

A NIGHT WITH EDISON.

A DESCRIPTION of the machine of Thomas A. Edison,* for registering and reproducing sound, the phonograph, has already been given in this magazine. It is not necessary to amplify further upon its scientific aspects, or those ingenious speculations as to its future when perfected,—for it possibly bears hardly more the relation to what it will become than that of the early daguerreotypes to the best photographs,—with which every active imagination can supply itself. Some account, from a more personal point of view, of its inventor,—who bids fair to open a new period in the world's development, not only through his own discoveries, but on account of the immense stimulus, the fresh courage, he has given to the inventive impulse everywhere, it is believed, will be a not unwelcome supplement.

The invention has a moral side, a stirring, optimistic inspiration. "If this can be done," we ask, "what is there that cannot be?" We feel that there may, after all, be a relief for all human ills in the great storehouse of nature. We are not limited to the incomplete data for solving the problem of life already given; they are to be indefinitely extended. There is an especial appropriateness, perhaps, in its occurring in a time of more than usual discontent. It is a long step in a series of modern events which give us justly, in the domain of science, wholesale credulity. At the beginning of the century, the French Academy of Sciences reported to Napoleon, as to the feasibility of steam navigation, that it was "a mad notion, a gross delusion, an absurdity." At present such a thing as skepticism hardly exists. There were those who saw in the delusive Keely the basis of a tangible millennium,—a machine of enormous force and no appreciable cost of maintenance, to do all the work of the world in a few hours of the day, and leave the remainder for improvement and recreation.

Brilliant, almost incredible, as the phonograph is, it is so simple in its construction and process—the mere dotting of a cylinder of tin-foil with indentations, which become in turn the cause of the vibrations of the mouth-piece of which they were at first the effect—that one is not immediately, from

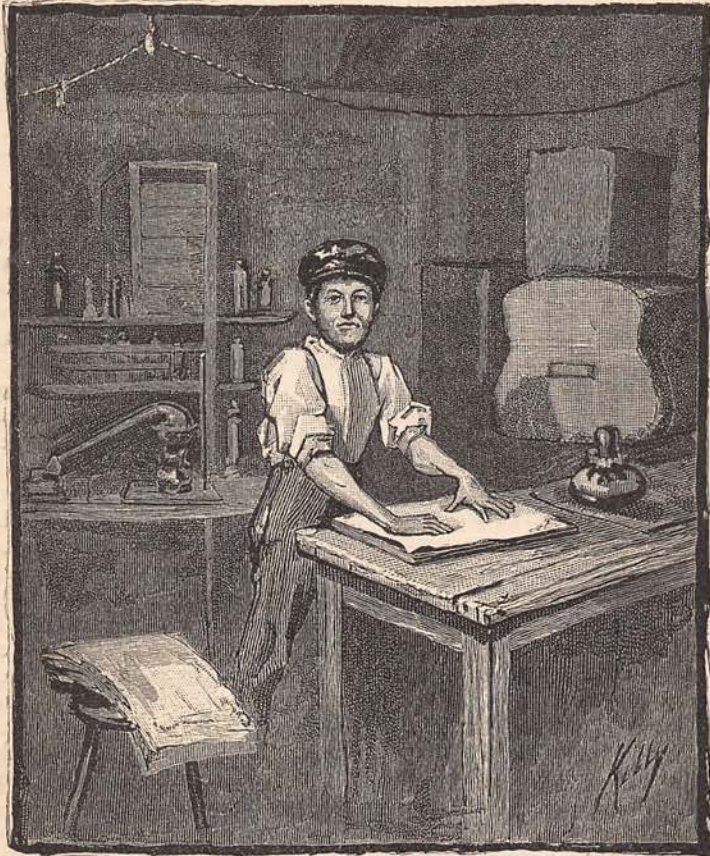
this alone, impressed with a profound reverence for its author, as for one who has carried through a long scheme of subtle contrivances. You are inclined rather to take him for a favorite of fortune—a sort of Columbus, who has hit upon the way of making the egg stand on end, which anybody might have thought of; that is all. We shall see how just it would be to take such a position; how far the element of luck enters into the success of a man whom Professor Barker calls "a man of herculean suggestiveness; not only the greatest inventor of the age, but a discoverer as well; for when he cannot find material with the properties he requires, he reaches far out into the regions of the unknown, and brings back captive the requisites for his inventions."

Thomas Alva Edison was born at Milan, in Erie County, Ohio, February 11, 1847. An obscure canal village of the smallest size, it was not a place where the advent of a genius would be looked for, if this elusive spark had the habit of appearing anywhere according to prescribed formulas. The village of Port Huron, Michigan, to which his family removed soon after, and where the greater part of his youth was passed, would not have afforded a better prospect. His family was an average one of the humbler sort. There were no unusual talents in any of its members upon which a claim to heredity of ability could be based. Of a number of brothers and sisters, none have shown an inclination toward pursuits like the inventor's own. He may have taken from his father—who was in turn tailor, nurseryman, dealer in grain, in lumber, and in farm-lands—some of the restlessness which has impelled him to activity in so many different directions. He took, also, a good constitution. This parent, of Dutch descent—a hale old gentleman, still living at the age of seventy-four—had two immediate ancestors who survived, one to the age of one hundred and two, the other to one hundred and three. It is a point not altogether unimportant to note in passing, since it holds out the prospect, in the ordinary course of time, for the matured completion of the wonderful programme the inventor has laid out for himself already, at the comparatively youthful age of thirty-one. His mother, of Scotch parentage, though born in Massachusetts, was of

