Students as Conductors in Philadelphia. The Electric Engineer says that "during the past summer between 30 and 40 students of Jefferson Medical College, the Philadelphia College of Dentistry, the University of Pennsylvania and other colleges in this city obtained employment as conductors on the cars of the People's Traction System of Philadelphia. All of the young men came from outside the city, and were working their way through college. The last of them handed in their resignations last week, which the company accepted with regret, for the young men had proved to be the best conductors in its employ. An official of the company said the students were thoroughly honest, intelligent and polite, and as their desire was to earn as much money during the summer as possible, they were always willing to work extra hours and take out special cars. They lived economically and have probably saved something like $\$ 130$ erch, which will go a good way toward paying their college expenses next winter. One of the students has almost concluded not to go back to college, he likes railroading so well, and is still in the employ of the company.'

## THE MAGNETIC BICYCLE

In some parts of the country there are malicious persons who throw tacks in the roadway to annoybicycle riders by perforating the pneumatic tires. To meet this difficulty it has been proposed to attach a magnet in front of the forward wheel, with the object of picking up the tacks as the machine rolls along.
A caricaturist in one of the cowic papers has made use of this idea in the accompanying sketch. Here the cyclist is represented as carrying such a powerful magnet that it not only picks up tacks, but even draws out the nails from the shoes of passers-by.

## Obstinate Thumping.

Sometimes an engine which usually runs well develops an obstinate pound or thump, which persists in spite of all the doctoring that can be done to the machine. In rain the engineer will go from the wrist pin to the crosshead, and from eccentric to bearing. Even the flywheel and the manner in which it is keyed upon the shaft will be investigated, to see if the thump is located therein. After all cated therein. After all these things have been tried in vain, just give the engine a trifle more compression and note the re-
sult. Probably it will cure sult. Probably it will cure
or make it worse. In the or make it worse. In the
latter case change the latter case change the
valve again and give a little less compression than there was before. In nineteen cases out of twenty, says the Safety Valve, the change in compression will|gait is slow and plodding, formed in the painful schoo do the business. The philosophy of the business is this: The compression is too little or too great to allow the engine to run sasoothly over the center; and at that point the piston gives a "yank," which causes wrist pin and connection and sometimes the main bearing to vibrate to the extent of the lost motion, forming the thump or pound, which is so objection able to the good engine runner.

## Should Your Boy Go to College

Is a college course the best training for a boy designed for a business career? Upon this important question good judges differ. The editor of Munsey's, believing that those entitled to discuss this question with authority are rather the practical men of action than the theorists of educational science, has collected and presented the views of some of New York's leaders of affairs on this subject. In his introductory remarks the editor says :
"It might perhaps be thought that in the trial of such a cause each juror's verdict would depend upon his own personal history; that the college alumni would support the honor of their alma mater by voting for an academic training, while those who stepped di rectly from the school to the shop or office would advise others to seek business success by the pathway they themselves followed. This is, however, by no means invariably the case. There are university gradu-ates-men who made good use of their time in the classrooms, and who went on to honorable places in the world-who question, nevertheless, whether those four formative years might not possibly have been spent to formatile years might not possibly have band
not most of those who have gained success without a college course look back upon their early days with a regretful sense of having missed something that would have helped and benefited them all through life; of having entered the arena without a weapon which nothing can entirely replace, even though they win the battle with the arms at their command."
Mayor Strong thinks that while a college education is a good thing to have, it is far from being indispensable to the business man. He says that if he had to choose between two applicants for a position, the one a college-bred man aod the other a smart young fellow with only a common school education, he should en gage the first, if the post in view would warrant it, and provided the college man displayed an equal capacity for work. If the other applicant was found to be more active, more willing, he would prefer him. Mayor Strong concludes by saying :
"A college education requires the investment of a small capital and the expenditure of several years of study. The boy of natural talent, who enters business life when he leaves the public schools, begins to earn money at once; but it does not follow that the college man's time and money have been wasted. His increased broadness of vision, the greater extent of resources at his command, will equip him to contend with the exigences of life, and to grasp the business pro blems that will confront him, with a surer hand, a clearer head, and more ready determination than his brother. The latter's advance in his chosen field will be steady, the result of unceasing labor. The college-bred steady; the result of unceasing labor. The college-bred


