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THE ROSE TECHNIC.

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I. C. P. A. NOTICE.

It was not deemed advisable to attempt the Indiana College news department for the month of March. There being no present arrangement as to order of publication THE TECHNIC will undertake for April the compilation of the first news letters. All items should be in before April 16th. For the succeeding month the publication will be assigned to *The Earlhamite*, notification of date for copy to be made by card.

W. M. BLINKS, Pres.

* * *

PRESIDENT Eddy has tendered his resignation to the Board of Managers to take effect at the close of the current school year. The exact causes that have led to such a move THE TECHNIC is not in a position to state, but it is generally understood that for a year past there has been some friction between Dr. Eddy and the Board on questions of administration and this is perhaps the direct outcome. However this may be it is extremely unfortunate that the Institute is so soon forced to undergo a change of head and any causes that have led to such a condition are greatly to be deplored. During Dr. Eddy's term of office the standard of study and of proficiency in the Institute has been considerably raised. He has labored to build up and maintain a high moral and social standing among Rose men. The interest of their enterprises he has at all times actively worked to promote and freely given his co-operation and counsel. As a deep student and man of science he has not failed to lay his impress upon the work of the Institute.

In leaving Dr. Eddy will carry away with him the esteem and respect of the student-body for his personal character and scholarly attainments and wherever his lot may be cast we wish for him and his charming family, happiness.

* * *

YEAR by year the cap and gown is gaining favor in our American colleges. It is hardly probable that they will be adopted by technical schools as the now generally approved overall equipment possesses sufficiently obvious advantages to offset the slight gain in the picturesque afforded by the former. But with the literary institutions the cap and gown has attained quite a full measure of approval. As one enthusiast has said: "The academic gown as used in America, is really a uniform. On its historic and picturesque side it serves to remind those who don it of the continuity and dignity of learning and recalls the honored roll of English-speaking university men. On its democratic side, it subdues the differences in dress arising from differences in taste, fashion, manners and wealth and clothes, all with the outward grace of equal fellowship which has ever been claimed as an inner fact in the republic of learning." Types of gowns are as distinctive as those of military uniform, this one may be worn by a member of the faculty only, while that one proclaims the student. Abroad and especially at Oxford and Cambridge, a man's degree is indicated by the lining or the trimmings of a hood attached to the classic gown. The economic side of the system has probably appealed as strongly

in practical America as the æsthetic. Where the custom regularly prevails, one is at liberty to wear the plainest garments beneath the scholastic exterior. In other places the garb is used only on special occasions, and particularly does it appeal to graduating classes enabling them as it does to make the best appearance with a saving of considerable expense at just the time least is left to spend.

* * *

REAL estate men are, as a class, generally enterprising; sub-division projectors and founders of new towns invariably are; and as for their prospectuses they can only be compared with the proclamation of the approaching circus as an example of the possibilities of the English language, while the advantages of that particular section of earth controlled by these benefactors of humanity seem to leave little to be hoped for in another world. To the students of English, of our natural resources, of reality as well of realty, such publications should appeal, but not long ago appeared in the city press a most noteworthy manifesto of a project affecting local lands and of unusual moment to us of the collegiate world. Of interest to us since it involves the location of another college in our midst. Now we might simply extend the hand of fellowship and be done were this any ordinary institution, but to a World's National College we must do more. Just let us consider the possibilities of the case, we might form a triangular league right here in Terre Haute with the World's Nationalists, the State Normal and R. P. I. with the hope of soon making it a pentagonal association by the accession of Coates College and St. Mary's, and hold a field day here every year without so much as saying "By your leave" to the rest of the State. Think of the broadening cosmopolitan influence of a World's National institution so close at hand, and of the augmented quantity of erudition that would be exhaled to the already well laden atmosphere, rendering possible, perhaps, what so many have sought, an education from this source alone. Consider the opportunity for them to compound and us to hear a college yell which shall have all the concentrated harmony which accompanied a portion of the construction of the tower of Babel. To the few who may not have heard of this grand project it might be well to explain that it is to be incident to opening to the market of a large tract of land north of the city. The college is to be of such a force in educational matters as to attract the attention of liberal minded men to whom to know is to endow; the richly endowed college is to attract students from all over the earth; people are to build houses so as to accommodate these students; to build they are to buy land. Such is the mighty fabric to be reared upon this company's property, Minerva and Mercury join hands to help mankind. The prospectus goes farther and promises innovations in methods of instruction. The surroundings are to be so educational in character as to greatly aid instruction by simple object lessons. Just how it is to be our single reading of the document did not entirely elucidate. We presume that the immediate vicinity of the site of old Fort Harrison will inspire the historical train of thought; the mighty Wabash, ever surging on, shall be sponsor of great thoughts, while the cold type plainly indicates that an electrical water purifying device controlled by the syndicate will attract the scientific interest of the world. Verily this is a progressive age.

* * *

THE insinuation that R. P. I.'s supremacy in general athletics is partially attributable to the fact of recent Field Days having been held on our own ground has acted as a great spur in prodding athletic interest all along the line with us, and if it does not result in sending out upon alien soil as fine a body of men as has ever maintained Rose's fair fame upon the track and field, it will be because enthusiasm has untimely waned. This we must not permit. We want enthusiasm from now on until Field Day, and then we want more enthusiasm than ever. We want a long special train load of wearers of the old rose and white—every Rose man and all his friends. If there is truth in the statement that Terre Haute has helped us win pennants, let us take Terre Haute over with us and win another. R. P. I. has not been

a participant in any of the recent college events at the state capital and this will be our opportunity to sort of introduce ourselves again. Begin to make your preparations now so that later on nothing shall prevent you from joining in the pilgrimage.

* * *

IT is to be hoped that arrangements can be made for a goodly number of Rose men to attend the Western Inter-collegiate athletic meet at St. Louis. There seems to be a general agreement that our athletic association ought to defray at least part of the expenses of our contestants. Just how far this can be done will be largely determined by the condition of the local treasury about that time. There is another object in having a good representation. Since Rose Polytechnic stands a good chance of getting the next Field Day in 1895, this would be a big thing and is well worth striving for. The athletic officers have the matter well in hand, and in this case, with no record of previous favors, and our well known advantages of ground, athletic interest and proved ability to make such an event a success, we ought to secure recognition.

* * *

THAT Rose Polytechnic did not get Field Day we are sorry, though not greatly surprised. With the exception of one or two youths of small experience none at the recent State Association meeting denied that R. P. I. offered great advantage in its bid, but the opinion seemed to be that we had had our full share of glories and that the meet should now go elsewhere. There was nothing out of order in this, but in the haste to make sure that the magic name of Terre Haute should not triumph again, the business relating to Field Day was transacted in a very hap hazard manner. We have hitherto outlined some of the objections to a committee management of affairs, yet if this committee has a mind to work hard and the colleges which so advocate this plan, will do their part, there is no reason why there should not be a great day. Not so great as if it were in Terre Haute where the charm of the sports is known and appreciated, but we shall hope that Indianapolis will send a crowd of spectators from curiosity if for no other reason; whether the large college delegations so expatiated upon will be in evidence remains to be seen.

* * *

THE usual number of quizzes, reviews and exemption examinations have heralded the approach of the spring vacation. The student who is exempted or is incited to carefully re-study the work of the term now, and thereby escape the ordeal of "plugging" in the torrid weather of June in a hot room beside a hotter lamp, may well then rise up and call these things blessed.

MALLEABLE IRON.

BY INSTRUCTOR W. P. SMITH.

In every manufacturing town can be seen a foundry that makes malleable iron castings. There is a great and growing demand for them, consequently it is to-day a business of very considerable importance. The manufacture of malleable iron castings is older than is generally thought, though the principles on which it is based were not understood until chemical science was established.

