THE DAILY RECORD-UNION.

SEPARATION.

A wall has grown up between the two—
 A strong, thick wall, though all unseen;
None knew when the first stones were laid,
 Nor how the wall was built, I ween.

And so their lives were wide apart,
 Although they shared one board, one bed;
A careless eye saw naught amiss,
 Yet each was to the other dead.

He, much absorbed in work and gain,
 Grew soon unmindful of his loss;
A hard indifference, worse than hate,
 Changed love's pure gold to worthless dross.

She suffered tortures all untold;
 Too proud to mourn, too strong to die;
The wall pressed heavily on her heart;
 Her white face showed her misery.

Such walls are growing day by day
 'Twixt man and wife, 'twixt friend and friend;
Would they could know, who lightly build,
 How sad and bitter is the end.

A careless word, an unkind thought,
 A slight neglect, a taunting tone—
Such things as these, before we know,
 Have laid the wall's foundation stone.

AUTOBIOGRAPHY OF AN AGNOSTIC.

IN FOUR PARTS.

I.

My name—No, I purpose in this sketch to assert nothing but what I can bring forward sound evidence to prove. The antecedent improbability of any man's having been christened Diggory Nonsuch is sufficiently obvious; and the remoteness of Penzance, my alleged birth-place, has prevented verification by personal inspection of parish registers. The point itself is of minor consequence, since Diggory Nonsuch Andrews is unquestionably the appellation to which I have been taught to respond.

Already, when a fourth-form Eton boy, I was no less powerfully than mournfully impressed by the spectacle before me of some 800 young minds daily according implicit belief to fresh facts, historical and scientific, handed down to them on testimony and trust alone; facts scarce one of which their teachers could have defended on rational grounds, much less have rigorously and scientifically demonstrated. The germs of the principle that has placed me apart from, and I trust above, the unreflective herd, and that culminated in my stern resolve, never—however habitually I might be compelled to *act* as if I believed—never, so help me reason! to allow my mind to accept positively what admitted of a doubt, were nacent in me, even at this early period. And as all persons, in advanced age especially, are liable to corruptions of memory, such as counterfeit recollections, waking dream-fancies or confusion of imagination with reality, sometimes even to the extent of deranging the sense of identity, before leaving school I desired my cousin Frank, an adept at such arts, to tattoo on my arm three distinct impressions of "Floreat Etona," with the lilies, the device of the college. So to this day, whenever the statement that I am an Etonian is called for, I have only to raise my sleeve to corrobrate by the evidence of my senses the testimony of memory—in itself, and when applied to a remote past, often illusive and inadequate.

At Oxford similar speculations ceased not to beset me, and with ten-fold force. Of all my university associates, not one could be said to live in the region of calm, accurate observation. Nothing could exceed the contempt with which I learned to regard the overwhelming majority of my fellow-men, ready and eager at every moment of their lives to embrace facts and statements, and dispense with close scrutiny. Which of them ever probed the foundations of any particular belief? Which could have logically justified his faith in—say the existence of Alexander the Great, or the motion of the earth? Enough for them was the verdict of "competent judges." As though it was final! As though "competent judges" had not also believed in Romulus and Remus, and the motion of the sun! My conviction that the only true standpoint is the negative one was not only established, but its importance as the one certainty so possessed itself of my mind that I could no longer ignore its lessons in my course of action.

After taking my degree I chanced, before returning home, to pass some days under the roof of a garrulous maiden aunt. I mention this, as it was her conversation that drew my attention to some peculiar circumstances connected with my first appearance in this world, which forced me to ponder the possibilities of error to which we are exposed in such matters, when reposing unhesitating faith in the statements of interested witnesses. And the particular application of my theory of philosophic doubt, thus prompted, was one that materially affected my future.

I came home with flying colors, a first class and other honors; a distinction that seemed to surprise and delight my parents in about equal measure. My mother, indeed, could talk of nothing else.

"It was always my prayer to live to be proud of you, Nonsuch," she observed one day, when we were alone, with playful fondness; "but you have upset all our calculations, I must tell you. Brought up as you have been, that your conduct should be all we could desire we had perhaps a right to expect. But that our son should distinguish himself as a scholar—"

"Is most singular," I chimed in; "I quite concur. It is a well-known fact that nearly all intellectual men have had intellectual mothers. Marked abilities must have some origin, and can usually be traced to the maternal side. Now in you, my dear mother, though I perceive in you no actual deficiency, these qualities are, to say the least, not strongly developed."

"Nor yet in your father," she reminded me, nettled. I could not contradict her, as I mused uncomfortably.

