

crust of bread swimming in a dish of water, as, under a depth of eight or ten feet of earth, the whole was nothing, he said, but mere water. The draining thereof was, therefore, impossible. It was affirmed by his opponents that interest had betrayed his judgment into an evident error, and that his brain, rather than this floating earth, seemed to swim. The savans of Cambridge then urged that the Cam would have its stream dried up by the draining of the fens; and as Cambridge is concerned in its river, so the well-being of the whole country, yea, of the whole kingdom, is concerned in Cambridge and its University, and the stream of knowledge would be dried up with the stream of Cam. It was, therefore, not reasonable that private men's particular profit should be preferred before a universal good, or the good of a university. Assurances were given that no damage should accrue to the river Cam; on the contrary, "to take away the thief is not wasting nor weakening the wick of the candle."

Those who professed to be the poor man's friends brought forward other objections. They said, that the fens were nurseries and seminaries of fish and fowl which would be destroyed by the draining; that the sedge, turf, and reed would likewise be destroyed, and that many thousand people then gained their livelihood by fishing and fowling in the fens, while the turf furnished fuel for the poor. The answers to these objections were forcibly though quaintly put. It was said that a large first course, at any man's table, compensates for his shorter second course; and who would not prefer a tame sheep before a wild duck, and a good fat ox before a well grown eel; while the people employed might turn their industry to a more profitable account. The sedge, &c., would be replaced by good Grass and grain. He cannot complain of wrong who hath a suit of buckram taken from him and one of velvet given instead thereof.

It was then asserted, that even if these marshes could be drained after vast difficulty and expense, they would quickly revert to their old condition, like the Pontine marshes in Italy: the speculators, on the other hand, urged that moderate care would prevent this catastrophe. Well, said the objectors, grant them drained, where would be the advantage? the rich man would jostle out the poor from their commons. Wherefore, it was answered, was this a necessary result? why should oppression be an essential accompaniment to draining or inclosing? an equitable allotment would be made which would benefit the poor as well as the rich.

All these arguments fully impressed the generality of people with the opinion that the project was impossible, and that it was only an idle dream of fanciful speculators. Perseverance and experience, joined to skill and ingenuity, have, however, brought to a successful issue many schemes which have been deemed impossible; and much rich and productive land, by these united powers, have in this instance been brought into successful cultivation. Where the wild-fowl and the fish once held undisputed sway, now graze in luxuriant pasturage the ox and the sheep—where the reed lifted its profitless head now waves the golden harvest—the industry of man has reclaimed a great part, and is constantly reclaiming more, of this once unhealthy and stagnant morass.

Now, whenever we agitate the importance of reclaiming wastes, or of breaking up Grass lands, and many other improvements, we meet, even in this period of enlightenment, with precisely the same class of objections; and why may not the same sort of answers be returned? When we make innovations upon established and antiquated customs, and are confronted by the "very old school," laughing at "theory" and "new-fangled schemes," may we not (amongst other evidences in our favour) point to the fens as an example of what we wish to see effected; for there we find ignorance silenced, prejudice put to shame, and all weak objections vanquished by the skill of the drainers; and we have also the result of their labours left to us as a triumphant memorial of what innovating, skilful, and patient efforts have effected, and a great example of what they may yet accomplish.—I. A. C.

ORNAMENTAL POULTRY.

No. I.—THE GUINEA FOWL.

This is no great favourite with many keepers of poultry, and is one of those unfortunate beings which, from having been occasionally guilty of a few trifling faults, has gained a much worse reputation than it really deserves, as if it were the most ill-behaved bird in creation. Whereas, it is useful, ornamental, and interesting during its life; and when dead a desirable addition to our dinners, at a time when all other poultry is scarce.

The best way to begin keeping guinea fowls is to procure a sitting of eggs from some friend or neighbour on whom you can depend for their freshness, and also, if possible, from a place where only a single pair is kept. The reason of this will be explained hereafter. A bantam hen is the best mother; she is lighter, and less likely to injure them by treading on them than a full-sized fowl. She will well cover nine eggs, and incubation will last a month. The young are excessively pretty. When first hatched they are so strong and active as to appear not to require the attention really necessary to rear them. Almost as soon as they are dry from the moisture of the egg, they will peck each others toes, as if supposing them to be worms, will scramble with each other for a crumb of bread, and will domineer over any little bantam or chicken that may perhaps have been brought off in the same clutch with themselves. No one, who did not know, would guess

from their appearance of what species of bird they were the offspring. Their orange-red bills and legs, and the dark, zebra-like stripes with which they are regularly marked from head to tail, bear no traces of the speckled plumage of their parents.