Réaumur, a distinguished French metallurgist, published a book in 1722 on the "Art of Converting Wrought Iron into Steel and of Softening Cast Iron." He gives numerous experiments by which he succeeded in producing malleable iron castings, yet the process had been effected twenty years previously but kept secret. Réaumur observed that by exposing a plate of cast iron for a long time to the direct action of a fire it was covered with a coat of red and black oxide and that the metal underneath had become softened (malleable). He collected this oxide and packing small bars of white cast iron with it in covered

crucibles and heating he obtained a perfectly malleable iron. In 1804 patents were granted to Lucas of Sheffield, England, and fifty years later to Brown & Lennox.

In a book by Ferdinand Kohn, dated 1868, we learn that the best malleable iron at that time was manufactured by a firm in Glasgow, which ran two cupolas and several annealing furnaces. The process was kept a dead secret, but Kohn knew that a moistened powder was put into cast iron pots having covers and thrown into the cupola. The pots did not melt until the water had evaporated, consequently they got below the tuyeres of the furnace before the powder escaped, and so avoided being blown out. He also knew that for the most part the powder used was oxide of manganese. The castings made from this metal were afterwards annealed and the firm guaranteed the tensile strength of their castings up to twenty-five tons breaking strain. Engineers such as Napier and Nasmyth had their cylinders manufactured at this foundry and it is an interesting fact that the selling price of these castings was from $175 to $200 a ton, more than five times their price to-day in England.

The essential difference between cast and malleable iron is found in the amount of carbon contained in these materials, cast iron containing about 3½ per cent of carbon, while malleable iron seldom contains more than 0.4 per cent. Making malleable iron of cast iron is therefore a decarbonizing process. Cast iron, disregarding other substances combined with it, is essentially a compound of iron and carbon, in which the carbon is partly combined and partly mixed with it; in the latter condition it is said to exist in the "graphitic state." Combined carbon on account of its atomic state is more easily removed from the iron than the graphite which is very hard to burn; it is therefore reasonable to assume that for malleable iron castings an iron would be chosen that had most of its carbon in combination.

From the state in which carbon exists in cast iron it is classified into three principal subdivisions, white, mottled, and gray iron. If gray iron be struck with a sledge it fractures easily and presents a highly crystalline structure, the crystals of graphite can be distinctly seen appearing as black lustrous patches in the iron and giving the surface a dull bluish gray metallic lustre. If a portion of the iron is crushed and powdered the graphite will float on the surface of water. This iron is soft and has great fluidity which is due to its graphite. In white cast iron the carbon is in combination, a fracture revealing long needle-like crystals of a bright almost silver-like lustre and no scales of graphite can be detected. In the melted condition it is sluggish and pasty compared with the gray iron and when cast is too hard to work with file or chisel. The mottled iron comes between these two, it partakes more or less of the characteristics of each. The surface of a fracture shows patches, the gray iron sometimes appearing in specks, while in other specimens the mass is composed of gray iron and the white iron appears in spots, hence its name. There are several grades of these irons but their chief characteristics have been stated. It will be inferred from the foregoing that white iron offers the greatest inducement for use in malleable iron. Another reason for its preference is the appearance of the castings. A casting rich in graphitic carbon submitted to a protracted heat with oxidizing substances would come out porous and weak, the place the graphite occupied being empty. On the other hand a decarbonized white iron casting appears with almost the same sharpness of form and smoothness of surface as before the annealing process. There is only one objection to the use of white iron for this purpose, that is its pasty consistency. The metal employed must therefore contain enough carbon in the graphitic state to insure its running freely. As none of the other constituents of the iron are removed by the process it is necessary to use a good pure iron, as free as possible from sulphur, manganese and phosphorus. Sulphur contributes to retain the carbon in the combined state and probably also promotes the formation of combined carbon. Manganese also tends to the formation of combined carbon and makes the iron hard and brittle. Phosphorous causes hardness and brittleness

by lowering the separation of graphite. English firms prefer the various brands of hematite to make their malleable iron castings from, but in this country Lake Superior charcoal pig or some unquestionably pure brand is selected.

The only difference between a pattern for an ordinary iron casting and a malleable one is the increased allowance for contraction, for while gray iron shrinks about $\frac{1}{10}$ of an inch to the foot, the white iron used in malleable castings shrinks from $\frac{3}{16}$ to $\frac{1}{4}$ of an inch to the foot. The moulding is much the same as in ordinary castings, but to overcome the shrinkage and the lesser fluidity of the metal used, the running gates are made as large as possible and put in the upper part of the mold. The iron is melted in ordinary cupolas or in clay crucibles but preferably in a reverberatory furnace. The latter consumes more fuel and produces more waste than the cupola, but the result is better because it is not melted in direct contact with the fuel and does not absorb its impurities, sulphur especially. Another advantage this furnace has, if the iron has an excess of carbon it will be considerably lessened by the oxidizing action of the flame.

The castings are usually made in green sand and are extremely brittle when cast. As it is necessary to have them as clean as possible before the annealing process begins they are put into a revolving cylinder, called a "tumbler," and the sand removed by abrasion, or they are scrubbed with a wire brush, or pickled in dilute sulphuric acid. The annealing boxes or "saggers" as they are often called are generally made of cast iron and of the same metal as the castings to be annealed therein. Under ordinary conditions these boxes stand about twenty heats. The carbon is removed from the castings by submitting them at a certain temperature in these boxes to the action of substances holding oxygen. The substance generally used is rolling mill scale, but other oxides are at times used, such as powdered hematite ore and rusted turnings. The danger with the ore is that it may be earthy and at the temperature of the annealing furnace the earth will fuse and form a slag or cinder, preventing the oxidizing action, especially if it adheres to the castings, thus interfering with the removal of the carbon and leaving the castings rough and unsightly. The scales are much to be preferred, although containing less oxygen, as they are quite free from such impurities and do not interfere with the free passage of the carbon. The scales of course part with some of their oxidizing properties during each heat, but this is renewed by sprinkling them with a solution of salamoniac. The packing of the castings in the saggers is a matter of considerable importance. At the bottom of the box is placed a layer of scales or ore, the castings being placed on them and separate from each other, then another layer of scales covering them, then castings and so on until the box is filled. The thickness of the layers vary from half an inch to an inch in boxes about 12″x12″x18″. To prevent the air being admitted into the boxes the cover is carefully set in and made tight with loam or clay.

The annealing furnace mostly used resembles an ordinary reverberating furnace, the flame passing through into the chamber and around the saggers. On account of the sulphur in the fuel it is better that the flame pass around the chamber without coming into immediate contact with the saggers. The pots can be put in and withdrawn at any time without disturbing the working of the furnace. The length of time necessary to remove the carbon from the castings depends altogether upon their size and the degree of malleability required. Sad experience usually qualifies a furnace man for his post. Castings of uniform size should go into the same box if possible so that the furnace men can distribute the boxes over the furnace according to their size, the large castings being placed in the hottest position. The oxide that collects on the outside of the castings during the process is the best indicator of the malleability secured, the operator judging by the hue presented. Castings are subjected to a red heat for periods varying from two days to two weeks, of course care being taken to prevent the furnace getting to a melting temperature. Usually the annealing begins by reducing the heat

from ten to twenty hours before the boxes are taken out of the furnace and the castings are left in the boxes until they are cold. During the conversion the castings become slightly larger due probably to the remaining combined carbon changing to graphitic and in its mechanical mixture requiring more room. If the castings are overdone, that is, if the heating continues after the carbon has been removed they become brittle, due to the formation of oxide of iron permeating the mass.