"As to that," she began, by and by, "we might as well wonder how you came to be so good-looking. It was not for beauty your father married me, my dear; nor—"

"Nor is that, nor ever was it, his strong point." My intelligence supplied the last words she did not utter. My own prepossessing image met me in the glass opposite, like a challenge to the veracity of my earliest and most cherished convictions.

"Well," she resumed, caressingly, "with your handsome face and your talents, you may be a wonder—a prodigy. What, then? The better for you, the prouder your mother!"

"Are you my mother?"

I half started as the phrase, expressive of a doubt I could no longer conscientiously disregard, escaped me involuntarily, aloud.

"Nonsuch!" Impossible to describe her horror-stricken tone.

"Am I your son?" I repeated, subjecting her countenance to a narrow scrutiny as I spoke. But her shocked look might have been caused equally well by simple astonishment, or sudden dismay at apprehended exposure.

"Do not misunderstand me," I urged mildly; "I am far from my denying my parentage. A confident assertion to that effect would be as unwarranted as one to the reverse. Project your imagination, mother (I may call you so in the absence of proof to the contrary), and look, from my point of view, at my reasons for suspending judgment."

She looked dumbfounded, and listened with increasing bewilderment. I went on: "I am your only child. After six years of matrimony you and my father were a wretched couple. You were childless, and this, the only flaw in your domestic bliss, was a fatal one. The family property seemed likely to fall naturally to my uncle—a scapegrace relation you were ashamed of—and his heirs. Supposititious children have been introduced into households from slighter motives than these. The practice may even be frequent, since only those clumsy attempts come to light where the artifice fails. The deception would have revolted you, no doubt, and all deception is wrong. Still the strength of the temptation, and, above all, the laudable motive—the bequeathing of your wealth to an individual carefully trained by yourselves instead of to my cousin Frank, who might reasonably be expected to grow up a scamp and a spendthrift like his father—these, I say, were extenuating circumstances."

"Nonsuch," she gasped, breathless, "are you laughing at me? You must be mad."

But I persisted. Now the subject had been broached I felt it behooved me, in self-justification, to make the strength of my position as clear as possible. "Where is the nurse who took charge of me as an infant? You do not know. Dead or disappeared. Could she be found her evidence might support your testimony, or it might not. In default of such evidence I must hold my judgment open to accept any theory that may offer."

"I can't believe my ears," she faltered aghast, as I proceeded.

"Consider, I resemble neither you nor my father in any notable particular. I have gifts of mind and person of which I search in vain for the slightest trace in you. The proofs, so far as they go, are against you. Briefly, I have accepted the theory of my birth on the same ground as, at six years old, I accepted the history of Jack the Giant-killer—oral evidence."

She started up; I thought she was going to fly into a passion, and expostulated, "You have no cause for displeasure, dear mother. I will always call you so, if you like. Indeed you may be my mother—you probably are—I assert nothing. The case is one of conflicting possibilities. On what grounds am I to choose between them?"

"You're talking nonsense, Nonsuch," she said angrily.

"I readily grant," I soothingly responded, "that all hypotheses except one—that I am your son—seem extravagant and improbable. This, however, is merely the way in which they strike on our imagination."

I was going to elucidate, when at this juncture my father entered the room, and asked in some alarm what was the matter, for my mother—such is the inveterately unphilosophic habit of the female mind—seemed nearly beside herself with indignation. The salient contrast of so vehement a temperament with my own could not but strike me forcibly, confirming my doubt respecting my origin.

"Hear what he says!" she exclaimed to her husband distractedly, throwing up her hands; "that he is not our son!"

"Nay, nay," I remonstrated, and hastened to resume my chain of reasoning; premising it by a solemn assurance that, indebted to them as I was for nurture and education, my regard was established on a solid basis. Only in the question before us I refused to be biased by gratitude or affection, or anything, indeed, but reasonable argument.

I knew my father's irritability, and dreaded an outbreak. I strove to avert it, but in vain. A storm of irrelevant reproaches burst from his lips. Fresh argumentation on my part provoked only a fresh volley of injurious epithets—I caught at the one "unnatural."

"My sentiments, you state, are such as in a child of yours would be abnormal. This, if true, tells in favor of my hypothesis—"

My father came striding up to me, his features convulsed with rage. "Sir," he said, "I don't know if I can credit my senses. Answer me this: Do you mean to tell me you want further proof of your parentage before you subscribe to it?"

"As matters stand I have no warrant for subscribing to it," I replied, with heroic frankness. "No proof is forthcoming but your statement. Evidence, to be satisfactory, must be as good as can well be imagined. And if any theory be barely possible, such as that of my supposititious birth, I am bound not to reject it—at least not without calm, thorough investigation."

