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THE TECHNIC

TERMS

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THE question is constantly being asked whether our colleges prepare their students to be successful in after-life. In nine cases out of ten, the man who asks this question measures success in terms of wealth. He thinks the whole world is playing a game in which money is the prize, and the man who makes most money is the winner. The true measure of a man's success is the service which he renders, and not the pay that he exacts for it. The true measure of a man's ability is the power to help others, and to contribute to their advancement. The effort to make money is an important incentive to social service and industrial progress, but the amount of wealth each man acquires is no accurate indication of the service which he has rendered, or the progress which he has made possible.—*President Hadley, of Yale University.*

All that President Hadley says here is good, and deserves the careful consideration of every college man. Far be it from us in our humility to disagree with him, but there is a good deal to be said on the other side of the question.

We are all engaged in the pursuit of success and happiness, and before either of these can be obtained, it is absolutely necessary that we gather together at least enough of the coin of realm to keep body and soul together. Most of us when we graduate will take the job that offers the best pay, and envy the man who gets a better one. We are mercenary from necessity, not from choice. In these days of the high cost of living, no man can consider social service unless he first considers and provides for himself, and perhaps for his family.

President Hadley is a successful man. He has undoubtedly done much that has been of service to the human race. His success is the kind that is not measured in terms of dollars and cents—it rises above the question of mere money. But on the other hand, while we do not suppose that President Hadley is a wealthy man, still it is quite likely that he has not had to worry about next month's grocery bill for quite a number of years. This is one of the things that has enabled him to devote his life to social service. It is very well to say that money is not everything, and that it cannot buy every-

thing, or that success should not be measured in terms of it. The fact remains that it is a very necessary article of commerce. Show us a way to get along without it, and we will gladly leave its mad pursuit, and devote our lives to the betterment of the human race.

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THE leading article this month is by Mr. O. E. McMeans, '96. Mr. McMeans has had a varied experience since he left Rose. He spent some time teaching, and also had some experience at draughting and machine design. For the past few years he has been engaged in consulting engineering work in Indianapolis, and has had some very interesting and valuable experiences, from the very nature of the work itself. He has written articles for the Technic several times before, and those who have read these will undoubtedly recommend this one.

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UNDER the heading "Judgment Days for Our Colleges" there is published in "The Polytechnic," from Rensselaer Polytechnic Institute, an article on the classification of all the colleges in America.

It seems that the Government assigned the aforementioned task to one Dr. Kendrick C. Babcock, who appears to be a specialist in higher education, in the Government employ. The classification is officially declared to be "an attempt to estimate the work and status of a large group of institutions whose alumni in considerable numbers have sought admission to graduate and professional schools requiring bachelors' degrees or some part of an undergraduate course for admission to regular standing."

Colleges of the first class are defined as follows: Instiutions whose graduates would ordinarily be able to take masters' degrees at any of the larger graduate schools in one year after receiving their bachelors' degrees, without doing more than the amount of work regularly prescribed for such higher degree. The full list of these schools is given, and includes 44 endowed and private institutions, and 15 state universities. Only two Indiana colleges are mentioned, Purdue and Indiana University.

Colleges of the second class are defined as follows: Institutions whose graduates would probably require for masters' degrees in one of the strong graduate schools somewhat more than one year's regular graduate work. Perhaps one or two extra courses would supply the deficiency. From the colleges which have a star before them (about two-thirds of those in the list of 161), brilliant students with brilliant undergraduate records could probably be admitted probationally and might do the work required for the master's degree in the required time.

Only a partial list of these second-class schools was given. Rose was not in either the first class list, nor this partial second class one, although a full list of the latter would probably show its name. The article goes on to give classes three, four and even five. The big gap is said to be between classes two and three, classes one and two being regarded as close together.

We are not acquainted with Dr. Babcock, who performed this laborious work of classification. However, we must say that there are several points where we cannot agree with him. First, we defy any man, however expert, who claims to be able to classify all the colleges in the country. There are so many things to be investigated, and there is so much to be taken into consideration before this could be done, that by the time he had finished his work for all the colleges in the country, the list would be out of date, and he would have to start all over again. In the second place, we do not believe that the basis of classification is a fair one. Throughout the west, at least, not more than one graduate in fifty ever takes a post-graduate course. Why classify for the one and let the forty-nine go? Of course, to a large extent, a course that prepares for the graduate school, prepares for after life but, in engineering, at least, this is not always so.

Now let us take up one of several specific instances where we think the tables given are wrong. Consider Purdue. Now far be it from us to detract from the glory of Purdue. It is an excellent school, fully as good as many of the others mentioned in the list, and much better than some of them. However, it cannot come up to Rose in several particulars. As an example, the writer could have entered Purdue as a Sophomore, on the strength of his High School diploma alone. Many of his class did so, and have since graduated. Not so at Rose. He had to study very steadily his freshman year in order to keep going. Also, there have been men in his class at Rose who have "flunked out" here, and have gone to Purdue and will graduate. Some may say that this is due to better instruction at Purdue. Investigation, we believe, will prove the contrary. As another example, there is one college mentioned in the list of first-class ones, at which one-third of a man's credits toward graduation may be in athletics. If he tries for the football team, he gets credit for the time put in. If he takes a swim in the gymnasium pool, he does likewise, and may do so to the extent of one-third of all his credits. Would these help to prepare him to take his master's degree? We doubt it. As a third example, there is among the faculty at Rose, one man who is a graduate of one of the larger technical schools of the east. The school in question is down as a first-class college, and is one of the best known in the country. This man was asked how the course at Rose compared with that at his Alma Mater. He replied that the course at Rose was actually deeper than that at his own school, although it was possibly not quite so broad. This lack of broadness is due to the fact that no four-year engineering course that *is* an engineering course has any great amount of time to devote to those things which, although they go to make a broad-minded man, are not absolutely necessary for a successful engineer.

If Dr. Babcock is classifying with respect to size alone, Rose cannot compete. If he is considering equipment alone, we may not be as good as some in his list, although we are better equipped than the average school. If he is judging us on our faculty, we stand second to none in the west. Our requirements for admission are as high as any in the State of Indiana at least. Our requirements for graduation are at least as high as the average of his so-called first class colleges. As regards preparation for masters' degrees, Rose does not aim to prepare for these so much as for the actual battle of life. If however, he is judging us on the number of successful graduates, then we are willing to invite comparison with any school in the country.

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OUR Alumni Article this month is by Mr. Carl Wischmeyer, '06, who is at present Assistant Professor of Drawing and Machine Design at the Institute. The paper is on Rolling Levers, a subject that has been given very little consideration in this country, and should on this account be not only interesting but valuable.

SOME EXPERIENCES AS A CONSULTING ENGINEER

By O. E. McMeans, '96.

THIS is not a scientific paper, for there will not be a single integration sign nor a footnote about it. It has just occurred to me that it might be of interest for a few minutes if I were to stand up before the Technic audience and give a few items of experience in engineering practice.

If I shall grow somewhat personal in the telling, it is only because I feel very much at home before Rose friends, and in the columns of *The Technic*. The presence of the learned Editor does not even abash me, for is it not only a short while ago that he was accustomed to play marbles in my back yard after school? So, if he will forgive me for the reference to his early activity in spherical mechanics, and will give me the floor, this experience meeting will soon be over.

Some few years ago I determined to cut loose from the quiet mooring of a salaried job with a soulless corporation and launch upon the unknown sea of consulting engineering in my own canoe with a paddling mate. I must admit that the seeing dead ahead was not very clear to us for some days after the ripples of the launching had subsided. But we have kept going and have made some landings both interesting and profitable. We have accumulated a few charts and soundings also. These we have either made ourselves or have checked up carefully so that the steering comes easier now.

Starting out on the basis of general mechanical and electrical engineering practice, we have met with a wide variety of subjects. On our boards at the same time have been drawings for a line of delicate instruments, an automatic power press weighing thirty tons and steam and electrical power plant installations. We have designed complete systems of electric distribution for state institutions and large manufacturing plants, magnetic chucks, electric controlling systems for hydraulic accumulator pumps, and electric recording systems.

The work which has come to us falls naturally into two general classes, general engineering, and machine design. These call for widely different qualifications on the part of the engineer and demand special treatment in the process of designing. General engineering, including the design and supervision of construction of complete manufacturing plants, mechanical and electrical equipments for large institutions, power plants, and steam heating installations, with the making of efficiency tests of the various units of such equipments, requires of the engineer a knowledge of general practice and of the various grades of quality in workmanship and materials.

Tact in dealing with men is an important factor. Preliminary and later interviews with the owner must be carried out with courtesy, dispatch, and a knowledge of business methods,

Ofter the owner is represented by a board of directors or trustees, some members being friendly and others uncertain or openly hostile to the project and all concerned in it. Tact here merges into diplomacy and the engineer will often find himself subjected to a crossfire where the art of expression and the ability to think on his feet are golden.

Later on when the job is under way the engineer will meet with contractors, foremen, and salesmen. He must defend his specifications against the protests of the practical man who never heard of such ridiculous construction and who generally has an ax to grind. Courteous bearing, quiet firmness, and positive instructions should be the rule of the engineer, coupled, however, with an open mind always ready to accept and acknowledge a good idea from water boy, foreman, or owner.

"What will it cost?" is the ever-rising question and the hardest one for the engineer to answer. Careful records of work executed are valuable as also personal acquaintance with large contractors and manufacturers of equipment. Even with such help a large element of judgment and skillful adjustment are required.

Machine designing on the other hand, calls for something different. An engineer handling both classes of work at the same time must have water-tight compartments in his brain. It may be taken for granted that nearly every job of machine designing which comes to an engineering office is a hard nut to crack. If the client could have found something on the market that would serve his purpose even approximately, he would never have come in.

Usually the problem is put in the way of an article which is to be made or an operation which is to be performed. Suggestions as to how it may be done are often very crude, and must sometimes be entirely disregarded. However, statements of workmen and foremen concerning hand methods in use are invaluable as throwing light on the nature of materials and the operations required on them.

With this information in hand, and a good supply of reference books and catalogs, coupled with a knowledge of good shop practice, the machine designer must go into the chrysalis state for a time. This is the period of the incubation of the idea of the new machine and its transference to paper as an assembly drawing with operation charts. The designer may at this stage receive valuable help in the way of criticism or suggestion from fellow engineers or draftsmen. This must come at intervals, however. For the most part he will be wholly absorbed in his own imagination and calculations.