Alder Wright, in the Ency. Britt., explains the chemistry of the subject very clearly. He says that the above circumstance "together with the known character of the chemical actions of carbon dioxide on iron and carbon at a red heat, indicates the nature of the processes taking place during the decarbonization. The ferric oxide and the heated air in contact with it first oxidize the carbon in the outermost film to carbon dioxide, this then passes inward by the process of 'occlusion' (gradual solution of gases in solids) and reacts upon the carbon of the next layers in accordance with the equation $CO_2 + C = 2CO$, the carbon oxide thus formed first becoming dissolved in the iron, and subsequently when the iron is saturated therewith gradually diffusing outwards, becoming converted into carbon dioxide as soon as it comes in contact with either the ferric oxide of the packing or the partially oxidized iron of the outer film, which when free from carbon, reacts on the carbon dioxide, thus $yCO_2 + xFe = Fe_xO_y + yCO$. In the outermost layers, accordingly, there is always a tendency to the formation of iron oxide in virtue of this reaction and simultaneously a tendency to the reduction of this oxide by the agency of the carbon oxide which is being formed in the interior layers and traveling outwards; as long as this latter action keeps the former in check, the accumulation of iron oxide in the outer layers does not take place to such an extent as to deteriorate materially the tenacity of the malleable iron skin; but when the carbon of the core has been so completely removed that the supply of carbon oxide from the interior almost ceases, the formation and accumulation of iron oxide in the outer layers goes on, rendering them more or less brittle, in the inner layers the removal of carbon by the penetration of the dissolved carbon dioxide and its reaction on the carbon is continually progressing, the decarbonization gradually creeping inwards, as it were, until finally the innermost central part becomes decarbonized also. The non-removal of silicon, sulphur and phosphorus during the process is due simply to the fact that these elements are not acted upon by the occluded carbon dioxide as the carbon is, and consequently not being oxidized cannot be eliminated."

The number of uses to which malleable iron is put cannot be mentioned, but when we know its characteristics it is readily understood that its field of usefulness must be a large one. Malleable iron is about a cross between cast iron and steel. It is often called "run steel," but it does not possess the tenacity or ductility of steel while it is much more tenacious and tough than iron. Its flexibility almost approaches wrought iron, it can be welded and thin pieces can be bent double when cold and even straightened out again with care. Although rather difficult it can be joined by fusion or brazed to either wrought iron or steel. It has taken the place very largely of wrought iron where the reduced strength is immaterial. The results are cheaper and more correct than a blacksmith could possibly make them. Malleable cast iron can be hardened but tempering is precarious. It can be turned in the lathe with about the same ease as wrought iron. Saddlery hardware, carriage and sewing machine parts, guns, locks, scissors, hinges, padlocks, and even malleable iron nails are manufactured in England. Propeller blades are made malleable and by a subsequent process their faces are converted into steel by "case hardening." Hydraulic cylinders having to resist high pressures can be made about half the thickness of ordinary cast iron with safety. It will be seen from the foregoing that malleable iron must have cheapened production immensely in almost all branches of manufacture and is now an indespensable material.

TWO HANDS.

Last night I held her hand in mine,
Her hand so slender and divine,
Endowed with all the graces.
But now another hand I hold,
A hand well worth its weight in gold,
Just think of it—four aces.—*Ex.*

ALUMNI DEPARTMENT.

HOMESTEAD STEEL WORKS, MUNHALL, PA.

BY S. M. ROCK, '92.

The Homestead Steel Works, controlled by the Carnegie Steel Co., of Pittsburgh, Pa., are located on the Monongahela river, about seven miles from Pittsburgh, at a small place called Munhall. The works, while taking their name from the town of Homestead, are about a mile further up the river. This article will convey but a slight idea of the magnitude of this wonderful plant. To be appreciated, the plant must be seen and several days spent in examining it. The plant contains eight mills for rolling finished steel, two open-hearth departments, a converting mill, the armor plate machine shop, foundry, blacksmith and machine shops, chemical and physical laboratories, and a complete electrical plant. There are also now in process of construction a new open-hearth department and a plant for the purpose of Harveyizing nickel steel.

The rolling mills are composed of the following mills: The 32″, or universal mill, the 119″ mill, the 28″, 10″, 23″, 33″, 35″ and 40″ mills. I will take up these various departments and give a short description of their product and the manner of working them.

The foundry is just a recent addition to the plant and is used only for casting the big ingots to be rolled into nickel steel. There are about thirty men employed here, and the moulds are made of the best of sand and have to be very carefully made so that the ingot shall be as free from blowholes as possible. The moulds are very large and are handled by means of an electric crane, the ingots cast from them weighing from 12 to 50 tons. The heaviest one ever cast here weighed 73 tons. The company is providing means for casting even heavier ones than this. The moulds are dried by natural gas and then loaded on iron cars or buggies and taken to the open-hearth where they are placed in the pits and the hot steel run into them from an immense ladle. A further description of how the ingot is treated will come up in connection with the armor plate department.

The two open-hearth departments are known as O. H. No. 1 and O. H. No. 2. There are eight furnaces in each department, their capacities ranging from 20 to 50 tons. The foundations, flues and pits are built of common brick; the furnace proper is built of fire-brick, and is lined with silica brick. The silica brick are used on account of the small per cent. of impurities they contain, and for the reason that they will stand a greater amount of heat than any other. Any little impurity in the bottom or side wall of a furnace is liable to be dangerous, because the hot metal will burn through there and destroy the furnace. Both the basic and acid process for making steel are used. When a furnace is newly built it is thoroughly dried for a week or ten days, and then the basic or acid bottom is made and the furnace charged. Pig iron, steel scrap and old castings are used along with

the proper percentage of lime, ore, &c. The lime is added chiefly to shorten the time of melting. These are analyzed at once, a complete laboratory being located in each O. H. department. When the steel has been melted to the final point a test is taken, and if it shows too low in carbon, coke dust is added to increase the carbon. If it is too high, a low carbon ore is added. The time of melting varies from 9 to 15 hours, according to the length of time a furnace has been working. The furnaces work much better when first charged. They usually run from 5 to 7 months without rebuilding. In O. H. No. 1 six of the furnaces are charged by hand. The pig ore and scrap is wheeled in from the stock bins and dumped in front of the furnace; there are three doors in each furnace, and in front of each door is a small roller. A long bar which is flat on one end and called a peel is used; the flat end is placed on the roll and a piece of pig or scrap is laid on the peel. The door is then raised and the peel is run into the furnace, and by a quick turn the piece is dumped into the furnace. This method of charging is very hard on the men. Nos. 1 and 8 furnaces in O. H. 1 are charged by hydraulic cranes. The whole top of these furnaces is lifted off by hydraulic pressure and run back out of the road; then the crane swings around with a big piece held by iron tongs and drops it into the furnace. In O. H. 2 the charging is accomplished by means of a charging machine run by steam. A number of small cars are loaded with half-cylindrical shaped buckets which are filled with pig iron or scrap steel. These buckets are about 4 feet long and 2 feet wide. The machine picks the bucket up with a pair of tongs, runs it in the furnace and dumps the pig or scrap out. This operation is repeated until the furnace is full. The objection to these machines is that they are complicated and very hard to keep in repair; it takes about ten men to run a furnace, viz.: the melter, first and second helper, four stockers, one ladleman and two pitmen. There are at present 16 furnaces in operation and 8 in various stages of construction. The converting mill has a capacity of 350 tons a day. The Bessemer process is used in making the steel. There are four cupalos and two converters. There are four blast engines used, giving a pressure of 20 pounds per square foot. The pig, lime, etc., is carried up to the cupalos by elevators and thrown in; then, when it is melted down, it is run into a ladle and hauled along an elevated track to the converters. It is poured into them and the blast is turned on and the impurities blown out. From the converters it is poured into a ladle, and from the ladle to the moulds. The moulds are then run to the strippers. These strippers are a pair of jaws which catch hold of either side of the mould; then as the jaws move up, a piston pushes the ingot out of the mould. When an ingot will not strip from the mould it is called a sticker, and the whole thing is thrown into the furnace and melted up.