I drew a veil, out of regard for my reputed father, over the sequel. Suffice it to say I was forbidden his house, his presence—prospectively cut off with a shilling—treated, in short, precisely as though I were an alien, the mere suggestion of which possibility had occasioned this uproar! I pointed out this inconsistency to the elders, but it merely aggravated them afresh.

I returned to my rooms in college—which I still held—to consider my next step. Deeply though I lamented the breach, my dominant feeling was regret at the deplorable spectacle just revealed to me of human intolerance and unreason, that can exact from you blind belief without argument, openly requiring you to do without it. My solace was a high self-approbation at my readiness to imperil my most material interests sooner than swerve from my dire determination to follow truth wherever it leads, even through apparent paradoxes.

II.

At my rooms I found a note awaiting me. The contents, which staggered me not a little, ran as follows:

Sir: I am in search of a tutor to undertake the entire charge of my youngest son during the approaching absence from England of myself and the rest of my family. Professor X. has spoken of you to me in terms that incline me to desire your acquaintance. The best way will be for you to join the professor and myself at luncheon to-morrow at 2 o'clock.

The letter bore the signature of the Duke of Midlothian.

If I was elated it was for an instant only. I saw through it at a glance. It was not the first of such tricks my cousin Frank had played me. Paper and envelope bore the arms of St. Radigund's—his college. An invitation to lunch with a Duke, indeed! A good joke! An offer of tutorship to his son, and on the recommendation of Professor X., of whom I had made a life enemy by disputing with him (successfully) the meaning of a passage in Homer! A likely story! Yet so easily are we betrayed by an inward inclination into giving credence to appearances flying in the face of all probability, and contradicting all previous experience, that another than myself would have blindly fallen into the snare, I complacently reflected, as by and by a pretense was made of calling for an answer to the note.

I replied that there was none; and when, later, Frank himself dropped in, the hoax had nearly passed out of my mind, which was indeed more seriously occupied. I intimated to Frank that I had had a quarrel with my "governor" (an appellation to which no exception on the score of accuracy could be taken), and expected to be thrown awhile on my own resources. He was sympathetic, so far as his over-sanguine disposition allowed, concluding with the cheerful prophecy, "Never fear but you will get into some good berth or other. With your class distinctions you are sure to get on. Depend upon that." Such unauthorized presumption I felt bound to qualify in some measure.

"Though my name be on the first-class, it would be rash to infer that I came up to the standard. The examiners may have been prejudiced in my favor—my success due to some happy hazard. There are ways of accounting for it equally conceivable with that of superior excellence."

Argument always bored Frank. He yawned and looked about. "Talking of tip-top men," he remarked, "do you know we have one stopping up at St. Radigund's—a first-class man, and a Duke, too! A friend of Professor X. Have you heard?"

"Oh, yes! I have heard," I replied, laughing; "and he requires a tutor for his son, and wants to appoint me. Are you sure he is not in search of a *parti* for his daughter, and thinking of offering me her hand?"

Frank gazed at me in blank amazement.

"Don't pretend innocence," said I, "or suppose I believed in your letter!"

"Letter—what letter?"

I tossed him over the document. He read it and looked up in dismay.

"Gracious powers! Nonsuch! You took this for a practical joke?"

"The balance of evidence—" I began.

"Balance of balderdash! What have you done? What have you answered?"

"Answered? Nothing. Sent the messenger empty away," I laughed.

Frank sprang to his feet in consternation. "Good heavens, Nonsuch, what a fool you are! Upon my honor, I had no hand in it. The note is from his Grace himself. How can you have doubted? Send round at once and get out of the scrape if you can. Say you were away; say your scout made a mistake. But don't spoil your chance and tell me it's my fault."

His reiterated protestations induced me to consider the possibility, I had indeed too hastily discarded, of the document's being genuine, which it proved to be. I called on his Grace, met with a gratifying reception, and was shortly appointed private tutor to Lord Herbert Fanfarron, a boy of 14, whose delicate health forbade his accompanying his parents on a projected Egyptian tour.

I pause to add that, though the upshot showed the exceptional event to have actually happened, had I forfeited the engagement through my hesitation to believe when the balance of probability was clearly on the forgery side, I should have found ample consolation in the reflection that unquestioning acceptance would have been a more irrational course than the rash skepticism that so nearly cost me dear.

A month later the Duke, Duchess, and suite, were en route for Egypt, and I was settled with my charge at Nineoaks—a glorious place overlooking the river. Weeks flew quietly by. My pupil gave me no trouble, unless it were that of keeping duly ahead of his curiously rapid progress. For playmates he had his cousins, the Spencer Fanfarrons, at the rectory, Lollham—a family living not a mile off; a charming household, with whom I was soon on the best of terms.