## THE MAGNETIC BICYCLE

of experience.'
Similar ground is taken by Hon. Roswell P. Flower, who says that if he had a dozen boys, he would no end all of them to college, but would carefully select rom the number those he judged to be best fitted for bigher education, and the rest would have to get along as best they could with elementary knowledge. He had to make his own way thus insufficiently equipped, and while he is quite contented with his fate, he cannot help wishing sometimes that in his youth he had had better opportunity for developing bis natural ability. Mr. Flower invites a glance at the careers of some of America's great intellectual leaders of the past who had no college education, such as Clay, Douglas, and Lincoln. He says :
"I think a college education the greatest boon that can fall to the lot of a boy endowed with a clever and active mind and a wholesome thirst for knowledge. However humble a man's station in life, knowledge will enrich him in the long run, one way or another At the same time a university training is not essential to success in business life. Moreover, I should hesitate to advise a parent to send even the brightest boy to college if $I$ was not quite sure that he could withstand the emptations sure to be offered to him there. There is too much luxury about our present-day college life

Very few of the business men and politician of the older generation were college-bred; the majority of those who are leaders in the commerce and industry of to-day, too, have achieved success upon a basis of a common school education; but the desirability of a aniversity course is becoming more and more appar ent as the strugcle of life sharpens. Nothing will more
thoroughly fit a boy for the battle before him than natural talent developed by a college education, and Oacked up by frugal habits."
One of the most conspicuous disbelievers in the university for the training of a boy for a business life is the well known banker, Henry Clews, who is reported as saying :
"Think of a man going into business with three fourths of his brain cells filled with classical knowledge dead languages, and high sounding but unpractical ideas!
'I have been severely criticised for saying that I would not have a college-bred man in my office. Here is my reason: To become a successful merchant banker, or broker, one must begin young. Most college boys, when ready to enter an office, are over twenty years of age. I have a son at college-a six footer, in his twenty-first year. Can I ask him to undergo the training I deem necessary for every business man? Would he be willing to commence at the foot of the ladder, with bovs of sixteen, and on a salary of $\$ 150$ pe year? Why, that youth not only knows more, in every branch of knowledge, than all the office boys and clerks in this office; he knows more than his father, too.
"A collegian cannot, or perhaps will not, humble himself sufficiently to learn the rudiments of the business man's vocation. He rebels against the discipline necessarily imposed upon a subordinate. He has been used to recard himself as a brilliant young gentleman for several years; can you blame him for objecting to sit on the same bench with errand boys? And has he enough practical know ledge to deserve a place behind the desk? In my opinion the average gradu ate does not even know enough of arithmetic and of caligraphy to earn, upon his arrival in an office, a salary of five dollars a week. My legible hand secured for me the first good position I ever held the average college gradu te writes a fearful scrawl, and is proud of it. I under stand that none of our universities employs a teacher of caligraphy. This is a sad defect, of which the collegian does not become aware, as a rule, until it is too late to remedy the evil.
'I have practically test ed the problem whether a college education is desir able for a business man. Years ago I employed sev eral college men one afte another; none of them suc anoth in benefing ceeded in benefiting eithe my business or himself So I got rid of them. O the boys who came to me equipped with nothing beyond a common schoo education, a sound mind,
and an ambition to work, dozens are now independent business men, while as many hold responsible position with large firms."
a more moderate view is expressed by a member of he famous Seligman fraternity, who says that in his business he prefers men who have received a college education, but does not make employment conditiona upon that fact. Although college alumni are com paratively scarce among the business men of the pre sent generation, he believes that the next generation will abound with them, for in every walk of life the necessity of higher education is becoming more and more apparent. He thinksthat while a man of sound mind and good habits will come to the front, whether he is college-bred or not, with equal gitts and with the same application the collegian will outstrip him in the ace.
The article closes with the views of Mr. Chauncey M. Depew, from which we quote :
"While the world gives on its material side such examples of success as Commodore Vanderbilt and such instances of wise statesmanship and service to his country as Abraham Lincoln, we must remember that in the affairs of life no comparisons can be made with the phenomenally gifted who are endowed by the Almighty from their birth with powers far beyond the equipment of their fellows. With the business man who must be more than his rocation, the artisan large than his trade, and the farmer more learned than in the traditions of his fathers, it is the tranned intellect disciplined by higher education which alone has any certainty of success.

