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THE ROSE TECHNIC.

VOL. III. Terre Haute, Ind., January, 1894. NO. 4.

THAT the work and scope of the technical school is not always fully understood, even by those generally considered well-informed, many a Tech will be willing to attest. He who has been placed in the delightful position of final arbiter on a disputed question in the classics, or literature, or upon a poser in pronunciation, to be decided "just as is done at your college," could do exactly this and say nothing, but if he has the proper pride he gives an answer, whatever the subject, and if he hits it right, woe betides that young man. He becomes an authority and will need all his mathematical practice in imaginaries to keep up his reputation till the end. It may not be that the general public do not appreciate the term technical, so much as that they disregard it, and that one's acquaintances knowing one to be at college somewhere simply classify him according to the old standards. And when some would do the "highly friendly," what a dream of bliss it is to be taken in hand and put through several long catechisms as to the relative greatness of Cæsar and Alexander, the psychical aspects of theosophy, or the surpassing advantages of Greek roots as a mental descipline. But this ordeal fades into insignificance when he of the public takes his turn about and seeks to edify you with a most detailed account of how a friend of his, "who, by the way, is a mechanical genius," speeded up a machine by means of an arrangement of large and small pulleys with the belt running over them, or he may tell you just how the smoke problem could be solved simply by burning all the gases, and most surprising it is if you, a college student, know any of these things. Fully as delightful is he who, on the other hand, knows something of your shop practice, who tells you of his four years' apprenticeship in the machine shops, and then looks so condescendingly upon you if it occurs that in your "college-work," you have not run across all the handy expedients which he has acquired in years. The student latest to be heard from is the Rose man who was forced to undergo a regular Chinese civil service examination on all the points of the air brake and kindred appliances at the instance of a locomotive engineer, who evidently had found "polytechnic" and "pneumatics" masquerading as synonyms somewhere along the track on his run. The worm may turn; and if, one of these days, each and every indication of the lack of an absolutely correct idea of the lines and provinces of an institute of technology draws down upon the indicator the most full and complete exposition of the entitles and theory of the school from times past right down to the latest practice in the science, we can only say "Poor fellow! he brought it upon himself."

* * *

NOT a great while longer and the annual meeting of the State Intercollegiate Athletic Association will occur. Then will be decided the place at which the Field Day will be held. Now we know just where this ought to be; the next thing is to convince others. Rose Polytechnic wants Field Day. Let that be borne in mind by everyone. We have shown that we can

manage it with the greatest success, and we have at our disposal the best grounds in the State for holding such a meet. Last year there was some talk of holding Field Day at Indianapolis under the management of the State Association. At first sight this might seem a pretty idea, but experience has shown us that what is everyone's affair is no one's business, and the success of the plan is open to question. The Field Day differs radically from a football contest arranged by the two managers. In the first place, there are many more colleges involved and numberless details enter into the arrangements which do not come into football preliminaries. In the matter of apparatus it is hard enough when right at home to have it in good shape and on hand. What would it be at Indianapolis? The time taken up in travelling to and from the capital city on the part of the college representatives having the matter in charge would be a serious objection. When a single college assumes the burdens it becomes a matter of college pride and receives better attention, at least it has so far. THE TECHNIC believes in a one head management and thinks that head should be R. P. I. Let us send a strong delegation to present our claims at the meeting and be prepared to back up our petition with a very liberal proposition.

* * *

THERE seems to be a doubt in the minds of some as to the present status of the school yell. It will perhaps be remembered that in the Alumni columns of this paper for October, mention was made of the action of the Alumni Association in recommending that the repetition of the first line of the yell be done away with. Up to this time of writing no official notification to this effect has been made to the school and the yell remains as of yore. If any change is to be made it would certainly be well to have it done before the beginning of the spring athletic campaign, and THE TECHNIC respectfully suggests that any communications from the proper officers of the Alumni Association will receive due consideration before the general assembly.

FOLLOWING along in the train of that time-honored and most valuable admonition to "make hay while the sun shines," comes the thought that we do not always know just where the sun does shine. It is in such a year as this that the educational institutions of the country should be appreciated as the fields of the most luxurious growth. This is a good year to be in college, if for no other reason than that there seems to be little to do out of it. In times of great prosperity the prospect of immediate money-getting not infrequently appeals more strongly to the young man than does the quest of learning, while to him already enrolled in the latter cause those arts and sciences which are not easily comparable in the columns of the daily stock quotations may lose force. Now, however, much of that glamour and attraction is surrounded by the haze which we may have heard called hard times. Indeed, this would seem to be the ideal time for study, and doubly unfortunate is he whom the exigencies of the times calls from his books.

* * *

IT was with considerable pleasure that well-wishers for R. P. I. athletics noted that the Y. M. C. A. gymnasium class was to be formed again this year. We think that there will be no exaggeration in saying that the class of last year retained the pennant for us. Theoretical athletics does not carry off the medals; only in the training of the months preceding is it that the reserve force and skill of the winners of the decisive day are obtained. The Field Day pennant has become an old friend with us and any thought of parting with it must not be tolerated. Physical Director Barnes, of the Y. M. C. A., is right with us in the work of strengthening the bonds which holds the honors to Rose. It remains for us to do our part.

* * *

IT is to be hoped that Prof. Waldo's suggestion of giving a medal to the best all-round athlete will be adopted at the State A. A. meeting and made one of the regular features of Field Day. As the professor said, the all-round man may not

have won a single event but in the breadth of development exceed all, and this surely merits recognition. Our representative should be instructed to advocate the measure.

* * *

WHILE still upon athletic matters, perhaps a word or two as to baseball may not be amiss. Our record for the past two years has not been gratifying nor what it should have been. It has not been from lack of material on the teams, the men occasionally demonstrated that they could play ball. Take last year, it is said that the best game of the season was that in which Rose defeated De Pauw, but it was also the last one of the season and all hope of honors had been lost in earlier defeats. This improvement at the close indicates that practice is what was necessary. Too much time had been given to batting and catching flies and not enough to "sawing wood," to use an expression which will be readily understood. Our fielding was always good, but take other things, as for instance, base running, the most lamentable ignorance was shown and a working knowledge of the game's fine points was not usually much in evidence. More team work, which means team practice, is wanted. Can we not profit by experience and be ready to play ball beginning immediately with the opening game?

* * *

THESIS work from now on will occupy a great deal of the mind of the Senior. According to the catalogue, in the thesis the student "records the independent investigation of some subject congenial to his tastes, and included in the scope of his course." It is hardly to be expected that these records of the work of five or six weeks of investigation will set on fire the scientific world, in which years are devoted to the study of a single problem, but the work becomes of greatest value to the student who conscienciously goes about it, as giving an insight into the manner in which problems are attacked. It will be well for the men to bear in mind the offers of prizes by engineering publications for the best graduation theses. There are men in the class who can make a strong bid for recognition. Whether they are successful or not in this, undergraduates and long-suffering friends may anticipate for Commencement the usual number of big words and untranslatable scientific terms brightened by the usual scenic effects of curves and graphic solutions, unless—unless it should be decided that justice should be tempered with mercy.

INDICATED STEAM CONSUMPTION.

BY PROFESSOR C. S. BROWN.