* "The Telephone and the Phonograph," SCRIBNER'S MONTHLY, April, 1878.

good education and had formerly been a school-teacher in Canada. She imparted to him about all the instruction from outside sources he ever received. Of regular schooling he had no more than two months in his life. His schoolmates of this brief period do not remember him as brilliant, nor are there preserved family records of phenomenal infantile doings. But he was a child who amused himself much alone, and doubtless, if

with the rest, and gave, as it seems, the direction to his future action. One can imagine these works. It was not a time nor a place for fastidiously elegant bindings. They were serious in aspect; perhaps an occasional half-cover gone; the leaves well yellowed and stained with brownish spots. But to a boy of ten with the omnivorous taste, a book is a book all the same. He extracts a honeyed sweetness, as he bends



PUBLICATION OFFICE OF THE "GRAND TRUNK HERALD," EN ROUTE.

his quiet plays had been noted, there would have been detected indications of the faculty in which his extraordinary future career was involved. He was in particular an omnivorous reader. He had the intense curiosity about the world we inhabit and its great names and great deeds which will be found an early trait in common in almost all the lives that have histories of their own to leave behind them. At ten, he was reading Hume's "England," Gibbon's "Rome," the "Penny Encyclopædia," and even some books of chemistry, which came in his way

over it, which has nothing to do with accidents of appearance.

At twelve he began the world—as train-boy on the Grand Trunk Railroad, of Canada and Central Michigan. To one who has noted the precocious self-possession, the flippant conversational powers and the sharp financial dealings of the young persons who for the most part abound in it, it does not seem a profession for the cultivation of a spirit of quiet research, or the most thorough acquirement of the sciences and arts. But it is fair to presume that Master

Edison at this time had no very comprehensive scheme of development prepared. It offered the most available means of a livelihood. He went into it with such a will that in course of time he became an employer of labor, having four assistants under him for the disposal of his wares. He is not averse to recur to the humors of this part of his life.

"Were you one of the kind of train-boys," he has been asked, "who sell figs in boxes with bottoms half an inch thick?"

"If I recollect right," he replied, with a merry twinkle, "the bottoms of my boxes were a good inch."

There exists a daguerreotype of the train-boy of this epoch. It shows the future celebrity as a chubby-faced fellow in a glazed cap and muffler, with papers under his arm. The face has an expansive smile,—not to put too fine a point upon it, a grin. Yet there is something honest and a little deprecating in it, instead of impudence. He was, as will be shown, an eccentricity among train-boys, and was no doubt sensible of it. He looks like a fellow whose glazed cap a brakeman would tousele over his eyes in passing, while thinking a good deal of him all the same.

His peculiarity consisted in having established in turn, in the disused smoking-section of a springless old baggage-car which served him as head-quarters for his papers, fruits and vegetable ivory,—two industries little known to train-boys in general. He surrounded himself with a quantity of bottles and some retort stands,—made in the railroad-shops in exchange for papers,—procured a copy of "Fresenius's Qualitative Analysis," and, while the car bumped rudely along, conducted the experiments of a chemist. By hanging about the office of the "Detroit Free-Press," in some spare hours, he had acquired an idea of printing. At a favorable opportunity he purchased from the office three hundred pounds of old type, and to the laboratory a printing-office was added. It seems to have been by a peculiar, good-natured, hanging-around process of his own, with his eyes extremely wide open and sure of what they wanted to see, that his practical information on so many useful subjects was obtained. He learned something of mechanics and the practical mastery of a locomotive in the railroad shops, and acquired an idea of the powers of electricity from telegraph operators. With his printing-office he published a paper—the "Grand Trunk Herald." It was a

weekly, twelve by sixteen inches, and was noticed by the "London Times," to which a copy had been shown by some traveler, as the only journal in the world printed on a railway train. The impressions were taken by the most primitive of all means, that of pressing the sheets upon the type with the hands, and were on but one side of the paper. Baggage-men and brakemen contributed the literary contents. In 1862, during the battle of Pittsburg Landing, the enterprising manager conceived the idea of telegraphing on the head-lines of his exciting news and having them pasted on bulletin-boards at the small country stations. The result was a profitable venture, and the first awakening of interest on his side in the art of telegraphing, in which he was destined to play such a remarkable part.

During this time he continued his reading with unabated industry. His train carried him into Detroit where there were advantages he had never enjoyed before. An indication of his thirst for knowledge, of a *naïve* ignoring of enormous difficulties and of the completeness with which the shaping of his career was in his own hands, is found in a project formed by him to read through the whole public library. There was no one to tell him that all of human knowledge may be found in a certain moderate number of volumes, nor to point out to him approximately what they are. Each book was in his view a distinct part of the great domain, and he meant to lose none of it. He began with the solid treatises of a dusty lower shelf and actually read, in the accomplishment of his heroic purpose, fifteen feet in a line. He omitted no book and skipped nothing in the book. The list contained among others Newton's "Principia," Ure's scientific dictionaries, and Burton's "Anatomy of Melancholy."