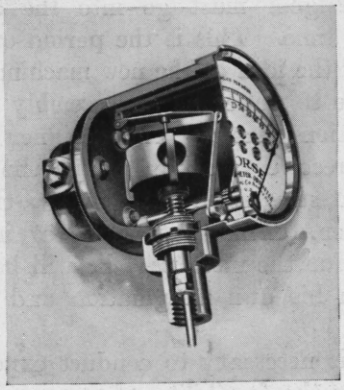
Ofter it is necessary to conduct experiments to determine the feasibility of proposed operations, the nature of stresses developed, the speeds possible, or the form of tools desirable. Results of these tests will throw much light on what it is necessary to do, as well as how to do it.

I recall an incident in designing a large automatic pasting machine. This was to handle strawboard sheets up to eighty inches square, distributing paste on both sides of the sheets. The owner's idea was to use a pair of rolls, the lower one running in a tank of paste, and a supply hopper feeding paste to the upper roll. The general design was pretty well developed, when in trying an experiment to determine the size of rotary pump needed, for supplying the paste, it became evident that the supply tank over the upper roll was needless. This was omitted, the machine built, and it has been running several years successfully.

There is a large element of pure invention involved in the work of the machine designer. He may often bring a device out of the crude impractical form in which it has been left to that of a successful workable machine. This finds a good illustration in the case of a speedometer which came to us a short while ago.

The patent covered a centrifugal element consisting of steel balls enclosed in a revolving cage with a sliding spider having inclined arms bearing on the balls. As the cage revolved, the balls pressed against the inclined arms of the

spider causing it to slide lengthwise of the spindle, being resisted by a spring. Simple



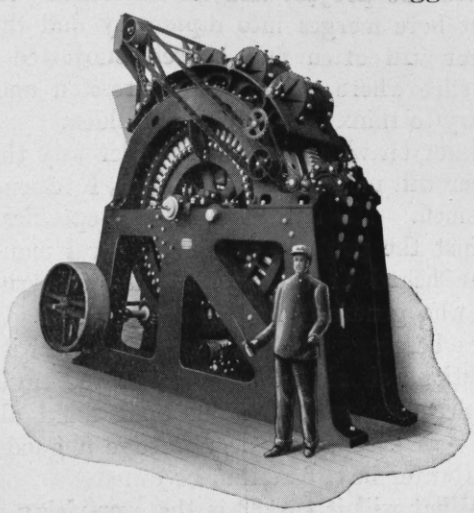
linkage connected the spider to the index.

Several thousand dollars had been spent in getting ready to market the device when it became evident that it was not satisfactory. At this stage the owner brought it to us. A few experiments showed the trouble. The arms of the spider were straight. As the speed increased, the index passed over increasing spaces for equal increments of speed and then went clear off the dial.

A little figuring showed that the arms should have a parabolic curve. A template was plotted, an experimental spider made, and the instrument tried out. The smile on the owner's face when next he came in was of the sort that means both friendship and dollars for the designer. He instructed us to prepare complete detail drawings for the instrument with all mountings and fittings. His shop is now busy up to capacity turning out the speedometers.

Another interesting job was the designing of a press for briquetting bituminous coal slack. The inventor brought to us simply his patent specification with some few crude suggestions. He had tried no experiments but was operating a briquetting plant with an entirely different form of press.

The problem was put in the hands of one of our staff who proceeded to dig. A few days later he emerged with a big bunch of sketches and calculations and the verdict that the thing could not be done. A conference on the question seemed to confirm this opinion. But before breaking the news to the owner we decided to think it over for a day or two. One suggestion

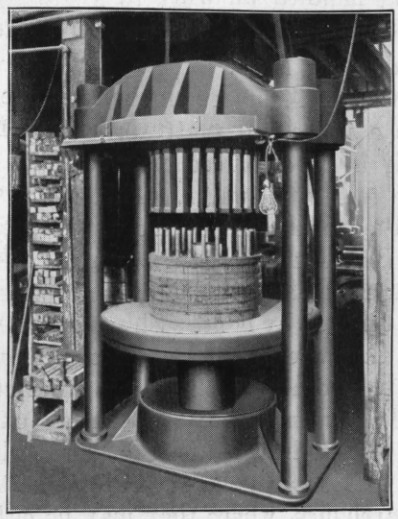


followed another until the news breaking consisted of an invitation to come down and look at the assembly drawing.

The press was built and is now rolling out briquettes at the rate of ten tons per hour. Its performance has attracted the attention of the government engineers by reason of its large capacity and uniformly perfect product. The general scheme is the use of a large master wheel, gear driven, having a double row of pockets for receiving the mixture of coal and pitch. Each pocket contains a steel plunger bearing at its inner end a solid steel roller. These rollers bear against a fixed cam at the center. Coal is fed into the pockets near the top, tamped down by a series of tamping wheels and then compressed by the extrusion of the plungers. The outer end of the pocket is closed during this compression by a series of steel shoes, forming a chain, each shoe carrying a steel roller travelling on a cam surface holding the shoe in contact with the face of the master wheel.

We have designed magnetic chucks for use on grinding machines and for other standard operations, but here is one a little out of the

ordinary. The hydraulic press shown is one of a battery of ten in use for building up paper



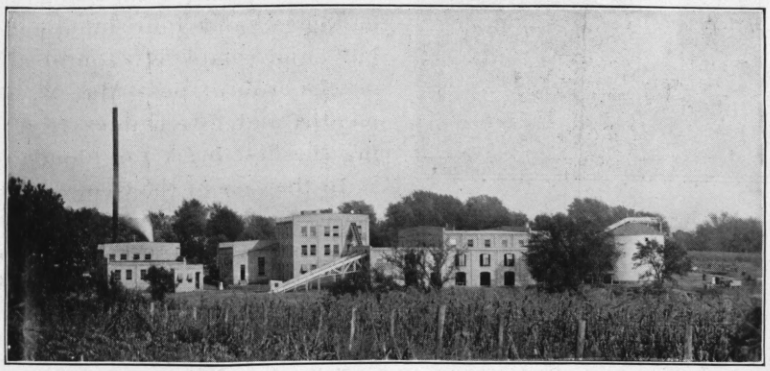
pulleys. In pressing the paper slabs down over the wooden dowels, it is necessary to use wood blocks between the dowels.

Formerly it was necessary to set up these blocks on end in a circle between the dowels for each squeeze, then take them down to place the next slab of paper. We put grey iron caps on the blocks and covered the entire face of the upper platen with a magnetic chuck. Now, after the first squeeze, the chuck is turned on and the blocks hang up while the lower platen descends for the insertion of another paper slab. Result, fifty per cent saving in time for the operation.

In the engineering of industrial plants and institutions we have covered a fairly wide range. Some products for the manufacture of which we have designed plants are architectural marble, wool blankets and paper mill felts, worsted goods, knit underwear, brass and aluminum automobile fittings, paper pulleys and fibre frictions, and canned foods of various kinds.

If we have developed any specialty, I may say it is in connection with the last named class of products. The canned food industry has within the last few years begun to take on a more permanent character. Well built plants and highly elaborated systems of automatic production at low cost and with close regard for sanitary measures, have brought the design of modern canneries into the scope of the mechanical and electrical engineer.

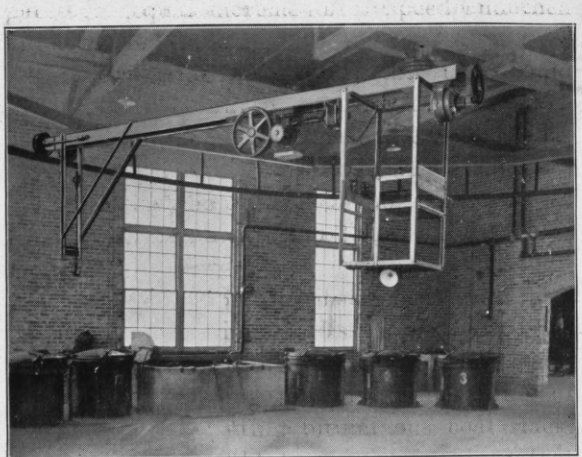
Fourteen such plants for sanitary food preservation is our record to the present time. A number of these are well up in the first class in size and capacity. Some of these canneries are equipped to handle one product solely, as in the case of several corn packing plants in northern Illinois, and pea packing plants in Wisconsin. It may not be generally known that thirty per cent of the total pack of peas in this country comes from Wisconsin, there being some sixty-three canneries in that state which handle nothing but peas. The other extreme is represented by some canneries in New York state whose products may be most easily listed as "All fruits



and vegetables except tomatoes."

The plant of Dickinson & Company, at Washington, Illinois, shown here, is designed for packing corn exclusively. It is thoroughly equipped with automatic machines and conveying systems and is motor driven throughout. The corn is dumped from the wagons onto conveyors, stored on the upper floor of the husking house, and thence down to husking machines on the lower floor. The husked corn is inspected, washed, brushed, and carried up to the cutting machines on the third floor of the main factory. The cut corn is spouted down through silking machines to the mixers, where sugar syrup is added automatically, to the fillers where it meets the cans. The cans are filled and soldered automatically, then taken to the sterilizing room where they are subjected to a temperature of 250 degrees F. for seventy-five minutes.

In laying out the sterilizing room at this plant we could find no power crane of the type and capacity needed, so designed the crane



illustrated. It may be described as a travelling crane moving in a circle. A ball bearing pivot bolt at the center and a circular track support it from overhead. Two motors, one for hoisting and one swinging, are controlled by the operator in the central cage. The capacity probably reaches the maximum for this operation. A number of cranes from the same design have been installed since in other plants. One at the plant of the Columbus Canning Co., Columbus, Wis., handled on July 3, 1912, 274,142 cans in a day of 17 1-4 hours, an average of 15,900 cans per hour.

From the sterilizing room the cans are dropped onto a travelling platform conveyor moving slowly in a reinforced concrete tank eighty feet long, filled with water. This conveyor discharges the cooled cans at the warehouse where they are placed in boxes for storage. This last operation is usually the only place where the cans are touched by hand. Shipped in box cars in which they are stacked in tiers, the cans are picked up fifteen at a time on a wooden tined fork and laid on a gravity runway extended into the car. Thence they roll out to the foot of a belt elevator which carries them to the top of the warehouse, where they may be either diverted to storage, or go directly by gravity to the factory. Here they pass through the can washer, being subjected to a jet of water and then steam, and then down to the filling machine where each one receives its charge of corn. The plant has a capacity of 130,000 cans of corn per day of ten hours.

Singularly enough, the largest two canneries on our list were built and equipped under emergency conditions. At Greenwood, Ind., the former plant of the J. T. Polk Co. was totally destroyed by fire on December 12, 1906. The new plant, comprising seven large brick buildings, and four buildings of wood, was built and completely equipped in time to start on the crop of peas May 27, 1907, or three months and fifteen days from the time of laying the first brick for foundations.

