

upon graduation from the

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KANSAS STATE AGRICULTURAL COLLEGE

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THE ECONOMICAL MANAGEMENT OF FARM LANDS.

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At this age of rapidly increasing habitation of the world it is evident that there will eventually be a time when land for the occupation of the population will be in much greater demand than at present, and as farmers will necessarily constitute a large proportion of the population it is important that the lands occupied by them, be economically managed.

The time will come when farmers cannot all have as many acres as has been possible for them to have in the past. All of the good farming land has or will soon be occupied and the time is past when farmers in the East can abandon their farms, go to the West and have land for the asking in such large quantities that it is unnecessary and unprofitable to give much consideration to its management.

A few years ^{ago} only the land which was most valuable and which could be conveniently farmed was used for that purpose, but in the future most or all lands must be occupied and instead of taking a farm of large area and farming it in a wasteful way, the farmer will farm small areas and give especial attention to the economical management of the land, thus deriving ^{as much or} greater profit ^{than} would be derived from farms comprising more but less economically handled land.

In order that the producing capacity of a farm may be increased to a maximum it is necessary that the greatest possible amount of the land be concerned in producing the pro-

ducts of the farm;--the ordinary waste land must be utilized. The correctness of a notion--that the ownership of land imparts respectability--which obtains among many persons is conditional. The possession of broad and productive acres, it is true, gives respectability as well as profit, but the ownership of unproductive land is discreditable.

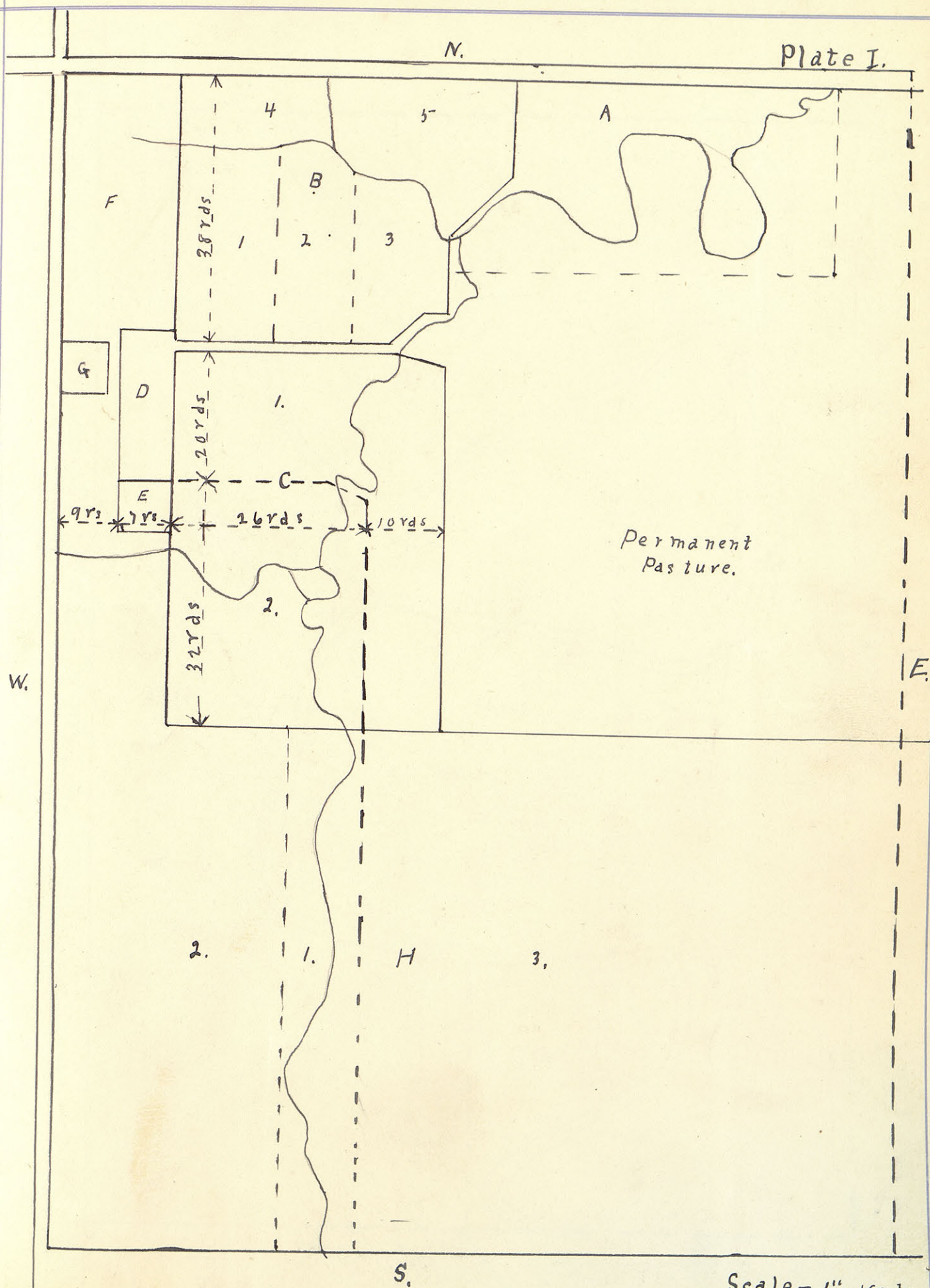
The character and thrift of the farmer may be justly estimated by the appearance of his land. If the owner of such unimproved land would sell the surplus he would not only promote his own interest but that of ^{the} commonwealth or community as well. Waste land not only represents idle and taxable capital for the landlord, but the withholding of profitable support from others. If he is a benefactor of mankind, who succeeds in making two blades of grass grow where only one grew before, how much more beneficial is the mission of making profitable vegetation grow where unprofitable vegetation or none at all was wont to thrive.