By measurement from its indicator diagram we are enabled to compute the amount of dry steam in an engine cylinder at any point of its stroke, and make interesting and instructive deduction as to its steam consumption under different conditions of working. The diagram records the steam pressures and the volumes filled with steam for all positions of the piston of the engine and steam tables furnish us with data as to the weights of a cubic foot of saturated steam under all ordinary pressures. If, therefore,

S = Weight of dry saturated steam in pounds per I. H. P. hour.
a = Area of piston in square inches.
l = Length of stroke in feet.
n = Number of strokes per minute.
c = % clearance.
P = Mean effective pressure.
k = Length of indicator card in inches.
$\frac{12\,l}{k}$ = Ratio of length of stroke to card length.
w = Weight of dry saturated steam per cu. ft. at pressure p.

Then, for an engine without clearance, and with expansion continuing till the piston reaches the end of its stroke.

$$S = \frac{\text{Cyl. vol. in cu. ft.} \times \text{strokes per hour} \times \text{wt. of cu. ft. of steam at terminal press.}}{\text{I. H. P.}}$$

$$= \left[\frac{\frac{a}{144} \times l \times 60\,n}{\frac{P\,l\,a\,n}{33000}} \right] w.$$

$$= \frac{13750}{P}\, w.$$

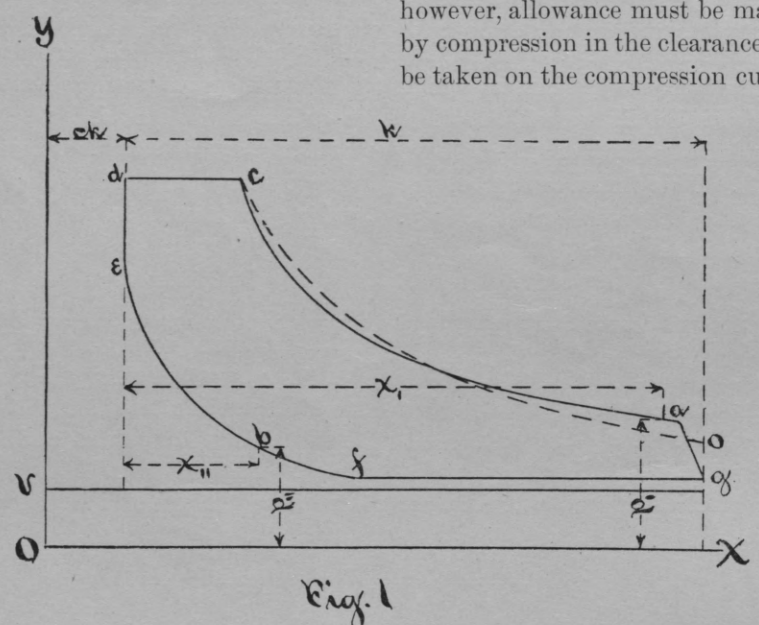

Fig. 1

But in every engine more or less clearance space must be filled with steam each stroke, as well as piston displacement. Also, release usually occurs at some point earlier than end of stroke. We must consequently correct our formula for these conditions:

Fig. 1 shows a card taken from an engine having clearance and with release occurring before the piston reaches the end of its stroke. For computing the maximum amount of dry saturated steam in the cylinder during the stroke, a point a should be taken on the expansion curve, as near release as possible. Let x_1 be the distance of this point from the admission line of the diagram and p_1 the corresponding steam pressure. Then,

$$S = \frac{\frac{a}{144} \left\{ \frac{x_1 + ck}{12} \times \frac{12\,l}{k} \right\} 60\,n}{\frac{P\,l\,a\,n}{33000}}\, w_1$$

$$= \frac{13750}{P} (x_1 + ck) \frac{w_1}{k} \quad (1.)$$

This formula can be used in all cases where there is little or no compression.

In an engine working with much compression, however, allowance must be made for steam saved by compression in the clearance space. If a point b be taken on the compression curve distant x_{11} from the admission line, and p_{11} be the pressure at that point, then by the same process as above.

Steam saved by compression

$$= \frac{13750}{P} (x_{11} + ck) \frac{w_{11}}{k}$$

and the value of S corrected for compression becomes,

$$S = \frac{13750}{P} \left[(x_1 + ck)\, w_1 - (x_{11} + ck)\, w_{11} \right] \frac{1}{k} \quad (2.)$$

This formula is applicable in all cases but can be put in more convenient form for general use as follows:

Suppose the point b (see Fig. 2) be taken at the same height from the vacuum line as a, then $p_1 = p_{11}$ and $w_1 = w_{11}$.

These values substituted in (2.) give

$$S = \frac{13750}{P}\left(\frac{x_1 - x_2}{k}\right) v_1 \quad (3.)$$

In a compound engine the computation may be based on the dimensions of the low-pressure cylinder, or its diagram, as all steam admitted to the engine passes through this cylinder. For the expressive $\frac{13750}{P}$ of our formula we must substitute, however, $\frac{13750}{v P_1 + P_2}$ in which P_1 and P_2 represent the mean effective pressures acting on the areas a_1 and a_2 of the high and low pressure pistons respectively, and v equals the ratio $\frac{a_1}{a_2}$ between these areas.

It will be noted that in formula (3.) clearance is entirely eliminated as a factor, and that $x_1 - x_2$ the distance between the points a and b can be measured direct from the card. (See Fig. 2.)

All other quantities entering this equation are entirely independent of the dimensions of the engine which, in the computation, need not be considered.

It should not be inferred from this result, however, that the steam consumption and consequently the economy of an engine may be independent of its size. Our formula merely deals with the amount of dry saturated steam shown by the diagram, for one-horse power developed, and takes no account of that portion of the steam admitted which is condensed on the colder walls of cylinder and piston.

This quantity under most favorable condition is considerable, and increases as the ratio of the area of condensing surface to the weight of steam admitted, becomes greater. Or, in other words, it is greater with small cylinders than with large.

It will also increase as the length of steam line to the point of cut off decreases, or as expansion increases, and the range of temperature through which the steam is worked becomes greater. How much this loss is can only be determined by actually weighing the steam delivered to the engine, either by weighing the feed-water pumped into the boiler, or better, by condensing the steam exhausted from the engine in a surface condenser, and weighing. In either case these weights must be corrected for entrained water, in order to obtain the actual weight of dry steam delivered to the engine.

Steam computed from the diagram will always be less than this measured weight by an amount varying with the condition of running, and could never equal it in any condition.

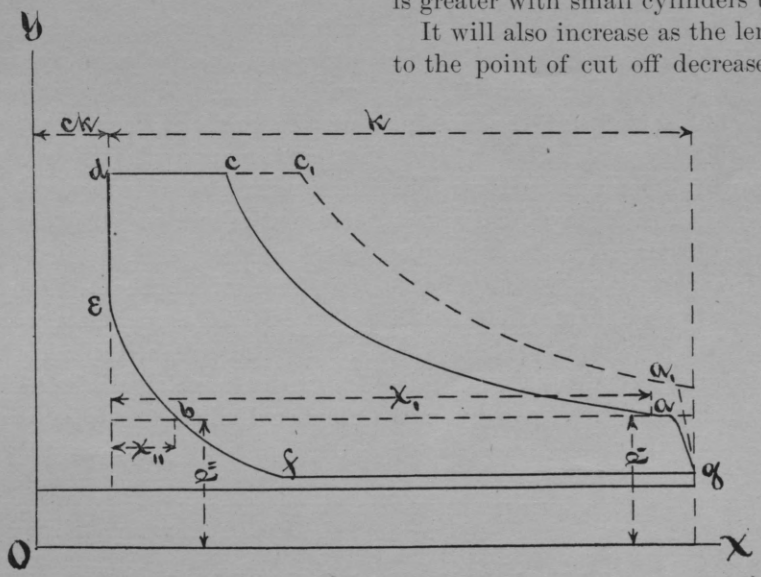

Fig. 2

We may extend the steam line of the diagram, Fig. 2, to the point c_1 so that the distance of this point from the clearance line $O\ Y$ represents the volume of the cylinder which the actual weighed steam would have filled per stroke had there been no condensation. If we then draw through c_1 a curve representing steam expanding and doing work in a non-conducting cylinder—or expansion without loss due to heat transfer between it and the walls of cylinder and piston, we have an area $c_1\ a_1\ g\ f\ e\ d$, which, neglecting a possible slight change in the compression curve, represents the work which might have been done by the total steam admitted under these supposed conditions.