One day my pupil's eldest brother came bearing down upon us and carried off the boy to Ascot—an unexampled treat. I spent my unexpected holiday out of doors in serious introspection, not unmixed with self-reproach. Lulled by pleasant surroundings, I had hitherto not so much as asked myself the question whether my scholar's satisfactory progress, of which I had written so decisively to his father, might be referred to other causes than that of natural ability.

As I stood cogitating on the edge of the wooded hill-side by the river's brink I saw a canoe coming up stream with a lady in it—a young lady. She seemed making for the point where I stood. With the utmost dexterity she paddled alongside, and sprang ashore.

Now, visitors could land here only by special permission. As she moored her craft I looked round for Mumbles, the keeper at the lodge close by, whose business it was to warn off trespassers. He did not appear. Was it now my duty to ask the damsel for her ticket?

I advanced dubiously. Our eyes met. She looked frankly amused.

"Oh, I beg pardon," she began, "but am I now speaking to Mr. Andrews?"

I bowed assent. She was laughing irrepressibly.

"You were going to tell me I was trespassing. Oh, but you were?" with another little peal of merriment. "That was Mumble's business, though," and she ran towards the lodge.

"Mumbles, what are you thinking of?"

Mumbles had wakened from his nap, and now stood in the porch, with his cap in his hand and a broad grin on his face, while she rebuked him.

"Fie, Mumbles! All the tourists from London might have landed without tickets! Is this the way you do your duty?"

"Please, Miss Vivia," apologized the culprit, "not a party has been all day, and they always come, when they do come, in time to take lunch. It's nearly 5 o'clock, so I thought—"

"Well, well! There's no mischief come ashore—except me! I'm going up to the hall. But, I declare! they have altered the paths! Mumbles, I shall lose the way!"

I volunteered to show it, excusing myself for not having instantly identified the fair visitor, Miss Vivia Spencer Fanfarron, the rector's eldest daughter, absent hitherto with friends on the continent, but daily expected home. My stupidity was perhaps due to my bewilderment at the apparition of so charming a young lady, and so vivacious a one. All the way up the wood she talked—of what, I scarcely knew, engrossed as I was in admiring her youthful English loveliness, bright eyes, sunny hair, dazzling complexion, and pretty movements, as she stooped to pluck the wild-flowers or turned back to catch glimpses of the river. From the woods we emerged into the rhododendron shrubberies, and the steep gravel walks leading to the plateau above, crowned by the deserted mansion.

"Now, where shall I find Bertie?" she asked.

I explained that "Bertie" was not at home. She looked blank, then laughed.

"Why didn't you tell me? I know what you are going to say—I never asked you. I forgot. So did you. We are quits then! But what else did you suppose I came here for? Well, I shall just run in and see Tom" (Mrs. Tomkinson, the housekeeper), "and old Blossom" (a superannuated nurse.) "It's too bad to go without seeing Bertie. I must leave a card. I promised him my photograph, and brought it to-day. Put it in his room, Mr. Andrews, and tell him to come and see me to-morrow."

And she ran in-doors. I waited on the broad stone balconies to see her come out again. I watched her flit down the lawn, round the rosery beyond, and vanish in the beech woods. Presently I caught a glimpse of her canoe floating down the stream in the glow of the summer sunset.

To "Bertie," when he returned, I duly delivered his cousin's portrait and message. To the rectory after lesson hours on the morrow he went—I, also, alas!

I pass briefly over this phase of my existence. My experience is one familiar to all—a first, a fervent love. Why dwell on the particulars of its evolution?—the afternoons at the parsonage, the lawn-tennis matches, the five-o'clock teas and the strawberries, and whether over the court, or the tea-pot, or the strawberry beds, the same divinity presiding, with the golden hair, brilliant complexion, sparkling eyes, and merry tongue—the little witch who speedily absorbed my thoughts and affections and aspirations. In vain! So I feared, until one memorable moonlight night, when, on our way back from evening church I betrayed myself, letting fall a lament that my estrangement from my family, "on account of my opinions," forbade me to ask another to share my hazardous fortunes. How sweet was her impulsive reply!—that only indifference could hesitate thus, since where sympathy existed any hazards must be sweet to share.

Our engagement was soon an understood thing. "Bertie" was overjoyed; the Rector gave his sanction. My present predicament made me anything but a brilliant *parti* in a worldly sense. But I was popular with the family, and the ardent girl declared herself ready to wait years—centuries, if need be!—in faith and hope.