This is not a modern thought, a new-fangled idea American independence, and the founding of our
nation upon constitutional lines, embodying the experience and the lessons of the ages, was the work of the graduates of the colonial colleges. Harvard, Yale, and Princeton, Columbia, and William and Mary were the architects of the Declaration of Independence, of the Constitution of the United States, of the union of the States, and of the incomparable system of executive, legislative, and judicial independence and inter tive, legislative, and judicial independence and inter-
dependence which have survived so successfully a century of extraordinary trial and unprecedented developtury of extraordinary trial and unprecedented develop-
ment. Samuel Adams, in his commencement thesis at ment. Samuel Adams, in his commencement thesis a
Harvard, struck the keynote of colonial resistance. John Morin Scott brought from Yale to New York the lessons which prepared that rich and prosperous colony for the sacrifices of the Rebellion. Alexander Hamilton, a student at Columbia, though only seventeen years of age, educated the popular mind to the necessity of the struggle; while the pen of Jefferson, of William and Mary, wrote that immortal document which lives and will live forever as the most complete charter of liberty
" The best proof of the value of a college education in all the pursuits of life is to be found in the eminent success of those who have enjoyed it in the higher walks of the professions, of statesmanship, of business.' -The Literary Digest.

## Power Required for Electric Traction.

In an article in the Sibley Journal of Engineering, Mr. James Lyman gives the results of a number of tests made in different American cities of the power required for electric traction. At Rochester, where the first of Mr. Lyman's records were obtained, there are about 20 miles of track which was in good condition at the time of the test. The number of cars on the road was 40 , each weighing about 8 tons and provided with a 15 horse power geared motor. In general the road was level, but in the heart of the town there were some gradients of from 3 to $4^{\circ} \%$ per cent. Mov ing on the level the necessary tractive power averaged
38 lb . per ton of car, and for the whole run over the 38 lb . per ton of car, and for the whole run over the
four principal routes at 6.5 miles per hour, the average horse power was 1.4 per car, and the maximum 6 horse power, this latter being used only momentarily. At power, this latter being used only momentarily. At
Buffalo the same average power was required, but the
maximum was $6 \cdot 6$ horse power. In a large $W$ estern city a car with the axles coupled direct to the motor, with-
out the intervention of gearing, took 0.92 horse power per ton on the average with a maximum of $4 \cdot 7$ hors power. In wet weather the tractive power required is reduced, the rain acting as a lubricant. Wetting of the rails round curves is particularly effective, the requisite tractive power being thereby reduced by one-third. Comparative experiments made at Ithaca, N. Y., showed that on gradients the tractive force required exceeds that on the level by more than the theoretical amount.

The Dismal Swamp and its occupants.
"I have just returned from a visit to the Disma Swamp," said Dr. A. K. Fisher, ornithologist of the Department of Agriculture, in Washington, the other day. "It is a strange region, full of oddities that are not to be found elsewhere. The purpose of my expedition was to investigate the fauna of the locality, and of rare mammals and birds I secured quite a number. Snakes are abundant and are alleged by the natives to be venomous, but all that I saw were harmless. When I picked up a good-sized one from a log and held him by the neck, the negro who was paddling for me shuddered so he nearly upset the boat.

I found about fifty species of birds breeding in the swamp. One of them was Swainson's warbler, which is very rare. I trapped several species of small micerice mice, field mice, golden mice and lemming mice. The lemming mouse is hard to catch, because it will not take any sort of bait; the only way to capture it is to set a trap in its runway. I set my traps in dry places out of water. Among other things I got two rare
"There are plenty of cattle in the swamp-small, dark and very wild. They are the progeny of animals that have strayed from domesticated herds. Hunter stalk and shoot them like deer. Bears are numerous In the autumn they feed greedily on the fruit of the sour gum. Wildcats, opossums and raccoons are no scarce, while squirrels are remarkably abundant. The squirrels have discovered an easy way to get a living by going along the shores of Lake Drummond and picking up the nuts and berries which have fallen into
the water and drifted in windrows. They trot along the logs and fish them out with their paws. Deer ar common but hard to get. In the fall hunters run them into the lake and catch them with dogs.

There is fine fishing in Lake Drummond, which contains plenty of perch, black bass, two kinds of pickerel three species of sunfish and other panfish. There is no dry ground in the swamp, and one sinks at every tep to his knees in mud. The cane which forms brakes all through the South is abundant. Together with a varied undergrowth, it is tangled with vines that run up into the trees, so that half a mile an hour is a good rate of progress. One must carry a knife to
cut the vines, walking being further impeded bs the cut the vines, walking being further impeded by th on like hooks.