It could hardly be expected that so many active enterprises should be carried on without mishaps. Mishaps occurred and one was especially dolorous. During the chemist's absence, a phosphorus bottle rolled upon the floor and set the ancient baggage-car on fire. A conductor rushed in in a fury, hurled all of the eccentric, painfully amassed apparatus out of the place, and, by way of rendering the abatement of the danger more complete, gave the astonished scientist, editor and merchant a thrashing.

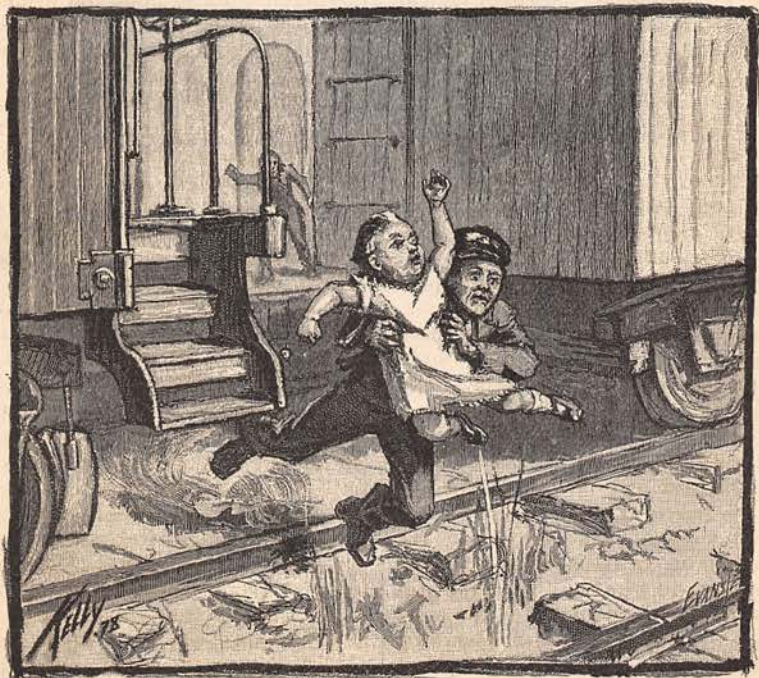
He seems to have had a genius for unlucky scrapes in these early times. He published a small paper called the "Paul Pry" at Port Huron, more nearly on the

regular plan. The articles, as before, were mainly contributions. The writers took advantage of their impersonality to make them peculiarly pointed. The young proprietor had the discouraging experience of being thrown into the river by the indignant object of one of them who had not time nor inclination for fine distinctions in the matter of responsibility.

Telegraphing, from the time he obtained a first rude insight into it, became more and more an engrossing hobby. He strung the basement of his father's house at Port Huron with wires. Then he constructed a short line, with a boy companion, using in the batteries stove-pipe wire, old bottles, nails for platina, and zinc (which urchins of the neighborhood were induced to cut out from under the kitchen stoves of their unsuspecting households and bring to him for a consideration of three cents a pound). His movements on the train were free and hardy. He had the habit of leaping from it, while it was going at a speed of twenty-five miles per hour, upon a pile of sand arranged by him for the purpose, in order to reach his home the sooner. An act of personal courage and humanity—the snatching of the station-master's child at Port Clements from in front of an advancing train—was a turning-

point in his career. The grateful father taught him telegraphing in the regular way. He tried shoe-making for a short time,—he had picked up this trade with others in some inexplicable manner; but it did not please him, and he shortly entered into his light work as a telegraph operator. From that time his interest in electric science has not varied. He has studied it intensely in all its forms. It constitutes the motive power of most of his long list of inventions. He even claims to have evolved from it a new principle, "etheric force," which sends a spark through twenty feet of air and has a peculiar action upon several chemicals, yet is imperceptible by the galvanometer.

His ready ingenuity is shown in an early instance of facile adaptation of the processes of his new profession to novel circumstances. One day an ice-jam broke the cable between Port Huron in Michigan and Sarnia on the Canada side, and stopped communication. The river is a mile and a half wide. It was impassable, and no present means existed of repairing it. Young Edison jumped upon a locomotive and seized the valve controlling the whistle. He had the idea that the scream of the whistle might be broken into long and short notes, corresponding to the dots and dashes of telegraphing.