Were memory an unerring guide I must put down these six months as the happiest of my life. But we know how memory, despite the look of perfect sincerity it wears, can play us false. It is open to me to suppose that, when in this act of recollection I seem to be reaching the past, I am but grasping a shadow. But that the period was one of lapse from my lofty principles of universal skepticism, is, alas! beyond dispute. The romance of my love, my success with my pupil, which contained despite my sentimental distractions—I so far forgot myself as tacitly to accept both as verities, without examination or inquiry.

I was roused to a sense of my slackness in the latter respect, by a letter from the Duke, expressive of his content with my services, and couched in terms whose positiveness awoke the philosopher in me and made me smile.

He was in England for a fortnight, previous to rejoining his family, now in Italy. The conversation he desired with me on the subject of his son took place at his London residence. The young gentleman's progress in various departments of knowledge, as displayed in his school exercises, was astounding indeed, considering his years; still, I was but half prepared for the tone taken by his father on the occasion of this interview.

"I purposely," he said, "refrained from expressing to you my own opinion of my son's mental capacity, wishing you to form your estimate without any previous bias. Your letters showed me it had struck you as forcibly as I had anticipated, and in looking over the exercises and compositions you forwarded at my request, I own myself more and more astonished. His progress these last six months would be alarming, were it not so well sustained. It is demonstrated beyond all possibility of doubt; the boy has extraordinary ability."

A proposition so crudely stated, in terms of unmitigated certainty, has at all times a distressing effect on me. Nothing could have more vividly brought home to me the instability of the speaker's position, and at the risk of wounding parental partiality, I felt bound to protest.

"You look dubious," said his Grace. "What is in your mind?"

"For me to indorse so positive a statement," I confessed, "the point must first be established, that the effect—these school exercises—can be due to one cause only—native cleverness. It is impossible by merely contemplating a phenomenon to say what was the cause."

"To what else could it possibly be due?" he asked, perplexed. "Take his mastery of the classical languages, as it appears in his translations. Could any ordinary school-boy, without the help of a first-rate crib," he said laughing, "have done anything approaching to it?"

"The use of translations," I ventured, "is, I fear, very frequent among school-boys, and is certainly not regarded as a heinous crime. I would rather, of course, suppose your son had never availed himself of one. That he should do so habitually is in the highest degree improbable. Still, I think it best to exercise no such strict surveillance as would put the possibility out of the question; and by inference alone we can arrive at nothing stronger than probability."

"Well," said his Grace, smiling, perhaps at some reminiscence of his own school-days, "let us come to his compositions, prose and verse. It is not beyond question that the subjects, treatment, ideas, form, style, versification, show amazing precocity, when we consider that these are the original poems and essays of a boy of fourteen?"

"Assuming that original they are—your Grace must pardon me—"

He had half started to his feet, in evident displeasure, and sharply interposed: "You cannot surely mean to insinuate that he has deliberately borrowed—copied—from other sources?"

"Not for an instant," I hastened to respond. "This, in so apparently truthful a disposition, is a remote and absurd possibility not worth consideration. But there is a not uncommon phenomenon by which much that seems marvelous in his work may be accounted for. He reads a good deal, and it is conceivable that his brilliant essays and poems may be due in great measure to unconscious recollection. Passages he has read, and forgotten he has read, may linger in his memory, and he reproduce them in all good faith as his own. Thus we may be admiring as the extemporaneous emanations of a budding intellect what are in fact the studied productions of a practiced and matured brain."

He seemed annoyed and to understand me very imperfectly. Yet it was clear there was no logical necessity for assuming Lord Herbert to be a genius—merely a strong probability to that effect. The assumption might be tested by various methods, as I was about to suggest, but he cut me short, saying:

"It would be impossible for me to believe that my son's productions are merely echoes, or that his good work can be due to anything but genuine cleverness. The suggestion strikes me as monstrous. I could not contemplate it for a moment."

How had he, unconsciously, laid bare the weakness of his position!

"I must venture to remind your Grace," I objected, respectfully, "how far the statement that we are incapable of disbelieving this or that is from showing we ought to believe it, though it may show that we must do so. A psychological necessity is no logical justification."

"Explain yourself, Mr. Andrews," he said dryly.

I proceeded to lay before him the theory of the evolution of belief, of which, for a man of letters, which Lord Herbert's father had some pretensions to be, he seemed curiously ignorant. I intimated in the most delicate manner how far I was from wishing to press the present application, or officiously to impair his agreeable conviction that his son was an exceptional genius. It was only when this was put forward as a dogmatic assertion and my unconditional ratification called for that the sincerity of my disposition compelled me to represent how far this was from having been scientifically demonstrated. Even this mild dose of skepticism I softened down by pointing out how every year must bring a nearer approach to certainty. Instances might increase to the point of eliminating chance or the possibility of imposition, conscious or unconscious. So occupied was I with my arguments that it was only when I had concluded that I noticed he was regarding me with an ominous frown. He gave his ultimatum:

"It would be as easy for me to doubt the fact of my own existence as that my belief in the boy's rare talents is well founded."

