land.

I am not so enthusiastic as to believe that a radical change from this universal system is to be hoped for at any early day; but I believe that it is worth while for farmers to consider how far they may, without permanent harm to the interests for which they are working, secure for themselves, and especially for their families, the benefits of village life.

To this end are adduced the following examples, both of which are of course purely imaginary. The first has reference to a new settlement of wild land, where, by the Government's system of division, the boundaries are rectangular, and where the political subdivisions are of uniform measurement. The second relates to the necessary change of conditions now existing in the longer-settled parts of the country.

For this latter, the illustration is taken from an actual

accurate survey[1] of a purely agricultural district in Rhode Island, showing the roads, houses, and field boundaries as they now exist, followed by a suggestion as to the manner in which the same division of estates might be made to conform to the assembling of their owners into a village.

[1] A map of the United States Coast Survey.

The Government division is into townships six miles square. It is proposed to divide each township into nine settlements, giving to each a square of two miles, or 2,560 acres. Each of these settlements should have its whole population concentrated in a village at its centre. A suitable method of division would be that indicated in Figure 11, where a public road crosses the middle of the tract north and south, and east and west. The outside of the tract, for the width of half a mile all around, is laid off in farms of 80 acres and 160 acres. These are bounded on the inner sides by a road. Inside of this road again is a series of smaller farms (40 acres), and inside of these a tier of still smaller places (10 acres), separated from the central village by a narrow road. The village itself occupies 40 acres.

The division of the agricultural land is as follows:—

4	farms	160	acres	640
	of			
16	"	80	"	1,280
12	"	40	"	480
12	"	10	"	120

in all, 44 tracts, aggregating 2,520 acres, and averaging nearly 60 acres each, the most distant being less than a mile from the village green. This division is arbitrary; in practice, the more industrious members of the community would buy land from their less industrious neighbors, and the size and arrangement of the farms would vary. Often, too, the division would be into farms averaging more than sixty acres. In such cases there would usually be

about the same population, as the larger holders would employ more workmen.

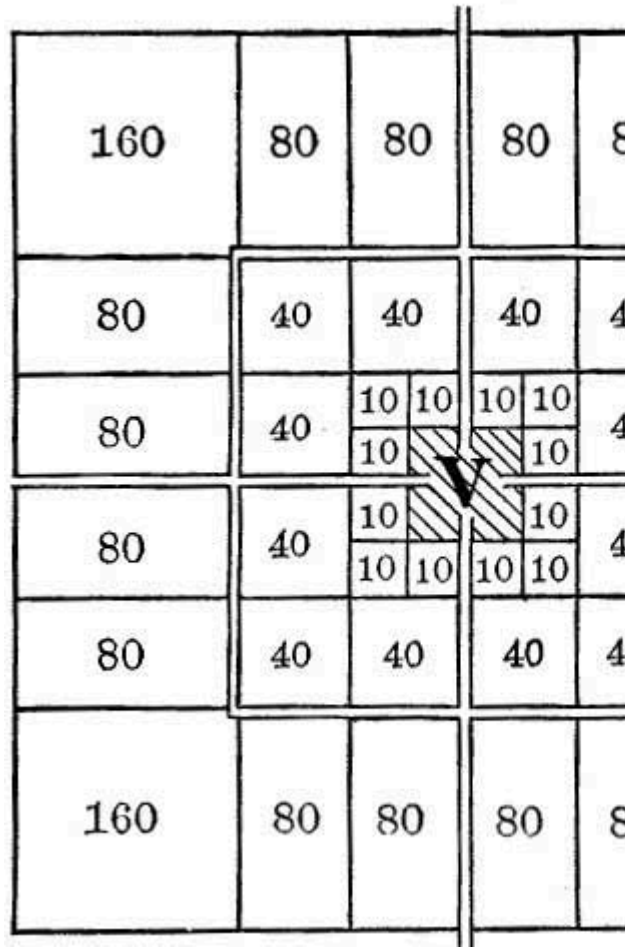


FIG. 11.—DIVISION OF FOUR SQUARE MILES WI

What is attempted is chiefly to show how four square miles of land may be so divided that its occupiers may be conveniently gathered into a village; and it may fairly be assumed, that, except in the more remote grazing and grain-growing regions, the

population (including laborers) would generally be about one household for each sixty acres. In the more thickly settled regions, this limit is exceeded now; and, as population increases, this condition will extend. In any case, the principle advanced remains the same, whether there be thirty households or sixty.

A suitable division of the village is shown in Figure 12. Its centre is occupied by a public square at the intersection of the main roads. The road surrounds a piece of ornamental ground, containing about one acre. North and south of the square are the sites of two churches, a schoolhouse, and a store and public house. This is again arbitrary; the purpose is to have these spaces occupied by somewhat important buildings, which it will not be necessary to enclose by fences, so that an appearance of more size may be given to the central feature of the village.

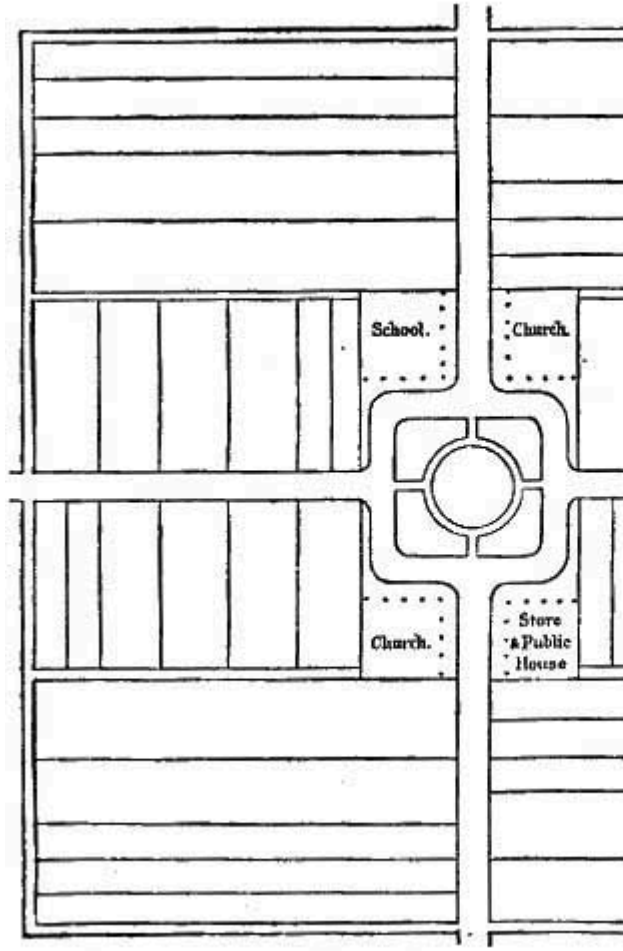


FIG. 12.—DIVISION OF THE CENTR

The spaces set apart for these buildings, as well as the village green, should be surrounded by regularly planted trees, such as will grow to a large size, like the American elm. But the whole open space should remain otherwise free from planting. Smooth, well-kept grass, and large trees planted in formal lines, with an entire absence of fences, posts, chains,

bushes, and all decorations, will give a dignity and character which an excess of ornamentation would spoil. A certain amount of judicious bedding would be permissible, but it would be best that even this should be confined to private places. Any fund available for embellishing the village green will be best used in keeping its grass cut and its walks clean, —entire neatness and simplicity being its most effective characteristics.

On the streets leading east and west from the green there are shown sixteen lots 100 X 250 (one-half acre), eight 50 X 250 (one-quarter acre). These lots all open on narrow lanes at the rear. On the streets leading north and south there are twelve lots 50 X 650 (three-quarters acre), and eight lots 100 X 650 (one and one-half acres). These are the village lots proper, but the twelve ten-acre tracts which front on its surrounding street would be the residences of their owners; and these semi-detached houses—the most distant not a quarter of a mile from the green—would form a part of the village, and come within the operation of its rules of association. Probably the blacksmith, the wheelwright, and the builder would occupy these outlying places, with an "annex" of farming to supplement their trades.

The village lots proper are all large enough for a kitchen-garden, barn, barn-yard, &c.; and all have means of access from the rear, so that their street fronts may be kept for ornamental purposes.

It would be a good rule that no house should stand nearer to the street line than thirty feet, and that no fence should be made nearer to the street than sixty feet. This would add very much to the largeness of appearance of the whole village; would decorate

every street with the ornamental fronts of the houses and with their plants and shrubbery, and would, at the same time, shut off from the ornamental parts every thing belonging to the working department of the village life. Even the baker and the shoemaker should conform to this rule, and their shops should be made to help the neatness of appearance of the village.

The larger farmers, having the most cattle, would occupy the largest lots, which would readily accommodate their larger needs. The more ambitious of them would probably buy land, for night pasture or for cultivation, from a ten-acre neighbor opposite their rear line.

The village population would be somewhat as follows: two clergymen, one doctor, one teacher, one baker, one shoemaker, one tailor, two store-keepers, one carpenter, one wheelwright, one blacksmith, one dressmaker, one innkeeper, forty-four farmers: total, fifty-eight heads of families. Probably, including hired laborers and servants, the average would be six persons to each household. This would make the population of the village about 350. No part of the whole scheme is more arbitrary than this arrangement of its human element; and no part of it would be more modified in different cases by the element of human nature. Still, this sketch of the industrial division of the community would probably be approximated in any purely agricultural village of this size,—with such changes in the detail as would come from individual enterprise or indolence.

Taking the whole area at 2,560 acres, and the population at 350 persons, we have an area of about 7⅓ acres to furnish the support and home of each

member of the community,—an amount ample for the purpose.

Figure 13 suggests the arrangement of the central open space of the village,—all of which should be in well-kept grass, except where roads and paths are needed. Paths should be reduced to the least amount that will furnish the necessary accommodation, and they should be kept in neat condition. If no provision can be made for this, it will be better to leave the people to beat their own tracks across the grass as their needs direct. These beaten foot-paths are never unsightly (in small villages), for the reason that they are never large, and that they are only of such width as their regular use will keep clean: the grass maintains its effort to spread, and grows always close up to the necessary foot-way. Even in Hyde Park (London), where the people have made short cuts across the broad lawns, the paths thus marked out, and receiving no attention, are not only unobjectionable, but are a charming feature of that beautiful pleasure-ground.