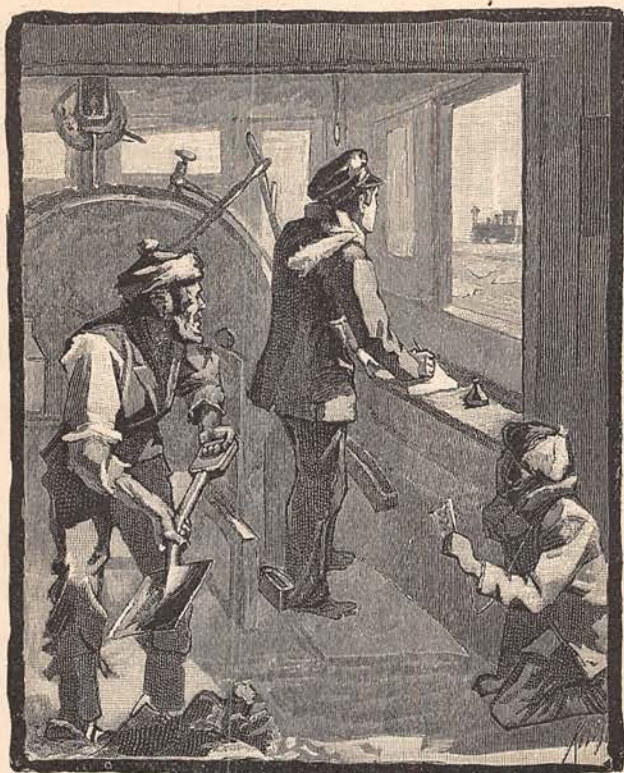
THE RESCUE.

"Hallo! there, Sarnia! do you get me? Do you hear what I say?" tooted the locomotive, lustily.

No answer.

"Do you hear what I say, Sarnia?"

his idea of duplex transmission. The office changed hands, and he had created no better an impression than that he was thought a good man to get rid of, in the re-adjustment. At Louisville, in procuring some



STEAM TELEGRAPHY.

A third, fourth and fifth time the message went across without response, but finally the idea was caught on the other side; answering toots came cheerfully back, and the connection was recovered.

Edison's history for a number of these first years is chiefly a record of desultory wanderings from place to place, with the view of seeing the world, of procuring better wages, and very often, if the truth must be told, under the stimulus of abrupt dismissals from his positions for blunders or unpardonable negligences. At Stratford, Canada, being required to report the word "six" to the manager every half-hour to show that he was awake and on duty, he rigged a wheel to do it for him. At Indianapolis he kept press reports waiting while he experimented with new methods for receiving them. At Memphis, in 1864, he was first working out

sulphuric acid in the office at night for his own purposes, he tipped over a carboy of it, to the ruin of the appurtenances of a handsome banking establishment below. At Cincinnati he abandoned the office on every pretext to hasten to the Mechanics' Library to pass his days in reading. It would be gratuitously malicious to cite so many of these instances if they were thought to show a want of conscientiousness. They certainly could not be commended to the imitation of *employés* in general, but in Edison they seem to have been the result of an uncontrollable impulse. His inventions were calling to him with a sort of siren voice. Under the charm he was deaf and semi-callous to everything else.

In 1868 he appeared in Boston. In spite of his peculiar fashions of passing his time, he had become one of the most accom-

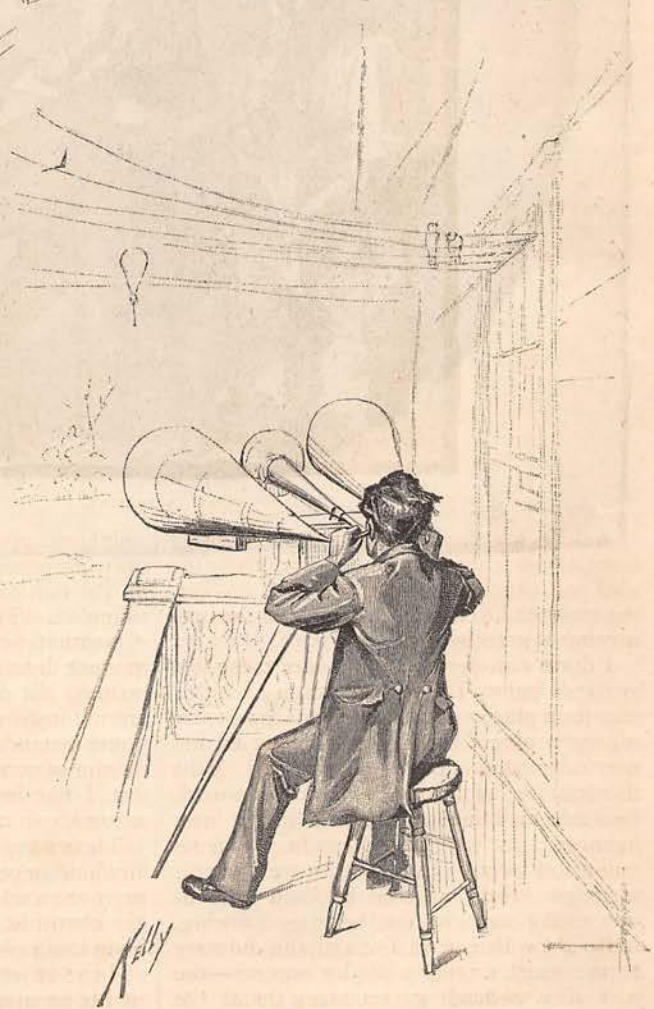


THE DUET.

plished operators. He overcame obstacles put in his way on account of a somewhat uncouth appearance, and soon took an important position. He had up to this time dabbled with a number of the ideas he has since perfected, acquired a beautiful, small, rapid handwriting as clear as print, and gratified considerably his desire of seeing the world. He had once been upon the point of sailing for South America, from New Orleans, but had only been prevented by an accident. A new period commenced for him. Some small things of his succeeded,—a dial instrument for private use, a chemical note-recorder and others, and he began upon a vibratory principle of telegraphing. He commenced a great epoch in one's history,—to believe in himself. Up to this time he had not done so. "I did not think," he says, "that I

was competent." He was not successful, however, in an important trial of his duplex system, and was soon again adrift.