The 10″ rolling mill is designed to roll small stuff, such as bars, rods and angles. Small billets of steel are used; these billets are heated in small furnaces and run to the rolls by hand. They are passed from four to six times through the rolls before being put through the finishing train of rolls. The finished product is from $1\frac{1}{2}$″ round to 2″ round rods, 1″ to $2\frac{1}{2}$″ square, and angles up to 10″ wide. Chilled steel rolls are used. A man stands on each side of the rolls, and as the piece comes through he catches it with a pair of tongs and starts it through the next set of rolls. When the piece is finished it is carried to the saws and cut the required length, weighed, and loaded on the cars for shipment.

In the 23″ mill small beams, girders and channels are rolled. The heating furnaces are about the same as in the 10″ mill, but larger billets are used, and instead of men to catch the pieces as they come through the rolls, tables that travel back and forward in front of the rolls are used. These tables are run by electricity. Experiments in rolling aluminum girders and beams have been tried in this mill, but so far they have not proven a success.

In the 33″ mill large I beams and channels are rolled. The beams are rolled direct from the ingot. The ingot is heated in what is called a soaking pit. They are then run on a train of rolls to the breaking down or roughing rolls and rolled to

rough shape, then re-heated and carried to the finishing rolls by means of electrical tables; these tables are great labor-saving devices, and are a big help in getting out a large product. I might say here, that, wherever electricity can be used, the Carnegie Co. is putting in electrical machinery. The introduction of this labor-saving machinery is the reason this company can compete so much better with other firms in producing this class of steel.

The 35″ and 40″ mills are similar to the 23″ and 33″ mills in that they roll the same kind of material, but on a larger scale, the 35″ mill being the roughing or breaking down mill and the 40″ the finishing mill.

The 28″ mill is simply a mill for rolling the ingots, which are from 16″ to 30″ square and 36″ to 48″ long, into blooms and billets, these latter pieces being rolled into finished material, such as rails, rods, beams, etc.

The 119″ mill, or plate mill, is the mill where boiler plates, fire-box steel, light doors and bridge steel is rolled. The steel is brought into this mill in the form of slabs from 2½″ to 6″ thick and from 2 feet to 5 feet square. These slabs are run into heating furnaces by means of hydraulic cranes and heated to a white heat. They are then taken out and carried to the rolls by these same cranes and rolled down to whatever thickness, width and length the order calls for. These pieces are then carried 400 or 500 feet on a long train of rolls and worked out roughly to length and width. They are then sheared by means of immense shears run by steam and hydraulic pressure. This mill is one of the finest equipped in the country. The rolls are run by a Porter-Hamilton engine of 1600 h. p., the highest product so far of finished plate being 7,500 tons in one month.

The 32″, or universal rolling mill, so called on account of having a vertical and horizontal set of rolls, is where the slabs for the 119″ mill are rolled and also where the large armor plate are rolled. The rolls in this mill are run with two pairs of reversible engines, each pair being of 1,000 h. p. These engines are built by the E. P. Allis Co., of Milwaukee. The large ingots are heated and carried from the heating pits by immense hydraulic cranes. The ingots vary from 36″ to 60″ square, and from 48″ to 90″ long. The finished plates are from 60″ to 120″ wide, and from 100″ to 300″ long, 3″ to 18″ thick. It is almost impossible to roll a solid plate or a plate free from blow or sand holes which is over 8″ thick. The average tonnage per 24 hours in this mill is 250.

After the armor plate is rolled to gauge it is taken to the armor plate machine shop and rough cut to length. Then they are hauled to the press shop and straightened and annealed, then brought back to the machine shop and marked for rough cutting to length, width and bevel. After this work is done they are again taken to the press shop, heated and tempered in oil. From this they are brought back to the machine shop and marked to finish all over. This marking is done from the government drawings and has to be accurately done. The plate is first chalked with a soft chalk. Then the length, width, bevel and bolt holes are measured and marked off with a steel scriber, and these points are fixed by a center-punch. The plates are then put on the machines and finished to these marks. The finished plate must not be any over gauge, and not more than $\frac{3}{32}$ of an inch under gauge. There are five men engaged in this marking, all but one being graduates of technical schools. The production of this shop is about 300 tons of finished plate per month. From now on nothing but Harveyized armor is to be turned out. In Harveyizing steel, a special furnace is built. The plate is put in the furnace and covered with coke dust, then the gas is turned on and the plate as it becomes heated absorbs the carbon from the coke dust, making the surface very hard. In the new plant there are 12 Harvey furnaces and an immense hydraulic press which will give a pressure of 80 tons per square inch. All plates over 6″ in thickness will be pressed from the ingot into shape by this press. This is a new process in this plant. The working of it is awaited with great interest by the engineers and superintendents connected with the plant. The first plate is to be forged next month.

The electrical plant contains eight Thompson-

Houston machines and two Westinghouse machines. The T-H. machines are used for lighting purposes, the Westinghouse for power for cranes, tables and small motors around the plant. Mr. S. S. Wales, '91, is connected with this department.

The blacksmith shop has 12 forges and 3 steam hammers in it. The machine shop is well equipped and does nearly all the repair work for the plant.

I have given you a brief description of the various departments here, and I hope that some of you may be able to visit the Homestead Steel Works and see for yourselves the workings of a large steel plant.

NOTES.

Johannesen, '93, was in town this week and remained until after the Orchestra Concert. He is at present with the Wagner Electric Co., and his visit here was a pleasure to his many Poly friends.

While in St. Louis attending the meeting of the Western Athletic Association, Andrews was entertained by Condron, '90, and met Layman, '92, and Johannesen, '93.

The Rose delegates met Burgess Allen, '93, member of the firm of Allen Bros., artists and designers, who reported a prosperous run of business in his specialty.

W. H. Harris, '91, recently left Terre Haute to accept a position on the Big Four engineering force at Springfield, O.

Layman, '92, is expected in town to spend Easter.

ATHLETIC DEPARTMENT.

FIELD DAY AT INDIANAPOLIS.

The State Association at the meeting held March 9th, in Indianapolis, voted to hold State field day in that city under the management of the Association as a whole. The necessary arrangements are to be made by a committee consisting of one representative from each college. This committee at their first meeting, which is to be called about the first of April, will name the date upon which the exercises will occur. This committee, of which Mr. Somerville, of Butler College, is chairman, has the opportunity for making a grand success of this day of college athletics, and if the assistance of the people of Indianapolis, together with the friends and students of the several colleges can be enlisted, the day will be a memorable one.

Many of those most interested in the college athletics of this state will be close observers of the outcome of that perplexing question, whether the combination of a general committee *will* make better arrangements than an individual college which pledges itself, and assuming the responsibility works unceasingly for success. The delegation which is to represent Rose this year should be a large one and each member should be well trained. Training can be accomplished without interfering with school work if the athlete is systematic and avoids wasting his time. Train carefully. Go to Indianapolis on Field Day and be found there with an object in view.

THE COLLEGE ASSOCIATION.

An impetus was given to the work of the Association February 24th, at which time a regular meeting was held at the Institute, all directors except one being present.

The office of Treasurer of the State Association, which was held by Rose, ended March 9th and was succeeded by the State Secretaryship. W. E. Burk was elected to the office.

Andrews '94, was chosen to represent the local Association at the meeting of the State Association.

At the meeting held March 7th, Mr. Burk was elected delegate to look after our base ball interests in the Indianapolis meeting.