In the case of the Geneva Preserving Co., Geneva, N. Y., even more strenuous conditions were met. Their old wooden plant was burned out entirely on March 20, 1912. Contracts on "cost plus a fixed sum" basis were let before plans were started. Five buildings of brick and heavy timber construction, with concrete foundations and first floors, were erected, steam power plant and canning machinery installed,

with motor drives and all electric equipment, and the plant started on July 1, 1912, three months and ten days after the fire.

So, I may say that taking up the painter of that canoe metaphor again, we are still paddling along, trying to enjoy the scenery while keeping up the stroke. My partner of the voyage, Mr. Chas. A. Tripp, is from Boston Tech '93. We have found no difficulty in synchronizing the East and the West, even in rough waters. Our crew has been increased from time to time, and now, I am glad to say, includes two other Rose men, Snider, '05, and Rotz, '06. We are always glad to have friends from Rose hail us, and will back water anywhere on short notice to chat for a while.

ROLLING LEVERS

By Carl Wischmeyer, '06.

ROLLING levers are extensively used in the valve gears of both steam and gas engines in Europe, and American manufacturers have adopted the same type of gear in the larger sizes of gas engines. Practically nothing has been published in the American technical journals on the design of rolling levers, but several excellent articles on the subject are to be found in German texts and periodicals, notably one by Heinrich Holzer in the *Zeitschrift des Vereines deutscher Ingenieure* in 1908. From this article is taken much of the discussion given below.

Rolling levers are used for transmitting motion to valves of the poppet type, a type of valve used for both steam and gas engines in Europe, but seldom used on steam engines in this country. Rolling levers always work together in pairs, and may be divided into two general types. In the first type, illustrated in Fig. 1, one of the levers is fixed, the other has one end attached to the valve stem and guided to move in a straight line, and the other end is attached to the eccentric rod from the driving eccentric. This movable lever turns about its point of contact with the fixed lever as a fulcrum, thus giving a fulcrum at different points for different positions of the lever. In the second type, illustrated in Fig. 2, both levers move about fixed fulcrums, one being attached at its outer end to the eccentric rod, the other connected at its outer end to the valve stem. In the second type, since each lever moves about a fixed fulcrum the point of attachment of lever to valve steam cannot move in a straight line,

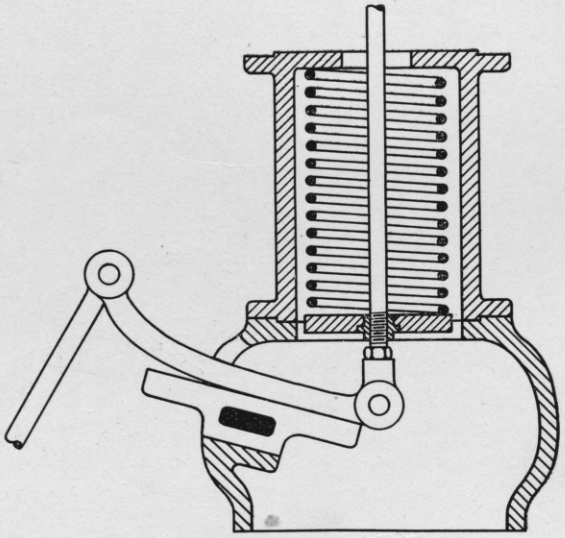


FIG. 1.

and the connection must be of some such flexible type as shown in the figure.

In the present article only levers of the first type, that is with one lever fixed, will be considered. The conditions to be satisfied in the design of this type of lever may be stated as follows: The point of attachment of lever to valve stem must move in a straight line; also the motion of the levers shall be a pure rolling motion, with no sliding of one on the other.

Referring to Fig. 3, the point A is to move along the straight line AC. The point D, at which the two levers are in contact, is the in-

stantaneous center about which the whole lever may be considered to be rotating for an in-

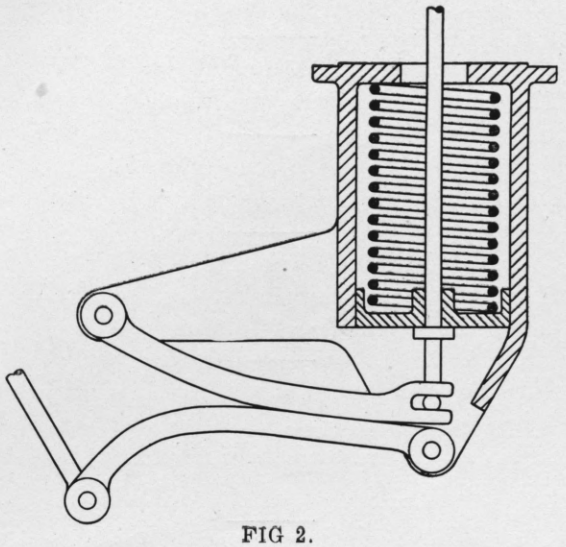


FIG 2.

stant. The instantaneous direction of motion of any point in the lever will be at right angles to the radius drawn from the instantaneous center to the point in question. Since the point A is to move alone AC, it is necessary that AC be perpendicular to the line joining A with the instantaneous center. To meet the first condition, then, it is necessary and sufficient that the line joining the point A with the point of contact of the levers shall be perpendicular to AC. If the valve stem is vertical, we can say that the point A and the point of contact of the levers shall lie on the same horizontal line for any position of the lever.

Pure rolling motion can be obtained only if the point of contact of lever and guide travels equal distances on lever and guide. Suppose the lever is rolled from the position shown in Fig. 3 to some new position. The point of contact D will move to a new position, and the length of curve from D to its new position measured along the lever, must be equal to the similar length measured along the guide.

From what has been said, it will be evident that we can give one of the levers any shape we please, within reasonable limits, and design the mating lever to satisfy the necessary conditions. This at once suggests making one of the levers of a simple outline, either a straight line or a circle. It can be shown mathematically that for a straight line guide, the rolling lever takes the form of a logarithmic spiral, a curve whose equation (polar coordinates) is

$$r = ae^{m\phi}$$

in which m is the tangent of the angle of slope of the straight line guide, and "a" is the distance from the point of attachment in its lowest position to the corresponding point of contact of lever and guide.

If we take the lever curve as a circle, the guide curve becomes a circle of double the radius of the lever curve, and the center of the guide circle lies on the line AC, and A is a point on the smaller circle. This becomes evident when we consider that the hypo-cycloid becomes a straight line when the ratio of the radius of the rolling circle to the radius of the guide circle is one to two.

Other forms may be taken for the outline of one of the levers, and the corresponding outline of the mating lever be determined analytically or graphically.

All rolling levers of the type described poss-

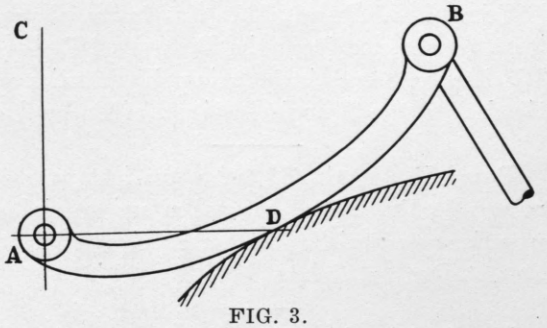


FIG. 3.

ess a feature which makes them desirable for use with poppet valves. Assuming that the motion is taken from an eccentric drive, the point B on the lever may be said to have approximately harmonic motion. This motion is transmit-

ted to point A with considerable distortion due to the variable position of the fulcrum D. At the start, the ratio of the lever arms BD to AD is quite large, so that a motion of B will produce very slight motion of the point A. As the lever rolls, D moves closer to B, the ratio decreases and A moves more rapidly. This gives exactly the sort of motion desired as it "cracks" the valve very gradually, then opens it quickly. On the return it comes down quickly until it is almost closed, then seats the valve very gradually.

Valve gears using rolling levers have been adopted by a number of American gas engine manufacturers, among them the William Tod Co., the Allis Chalmers Co. and the Buckeye Engine Co. Some of these firms use levers designed in a similar fashion, but not giving a pure rolling motion, that is a slight amount of slipping is allowed.

In the present article no attempt has been made to take up in detail the problem of designing rolling levers. Anyone interested in the subject will find Holzer's article previously referred to a very thorough mathematical analysis of the problem.

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ALUMNI NOTES.

Edward J. Ducey, '11, has taken a year's leave of absence from the Bureau of Roads at Washington, and is teaching Hydraulics and Geodesy at the Georgia Institute of Technology.

David W. Jones, '11, who was last year secretary to Dr. Mees, has taken up special apprentice work with the Denver Gas & Electric Co., at Denver, Col.

H. C. Schwable, '99, is travelling in Germany and England, combining pleasure with the business of serving some of his American clients at their foreign offices.

The Rose Tech Club of Chicago had a dinner on Nov. 2. The particulars have not reached us yet, but we hope to have them in our next issue.

A son was born to Mr. and Mrs. W. H. Burr, '05, on Oct. 29, 1912, at Philadelphia, Pa.

R. R. Schoonover, '12, is with the Heer Engine Co., at Portsmouth, Ohio.

Ben G. Elliott, '10, has been appointed to a University Fellowship in Mechanical Engineering at the University of Wisconsin.

R. D. Landrum, '04, who has been with Lsk Mfg. Co., Canadaigna, N. Y., goes to Kalmazoo, Mich., as superintendent of Michigan Enameling Works.

C. C. Scharpenberg, '07, and Miss Lola Vale Holloway, were married Oct. 20, 1912. They will make their home in Bakersfield, Cal.

John M. Lawler, '12, is Assistant City Engineer at Cuyahoga Falls, Ohio.

C. Owen Fairchild, '12, is with the Western Chemical Mfg. Co. at Denver, Colorado.

Frank H. Wente, '12, has entered the graduate course of the Allis Chalmers Co., at East Norwood, Ohio.

John E. Dailey ,'05, of Youngstown, Ohio, was married to Miss Doyne Ruth Scott, of Terre Haute, on Oct. 16, 1912.

Charles Scharpenberg, '07, has been appointed superintendent of the Belle Ridge Division of the Standard Oil Co. at McKittrick, Cal.

Oscar G. Klenk, '12, is inspector on bridge work for the Illinois Highway commission at Springfield, Ill.

STUDENT COUNCIL MINUTES.

THE first meeting of the Student Council for the school year of 1911-1912 was called to order by Financial Secretary Beauchamp, Oct. 11, 1912. All members were present except the Symphony Club representative, who had not yet been elected.