By integrating this area and comparing it with the area $c\ a\ g\ f\ e\ d$ of the actual card, the amount of this lost work may be determined.

Interesting and useful comparisons may be made of the steam accounted for by the diagram at different points of the stroke, as for example, the two ends of the expansion curve, cut off and release. In almost every case there will be found less steam at cut off than at release, for the reason that a portion of the steam condensed on admission is re-evaporated later in the stroke by heat imparted to it by the cylinder when the steam pressure has fallen by expansion to such a point that its temperature is lower than that of the cylinder.

By drawing an adiabatic curve through the point c, Fig. 1, condensation is shown by the fall of the actual curve below the theoretical in the early part of the expansion and re-evaporation by its subsequent rise above it.

If the card shows less steam at release than at cut off, it might be a reasonable conclusion that steam was lost on account of a leaky exhaust valve or defective piston packing, while on the other hand a very great excess of steam at release might indicate a leaky admission valve. With very short cut off, however, and consequent long expansion and wide difference of temperatures between steam admitted and exhausted, the excess of steam at release over that shown at cut off is very marked, even with perfectly tight valves. The loss from initial condensation in such a case more than offsets the gain from working steam expansively, and sets a limit on the extent to which expansive working can be carried with profit in a single cylinder.

ALUMNI DEPARTMENT.

NOTES ON COAL MINING.

BY B. R. PUTNAM, '92.

The Oneida Colliery of Coxe Bros.' & Co., near Hazleton, Pa., is a typical anthracite mine and a description of it will perhaps indicate the general method of mining anthracite in Pennsylvania. Last summer the writer had the privilege of spending several weeks at this mine and the following is the result of that experience:

The strata in this region consist of long narrow folds with a northeasterly trend. The crests of these have been eroded so that coal is only found in occasional synclines. There are three "slopes" (or mines) at Oneida, Nos. 2 and 3, working different ends of the same basin, but No. 1, which has received the largest development, and is the one here described, is on an independent basin. Most of the work at No. 1 has been done on the Buckmountain seam, which here averages from 12 to 15 feet, but several gangways have also been opened up in the Mammoth seam which overlies the Buckmountain several hundred feet. The coal lies in a canoe-shaped trough about 1,500 feet wide by 500 feet deep and several miles long and is surrounded by the hard Pottsville conglomerate, which, in this region, invariably underlies the coal measures. The pillar and breast method of mining is employed at this colliery, as in fact at almost

all the anthracite mines in Pennsylvania. But this method is greatly modified by the thickness and inclination of the seam, the character of the roof, strength of coal, nearness of seams, etc., so that it is sometimes hard at first sight to see any method at all. At Oneida No. 1, the roof is good and the seam regular, but the pitch varies from nearly 0° at the bottom of the basin to a little more than 90° (as one of the miners expressed it) on one of the sides.

The mine is opened up by gangways driven at three different levels, respectively 184, 324 and 465 feet from the surface, the third level being near the bottom of the basin. These gangways are driven in the coal so that in a map they would show as contours of the basin. They are, in general, timbered by the collar and leg system, but under certain conditions of roof, etc., other methods are more economical of timber. The clearance between collar and rail is about 7½ feet. Communication between the two sides of the basin is effected by two cross tunnels on the first and second levels.

The breasts are opened up from the gangways in pairs and are driven up the pitch toward the next higher level, but leaving a "chain" pillar of 20 to 30 feet below the gangway. The breasts are driven at right angles to the gangway and have in general the following dimensions: For the first 18 feet they are from 12 to 14 feet wide and are then opened on one side to 27 feet, the straight sides of the pair being towards each other with a 16-foot pillar between. The width of pillar between pairs varies, but 50 feet is about the average. "Cross headings" are driven between the breasts of a pair about every 45 feet for the purpose of ventilation. A door is placed between the breasts in the gangway, thus sending the air up one breast and down the other. There are three methods of working breasts depending upon the inclination of the coal. "Buggy" breasts are used from 0° to 23°, "Sheet Iron" breasts from 23° to 30°, and "Battery" breasts above 30°. These limits are of course not absolute. The maximum inclination at which cars can be handled conveniently by hand is about 8°, and the minimum inclination at which coal will slide on sheet iron is 23°, so that between these limits other methods must be used. A combination of buggies and shutes, breasts driven at acute angles with gangway or self-acting planes, may be used between 8° and 23°. The "buggy" is simply a small car holding about a ton by which the miners take the coal from the face of work to the loading platform at the gangway. In the "sheet iron" breasts the coal slides down an iron shute about 3 feet wide to the loading platform.

In the battery breast enough broken coal is left to give the miners a place to stand on. Only about one-third of the coal is taken out, that being the excess in bulk of broken over solid coal. A manway is maintained by timbers and lagging up one side of the breast while the battery proper which is 18 feet from the gangway and which holds the coal back, is built of heavy timbers with iron lagging and a draw-hole 5 feet square. Under this is a check battery similarly constructed, but with the draw-hole on the opposite side of the shute, while below the check is the loading platform—often directly over the gangway. No timbering is used in the breasts proper. An inclination of about 45° is said to be the hardest to work.

Beyond clearing off loose pieces no pickwork is used in mining the coal. A simple "churn" drill, whose name is strikingly indicative of the method of operation, and black powder being the usual instruments of warfare. Some miners prefer an auger drill worked by hand. No power drills are used, the steam for the pumps being the only power taken underground. Holes are drilled 4 to 7 feet deep and fired with 12 to 20 inches of powder. Ordinarily but one hole is fired at a time and six or seven holes a day is good work for a gang of two.

Coal is conveyed from the breasts and ends of gangways to the hoisting slopes in strong cars of sheet iron and wood, holding over two tons apiece. The motive power is the much abused but truly intelligent mule. Two mules can haul three loaded cars, and trains or "trips" often consist of eight cars and five mules. On the first level there were thirty mules and one hundred and fifteen

cars; on the second, four mules and twenty cars, and on the third, one mule and seven cars. The mules on the lower levels are stabled underground, the others being brought up by a zigzag muleway.

There are two hoisting slopes about one-quarter of a mile apart. One, the breaker slope, hoists all the coal from the first level, which is at present the only one being extensively developed, directly to the top of the breaker. The coal is hoisted in "gunboats," or large skiffs (capacity, 2¼ tons), of which there are two—one counterbalancing the other so that the engine has only to hoist the net load. The engine is directly connected to the 11-foot drum and is double, each engine being tandem compound, size 22x36x38. The other slope has but a single track and is only used to lower timbers and hoist rock from the first level and coal and rock from the lower levels.

The mine is not very wet. The water from the second and third levels collects in a sump on the third level from which it is pumped by two Knowles' pumps to a sump on the first level, which sump also receives the drainage of that level. Here two Knowles' pumps put it to the surface. These pumps are regulated by a float in the sump. The gangways are driven on a dead level but a ditch along the sides is given sufficient inclination to carry the water.