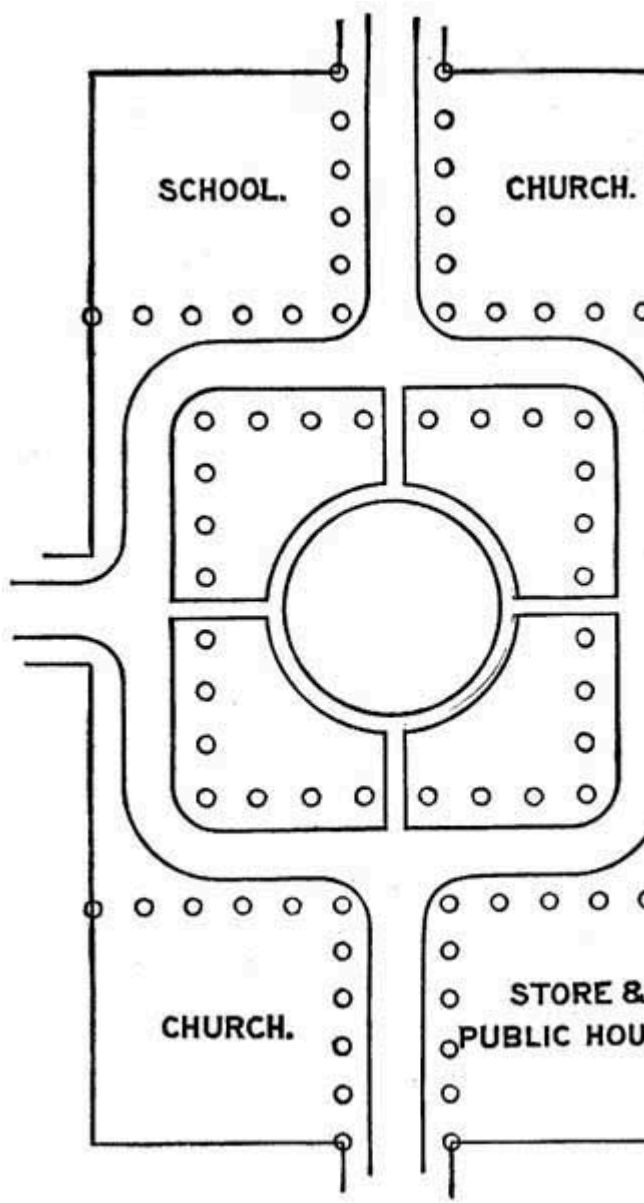


FIG. 13.—DIVISION OF THE CENTRAL OPEN SPACE O

The foot-path indicated for the village green will be

demanded by the more ambitious village improvers; but were I making an ideal village for moderate and tasteful people, the road surrounding the green should enclose only a level, close-cropped lawn, neatly trimmed at its edges, surrounded by fine and simple trees, and traced here and there with the foot-paths that honest use had marked out and made, and by the suggestive diamond-shaped track and bases of the village base-ball club. It should be perfect in grade, in outline, in regularity of planting, and in mowing; but it should be a perfect lawn *plus* the wear of constant use and frequent pleasure.

The second example is taken from existing conditions in my own neighborhood. The United States Coast Survey has furnished all the necessary details save the *farm* boundaries. The field boundaries and roads are exact.

The tract is of the same size with the one just considered,—two miles square. Its centre is in one direction about two miles from a small village, and in the other about seven miles from a large town which furnishes the chief market for its agricultural products, and is the source of all (or nearly all) of its supplies.

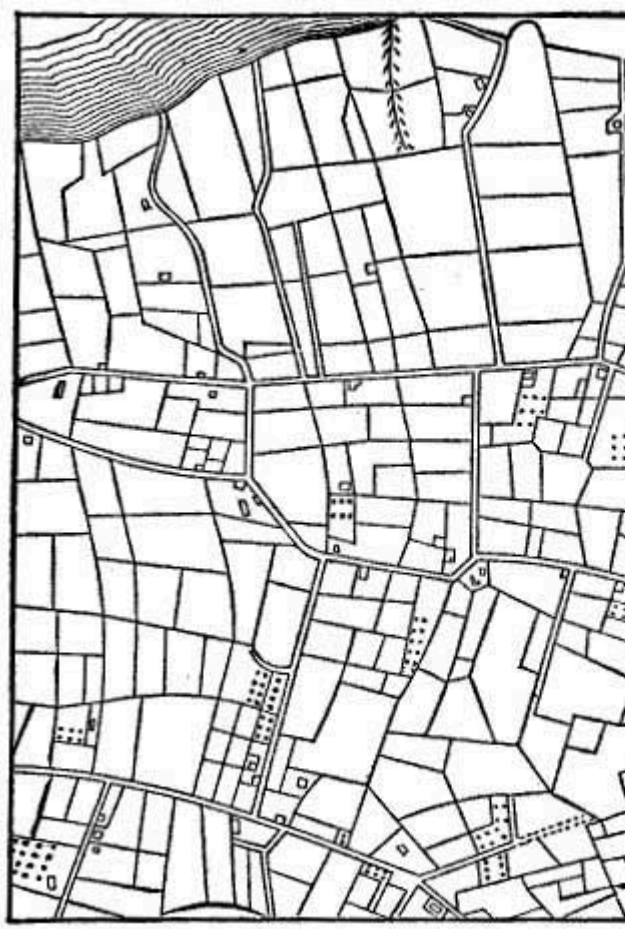


FIG. 14.—PRESENT DIVISION AND SETTLEMENT OF TRA SQUARE.

Figure 14 shows the present settlement of this area, the houses, about sixty in number, being scattered over the whole tract, with no near approach to a "neighborhood" at any point. These are practically all farmers' houses, some trade being carried on here and there in connection with the farm-work. A few of the houses belong to farms which lie mainly outside

of my lines. Deducting a fair proportion for this, and others for the wheelwright, blacksmith, &c., we shall have about the same number of farmers as in the former instance, say forty-four; and, taking the same area for the village, we shall have the same amount of farm and village property for their support.

Figure 15 shows a suitable division of property and the location of the village, on a short cross street running from one to the other of the main public roads, and extending a short distance up and down these roads.

It would be a necessary condition precedent, that the whole property taken for the village should be set apart for the purpose. This requirement and the cost of moving buildings from the farms to the village would doubtless be an serious obstacle to the immediate carrying out of the plan. And thus the theory must long remain a theory only. No sudden change of the sort could be made in practice.

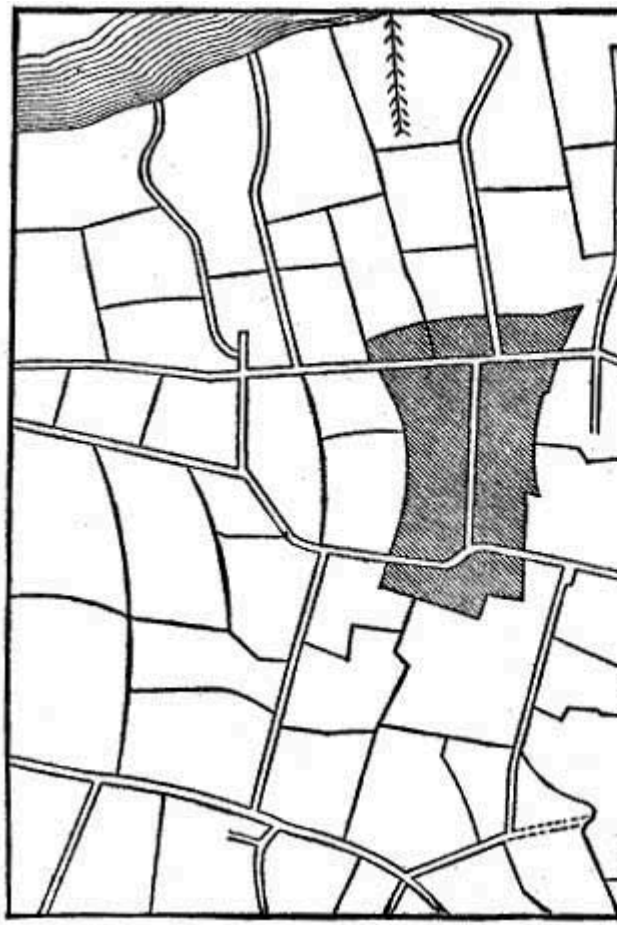


FIG. 15.—THE RHODE ISLAND TRACT, WITH ITS BUILDI VILLAGE.

It would not be impossible, however, to bring about the end in time, if a few of the larger proprietors could secure possession of the village tract by exchange, and would dedicate it to the purpose, agreeing at any future time to sell small lots for building at a fixed low rate. In the instance under consideration, the village tract is thinly settled, and

so situated as to be available at moderate cost. If a church, a schoolhouse, and a store could be established as a nucleus of the village, the young couples of the neighborhood might incline to settle there; and in time the settlement could be made so attractive—as compared with the outlying farmhouses—as to lead to the concentration of the whole population.

This part of the subject is, however, foreign to the present purpose. If the *desirability* of village life for farmers can be established, the ways and means may safely be left to those interested in securing it. The influences now at work to make the farmers' children seek a better social condition, together with the necessity which confines them to some form of agricultural work, must be depended on to secure the relief suggested, unless some better relief can be found.

In this case, as in every other of village construction, the original plan should include some quality or feature, which, while appropriate to the modest end in view, will give character to the place.

Every village has in its situation, its uses, or its origin, some characteristic which may be developed into a leading and an attractive feature. Especially when the work is to be begun from the foundation, and when there are no buildings to be torn down or removed, a consistent and dignified result may be planned for at the outset.

The characteristic feature of the village we are now considering is that it is to consist of a single long, straight street cut off at each end by other roads. After removing one unimportant house, there remains no obstacle to the laying-out of one straight

street two hundred feet wide, with either two or four rows of spreading elms. This street, two thousand feet long, mainly in well-kept grass, with only the necessary width of road and the requisite paths,—having perhaps a well-kept and home-like private place opposite each of its ends,—would stamp the village at once with an attraction which would have a constant civilizing effect on those living under its influence.

Such a village street, entirely without costly ornamentation, and requiring only the simplest care, would soon take on a look of appropriate neatness and freshness; and, as the trees grew, it would acquire a dignity and beauty which could in no other way be so well secured.

The church and the schoolhouse, being placed in broad recesses opposite the central point of the street, would gain importance from their position; and, these main features being attended to, the *character* of the village would be fixed, and it would be difficult to make any arrangement of its private places which would spoil its beauty. Neatness and a reasonable care in the matter of house-gardening, the planting of flower-beds, vines, etc., are all that would be needed.

With so wide a street, it would be as well to bring all house-fronts to the street line, completing this line with simple fences, and paying some attention to the ornamentation of the enclosed yards.

In this village, as in the other, all meretricious ornamentation should be avoided, whether public or private. All money available for such improvement should be spent in securing perfect neatness. In fact,

the two radical requirements of good taste in all such cases are an absence of obvious money-spending, and the evidence of constant care and attention. "Showiness" is common in every trumpery village in the land. What we should seek in our farm-villages is the most modest simplicity, shining with the polish of an affectionate care. Every spot should breathe of homely influences and moral peacefulness.