The meeting proceeded at once to the election of officers for the year. The following were the results:

For President—Buck 6; Scheffel 3.

For Vice-President—O'Laughlin 6; Brennan 3.

For Treasurer—Nehf 6; Stoms 3.

For Secretary—Sullivan 9.

Mr. Buck expressed his appreciation of the honor that had been done him. Beauchamp read an informal report of the financial condition of the council.

It was moved and carried that a committee be appointed to see the railroad companies about the fare and accommodations to Crawfordsville for the game there Nov. 2. Scheffel, Sullivan and Buck were appointed.

The Secretary was empowered to see about obtaining stationery for the Council.

Moved and carried that the regular meeting be held on the second Saturday of each month at 11:00 A. M.

Adjourned.

A. F. BRENNAN,
Secretary Pro Tem.

A special meeting of the Student Council was called to order by President Buck Oct. 28, 1912. All members were present with the exception of Brennan.

The Secretary reported the delay in ordering stationary pending the election of the Symphony Club representative.

A complete financial report was read by Financial Secretary Beauchamp.

Scheffel reported, for the train committee, that the fare for each student to Crawfordsville Saturday, November 2d, would be $2.10. It was moved and carried that $1.10 of each fare be appropriated by the Student Council.

It was moved and carried that Dr. Mees be asked to call a general assembly Tuesday, the 29th, for the purpose of arousing a little spirit.

Adjourned.

F. E. SULLIVAN, Secy.

A special meeting of the Student Council was called to order by Pres. Buck, Monday,

November 4th, at 11 A. M.

Barrett, Stoms and Nehf were absent.

It was moved by Scheffel that a committee be appointed to draw up a petition to the faculty asking for a holiday Nov. 5th, on account of election.

The motion was not carried.

It was moved by Beauchamp and seconded by Brennan that Mr. Denny be formally seated in the Council. Carried.

Adjourned.

F. E. SULLIVAN, Secy.

The second regular meeting of the Student Council for the school year was called to order by Pres. Buck, Nov. 9, 1912.

Nehf, Stoms and Barrett were absent.

It was moved by Brennan and seconded by Deck that a committee be appointed to draw up a petition to the faculty asking for holidays Friday and Saturday after Thanksgiving. The motion was carried.

A committee of Denny, Beauchamp and Brennan was appointed.

Beauchamp reported on the financial condition of the Symphony Club.

Ways of cutting down the expense of the Symphony Club was discussed. Discussion held over until next meeting.

Adjourned.

F. E. SULLIVAN, Secy.

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REPORT OF FINANCIAL SECRETARY TO OCT. 24, '12.

Amt. in bank on May 17		$483.53
Credit to Athletic Assn. (overdrawn)		127.87
Credit to Symphony Club (overdrawn)		8.90
Credit to General Fund	$430.38	
Credit to Rose Technic	70.08	
Credit to Y. M. C. A.	86.94	
Credit to Scientific Society	18.40	
Credit to Camera Club	14.50	
	$620.30	$620.30

Expended by Athletic Assn. since May 17	$1242.76
Expended by General Fund since May 17	424.76
Expended by Symphony Club since May 17	41.82
Expended by Rose Technic since May 17	202.00
Expended by Y. M. C. A. since May 17	111.94
Expended by Scientific Society since May 17	18.40
Expended by Camera Club since May 17	14.50
	$2056.18

Received by Athletic Assn. since May 17	$1736.97
Received by General Fund since May 17	451.03
Received by Symphony Club since May 17	172.22
Received by Rose Technic since May 17	344.70
Received by Y. M. C. A. since May 17	186.50
Received by Scientific Society since May 17	9.00
Received by Camera Club since May 17	18.00
Total receipts	$2918.42
Amount in bank on May 17, plus $2918.42	$3401.95
Total expenditures since May 17	2056.18
Amount in bank on Oct. 24	$1345.77
Credit to Athletic Association	$ 366.34
Credit to General Fund	456.65
Credit to Symphony Club	121.50
Credit to Rose Technic	212.78
Credit to Y. M. C. A.	161.50
Credit to Scientific Society	9.00
Credit to Camera Club	18.00
	$1345.77

J. M. BEAUCHAMP, Fin. Secy.

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HALLOWE'EN.

HALLOWE'EN has come and gone and again have the Juniors, according to custom, celebrated that evening by banquet and by doing stunts on campus and in the building of old R. P. I.

This celebration, however, was entirely different from any before. For the first time in many years it rained all evening, and a trip out to school was out of the question, but at eight-thirty more than two-thirds of the class had braved the elements and assembled at the Terre Haute House and the banquet was on. Many good things to eat were quickly disposed of and then the attention was turned to the toasts. In the absence of Stoms, who, owing to his position on the football team deemed it best not to attend the banquet, the toasts were very ably handled by Templeton. The toasts ran as follows:

"Just a-Startin'"	A. N. Nehf
"Beginning With Doc."	A. L. Pfau
"Our Memorial"	I. L. Kaufman
"Junior Society Troubles"	E. R. Weaver
"Athletics Without Us"	J. G. Moore
"Mostly Salve"	C. A. Dutton
"From Now On"	C. F. Harris

In the talk given by Harris final arrange-

ments were made and plans perfected to visit the school the following night.

This time weather conditions were satisfactory and the Juniors, preceded by a band (?) had a red light parade through the main thoroughfares of the city, carrying large caricatures of the faculty and "Doc's" green carpet which had been "annexed" for the occasion. This parade ended on the campus and the bunch was divided into squads to attend to the work on hand. One squad gathered material for a huge bon-fire while the rest posted the "portraits" of the faculty in the main hall under the heading of "Rogue's Gallery." These remained on the walls for three days and everyone saw our dear professors in a somewhat more humorous light than they are no doubt accustomed to be taken.

Then the bon-fire was started and most of the Freshmen's wonderful (?) work as well as the old shed decorated with shamrocks and numerals of previous classes, went up in smoke. At the same time the numerals '14 were going up on the stack to remain until the next Juniors came along. Then after a few sad rites and a short sermon by "Hath," an honorary Junior, that familiar but obnoxious green carpet of "Doc's" was consigned to the flames. Next a part of a locker from the "gym" was burned to commemorate the passing of those relics for they are to be replaced by sanitary steel lockers, as a memorial, by the Junior class. Then a picture of the gang was taken and off for bed, a good night's work well done.

Thus a new custom was started. There was very little destruction of property and what ever there was, it was not on the program. Everything that was done that evening will bring no discredit to the school and had the full consent of President Mees. Furthermore the numerals will remain as a reminder and the "Rogues Gallery" furnished more or less amusement to others than the Juniors, which is more than can be said of the destruction of former Hallowe'ens. It is to be hoped that following Junior classes will follow along these lines and have a "safe and sane" Hallowe'en.

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THE WABASH TRIP.

"VENI, Vidi, Vici." If all of us don't know what that means it's what Caesar said after he finished the Germans. We can't exactly say that about the Wabash trip but we can say that we had a good time and learned quite a few things. The trip certainly showed that the school spirit of Rose is not dead as some people have supposed, but is very much alive. About a hundred twenty-five rooters accompanied the team and according to reports from the spectators across the field we made much more noise than all of Wabash. If noise counts for anything school spirit surely was much in evidence.

We learned that eleven light men can't beat eleven heavy ones, a referee and a sloppy field. At that our team did not lay down which is the best that can be said of any team.

As for Crawfordsville, much can't be said. It's dry, which in the opinion of some of the more hilarious of our number, was a large detriment to the prosperity and life of said "burg." Furthermore, the town was solid for Taft, which does not agree with our "fessor Hath," and so does not agree with us. So when the train pulled out for home there were no gloomy faces anywhere but everyone swore revenge in basketball and baseball.

—J. T. Scott.

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THE Post Office Department this year compels every publication to file with them a "Statement of Ownership, Management, Circulation, Etc." This must be filed in duplicate, and must also be printed in the publication itself. The statement filed by the *Technic* is as follows:—

I, T. A. Novotney, Business Manager of the *Rose Technic*, claim exemption from the filing of this statement, on the ground that the *Rose Technic* is a scientific paper, published by the

Rose Polytechnic Institute, of Terre Haute, Indiana.

(Signed) T. A. NOVOTNEY.

Sworn to and subscribed before me this 15th day of October, 1912.

(Signed) Nelle F. Osborne,

(SEAL) Notary Public

(My commission expires March 10th, 1916.)

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STUDENT DIRECTORY.

CLASS OFFICERS

Seniors—

President, J. M. Beauchamp; Vice-President, R. O. Headley; Secretary, J. E. O'Connell; Treasurer, C. C. Baines; Athletic Directors, S. N. Crowe, F. M. O'Laughlin.

Juniors—

President, M. W. Stoms; Vice-President, R. J. Templeton; Secretary-Treasurer, W. R. Cox; Athletic Directors, A. N. Nehf, H. B. Deming.

Sophomores—

President, F. E. Sullivan; Vice-President, R. B. Larr; Secretary-Treasurer, A. T. Arnold; Athletic Directors, W. E. Carter, M. V. Hegarty.

Freshmen—

President, J. C. Barrett; Vice-President, H. J. O'Laughlin; Secretary-Treasurer, F. W. Kingery; Athletic Directors, J. Carter, F. C. Goldsmith.

Student Council Officers—

President, Ray Buck; Vice-President, F. M. O'Laughlin; Financial Secretary, J. M. Beauchamp; Secretary and Clerk, F. E. Sullivan.

Athletic Association Officers—

President F. M. O'Laughlin; Secretary, Not yet elected; Treasurer, Not yet elected.

Glee Club Officers—

President, L. W. Lewis; Vice-President, H. O. Kelley; Secretary-Treasurer, C. C. Baines; Symphony Club Representatives, C. G. Kronmiller, H. E. Ransford.

Mandolin Club Officers—

President, H. E. Wallace; Vice-President, J. M. Sanford; Secretary-Treasurer, F. H. Nicholson; Symphony Club Representatives, E. E. Hughes, M. R. Denny.

Orchestra Officers—

President, Ray Buck; Vice-President, Prof. C. Wischmeyer; Secretary-Treasurer, Caspar Wagner; Symphony Club Representatives, J. T. Scott, C. F. Carlisle

Symphony Club Officers—

President, M. R. Denny; First Vice-President, L. W. Lewis; Second Vice-President, H. E. Wallace; Third Vice-President, J. T. Scott; Secretary-Treasurer, C. F. Carlisle.