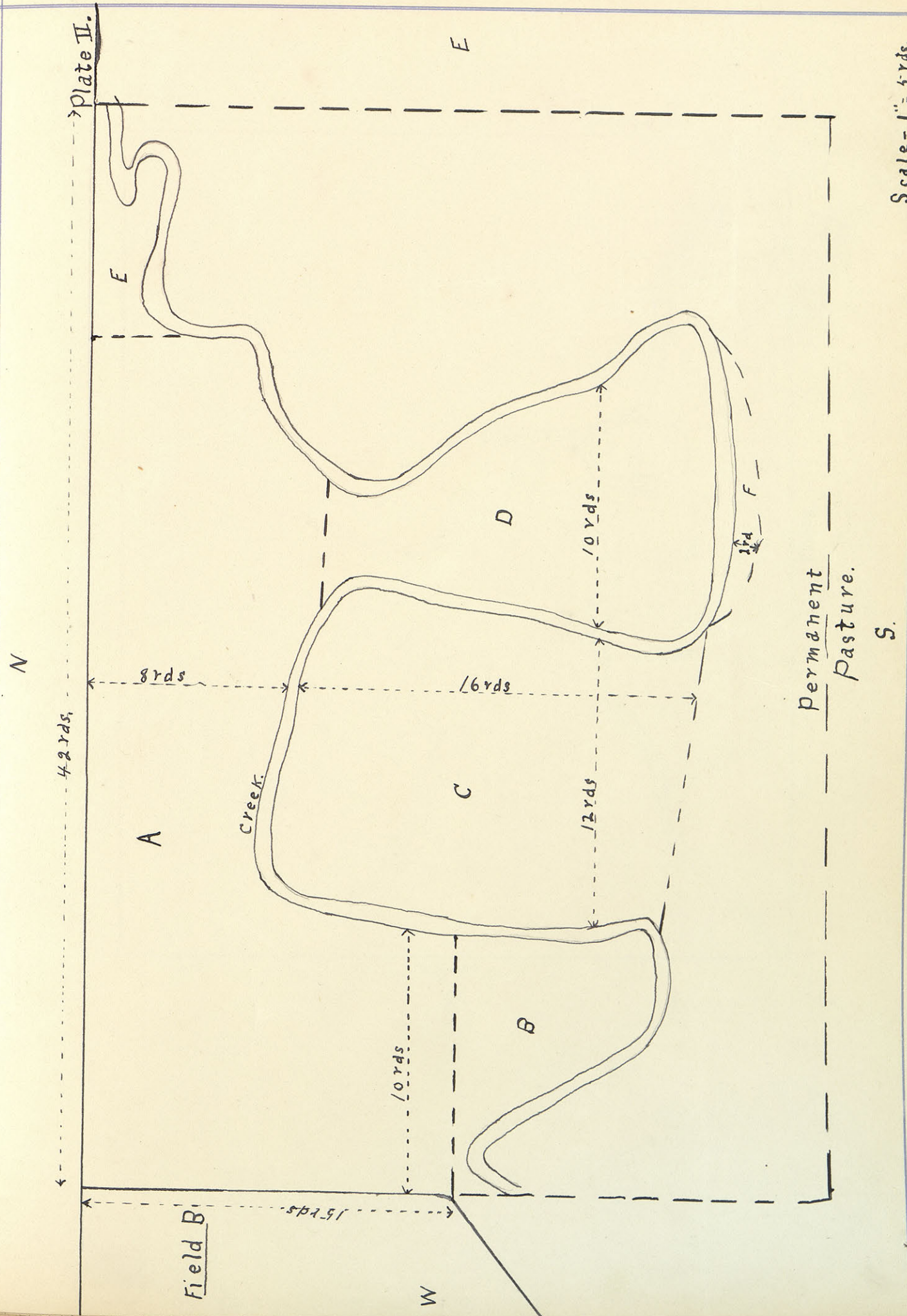
Utility of waste land involves primarily the clearing of new land or land which has through changed conditions inevitable gone to brush and small timber. Although there are sections of the country where woodland lots are at a premium, and although much wooded land had better be left for timber and fuel purposes, there is ^e more or less land of this bushy character which is neither tillable nor productive of wood and should therefore be cleared. Such land is often an eye-sore to the community, it has no earning capacity, and leads only to the impoverishment of the owner.