Edison came to New York in quite a disconsolate mood. But it was here that his brilliant success, the harvest of his long tillage of an apparently thankless soil, almost immediately commenced. He repaired the indicator of the Gold and Stock Company, which had got out of order at an important moment. His attention was turned to their apparatus, and he invented a printer of stock and gold quotations, which they at once adopted. He has a radical instinct which goes, in every piece of mechanism, straight to the underlying principle. As if it were an imprisoned spirit, he considers how best to release it from its trammels, or to make them the fewest possible. The spirit may



GOSSIP, BY THE MEGAPHONE.



THE TASIMETER.

be considered, if one chooses, an enchanted fairy who, grateful for the service, procures him fame and fortune. He was taken up by the Western Union Telegraph Co., and retained by the two companies at a handsome salary, to give them the first bid on all his inventions relating to telegraphy. Most of what he has done, as has been said, does relate to telegraphy. To give a little enumeration: he has thirty-five patents connected with chemical and automatic telegraphs, eight with duplex and quadruplex, thirty-eight with telegraphic printing, and eight with emendations of the ordinary Morse register. The duplex system—the possibility of sending two messages at the same time by the same wire—had been

ridiculed. The incredulous soon had the opportunity of seeing four messages going at once by the same wire—the quadruplex system. The explanation is, as all the world knows, in the existence of different electrical properties, which can be called into action on the wire at the same time without conflict. The inventor talks cheerfully of a sextuplex to come.

The ex-train-boy has arrived at an almost fabulous success. The Western Union Company are said to have paid him \$100,000 for his invention, the carbon telephone, and nobody knows what for the quadruplex system, and the others that they have taken. He is said to be in receipt of \$500 per week in royalties for the exhibition of the phonograph

alone. There is hardly one of his long list of patents which has not answered its purpose, and does not bring him returns. Everything in this last period has been on a great scale. He has spent \$400,000 in his experiments and researches. At Newark he manufactured his stock-quotation printers, with a force of three hundred men. The business was not to his liking, as, indeed, no pursuit is which does not include the active evolution of new ideas. He took formal lessons in chemistry here, for the first time. He married, too, a Newark lady, Miss Mary Stillwell by name; but in 1876 sold out his machinery and removed to Menlo Park.

It is time that we arrived at the man himself. Menlo Park is one of the newer stations on the Pennsylvania Road in New Jersey, an hour's ride from New York. It is the merest hamlet,—half a dozen houses in shades of yellow ochre and chocolate, and of the usual suburban type. Edison's own is one of the best,—comfortable, but without a trace of ostentation. If one has come without preconceived notions, he looks about with some surprise, as the train rattles off along its broad tracks, and leaves him at the quiet station, with only the bees humming and a warm air bending the clover-tops. It hardly seems a spot for the origin of mysterious new forces which are to revolutionize science—for this is to be especially noted in these radical new discoveries: their part in preparing the way for new classifications of knowledge, for the summing up of the vast accumulation of matters and of all the forms of force in a few simple generalizations, which the human mind may grasp and save itself from a deluge that threatens to overwhelm it.

The ground falls, behind the station, to a meadow, and rises steeply in front. Near the crest of the long slope, at a distance from the houses, surrounded in a large, treeless yard by a low fence, is an elongated, white, wooden building of two stories, with a piazza on the gable end facing front. It might be a school-house, or a meeting-house, or—seeing the number of respectable men that pass in and out of it at noon, for instance—a town-hall of some kind, in which a meeting of tax-payers is in session. Doubtless the inventor's laboratory is in one corner of it. But the inventor's laboratory is in the whole of it, and twenty-eight by one hundred feet in extent as it is, it is so contracted that the plans for a larger edifice, of brick, are already in hand. A collection of valuable running machinery and tools for

every delicate operation, with the office and draughting-room, occupies the lower story. A force of thirteen skilled mechanics is busy there. Above, a long, unbroken room has working-tables from distance to distance, littered, as is the floor, with batteries, magnets, retorts, and apparatus of unknown forms and uses. The whole extent of the walls is lined with shelves, containing a museum of smaller apparatus, but, for the most part, an interminable background of chemicals in jars.