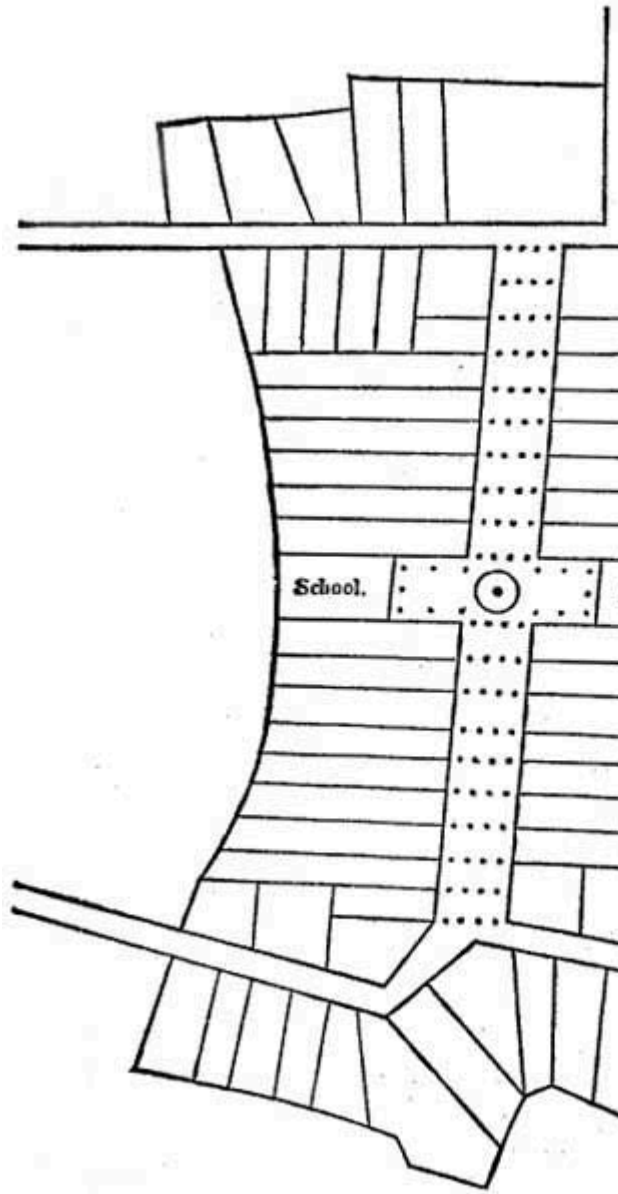


FIG. 16.—PROPOSED ARRANGEMENT OF THE RHO

Figure 16 shows the general plan of the village. If

other public buildings are needed, they might very well be placed opposite the ends of the main street.

It is not possible, in remodelling an old farming district, where boundaries and roads are irregular, to apportion the division of land among the population with especial reference to its distance from the village; so, for example, that the small farmers, who have little team-force, shall not have so far to go as the larger ones who are better equipped; but, even in this case, the most distant farm will be rarely a mile from the village, where all the farmers, their families, and their work-people, and their flocks and herds, would be gathered together, under the best circumstances for getting out of their lives as much good as the need for earning a living by arduous work will allow them to get anywhere,—more than they could hope to get in the isolation of the distant farmhouse.

Having now considered the methods by which farmers may congregate their homes and their farm-buildings, and live in villages, let us take up the more important question of policy.

Which would be better for a young man, just starting in life with a young wife,—to go to a distant farmhouse to found his home, or to settle in a well-ordered farm-village under substantially the conditions described above?

There is much more to be said, on both sides of this question, than there is room to say here; but certain points are worthy of consideration.

There is no doubt that in a strictly money-making aspect there is an advantage in having the animals on the land from which they are fed, and the men on

the farm which they are to work. It is certain, also, that the men and the women must be near the stables, that the early and late work of feeding and milking may be promptly and regularly performed. If the family is to live in the village, the cattle must live in the village too. This involves the hauling home of all the hay and grain, and the hauling out again of all manure,—no slight task. If the work is all concentrated on the farm, under the immediate supervision of the farmer, there will be a certain convenience and economy of time.

The same principle holds true in all other relations. The merchant would find a certain advantage in living at his warehouse, the engine-builder at his factory, the cotton-spinner at his mill, the carpenter at his shop, and the grocer at his store. All of these have found that, so far as may be, they get certain other and greater advantages in living away from their business. One and all carry to their homes, at least occasionally, books, papers, and plans for work that needs attention out of the regular business hours.

The farmer alone—and in this country especially—disregards the benefits of living away from his shop, and passes his whole life—day and night—in close contact with his field of operations. He might, if he chose, make his home nearer to other homes, taking with him so much of his work as is not necessarily confined to the farm.

For his own sake, it does not make so much difference; but for the sake of his wife and children it makes all the difference between life and stagnation. The business needs which call him to town, and the habit he has of passing his evenings at "the store,"

give him a certain amount—and a certain kind—of social intercourse which keeps him from absolute rust. The amount of society available for his family is not usually great, and the dulness and confinement of farmhouse life need no description.

The main reason for preferring village life is principally because it is better for the women and children; but there are reasons, in the same direction, why better social conditions would give the farmer himself decided benefits. The life, too, would be more *attractive* for both boys and girls, and would be divested of that naked and dismal gloom and dryness which now drive so much of the best farmer blood of the whole country to work-benches and counters,—to any position, in fact, which promises relief from the stifling isolation of the country.

While conceding that, just as a cabinet-maker would make more money if he lived in his back shop, and had little thought from early dawn until late evening except for his work, so the farmer may make more money if he lives on his farm than if he lives at a distance, still it must be said that the difference in profit is by no means so great as would be supposed.

It may be fairly assumed, that, at least in the more thickly settled farming regions at the East, the average distance at which farmers live from the nearest centre of population that supplies their "shopping," and from church, is not less than three miles. The visiting acquaintance of the family is nearly or quite as remote; and there is, altogether, so much driving to be done, as to make it necessary to keep a decent carriage and horses, and to supply a certain amount of extra horse service. Indeed, among those who are tolerably well off it would be

moderate to set down the total services of one good horse as needed to supply the family's demand for transportation.

Then, too, the need of the farmer himself to go to town to sell and to buy, to get repairs and information, and (a much more generally gratified taste than he would always care to confess to his wife) to satisfy his craving after intercourse with his kind,—who shall estimate the aggregate of all this travel, or even of that part of it which, under the pretext of business, is really only an habitual going for gossip? All of this driving is confined to no season; it is perennial,—in good weather and in bad, —and it costs an amount of time and money that few farmers would like to put down in black and white, and charge to their expense accounts. It would form one of the most serious items of their budget.

Did the farmer live in a pleasant and attractive village, among neighbors and friends, nearly all of this driving would be saved. The appliances for the family's pleasure-driving might be entirely done away with, for the wife and daughters would gladly exchange the means for occasional visiting and for distant shopping, for an agreeable circle of friends near at hand and a good village store and post-office within five minutes' walk. In such a settlement as is contemplated, most of the business needs of the farmer would be amply supplied, and he would find the companionship at hand even more satisfactory, because more familiar, than that which he now finds in the town.

It is not worth while to calculate the cash saving that would come of this reduction of road-*work. It is enough to consider it as an important offset to the

cost of carrying men and manure to the field and of bringing crops to the village.

Under the present system the women have the worst of it. They have the confinement and seclusion and dulness. Under the village system the men would have the discomfort, and this is why it will be less easy to secure its adoption; for the men control, and prefer *not* to have the heavy end of life's log to carry.

Under either of the plans given herewith, the greatest—not the average—distance from the house to the farm would be about one mile, and it would have to be travelled only during the working weather of the warmer months, and during the good wheeling of winter. In summer, all hands would have to set off early, and come home late, often carrying their dinner with them as mechanics do; but when field-work did not call them out, as during rains, or when the ground is too wet to be disturbed, their barn-work and shop-work would be at home; and, all the winter through, the only road-work to be done would be to send the teams to haul out the manure, and to bring home the hay, which would be best stored under "Dutch hay-barracks" in the fields when it was made. This work would be systematic and simple; and it may fairly be questioned whether it would not, in many cases, amount to *less* than the cost of the "driving" that is now done, and which in the village might be foregone. Especially would this be the case when all the heavy farm-work is done by oxen, which when idle, instead of eating their heads off like horses, are accumulating valuable flesh. With sufficient ox-power to do the work easily, the whole transportation of tools and men, and all the hay-tedding and hay-raking, would be easily done by one horse, with leeway enough to allow for a fair amount

of business or pleasure travel.

So far as the presence of the farmer himself is concerned, it is to be considered that if his farm and cattle are near his house in the village, he will be within easy reach of them very often at times when his visits to the distant town would take him away from them if they were on the farm. In the village, during the whole winter, and in bad weather at other seasons, he would have little necessity or temptation to absent himself from home. Indeed, those who have had an opportunity to watch the life of the exceptional farmers whose houses and barns and stables are in a village cannot have failed to notice how much more home-like and engaging is the whole farm establishment than it usually is in the country. It is hardly too much to say that the few instances that we have, as in the farm-villages of New England, show that these village-living farmers are apparently more attentive to their home duties than are their isolated brethren, at least in the matter of tidiness.

To complete the comparison with the merchant or manufacturer, who takes his papers or plans home with him for work out of regular hours, one might say that the farmer who lives at a distance from his land, with his flocks and herds gathered about his homestead, has such of his work as needs early and late attention close at hand, while his regular workshop, the farm, calls him away for certain regular hours and regular duties.

It is not worth while here to enter into the details of the question. They are of serious moment, and involve among other things the driving of animals to and from pasture, *versus* the raising of soiling crops

to be fed in the stall or yard. All of these questions have been satisfactorily solved in the experience of many exceptional cases in this country, and of the almost universal conditions obtaining in Europe. They present no practical difficulty, and need constitute no serious objection to the general plan.

The items of economical working and money-making being fully weighed, the more serious considerations of the mode of life, and the good to be got from it, demand even greater attention. It may seem a strange doctrine to be advanced by a somewhat enthusiastic farmer, but it is a doctrine that has been slowly accepted after many years' observation, a conviction that has taken possession of an unwilling mind, that the young man who takes his young wife to an isolated farmhouse dooms her and himself and their children to an unwholesome, unsatisfactory, and vacant existence,—an existence marked by the absence of those more satisfying and more cultivating influences which the best development of character and intelligence demand. It is a common experience of farmers' wives to pass week after week without exchanging a word or a look with a single person outside of their own family circles.

The young couple start bravely, and with a determination to struggle against the habit of isolation which marks their class. But this habit has grown from the necessity of the situation; and the necessities of their own situation bring them sooner or later within its bonds. During the first few years they adhere to their resolution, and go regularly to church, to the lecture, and to the social gatherings of their friends; but home duties increase with time, and the eagerness for society grows dull with neglect. Those who have started out with the firmest

determination to avoid the rock on which their fathers have split, give up the struggle at last, and settle down to a humdrum, uninteresting, and uninterested performance of daily tasks.

In saying all this,—and I speak from experience, for I have led the dismal life myself,—it is hardly necessary to disclaim the least want of appreciation of the sterling qualities which have been developed in the American farm household. But it may be safely insisted that these qualities have been developed, not because of the American mode of farm life, but in spite of it; and, as I think over the long list of admirable men and women whose acquaintance I have formed on distant and solitary farms, I am more and more impressed with certain shortcomings which would have been avoided under better social conditions. If any of these is disposed to question the justice of this conclusion, I am satisfied to leave the final decision with his own judgment, formed after a fair consideration of what is herein suggested.