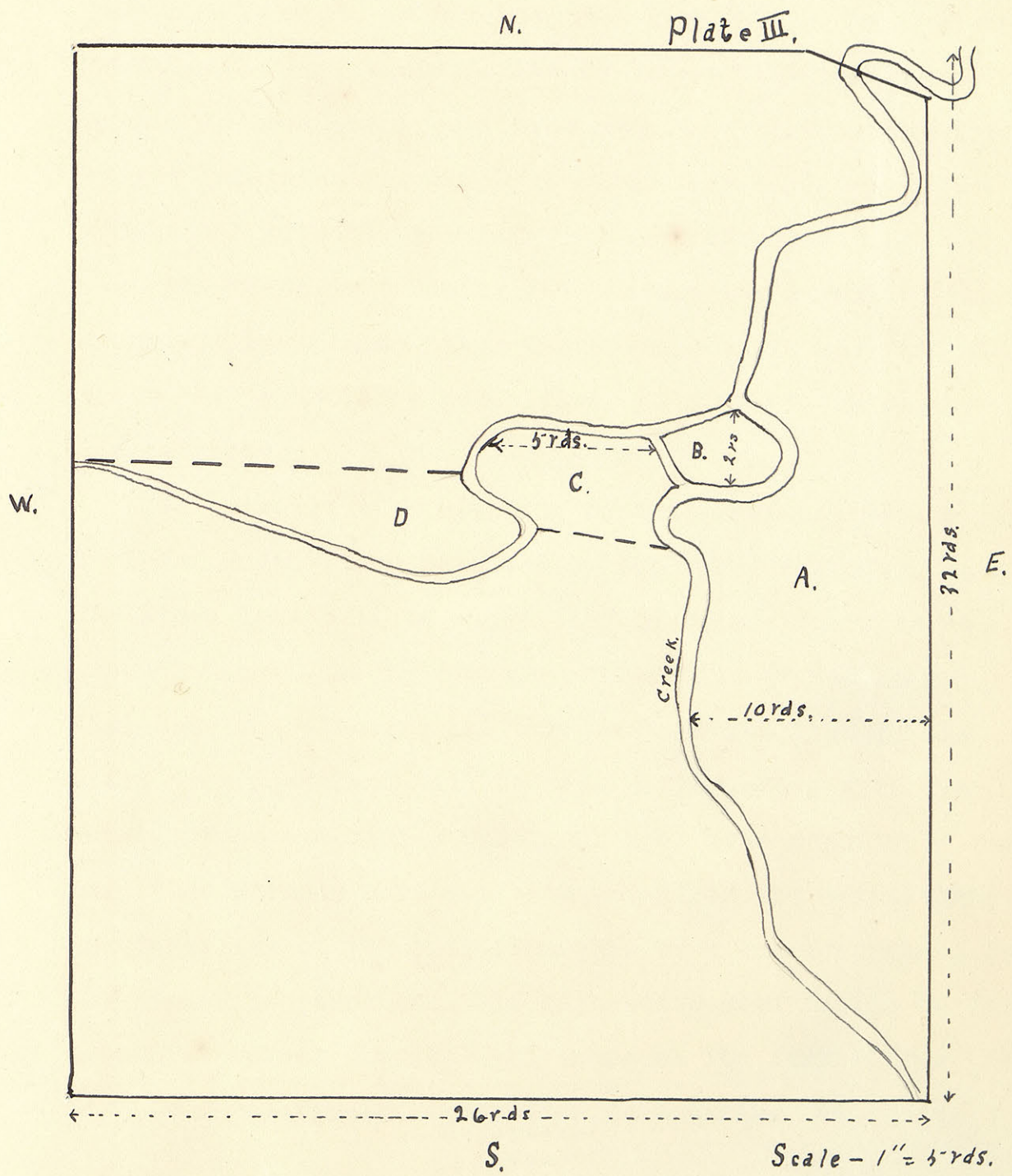
Holding land in such a condition will invariably be a loss to the owner as taxes and loss of interest on purchase money will usually offset any increase in value. If the farmer takes the proper view of agriculture the work of clearing the land will be interesting and he will have the sentimental satisfaction of working out the salvation of his own place." For who would not rather improve his own wooded hills and swampy bottoms than exchange them for the fields of another; the lover of one's own place is happily a virtue that most men possess" A farmer who stops to figure whether such undesirable land would yield enough harvest to pay for its clearing will never have an attractive farm nor extract from farm life the pleasure it is capable of affording.