"All beliefs are caused," I urged. "The consideration in each case is whether there is anything in the causes to make them true. So many erroneous beliefs have existed. People have been deceived, may be again, and wherever personal feeling comes into play, as here, we should be doubly cautious. Extreme fondness, a trusting disposition, personal incapability of deceit, leading us to transfer our own virtues in imagination to others, tend to bias us. Then we are convinced where we should not be, because we start from an implicit and indestructible confidence in the facts that have to be proved."

"That will do, Mr. Andrews," said his Grace, curtly, in a tone that put an end to the discussion.

The marked coolness of his manner did not escape me. Still, the vexatious sequel, a few days hence, took me completely by surprise. I received a courteous but distinct intimation that, after a certain period, my services would no longer be required. That my dismissal was immediately provoked by my conscientious frankness it was not permitted me to doubt. However, my pupil's health had so improved of late that his father was able to put forward his intention of sending him to a public school. "No partiality there, Mr. Andrews," he observed at parting. "By and by we shall have proof positive what his talents are worth."

Proof positive, as I could not forbear reminding him, is so rare as to be well nigh unattainable. Still, I must applaud the step, as one likely to strengthen the evidence on one side or the other; and the obvious inference that the arguments I had put forward to his Grace had made some impression, inclining him to be more careful to verify his beliefs in future, was so highly gratifying as to compensate me in no small degree for the loss of my post.

(Conclusion next week.)

PARALYZED BY ELECTRICITY.—A young man in Denver, Col., while engaged in repairing an electric lamp, mounted a high step ladder, and, with a wire in each hand, was about to connect the circuit when the current was turned on. The shock completely paralyzed him, and he fell backward off the ladder. He has brought a suit for damages against the company, and the trial will be an interesting one. He claims that the current was turned on before the usual time, which the company denies. One side of his face is still paralyzed, and the doctors think it will remain so the rest of his life.

IF the mother is feeble it is impossible that her children should be strong. Lydia E. Pinkham's Vegetable Compound is a perfect specific in all chronic diseases of the sexual system of women. Send to Mrs. Lydia E. Pinkham, No. 233 Western Avenue, Lynn, Mass., for pamphlets.

General Fitzhugh Lee has begun to write a history of the campaigns of Lee's army.

AGRICULTURAL PAPERS.

A SERIES PREPARED ESPECIALLY FOR THE "RECORD-UNION."

Presenting Instruction Contained in Lectures from the Chair of Agriculture, State University.

[ELEVENTH PAPER.]

The absorption of food by the root is of the utmost importance to the plant, and a function which the root is, by its delicacy of structure, rapid growth in length, and great amount of surface exposed, well qualified to perform. The young roots are more delicate, and hence better adapted for the absorption of liquids than the older ones. It was commonly thought that absorption took place through the extremities of the roots, or the spongioles, as they were termed. The root tips have not the power of taking up liquids, but all other of the younger parts and tender surface textures of the roots are constantly absorbing nutriment. In some perennial plants the older roots acquire a sort of corky coating or cuticle which is impervious to liquids, and which practically prevents them from performing any nutritive functions. The length of the root or the distance in a direct line from its extremity to the base of the stem cannot be taken as a just criterion of its efficiency. A root much shorter, but which has more lateral branches, may present a much larger surface to the soil, and hence have a greater absorptive power. The aggregate absorbing surface should always be taken into account when comparing the relative efficiency of roots. The growth of roots is controlled largely by the composition and tilth of the medium or soil in which they are buried. In poor soils, a sand-bed for instance, the roots are very long, slender and almost thread-like, and have no, or but very few, lateral branches. In this case the root has been obliged to penetrate to a great distance in order to find enough nutritive matter to maintain the life and growth of the plant. In moderate good soil