The meeting held Monday evening March 12th, was a particularly busy one. The base ball committee was elected as follows: Burk, chairman; McCulloch and Brinker. Andrews was chosen to represent Rose at the meeting of the Western Inter-Collegiate Athletic Association in St. Louis the 15th inst.

McCulloch was elected representative for Rose to serve on the State committee, which will hold its first meeting in Indianapolis about the middle of April for the purpose of arranging for State Field Day.

A new combination which promises to be of the utmost importance is a proposed Alumni-Senior base ball game during commencement.

The tennis courts have been leveled and put in excellent order. They will be in condition to be occupied within a few days.

Y. M. C. A. CONTEST.

The Y. M. C. A. held a Pentathlon contest Feb. 26th, which was open to all members of the Association. The Polytechnic class was represented by Crowe and Ridgeley, who took third and fourth places respectively.

The complete score is here given:

Number.	NAMES.	Potato Race.	Putting 16-pound Shot.	Hitch Kick.	Fence Vault.	Rope Skip, 900 times.	Totals Points.
1	Bert Modesett	14⅜″	25′8″	8′2″	6″	6′6″	
		60	51	80	64	34	289
2	Edmond Probst	15⅝″	26′8″	7′4″	5′8″	5′17″	
		40	56	55	48	83	282
3	W. W. Crowe	15⅝″	31′8″	8″	6′4″	7′8″	
		40	80	75	80	00	275
4	C. M. Ridgely	14⅜″	22′10″	7′8″	5′8″	5′36″	
		55	38	65	48	64	270
5	Will Rippetoe	15⅝″	25′2″	7′4″	5′8″	5′23″	
		40	49	55	48	77	269
6	A. Little	15″	21′9″	7′10″	5′10″	5′41″	
		50	32	70	56	59	267

WESTERN INTER-COLLEGIATE ATHLETIC ASSOCIATION.

Delegates of the W. I.-C. A. A. met in response to a call of President Leahy, at Lindell Hotel, St. Louis, March 15, 1894. The object of the meeting was to effect a more permanent organization by adopting a constitution and by-laws. Colleges represented were Washington University, University of Illinois, Christian Brothers' College and Rose Polytechnic Institute. It was somewhat discouraging that more colleges were not represented, and in order to have a better attended meeting it was resolved that a call be issued to each of the colleges that took part in either of the athletic meets at Champaign, Ill., to send a representative to a meeting to draft a permanent constitution, said meeting to be held at Lindell Hotel, in the city of St. Louis, at 8 o'clock P. M., May 25, 1894. It was further resolved that only those colleges that are represented in this meeting of May 25th are to be considered members of this association.

The following resolutions were adopted:

Resolved. 1. That the athletic meet for the year 1894 be held in St. Louis on Saturday, May 26, the same to be under the auspices of the Paulian Athletic Club of Christian Brothers' College.

Resolved. 2. That all contests shall be governed by the Amateur Athletic Rules of the Eastern Inter-Collegiate Athletic Association.

Resolved. 3. That no college will be allowed to enter more than three contestants in any one event.

Resolved. 4. That the Paulian Athletic Club issue blanks and forward the same to the several athletic associations belonging to the W. I.-C. A. A.; that these blanks be in the nature of a certificate saying that contestant whose name is entered thereon is a student in good standing and in a regular course of his college, and that these certificates be signed by the President of the college from which the contestant is entered.

Resolved. 5. That it be required that the name of each contestant and the events in which he is expected to take part be sent to the Paulian Ath-

letic Club not later than May 16. Also, that each contestant at the same time send $1.00 as a guarantee, which money will be refunded in case he makes a start in each of the events in which he is entered.

Resolved. 6. That the events for Field Day contests be as follows:

100 yards run.
220 yards run.
One-quarter mile run.
One-half mile run.
One mile run.
Putting 16-pound shot.
Throwing 16-pound hammer.
Running broad jump.
Running high jump.
Pole vault.
One mile walk.
Two mile bicycle race (safety).
120 yards hurdle.
220 yards hurdle.

Resolved. 7. That three medals, gold, silver and bronze, be given in each event. That the scoring of points be:

1st prize . . . . . 5 points.
2d prize . . . . . 3 points.
3d prize . . . . . 1 point.

That the college scoring the greatest number of points be declared Champion of Field Sports for the year 1894, and be awarded a championship pennant.

Resolved. 8. That the club giving the meet receive all proceeds above expenses.

Resolved. 9. That this Association shall consist of the following colleges: Washington University, University of Illinois, Lake Forest University, Rose Polytechnic Institute, Illinois College, Iowa College, Northwestern University, Christian Brothers' College and Purdue University. That other colleges of recognized standing be admitted to this Association is case such privilege is asked, except where such admittance is opposed by the votes of two colleges which are at present members of this Association.

Resolved. 10. That in case any business should demand the attention of the Association before May 25th, such business be transacted by correspondence and vote taken by mail.

Resolved. 11. That the above rules are to be in force only till after May 26, 1894.

M. C. Andrews, Sec.

INDIANA INTER-COLLEGIATE ATHLETIC ASSOCIATION.

The regular meeting of the Association was held at the Denison House, Indianapolis on the 9th inst., President Blair, of Wabash, in the chair.

The officers for the ensuing year were installed as follows:

Isham Taylor, of I. U., President.
A. H. Somerville, of Butler, Treasurer.
W. E. Burk, of Rose, Secretary.

On the motion of Andrews, of Rose, the two mile and half mile safety events were substituted for the two mile and half mile ordinary races.

On a motion made by the delegate from I. U., Section 2 of Article X of the Constitution was amended to read: "That the pitcher be stationed at the distance from the home plate as provided for in the National Association rules for base ball of 1893."

The motion to change Field Day for '94 from Terre Haute to Indianapolis was made by the Butler delegate. This motion, which was carried, provided that Field Day be held under the control of the colleges of the Association, each of which should receive a share of the proceeds. A committee consisting of a representative from each college was appointed to arrange for and control Field Day exercises, Somerville, of Butler, being chairman of this committee. Butler agreed to furnish all apparatus necessary for the event.

The second meeting of the Association took place in the afternoon in order to give committees on base ball and football time to arrange schedules.

The schedules, which were approved, are as follows:

April 21, { Butler-Purdue, at Indianapolis.
DePauw-Rose, at Terre Haute.
Wabash-Hanover, at Hanover.

April 28, { Wabash-Purdue, at LaFayette. / Butler-I. U., at Bloomington.
May 5, { Rose-Purdue, at LaFayette. / I. U.-Wabash, at Crawfordsville. / Butler-DePauw, at Greencastle.
May 12, { I. U.-Rose, at Terre Haute. / Purdue-DePauw, at Greencastle.
May 14, Hanover-Butler, at Indianapolis.
May 15, Hanover-Purdue, at LaFayette.
May 16, Hanover-DePauw, at Greencastle.
May 18, Hanover-I. U., at Bloomington.
May 19, Rose-Butler, at Terre Haute.
May 26, { Wabash-DePauw, at Greencastle. / Rose-Hanover, at Hanover.
May 30, { DePauw-I. U., at Bloomington. / Butler-Wabash, at Crawfordsville.
June 2, { Rose-Wabash, at Crawfordsville. / Purdue-I. U., at Bloomington.

The football schedule adopted for the season of '94 has the following arrangement:

Oct. 13, { DePauw-I. U., at Greencastle. / Butler-Purdue, at Indianapolis.
Oct. 20, { Wabash-DePauw, at Greencastle. / Butler-Rose, at Terre Haute.
Oct. 27, { Wabash-I. U., at Bloomington. / Purdue-Rose, at LaFayette.
Nov. 3, { Butler-I. U., at Bloomington. / Wabash-Rose, at Terre Haute.
Nov. 10, { Wabash-Purdue, at Crawfordsville. / Butler-DePauw, at Indianapolis. / I. U.-Rose, at Bloomington.
Nov. 17, DePauw-Rose, at Greencastle.
Nov. 24, { Butler-Wabash, at Indianapolis. / Purdue-I. U., at Bloomington.