The farmer, however, should exercise intelligent discretion in the disposition of wooded lands. Since the desecration of our forest amounts to almost a national calamity, every farm should have its timbered tract which should be wisely conserved. Therefore wooded land to a reasonable extent, if it promises to develop into a reasonable, satisfactory forest, other considerations warranting it, should be conserved and given the necessary tending for development of the same. The reckless use of an ax in such a case in a short time may inflict damage that it would take nature many years to repair.

The land to be cleared may be improved gradually as time and means permit and in a short while a most creditable show-







ing will be made. A man with the help of one or more enthusiastic boys, a strong, steady team of horses, a sharp ax and mattock and a good plow working from time to time during intermissions in the regular farm work can accomplish much without over taxation and discouragement. His time and means in subduing the encroaching growth of bushes and in reclaiming other waste lands would be profitably spent and he would be more likely to command the esteem of his neighbors.

As a result of a clearing of land not only will more land for cultivation be added to the farm, but often such reclaimed land will be especially fertile. There is no question about the profitable cultivation of new land. When once the clearing has ^{been} completely accomplished, the yield from such land will be more satisfactory than the harvest from old fields which may have been improperly farmed. When methods have not been practiced for maintaining the fertility of the soil it may be wise and economical for the farmer to plant such old worn and wasted fields to forest trees to protect the soil and increase its fertility.