The boats used in the Dismal Swamp are all dugouts, made from cypress logs, twelve feet long and very narrow. To shape such a craft properly is a nice piece of work. The novice who steps into one of thes boats is apt to go out on the other side, but the native stands up and paddles with security. The water is darker than amber and excellent to drink; it is said to be a sure cure for malaria. There are no malaria iseases in the swamp. The swampis full of magnolias, rom the size of bushes to trees sixty feet high.
"When I was there they were full of flowers. The cypress trees are cut for shingles. The best trees for the purpose are those which fell from twenty-five to fifty years ago, and are now covered with moss. The negroes wade in and cut off the moss and rotten bark Then they cut up the log into shingles on the spot. The next best tree is one that is newly fallen, and th hird quality is the tree that has to be felled."-Philadelphia Telegraph

Accurding to Dr. Krüger, of Charlottenburg, Ger many, a mixture of equal volumes of acetylene and car bonic acid gas can be used with all ordinary gas burn ers and gives an excellent light, and which is practi cally entirely without the explosive qualities possessed by the pure acetylene gas. Compressed acetylene and carbonic acid gas can be obtained commercially in Germany, so that gasillumination can be obtained in dependent of gas companies' pipes.

## RECENTLY PATENTED INVENTIONS.

 Railway AppliancesCar Fender.-John F. Girtler, Brook yn, N. Y. This fender is conveniently attachable to any car, and adapted to be folded up when not in use The fender frame is detachably connected by hooks wit y and downwardly extending platform, held in positio y and downwaraly extending platform, held in position
by chains, and beneath which are track rollers, ther being on the front end of the platform a tripping plate connected by springs with a guard rail, which is swung tho position to hold a person in the path of the car afely on the fender, when struck by the tripping plate.
Buffer and Draught Device for ars.-George E. Shuey, Lawtey, Fla. This improve ment is designed to relieve car frames from pulling bocks or strains, or the impact of one coupling on another. A yoke is transversely secured to each coupling,
at each side of which, on the car frame, are guide rods carrying springs pressed on by a follower plate, draught rods secured to the yokes passing loosely through the follower plates

## Electrical.

Thermometric Circuit Closer.Richard Pearson, London, England. According to this improvement, a thermometer mounted on a horizontal
axis is so balanced as to be caused to oscillate under the dieplacement of the center of gravity by the expansion and contraction of the thermometric fluid, thus automatically completing or breaking an electric circuit for
any purpose. A novel form of thermometer is employed, iny purpose. A novel form of thermometer is employed, expansion and contraction of a lighter fluid, and also as a means of producing the oscillation of the instrument, the balance of which may be readily adjusted so that it will oscillate at any given temperature.

## Mechanical.

Numbering Machine. - Thomas F. Geary and William E. Bracewell, Brooklyn, N. Y. This mprovement is more especially designed for use in ro-
tary web-perfecting printing presses and other machines, to be inserted in the type or printing plate cylinder. to effect numbering with each impression. The numbering wheels, meshing with gear wheeis, are monnted in a frame to be set in the plate, the shafts of the wheels
passing through a slot in a spring-pressed slide carrying passing through a slot in a spring-pressed slide carrying a pawl engaging one of the gear wheels, while a head is
engaged by the impression cylinder to operate the slide
Engraving Machine.-Jere G. Kingsbury, Bridgeport, Conn. This is a machine for cutting numbers in intaglio, or below the sarface, apon a counting wheel, the wheel doing all the work of cutting and has two shafte, one supporting a master wheel and other a blank wheel, there being means for imparting rotary movement to one shaft and a compeneating gearing between the two shafte, while a delineating arm having a tracing point engages the master wheel and a cutting
tool engages the blank wheel.

## Agricultural.

Hay Loader.-Ole and William Swen-
n, Cresco, Iowa. In this implement an elevator is sus
with reciprocating feed arms operated from one of
drive wheels, the mounting of the elevator enabling person standing upon the load to readily elevate the upper end of the elevator. At the rear of the elevator is a rake, and shields facilitate the grasping of the hay by
hook teeth at the bottom of the elevator arms, two these teeth on each arm delivering the hay from the rake to the elevator.