If American agriculture has an unsatisfied need, it is surely the need for more intelligence and more enterprising interest on the part of its working men and women. From one end of the land to the other, its crying defect—recognized by all—is, that its best blood, or, in other words, its best brains and its best energy, is leaving it to seek other fields of labor. The influence which leads these best of the farmers' sons to other occupations is not so much the desire to make more money, or to find a less laborious occupation, as it is the desire to lead a more satisfactory life,—a life where that part of us which has been developed by the better education and better civilization for which in this century we have worked so hard and so well, may find responsive

companionship and encouraging intercourse with others.

It so happens that the few farm villages to which we can refer—such as Farmington, Hadley, and Deerfield—have become so attractive by means of their full-grown beauty, or have been so encroached upon by the wealth that has come over the district to which they belong, that they are no longer to be taken as types of pure country villages; nor do I recall a single village in the land which is precisely what I have now in mind.

Assuming that a farming neighborhood—two miles, or at the utmost three miles, square—had been so arranged as to have all of its buildings (with the exception of hay-barracks in the fields, and cattle-shelters in the pastures) in a village, let us consider what would be the advantages in the manner of living which it would have to offer.

The social benefits, and the facilities for frequent neighborly and informal intercourse, are obvious. To say nothing of the companionships and intimacies among the young people, their fathers and mothers would be kept from growing old and glum by constant friction with their kind; and, in so far as a more satisfactory social relation with one's fellow-men gives cheerfulness and the richness of a wider human interest, in that proportion would the village life have a wholesome, mellowing effect that is not to be found in the remote farmhouse, nor even in the sort of neighborhood we sometimes find in the country where several farmhouses are within a quarter of a mile of each other. The habit of "running in" for a moment's chat with a neighbor is a good one, and it gets but scant development among

American farmers. This view of the case will suggest itself quite naturally on the first consideration of the subject.

If the first need of the rising generation—the men and women of the future—is education, then the village beats the farm by long odds. The country school-district, sparsely settled and chary of its taxes, is apt to obey the law in the scantiest way possible. Three months school in winter and three months more in summer, under the supervision—it can hardly be called the instruction—of a young miss who is by no means well educated herself, and who is entirely often without training as a teacher, gathers together all of the school-going children of a wide neighborhood. Big and little, boys and girls, are huddled together in a sort of mental jumble, where the best that the most skilful manager can hope for is to regulate the instruction and the discipline to suit the average of the scholars. The best result attainable is to secure a good amount of *schooling*: the word "education" would be quite misapplied here.

In the village, the number of scholars would be sufficiently large to warrant the establishment and to bear the maintenance of one good school, with one, if not more, teachers, regularly employed, and worthy to be called teachers rather than "school-marms." Pupils would be graded according to their ages and acquirements, and a due use could be made of the stimulus of competition. A real school, a real instrument of education, would take the place of the noisy congregation of uncontrolled boys and girls, who, in the country district-school, are apt to acquire less of valuable learning than of the minor viciousness that prevails among country children.

In this connection, I was forcibly struck with the announcement of a German farmer once in my employ, whose reason for leaving me, after his children had reached the ages of seven and eleven, to return to his little village in Germany, was that it was impossible in this country—and this, be it remembered, was in New England—to secure satisfactory instruction for them. He thought that in their experience at school here they had gained little beyond a familiarity with English, and with a large admixture of "bad words" at that. At home they would have, within the elementary range of a primary-school education, a thorough training and a severe drilling which he could not hope for here, and without which he was unwilling that they should grow up. I have seen his village school in Germany, and the cloud of tow-headed children who fill it; and I am prepared to believe that his preference was not without foundation. Of course we have all the material for as good or better schools in this country. What we need is longer terms, better trained and educated teachers, graded classes, and better books and appliances. These cannot be afforded in the small country school-district. They can be had in their perfection in even a small village; and this consideration alone, even if this were all, should be a controlling argument in favor of village life.

But this is by no means all. Another great benefit is to be found in the post-office near at hand, with its daily mail as an encouragement to correspondence and to interest in the affairs of the outside world. A village, such as is here pictured, could afford its weekly or semi-monthly public lecture, furnishing a means for instruction and entertainment, and for frequent gatherings. The church, too, would probably be conducted in a more satisfactory way than is

usual in the country; and the conditions would be the best suited for fostering that interest in the collateral branches of the church, the Bible-class, the Sunday school, and the Dorcas society, by which the women of the community get, aside from the other good that they receive and do, advantages of a character somewhat corresponding to those which men get from their clubs.

I should hope further, as an outgrowth from the community of living, for a modest village library and reading-room. Indeed, if I could have my own way, I should not confine the attraction and entertainment of the village to strictly "moral" appliances. It would probably be wiser to recognize the fact that young men find an attraction in amusements which our sterner ancestors regarded as dangerous; and I would not eschew billiards, nor even, "by rigorous enactment," the milder vice of social tobacco. Better have a little *harmless* wickedness near home and under the eye of parents than to encounter the risk that boys, after a certain age, would seek a pretext for more uncontrolled indulgences in the neighboring town.

One might go on through the long range of incidental arguments—such as lighted streets, well-kept sidewalks, winter snow-ploughs, and good drainage, and a wholesome pride in a tidy, cosey village, until even the most close-fisted of all our class would confess that the extra cost would bring full value in return, and until he would recognize the fact that the attractions of such a home as the village would make possible would be likely to insure his being succeeded in his wholesome trade by the brightest and best of his sons,—a result that would surely be worth more than all it would cost.

But my purpose has been only to suggest a scheme which seems to me entirely, even though remotely, practicable, and in which I hope for the sympathy and help of the country-bound farmers' wives and daughters,—a scheme which promises what seems the easiest, if not the only, relief for the dulness and desolation of living which make American farming loathsome to so many who ought to glory in its pursuit, but who now are only bound to it by commanding necessity.

LIFE AND WORK OF THE EASTERN FARMER.

We are all familiar with the lavish praise bestowed—especially when votes are to be secured—upon the "bone and sinew of the country;" but the farmers themselves are very far from accepting as true, even if sincere, the estimate of their qualities which the editor and the public speaker so loudly profess.

The average farmer is precisely what any other average man would be who had grown up under the same conditions. There is no mysterious charm belonging to his occupation which removes him beyond the reach of the influences by which all mankind are controlled. Coming from the same original stock and inheriting the same peculiarities of race, he is essentially the same as men in other vocations. The character of his work, the necessities of his financial condition, and the social surroundings amid which he has been reared, have

had the same influence in moulding his character that similar conditions have had in moulding the characters of others.

Farming is in a certain sense the basis of all individual and national prosperity; but the case would be more fairly stated were we to say that farming happens to be the first step in an industrial process, many steps of which are alike essential to civilization. The farmer produces raw material, and without raw material the world must come to a stop; but the butcher, the baker, the spinner, the weaver, and every artisan, render as essential service in the development of this raw material into the forms demanded by modern life, as does the farmer in growing it.

As a member of the farmer class, I hasten to disclaim for it any *especial* consideration given it because of its contribution to the welfare of mankind. We are as useful as any other hard-working people, no more and no less. We claim no higher appreciation for muscular effort exerted in swinging the flail than for that applied to the wielding of the hammer.

The controlling motive of a farmer in performing his work and carrying on his business is the hope of material gain. He works for the money that he expects to earn, and not with any conscious reference to the service he is rendering to the world. In this capacity as a farmer he is neither a philanthropist nor a patriot, only a man of business. If we wish properly to estimate his character and his value as a factor of modern civilization, we must not be misled by sentimental considerations as to his relation with nature and his "noble" occupation.

The conditions of Eastern farming and of Eastern

farm life are the true index, as they are the true cause, of the character of the Eastern farmer. These conditions are constantly varying, and their effect is always modified by individual qualities.

It may be possible to strike such an average as shall afford a tolerably good suggestion of the real character and condition of the farmer, and a hint as to his future; that is to say, certain prevalent influences tend to mark the type, and certain modifications of these influences may lead to its improvement. Any attempt to portray the class as a whole would be met by such a list of exceptions as would seriously affect the result; but the following may be considered true in a large number of cases, and applicable, with minor changes, to many more.

Let us take the case of an outlying farm in New England, of one hundred acres,—a farm that has been in cultivation from the earlier settlement of the country, and which is of the average degree of improvement, with the usual division into arable, mowing, pasture, and wood land. It lies two or three miles away from a considerable town or village, and its chief industry is the selling of milk in the town. With an allowance of two acres per cow for summer pasture, and of one and a half acres of mowing-land for winter feeding, the cows it keeps number about a dozen. For team-work on the farm and for road-work and pleasure-driving, there are kept two horses and two oxen. In addition to these there will be a greater or less amount of young stock and the usual swine and poultry, and perhaps a few sheep. The farmer himself is the chief workman on the place, and he has the regular help of a hired man or a grown son. An extra hand during the working season is usual; but in winter the farmer and his one assistant will do

all of the work of feeding, milking, delivering the milk, hauling out manure, etc.

A few years ago the housework was done almost entirely by the mother of the family and her daughters, or by a girl taken to "bring up;" but latterly the more troublesome element of an Irish girl in the kitchen has become general, for the daughter of the farmer has aspirations and tastes which disqualify her for efficient household drudgery. In spite of all modern appliances, much of the work of the farmer's household must be so characterized. The life of American farm women is, however, not now under discussion: the subject is a fruitful one, and has important bearings upon the development of the race; but what we are to consider here is simply the work and condition of the farmer himself. The milk-selling farmer—and this industry is one of the most wide-spread in Eastern farming—is more regularly employed than any other. Winter and summer his cows must be milked twice a day. Evening's milk must be cooled and safely kept until morning; and morning's milk must be ready for early delivery. It is usual for the farmer to rise at three every morning, winter and summer, to milk his cows,—with one assistant,—and to start as early as five o'clock to deliver his milk. Returning about the middle of the forenoon, he is able to attend to the details of barn-work in winter and field-work in summer, until half-past two or three o'clock in the afternoon, less the brief interval needed for the consumption of food. Early in the afternoon the cows must be again milked, and the cans of milk must in summertime be set in spring water for cooling. Then comes the feeding of the stock and the greasing of axles, the mending of harness, the repairing of tools, and the thousand and one odds and ends of the farmer's

irregular work. In the winter, save for the early rising and the work of cold mornings, life is by no means hurried; and after a very early supper there is often a stroll to the corner store or to a neighbor's house, for a little wholesome idleness and gossip,—the latter not invariably wholesome. At about the hour when the average reader of "The Atlantic" has finished his after-dinner cigar, all lights are extinguished, and the farm household is wrapped in heavy slumber; for such early rising as the milk-farmer is condemned to must needs trench upon the valuable evening hours for requisite rest and sleep.