A Practical Illustration in Clearing Land.

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Plate (I-A) and II represents an area of land of several acres which is a common example of land yielding practically no income to the owner, because of a covering of small wooded growth. The growth on this land is mainly

of a bushy character, consisting of plum, sumac, buckberry and box elder seedlings which will never develop into timber. Although this growth is not dense, the growth of weeds is encouraged and consequently the pasture is rapidly deteriorating and the owner is accordingly becoming impoverished, is losing satisfaction in his farm, and is failing to obtain the greatest pleasure from his farm life.

In clearing this land the principle requisite is to get the work started. The owner should take delight in removing the undesirable growth during winter and early spring while his time is less likely to be occupied by other farm work and when there is the least amount of vegetation to contend with. By first removing a few small trees, the clearing may be done mostly with a plow. In plowing, a good steady, strong span of horses is of first importance as the plow cannot be closely ^{guided} and stumps avoided if it is drawn rapidly. Any standard plow with a good cutter properly adjusted can be used. A mattock should be carried and all roots that do not break should be cut. A continuous furrow should be turned and as many roots severed as possible. If the plowing is repeated for one or two seasons the ground will be completely subdued. Along the creek where the land is liable to be overflowed it is not advisable to plow the ground because of washing that would result, hence it is necessary to do the clearing with an ax or mattock. Weeds may then be cut and the pasture will be improved. In clear-

ing, the desirable forest trees should be preserved where the land is not to be used for cultivation and especially along the creek bank, and these should be encouraged to grow by the removal of all undesirable trees and bushes.

The owner of the land will be certainly be repaid for such work. Besides the satisfaction of having the undesirable growth removed, more or less fuel will be secured and the brush may be used to dam ditches to prevent washing.

The utility of waste land also includes the reclaiming of much land which for some reason other than a covering of wooded growth, cannot be used for producing ordinary farm crops. Such land consists of rocky and rough land, hilly land which cannot be cultivated continuously because of the resulting deterioration from washing, and poorly drained land situated along creeks which is subject to overflow during hard rains and which may be wet during part of the year.

In tillizing land of this character the most common practice is to establish and maintain as long as possible a growth of grass upon it. As such rocky ground cannot be plowed, it is usually kept in native grass and used for pasture purposes. Some tame grasses, however, may be established on such lands by working the seeds into the soil with a harrow or by scattering it in rainy weather, and allowing the rain to beat it into the ground. Such grasses must be hardy and adapted for growing on such land. Hilly land erodes considerably, especially if it is deficient in

humus, when the ground is plowed. If grass is grown for a while and the land then cultivated there will be a smaller loss from washing than if grass had not been grown on such land, because of the greater capacity of the soil to absorb the moisture as a result of the humus added. If such land is cultivated, the cultivation could be done at right-angles to the slope. Plowing up and down hill should be avoided. Such land, however, should be kept covered with vegetation as much as possible. It is well to use it as much as possible for pasture and hay land, the grass grown being especially adapted to building up the soil. Low ground should be drained and also kept covered with vegetation. Grass for low lands should be moisture resisting and should form a dense mass of roots to withstand floods and the tramping of animals in wet weather. Seeding on such land should be done in seasons when hard rains are not likely to occur and wash or drowned out the seed. The ground should be stirred shallow and well firmed at seeding time to insure against the washing away of the soil.

A method of utilizing wet lands that is becoming of much importance is that ^{of} planting them to forest trees. Since it is generally accepted that for the most successful agricultural conditions, from ten to twenty five per cent of the land should be forested, and since timber is becoming an important and profitable farm crop, reclamation of wet land by forest planting is often an economical method of utilizing such land. Since trees can be grown on

wet land, along banks of creeks and on rocky land where no farm crops can be grown, a considerable profit may result from the planting of trees. Red Cedar for instance seems supremely indifferent to conditions of climate, soil, or moisture, and grows nearly as fast without cultivation as with it; hence it is fitted for planting anywhere on the plains.