Before adjourning, the Secretary was instructed to have one hundred copies of the Constitution printed for distribution among the colleges of the Association.

BASE BALL WORK.

The interest which is being shown in base ball, and the efforts which are being made by the base ball committee to develop and select talent for the team is decidedly encouraging to those who hope and expect to see Rose stand first in base ball this season.

We are to have three games here this season, and if the team is up to the standard of excellence which is now promised there is no reason why the games should not be well attended. The first game will be with DePauw, April 21st. The entire school, including the faculty, should be in attendance to give the usual encouragement. The diamond has been improved at considerable expense, having been leveled and filled in. There seems to be too much sand on the surface at present, but that condition will be improved within a week or two with the result that we will have a good ball ground for all time.

PREPARATION.

A general assembly was held last Tuesday, the 20th inst., which was attended by forty enthusiastic students who met to hear the reports of the meetings in Indianapolis and St. Louis.

Andrews '94, as President of the Athletic Association and delegate to the meetings, stated in substance what transpired. Mr. Burk gave somewhat in detail the subjects under discussion at the Indianapolis meeting. Mr. Blinks followed with a few remarks, urging all to attend Field Day, and referred to the need and manner of making a demonstration characteristic of the Rose and White.

The training committees were then read as here given:

Tennis.—Prof. Hathaway, Miller, Morg, Farrington.

100 Yards Dash, 220 Yards Dash, One-fourth Mile Run, 120 Yards Hurdle Race.—Crowe, McTaggart, Decker, Ridgely.

Pole Vault, Running and Standing High Jumps, High Kick.—McMeans, Hildreth, Warner, Hellweg.

Mile Run, Mile Walk.—McCulloch, Chandler, Butts.

Throwing 16-pound Hammer, Putting 16-pound Shot, Throwing Base Ball.—Troxler, Burtis, Darst, Tucker.

Running and Standing Broad Jumps, Hop, Step and Jump.—Miller, Crowe, Liggett.

Bicycling.—W. J. Klinger, P. W. Klinger, Werk.

Base Ball.—Burk, McCulloch, Brinker.

GENERAL NOTES.

Emmons, of Harvard, has been elected captain of the football team for the season of '94.

There were ninety-two candidates for the Ann Arbor base ball team.

According to the Cornell *Sun*, the poor showing made there in athletics is attributed to the circumstance that the students are obliged to devote too much time to their university studies.

Johnston, ex-'96, will no doubt be one of the tennis players for Purdue this year.

A tennis court, the place for sport,
A net and rackets two.
A sunny day the time to play,
A maid with eyes of blue.
The ball she serves. Alas! It swerves!
Goes bounding down the hill.
"A fault," I call, but yet with all
Her faults, I love her still.—*Ex.*

ROSE LEAVES.

*EXPERIMENTS TO DETERMINE THE EFFECT OF BEDDING UPON THE STRENGTH OF MARBLE.**

BY PROF. M. A. HOWE.

It is well recognized that it is very difficult to obtain uniform results in testing specimens of stone in compression, even when great care is exercised in preparing the specimens and in placing them in the testing machine. This is due mainly to the inability of workmen to make the bearing faces of the specimens true parallel planes without special machinery or great expense. For commercial purposes it is necessary that some means be devised by which reliable results can be obtained with specimens formed by tools and machinery usually found at stoneworks of any considerable magnitude, so that the engineer may obtain a definite knowledge of the strength of the stone in compression which he intends to use, without going to great expense and consuming much time. This does not necessarily mean that the results of the experiments shall represent the strength of the material in large pieces as used in engineering structures, but that they shall represent the comparative strength of the material, some well known homogeneous stone being taken as a standard.

If specimens are formed by ordinary tools and machinery the faces will usually have ridges and high points and are seldom parallel; and when such a specimen is placed in the testing machine it will first take the applied load on the high points and ridges. As the pressure is increased these will be crushed down and the specimen fails by being wedged apart, if the term wedge may be applied to the portions of the specimens which have the maximum loads. The specimens may be artificially "trued up" in several ways, the most common way being, perhaps, to cover the bearing faces with plaster of paris which can be either cast so as to present true parallel planes or ground to such a state. Another method is to place between the bearing faces of the specimen and the faces of the testing machine some material which will, or rather is supposed to, conform to the irregularities of the specimen and distribute the applied load uniformly over the bearing faces. Sheet lead, sole leather and pine have been applied for this purpose, but as far as the writer is informed none of them has been used to any great extent.

In order to determine, if possible, something about the effect of bedding upon the results of compression tests and also their reliability, the writer had a series of specimens prepared at a marble quarry in Iowa under the following specifications: (1) Specimens to have square bases and a height equal to $1\frac{1}{2}$ the side of the base.

*Abstract of paper prepared for the Indiana Engineering Society.

(2) For any particular grade of stone the specimens representing that grade to be cut from the same piece of stone. (3) Specimens to be cut so that the natural bed of the stone would form the square bases.

The specimens were cut by ordinary tools and machinery. Five grades of stone were represented by the specimens, which were of two sizes, one set being $3 \times 3 \times 4\frac{1}{2}$ ins. and the other $2 \times 2 \times 3$ ins.

The writer decided to try five kinds of bedding material, namely, cast iron, soft pine, sole leather, sheet lead and tar board. Plaster of paris was not tried, owing to the unknown effect of the moisture necessarily absorbed by the stone and the undesirability of using such a material in commercial work. The cast iron employed was in the shape of a rectangular block having true and parallel bearing faces. The soft pine was in thoroughly seasoned pieces about $4 \times 9 \times \frac{1}{4}$ in. The sole leather was perfectly dry and the pieces were just a little larger than the bearing face of the specimen. The sheet lead was in pieces 4×4 ins., as were also the pieces of tar board. In each case one piece of bedding material was used on each bearing face of the specimen and in no case was any piece used twice.

As the pieces were tested they were carefully measured, two measurements being made to determine the area of each bearing face and four to determine the distance between these faces. The specimens were also examined for chips, cracks, ridges, high points, etc. In placing the specimens in the testing machine care was exercised to have the plates transmitting the pressure gear as nearly as possible over the entire face of the specimens by means of thin iron wedges. In case the faces were parallel no wedges were employed. These specimens were closely watched for the first crack or signs of failure. In all cases the load was slowly applied.

Cast iron bed, for specimens prepared with ordinary tools, was found to give the results least satisfactory.

Soft pine bed produced a tendency in the specimen to split on lines parallel with the grain of the pine. The pine was usually compressed about $\frac{1}{8}$ inch, and specimens were thus confined at the edges increasing the magnitude of results obtained. The results stand third.

With sole leather bed the edges of the specimen were confined by the compression. The distribution of pressure was not uniform, owing to inequalities in the thickness of the leather. The results stand second.

For sheet lead it was found that the pressure was very evenly distributed, but the magnitude of the results was lowered owing to the lead flowing into the specimen and wedging it apart. The results stand fourth.

Tar board bed was found to be the best, as it was very slightly compressed and distributed the pressure most evenly.