Camera Club Officers—

President, H. L. Deck; Vice-President, R. D. Madison; Secretary-Treasurer, C. C. Baines; Faculty Advisor, Prof. J. B. Peddle.

Scientific Society Officers—

President, Ray Buck; Secretary, J. E. O'Connell; Senior Councillor, H. L. Deck; Junior Councillor, G. E. Schopmeyer; Faculty Advisors, Dr. John White, Prof. A. A. Faurot.

Y. M. C. A. Officers—

President, A. N. Nehf; Vice-President, S. N. Crowe; Secretary, I. L. Kauffman.

Student Branch of A. I. E. E. Officers—

Chairman, S. I. Stocking; Secretary, J. E. O'Connell; Executive Committee, Prof. C. C. Knipmeyer, Wilbur M. O'Laughlin, E. E. Hughes.

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LOCATION OF FRATERNITY HOUSES.

Alpha Tau Omega, 1010 N. Ninth St.
Citizens Phone 2250

Sigma Nu, 441 N. Seventh St.
Citizens Phone 1408

P. I. E. S., 834 N. Eighth St.
Citizens Phone 2596

M. E. P., 621 N. Seventh St.
Citizens Phone 1958
V. Q. V., 825 N. Seventh St.
Citizens Phone 698-R
Theta Xi, 1012 N. Eighth St.
Citizens Phone 2984
Alpha Chi Sigma, 1107 N. Eighth St.
Citizens Phone 2437

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TEAM MANAGERS AND CAPTAINS.

Football—

M. W. Stoms, captain; F. T. Loehninger, Manager; W. H. Henry, Asst. Manager.

Basketball—

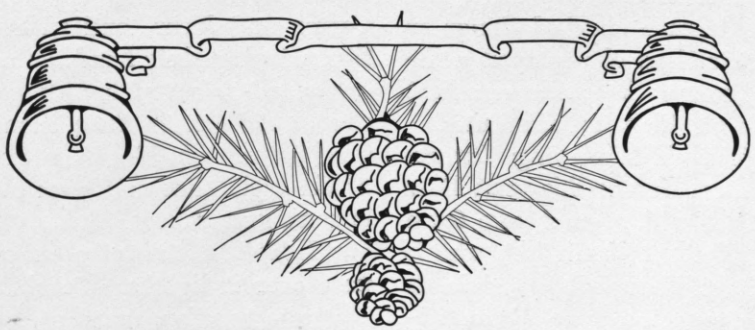
C. Gray, Captain; R. D. Madison, Manager; A. C. Hansen, Asst. Manager.

Baseball—

A. N. Nehf, Captain; Ray Buck Manager; J. Schoonover, Asst. Manager.

Track—

J. G. Moore, Captain; W. R. Cox, Manager.



THE Rose Tech football team has played three-fourths of its schedule without a whole lot of success, but has had the "heads up" sign displayed all the time. Tough luck has pursued the team from the start. First Somers was ruled out, then Baxter got hurt, and finally the Vanderbilt game knocked things to pieces. Parental objections also played a little havoc with the line-up. We have seen that the team is no stronger than its substitutes.

That a mistake is made in playing Vanderbilt, was made plainer than ever this year. Rose went down to Nashville with a good team for a secondary college. She met Vanderbilt, who is good enough to get on Harvard's schedule. A lighter team, with a scarcity of good substitutes, bucked a fine bunch of big fellows who needed some early season practice. It is a question whether the pleasure of the trip plus the $75.00 to $100.00 which is usually cleared, is worth the resultant injuries, doctor's bill, and loss of strength for the games with the other secondary teams of Indiana, which are in our class, and which we have some chance of beating. This is an old question and was brought up in the Athletic Association last year. We are pretty sure there is a majority of the fellows in school who are strongly opposed to this annual game, and the wish of the student body should be considered to some extent in scheduling games.

The Saturday after the Nashville trip, Tech minus the services of cripples Poggensee, Joe Carter and Nehf, and with Jim Moore and Stoms trying their hands at new positions, lost a nip-and-tuck tough luck game to Earlham. Carter did get in long enough to score a touchdown. The Earlham team was on the job at the right time and came out ahead on what is sometimes called a fluke. The second Eastern Illinois game was a surprise, and we will pass over it lightly. Coach McKinney pulled the team together for the Wabash game. Poggensee was back in harness for the first time in three weeks, and Nehf and Childs came out again. The game which Tech put up was good, but the Little Giants had more beef and more experience. There was no kick on that game. Rose's spirit didn't lag, and it was a good game to watch.

That a good number of the fellows are staying with the team was shown by the fact that 75 students accompanied the team for this Wabash game, and rooted hard. There is an old

saying that "when you're up, you're up, and when you're down, you're down," etc. Some fellows at Rose don't seem to realize that when the team is down is when it needs support; that anyone can keep smiling when his side is to the good.

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ON November 1st, the Terre Haute Boosters Club held a 4.8 mile Marathon for amateurs, with 15 entries, through the southwestern part of town, with the start and finish at Fifth and Wabash. Ransford and Shopmeyer, of Rose, finished first and second respectively, and Stuart, '16, was barely nosed out for third by a Normalite. The Normal rooters had a ribbon be-decked cab waiting to haul their conquering heroes through town, but said heroes didn't come across and the parade was cut short.

Mr. Stephenson has been working hard with his cross-country runs and the results are beginning to show. He has kept interest in track work alive during the last year or so by hard plugging in the face of discouraging odds, and when we finally get a winning track team at Rose, the lion's share of credit should go to "Stevy."

For the cross-country work, H. O. Kelley, Coltrin, Whipple and Brooks are the class captains. In the Saturday afternoon hare-and-hounds, Shopmeyer, Coltrin, Stuart, Ransford and others have been showing up well. As a rule, the hares or honuds have made the better time according to which side Shop was on. An inter-class cross-country run is now planned for some time before Thanksgiving.

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THE Boosters trip to Crawfordsville turned out pretty well. About 75 fellows made the trip, besides the team and twenty-five outsiders. The result of the game was somewhat of a disappointment to some, but there was not much down-heartedness on the special coming home. Most of the bunch seemed to get clear of Crawfordsville. One of the Seniors remarked that the town left a bad taste in his mouth. It was a lack of taste rather.

The rooting during the game was good and better still was kept up through the whole game.

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AT a meeting of the Athletic Association on November 4th, the following elections resulted:

Baseball Manager—Ray Buck, '13.
Track Manager—Cox, '14.
Assistant Basketball Manager—Hansen, '14.

It was also decided that hereafter class numerals can be worn only by men taking part in three inter-class basketball games or by those placing in an inter-class cross country run or track meet.

Prof. Wischmeyer was appointed to watch the inter-class basketball candidates and decide on the line-ups. Mr. Stephenson will be general overseer of the inter-class track work.

The question of a Rose cross-country monogram was brought up and discussed.

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AFTER two more games of football we will begin to get busy on basketball. Manager Madison is working on the schedule, and has secured the new K. of C. hall again for the home games.

The usual line of talk is going the rounds about the stars in the Freshman class. Barrett, Brown, Carter and Planque are the only ones we know much about. In the upper classes there are Capt. Gray, Crowe, Poggenssee, Hegarty, Deming, Harrison and others who have had experience. If Wente's place can be filled right, things look fairly good.

The interclass games will start soon after Thanksgiving and will give an opportunity to get a line on some of the new material.

INTER-CLASS CROSS COUNTRY RACE.

IF anything can be predicted from the interest taken so far this fall in cross-county running, the Inter-Class cross country race to be held Saturday, November 23rd, should be a great success. It is expected that at least twenty men will compete. The three lower classes have strong teams and promise a close and interesting contest.

Since there is no foot ball game on the 23rd a number of foot ball men, all of whom will be in prime condition, should take part. The Boosters' Marathon race held the first of the month showed that we have some good distance men at Rose. The course for the Inter-Class race is shorter than the one used for the Marathon, being only about four miles.

With the kindly consent of the Country Club the race will start from their grounds, follow a foot-path along Lost Creek and under the Van R. R., west on the north side of the tracks about two city blocks; cross a field to where the S. I. R. R. crosses Lost Creek; under the trestle and along the Creek to the wire fence which crosses it; west about two blocks to Fruitridge Ave.; south half a block; west along a farm fence to the Van cut-off just north of Van roundhouse; west to 25th street; south to Third Ave.; west to Rose Field, in the drive-way and finish at the Gym.

Besides the fun and exercise to be derived from the run, the first four men to finish will be awarded their class numerals as will also the first four men of the winning team. Each man scores a number corresponding to the place where he finishes. The numbers of the first four men on each team are added and the one with the lowest total wins. Thus a team finishing 1, 3, 8 and 12 will lose to a team finishing 2, 5, 7 and 9.

J. N. S.

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VANDERBILT 54—ROSE 0.

In view of past performances of Rose teams against Vanderbilt, a lower score was expected. The Southern team was out of our class, however, and began scoring in the second minute of play. According to reports Rose put up her usual gritty game, Joe Carter's punting and Gillum's defensive work being features. Line-up:

Vanderbilt 54.		Rose 0.
Morgan, Huffman	C	LeForge
Daves, Reyer	L.G.	W. Carter
Swafford	R.G.	Poggenssee, Stoltz
Shipp, Lowe	L.T.	Gray
T. Brown, Darwin	R.T.	Hegarty, Stoms
E. Brown, Reams	R.E.	Gillum
Turner, Milholland	L.E.	Deming, Planque, Barrett
Robbins	Q.B.	Larr
Collins, Shea	R.H.	Nehf, Deming
Hardage, Luck, D. Morrison	L.H.	J. Carter
Chester	F.B.	Stoms, Hansen

Touchdowns, Hardage 3; Robbins 1; Milholland 1; Shea 1; Reams 1; Collins 1. Goals from touchdowns—D. Morrison 2; Hardage 4. Referee—Walker, Virginia. Umpire—Hall, Vanderbilt. Linesman—Irons, Worcester. Periods—Ten minutes. Game called after three minutes of last quarter to allow Rose to catch a train.

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EARLHAM 7—ROSE 6.

With a somewhat crippled and green team, Rose tackled Earlham at Richmond on a heavy field. As was the case last year, the Quakers had the breaks and made the most of them. In the first quarter Rose carried the ball to her opponent's one-yard line, where she was held for downs. Larr then slipped and fumbled Brownell's punt and the Earlham center grabbed the ball and went 45 yards for a touchdown. In the second quarter Joe Carter scored Rose's touchdown after a 30-yard gain by Gillum on a forward pass.

Deming missed a difficult goal. There was no more scoring.