Practical Illustrations of Utilizing Waste Lands
by Tree Planting.

The land included in (B) (C) (D) (E) --Plate II, can better be utilized for the production of timber than of any ordinary farm product, as much of it is low and shaded by large trees growing along the creek, and the sized and irregularity of the areas would make the cultivation and harvest of field crops inconvenient. The land included in (A) consists of higher land well adapted to farm crops and does not need to be planted to trees except as a commercial investment. The area represented by (C) consists of a growth of Black Walnut trees which by a little tending may be transferred into a sufficiently satisfactory wood lot to be preserved.

When the land is cleared of the present superfluous wooded growth, the higher ground--that included in (A) and most of that in (D) should be cultivated for a year or two until the sod and other vegetation decomposes and all roots are removed, when it will be ready for the planting of the desirable trees. The land which cannot be cultivated should

be planted immediately and the undesirable wooded growth kept removed with an ax or a mattock, while the trees are allowed to grow. For greatest economy, particular care should be taken to establish trees as thickly as advisable in the banks and in the bends of the creek. (F) is a small clayey bluff on which should be planted trees especially adapted to such conditions. Red Cedar and Scotch and Austrian Pines would be satisfactory from the standpoints of adaptability, economy, and landscape effects.

The land represented in plate III and (2-C), plate I, includes much waste land which could be very profitable utilized for tree growing. The land is used for hog pasture, but that included in (A) (B) (C) and (D) is occupied only by dense growth of large weeds, elder bushes, and a few seedlings, while it could just as well be supporting a profitable growth of trees. Considerable timber is at present growing along the banks of the creek but it consists chiefly of trees of poor quality for timber purposes. It would be a profitable investment to remove the inferior ones and replace them by more desirable varieties. Most of the ground in (A) and (D) could be improved and a moisture resisting grass for pasture established, but hogs have access to it during the winter, but temporarily the pasture ^{being} provided for summer; hence grass could not be maintained and as it would not be advisable to keep the

ground loose in growing annual crops because of the danger of washing of the land, ~~and~~ timber production would be the most economical method of utilizing the land.

In preparing the land for planting, that included in (A) can be cleared by plowing in the spring when there ^{are} ~~is~~ no weeds, and a crop grown which may be pastured. Rape, for example is an excellent plant for the first crop upon reclaimed swampy soil, and is well adapted to newly cleared woodland. As most of the wooded growth on the land consists of elder brushes, the roots of which are not hard to eradicate, plowing will not be difficult. The remaining ground must be cleared with an ax and the trees set with a spade without any cultivation of the ground.

The ground ^{along} the creek on the south side of lot (E) plate I, a hog lot, should be planted to high growing trees for furnishing shade and acting as a wind-break. The ground farther west, being moist and fertile and near the house, is well adapted to the growing of fruit trees adapted to moist soil. A plantation of plum trees would do well in such a location and would be a great improvement to the land over its present condition.

By thus ^h managing such lands a blemish to the surroundings is converted into a spot of beauty and much pleasure and satisfaction afforded the owner. He will naturally take much interest in the development of the trees if he ^{is} if he is a true agriculturist, and by keeping a record of the growth, by taking photographs of the various stages, and observ-

ing the processes of nature at work among the trees he will receive much enjoyment aside from the profitable standpoint.

On many farms, especially the more rough and hilly ones, much waste land exists because of the washing of ditches in the depressions of the land, by hard rains. By the formation of such ditches not only is much soil washed away but the farm is cut into small and inconvenient fields. Although the formation of these ditches is inevitable along principal streams and although it is difficult to stop the washing completely in any ditch, much can be done to many of those which exist on the ordinary farm, either by filling them completely ~~or the cultivation of the fields~~, or by preventing their further formation. Prevention of their formation is the best remedy and as soddy land is much less liable to wash than cultivated land, all rough land should be maintained as pasture or hay land when this can be conveniently done. Such land, if well set, will yield prairie grass and should not be broken if it can be used to a good advantage for this purpose. The land in draws at least, where ditches are likely to be formed should not be cultivated if it is considered necessary to cultivate the surrounding land. If a ditch begins to form it should be attended to immediately ^{and} further wash prevented, by filling the ditch if possible. If the land has been cultivated it should be seeded to grass the roots of which are soil-binding and which will withstand overflows. If the wash