THE MAIN ROOTS

Are much shorter, with the lateral roots much more numerous. If the soil is exceptionally rich, just in proportion will be the multiplication of rootlets. Masses of manure, if in reach of the roots, are soon covered with a complete mass of rootlets. The greatest development of the roots always takes place in the immediate vicinity of the nutritive matter. If a stratum of clay or sand be interposed between the plant and a clod of manure, the roots will be fibrous and attenuated while going through this unfertile stratum, but as soon as the manure is reached they multiply and ramify almost indefinitely until they have absorbed and transmitted through their slender channels all of the available nourishment. Although no very definite relation exists between the foliage of a tree and the position of its roots, yet there appears to be some connection between the development of foliage on a given side of the tree and the development of the corresponding roots. It is surprising and not generally known how large a quantity of roots is put forth by many plants. No adequate idea of their number or length can be obtained by pulling up a plant, even though it be in a very loose and friable soil. Schubert made an exhaustive set of experiments on this subject, and met with astonishing results. His method was to excavate a perpendicular cut as deep as he wished to go, and then to wash away and remove the dirt by turning a gentle stream of water against it. By this means the mass of the roots were laid bare and left intact. He found the roots of rye, beans and garden peas to present the appearance of a mat or felt of white fibers to the depth of four feet. Forty-seven days after sowing he found the roots of winter-sown wheat at a depth of seven feet, and roots of winter-sown clover or colza were from three to four feet long. He found the roots of one-year-old clover at the depth of 3.5 feet, while the depth of roots of two-year-old clover was only six inches more. He gives the relative amount of roots to the whole plant, in the dry stalks, of winter wheat, —examined the last of April and again a month later—to be respectively 40 and 22 per cent.; of rye examined in April, as 34 per cent., and peas, four weeks after sowing, and again at blossoming as 44 and 24 per cent. of dry weight. We thus see that the relative proportion of roots decreases with the age of the plant. This is caused, not by the falling off in the growth of the roots, but by the much greater corresponding development of the stem during the latter stages of growth. Hellriegel also made a number of experiments on the roots of the grains. He found that from 20 to 30 roots branch out from the base of the stem, and, as Johnson says, "observed that these roots at their point of issue have a diameter of .04 of an inch, but a little lower their diameter diminishes to about .01 of an inch. Retaining this diameter, they pass downward, dividing and branching, to a certain depth. From these main roots branch out innumerable side roots, which branch again, and so on, filling every crevice and pore of the soil." By weighing the lengths of selected average portions, and then comparing their weights with the weight of the entire mass of roots he was enabled to calculate approximately

THE LENGTH OF THE ROOTS.

By this means he found the length of the roots of a vigorous barley plant to be 128 Rhenish feet, and of an oat plant 180 Rhenish feet. As one would suppose might be the case, he found that the aggregate length of the roots was influenced by the quality of the soil. In one case, in rich, porous garden soil, he found the length to be 128 feet, while the roots of the same kind of a plant grown in a coarser and more compact soil only furnished 80 feet of roots. In most cases it is only with the aid of the microscope that we can appreciate the real absorbent surfaces of roots. The roots of some plants—onions and other bulbs—are fibrous, perfectly smooth and unbranched throughout. Other plants have roots which are numerously branched, and which branches are covered with minute root hairs, often imperceptible to the naked eye. These root-hairs are cylindrical elongations of the external root cells, and when their superficial area is taken into account it is found that the amount of root surface exposed to the soil is almost incredibly large. During the accumulation of the corky layer of impervious matter, previously spoken of, many of the older roots lose their root hairs and also the power of absorbing liquids. These root hairs are more numerous on roots growing in poor soil than on those growing on better soil. This is owing to the greater amount of absorption surface required to gather the requisite amount of plant food. The roots of those plants which have no root hairs are generally of considerable thickness, white, and retain their delicate texture and power of absorption throughout the whole time that the plant derives its nutriment from the soil. The hairless roots are farther compensated by the greater number of rootlets, which perish before hardening, and give place to new and young rootlets. The function of the root hairs and rootlets is to bring the root into the most intimate relation with the soil, thus facilitating the process of absorption through the roots. The root hairs are often found to be inseparably attached to particles of soil which cannot, by mechanical means, be freed from them without breaking the root hairs. In other cases

THE ROOT HAIRS,

On meeting some obstruction, have grown round and partially enveloped particles of the soil. The roots not only imbibe water, but they actually force it up into and through the stem. This force is much greater than is generally supposed. It can be ascertained by fastening a pressure gauge to the upper portion of the root of a plant, and then immersing the roots in water. In an experiment made by Hales, over a century ago, in which he attached the gauge to the stump of a grapevine during the spring flow of the sap, he got a rise of the mercury to a hight of 32½ inches in the tube. In other words, the imbibing force of the roots was equal to the pressure of a column of water 36.5 feet high, or a little greater than the barometric pressure of the air. In another set of experiments made by Hoffmeister, the mercury was forced to a hight of 6 inches by the roots of a bean plant, 14 inches by the absorption power of the roots of the nettle, and 29 inches by that of the roots of a grapevine. It was found that the rise of mercury in the tube was inversely proportional to the length of stem attached to the roots; that is, the greater the length of stem the less the hight of the mercury. This shows conclusively that the structure of stem obstructs the upward flow of the sap instead of aiding it, by the force of capillarity, as is often supposed. The seat of this