Of the number of persons in the laboratory, remark principally the one you may have least thought of selecting, from the informality of his appearance. The rest are but skillful assistants, to whom he is able to commit some experiments in their secondary stages. It is a figure of perhaps five feet nine in height, bending intently above some detail of work. There is a general appearance of youth about it, but the face, knit into anxious wrinkles, seems old. The dark hair, beginning to be touched with gray, falls over the forehead in a mop. The hands are stained with acid, and the clothing is of an ordinary, "ready-made" order. It is Edison. He has the air of a mechanic, or more definitely, with his peculiar pallor, of a night-

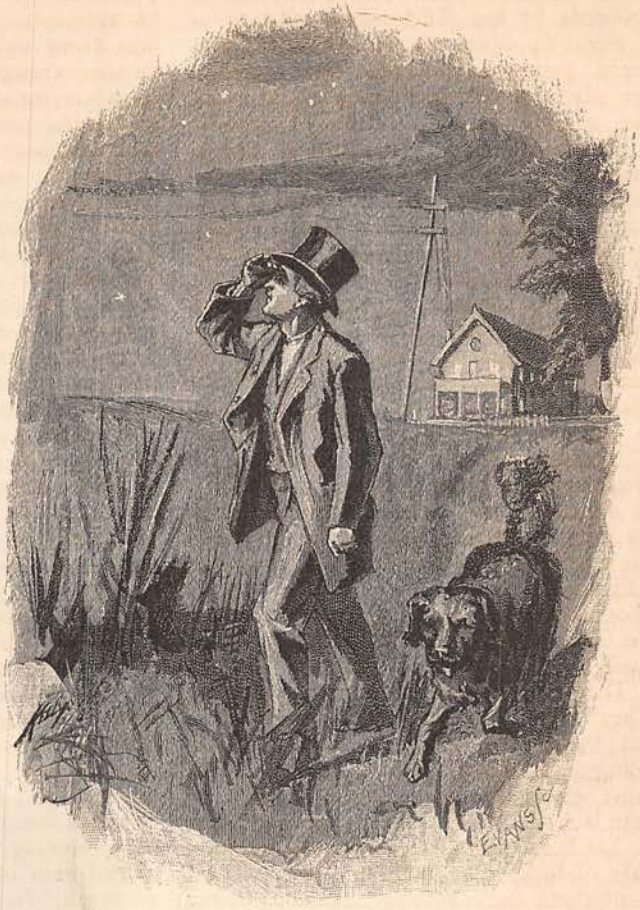


MAKING CARBON.

printer. His features are large; the brow well shaped, without unusual developments; the eyes light gray; the nose irregular, and the mouth displaying teeth which are, also, not altogether regular. When he looks up his attention comes back slowly, as if it had been a long way off. But it comes back fully and cordially, and the expression of the face, now that it can be seen, is frank and prepossessing. A cheerful smile chases away the grave and somewhat weary look that belongs to it in its moments of rest. He seems no longer old. He has almost the air of a big, careless school-boy released from his tasks.

If the visitor be one of those who have known Edison only by the phonograph, a series of startling surprises awaits him in the tour of the curious laboratory which he will hasten to make. Here lie the dismantled portions of the "megaphone,"—a great speaking-trumpet and two ear-trumpets, which in use are to be mounted together upon a tripod. Provided each with such an instrument, two persons converse in an ordinary tone some miles apart. "From the hollow yonder behind the red-roofed house," says the inventor, pointing over the pleasant rural prospect, "a whisper can be heard." The disadvantage of the apparatus at present is that it collects irrelevant, intervening sounds, even the twitter of birds and the munching of cows in the grass coming into it, as well as what is designed for it. For this reason it can be tested best of still nights. No doubt there are inhabitants of the vicinity who, hearing strange whisperings at midnight, and perhaps catching glimpses of figures gliding, with lights and equipments of vague, ominous import, have been satisfied to leave these phenomena uninvestigated, and have turned back with a re-awakening interest to anecdotes of the doings of the powers of darkness—if, indeed, they did not dream.

Here is the project of the *aërophone*, the



3 A. M.: GOING HOME FROM THE SHOP.

great voice, two hundred and fifty times the capacity of the human lungs, which is to shout from light-houses, from ships at sea, from Bartholdi's statue towering god-like above our harbor. Its principle is simple, with a simplicity that constitutes a part of the greatness of these inventions. There is a mouth-piece as in the telephone and phonograph, but the vibrating disk here, instead of breaking and closing an electric circuit, as in the one, or dotting a sheet of tin-foil as in the other, flutters the valve of a steam-jet which takes the tones of the voice and sends them on to the limit of its capacity. Again, we make drawings and autographic writings with the electric pen. It is a steel point vibrated by a small battery, and cutting the writing through the paper, which may then be used as a stencil for hundreds of impressions. There will be a tool on the same principle, with a diamond point, to act like a sand-blast for engraving gems.

Next, we come to an electromotograph which proceeds by the difference in friction of a metal tip upon certain chemically prepared papers and would have supplied the place of an electro-magnet if it had not already existed. Then we turn to a harmonic engine, a tuning-fork electro-magnet two feet six inches long, which will pump, if put to such use, three or four barrels of water a day at a cost of almost nothing. There are systems of chemical telegraphic printing, and one by which the sender of a message is to transmit his own handwriting; the writing is in a white ink which rises in strong relief from the paper. An apparatus for the use of the blind who read, as is known, by the touch, is projected also from the same material. There exist already, or are in progress, an electric shears for cutting heavy materials; an electric engine for embroidering; others for revolving the limes of calcium lights and the goods in a show-window; a talking box; a flying bird, to go a thousand feet; and a phonomotor, in which a wheel which resists the force of the hardest blowing is revolved easily by the sound of the voice.