Natural ventilation is employed in about two-thirds of the mine, the other third being taken care of by an exhaust Pelzer fan. In general, the air is made to go down the gangway taking in such of the breasts as may be working to within 50 feet of the end and is then brought back by a brattice along one side. Explosive gas is found only in one gangway and gives but little trouble. Choke damp collects in abandoned breasts.

The miners, who, by the way, are as a rule intelligent and sociable, work in squads of two, or four, if two shifts are employed. They are paid by the yard for driving gangways and battery breasts and by the car for working other breasts, but they are required to furnish their own oil, tools, powder, etc. They are "docked" for hoisting too much slate.

Space will not permit of a description of the treatment of the coal after coming to the surface, although the breaker is perhaps the most interesting feature of an anthracite colliery. But the reader is referred to an excellent article by Mr. E. B. Coxe, on "The Iron Breaker at Drifton," in Vol. XIX, of the "Transactions of the American Institute of Mining Engineers." The breaker there described is built after the same plans as the one at Oneida.

The loss of coal in mining in Pennsylvania is hard to realize until one has visited the anthracite region. Mr. H. M. Chance gives as a general estimate a loss of 60 per cent. in the mine due to fine coal, pillars, etc., and 6.4 per cent. in the breaker, thus putting on the market 33.6 per cent. of the coal in the ground. At Oneida, the loss will probably be less after the pillars are robbed.

A REVERSING MOTOR.

To the uninitiated observer the uncommon action of the reversing motor savors of the mysterious, and the cause or causes to which its action is due are not easily solved, but to you who have been introduced to the first principles of electricity the following will "be easily seen."

The fields of a small Weston motor were excited by means of a weak current from an Edison generator, while a current was sent through the brushes from a diminutive series machine. The Weston thus became a separately excited motor. The connections made, the motor was suffered to run with no load. Slowly the armature started up, its speed gradually increasing and continuing to do so for a few seconds, then the acceleration diminished until it became negative and the armature slowed down, stopped, and started up in the reverse direction for a like period of time. Thus the cycle was complete.

An ammeter placed in the series circuit bore evidence to the change in the direction of the current with each reversal of the motor armature. By shifting the brushes on the motor armature the periods of running and of rest varied. When the brushes were shifted to a nearly horizontal, *i. e.*, lead nearly ninety degrees, the motor armature did not reverse but merely slowed up peri-

odically. For a lead a little less the motor armature would stop momentarily and then proceed in the same direction; but should the brushes be moved farther from the horizontal, *i. e.*, the lead decreased, while the armature revolves, say to the right, and then returned to their horizontal position after the motion has reversed, the movement will continue in the opposite direction and the ammeter will show the current in the series armature to be reversed, as in the first case.

With a slight load applied by the hand, or a brake to the belt pulley, the motor did not reverse but ran continuously in one direction.

The action may be explained thus; when a motor is running it generates a counter or back electromotive force which opposes the passage of the driving current, hence the amount of current in the circuit is the difference between the driving current and that due to the back electromotive force. Now the back electromotive force varies with the speed of the armature as well as with the strength of the field of the motor, so that when the armature is at rest there can be no counter electromotive force and the actual energy to operate the motor is then a maximum.

As the speed of the armature increases, so does the counter electromotive force, and consequently the energy given to the armature diminishes until it reaches a point where the machine is no longer a motor receiving energy, but for an instant becomes a dynamo sending a current back into the series machine; which machine, its current continually cut down as the speed of the motor increases, for a moment has zero current and then a slight current in the opposite direction. However short the duration of this current, it suffices to reverse the polarity of the dynamo and cause it to generate in the opposite direction. With this polarity the dynamo builds up its fields, and as it does so, the motor armature is stopped and then started in a reverse direction, again building up its back electromotive force. And so the cycles continue.

When the brushes are not in a position of maximum commutation the motor more easily reverses, but when at the point of maximum commutation on the back electromotive force cannot quite overcome the current and the armature simply slows up without stopping. By cutting out the current which excites the fields of the motor, the reversal of the armature is stopped, as no counter electromotive force is generated.

Undoubtedly current from a "shunt" machine would not cause the motor to reverse as the resistance of such a machine is too great to be overcome by the counter electromotive force, which at best is very small. Yours, etc.,

E. F. Folsom, M. M. E.

NOTES.

In the recent annual election of officials for the Vandalia road, services of R. P. I. alumni appear to have been well recognized. Mr. Benjamin McKeen, '85, was elected General Superintendent of the Peoria Division. Mr. V. K. Hendricks, '89, was elected Superintendent Maintenance of Way of the Michigan Division, formerly known as the T. H. & L.

Hart, '93, is in St. Louis, assisting the superintending of the installation of electric light plants, one at the new Union Depot, another at the Union Trust Co.'s building. He is with the Seemens-Halske Co., and will be in St. Louis until about April 1st.

A. M. Hood, '93, writes pleasantly of his life in Washington, where he is employed in the Patent Office, and is also studying law. He reports that "Blackstone is the most powerful sedative known."

C. G. Wenzel, '93, in addition to his regular work as instructor in the Toledo Manual Training School, is at present working on patent drawings for a Toledo firm.

W. A. Layman, '92, returned to this city for a short visit, which included Christmas and the two preceding days.

C. C. Rose, '93, has charge of an electric plant at Camden, Ark., a town of about 6,000 inhabitants.

E. G. Waters, '88, of Pittsburg, Pa., visited friends in Terre Haute last Sunday, 14th inst.

McGregor, '93, has returned from Europe, and is now with the Westinghouse people.

ATHLETIC DEPARTMENT.

SPRINTING.

BY W. L. RICHARDS, YALE, IN THE UNIVERSITY MAGAZINE.

A sprinter more than any other athlete, is dependent for success upon his trainer, and though sprinting qualities are in-born, there are an infinite number of details that must be mastered before perfection is approached. The wonderful success that Yale has had in the sprints, scoring thirteen firsts in the long and short dashes since the institution of the intercollegiate meetings, is directly attributal to one man—Mr. M. Murphy, who has developed all the present world record holders at the sprints, viz.: Owen, $9\frac{4}{5}$; Jewett, $21\frac{3}{5}$; Sherrill, who holds the world record for 150 yards, at $14\frac{4}{5}$; and such other stars as Brooks, Swayne and Allen, who have all done even time. Every loyal Yale runner, myself included, is firmly convinced that Murphy can make any man, with the elements of a runner, do $10\frac{2}{5}$. But for those unfortunate short-distance goers, who have not had the advantage of his coaching, I append a few hints that I have found useful in my own experience.

In the first place, sprinting is almost entirely the result of nerve force, and the more of that quality a man can store up the better his chances for winning. One of the quickest of all animals is a cat, that being the only animal which can dodge the bite of a rattlesnake and disable the reptile before he can strike a second time. Yet watch a cat when "off duty." All it does is to lie around in the sun and do nothing, and the more a sprinter does of that, when not training, the faster he will run. Sleep is one of the indispensible factors of speed; it rests the nerves and builds up their strength. Don't go into hard training in regard to diet, and above all things don't run too much. In fact, the day before a race no running at all should be done.

The first thing that a man who wants to become a sprinter must do is to run 300 or 350 yards fairly fast, taking the utmost care that his stride be long and easy, and springing from the toe just before the foot leaves the ground. The advantage of this last point is very evident. If you watch an untrained man and then a sprinter run, one difference is especially noticeable, viz.: the sprinter springs from his toes, and the other man does not; and as a rule the sprinter will cover ten yards while an ordinary runner is going nine. At the same time, when commencing with this, begin starting. A good sprinter will beat most people two yards in the first five, and a great deal depends on that.