Earlham was kept mostly on the defensive

during the rest of the game, but Rose's fumbles kept her from scoring. On the whole it was a tough game to lose, and with the team less shot to pieces, there might have been a different story. The line-up:

Rose 6.		Earlham 7.
Gillum	L.E.	Sharpless
Gray	L.T.	Stanley Pennington
Stoltz, Harrison	L.G.	Lamb
Laforge	C.	Jones
W. Carter	R.G.	Jones
Stoms	R.T.	Thistlewaite
Planque, Barrett	R.E.	Lancaster
Cox, J. Carter	L.H.	Bogue
Deming, Hansen	R.H.	Brownell
Larr	Q.B.	Vickery
Moore	F.B.	Guyer

Touchdowns—J. Carter, Jones. Goals from touchdowns—Vickery. Officials—Pollock, Cornell, referee; Davis, Princeton, umpire.

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EASTERN ILLINOIS 36—ROSE 14.

This was a nice sociable game with our friends over at Charleston, whom we walked away from at the beginning of the season. There were murmurs of disgust around the campus when it was learned that Manager Loehninger had scheduled a return game with the Suckers. Later when the team had to be rebuilt, it appeared to be a good thing, a sort of warming-up for Wabash.

The dope was upset, however, due partly to a somewhat new line-up, and probably to over-confidence. Poly found the score 14 to 0 against her at the end of ten minutes. Normal held the lead from then on, and judging from reports, it was a case of Rose being rushed off her feet right at the start by a lighter and underestimated eleven, and never getting back into her real stride. There was much rejoicing in Charleston that night. Line-up:

Normal School.		Rose Poly.
Butler	R.E.	Planque
Cooper	R.T.	Stoms
Taubernach	R.G.	W. Carter
Steinmetz	C.	Laforge
Sternauch	L.G.	Stoltz, Moore, Stiltz.
Ewald	L.T.	Gray
Wright	L.E.	Gillum, Moore
Wilson	Q.B.	Larr
Corzine	R.H.B.	J. Carter Hansen.
Ginther	F.B.	Hansen, Cox
Butler	L.H.B.	Hansen, Deming

Referee—O'Neil, Bloomingdale. Umpire—Davis, Charleston. Time keeper—Thomas Charleston.

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WABASH 39—ROSE 0.

The Little Giants have a very strong team this year and plowed through Poly for six touchdowns. They have a fast backfield, a heavy line and the headiest and fastest quarterback in the state.

During the first quarter, honors were about even. Rose put up a stubborn defense, but as the game wore on, the difference in weight of the two lines began to show. Lambert went through for the first touchdown in the second quarter, and from then on Wabash gained ground consistently. Showalter nearly always smashed the line for a good gain. Joe Carter and Nehf got away for a couple of end runs, but outside of that there were few heavy gains by Rose.

Wabash got away with about half a dozen forward passes, one of which resulted in a touchdown. Rose succeeded in breaking up most of them. Lambert worked his incompleted forward pass gag a number of times, and his open field running was good, but not as spectacular as usual.

Poly's interference looked weak from the sidelines. The best feature of Rose's work was her fighting spirit; the team played hard the whole route. Jim Moore and Nehf did good work. Line-up:

Wabash 39.		Rose 0.
Howard, Berkley	L.E.	Gillum
Hurd, Hines	L.T.	Gray
Ebert	L.G.	Childs, W.Carter
W. F. Cravens	C.	W.Carter, Leforge
C. Cravens, Blair	R.G.	Poggenssee
Elliott, Foster	R.T.	Moore
Nusbaum, Culp	R.E.	Planque
Alcorn, Nicar	L.H.B.	J. Carter, Cox
Nichols, Coffing	R.H.B.	Deming, Nehf
Lambert, Watt	Q.B.	Nehf, Larr
Showalter, Rowe	F.B.	Stoms

Summary: Touchdowns—Lambert, Nichols, Alcorn, Showalter (3). Goals—Howard, Hurd (2). Referee—Porter, Cornell. Umpire—Jameson, Purdue. Head Linesman—McGaughey, Indiana.

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DEPAUW 24—ROSE 0.

Rowan kicked off to Joe Carter who returned 25 yards. Rose failed to make her 10 and Stoms kicked. DePauw worked the ball to midfield and Rowan made 25 yards from a punt formation. With some line plays and a well-executed forward pass from Rowan to Tucker for 25 yards, DePauw got within striking distance and shortly afterward Rowan went over for the first touchdown.

Right after the next kickoff and down, Joe Carter got away for a 25 yard run around end. It looked as if Tech would register when Deming and Carter went through the line for 20 yards, but a fumble lost the ball and the quarter ended without further scoring. Poly braced in the second quarter, with Jim Moore playing the greatest defensive game seen on Rose field for a long time. Rose got the ball and started down the field with a series of line plunges, mostly by Carter. A forward pass was missed by Carter, hit Tucker, of DePauw, and was grabbed by Stoms on DePauw's 20 yard line before it touched the ground, but was ruled an incompleted pass by the referee. The ball was called back and Rose's best chance to score was gone. The half ended DePauw 7, Rose 0.

DePauw began hammering the line with effect again in the third quarter and mixed in some end runs, bringing the ball to the 25 yard line from which Rowan drop-kicked a goal. The ball see-sawed the rest of the quarter. Moore kept up his good defensive work, breaking up the DePauw interference and repeatedly going around and getting his man from behind.

The Methodists opened the final period with a rush. Their backs worked down the field in a hurry and Rowan was sent over for his second touch-down. The battering of the line was kept up and another touchdown resulted. DePauw sent in a bunch of subs and shortly afterward time was called with it Tech's ball on DePauw's 20 yard line.

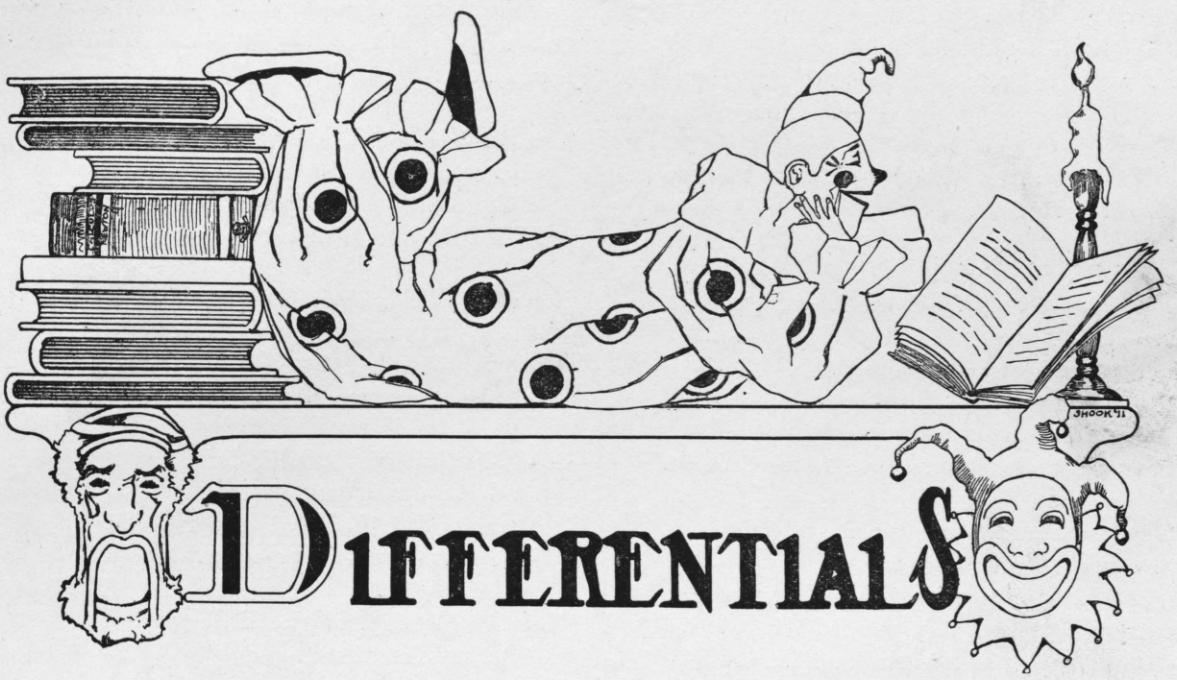
The work of Rowan, Capt. Tucker and Sellars stood out for the visitors. Their interference was good in spots.

For Rose, Joe Carter and Moore both starred. Carter was responsible for most of Poly's gains. Moore's work has been mentioned. Rose was on the defense most of the time, and the fact that "Cincinnatus" was playing the game of his life kept the score down.

Neither team made much use of the forward pass. The line-up:

DePauw 24.		Rose 0.
Stevenson, Moore	L.E.	Planque, Cox
Grady, Cochran	L.T.	Gray
Gardner, Menser	L.G.	Woodward
Tieler	C.	LeForge, Carter Poggensee, Stevens.
Cannup, Bramer	R.G.	W. Carter
Bachelder, Worthington	R.T.	Childs
Freeman	R.E.	Moore
Rowan, Anderson	Q.B.	Larr
Tucker	L.H.	J. Carter
Sellars, Long	F.B.	Stoms
Smith	R.H.	Deming, Nehf

Touchdowns—Rowan 3. Field goal—Rowan 1. Goal from touchdown—Tucker 3. Referee—Williams, Wabash. Umpire—McKay, Purdue. Head linesman—Scott, Princeton. Timer—Ellis, DePauw. Time of quarters—12 1-2 minutes.



Ed. Hegarty, translating French—"If a piece of paper is placed between the earth, it will rise to the ground."

* * * *

Grimes—"I didn't understand how you pronounced that last word."

Prof. Faurot—"I didn't. I was only coughing."

* * * *

Hath—"What is the differential of sin v?"

Soph—"Cos B. V. D."

* * * *

Sommers, translating—"The bicycle coasted up the descent."

* * * *

Mac—"Who is the Prohibition candidate for President, Kronmiller?"

* * * *

Henry—"Somebody trust me with a nickel to draw a circle."

Baker—"I don't approve of trusts."

Harris—"I'd rather draw a beer with that nickel than a circle."

Bob Wisely, as Sullivan is unpacking a box of excelsior—"Huh. Excelsior. Must be a motorcycle."

* * * *

Written after Tesreau and Mathewson had both lost and Marquard had won his first game in the World's Series:

MARQUARD'S REBUTTAL.

So I was naught but a bally joke,
I'd lost the break to my curve and smoke;
I'd nothing left, but a glove and prayer.
With a heart bowed down by a load of care.
Tesreau lost, and amid the din
Matty pitched and he couldn't win—only the
Rube left—
Pipe the shame—
But who was there when the showdown came?