In summer the conditions of life are immeasurably hardened. The farmer himself is necessarily absent several hours every morning with his milk-wagon; but, although he cannot lend a hand at the early field work, this work must go on with promptness, and he must arrange in advance for its proper performance. From the moment when he has finished his late breakfast until the last glimmer of twilight, he is doomed to harrowing and often anxious toil. There is no wide margin of profit that will admit of a slackening of the pace. Land must be prepared for planting; planting must be done when the condition of the ground and the state of the weather permit. Weeds grow without regard to our convenience, and they must be kept down from the first; and well on into the intervals of the hay-harvest the corn-field needs all of the cultivation that there is time for. Regularly as clock-work, in the late hours of the night and the early hours of the afternoon, the milking must be attended to; and the daily trip to town knows no exception because of heat, rain, or snow. At rigidly fixed hours this part of the work *must* be done; and all other hours of the growing and of the harvest seasons are almost more than filled

with work of imperative need. These alone seem to make a sufficient demand on the patience and endurance of the most industrious farmer; but, aside from these, he is loaded with the endless details of an intricate business, and with the responsibility of the successful management of a capital of from fifteen to twenty thousand dollars, upon the safety and the economical management of which his success entirely depends; he must avoid leakage and waste, and make every dollar paid for labor, or seed, or manure, or live stock, bring its adequate return.

Probably no occupation in the world can compare with farming in the opportunity that it offers for the *losing* of money. Nothing is so enticing as slate-and-pencil farming. Ten acres of land can be ploughed, manured, and planted with corn, and the crop can be well cultivated and harvested for so many dollars. Such land with such manuring and cultivation may be trusted to yield so many bushels of corn to the acre; and, after making due allowance for chance, the balance of the calculation shows a snug profit. In like manner we may figure out a corresponding return from the hay-fields, from the root-crops, from two or three acres of potatoes, and from a patch of garden-truck for which the neighboring village will furnish a good market. Then the poultry will return a profitable income in eggs and in "broilers;" and altogether it is easy for an enthusiastic person to show how interest on invested capital and good compensation for labor are to be secured in agriculture.

But when the test of practice is applied to our well-studied and proven scheme; when we see how far our allowance for "chances" has fallen below what is needed to cover the contingencies of late springs, dry

summers, early frosts, grasshoppers, wire-worms, Colorado beetles, midge, weevil, pip, murrain, garget, milk-fever, potato-rot, oats-rust, winter-killing, and all the rest; when we learn the degree of vigilance needed to keep every minute of hired labor and team-work effectively employed; and when we come finally to the items of low markets and bad debts,—we shall see how far these and similar drawbacks have undone our arithmetic, and how often our well-contrived balance must be taken into the footings of the other column of figures.

The regular work of the farmer, as indicated in the foregoing sketch of his occupations, and as perceptible to the summer boarder who watches his work from the piazza, although arduous and exacting, may be quite compatible with a happy life; and, when we estimate the promise of the occupation as offering a pleasant livelihood, no able-bodied man need be deterred by it. But when we add this long list of contingencies, and consider the ceaseless anxiety that they bring, we may well hesitate before adopting such a life for ourselves or desiring it for our children. No true estimate of the developed character of the farmer can be formed without giving due value to this uncertain factor in the calculation.

Instances are hardly exceptional where a clear natural intelligence, an indomitable courage, and great industry, have turned themselves into a real source of mental and moral strength. Success achieved in spite of such drawbacks is all the sweeter and all the more inspiriting because of them. But if we take the case of the average farmer with average human weaknesses, we cannot fail to see, that, however well he may have borne up against the more obvious requirements of his work, he has been

warped and cramped, and often made in many ways unlovely, by the hard and anxious toil through which his halting success has been attained.

In nearly every other occupation than farming, the hardest worker finds a daily relief from his toil, and from the suggestion of toil, in a home that is entirely apart from his industry. However arduous and anxious and long-continued the work, there comes a time when it is laid aside, and when the workman goes into a new sphere, where the atmosphere is entirely changed. His home is a place of rest and pleasure, or at least a place of change. The pen and the hammer are left in the counting-room and in the shop; and, however far the home may fall below his desires and ambition, it is at least free from the cares of the day's occupation.

The American farmer has no such relief. His house is a part of his farm; his fireside is shared by an uncongenial hired man, his family circle includes too often a vulgar and uninteresting servant; and from one year to another, his living-room being the kitchen and work-room of the busy farmhouse, he rarely knows what it is to divest himself of the surroundings of his labor and business, and to give himself over to the needed domestic enjoyment and recreation. It is this feature of his life, more than any other, which seems objectionable. If it is objectionable for him, it is infinitely more so for his wife and daughters, who, lacking the frequent visit to the town or occasional chat with strangers, and the invigorating effect of open-air work, yield all the more completely to depressing cares. They become more and more deficient in the lightness and cheerfulness and mental gayety to which in any other occupation the chief toiler of the family would

look for recreation at his own fireside.

So far as interest in his business is concerned, the farmer's condition is in every way elevated when he devotes himself to some improved form of agriculture, or to some special industry which gives him better compensation for his work. This benefit by no means generally results from an attempt at "scientific" agriculture, nor is the adoption of a special industry by any means generally successful. Failure in either of these directions is disheartening and discouraging to those who are watching his example. There are many well-tried improvements upon the old methods of our fathers which are universally adopted, especially in the direction of the use of better implements and more judicious care in the application of manure. But the average agricultural newspaper, while doing great good, has naturally led enthusiastic men to see a chance for ameliorating their condition by the adoption of processes which are not suited to their circumstances, or which they themselves are not qualified to carry out. It is this that has led to the outcry—much more prevalent a generation ago than now—against "book-farming." On the whole, whatever may have been the influences of agricultural writers upon the fortunes of their early converts, they have vastly modified and improved all modern farm-work, and have greatly benefited the more recent farmer.

The conditions of the industry are hard, chiefly because the business of farming is a laborious one, and one in which an enormous population is working, with dogged industry, for a moderate reward. However enterprising and intelligent a farmer may be, when he goes to market to sell his

crops he finds himself in active competition with men who are working for their bare subsistence.

Much is said about the competition of the farmers of the rich West as a serious obstacle to success at the East. This is the case only in so far as the Eastern farmer attempts to compete with the Western in the production of crops which will bear storage and long transportation. As a business proposition, it seems clear that this drawback is to be overcome only by the cultivation at the East of such products as it is not within the power of Western competition to supply, or only such as our situation and the good quality of our land will enable us to produce at low cost. Milk, fresh butter, and hay are the three most promising staples, for which so large a demand exists as to furnish employment for the whole farming population. Hay from its bulk does not bear a very long transportation. Milk will always bring a higher price when produced near to the point where it is to be consumed. Butter-making is not an especially profitable industry if we depend upon the average grocery-store demand; but it is possible for any farmer at the East, who will take the trouble to make and to retain a good reputation for his dairy, to secure a price enough higher than that of the regular market to constitute a good margin of profit.

So far as relief in Eastern farming is to be achieved with no material change in the character of life and work, it must apparently be sought in these directions. In his relation to Eastern civilization, past, present, and prospective, it may fairly be questioned whether the influence of the Eastern farmer is increased since the general introduction of railroads; and we are justified in looking with some anxiety to the relative position which he is to hold hereafter.

There are well-known influences at work which are not promising. The desire of the sons and daughters of the farmer to obtain some other means of livelihood, and the too frequent yielding to this temptation on the part of the more intelligent of these young persons, is the most obvious danger to the future of the industry.

Much has been said of the dignity and independence which come of the ownership of land; but it is possible that this influence has been over-estimated, and that our ideas of it have been derived more or less from our European traditions. Perhaps, after all, we ought to and do attach the most importance to that which is the most rare. In England, where the ownership of land carries with it a certain social dignity, and where the mere possession of money has a less marked influence in this direction, there is no doubt that the title-deeds to broad acres constitute a certain sort of patent of nobility. In this country, where land is plenty and cheap and where large fortunes are rare, a farmer gets consideration less for the amount of land that he himself owns, than for the sum-total of the mortgages which he holds upon his neighbors' land. That is to say, it is better to be rich in money than in land; and instances are comparatively rare, even among those who are cultivating their ancestral acres, where the farm would not be gladly sold for a sum of which the income would secure a better and easier mode of life. The farm is not regarded with especial affection: it is mainly regarded—along with its stock and tools—as an instrument for making money.

The American farmer is distinguished from the English farmer chiefly by having his capital invested in the land which he cultivates, rather than in the

tools and live stock and working capital needed to carry on his business. As a general rule the farmer's whole fortune is invested in his land. Often his farm is mortgaged, and he has little loose money with which to improve his system of work. The necessity for making a living and paying interest, without sufficient capital for the best management, makes the life of the farmer too often a grinding one. If he is skilful and industrious and prudent, he may hope with certainty to free himself from debt, and to accumulate a respectable support for his old age.

When we consider any class of working people, as a class, this is perhaps all that we can hope for under any circumstances. The unhopeful thing about it all is that while farmers work less hard than their fathers did, and while they get a better return for their work, the surroundings of their life have not improved as have those of men engaged in other industries, so that although actually much better off than their ancestors were, they are relatively less well off in the more attractive conditions of other classes of workmen; and this deficiency is driving away the children on whom they ought to depend for assistance and for succession.

In the abstract, farming is a dignified occupation, and in proportion as it borrows aid from science it becomes more dignified. So far as the casual observer can see, it combines more of what is desirable than does any other pursuit. While it promises no brilliant reward, it insures a steady, reliable, and sufficient return for the capital and labor invested in it. It promises a sure provision for old age, and it secures the wholesome pride that comes of the ownership of visible property. Indeed, look at it and argue about it as we may, it is not easy to see why it is not the best

occupation for a wholesome and intelligent man.

Those who know the condition of the art intimately, and who have studied the influences of its work and its life upon those who are engaged in it, recognize serious drawbacks which must in some way be removed unless it is to fall away still more from its original character, and is to be given over to German and Irish immigrants, who, during one or two generations, will be contented with what it has to offer. It is difficult even to theorize as to the means of relief, if farming must be considered, first of all, as a means for obtaining a livelihood and for making money; and no effort to improve the situation of the farmer will be successful which does not keep this prime necessity always in view. It is easy to see how the condition of any farmer's family might be improved by a large additional income; but there is no obvious source from which this increase is to be drawn, nor will he adopt any scheme that will endanger the income that he now receives.

If we could convert the farmer into a chemist and physiologist, and give him the satisfaction that comes of controlling the combinations of physical and chemical materials according to laws which he understands, and of securing his results with scientific accuracy, we should accomplish our purpose; for no man with such scientific knowledge, realizing its relation to his daily work, could fail of an enthusiastic fondness for his profession. But the worst of it is that all efforts in this direction have generally ended in producing a "smatterer," whose theories are baffled by constant disappointment, and whose worldly prosperity is lessened by his mistaken experiments.

Successful farming implies, first of all, steady and dogged hard work, coupled with prudent and watchful skill. When the hopes of enthusiastic agricultural reformers are considered with the practical eye of cold common sense, they must inevitably be condemned to disappointment. In so far as they constitute an incentive towards improvement, they work great good; but the success of the future is to be attained too often through the distressing failure of the present. The art is an experimental one, and the temptations to extend experiments are enticing. Unfortunately, novel processes depend for their success upon contingencies which are likely to be disregarded at the outset; and, however much any improvement may be destined to prosper after its application shall have been practically tested and modified, it is altogether likely that its first introduction will result in failure. The mere money losses coming of these failures are not so serious; but the discouragement and disappointment that they entail exert the gravest influence where what is chiefly needed is the encouragement of success.