Ants' eggs (so called), hard-boiled egg chopped fine, small worms, maggots, bread crumbs, chopped meat or suet, whatever in short is most nutritious, is their most appropriate food. This need not be offered to them in large quantities, as it would only be devoured by the mother bantam as soon as she saw that her little ones had for the time satisfied their appetites, or would be stolen by sparrows, &c.; but it should be frequently administered to them in small supplies. Feeding them three, four, or five times a day, is not nearly often enough; every half-hour during daylight they should be tempted to fill their little craws, which are soon emptied again by an extraordinary power and quickness of digestion. The newly hatched guinea-fowl is a tiny creature, a mere infinitesimal of the full-grown bird; its growth is consequently very rapid, and requires incessant supplies. A check once received can never be recovered. In such cases they do not mope and pine for a day or two, like young turkeys under similar circumstances, and then die; but in half an hour after being in apparent health they fall on their backs, give a convulsive kick or two, and fall victims, in point of fact, to starvation. The demands of nature for the growth of bone, muscle, and particularly of feather, are so great that no subsequent abundant supply of food can make up for a fast of a couple of hours. The feathers still go on, grow, grow, grow, in geometrical progression, and drain the sources of vitality still faster than they can be supplied, till the bird faints and expires from inanition. I have even fancied that I have seen a growth of quill and feather after death in young poultry which we had failed in rearing. The possibility of such a circumstance is supported by the well-known fact of the growth of hair and nails in many deceased persons.

This constant supply of suitable food is, I believe, the great secret in rearing the more delicate birds, turkeys, guinea-fowls, pheasants, &c., never to suffer the growth of the chick (which goes on whether it has food in its stomach or not), to produce exhaustion of the vital powers, for want of the necessary aliment. Young turkeys, as soon as they once feel languid from this cause, refuse their food when it is at last offered to them (just like a man whose appetite is gone, in consequence of having waited too long for his dinner), and never would eat more, were food not forced down their throats, by which operation they may frequently be recovered; but the little guinea fowls give no notice of this faintness till they are past all cure; and a struggle of a few minutes shows that they have indeed outgrown their strength, or rather that the material for producing strength has not been supplied to them in a degree commensurate with their growth.

A dry sunny corner in the garden will be the best place to coop them with their bantam hen. As they increase in strength they will do no harm, but a great deal of good, by devouring worms, grubs, caterpillars, maggots, and all sorts of insects. By the time their bodies are little bigger than those of sparrows, they will be able to fly with some degree of strength; and it is very pleasing to see them essay the use of their wings at the call of their foster-mother, or the approach of their feeder. It is one out of millions of instances of the provident wisdom of the Almighty Creator, that the wing and tail feathers of young gallinaceous birds, with which they require to be furnished at the earliest possible time, as a means of escape from their numerous enemies, exhibit the most rapid growth of any part of their frame. Other additions to their complete stature are successively and less immediately developed. The wings of a chicken are soon fledged enough to be of great assistance to it; the spurs, comb, and ornamental plumage do not appear till quite a subsequent period.

When the young guinea-fowl are about the size of thrushes, or perhaps a little larger (unless the summer be very fine), their mother bantam (which we suppose to be a tame, quiet, matronly creature) may be suffered to range loose in the orchard and shrubbery, and no longer permitted to enter the garden, lest her family should acquire a habit of visiting it at a time when their presence would be less welcome than formerly. They must still, however, receive a bountiful and frequent supply of food; they are not to be considered safe till the horn on their heads is fairly grown. Oatmeal (*i. e.* groats), as a great treat, cooked Potatoes, boiled Rice, anything in short that is eatable, may be thrown down to them. They will pick the bones left after dinner with great satisfaction, and no doubt benefit to themselves. The tamer they can be made the less troublesome will those birds be which you retain for stock; the more kindly they are treated, the more they are petted and pampered, the fatter and better conditioned will those others become which you design for your own table, or as presents to your friends, and the better price will you get if you send them to market.