is stopped and satisfactory grass sown the banks and bottom of the ditch will gradually become sodded and the ditch filled. For stopping the washing of the ditch, a succession of dams may be built and brush, old straw, etc., thrown into the draw back of the dams. If rock is available and plentiful it may be used advantageously in filling deep ditches in which a strong dam is necessary. In construction the wall of rock should be built up gradually as the ditch fills so that less surface will be exposed to the pressure of the water. In filling large ditches where much time will be required, trees established along the banks and in the bottom will be beneficial in building and collecting the soil, and when of sufficient size can be cut down, the stumps used for braces for the trunks which are laid crosswise, in constructing dams, and the tops for filling in against them.

On the average farm much of the improved agricultural land (that adapted to farming operations) is managed with much less economy than is possible, though much time and hard work be applied to the farming operations. In the management of this land there is a necessity of studying its various conditions and possibilities. Land comprising fields, meadows and pastures, lots, orchards, woodlots, etc., must be managed with much consideration and the various methods taken into account before a definite system is established. The condition^s that must be contended with differ in different farms and hence the same management

does not apply to all farms. The principles, however, apply to the management of all farms and each farmer should manage the land on his particular farm according to these principles.

On all farms the raising of live-stock is an essential branch of the farming operations. Hence provisions should be made in the management of the land for the growing of live-stock as well as of the commercial field crops. Pastures, therefore, must be provided. These, if possible, should occupy fields which can be kept more profitable to grass than in any other crop and which cannot enter into the regular crop rotation system. On low and moist ground or hilly ground that tends to wash, permanent pastures bind the soil while if the ground was in the rotation system much soil would be lost. Pastures which include shade trees, if possible, should occupy ground where the farming operations are not interfered with. If the woodlot is located where it will furnish shade and more or less pasture when beyond the stage of cultivation, and weeds will be kept out by the stock.

If there is no land that would be especially benefitted by permanent pasture, or if more pasture besides the permanent pasture is required, a system of rotation should be inaugurated which will include the desired acreage of grass. New pasture produces more grass than ^a permanent one, and beneficial results are obtained when the pasture is broken and planted again to crops. An early spring or late

fall pasture, consisting of those grasses which start early and those which are resistant to cold in the fall, is a very economical possession and can be composed of a temporary crop which will not interfere with a growing crop during the summer. Rape for instance, will endure quite severe cold weather and thus will last a long time after the ordinary pasture grasses succumb to the frost.

In laying out the land into fields consideration must be given to future advantages. For convenience in tending the crops and in the rotation of crops the field^s should be as uniform in size and area as the lay of the land will permit and should be rectangular in form, extending about one-third farther east and west than north and south if possible; they should also be arranged so as to be made uniform as regards moisture and soil fertility, so that the entire field may be treated as the character of the soil may demand. The small, irregular fields which cannot be conveniently used in the rotation system should be planted to a special crop, preferably a permanent one, as grass for producing hay or pasture, or forest trees for the production of timber.

In the management of farm lands as stated above, it is generally recommended to devote a portion, say ten to twenty-five per cent of the farm to the production of timber. One authority in regard to farm woodlots says: "Forest planting by small land owners is an important line of forest work, and in many sections of the United States is a recognized

adjunct to successful agriculture. By the planting of forests by small land owners many abandoned farms may be made productive, the best kinds of shelter-belts and woodlots secured in newly irrigated sections, the needed protection given to field crops, the necessary wood materials produced cheaply on the treeless plains and prairie, and the whole country made more attractive as a place of habitation."