It is something to know the direction that improving effort should take; and it seems to be generally conceded that what American agriculture needs, at the East and at the West, but especially at the East, is *an improvement in the character of its personnel*. There is everywhere ample opportunity for the profitable and successful introduction of modified processes and of new industries. There is, too, hardly an instance where the processes and industries now pursued are not susceptible of great improvement of detail. There are few farms so well managed and so successful, that if given into the hands of better, more intelligent, and more enterprising farmers, they

would not produce better results. The father is working according to his light, and is directing his work by such intelligence as his natural capacity and his training have given him. His brighter son, with more natural intelligence, with a better education, and less trammelled by traditions and prejudices, might so modify the same industry as to make it more certain, more profitable, and in every way more satisfactory.

The change that is now taking place, especially in New England, is toward the greater economy of living, and the harder work and closer management of business, that comes with immigrant proprietorship; and this element is by no means to be depended upon for the improvement of our farming. It may result in a more money-making agriculture, but it will supplant our best political element by the introduction of what has thus far seemed to be one of the worst.

Look at this question as we will, it is difficult to see how else than by improving the race of American farmers we are to accomplish any result whose good effect will be radical and lasting. This brings us around to that threadbare subject of the vague discussion of agricultural writers: "How to keep the boys on the farm."

The devices recommended for accomplishing this result have thus far failed of their object. The average farmer boy is not a sentimentalist, and he is not likely to be moved by the sort of talk so often lavished upon him. To use a vulgarism, he has an extremely "level head." He fails to realize the attraction and the dignity which are implied by what he is told of the nobleness of his father's calling, of

the purifying and elevating influences of a daily intercourse with nature. He is not to be caught with this sort of chaff. His cultivation has not been of that æsthetic character that he has an especial drawing toward nobleness, or purity, or elevation. Nature, as he knows it, shows at times an unattractive side; and he fails to recognize precisely what is meant by Mother Earth as a source of dignity. To him Mother Earth is an exacting parent, calling for constant and regular toil, and whipping him on day by day with weeds to be hoed, dry gardens to be watered, snowdrifts to be shovelled, and an almost endless round of embarrassments to be overcome. As for the purity and simplicity of the farmer's life, he knows very much better than to pin his faith to it. To him the farmer's house is too often a place where the mother is overworked, tired, wearied with constant annoyance, and made peevish and fretful. The conversation of hired men and young neighbors and brothers is not marked by refined delicacy and simplicity, as he understands these terms. At the end of all our preaching he will say, at least to himself, that this is probably the sort of talk that we consider appropriate to the occasion, but that, if we knew what he knows about farming, we should see how little effect it is likely to have. If he sought our motive in saying it, he would conclude that we were interested in keeping up the supply of farm labor; and that so far as *he* was concerned, since he must work for a living, he would work at some other industry if he could get a chance, and leave those who were less fortunate to work on the farm.

The more sentimental and more influential considerations governing in this matter were very well set forth by Dr. Holland in a paper on Farm Life in New England, published in "The Atlantic Monthly"

some twenty years ago. While acknowledging the frequency of bright exceptions to the rule, he does not hesitate to set it down as a rule that the life described is in every way a hateful one; where every member of the family, from father to child, is driven by the lash of stern necessity, and where many conditions which are deemed requisite in the life of all other classes of the same wealth are comparatively rare; where the expectant mother of the child is worked without stint to her last day, while the mother of the colt is relieved from all hard toil and treated with consideration throughout the last months of her time; where, in short, whether from interest or from a mistaken idea of necessity, hard work long hours, poor food, and dismal surroundings are the rule of the farmer's household.

Since that time there have been noticeable modifications, involving the introduction of more or less tastefulness, because of the cheap literature and cheap music of these later days. But, much as these have done to affect the individual characters of the younger members of the family, they have only aggravated the evil, so far as farm-work is concerned, by creating a desire, born of knowledge, for the pleasanter manner of life which the town has to offer. The young girls whom one now sees about railway stations in the most distant part of the country are dressed after the instructions of "Harper's Bazar" and "Peterson's Magazine;" and they know more than their older sisters did of the difference between their own life and that of their city cousins. They are certainly not to be blamed if they long for some vocation in which they can more freely indulge their growing ideas of luxury, and gratify their growing desire for better dress and more interesting companionship.

All that has here been said is seriously true and important. The circumstances described are so generally prevalent as to constitute, with constant minor variations, an almost universal rule. Where we are to look for relief, is the most serious problem. Relief must be found, or the character of our farming class must assuredly degenerate. In one way or another we must change, in a radical degree, the conditions of the farmer's life. We can perfectly understand why it should be distasteful to any young person of ordinary ambition or intelligence; and we know, from the constant flocking of farmers' sons and daughters to even the least attractive employments of the town or village, that this distaste is everywhere a controlling one.

It is easy to say that the farmer's life must be made more cheerful, attractive, and refined, and less arduous; but it is by no means easy to see how the improvement is to be brought about. The cardinal defect is the loneliness and dulness of the isolated farmhouse. Intelligent and educated young women, brought up among the pleasantest surroundings, marry young farmers, and undertake their new life with the determination that, in their case at least, the more obvious social requirements shall be met. During the earlier years after marriage they adhere to their resolution, and are regular in attendance at the church and public lecture; and they keep up, so far as possible, social intercourse with their neighbors. But as time goes on, as the family increases, as toil begins to tell on health and strength and energy, they drop out, little by little, from the habit of going abroad, until often for weeks together they never exchange a look or thought with any human being outside of their own households. Aside from the overworked members of their own families,

their companionship is confined to hired men who smell of the stable, and to hired girls with whom they are yoked in the daily round of household duties.

Having given much consideration to the subject, I have come to believe that the agriculture of Continental Europe is far more wisely arranged than ours; for there, almost as a universal rule, isolated farm-life is unknown. The reward of the cultivator is less, and his labor is at least as great. The people are of a very much lower order, and are lacking in the cultivated intelligence which distinguishes so many of our own farming class. Women and even young girls perform rude labor in the field and in the stable; and those aspirations which are born of a universal diffusion of periodical literature are almost unknown. At the same time, when the hard and long day's work is over, there comes to all the inexpressible relief and delight of the active social intercourse of the village, where the tillers of the country for a mile around have gathered together their homes and their herds, and where the most intimate social life prevails.

Observation even indicates that the habit of out-of-door labor has had no injurious effect upon the women of these villages. The "nut-brown maid" grows too fast into the wrinkled-brown woman; but better a sunburnt and weather-beaten cheek than that pallor that comes of anthracite and in-door toil. Better the broad back and stout limb of the peasant mother than the hollow chest and wasted energy of the American farmer's wife.

I by no means intend to say that our own farming class is not far superior to the peasantry of Europe;

but I do believe that if a good system of village life for farmers could be adopted here under the modifying influences of the more refined and intelligent American character, we should have gained a most important step in advance. We have in New England many villages almost exclusively of farmers,—villages where the old-time settlers gathered together for defence against the Indians, and for the protection of houses and stock and store from river floods. These villages are as different as it is possible to conceive from the ordinary European cluster of unattractive cottages, lining both sides of a street which is filled for one-half of its width with manure-heaps. It may be naturally assumed that any adaptation of the village system among us would be governed by the same refining influences which have made our few existing agricultural villages so beautiful and attractive.

That which most distinguishes American people is the general spread of education among them; but it is, after all, an education which soon reaches its limit, and, so far as the district-school of a sparsely-settled country neighborhood is concerned, it goes little beyond the simplest rudiments. An inexperienced young miss holds school for not more than one-half the year in an unattractive and inconvenient room, in which are gathered together most of the boys and girls of the school-going age from all the farms about. The books and other appliances of instruction are inadequate. There is no grading of the pupils, and the frequent change of teachers prevents the possibility of experienced instructions. Even in the meanest peasant village of Germany, a village always prolific in children, an inexorable law compels all between the ages of five and fourteen to attend regularly the teaching of a

master, an officer of the state, who has generally adopted his profession for life, and who adds to a certain specified degree of capability the advantages of long experience.

No thoughtful person can fail to be convinced, after a due consideration of the argument in its favor, that, if the social influences inseparable from village-life could be secured to the American farmer, the greatest drawback of his life would be done away with. It remains, unfortunately, a serious question, how far such a radical change is practicable. There is little doubt that the family would naturally drift into some more costly style of living; and the necessity for hauling to a distant home all the crops of the fields, and of hauling out the manure made at the homestead, would add somewhat to the expenses of the business.

In the case of the individual farmer now cultivating land upon which he lives, it is not unlikely that he would find a certain pecuniary disadvantage in the change. But, as a broad question of the future benefit of our agriculture, it must be conceded that whatever will tend to make the occupation more attractive cannot fail, by enlisting the services of more intelligent minds, to insure its very decided improvement. As the case now stands, the farmer's son will become a clerk or a mechanic rather than remain a farmer, because clerks and mechanics live in communities where there is more to interest the mind, and where, too, the opportunities for enjoyment and amusement are greater. The farmer's daughter will marry the clerk or the mechanic rather than a farmer, because she knows the life of a farmer's wife to be a life of dulness and dearth, while she believes that the wife of the clerk or mechanic

will be condemned to less arduous labor, and will have much more agreeable surroundings. I have no means of judging what may have been the experience in Deerfield, Mass., for instance; but I am confident that many a mechanic's daughter, and indeed many young women of much higher position in life, would consider her lot a fortunate one in becoming the wife of a farmer whose homestead lay on the beautiful street of this old village.

All that is here said is, to a certain extent, mere theory; but the subject is one that has not thus far met any practical solution, and in which, therefore, nothing except theorizing is possible. The broad fact is that the farming class in this country is degenerating by the withdrawal of its best blood; and still more serious injury is being done to it by the introduction of the lower class of foreigners. It may well be doubted whether it is possible so to modify the manner of life of the isolated farmhouse as to make it materially more attractive to American boys and girls. All that can be done is to rob it of its isolation by withdrawing its people, and placing them under better conditions of life.

In a word, the only way that seems to offer to keep the boys on the farm is to move everybody off of the farm, bringing them together into snug little communities, where they may secure, without abandoning the manifest advantages of their occupation, the greater social interest and stimulus which they now hope to enjoy by going into other callings whose natural advantages are less. That such a course as this would restore the farmer to his former position as a leading element in Eastern civilization, cannot be questioned. That he will retain even the relative influence that he exercises to-day,

unless some radical change is made, is at least very doubtful.

In considering the questions here suggested, we must never lose sight of the fact that the controlling element is economy. The farmer exists because he is needed. The world demands the products that he produces, and the world must needs pay him a living compensation for them. No change will be possible which disregards this; and all who know the present circumstances which control the reward of the farming class know that these circumstances would be inadequate to maintain him in a life of greater ease, while calling for greater expense. This gives the added embarrassment that we must not only change the mode of life, but must also increase the ratio of profit, if this is possible. This is possible only through a reduction of the area cultivated, the cultivation of this reduced area in a more thorough and profitable way, and the turning of farming industry into channels better adapted to securing a profitable return.