For beginners, the "Australian" or crouching start, is the best, for until a man becomes experienced and cool, he is liable to go off his mark before the pistol sounds, which means he will be put back a yard. This start is made by putting the feet about as far apart as one would step when going at an ordinary pace, with the hands holding the running corks on the ground about eighteen inches apart and even with the front foot. Don't let the hands be in front of the feet, for in that case a certain amount of ground is lost, in that case a certain amount of ground is lost, for the start must be made with the hands back of the mark, and if the feet are back of the hands just so much is lost. Always practice starting from a pistol, which can be bought for one of those silver standards which have lately been fought over so much. Practice the start always in the regulation way when the starter says, "Get on your marks!" "Get set," and then comes the "bang" of the pistol. A starter will nearly always give one plenty of time to get into position, and one need but rarely fear being sent off before getting down.

Try six or seven starts each day and get some friend to start with you; if slower than you, give him a handicap of a yard or more, and try to be up with him before he gets off his mark. One very good habit to form is that of taking a full breath when the starter says "Get set!" In fact this sometimes means a yard to a sprinter in going a hundred, and Sherrill used to say that he

won many a race by knowing when to breathe at the proper moment. Do not let the hands touch the ground until the command "Get set!" comes; then tighten all the muscles and press forward on the hands with the knuckles on the track.

After breaking off the mark run at full speed some twenty or thirty yards—strain at it all the way. In running the full distance in a hundred yards stride out after passing the twent-five yard mark in the same way as described above when running 350 yards, only of course, at full speed.

A common fault with many runners is to bend their bodies too far forward when endeavoring to attain a maximum speed. This is a mistake. The body, in sprinting, should be kept almost vertical and the head and neck held rigidly straight. If the runner bends over too much he is apt to cramp his breathing and shorten his stride.

After a couple of weeks of doing 300 and 350 yards at three-quarters speed, shorten the distance down to that of the furthest distance expected in the race—usually 220 yards. Never run further than this, nor do it at full speed; in fact, in practice, fifty yards is the furthest distance which should be done at top speed.

Finally, never try and beat the pistol; the honest starters are the ones who win the most races, and in the end you will be a better sprinter if you try to get off the instant the pistol cracks rather than before.

One often hears the statement made that sprinting is injurious for a man. No man is ever hurt by sprinting unless he has some constitutional trouble with his make-up, and in that case he had better refrain from athletics. Too much sprinting is bad for any man, just as is too much food or too much sleep. Of course one should not begin racing or any other violent form of exercise too young—before the heart and lungs have attained their full strength. In fact it is very seldom that the great sprinters do begin young. John Owen, the record holder, commenced running at twenty-eight, and made his record when he was twenty-nine.

R. P. I. GYMNASIUM CLASS.

A gymnasium class of Polytechnic students has been formed and will meet each Wednesday and Saturday evening at the city Y. M. C. A. building. The membership fee for the remainder of the school year has been reduced to three dollars. This is a special rate for students and is particularly opportune for those who desire to accomplish anything along the line of general or special athletics. The spurt made by the records last Field Day has a significant meaning. The day is past when anyone can enter the competitive sports with the prospect of accomplishing anything without careful and persistent preparation; this under the direction of a competent physical instructor can be obtained by joining the "Gym" class and besides the prospect of athletic acquirements, health and the basis for a strong constitution are among the possibilities.

NOTES.

The intercollegiate chess tournament, which was held in New York during the holiday vacation, resulted in a victory for Columbia. The best individual playing was done by Hymes, of Columbia, who won five games and played one draw. Hewins, of Harvard, was a close second with four games won and two games drawn. Result of games won by colleges were as follows: Columbia, $8\frac{1}{2}$; Harvard, 7; Yale, 5, and Princeton, $3\frac{1}{2}$.

At many of the eastern colleges base ball practice has already commenced. Princeton has six members of last season's team while Harvard has but one eligible man who played last year, the new rules throwing out four members of the old team.

The regular monthly meeting of the Athletic Directors was held Saturday, 13th, at which time business relating to grand stand improvements was concluded and twenty-five dollars was appropriated for the improvement of the baseball diamond.

The Harvard *Crimson* of January 3d, contains the new set of rules which went into effect January 1st, and which are to govern athletics at Harvard. They are essentially the same as those adopted by Harvard, and University of Pennsylvania, in the foot ball game between the two colleges. These rules define the position taken by these colleges relative to the eligibility of students who are permitted to compete in athletic contests. Their aim, evidently sincere, is the exclusion of professionalism in college athletics.

An athletic contest will be held Saturday night, the 27th inst., at the Y. M. C. A. building, in which members of the Polytechnic class will compete. An interesting time is anticipated among entries for the following events:

Putting the Shot.
Skipping the Rope.
Pole Vault.
High Dive.
Sixty foot Potato Race.

FOOTBALL POETRY.

Came to college,
Joined the 'leven—
Played one game
And went to heaven.—*Ex.*

As a maid so nice,
With step precise,
Tripped o'er the ice,
She slipped! her care in vain!
And at the fall,
With usual gall,
The school boys call,
"Third down! two feet to gain.—*Ex.*

REALISM.

A little deed forsooth it seemed.
Who could have guessed or would have dreamed
Of how it ended?
The facts, in truth, are sad to tell,
The faculty just gave them—well,
They are suspended.

ROSE LEAVES.

COMPRESSED AIR.

We have received from the Clayton Air Compressor Works, of New York, a pamphlet on "The Widening Use of Compressed Air," by Whitfield Price Pressinger. He says:

"Compressed air, utilized for power purposes, either locally or at a distance, has been known to the world for nearly two hundred years, Dr. Peppin, an eminent French engineer, having conducted some experiments with it in the early part of the eighteenth century. It has been more or less identified with almost every prominent engineering work in America in modern times, furnishing as it does a means of transmitting power a long distance from its source, without the heavy losses from condensation attendant upon the use of steam; or supplying the power for sinking a bridge caisson without interfering with the duties of the workmen inside; or permitting mines to be worked at levels where the use of steam would be impracticable, the exhaust air having a marked effect upon the temperature of the mine."

The employment of compressed air for sinking bridge caissons operating mine machinery, manipulating air brakes, etc., are familiar ones to nearly everybody. Among the less familiar uses Mr. Pressinger mentions the method of raising water from deep wells and says that many of our largest factories and mills have discarded deep-well pumps and become dependant upon their air compressors for their entire supply. "The plan

is that of the siphon and consists of little else than two plain parallel pipes inserted into the well, one acting as an inlet for the compressed air and the other serving as an outlet for the water, which is expelled in a solid column." An efficiency of as high as 70 per cent. is claimed for this method whereas the average of a deep-well pump is 30 per cent.

The propulsion of cars by compressed air offers an interesting study.

"The Mekarski system, which has been operated so successfully in Paris and other European cities, has been introduced into this country, and the Judson, Kames, and other systems are more or less known. A compressed-air motor needs no conduits or overhead contrivances, does not emit smoke or hot gases, and is almost noiseless. It is very light and can easily be handled on the steepest grades. It is simple in form and does not frighten horses, the machinery in front being almost invisible from outside. With the increasing efficiency of the best types of air-compressors, and the resultant economy in compressed-air production, the cost of this system is gradually approaching the most favorable comparison with other methods of street-car propulsion."