At a certain period they will have got beyond the management of their good mother-in-law, and will cast off her authority. They will form what has appropriately been called a "pack;" prowling about in a body after insects and mast, or grazing together (for they eat a great deal of Grass*) still in a pack; fiercely driving

* Mr. Swainson points out the analogy which exists between the horned birds, the cassowary, curassow, and guinea fowl among the feathered tribes, and the ruminants among quadrupeds; the quantity of Grass eaten by the last mentioned birds confirms his view of the subject.

away any intruder on their society, and all giving tongue in one chorus at the approach of any danger.

Birds thus reared on the spot where they are meant to be kept, are sure to thrive better and give less trouble than those procured from a distance; which sometimes will not remain in their new home, but wander about in search of their old haunts till they either find them, or are themselves lost, destroyed, or stolen. All the poultry-books that I have seen are very meagre, and sometimes erroneous in their directions for the management of the less common fowls. For instance, not one that I am aware tells you that the guinea fowl is a monogamous bird, pairs with his mate, like a partridge or a pigeon, and remains faithful to her (perhaps with one or two trifling peccadilloes) so long as they continue to live together. It is generally supposed that the male guinea-fowl, like the common cock, is pleased with a plurality of wives; and the supposition is acted on with bad practical effect. In the case where a guinea cock and two hens are kept—a usual number—it will be found on close observation that though the three keep together so as to form one "pack," according to their original instinct, yet that the cock and one hen will be unkind and stingy to the other unfortunate female, keep her at a certain distance, merely suffering her society, and making her feel that she is with them only on sufferance. The neglected hen will lay eggs, in appearance, like those of the other, but not so many, probably in the same nest. If they are to be eaten, all well and good; but if a brood is wanted, and the eggs of the despised one chance to be taken for the purpose of hatching (and there is no possibility of distinguishing them without breaking them,—unless, it may be, the oxyhydrogen microscope could be made to throw light through them, as well as upon them), the result is disappointment and addle eggs. If the produce of the favourite (or rather let us say of the lawful) wife are selected, at the end of the month you have so many strong chicks; if a mixture of eggs come to hand, the hatch is in proportion. I have known this occur repeatedly. Therefore let all those who wish to succeed with guinea-fowls match their birds as strictly as the couples in a country dance.

It is not every one who knows a cock from a hen of this species. An unerring rule is that the hen alone uses the call-note "come-back, come-back," accenting the second syllable strongly, from which they are usually called "come-backs," in Norfolk; the cock has only the harsh shrill cry of alarm, which, however, is also common to the female. A widowed hen, whose husband had been unceasingly and irreclaimably impertinent to a noble game cock, and who lately lost her spouse in the duel provoked by his own repeated insolences, is, while I write, piping her melancholy cry "come-back, come-back," under my study window. Back, however, he comes not, nor will come, in spite of her plaintive invitation, which will, doubtless, continue to touch our hearts and grate our ears, till she is consoled for her bereavement by a second union.

Their amours are conducted with strict decorum and privacy. The cock, however, is properly polite and attentive to his own hen in public, walking very close by her side, so as to touch her wings with his own, offering her tit bits now and then, a worm or a grain of corn; he has also a habit of running very quick for a few steps, and then walking affectedly on tip toes, with a mincing air, like the dandy in a Christmas pantomime, setting up his back and increasing his apparent height. These latter symptoms are less evident in youth, when it is necessary to make the selection, and the call-note will be found the safest guide.

Of all known birds this, perhaps, is the most prolific of eggs. Week after week, and month after month, sees no, or very rare, intermission of the daily deposit. Even the process of moulting is sometimes insufficient to draw off the nutriment the creature takes to make feathers instead of eggs, and the poor thing will sometimes go about half naked in the chilly autumnal months, like a fowl that had escaped from the cook to avoid a preparation for the spit, unable to refrain from its diurnal visit to the nest, and consequently unable to furnish itself with a new great coat. As the body of a good cow is a distillery for converting all sorts of herbage into milk, and nothing else, or as little else as possible, so the body of the guinea-hen is a most admirable machine for producing eggs out of insects, vegetables, grain, garbage, or whatever an omnivorous creature can lay hold of.