These are examples taken at random. They show, whether actually realized or yet in embryo, the character of studies going on in what it is fair to call one of the most remarkable places in the world. The man lacks our profoundest respect no longer. It has been seen that his success is not a case of luck, in a single direction. There is nowhere such another ingenious mind, but there is also nowhere such a worker. When in search of some special object he allows himself absolutely no rest. At Newark he mounted to the loft of his factory with five men, on the occasion of the apparent failure of the printing-machine he had taken a contract to furnish, and declared he would never come down till it worked. It took sixty hours of continuous labor, but it worked, and then he slept for thirty. The routine of his day is a routine of grand processes and ennobling ideas. Nowhere else probably would such a day be possible. There are not fortunes, if there were capacity, to carry on the business of pure scientific research on such a scale. His whole great establishment is occupied not in manufacturing, nor primarily in projects for profitable returns,—though these follow,—but in new reflections, new combinations, in wrestling from Nature inch by inch the domain she would have kept hidden. He comes in the morning and reads his letters. He

overlooks his men and the experiments of his assistants. The element of hazard enters into these somewhat. There are a great number in progress,—the action of chemicals upon various substances or upon each other, or the phenomena of substances subjected to the various forces at command. Strips of ivory, for instance, in a certain oil in six weeks become transparent. A globule of mercury in water, then with a little potassium added, takes various shapes for the opposite poles of the battery, retires coquettishly or is attracted, forms in whirlpools, changes color, or becomes immobile. There is no use at once for these results, but they are recorded in voluminous notebooks. When the proper time comes they are borne in mind; some one of them may form the connecting link in the chain of an invaluable discovery. Then perhaps he tests for the thousandth time his carbon telephone for new perfections, and then goes on carrying forward a step each of the works in progress, or becomes wholly engrossed, according to his mood, in one.

In spite of the fact that the motive of his retreat to Menlo Park was in good part to escape them, numerous visitors arrive. It is the Mecca of a continuous pilgrimage of scientists, reporters for the journals, and curiosity-hunters. Yesterday a troop of one hundred and seventy-five persons brought by a gentleman who had asked the privilege of presenting a few friends,—to-morrow a special train of visitors from Boston is announced. He receives all affably, submitting himself and his inventions to be gazed at without reserve. One wonders, next to his phonograph, at his good humor.

"Still, I shall blow up somebody yet," he says, laughing. "I am considering the idea of fixing a wire connecting with a battery that knocks over everybody that touches the gate."

He sits down at the phonograph, fixes a double mouth-piece to it and summons one of his assistants, while another places himself at an organ in the corner. They sing in two parts "John Brown's Body." As the sonorous music rises and fills the long apartment, one gazes musingly yet with a secret thrill. It is like assisting at some strange, new rite,—a martial chant of rejoicing in the greatness of a new era full of sublime promise and the dissipation of mysteries.

But it is at night that the great inventor is to be seen in his most characteristic aspect. He has the habit, acquired through the necessity of gaining solitude, of doing then his most important work. It is not till

midnight merely that it continues; it goes on far into the small hours of the morning. Then more than ever does the business in progress, the discussions entered upon, the speculations, the news reported, take an inspiring character that gives the ordinary matters of life a cast of puerility. It is a question of planets, of splendid forces, of essential essences. One seems to be at a point where a hand is placed upon a lever connecting with the very heart of things. The writer has had the privilege of spending one of these nights at Menlo Park and cannot fail to look upon it as a unique and memorable occasion. The combination which is certain to come of the three instruments—the telephone, to transmit the message, the phonograph to receive it, the aërophone to proclaim it aloud at any distant time or place—is discussed. We talk about the microphone, which is to sound what the microscope is to sight; about the combination proposed by Dr. Phipson of the phonograph and kinctoscope, by which a phonographic image is to move and seem to talk. The long building on the hill is a singular spot of energy in the lonesome country sunk in repose. The crickets and tree-toads are chirping in the thick darkness outside. Within, the lamps burn steadily, raising the temperature, and the machinery plods on with a patient rumble.

An apparatus in progress, of immense importance,—a device for resolving sound into its constituent elements, as light is analyzed by a prism,—is brought out. A gentleman of New York has already found a philological use for the phonograph in proposing to preserve with it Indian dialects, like those of the Senecas and Tuscaroras, which are ready to disappear with this generation. But this sound-prism, to call it so, if it can be perfected, opens a way for philology to reduce to a few simple formulas speech of every variety, and would render a scheme of universal language by no means chimerical. We sit down and watch the action of a carbon thermo-pile thermometer, called the tasimeter, which detects one-twenty-four-thousandth of a degree of Fahrenheit, and is capable of yet greater delicacy. The sensitiveness of the carbon, on which it is based, was discovered by accident while experimenting with it for the telephone. Thus human progress avails itself of a new discovery like a ladder. It mounts and draws up its ladder after it and mounts again.