Among the more novel of the applications mentioned is that of the utilization of compressed air at the World's Fair in painting the large buildings by means of a spray, the air forcing the paint through a hose to a nozzle which is handled by the painter instead of his brush; playing away at the object to be painted much after the manner of the gardener of the lawn. In the dome of the Horticultural building the painter stood about seventy feet above his source of supply, and a large amount of space was covered in an incredibly short time by this method.

"Some years ago a steamer was seen one day to pass through the Killvonkull at the then extraordinary speed of twenty-five miles an hour. This was accomplished by means of air compressors pumping air beneath her hull, thereby imparting great buoyancy. Unfortunately the swell from her rapidly-revolving paddles was so great as to wash over piers and wreck small boats, and it was even alleged that it injured oyster beds in the vicinity. A drag was adopted to keep down the swell, but the expense of operating in this manner was too great and the project was abandoned."

The use of compressed air is evidently "widening" and he who would keep abreast the times will do well to watch this new industrial factor. In the concluding words of the author of the paper, "The old maxim that 'importance oft attaches to trifles light as air' becomes doubly true when we consider that this atmosphere, always so necessary to human existence, is being concentrated and harnessed to the service of mankind in so many new and widely-different ways.

ENGINEERING NEWS' PRIZES.

Students should not overlook the "Third Annual offer" of the *Engineering News* for the best gaduating thesis. This offer is open to all engineering schools of the United States and Canada and consists of three prizes, seventy-five, fifty and twenty-five dollars each. Honorable mention, togetther with two years paid subscription to the *Engineering News*, will be given to each other thesis which the judges decide merits special recognition. Considering the fact that several original subjects have already been submitted it is to be hoped that students of Rose will make an effort this year to distinguish themselves.

Hitherto no Rose men have entered the lists, so far as we know; the prizes for 1893 were awarded as follows:

The first prize of $75 to the thesis entitled "Comparative Tests to Determine the Availability of the Method of Transverse Breaking vs. Direct Tension in Testing Cement," by Herman E. Abbott, of Hanover, N. H., and Edwin J. Morrrison, of Henniker, N. H., graduates from the Thayer School of Civil Engineering of Dartmouth College.

The second prize of $50 to the thesis entitled "Nails and Drift Bolts," by F. W. Clay, of Richmond, Ky., a graduate from the course in Civil Engineering of Cornell University.

The third prize of $25 to the thesis entitled "Experiments to Determine the Power Absorbed

by a 56-inch Circular Saw," by Robt. C. H. Heck, of Heckton's Mills, Pa., and Henry B. Evans, of Dayton, O., graduates from the course in Mechanical Engineering of Lehigh University.

Honorable mention, accompanied in each instance by two years' paid subscription to *Engineering News*, was awarded to the following theses:

1. "An Investigation of the Effects Produced by Punching Cold Steel Plates," by Geo. S. Allen, of Cleveland, O., Graduate from the Case School of Applied Science.

2. "The Testing of Iron and Steel by Impact." (This award has since been withdrawn on account of the discovery that while the award was made for what was supposed to be original work, the author described experiments in which he was merely assistant to a practicing engineer, and made no mention of the fact.)

3. "An Experimental Study of Railway Track Joints," by G. E. Hayward, of Waterford, Ohio, graduate from Ohio State University.

4. "Tests on Nails," by Jas. C. Hain, of Edgerton, Wis., and Frederick F. Fowle, Graduates from the University of Wisconsin.

5. "Garbage Cremation in America," by Chas. T. Bayless, of Louisville, Ky., and Arthur E. Merkel, of New York City, graduates from Stevens Institute of Technology.

The conditions of the competition for this year are:

1. Competing theses must be sent in by the college authorities, not by the authors. They must be sent in anonymously, both as to author and college, indorsed on the outside, "For *Engineering News*' Thesis Competition," and addressed in care of the Secretary of the American Society of Civil Engineers, 127 East Twenty-third St., New York, who has kindly consented to receive and open the packages. They must be accompanied by a sealed envelope indorsed on the outside with the title of the thesis, and containing within, the name, address and college of the author, and a certificate from some one of his professors to the effect that the thesis has been examined and is indorsed as in all known respects worthy of entering such a competition. (Blank forms for certificates will be sent to any person on request.) These sealed envelopes will be retained and opened by the secretary after the announcement of the awards has been made to him. (It is particularly requested that all marks or words giving any clue to the origin of the thesis be erased, so far as possible.)

2. Theses by post-graduates must have the word "Post-graduate" conspicuously and permanently attached to the manuscript.

3. The examination and awards will be made by the editors and associate editors of *Engineering News*, assisted by such experts in the several branches of engineering as they may select to aid them in reaching a just decision.

4. The basis of selection for premiums will be the same as that used in selecting papers for publication in engineering journals or society proceedings; that is to say, theses are to be graded according to their apparent permanent value for the advancement of engineering practice or theory, either as records of original research or as intelligent and concise discussions or critical summaries of older researches. Clearness, conciseness and care in summarizing conclusions will be essential merits for a high award.

5. The right is reserved of withholding any or all premiums, in case no theses of sufficient absolute merit to deserve them shall be received. No thesis not deemed worthy of publication in full in *Engineering News* will be awarded any premium.

6. Except for special reason stated in the professors' certificates above referred to, not more than three of the graduating theses of any one college shall be entered for the competition.

7. The right of first publication of all theses awarded premiums or honorable mention is reserved to *Engineering News*, and all theses receiving premiums will be so published.

8. No thesis which has been previously published in full or in substance will be eligible for the competition, nor any in which due credit is omitted for any part of the thesis not original, or for work recorded therein not performed under the author's direction—excepting of course such facts as are of common knowledge and record.

9. All theses competing for these prizes should be sent in on or before Aug. 1, to insure consideration, though this date will not be rigidly insisted on.

10. The awards will be announced on or before Nov. 1, 1894, failing some special cause for further delay. All theses receiving neither premium nor mention will be returned by express to their authors. The manuscripts of the selected theses will belong to *Engineering News*, but the drawings will be returned after publication.

A special prize of $100 is offered for the best thesis in 1894 by a post-graduate student.

Provided, however, that should any thesis or theses submitted by graduating students appear to the judges to be of superior merit to the best post-graduate thesis, then the prize of $100 shall be awarded to the graduate's thesis, and the post-graduate thesis will be given a prize according to its relative rank.

THESES.

A new departure from the path of custom, relating to theses, was the requirement that the subjects should be handed in before the 13th inst. There are many advantages in such a course. Of special importance is the fact that the student selecting his subject at this early date may especially direct his attention to such parts of his regular work as relates to his chosen subject, and further, ample time is given for the consideration of methods and for designing apparatus. It is not generally known what time has been set apart for the work, although the catalogue designates two weeks of the present term and three weeks of the next term. This was the arrangement last year and seems to be much in favor among the students although some would prefer one week each month, while others think the five weeks should be put into one block during the latter part of the spring term.

OBITUARY.

Harry M. Fuller died at his home in this city on Friday, January 19th. Mr. Fuller entered the Institute in September, 1891, as a member of the Class of '95, he completed his Freshmen and Sophomore years, but ill health prevented him from taking up the work of the Junior year. His death, though not entirely unexpected, was a sad blow to his many friends in the Institute, both in and outside of his class. The funeral service which was held at the home was attended by the Junior class in a body and by many other Rose men who gathered to pay a final tribute of affection and respect for the memory of one whom they had been proud to claim as a friend. The class has adopted the following:

RESOLUTIONS OF RESPECT.