From this great aptitude for laying, which is a natural property, and not an artificially encouraged habit, and also from the very little disposition they show to sit, I am inclined to suspect that in their native country, the dry burning wastes of Central Africa, they do not sit at all on their eggs, but leave them to be hatched by the sun, like ostriches, to which they bear a close affinity. That they do in this country occasionally sit and hatch is no valid objection to this idea, but only a proof of a constitution modified by change of climate similar to the cessation of torpidity, and to the brown, instead of white, winter dress in animals brought from the arctic regions to temperate climates. Even in Great Britain there are not enough guinea-fowls hatched by their actual parents to keep the breed from becoming extinct in a few years. It is certain that the sands of tropical Africa are more than hot enough to hatch them, and that the young birds are unusually vivacious and independent, if they have but a supply of proper food, which they would find in the myriads of insects engendered there. They are also found wild on

the Island of Ascension, but it is doubtful whether any accurate account of their habits or mode of increase there is extant.

Housewives complain that they are apt to lay astray in the hedge-rows and copes; but what does it matter, if the people about you are but honest (and the way to make and keep them so is to treat them kindly and liberally), what does it matter whether you get one egg a day, or seven at the end of a week? And nest-hunting is always good fun for the children, and sometimes for the master and mistress. The cock attends his own hen to the nest, waits for her close at hand till she has made her daily contribution to the treasury already there, and occasionally will betray the situation of the secret hoard by his extreme solicitude in announcing the presence of intruders.

Eggs of the guinea-fowl are occasionally produced covered with wrinkles, as if the shell had shrunk in the process of hardening. These sometimes are confined to one (the smaller) end, and sometimes extend over the whole surface. They are evidently the result of weakness or over exertion of the egg organs, appearing in young and healthy birds only at the close of their long laying season; in old and weak ones, showing themselves in the first-laid eggs, and increasing in depth and extent as the season advances. The same thing is less frequently seen among turkeys that are about to cease laying. Such eggs are quite good for the table, but should not be taken for the purpose of hatching. They appear to contain a less proportion of yolk than the perfect egg.

Guinea-fowl are in season from the middle of December till April, but are usually reserved till the latter part of that term, in order to occupy the gap caused by the deficiency of game. They usually weigh from 3 to 4 lbs. each, and fetch from 5s. 6d. to 7s. the couple in Norfolk. It is of no use attempting to shut them up to fatten, unless they have previously been made particularly tame, as they would sulk, pine, and die before they became reconciled to confinement, in spite of its extra diet. The only plan, therefore, is to keep them in high condition during the winter, by liberal hand-feeding. The practice is not to kill them with the knife, like other poultry, but to dislocate their necks, leaving the blood in them to remedy the dryness of their flesh, which is the great fault an epicure would find with them. They should also remain in the larder as long as possible before being cooked. It was formerly the fashion for farmer's wives and daughters to make tippets and muffs of the smaller feathers, which much resembled chinchilli fur in appearance, and were both elegant and useful.

The plumage of the guinea-fowl is singularly beautiful, being spangled over with an infinity of white spots on a black ground, shaded with grey and brown. The spots vary from the size of a pea to extreme minuteness. Rarely the black and white change places, causing the bird to appear as if covered with a network of lace. A white variety is not uncommon, but is less hardy, and it is doubtful for how long either this or the former one would remain permanent; probably but for few generations. Pied birds blotched with patches of white are frequent, but are not comparable in point of beauty with those of the original wild colour. The head and face are remarkable. The scarlet wattles, naked skin, distinct mark of the eye-brow, bright glancing eyes, and comical quick expression, make, at a front view, a perfect miniature of a clown dressed and painted for the circus or the pantomime.—D.

THIN SOWING.