In conclusion Prof. Howe says, it appears that to obtain the best idea of the comparative strengths of specimens of different kinds of stone, the specimens should be cut with perfectly parallel plane ends and tested between parallel iron or steel plates. But this calls for great labor and expense in preparing the specimens, so that some kind of bedding material seems desirable. Of those tried, sheet lead seems to distribute the pressure the best, but lowers the strength of the specimens by an unknown amount, depending upon the structure of the material. Pine is undesirable, owing to its splitting action. Sole leather answers very well, but has the objection of not being uniform in thickness. Tar board distributes the pressure very well, does not flow into the specimen, has no splitting action, but raises the strength of the specimen by confining the ends, yet, in spite of the latter defect, the writer believes for commercial testing or comparative tests that it is the most reliable of the five kinds of bedding material tried. This conclusion is based upon but 80 experiments; but a careful examination of the detailed results shows that the specimens were practically uniform in respect to the characteristics of their end faces, and as each grade was cut from the same piece of stone it is believed the conclusion is warranted.

THE ORCHESTRA CONCERT.

In its fifth annual concert Tuesday evening, March 20th, the Orchestral Club scored another success. A large audience greeted the Club at the Congregational Church and were delightfully entertained. Professor Mees, who has been leading the orchestra for the past few months, swung the baton, the musicians responding in a manner which reflected great credit upon his instruction. No replies to encores were given, although applause was frequent and enthusiastic. Miss Harriet Paige assisted the orchestra. The following numbers were given:

PART I.

1. Overture—"Figaro's Hochzeit" . . . . . *Mozart*
   ORCHESTRAL CLUB.
2. Quartette—March—Cinderella . . . . . *G. Papini*
   Violins—MR. WILLIUS, MR. MENDENHALL, MR. HURLBERT.
   Cello—MR. BERTRAND. Piano—MR. MISCHLER.
3. Organ—1st Movement, Sonata in E Flat, *Dudley Buck*
   MR. HURLBERT.
4. *a.* Serenade . . . . . *Jensen*
   b. Soldier's Song . . . . . *Moniuszko*
   ORCHESTRAL CLUB.

PART II.

1. Spanish Dances { Minuet / Bolero } . . . . . *Moszkowsky*
   ORCHESTRAL CLUB.
2. Boat Song . . . . . *Neidlinger*
   MISS HARRIET PAIGE.
3. *a.* Post im Walde . . . . . *Schaffer*
   Cornet Obligato—MR. WINTERS.
   b. Am Meer . . . . . *Schuberth*
   Trombone Obligato—MR. LUFKIN.
   ORHESTRAL CLUB.
4. Quintette—Opera Sans Paroles . . . . . *C. DeBeriot*
   Introduction, Andante, March, Rondo.
   Violins—MR. HURLBERT, MR. MENDENHALL.
   Flute—MR. MEADOWS. Cello—MR. BERTRAND.
   Piano—MR. MISCHLER.
5. Funeral March of a Marionet . . . . . *Gounod*
   ORCHESTRAL CLUB.

The Orchestral Club has now the largest membership since its organization. Those taking part in the concert were:

1ST VIOLIN.
E. H. Hurlbert,
H. G. Kilbourne,
C. E. Mendenhall,
G. Willius.

2D VIOLIN.
R. E. Huthsteiner,
H. T. Liggett,
J. S. Royse.

CELLO.
F. M. Bertrand.

VIOLA.
R. W. Beebe.

BASS.
J. D. Ingle.

FLUTES.
H. H. Meadows, F. G Hunt.

CLARINET.
W. Bundy.

OBOE.
E. B. Harris.

CORNETS.
G. H. Winters, E. L. Shaneberger.

ALTO HORN.
C. H. Holderman.

TROMBONE.
J. E. Lufkin.

PIANO.
P. Mischler.

TRIANGLE.
F. W. Spencer.

THE PRESS ASSOCIATION.

The Indiana College Press Association held two well attended sessions at the Denison hotel, in Indianapolis, on Oratorical Day, March 9th. President Day, of the *Earlhamite*, called the morning meeting to order, the roll call showing the following journals represented: *Earlhamite*, *Phœnixian*, *De Pauw Weekly*, *Wabash*, *Butler Collegian*, and THE ROSE TECHNIC. The annual election of officers occuring, resulted as follows:

President, W. M. Blinks, ROSE TECHNIC; Vice-president, Max Erhmann, *De Pauw Weekly;* Secretary and Treasurer, R. R. Ragan, *Wabash;* Executive Committee, President of the Association, Chairman, Miss Anna Maddock, *Phœnixian*, Miss Anna Charlotte Stover, *Butler Collegian.*

The Clarion, of Franklin college, was elected to membership in the association.

It was decided to publish each month, in regular rotation among the journals, according to a list designated by the president, a department of Indiana college news. A representative from each staff sending in notes of interest from his college to the paper which publishes for that month these items. The object sought is to bring at least once a year each paper in the association

prominently before all others and thus to insure better acquaintance.

The afternoon session was called to order at three o'clock by President Blinks, and was almost entirely devoted to the reading and discussion of papers. Mr. Blinks opened the subject according to the program arranged by Ex-president Day, with "A Review of the Field of College Journalism Retrospective and Prospective."

Miss Stover, of *The Butler Collegian*, followed with an able paper on "The Literary Department —Its Sphere and Scope—Possible Lines of Progress." Mr. McKee, of *The Wabash*, with his subject "Editorial," gave some exceedingly good thoughts of much value to college editorial writers. Miss Hadley, of the *Phœnixian*, handled the "Exchange Department" as conducted by many college papers, without gloves, and also sketched her ideal department.

Nearly all the papers furnished material for lively discussion, which always forms one of the most valuable features of such a meeting. Messrs. Newline and Pritchard, both honorary members of the Association, being former editors-in-chief of *The Earlhamite* and Association officers, were present and responded to a call for remarks in appropriate words. Owing to the difficulty in recognizing members of the Association before and after such gatherings, it was decided to adopt pink as the official color to be worn on all state occasions. This does not resemble any of the college colors and will be easily recognized. When the meeting adjourned, it was to meet again on Thanksgiving Day, in the same city.

The student hurriedly leaves the game;
To the Latin lecture races,
Renders *Instruxit triplicem aciem:*
"He stayed and drew three aces."

—*Brunonian.*

DIFFERENTIALS.

Re Bender, ex-'96, is now at Butler.

Spring fever has been in order the past week.

Mr. McCormick is riding a wheel this spring.

Werk, '96, will spend the spring vacation in Florida.

Brown, '94, disputes the title of Hoosier poet with Riley.

M. R. Thompson, ex-'94, was seen in Terre Haute a few days ago.

Hildreth will spend the vacation with Andrews at his home near State Line, Ind.

At a meeting held some time ago the Juniors decided not to hold a banquet this year.

It has been suggested that the R. P. I. Athletic Association give an entertainment "en silhouette."

Elmer Hendricks, ex-'92, of Indianapolis, spent some time in Terre Haute during the past month.

Rice, reading a journal review—"Seventy per cent. of rice is starch." [Laughter and applause.]

The tennis courts are undergoing a "period of metamorphosis." We didn't suppose they were as bad as that.

Mead will agree with us that the meanest practical joke of the season was the one in which his rhubarb pie was served to him in vinegar and seasoned with salt.

You may talk of the explorers bold,
Safe back from savage lands;
But those who go to the blacksmith shop
Will return with blistered hands.

The Senior class has appointed a committee to consider the advisability of giving a class day program in June.

Many of the Seniors will remain in the city for the whole or part of the vacation to work on their theses drawings.

It seemed that every other man had orchestra tickets to sell. And just that many energetically worked the public.

Kingsbury is using a red lantern on trial. If that proves unsatisfactory he should have a special arc lamp arranged.

Prof. Brown has ordered a new steam engine indicator to be used by McCulloch and Mischler in their thesis work.

The Poly class at the German M. E. church are remaining firm in the faith and incidentally acquiring considerable German.

J. A. Parra has taken for his thesis the Investigation on the Chlorination Process for the extraction of gold and silver from their ores.