They'd cracked my nerve in the record pace;
They'd smashed my heart in the driving race.
Rube, the bum, was a bush league joke,
For his stuff was gone and his nerve was broke.
Tesreau fell in the path of Wood;

Matty worked, but it did no good;
Only the Rube now to be stopped—
But who was there with the stuff that copped.
—Indianapolis News.

* * * *

Written after Wood had won his second game for Boston:

MANHATTAN VS. SMOKY JOE.

Of all sad words from tongue or pen
The saddest are: "Wood pitched again."
Sadder than any throbbing note
That old Doc Chopin ever wrote.
Aye, sadder in its sombre skit
Than life's worst message: "Please remit."

Wood pitched again—tell me no more
The ultimate, the final score.
Waste no vain words in praise or blame,
Explaining which side copped the game.
Who had the works—who had the stuff—
Wood pitched—that's bally well enough.

Wood pitched again—oh bitter praise,
Oh, blighting echo of the days,
Sadder than any New York cop,
Or "Could you slip me five, old top?"
Aye, in each dreary Harlem flat,
Sadder than "Baker at the bat."

Oh, death, where is thy sting like this?
Oh, grave, where is thy serpent's kiss?
Oh, Baker, Bender, Coombs and Plank,
You look like money in the bank
Compared to this last scratch of pen,
"Wood pitched again!"
—Indianapolis News.

* * * *

The following poem was written, by a member of the Senior class. Its publication was allowed only after the Editor promised, on pain of instant death, never to divulge the writer's name, or at least to delay the publication of the author's name until after June 12 next, as the gentleman in question said that he hoped to graduate on that day, and in order to do so it was absolutely necessary that he receive credit in Senior Applied. The poem, like its author, is nameless:

The Seniors had a little goat,
  Its name? You'd never guess it.
It followed 'fessor 'Cormick 'round;
  He'd now and then caress it.

Sometimes he'd tell it funny jokes,
  Ah, yes, 'twould be quite gentle;
But when it saw a two-hour quiz
  Its thoughts were far from mental.

Said Mac, one day, "Let's take a vote
  And see who'll get elected,
Nine votes for Teddy, two for Taft,
  The rest should be rejected."

Now Mac once told our little goat
  That, while attending Poly,
He never used intoxicants.
  My! Doubt his word? What folly!

One thing we'd like to see him do
  And that, without evasion,
Is copy down without mistakes
  Just one straight line equation.

The object of this little ode
  Is plain, so don't forget it;
'Cause Mac would like to have our goat
  Let's see he doesn't get it.

* * * *

A straw vote was taken in Senior Applied on election day with the following results:
Wilson 14 Roosevelt 9 Taft 2
After this, Mac remarked "I can't understand it." That's just the way we feel about your Applied, Mac. We can't understand it.

* * * *

Eshie—Hey, Goldman, are you ticklish?
Heinie—No, I'm Yiddish.

* * * *

Senior—What is entropy?
Buck—A disease.

Duke Lewis—Votes for women.

Mac—That's about all they would allow you to vote for.

* * * *

Liz—How do you learn to hold your temper when it ought to be loosed?"

Hath—Teach a class of Juniors Analytical Dynamics.

* * * *

Jo Jo—*Now*, who is the best Electrical Engineer in America today?

Heine—The man from Mattoon.

* * * *

Klingman—What units did your answer come out in?

Mike—In mil-feet.

Tack—That's funny. Mine came out in cubic acres.

* * * *

Mac—What time is it, Crowe?

Pat—Ten of twelve.

Mac—I'll bet he sets that watch back before next Sunday night.

The Class—Hee haw!

Mac—Well, you fellows don't need to laugh. Some of you go where you can't carry watches.

* * * *

Reese, in Thermo—What is a polytropic change of state?

Waggie—It is a change of state in which none of the variables are constant.

* * * *

WHO IS THIS?

Prof (?)—What do you do if the earth in the sides of a railroad cut slides down onto the track?

1st Student—Make an easier slope.

Prof. (?)—Next.

5th Student—Sod the slope.

Prof. (?)—Next.

10th Student—Build a retaining wall.

Prof. (?)—Next.

15th Student (?) (desperately)—Shovel it off.

Prof. (?)—Why, certainly.

SPEAKING OF BECOMING CLOTHES.

She—If you had my complexion, what would you wear?

He—A thick veil.

* * * *

When is a hammock not a hammock?

When it is a spoon holder.—Ex.

* * * *

He kissed her on the cheek—
It seemed a harmless frolic;
He's been laid up for a week,
They say its painter's colic.—Ex.

* * * *

They sat beneath the apple blossoms.

The moon shone softly. Suddenly he broke the silence:

"What's to prevent my kissing you?"

"Why, my goodness!" she exclaimed.

But—it didn't.—Ex.

* * * *

"The melancholy days have come,
The saddest of the year,
When shattered is the full-back's frame,
And gone is the half-back's ear."—Ex.

* * * *

Mary had a little lamb.
You've heard that fact before,
But did you know she passed her plate
And had a little more?—Ex.

* * * *

Editor—I see that you are smiling at our jokes.

He—Yes, I always smile when I meet my old friends.—Ex.

* * * *

Passenger—How far are we from land, Cap?

Captain—Oh, about a mile.

Passenger—Why, I can't see it.

Captain—Of course not, the water's too deep.

—Ex.

* * * *

Prof. Thomas—I spent one whole summer testing the strength of prison bars.

* * * *

Denny—Well, I don't see how the pressure in the pipe can be zero because after the water

gets out of the pipe, it's not in it any longer.

* * * *

Prof. McCormick (looking through his note book)—Some day I'm going to index this note book.

Denny—I'll sell you a note book with an index, professor.

* * * *

W. O'Laughlin—That point on the curve is where ice freezes.

* * * *

Mac—When I was in school I stayed out all night Hallowe'en and came to school the next day.

O'Connell—Oh, well, professor, it's all in getting used to it.

* * * *

"But," her father objected, "you have never shown that you are capable of supporting a wife."

"O," the young man replied, "if you want her to marry a widower, I'll have to confess that I can't qualify." —Ex.

* * * *

"How would you classify a telephone girl?" asked the old fogy. "Is hers' a business or a profession?"

"Neither," replied the boob. "It is a calling." —Ex.

* * * *

He laughed at her for getting fat,
Smiled blithely at her double chin,
'Twas then she smote him to the mat,
Remarking, "I'm not mad, at that,
But exercise may make me thin."

—Ex.

* * * *

"Wot you doin' chile?"

"Nothin', mammy."

"My, but you is gittin' like yoh father."

—Ex.

* * * *

"You have a lovely complexion," began the lover.

"Thank you," answered his fiance, suspiciously, "why speak of it?"

"It's so smooth and white and—er—natural ——"

"It is. But you don't talk straight. Don't you believe that my complexion is my own?"

"Why, certainly, my own!"

"Then why refer to it at all?"

"I—I—just wondered why it was that every time I leave you at night and go to the club the fellows all say that I've been eating marshmallows." —Ex.

———ooo———

NEWS OF OTHER COLLEGES.

A motorcycle club has been formed at Case Tech.

A straw vote at Rensselaer Polytechnic Institute resulted as follows:—Wilson, 212; Roosevelt, 158; Taft, 98; Chaffin, 58; Debs, 8. Among the Seniors, Chaffin was the favorite.

The Honor System has been adopted at Washington University at St. Louis.

A Faculty Athletic Tournament is in progress at the Carnegie Institute of Technology. Golf and Tennis are included, among other things.

Sorrorities have been abolished at the Ohio Wesleyan University, by a vote of the members themselves.

It is said that Woodrow Wilson was fortieth in his class at Princeton. Cheer up, gentle reader. There is hope for all of us.

The enrollment at Case Tech this year is 504.

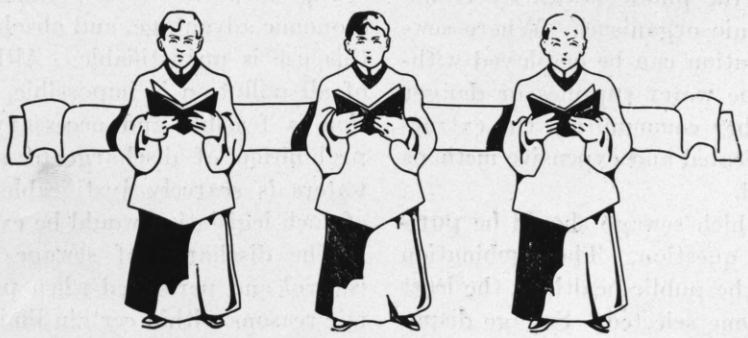
Fo Sun, the oldest son of the recent provisional President of China, has entered the University of California this year. India, Japan, Russia, Germany, Greece, Macedonia, and several other foreign countries are represented, and an effort is being made to re-establish a branch of the International Cosmopolitan Club.

During the past summer, there were on the pay rolls of the Westinghouse Electric and Mfg. Co., thirty college professors, representing the engineering departments of colleges of eighteen states. The company placed a special instructor at their disposal and the evenings were given over to inspection tours and lectures.

The Michigan Daily uses wireless reports. The Wireless station operated by students is also competing with the wire companies.

At the University of Montana an equal suffrage club was organized last session. Two men actually landed offices, the vice-presidency and the secretary-treasurership.

Franklin Field at the University of Pennsylvania, has been so enlarged that the stands will now seat over 31,000 people.



SEWAGE POLLUTION OF THE GREAT LAKES.

IT is estimated that a stream flow of 3 to 7 cu. ft. per second will care for the sewage of 1,000 persons without nuisance, or that a dilution of 15 to 20 times the quantity of sewage discharged will be sufficient to obviate nuisance. In view of the enormous quantity of water in the Great Lakes available for dilution the only object to be obtained in the lake cities by sewage disposal plants is an effluent which does not endanger the public health by transmission of pathogenic organisms. Where sewage disposal by dilution can be employed without detriment to the water supplies or danger to the health of other communities, the extraction of more complicated and expensive methods is scarcely justified.

The degree to which sewage should be purified is an economic question. The combination which will protect the public health at the least cost should be the one selected. Sewage disposals by dilution should be permitted in the Great Lakes for economic reasons, where this may be done without danger to the water supplies of other communities, or where such methods do not place an unreasonable burden or excessive cost upon the water purification plants of those communities.

The problem of sewage pollution of interstate waters with special reference to the spread of typhoid fever has been studied intensively by the author for the past two years. During that time his investigations have covered the entire drainage area of the Great Lakes within the United States from Duluth, Minn., to Ogdensburg, N. Y. As a result of this study certain fundamental facts seem to stand out prominently.