One fact is worth at least one thousand speculative opinions. I therefore send you at foot the comparative results of two experiments with 5 pecks of seed Wheat versus 8 pecks of seed Wheat. This is the third year of my experiment; and as usual the smaller quantity yields the largest return, besides saving the additional seed. In one case the saving is equal to the rent of the land; the corn was carted, threshed, and measured in the presence of myself and the labourers, some of whom had made bets as to the results. The ground was accurately measured. I had several pieces with only one bushel per acre, which certainly were in appearance more productive than the 5 pecks.

It will, no doubt, surprise some of the "old school" that my yield of Wheat should, on these two poor fields, be nearly 7 quarters per acre (including tail); but they must bear in mind that I do not waste my liquid manure; that I do subsoil; that I do drain 4 and 5 feet deep in stiff tenacious clays; that I do use Linseed; and that I do grow Wheat every other year on the same land. With me the rule is to sow thin; the exception, to sow thick on a few stetches for the convincing of others.

I consider it a very grave reproach to agriculturists generally, that they assume that thin sowing does not answer; instead of trying annually a few stetches in every field. Surely the prospect of saving and gaining 14s. to 21s. per acre ought to induce them to throw aside the prejudices of their forefathers. It is a great national question. A man who sows thin must make up his mind to be pitied and censured all the winter and spring by most of his visitors, and by all his labourers; but as harvest approaches he will see in the heretofore confident visages of mere practical men an amusing and peculiar contortion of dubiosity, and ultimately an humiliating but unwilling confession of defeat and surprise. In the spring the thick sown corn stands out in bold relief as far as one can see the field, and is trium-

phantly pointed at by the thick sowers; but as harvest approaches the thin sown gains ground, and like a good horse distances its exhausted competitor at the finish.

It cannot be said that this season was favourable to thin sowing. From November until the end of April vegetation was nearly at a stand still. My fox-hunting friends in March reported my farm to be like a clean fallow. Letters of condolence poured in from every side; still I fancied I could trace in the apparent anxiety for my crops an occasional ill-dissembled smirk of inward triumph. It afforded me much amusement one day in July to see nearly 100 agriculturists of eminence trying in vain to find out the thick sown stetches, although told of their immediate locality. It proves that the thin sown is thick enough at harvest time.

I think we must really consider this a settled question—at all events in the midland and southern counties of England. The only doubt as to the quantity of seed would be in the north of England, where their harvests are later. As the tendency of thin sowing is to retard the ripening about three to five days, it would be necessary to sow somewhat earlier. My Wheat was all harvested by the 20th of August, even where sown so late as November. I find, practically, that ample manure forwards the ripening. As to the injury from vermin, much will depend on ourselves. The application of common salt, and the use of Crosskill's heaviest roller after sowing, and the moment the Wheat appears above ground, and also at other more advanced stages of its growth, will effectually prevent damage: where I neglected this, I suffered. But still, where only one bushel was sown, and much of it destroyed by injudicious spring harrowing, and by wire-worm, I expect nearly 5 quarters per acre.

I consider the great bulk of land in the United Kingdom totally unqualified for thin sowing in its present weedy, woody, undrained, and half-starved condition. Landlords, and tenants too, must alter strangely before thin sowing can become the "custom of the country;" but on well-cultivated and drained land it must answer.

Some amusing incidents occasionally illustrate, very unintentionally, the advantages of thin sowing. A neighbour of mine, desirous of securing his plant of Clover, sows 1 bushel of Oats per acre. He finds that he gets so much straw that he thinks of going back (!) to 3 bushels again!!! It is absolutely a fact that we get quite as much weight of straw from thin sowing as from thick. Mr. Wm. Hutley (who farms in a first-rate way in this neighbourhood) had 180 acres of Wheat this year, sown with 6 pecks per acre. Although sown in November and December, on very heavy undrained land, it was so luxuriant that he was obliged to flag some of it, to prevent its going down; and I know of many other successful instances of thin sowing. In fact, it is rapidly spreading in this neighbourhood; but surely Mr. Hewitt Davis's beneficial and long-continued practice ought, alone, to bring conviction to the most resolute and prejudiced advocates of thick sowing.

I dibbled one acre of Barley with 3½ pecks of seed last January. One-half the acre was miserably poor black sand,—the other half of better quality. It was after Swedes drawn off, and no manure to compensate. The produce of the whole acre was 38 bushels of extraordinary heavy Barley, weighing 55 lbs. per bushel. The best half of the acre was estimated to be more than 6 quarters per acre.