ABSORPTIVE FORCE

Seems to reside in the young and active roots and rootlets, and near, but not at, their extremities. In general the absorptive power may be said to reside in those parts of the roots which are supplied with root hairs. It is most active when the growth of the plant is greater, and hence when the roots are in the state of most rapid development. This leads to the conclusion that the absorptive power of the roots vary with the different seasons and conditions of growth. This imbibing power is so great as some times to force the water through the leaves of newly sprouted plants with sufficient energy to cause it to exude from the extreme tip in little droplets. The spring flow of sap in the sugar maple and water elm are striking illustrations of the absorptive power of roots as well as the influencing conditions of vegetable growth. The temperature exercises a very marked influence on the absorptive power of roots; and the manifestation of this power is no doubt influenced by the amount of moisture contained in the soil. The nutritive matter required by the plant and existing in a state of solution in the soil, is carried up in the liquids imbibed by the roots. This process is not simply a mechanical transportation by the roots, but they, on the other hand, have a sort of selective power, and generally absorb only such water as is needful to the plant. If the roots of a plant be immersed in a solution of some chemical salt, the solution will, in the course of time, give an alkaline reaction with test paper. This change from a neutral solution to one having decidedly alkaline properties, is explained by the fact that the root decomposes the salt into its constituent acid and base, and by its selective power takes up a larger amount of acid than base. This process, when carried on long enough, renders the solution basic, or if the base be one of the alkali basis, will render it alkaline.

RELIGIOUS INTELLIGENCE.

A short time ago the Prado Monastery in Lima was entered by a gang of forty scoundrels at an early hour of the morning when the nuns were all asleep. The poor inmates were made prisoners in their cells, and the robbers proceeded to take everything of value possessed by the monastery, including the relics on the altars. No trace of the thieves has been discovered.

The temperance reformers of Bristol, England, took a census of drinking saloon attendance on a recent Saturday night, and ascertained that between 7 and 11 o'clock 54,074 men, 36,803 women and 13,415 children entered the public houses and beer shops of Bristol, making a total of 104,357, or half of the total population.

The First Baptist Church of Minneapolis, Minn., was organized March 5, 1853, in a cabin on the open prairie, with ten members. Since then six more Baptist churches have been formed by offshoots from it, and it now conducts two large missions, which are almost ready to become independent societies.

An organization was formed last week in Boston which is intended to become the nucleus of a large club of Unitarian laymen, and to hold toward the Unitarian denomination a position similar to that held toward their respective churches by the Congregational Club and the Baptist Social Union.

There is a rumor at Avignon, according to the *Moniteur*, of the contemplated return of the Papacy to the city, which remained under its allegiance till after 1789. Mysterious visitors from Italy have minutely examined the edifices formerly occupied by the Papal Court.

The money needed for the establishment of a new Episcopal diocese within the bounds of the present diocese of Central Pennsylvania has been subscribed. Over $30,000 has been pledged for the new See, to be erected out of the Convocation of Williamsport.

For the first time in twenty-eight years Christ Church, New Haven, is without a rector. The Rev. Joseph Brewster, who took charge of it in 1854, has tendered his resignation on account of ill-health, and it has been reluctantly accepted by his parishioners.

The Rev. George C. Miln has decided, after all, not to give up the pulpit of the Unity Church, Chicago, (Unitarian,) for the bar, his congregation having voted him perfect liberty to say in his sermons whatever he wishes.

The revival movement which originated in St. Paul's Methodist Episcopal Church, Cincinnati, under the ministrations of Mr. Harrison, has extended to nearly all the churches in that city and its suburbs.

The Centennial Methodist Mission at Lucknow, India, is reported to be in a prosperous condition. The present number of pupils is 115, comprising 58 Christians, 44 Hindoos and 14 Mohammedans.

The New England Methodist Historical Society proposes to establish an historical magazine in which are to be published important facts concerning Methodism in New England in the past.

PITTSFORD, Mass., September 28, 1872.
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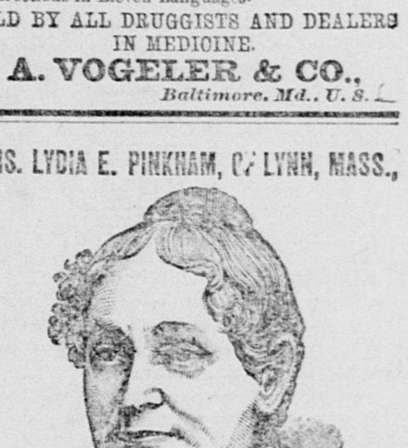

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