To discuss a modification of the whole system of farming would involve far more detail than is possible in this paper, since such a discussion must include the consideration of features which would change with changing locality; but, by way of illustration, we may take the previously supposed case of a farmer owning one hundred acres of land, and milking a dozen cows, selling the milk as before in the distant town. Assume that he and his neighbors within a radius of about a mile are living in a central village, from which his land is one mile distant. During the working season, say from the middle of April until late in October, he must, with his teams and assistants, spend the whole day on the

land. The cows are milked and all stable work done before breakfast, and some one drives them out to pasture. The men remain a-field until an hour before sunset. They must be content with a cold dinner, as is the usual custom with mechanics and laborers. The cows are driven home in time for the evening milking, and are put into the barnyard at night with green fodder brought home by the returning teams. After the "chores" are done, and a hearty and substantial supper is eaten,—the principal meal of the day,—all hands will be too weary for much enjoyment of the evening, but not so weary that they will not appreciate the difference between the lounging places of a village and the former dulness at the farm. Other farmers in the neighborhood will, many of them, also be milk producers; and, as the stables are near together, they will naturally co-operate, sending their milk to market with a single team, employing the services of a single man in the place of five or six men and teams heretofore needed to market the same milk. I have recently received an account of this sort of co-operation, where the cost of selling was reduced to a fraction over eight cents for each hundred quarts.

This arrangement will have the still further benefit of allowing the farmer to remain at home and attend to his more important work, leaving the detail of marketing to be done by a person especially qualified for it and therefore able to do it more cheaply than he could do it in person. During the working season there will be enough rainy weather to allow the work of the stable, the barnyard, and the woodshed to be properly attended to. There will of course be sudden showers and occasional storms, and other inconveniences, which will make the farmer regret at times that he lives at such a distance from his field

work; but he will find more than compensation in the advantages that come naturally from living in a village.

For his wife and children the improvement will be absolute; and it will be no slight argument in favor of the change, that both in doors and out of doors a better class of servants will be available, because of the better life that can be offered. It will be easier to secure the services of laborers who are married and who live in their own houses, and so avoid the serious annoyance to the household that attends the boarding of hired men.

To make this radical change in any farming neighborhood as at present constituted, would be impracticable. It would probably take a generation to convince the farmers of a community of its advantages; it would cost too much, even if not entirely impracticable, to move the house and stables to the central point; and it would involve such a change of habits of labor and of living as must necessarily be the work of time. However, if the principle commends itself to the leading men of the neighborhood, and especially to young men about to marry, the nucleus of a village may be established, and sooner or later the present or the coming generation will find a way to come into the fold.

If we assume that by this or some other means the more intelligent of the young men are induced to remain farmers, it is interesting to consider in what way their greater intelligence is to be made to tell on their work so as to secure the necessary improvement. It would not be unreasonable to suppose that young men of the class we have in mind, those who now seek occupations which afford

a better field for their intelligence, and who seek them because of their intelligence, would establish such centres of discussion and interest in improved farming as would not only mitigate the worthless gossip now so common at the country store, but would awaken a real enthusiasm in better processes and systems.

Not only would there be this tendency toward improvement; but where farmers are close neighbors, and are able to conduct their interests in such a way as to help each other, there would naturally grow up some sort of co-operative business. By the establishment of a butter-factory or cheese-factory, or by the common ownership of a milk-route, or where tobacco is grown by the undertaking of its manufacture as an employment for winter, or by the raising of honey or of poultry, or by the establishment of some valuable breed of live stock with a reputation for excellence that will cause it to be sought for from abroad, or by some other combination, they would secure profitable business.

Of course all the farmers in New England cannot within the next ten years move into villages; but what is suggested is that the farmers of some one community should try the experiment. Their success might induce others to follow the example; and little by little, in proportion to the promise of a good result, more and more would seek the advantages which the system would offer, so that sooner or later the benefits which are now experienced in village life in Europe might be felt here in the higher degree which greater intelligence and greater freedom would be sure to produce.

While advancing these suggestions, with much

confidence in their practical value, I would by no means confine the outlook for Eastern farming to this single road to success. Co-operative industry may be largely adopted among farmers living at some distance from each other. The cheese-factory has become an institution. The better quality of the product when made in large quantities, and the better price that its quality and the improved system for marketing have secured, constitute a very decided success in our agriculture. Butter-factories are coming into vogue with a promise of equally good results.

A very good substitute for the co-operative management of a milk route is in very general adoption throughout New England, where some single farmer who devotes himself to selling milk buys the product of his neighbor's dairies for a certain fixed price, taking upon himself the labor, the risk, and the profit of marketing. The co-operative breeding of live stock cannot as yet be said to have become well established, but its possibilities of success are considerable. A community can afford to buy and keep a thorough-bred horse, or bull, or boar, or buck, which would cost far too much for the means of a single owner, and thus gradually give to the stock of the whole neighborhood a superiority that will secure it a wide-spread reputation and insure good prices. Let us keep always in view the important principle of making two blades of grass grow where but one grew before; but let us remit no effort which may tend to make one blade worth what two were worth before.

Incidentally, there may be combinations to secure good outlet drainage for tracts of land belonging to different owners, and later a provision for the

general irrigation of these lands.

It is not to be hoped, that, either as a whole or in its details, agricultural improvement is to be advanced with any thing like a rush. Farmers are generally "conservative" in the worst sense of the term. They have during the past generation adopted many improvements and modifications in the methods of their work, the mere suggestion of which would have been scouted by their fathers; but they are themselves as ready as their fathers were to scout any further new suggestion, and it is only by iteration and reiteration that the shorter steps of tentative experiment can be urged upon their acceptance.

In reviewing what is written above, the thought arises that the one impression that it will surely produce will be that its writer fails to appreciate the better influences that cluster around the better class of farmers' homes. Such an inference would be quite unjust. Knowing as I do the intrinsic worth and the charming qualities of very many of these households, I appeal to the best of the thoughtful men and women whom they include, to confirm my statement that they find many elements of their life to be pinching and hard, and that however admirable they may now be, they would be in no way injured, but in many ways improved, by more frequent intercourse with their equals, and especially with their betters.

That the picture I have sketched of the average farmer's family is not overdrawn, I appeal to every country clergyman and physician to bear witness. The truths suggested are patent to all. They are set forth in no spirit of hypercriticism, and with no other view than to help to ameliorate the condition of

those to whom they refer. Knowing the farmer more intimately than does the average editor or orator, I am confident that my estimate of his character and of his life will strike him as being more just, if not more honest.

BY THE SAME AUTHOR.

A FARMER'S VACATION. Sketches of Travel in Europe; with a very complete Account of the Drainage of the Great Haarlem Lake in Holland; Notes on Dutch Farming; a Journey in Normandy and Brittany; and an Elaborate Description of the Channel Islands,—their Agriculture, Social Customs, Scenery, &c. Beautifully illustrated. Price $3.00.

WHIP AND SPUR. Papers reprinted from the "Atlantic Monthly,"—largely about Army Experiences; and certain Horses, at Home and in

the Field. Price $1.25.

THE ELEMENTS OF AGRICULTURE. A work of Practical Science for Farmers. Price $1.00.

THE SANITARY DRAINAGE OF HOUSES AND TOWNS. Illustrated. Price $2.00.

DRAINING FOR PROFIT, and DRAINING FOR HEALTH. Complete Directions for the Drainage of Agricultural Lands, Swamps, Malarious Districts, &c. Fully illustrated. Price $1.50.

THE HANDY BOOK OF HUSBANDRY. A Manual for American Farmers. Fully illustrated. Price $2.50.

THE SANITARY CONDITION OF TOWN AND COUNTRY HOUSES. Price 50 cents.

IN PRESS. *THE BRIDE OF THE RHINE; Two*

Hundred Miles in a Mosel Row-boat.

*** END OF THE PROJECT GUTENBERG EBOOK VILLAGE IMPROVEMENTS AND FARM VILLAGES ***

Updated editions will replace the previous one—the old editions will be renamed.

Creating the works from print editions not protected by U.S. copyright law means that no one owns a United States copyright in these works, so the Foundation (and you!) can copy and distribute it in the United States without permission and without paying copyright royalties. Special rules, set forth in the General Terms of Use part of this license, apply to copying and distributing Project Gutenberg™ electronic works to protect the PROJECT GUTENBERG™ concept and trademark. Project Gutenberg is a registered trademark, and may not be used if you charge for an eBook, except by following the terms of the trademark license, including paying royalties for use of the Project Gutenberg trademark. If you do not charge anything for copies of this eBook, complying with the trademark license is very easy. You may use this eBook for nearly any purpose such as creation of derivative works, reports, performances and research. Project Gutenberg eBooks may be modified and printed and given away—you may do practically ANYTHING in the United States with eBooks not protected by U.S. copyright law. Redistribution is subject to the trademark license, especially commercial

redistribution.

START: FULL LICENSE

THE FULL PROJECT GUTENBERG™ LICENSE

PLEASE READ THIS BEFORE YOU DISTRIBUTE OR USE THIS WORK

To protect the Project Gutenberg™ mission of promoting the free distribution of electronic works, by using or distributing this work (or any other work associated in any way with the phrase “Project Gutenberg”), you agree to comply with all the terms of the Full Project Gutenberg License available with this file or online at www.gutenberg.org/license.

Section 1. General Terms of Use and Redistributing Project Gutenberg electronic works

1.A. By reading or using any part of this Project Gutenberg electronic work, you indicate that you have read, understand, agree to and accept all the terms of this license and intellectual property (trademark/copyright) agreement. If you do not agree to abide by all the terms of this agreement, you must cease using and return or destroy all copies of Project Gutenberg electronic works in your possession. If you paid a fee for obtaining a copy of or access to a Project Gutenberg electronic work and you do not agree to be bound by the terms of this agreement, you may obtain a refund from the person or entity to whom you paid the fee as set

forth in paragraph 1.E.8.

1.B. “Project Gutenberg” is a registered trademark. It may only be used on or associated in any way with an electronic work by people who agree to be bound by the terms of this agreement. There are a few things that you can do with most Project Gutenberg electronic works even without complying with the full terms of this agreement. See paragraph 1.C below. There are a lot of things you can do with Project Gutenberg electronic works if you follow the terms of this agreement and help preserve free future access to Project Gutenberg electronic works. See paragraph 1.E below.

1.C. The Project Gutenberg Literary Archive Foundation (“the Foundation” or PGLAF), owns a compilation copyright in the collection of Project Gutenberg electronic works. Nearly all the individual works in the collection are in the public domain in the United States. If an individual work is unprotected by copyright law in the United States and you are located in the United States, we do not claim a right to prevent you from copying, distributing, performing, displaying or creating derivative works based on the work as long as all references to Project Gutenberg are removed. Of course, we hope that you will support the Project Gutenberg mission of promoting free access to electronic works by freely sharing Project Gutenberg works in compliance with the terms of this agreement for keeping the Project Gutenberg name associated with the work. You can easily comply with the terms of this agreement by keeping this work in the same format with its attached full Project

Gutenberg License when you share it without charge with others.