We go to where the preparation of these

carbon buttons is in progress. The material is taken from lamp-chimneys in which the wicks are trained to smoke as much as possible and is afterward solidified by a powerful pressure. The inventor, bending solicitously among a dozen lurid lamps, ranged upon a brick fire-place overhung by a canopy, with the dark wreaths twisting about his head, has for the moment a wizard-like air. One might imagine him engaged in conjurations, summoning occult powers to his aid. But for the most part his air is as far from wizard-like as possible. As the night goes on, his hair is more than ever tumbled over his eyes and his appearance more nonchalant. It is much after midnight now. The machinery below has ceased to rumble and the tired hands have gone to their homes. A hasty lunch has been sent up. We are at the spectroscope. Suddenly a telegraph instrument begins to click. The inventor strikes a grotesque attitude, a herring in one hand and a biscuit in the other, and with a voice a little muffled with a mouthful of both, translates aloud slowly the sounds intelligible to him alone: "London, May—. News of death of Lord John Russell premature. John—Blanchard—whose—failure—was—announced—yesterday—has—suicided—[no, that was a bad one, *succeeded*]*—in adjusting—his affairs—and—will—continue—in business.*"

A late moon has risen, and we pass out upon the balcony, to which a telescope is fixed, and gaze—most inspiring exercise of all—at its white vermiculated surface and the full starry heavens. It is after two in the morning. The others show fatigue, but the host is more animated than ever. It is at this time, in a feverish exaltation arising from the long night vigils, that some of his best inspirations come to him.

Some idea of the physical aspect of the man and his surroundings has, it is hoped, been conveyed. A word or two still nearer to his real personality. Morally, there are no relations, so far as is known, in which he is not exemplary. Sober and industrious, he has always had the virtues attaching to these qualities. He disclaims a mathematical mind, and even asserts that mathematics have been distasteful to him. However this may be, it is a mind of the keenest logic, of power of concentration and ability to hold at once long chains of connected processes. It is a radical mind, with a certain biting quality; it takes hold intensely, like an acid. He accepts nothing

upon authority alone. He denies, for instance, a part of the Newtonian theory of gravitation, and holds that motion is an inherent property of matter; that it pushes, finding its way in the direction of least resistance, and is not pulled.

In literature of the imagination, his liking turns to books depending for their interest upon exalted and romantic ideas or ingenious plots,—a kind of work in which one finds a certain resemblance to his own. He is fond of Hugo, Bulwer, Jules Verne—of the latter of whom his own feats go far to make a prophet rather than a rhapsodist. He has an excellent principle in literature. He had rather read one good book a dozen times than a dozen books. He does not profess to be a student of men, either in life or books. Consequently, such writers as Thackeray, George Eliot, Dickens, have a less attraction for him. His machines, the elements that serve his purpose, the constituents of nature, are his characters, and have for him the most engrossing interest. It is one of his axioms that all substances have an intelligence proportioned to their wants. "Else why," he asks, "will a potato-vine travel one hundred and fifty feet in a dark cellar, and rise, against the law of gravitation, to seek a ray of light?" He has great heaps of notebooks which, technical and abstruse as they are, send one's thought for a moment to Hawthorne. Engaged as he is, he might be called a Hawthorne whose personages are chemicals. It is the study of both alike to place their characters in unusual circumstances and watch the result. As to the phonograph itself, when he talks to it scraps of German, Spanish, Latin,—for he knows something of them all,—when he shouts to

it: "Well, old Phonograph! how are you getting on down there?" And it answers back in its grumbling or spiteful metallic tones, it is difficult to rid one's self of the notion that there is indeed an elfish personality there which has its own views of things and must be considered in its feelings.

Of the men of prominence with whom his position has brought him in contact, Edison speaks with the most respect and warmth of the scientists. He finds them more simple, unselfish and high-minded than any others. He describes his interviews with Sir William Thompson, and dwells with interest upon his bad hat and not very good clothes.

It may be asked how he amuses himself. He invents. What is his object in life? To what is he looking forward when he shall have accumulated an enormous fortune? Simply and always, to invent. If he worked hard while in obscurity, his exertions, now that everything is at hand to make the labor efficacious, are redoubled. It is not luxury that tempts him. He does not indulge in it. Nor is it public approbation, to which he is good-humoredly indifferent. He is a burning spark of inventiveness, and that only. He has called his children, one Dot, the other Dash, after the symbols of the telegraphic alphabet. He wishes to produce something at least as good as the phonograph every year.

It is three in the morning, and a late hour even for so tireless a mind. The flaring windows cease to mock the rural darkness, and the long building is outlined only against the sky. The air is cold, and the tall grass dripping with dew. The inventor circles one eye with his hand, to gaze through it at the stars, and goes stumbling down to his house over the clods.

OUR PATENT-SYSTEM, AND WHAT WE OWE TO IT.

WE are a nation of inventors, and every invention is patented; yet, curiously, there is no subject quite so void of interest to the average "gentle reader," as patents and patent-rights. Why, it is hard to say; for there is no factor of modern civilization that comes home to every one more constantly or more closely. Indeed, in their ubiquity and unresting action, patents have been aptly likened to the taxes which Sydney Smith described as following the overtaxed Englishmen of his day from the cradle to the grave. Does the comparison hold as

well, as some assert, in respect to burdensomeness?

It is not to be expected that an institution which enters so potently into our life-conditions as the patent-system does, should be, in all its workings, invariably beneficial. Human interests are very conflicting. The sunshine or the rain that makes my harvest sure may spoil yours; and, as with the forces of nature, so with human contrivances. They must of necessity go contrary to our wishes sometimes. The most we can reasonably ask of any social or govern-