At a meeting of the class of '95, of the Rose Polytechnic Institute, the following resolutions were adopted. That

WHEREAS, In the death of Harry M. Fuller we have suffered the loss of a classmate whose noble character won for him the respect and admiration of all who knew him, and as we will cherish the recollection of a warm friendship that was formed and strengthened by the close association of school life, be it

Resolved, That we extend to his family our heartfelt sympathy in this, their hour of sorrow and affliction; and be it further

Resolved, That a copy of these resolutions be sent to his family, to the press of the city, and to THE ROSE TECHNIC.

A. L. ROBINSON,
L. C. ANDERSON,
W. W. WIGGINS,
Committee.

THE ORCHESTRA.

The orchestral club is beginning work with renewed vigor. The realization that the time is approaching which has annually been marked by a concert is making the members redouble their efforts to make the organization a success. Prof. Mees has kindly consented to act as general instructor and supervisor which in itself is assurance that the coming concert will eclipse all previous efforts of the club. New music will be procured for the occasion. Indeed a bright future appears to be in store for the organization.

Mr. John B. Peddle, '88, assumes the duties of Instructor of Drawing as though he were as much at home in his new position as in Poly student life. Of his ability as a draftsman it is necessary to say but little, as the students have often admired his work, especially the drawing of a marine engine, which hung in the hall of the Institute until recently.

Since graduation, Mr. Peddle has been with several widely-known Eastern firms: The Thomson-Houston Co., at Lynn, Mass., The Dodge Coal Storage Co., of Philadelphia, for which firm he travelled superintending the erection of their plants, and lately with Henry R. Worthing, manufacturer of steam pumps, in the drafting and testing departments. This practical experience must be a valuable addition to the theory of his college course and of great assistance in teaching a subject, which is itself so entirely practical. THE TECHNIC wishes him every success in his new field.

Saturday evening, January 13th, Dr. and Mrs. Eddy were at home to the students of the institute. Miss Williams, of Paris, Ill., who is a college friend and guest of Miss Eddy, assisted in receiving.

After some time had been consumed in general conversation and in filling the conversation cards, the topics as designated were discussed. No doubt the young ladies carried away with them a most thorough knowledge of "foot ball" while perhaps their instructors in giving thrilling accounts of touch downs and flying wedges began to think that if the fair listeners could have witnessed last season's games, the preceeding topic, "My Hero," would have been more personal. It is understood that members of Coates college and R. P. I. teams discussed the game to mutual advantage.

Miss O'Boyle favored the assembly by whistling several solos, being accompanied upon the piano by Miss Fanny O'Boyle. The classes were well represented and those present indeed feel grateful to Dr. and Mrs. Eddy for a truly enjoyable evening in the company of Terre Haute and Coates College young ladies.

DIFFERENTIALS.

Due, due from each of you,
Athletic dues are due, due.

"Close up ranks."

Indiana college men will soon begin pounding the air in preparation for Oratorical Day.

In order to make room for some new books a great many new shelves have been added in the library.

Ernest K. Hood, ex '96, accepted a position at the beginning of the year with a firm in Cincinnati as chief of drafting department.

Class of '96 has received several new recruits. Ridgely, W. J. Klinger, Holderman and Gray, all formerly '95.

The Juniors will carry Williamson's dynamics and Deschanel's natural philosophy under their arms this term.

Earl Layman, an "ex-Poly," is studying law at the State University, and is one of the associate editors of the *Indiana Student*.

O'Brien, formerly of '94, has been "located" at St. Peter, Minn., where report says he is acting in the capacity of "chief electrician in an incubator plant."

Ex-President and general manager of freshman class, Schurman, intends to enter Purdue. We hope he will hold like positions of honor in that institution.

Prof. to Sophomore, "Do you know the difference between a tornado and a cyclone?"

Wether—e, "A tornado is on land and a cyclone on sea."

A Poly to his manly breast,
His loving wife he pressed,
And said: "I'm sure I've made a flunk,
If true this be, please send my trunk."

Freshman (in free-hand drawing)—Professor shall I draw that hole in yonder box?

Professor—No just draw the box, the hole will take care of itself.

Prof. Noyes delivered a very interesting as well as instructive talk to the Y. M. C. A. boys and their visitors Saturday evening January 6th. His subject was "What we are here for."

There is some talk of giving a sort of social in the chapel February 22nd. This would give the Sophomore and Freshman classes a chance to become acquainted with their classmates in the other sections.

Brown and Kilbourne, of the Senior class, are doing some work in ærial engineering, ballooning, etc.

Andrews, '94, is one of the Seniors who is kept busy. In addition to regular work, he is assisting Prof. Howe and is also acting in the capacity of agent for A. S. Aloc Co., the St. Louis instrument dealers.

E. J. Lake, a former Polytechnic student, visited Terre Haute during the holidays. He is taking advanced work in Architecture and Drawing at Illinois State University and will complete his course this school year.

A reception was held at the home of Dr. and Mrs. Eddy during the recent vacation, which was attended by nearly all the students who remained in the city. An exceedingly pleasant evening was spent by those present.

The Seniors hoped to do justice to Political Economy by devoting to it just the allotted time and no more. They encountered an extract in German, however, and we have the old story about the student and midnight oil.

Mory and Blinks visited Jackson Park while in Chicago during vacation. From reports brought back by the former we infer that World's Fair prices are still in vogue; $1.40 is rather expensive for lunch, unless it includes a tip to the waiter.

A Freshman's thought "Oh why are we so unlucky? Why can't we have some sleighing? P-per-haps the Coates College girls might enjoy coasting down Strawberry hill. Oh if 'twould snow — — — !" And then it became too sweet for print.

Have you noticed the grand stand? It has now become a thing of beauty with the new coat of paint. It looks so nice that it is hard to resist the temptation to go over and sit on it, even if we have to imagine a ball game in progress.

From the report in another column of the trip made by President Wiggins and Mr. Sanborn, it would appear that Mr. W. could not do better than take a short course in breaking on some railroad and learn the conventional signs used by railroad engineers.

Prof. Noyes was present at the dedication of the Kent Chemical Laboratory of the Chicago University on New Year's Day.

Prof. Hathaway exhibited his model of Sir William Thomson's Molecular Vibrator before the Terre Haute Science Club last Thursday evening. Dr. Eddy read a paper on Molecular Vibrations.

The new jointed electric light supports in the shop have ceased "barking," but the first afternoon's exercise after they had been connected, and while the Seniors were satisfying their curiosity, was hardly endurable.

A four-inch pipe has been attached to the tank on the fourth floor of the main building and passing to the basement. Prof. Howe has designed the cylinder and connections which, when completed, will be an important addition to the testing department of the Institute.

Prof. Wickersham recently surprised the Sophomores into remembrance of Freshman days. He is requiring of them sketches of the reign of Attilla king of the Hunns, who is mentioned in the story of Walther und Hildegund which the class is now reading. The boys had thought English essays were a thing of the past.

Prof. Ames announces that a Sophomore sketch book will appear this year. As it is to be a collection of work done by the three upper classes, the members of these classes are wondering if they ever made a drawing worthy of publication. Competition is invited in the matter of designs for the cover, and from the reputation of several members of '96 we may rest assured that a tasty design will be provided.

W. J. Klinger is certainly getting into such training that no weather shall bar him from making a record for Rose next Field Day. He made a century run not long since and pumped over some 25 miles out of 86 in a heavy drizzle and after supper started out again in the rain and finished his 14 miles. If our other athletes display as much pluck at the spring meet we will doubtless hold our usual first place in Indiana athletics.