Miscellaneous.
Bicycle Wheel.-Gustave Le Blanc nder Johnson, Mead, Neb. The tire of this a rim of similar outer surface and having side flanges, and the rim is connected to the spokes by means of bow prings, the spokes crossing each other, and each spoke which connected with the epring by a nipple or nut, by which the springs may be placed under more or less ten-
sion. By this means a maximum degree of resiliency is given to the wheel without employing a pneumatic tire, and the wheel is made very strong.
Blasting Powder. - Benjamin C. Pettingell, Victoria, Cauada. This is designed to be a cheap powder of great strength, which will emit no
flame when exploded and will make less than half the smoke of the black powder in common use. It is manufactured by first immersing powdered carbon alone in a solution of niter, drying, and afterward adding and Evaporating Liquids.-Leon F. Haubtman, New Orleans, La. An apparatus for evaporating water and saccharine solutions or other liquids has is caused to absorb the moisture contained in the tiguid is caused to absorb the moisture contained in the liquia blower, to come in direct contact with a flowing liquid, the liquid flowing in an opposite direction to the movement of the air, and a cur
the current of the liquid.
Filling Chocolate Dippers.-Cyprien Gousset, New York City. This inventor has de-
vised an apparatus to facilitate the manufacture of chocvised an apparatus to facilitate the manufacture of choc olate cream drops, consisting of a table provided with projections, each adapted to support a cream drop in position to be passed into a pocket in the chocolate dipper, a perforated guide board causing
Affixing Stamps.-William L. Dins moor, Portland, Oregon. This inventor has devised machine, to be operated by one hand, for applying the machine holding a large number of stamps, which are fed out one by one, moistened and applied. The machine has a spring-controlled plunger, beneath which
is a sliding table, a stamp-feeding device being operated simultaneously with the upward movement of the plunger, while a moistening device movement of the plunger is operated from the table. It is said that the be used for moistening envelopes.
Music Leaf Turner. - - Daniel T. Fox. Mount Pleasant, Pa. The body of this device supports a series of pivoted swinging sheet-carrying arms, finger-
operated throw devices being arranged when pressed operated throw devices being arranged when pressed
upon to throw the carrying arms. The throw devices include lever members to impart a speed movement to the
arms, giving them increased speed as they near the end
of their movement. The turning action is effected in a gentle but positive manner, without danger of tearing

Clothes Drier.-Williaim M. Rowley, Cuba, N. Y. A rack of very simple and inexpensive con-
struction has been devised by this inventor, capable of struction has been devised by this inventor, capable of
being attached to ang convenient support, and which being attached to any convenient support, and which
when in use will be firmly braced, the arms adapted to support the clothes being held adjustably in a horizontal
position. When the rack is not in use it position. When the rack is not in use it may be folded
downward compactly parallel with its support and be

Bed Clothes Holder.-Russell T. bed, this inventor has devised a holder, the gripping jaws of which will not injure the most delicate quilt or other bed covering, a locking device setting the jaws at various distances apart or substantially close together
to effectually hold the thickest or the thinnest bed various
to effect
clothes.
Lawn Sprinkler.- Russell T. Joy, Tacoma, Washington. This is a sprinkler of inexpensive construction, comprising virtually but two parts,
and arranged for the easy regulation of the spray. The and arranged for the easy regulation of the spray. The
casing bas an arched bottom, which will not injure the surface of the sod, and has an inlet opening at one side to which the hose is coupled, while the separating or sprinkling cone is screwed adjustably to place, to form ine spray or to deliver the
Culinary Utensil.-Edward O. Rabon, Pblladelphia, Pa. A utensil for pouring batter on
a griddle in making batter cakes has been provided by this inventor. It comprises a vessel with an outlet at ita lower part controlled by a valve actuated by a lever ad a minimum movement of the hand and is made at once simple and convenient.
Napkin Holder.-Alexander A. Vernon, Owen Sound, Canada. This holder permits the wearer to readily apply it on a collar or neckband, and
consists principally of a back plate having on its upper end rearwardly extending hooks, the plate having at its lower ends a doubled up clamping band to securely hold the napkin in position.
Design for Fan Rack.-Alexander H. Davison, Athens, Ga. This device comprises a vertical column or post with circular base, there being on
star-like figures with serrated or toothed edges.

Note.-Copies of any of the above patents will be
urnished by Munn \& Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

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## SLIENTIFIC AMERICAN

bUILDING EDITION.
SEPTEMBER, 1895.-(No. 119.)
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