From present demand for metropolitan daily papers we are led to imagine that the Senate debates on the Wilson bill must be getting lively.

It is said that Riedel has changed his thesis and will take the "Determination of trend of grain in brass by comparison of tests with rip and cross-cut hack saws.

W. M. Blinks represented THE TECHNIC at the meeting of college press editors at Indianapolis. An account of the meeting is given under the head of Rose Leaves.

Prof. Wickersham has required the Freshmen to write compositions entitled "Poly Notes." The local editor of THE TECHNIC extends his heartfelt sympathy for them in this trial.

It is currently reported that Buck Speed has taken to agricultural pursuits, and that he is now cultivating a promising magnetic field of considerable dimensions out near the shops.

During thesis weeks hereafter it is understood that Andrews and Hildreth will have full charge of the rolling stock of the Vandalia railroad and connecting lines. Note change of management.

Anderson, '95, has publicly announced that he calls himself "Dictionary." It is well known that "A Walking Encyclopedia" would be quite applicable to him, but if he prefers "Dictionary" we have no objection.

If universal chaos in the ambient air is what you think you need for your attack of spring fever, solicit from the designer an explanation of the internal arrangement and operation of the Winter's Extensiometer.

A "German Walk" is the latest thing in the Sophomore class. On the strength of a most affecting appeal in the adopted tongue, or rather pencil, Prof. Wickersham consented to a peripatetic Deutsche Unterhaltung.

Mr. Nicholson seems to make the work exceedingly hard for his classes. Under his watchful care no man has yet left the blacksmith shop without carrying away something to show for his work, usually a couple of blistered hands.

The Freshmen have had the pleasure of plotting again; not to capture Sophomores this time but to graphically illustrate some algebraical equations for Mr. McCormick. It is to be hoped they were more successful in this than in their former plotting.

Public opinion is that a few more erasers would save much of a man's time and be much more acceptable than such elaborate chalk troughs as are being introduced into the Poly. If, however, the chalk troughs will necessitate more erasers, we welcome their advent.

If Reuhl continues to be successful in his training he will request President Andrews of the A. A. to use his influence in having another event entered on the program of the coming state athletic contest. In his last trial against time he was eminently successful, eating five large crackers in five minutes without any very serious effects from choking.

The sight of the broken ground across the way from the Institute conjured up thoughts of the new physical labratory. Present indications suggest more strongly an oat field, we are sorry to say.

Those interested in track athletics will be pleased to learn that Mundy, '95, has commenced training for the 100 yards dash. So earnest is he with this undertaking that he has been seen sprinting from the Poly to the round-house and back between recitations.

The German entertainment given at Coates College Saturday evening, March 17th, by the pupils of Miss Haberstich, was enjoyed by a number of the Polys. It has been highly complimented as being the most enjoyable of the Coates College entertainments of the season.

It is astonishing to what a height the taste of some of the Polys has become elevated. Many go to only the best of entertainments and then procure the highest seats possible. It is encouraging to know that this state of cultivation has become quite general among the students.

The free-hand drawing room has received several improvements recently which add materially to its beauty and convenience. The old tables which held the models have been replaced by a set of neat shelves, and a new cabinet has been added as a receptacle for the drawing tools. Those instruments of torture, the spheres, rings, cubes, etc., have been freshly painted so that the dust of ages can no longer be an excuse if the artist does not represent the shades correctly. A number of new casts recently appeared, of which the Freshman class will reap the benefit as the Sophomores have nearly completed their course in free-hand drawing.

The Indianapolis delegation have quite a treat in store for them as the Cornell University Musical Clubs will be at English's Opera House on Wednesday the 28th. Folsom, R. P. I. '92, Cornell P. G. '93, says that the whole Institute could be taken care of if application for seats are telegraphed in time.

On Saturday evening, March 3d, Mr. James Farrington entertained the members of the Phi Sigma Phi in a manner which they will long remember. At 8 o'clock, Mr. Farrington led the way to the dining room, where the lucky members feasted their eyes upon a snowy table appropriately decorated with blue and white, the frat. colors, and upon which was afterwards served such a spread as had not greeted the eyes of the aforesaid members for many a day. Each member found at his plate, in the shape of a souvenir, a blue and white enameled scarf-pin. Before adjourning to the parlors, the sentiments of all present were admirably set forth in a toast to Mr. Farrington by Mr. Robinson. The remainder of the evening was spent at cards. The event was by far the most enjoyable in the annals of the fraternity. Those present were: W. M. Anderson, '94, L. C. Anderson, '95, E. H. Light, '95, F. H. Miller, '95, A. L. Robinson, '95, W. Wiggins, '95, W. Coupe, '96, F. C. Fletcher, '96, J. Farrington, '96, S. G. Meade, '96, R. Merriwether, '96.

A CHEMICAL ROMANCE.

Said Atom to Molly Cule,
"Will you unite with me?"
And Molly Cule did quick retort,
"There's no affinity."

Beneath electric light plant's shade
Poor Atom hoped he'd meet her,
But she eloped with a rascal Base,
And now her name's Salt Petre.

—*Souvenir, in Integral.*

THE COLLEGE WORLD.

Cornell has a course in photography which is very popular.

La Crosse will be played at University of Wisconsin this season.

Ice boating was a popular pastime at University of Wisconsin last winter.

An inter-collegiate tennis association is contemplated by the colleges of Iowa.

A man said to be seventy-five years old has entered the Freshman class at Princeton.

Windle, the famous wheelman, has entered the Massachusetts Institute of Technology.

A $750,000 building is to be erected by the University of New York on its present site.

The faculty at Cornell are making an effort to forbid any university team entering a contest outside of Ithaca.

Ex-president Harrison's lectures on international law at Stanford are to be printed and used as a text book.

Seniors at Yale and Princeton will wear the cap and gown on Sundays, after Easter, and at all public exercises.

The Massachusetts Institute of Technology has students from forty States and twenty foreign countries.—*Orient.*

Prussia has just erected at Charlottenburgh the finest institution of technology in the world, costing four million dollars.

Nine Rutgers students have been summoned into court for decorating the president of the Sophomore class with green paint.

Dr. Augree, of University of Michigan, will deliver the commencement address to the graduate class at Earlham this year.—*Phœnixian.*

The gymnasium formerly used by the Manhattan Athletic Club has been leased by two of Columbia's alumni for the use of the students.

—*Crimson.*

It is proposed to hold an international congress of ameteurs in Paris, next June, for "the consideration and extension of the principles which underlie the idea of amateur sports."

—*DePauw Weekly.*

A student once rapped at the pearly gates,
But he rushed away with fear-o!
When he saw as soon as Peter came out
That halo looked just like a zer-o.

—*Lehigh Burr.*

Hereafter the degrees of civil engineering and mechanical engineering will not be given at Stanford, but instead the degree of engineer, with special mention of the department, as "engineer in mechanical engineering," will be given.

—*Crimson.*

At a press meeting of the Iowa colleges, delegates from four colleges—Drake, Iowa, Simpson and Cornell—reported as receiving credit on the course for work done on the college papers. All Indiana college papers, except the TECHNIC, receive credits.

A party of U. of P. students leave New York, the first of June, for Labrador, where they will stay for three months. The object is to learn of the geology and vegetation of the interior of Labrador, a region about which little is at present known.—*W. P. I.*

$85,000 has been subscribed for the Students' Hall at University of Penn. Although primarily intended only for religious purposes, yet it will contain rooms for literary societies and college papers, a reading room, a smoking room and probably a gymnasium.—*Courier.*

In a college in western Pennsylvania it is customary for the Juniors to furnish music for the Senior address. On a recent occasion, as the Seniors were marching to the platform, headed by the president of the college, the Juniors began, "See the mighty host advancing, Satan leading on."—*Ex.*