I also had an acre of Oats dibbled with 3½ pecks, an excellent crop, not yet threshed.

Name of Field.	When sown.	How deposited.	Quantity of seed per acre.	Quantity of Land.	Produce per Acre.	Quality of Soil.	Weight per Bushel.
			pecks.	Stetches	bush		lbs.
Oak...		Drilled	5	2	58	{ Poor tenacious tile earth	62
"		"	8	"	57½	"	"
11 acres		"	5	"	55	"	"
"		"	8	"	53	"	"

The above was the result of the first dressing, and includes the tail Wheat. The sample being rather cold and damp, the Wheat was spread on a floor for a week, and rendered perfectly fit for grinding. The tail was removed, and the ultimate quantity of clean marketable Wheat, weighing 62 lbs. per bushel, gave—Oak field, thin sown, 52 bushels per acre, thick sown, 51½; 11 acres, thin sown, 48½ bushels per acre, thick sown, 47. There was no material difference in the samples or weight of thick or thin sown.

All my Wheat fields were salted this year in the spring: the heavy land at the rate of 4 bushels per acre, and 8 bushels per acre on the light land. The effect was excellent.—J. J. Mechi, *Tipree Hall Farm, Kelvedon, Essex, Sept. 9.*

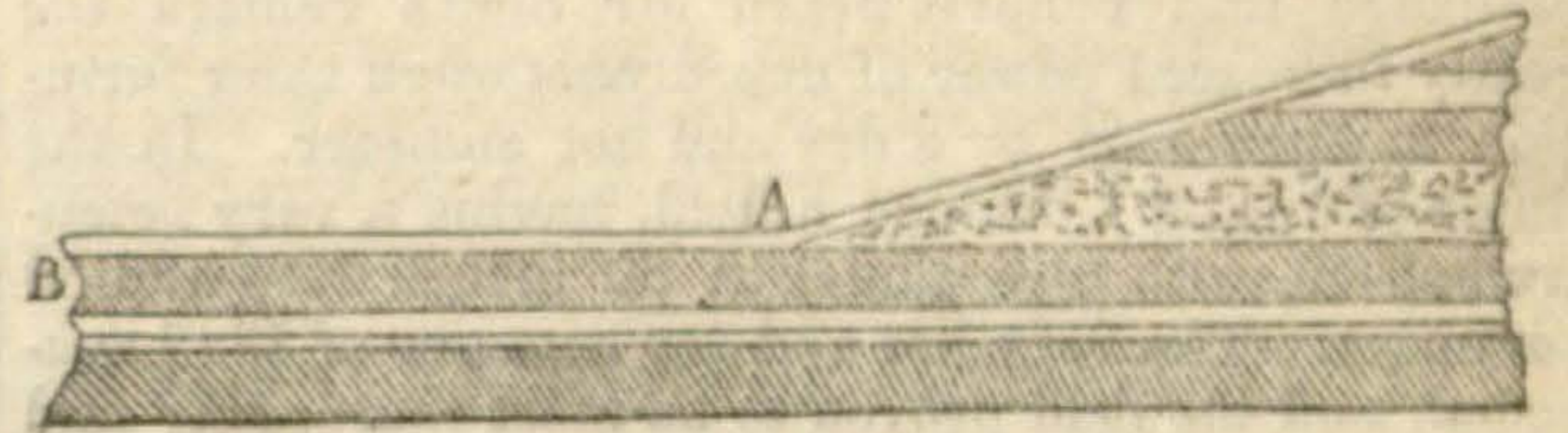
ON THE DRAINAGE OF LAND.—No. II.

If we examine the structure and configuration of the earth's surface, or rather of any of our acreable lands, we find in the first place a superficial homogeneous layer, which we call the soil—more or less deep, according to the quality of the land, or the nature of the cultivation to which it has been subjected. Below this layer lies the subsoil, which, unlike the soil, is generally composed of several separate and distinct layers or strata lying upon each other. These strata vary very much in thickness; some of them are only a few lines, while others are several feet thick. They also vary very much in their other qualities, and in the materials of which they are composed; but the point which more immediately concerns the subject of our present inquiry

is their very different powers of transmitting water. Some of them are comparatively impervious in their natural state, while others are so perfectly porous that water flows through them with the greatest facility. To the former class belong layers of clay, while the latter embraces seams of sand and gravel.