A whist tournament of three hundred games has recently been inaugurated. The Midway Five are arrayed against a Nursery Five. Pools are selling about even at present, but in a year or so, when the end is nearer, betting will no doubt be livelier.

At a recent meeting of the American Society of Chemists, held at Baltimore, a paper prepared by Prof. W. A. Noyes, of the Rose Polytechnic Institute, was read. It related to certain problems growing out of analysis made by him of the human stomach, made with a view to discovering evidences of poison. The paper was very highly complimented and was published in the Baltimore *Sun* at the time.—*Gazette.*

Prof. Hathaway is trying to make arrangements for taking a class in dynamics and curve traces, and invites those Juniors and Sophomores who have spare time to join. He began to think he had undertaken more than he bargained for when the members of Sophomore B agreed as one man that they had the requisite amount of time to spare. An upper classman would caution the young enthusiasts not to take more studies than they can do ample justice to and adds that Cliffords dynamics is no fun.

Decker, '96, has made the whole school wildly jealous by having the pleasant duty of escorting the Coates young ladies to their college after the receptions. Several times since the recent reception he has been caught smiling pleasantly at his conics while a reminiscent look comes into his eyes, all of which are unusual to the student of analytics. Naturally the boys would like to have the details of his trip, but, of course, ask no questions as they dislike to interrupt his pleasant reveries. He is to be congratulated—on having such good fortune, the boys only wish they could share it with him.

In the issue of November last, The TECHNIC made mention of the railroad that the Juniors had surveyed to Lost Creek. At that time the TECHNIC representative understood that the maps of the survey had been nearly completed but learned nothing of the road being under construction. Our readers will therefore be surprised to hear that acting-President Wiggins recently invited Messrs. Sanborn and Sinks, of '96 C. E.'s, to join him in inspecting the new road. A Big Four engine was chartered and the party took position on the footboard, as it had been decided that this was the best place from which to observe the new road-bed. It seems that the invited guests were working under rather complicated time-tables and it was not until the engine neared Locust street that Mr. Sinks discovered that he had a "previous engagement," and requested that he be let off at that street. President Wiggins would gladly have stopped the locomotive but unfortunately every gesture he made to stop, the engineer mistook as meaning—let her out—and the more frantic the president's gestures the wider the engineer pulled the throttle. Mr. Sinks jumped and as last seen by the party was describing an orbit around the Poly unable to overcome the tremendous momentum. Mr. Sanborn here also recollected an engagement but had become so carried away with the trip that he could not think of leaving. On reaching Lost Creek, the engine was reversed and they were speeding back to town before orders could be given where to stop. Again President Wiggins was unfortunate in his choice of signals and they were carried into town as far as Fifth street, before the perilous journey from the footboard to the cab window had been accomplished and the engineer made to understand that he was wanted to stop. Trusting no more to the power of steam and steel, but to their own muscle and brawn, the president, in company with Mr. Sanborn, set out for the Institute, having only a few minutes left before they were due to meet an assembly of brother engineers and submit the report. They reached the Institute with the flush of victory and exercise upon their countenances and recounted their thrilling adventure while they wiped the perspiration from their hat-bands.

THE COLLEGE WORLD.

Among the new rules which have recently gone into effect at Worcester Polytechnic, the one bearing on publications, by students, seems to awake, greatest interest. This rule, which is doubtless considered objectionable by the students, is in substance as follows: "The final proof sheets of any publication prepared by any class shall be submitted to a committee of the faculty appointed for the purpose; and the proof sheets of any other publication by students shall also be thus submitted whenever the faculty shall request it." The rule is for the purpose of eliminating from the yearly class-book, published by the Seniors, all allusions to the faculty which may be considered inimical to the best interests of the institute. In this attention on the part of the faculty, the *W P I* has been included and the proof of that journal must be examined whenever the faculty so elect.

The faculty at Cornell has recently made some radical changes. Hereafter there will be no regular examinations. The student's knowledge of the subject will be determined by his daily recitations and by short, unexpected quizzes. The Thanksgiving recess has been abolished; only the day itself will be observed.—*W P I.*

The "Harvard Annex" is no more. It is now under the official control of Harvard University and will be known as Radcliff College. The regular degrees in arts and sciences will be conferred upon its graduates and all professors will be appointed subject to the approval of the President and fellows of the University.

There has been fitted up in the Yale gymnasium a handsome trophy room in which are kept, with one exception, all the world's championship trophies ever won by Yale. The balls used in the great games are painted in the colors which represent the college from which they were won.—*Crimson.*

The library of the University of Wisconsin is kept open at night. That at Dartmouth is open Sunday afternoons.

The *Sewanee Times*, published at the University of the South, finds a novel cause for complaint in the fact that some of the professors in the university and in the departments do not allow the students to smoke during examinations.—*Courier.*

The young man who thinks none of the ordinary vocations in life are quite good enough for him will undoubtedly discover before long that he is not good enough for any of the ordinary vocations.—*Student.*

It was noticed in an advertisement of Wheaton, Ill., College the following: "This institution is a school for workers. Its students have little time for athletics, college yells and nonsense." What do you think of it?

The faculty of Hillsdale College has made it a rule that no student who enters the college single shall get married during his course and remain in college. This is said to interest the theological students.

It is expected that Yale, Harvard, Princeton and University of Penn. will form an intercollegiate foot ball league which will replace the one from which Wesleyan and U. of P. resigned last Fall. —*Argus.*

The order with the games won in the intercollegiate chess tournament, which was held in New York during the recess, is as follows: Columbia, 8½; Harvard, 7; Yale, 5; Princeton, 3½.—*Crimson.*

It is reported that the directors of the World's Exposition have presented the statue of Benjamin Franklin, which stood in the portal of the Electrical Building, to the University of Pennsylvania.

Ohio, by no means a large state, possesses more colleges than any other state in the Union, and claims one-tenth of the American students.

The students of English colleges publish no papers, while in this country about two hundred colleges are said to support periodicals.

Cornell University has 322 students in electrical engineering.—*Elec. World.*

Joseph Pulitzer has contributed $100,000 toward the Columbia College building fund of $2,000,000, in order to assist capable and ambitious poor boys to obtain a college education.

Foot ball in every form has been prohibited by the University at Heidelberg, Germany. They draw the line at dueling, and will allow nothing more dangerous.

Illinois University has obtained the fish exhibit which attracted so much attention at the World's Fair, and is building an aquarium for its accommodation.

In the universities of France there are no classes, no athletics, no Commencement Day, no college periodicals, no glee clubs and no fraternities.—*Courier*.

The University of Cairo, founded A. D., 973, has the largest attendance of any college in the world, the number of students being 10,000.

The University of Wisconsin claims its new gymnasium, which will be completed by spring, will rival that of Yale.

A kite-shaped running track is being made at Brown.

Hinkey has been re-elected captain of Yale's foot ball team.

Columbia College has 600 graduate students, the largest number in attendance at any college in the United States.

The Junior Class of Tuft's College publishes a "Tuft's Song Book" this year in place of the regular annual.—*Ex.*

We wonder if this book is for the exclusive use of "toughs."

At most of the eastern colleges candidates for the crew and base ball nine have commenced training.

Five of the Andover eleven and six of the Exeter men, it is said, will enter Yale next fall.

New chemical and physical laboratories have just been completed at the Chicago University.

"Who were the first tennis players mentioned in the Bible?"

"Joseph served in Pharaoh's court and Israel returned out of Egypt."—*Ex.*

Eight of last year's University of Pennsylvania nine are in college this year.

There are about 12,000 students in the scientific schools of this country.

Wittenberg College is preparing to have boat racing in the spring.