A writer in the Year Book of the Department of Agriculture for 1902 also says: "It is the experience of both the practical farmer and the forester that it pays to maintain a woodlot on every farm for the production of timber for farm uses. The woodlot furnishes fuel, posts, poles, logs, lumber; it shelters from the wind the buildings, orchards, gardens, fields, and in summer it furnishes shade. It is universally recognized as an essential component of the well-balanced, orderly farm.

The woodlot pays well even if it has to be located on valuable agricultural land, but as on nearly all farms there is variation in fertility, it pays better to use the best land for farm crops and locate the woodlot on the less valuable portion, if that can be done without interfering with any of its important uses."

The Ohio Agricultural Experiment Station advocates the planting of trees for commercial purposes as follows: "We feel safe in making the statement that Catalpa trees planted on soil sufficiently rich to grow a fair crop of corn

and far enough apart so that each tree may have about sixty square feet of space, given a sufficient amount of pruning and proper cultivation, will in from twelve to fifteen years produce a crop that will give a return of at least \$10 per acre for each year from the time of planting to that of harvesting the trees, and in some cases even better and quicker returns may be secured."

Beside growing trees for timber, the farmer should also grow some in various situations as windbreaks and for shade and screening purposes. For such places nut-bearing trees will answer and much enjoyment will be afforded by the nuts produced. In regard to planting these trees, a writer says; "I think every farmer would do well to collect such varieties of nut-bearing trees as seem best adapted to his soil and situation and plant them for shade, screens, or windbreaks, taking care of them as he would of the trees in a fine apple orchard, and in the course of a few years his farm would be more valuable and what is better, a pleasant home."

The management of land included in the various lots on the farm is also a factor in the economical management of farm lands. On many farms the lots are unnecessarily large or there are more than can be kept occupied by stock at least for part of the year, and so are left idle. In these cases it is economical to raise a quick-growing crop on the land, even if a temporary fence must be constructed. Such crops will often be profitable for pasture.

Practical Applications in Managing Agricultural Land.

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The land represented in plate I. consists of much which is poorly managed and which by a little consideration and rearrangement could easily be economically managed. The land represented by (C) consists of hog-pasture separated into two parts by a fence which is partly dilapidated and not hog-tight. This pasture, being the only one, and the hog-pen (E), being small, is occupied by hogs in winter so that a permanent pasture cannot be maintained. The cattle and horse lot (D) is fenced hog-tight on all sides except that connecting it to the hog-pasture. Hence by removing the fence between (1 and 2) - (C) and constructing a hog-fence between (D) and (C), two separate pastures would be formed. Permanent pasture could then be maintained in (1), and (2) could be occupied in winter and pastured in summer, a temporary annual crop being provided. By planting crops in the temporary pasture that will furnish pasture when the permanent pasture will not, as in early spring and late fall, or during the ripening season, continuous pasture will be provided for the entire season. Field (B) consists of much low land and a peach orchard, (1), and is badly cut into small areas by ditches. It is also separated from the other cultivated fields and it would therefore be advisable to maintain it to grass, at least until the ditches can be filled. As the fence around

(C) is not sufficiently tight to hold pigs, (B) should be fenced hog-tight so that pasture may be provided for them. In rebuilding the fence, the one between this field and (A) should be continued straight. (A) will then be sufficiently large so that crops can be conveniently grown on it. If, however, the amount of live-stock kept requires it, it could be established to permanent pasture and joined to the main pasture.

Field (1-H) consists of a permanent meadow which should be maintained for hay or pasture. Lot (D) is unnecessarily large in summer and should therefore produce a crop. By thus alternating the crops on (E) and (D) sanitary conditions will be improved in both lots. Fields (2 and 3) - H consist of land which can be included in the regular crop rotation system.

If the necessary attention is given to the management of farm lands in the future, each farmer carefully studying the particular conditions existing on his farm, the seriousness of the distribution of land will be greatly reduced, and if equal attention is given to farm management in general, the farmer will be among the foremost classes of business men.

Hiram R. Reed.