1.D. The copyright laws of the place where you are located also govern what you can do with this work. Copyright laws in most countries are in a constant state of change. If you are outside the United States, check the laws of your country in addition to the terms of this agreement before downloading, copying, displaying, performing, distributing or creating derivative works based on this work or any other Project Gutenberg work. The Foundation makes no representations concerning the copyright status of any work in any country other than the United States.

1.E. Unless you have removed all references to Project Gutenberg:

1.E.1. The following sentence, with active links to, or other immediate access to, the full Project Gutenberg License must appear prominently whenever any copy of a Project Gutenberg work (any work on which the phrase “Project Gutenberg” appears, or with which the phrase “Project Gutenberg” is associated) is accessed, displayed, performed, viewed, copied or distributed:

> This eBook is for the use of anyone anywhere in the United States and most other parts of the world at no cost and with almost no restrictions whatsoever. You may copy it, give it away or re-use it under

the terms of the Project Gutenberg™ License included with this eBook or online at www.gutenberg.org. If you are not located in the United States, you will have to check the laws of the country where you are located before using this eBook.

1.E.2. If an individual Project Gutenberg electronic work is derived from texts not protected by U.S. copyright law (does not contain a notice indicating that it is posted with permission of the copyright holder), the work can be copied and distributed to anyone in the United States without paying any fees or charges. If you are redistributing or providing access to a work with the phrase “Project Gutenberg” associated with or appearing on the work, you must comply either with the requirements of paragraphs 1.E.1 through 1.E.7 or obtain permission for the use of the work and the Project Gutenberg trademark as set forth in paragraphs 1.E.8 or 1.E.9.

1.E.3. If an individual Project Gutenberg electronic work is posted with the permission of the copyright holder, your use and distribution must comply with both paragraphs 1.E.1 through 1.E.7 and any additional terms imposed by the copyright holder. Additional terms will be linked to the Project Gutenberg License for all works posted with the permission of the copyright holder found at the beginning of this work.

1.E.4. Do not unlink or detach or remove the full

Project Gutenberg License terms from this work, or any files containing a part of this work or any other work associated with Project Gutenberg.

1.E.5. Do not copy, display, perform, distribute or redistribute this electronic work, or any part of this electronic work, without prominently displaying the sentence set forth in paragraph 1.E.1 with active links or immediate access to the full terms of the Project Gutenberg License.

1.E.6. You may convert to and distribute this work in any binary, compressed, marked up, nonproprietary or proprietary form, including any word processing or hypertext form. However, if you provide access to or distribute copies of a Project Gutenberg work in a format other than “Plain Vanilla ASCII” or other format used in the official version posted on the official Project Gutenberg website (www.gutenberg.org), you must, at no additional cost, fee or expense to the user, provide a copy, a means of exporting a copy, or a means of obtaining a copy upon request, of the work in its original “Plain Vanilla ASCII” or other form. Any alternate format must include the full Project Gutenberg License as specified in paragraph 1.E.1.

1.E.7. Do not charge a fee for access to, viewing, displaying, performing, copying or distributing any Project Gutenberg works unless you comply with paragraph 1.E.8 or 1.E.9.

1.E.8. You may charge a reasonable fee for copies of or providing access to or distributing Project Gutenberg electronic works provided

that:

- You pay a royalty fee of 20% of the gross profits you derive from the use of Project Gutenberg works calculated using the method you already use to calculate your applicable taxes. The fee is owed to the owner of the Project Gutenberg trademark, but he has agreed to donate royalties under this paragraph to the Project Gutenberg Literary Archive Foundation. Royalty payments must be paid within 60 days following each date on which you prepare (or are legally required to prepare) your periodic tax returns. Royalty payments should be clearly marked as such and sent to the Project Gutenberg Literary Archive Foundation at the address specified in Section 4, “Information about donations to the Project Gutenberg Literary Archive Foundation.”

- You provide a full refund of any money paid by a user who notifies you in writing (or by e-mail) within 30 days of receipt that s/he does not agree to the terms of the full Project Gutenberg™ License. You must require such a user to return or destroy all copies of the works possessed in a physical medium and discontinue all use of and all access to other copies of Project Gutenberg™ works.

- You provide, in accordance with paragraph 1.F.3, a full refund of any money paid for a work or a replacement copy, if a defect in the electronic work is discovered and reported to you within 90 days of receipt of the work.

• You comply with all other terms of this agreement for free distribution of Project Gutenberg™ works.

1.E.9. If you wish to charge a fee or distribute a Project Gutenberg™ electronic work or group of works on different terms than are set forth in this agreement, you must obtain permission in writing from the Project Gutenberg Literary Archive Foundation, the manager of the Project Gutenberg™ trademark. Contact the Foundation as set forth in Section 3 below.

1.F.

1.F.1. Project Gutenberg volunteers and employees expend considerable effort to identify, do copyright research on, transcribe and proofread works not protected by U.S. copyright law in creating the Project Gutenberg™ collection. Despite these efforts, Project Gutenberg™ electronic works, and the medium on which they may be stored, may contain “Defects,” such as, but not limited to, incomplete, inaccurate or corrupt data, transcription errors, a copyright or other intellectual property infringement, a defective or damaged disk or other medium, a computer virus, or computer codes that damage or cannot be read by your equipment.

1.F.2. LIMITED WARRANTY, DISCLAIMER OF DAMAGES - Except for the “Right of Replacement or Refund” described in paragraph 1.F.3, the Project Gutenberg Literary Archive Foundation, the owner of the Project Gutenberg™ trademark, and any other party

distributing a Project Gutenberg™ electronic work under this agreement, disclaim all liability to you for damages, costs and expenses, including legal fees. YOU AGREE THAT YOU HAVE NO REMEDIES FOR NEGLIGENCE, STRICT LIABILITY, BREACH OF WARRANTY OR BREACH OF CONTRACT EXCEPT THOSE PROVIDED IN PARAGRAPH 1.F.3. YOU AGREE THAT THE FOUNDATION, THE TRADEMARK OWNER, AND ANY DISTRIBUTOR UNDER THIS AGREEMENT WILL NOT BE LIABLE TO YOU FOR ACTUAL, DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE OR INCIDENTAL DAMAGES EVEN IF YOU GIVE NOTICE OF THE POSSIBILITY OF SUCH DAMAGE.

1.F.3. LIMITED RIGHT OF REPLACEMENT OR REFUND - If you discover a defect in this electronic work within 90 days of receiving it, you can receive a refund of the money (if any) you paid for it by sending a written explanation to the person you received the work from. If you received the work on a physical medium, you must return the medium with your written explanation. The person or entity that provided you with the defective work may elect to provide a replacement copy in lieu of a refund. If you received the work electronically, the person or entity providing it to you may choose to give you a second opportunity to receive the work electronically in lieu of a refund. If the second copy is also defective, you may demand a refund in writing without further opportunities to fix the problem.

1.F.4. Except for the limited right of replacement or refund set forth in paragraph 1.F.3, this work

is provided to you ‘AS-IS’, WITH NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE.

1.F.5. Some states do not allow disclaimers of certain implied warranties or the exclusion or limitation of certain types of damages. If any disclaimer or limitation set forth in this agreement violates the law of the state applicable to this agreement, the agreement shall be interpreted to make the maximum disclaimer or limitation permitted by the applicable state law. The invalidity or unenforceability of any provision of this agreement shall not void the remaining provisions.

1.F.6. INDEMNITY - You agree to indemnify and hold the Foundation, the trademark owner, any agent or employee of the Foundation, anyone providing copies of Project Gutenberg™ electronic works in accordance with this agreement, and any volunteers associated with the production, promotion and distribution of Project Gutenberg™ electronic works, harmless from all liability, costs and expenses, including legal fees, that arise directly or indirectly from any of the following which you do or cause to occur: (a) distribution of this or any Project Gutenberg work, (b) alteration, modification, or additions or deletions to any Project Gutenberg work, and (c) any Defect you cause.

Section 2. Information about the Mission

of Project Gutenberg

Project Gutenberg is synonymous with the free distribution of electronic works in formats readable by the widest variety of computers including obsolete, old, middle-aged and new computers. It exists because of the efforts of hundreds of volunteers and donations from people in all walks of life.

Volunteers and financial support to provide volunteers with the assistance they need are critical to reaching Project Gutenberg's goals and ensuring that the Project Gutenberg collection will remain freely available for generations to come. In 2001, the Project Gutenberg Literary Archive Foundation was created to provide a secure and permanent future for Project Gutenberg and future generations. To learn more about the Project Gutenberg Literary Archive Foundation and how your efforts and donations can help, see Sections 3 and 4 and the Foundation information page at www.gutenberg.org.

Section 3. Information about the Project Gutenberg Literary Archive Foundation

The Project Gutenberg Literary Archive Foundation is a non-profit 501(c)(3) educational corporation organized under the laws of the state of Mississippi and granted tax exempt status by the Internal Revenue Service. The Foundation's EIN or federal tax identification number is 64-6221541. Contributions to the Project Gutenberg Literary Archive Foundation

are tax deductible to the full extent permitted by U.S. federal laws and your state's laws.

The Foundation's business office is located at 41 Watchung Plaza #516, Montclair NJ 07042, USA, +1 (862) 621-9288. Email contact links and up to date contact information can be found at the Foundation's website and official page at www.gutenberg.org/contact

Section 4. Information about Donations to the Project Gutenberg Literary Archive Foundation

Project Gutenberg™ depends upon and cannot survive without widespread public support and donations to carry out its mission of increasing the number of public domain and licensed works that can be freely distributed in machine-readable form accessible by the widest array of equipment including outdated equipment. Many small donations ($1 to $5,000) are particularly important to maintaining tax exempt status with the IRS.

The Foundation is committed to complying with the laws regulating charities and charitable donations in all 50 states of the United States. Compliance requirements are not uniform and it takes a considerable effort, much paperwork and many fees to meet and keep up with these requirements. We do not solicit donations in locations where we have not received written confirmation of compliance. To SEND DONATIONS or determine the status of compliance for any particular state visit

www.gutenberg.org/donate.

While we cannot and do not solicit contributions from states where we have not met the solicitation requirements, we know of no prohibition against accepting unsolicited donations from donors in such states who approach us with offers to donate.

International donations are gratefully accepted, but we cannot make any statements concerning tax treatment of donations received from outside the United States. U.S. laws alone swamp our small staff.

Please check the Project Gutenberg web pages for current donation methods and addresses. Donations are accepted in a number of other ways including checks, online payments and credit card donations. To donate, please visit: www.gutenberg.org/donate.

Section 5. General Information About Project Gutenberg electronic works

Professor Michael S. Hart was the originator of the Project Gutenberg concept of a library of electronic works that could be freely shared with anyone. For forty years, he produced and distributed Project Gutenberg eBooks with only a loose network of volunteer support.

Project Gutenberg eBooks are often created from several printed editions, all of which are confirmed as not protected by copyright in the U.S. unless a copyright notice is included. Thus, we do not necessarily keep eBooks in

compliance with any particular paper edition.

Most people start at our website which has the main PG search facility: www.gutenberg.org.

This website includes information about Project Gutenberg, including how to make donations to the Project Gutenberg Literary Archive Foundation, how to help produce our new eBooks, and how to subscribe to our email newsletter to hear about new eBooks.