Every person who has seen cuttings made into the subsoil, as in the case of draining, sinking of wells, or in railway cuttings, &c., must have remarked the opposite properties of the different seams or layers. Sometimes a bed of a clayey nature is cut through, yielding no water, when suddenly a stroke of the spade into some highly porous seam, lying immediately beneath it, is followed by such a gush as to flood the trench. The converse of this also often occurs. After digging through a stratum filled with water, like a sponge, another is reached from which hardly a drop exudes. The strata generally lie in somewhat of a horizontal position; so that in flat land they lie over each other like cards in a pack, and are reached in a regular uniform succession in the course of cutting for drains. On sloping lands, however, the edges of the strata often reach the surface ("crop out"), so that a layer which is many feet below the surface at one point, is often at another in contact with the soil.

The following sketch will assist the explanation which has been given.



Every one at all conversant with sloping lands in an undrained state must have noticed those exudations of water in particular places, called "spouts," "springy land," "water croppings," &c. These are occasioned by some highly porous stratum reaching the surface as at A, immediately above a very retentive one, B. In wet weather the water collected by A continues to pour from it, saturating the whole of the land lying below it upon the retentive stratum, B.

The method practised by the old drainers in a case such as that described, was to put in a drain immediately above the line where the water shewed itself, or according to the words of their rule, "just between the wet and the dry." There can be no doubt that where draining across the slope (which I shall endeavour to show to be an objectionable plan) is practised, this ought still to be the rule for its application; for if the drain be opened higher up so that the bottom of it is above or nearly on a level with the wet stratum, the latter, from its great porosity, will still draw a considerable portion of water from the drain itself by its old channel; again, if the drain is made some distance below the line, there will be a wet space between the point where the wet stratum crops out and the drain.

Both soil and subsoil possess a property which plays a very important part in the drainage of land, that of expanding when wetted and contracting when dried; but as the ends of a field cannot approach each other to suit the contraction which takes place, in dry weather both soil and subsoil are torn asunder and divided into small portions by a network of cracks and fissures, the sum of which represent the amount of lateral contraction which has taken place throughout the field. This circumstance is familiar to every one, and most persons who are conversant with strong land are aware that in some seasons these fissures extend to a great depth.

The phenomena to which I have adverted are of the utmost consequence in drainage; indeed it may well be doubted whether, without such properties in the soil or subsoil, we could drain our clay lands at all. It is also worthy of observation here, that on stiff soils the cracking action is strongest; so that Nature seems to second the efforts of man, and compensates the want of porosity in clay by the more powerful development of a property which, under skilful treatment, renders it almost as easy to drain as the more porous soils. The tendency of draining is to increase and guide this cracking action, a fact which I think has been too little noticed by writers on the principles of draining.

Drains act in two distinct ways in drying land. The first of these which I shall notice is familiarly known by the term "drawing." This term is rather vague, indeed I apprehend the proper and precise meaning to be attached to it is but little understood by those who use it. It seems to refer to the capillary action which goes on in the soil and subsoil in the vicinity of a drain. Soil, like a sponge, will retain a certain portion of water, but as soon as that is exceeded it gives it off if an outlet is afforded. When drains are first formed, the portion of earth nearest them begins to give off its excess of water; but the equalising capillary action immediately supplies its place, by drawing a part of the excess from that portion next furthest from the drain, to be in turn replaced by the excess from that portion next again; and so on through the whole mass of soil and subsoil until it reaches the point to which the next drain extends its action. After this action has gone on for some time, if the season is a dry one, the soil next the drain gets very dry, and the cracking process commences. It is worthy of remark that the main cracks or fissures all commence at the drain, and spread from it in almost straight lines into the subsoil, forming so many feeders as it were to the drain. These again have a number of small fissures proceeding from them, so that the whole mass of earth is divided and subdivided into the most minute portions. The main fissures are at first small,