Sewage purification may often be an aid and sometimes a necessity to improve the quality of the raw Lake water, but will rarely, if ever, make one of these surface supplies absolutely safe. For this reason, it must be considered as secondary to water purification in preventing water-borne diseases. The use of streams for sewage disposal within permissible bounds is an economic advantage, and absolute prohibition of this use is unjustifiable. Although prevention of all pollution is impossible, control of pollution is feasible and necessary. The absolute prohibition of discharge of sewage into these waters is scarcely justificable and the legality of such legislation would be extremely doubtful.

The discharge of sewage should be under control and permitted when possible for economic reasons within certain limits. The permissible limit of such reasonable use should be fixed by official standards of the raw water after a careful sanitary survey and consideration of the purposes for which the waterway is necessary or available. These official standards would have to be made for each problem separately, and independently, it being manifestly impossible to attempt to fix any general standards of raw water to cover all cases.

The acceptance of these basic facts will tend to prevent unjustificable generalization in a problem where each city is a law unto itself.

By allowing a reasonable use of these inter-

state waters in the reception of sewage or sewage effluents subject to such restrictions, coupled with water purifications, which will amply protect the public health, the more intensive processes of sewage purification may in many cases be avoided. A city may thus be saved a very great expense which could only be justified on sentimental and not on practical grounds.

—Eng. Record.

———ooo———

THE VAPORIZATION OF METALS.

MOST practical metals workers know that some metals are volatile. No one knows many exact facts about this matter.

Metals have vapor-tension curves similar to that of water. Water at ordinary atmospheric pressure boils at 100 degrees C. or 212 deg. F. But at lower pressures it boils at lower temperatures; at one-tenth atmospheric pressure it boils at 46 deg. C., and at one-hundredth atmospheric pressure at 7 deg. C.

A point not generally understood is that an indifferent gas in contact with a volitable substance acts like a vacuum as far as inducing evaporation is concerned. Water evaporates in a current of dry air at any temperature whatsoever; the only condition being that dry air be renewed as fast as it becomes saturated with water vapor. Even solid water, ice, will evaporate in a current of dry air, although the temperature remains below the melting point of ice.

All that has been said of water is true of metals. They all have definite boiling points under atmospheric pressure, lower boiling points at lower pressures, and can evaporate at any temperatures down even to their freezing points, if the pressure is sufficiently reduced. They will also vaporize at low temperatures in the presence of an indifferent gas, if the latter is renewed as fast as it is saturated with the metal vapor.

To illustrate the above principles, let us cite zinc, which boils under atmospheric pressure at 920 deg. C., but which has an appreciable vapor tension at as low a temperature as 289 deg. F., or 130 deg. C. below its melting point. This tells us that not only will zinc evaporate rapidly when melted, in a current of indifferent gas, but that even solid zinc can give off vapor. Similar facts are true, although in a smaller degree, of many metals ordinarily considered as non-volatile. Silver, for instance, can evaporate from solid ingots which are being heated by direct contact with a flame, the gases of the flame carrying away with them more or less silver vapor, just as the dry air can carry off water vapor from ice.

Evaporation and volatilization of metals can best be avoided by melting them out of contact with currents of gases; that is, by heating in closed vessels. This can be accomplished either by melting them in crucibles with covers, or by using electric furnace heating. The latter is to be preferred and will be found much less expensive for power than is commonly supposed. I believe, for instance, that brass can be, at present, melted more cheaply in electric furnaces than by fuel, almost anywhere in the United States, with great saving of the zinc usually vaporized.—*Metallurgical and Chemical Engineering.*

———ooo———

THE VALUE OF THE HORSE POWER.

WHEN the Steam Engine began to assume industrial importance, it became necessary to have some unit by which to designate its capacity. The work to which it was initially put had been for the most part done by horses and the capacity of the engines was naturally compared with that of the horse which they replaced. Savery in 1702 considered that an engine which would raise as much water as two horses working continously would replace ten horses, and hence was a ten horse-power engine, since relays of horses must be used to keep the work going continuously.

When Watt and Boulton got into the engine business they established a standard of their own. Some heavy horses from Berclay and Perkins brewery, London, were caused to raise a weight from the bottom of a deep well

by pulling on a rope passing over a pulley. It was found that a horse could raise a weight of 100 pounds while walking at a rate of 2.5 miles per hour. This is 22,000 foot-pounds perminute. Watt added fifty percent. for friction and good measure and established the value of 33,000 foot-pounds per minute or 550 foot-pounds per second.

But if Watts' well had been in New Orleans, and if his method of measurement had been sufficiently accurate, he would have found that with the same effort his horses could have lifted more than they could at London. The attraction of the earth upon the same mass is greater at the poles than at the equator, greater at the sea level than at an elevation.

This is due to the fact that on account of the greater diameter of the earth at the equator, a body there is further from the earth's center, as it is also at an elevation, and to the fact that at the equator the effect of centrifugal force which opposes that of gravity is greatest becoming nothing at the poles.

Watts definition of a horsepower is therefore not a fixed definite unit, but has a different value for every latitude and elevation. If we take it at 550 foot-pounds per second at 50 degrees of latitude it will become 549 foot-pounds per second at the poles, and 552 at the equator. At 45 degrees it would be 550.48 at sea level, 550.45 at an elevation of 5000 feet, and 550.61 at an elevation of 10,000 ft. While these differences are not likely to be serious in ordinary commercial transactions, it is not right nor scientific that so important a unit as that of horsepower should have a changable and unstable value.

A watt is the power developed by the action, with the velocity of one meter per second, of a force capable of giving to a mass of one kilogram in one second a velocity of one meter per second. Since the kilogram is a definite mass (that of a cubic decimeter, or liter, of pure water at the temperature of its maximum density) the force which will accelerate it at a given rate is also a fixed quantity, and the rate at which work is done when the force is exerted at a velocity of one meter per second is a definite, absolute unit, independent of latitude, altitude or any of the disturbing factors which complicate the unit determined by the effect of gravity.

The watt, or kilowatt, is thus as much a mechanical as an electrical unit and may be used to indicate rates of power, development and application even when no question of electricity is involved with more accuracy and as much propriety as the horsepower. Its use for this purpose should be encouraged, but since most mechanical determinations in English speaking countries are made in foot-pounds, it is necessary that there should be a definite relation established between the gravitational unit, or horsepower, and the absolute unit or kilowatt.

The round number usually employed for this equivalent is 746 watts, which happens to equal 33,000 foot-pounds per minute for the latitude of 50 degrees, nearly that of London where Watts' experiments were made. By defining the horse-power, therefore, as 33,000 foot-pounds per minute at 50 degrees latitude and sea level, its equivalence with the absolute system of units is established as 746 watts.

The United States Bureau of Standards has adopted this value and, in a recently issued circular entitled the "Relation of the Horsepower to the Kilowatt," discusses the question historically and otherwise, giving tables of the value corrected for different latitudes and elevations and urging the use of 746 watts as the exact equivalent of a horsepower instead of the inconvenient 745.6496 relation which is obtained when the standard 45 degrees of latitude is used. —*Power.*

———ooo———

ELEMENTARY CHEMICAL THEORY.

By J. M. Wadmore.

D. VanNostrand & Co., $1.50.

IN this valuable treatise the author has treated the underlying principles of Chemical Theory in a very clear and readable manner. Prof. Wadmore has explained a number of

points that usually bother the beginner in a very comprehensive way.

The tendency is modern inorganic chemistries is towards including more and more theory, but in most cases theoretical parts are scattered through the book so the student is apt to think of each as independent of the rest. In this work there is a sequence of thought and the student is lead from one to the other and forms a definite idea as to their relations.

The contents of this work are:

Introduction
Gravimetric Laws of Chemical Reaction
The Atomic Hypothesis
Gas Volumes—Avogadro's Hypothesis
Vapor Densities—Molecular Weights
Selection of Atomic Weights
DuLong & Petits' Law of Specific Heat
Constitution of the Elements. Radio Activity
The Periodic Law
Crystalline Shape—Isomorphism
Formulae and Equations
Constitution and Configuration of Compounds
The Gas Laws and Kinctic Hypothesis
The Critical Temperature and Liquifaction of Gases
Properties of Pure Liquids
Solutions
Freezing and Boiling Points of Solutions
Molecular weights of Dissolved Substances
Liquid Diffusion—Osmotic Pressure
Degree of Ionization; Equilibrium of Electrolytes

While this work is primarily for elementary students it will be found to be a valuable reference work for more advanced students.

—H. L. D., '13.

———ooo———

A TEXT BOOK OF INOGANIC CHEMISTRY.

By George Senter, D. Sc., Ph. D.

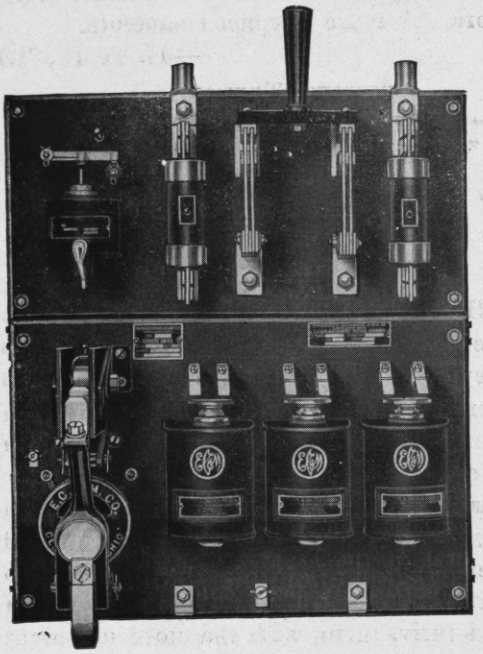
D. VanNostrand Co.

THIS most excellent and somewhat exhaustive text book on general inorganic chemistry takes up the various subjects in a logical and readable manner. The theoretical and more practical parts are interwoven in a natural sequency.

The work is up-to-date, and students looking for a good book for general use, will find such later ideas as Osmotic Pressure, the Electrolytic Dissociation Theory, and Thermal Dissociation discussed fully, along with the older principles of Dalton and Avogadro. The physical chemist will find much of value. Also, articles on such subjects as Radio-activity and "Modern Views on Valency" are interesting.

We recommend this as a complete and practical book for any chemist who wants a good reference book on general inorganic chemistry handy. The order in which the subjects are taken up, together with their clear discussion, would make it a first-class text book for class work.—E.A.S.'13.

Throwing One Switch Starts or Stops the Motor



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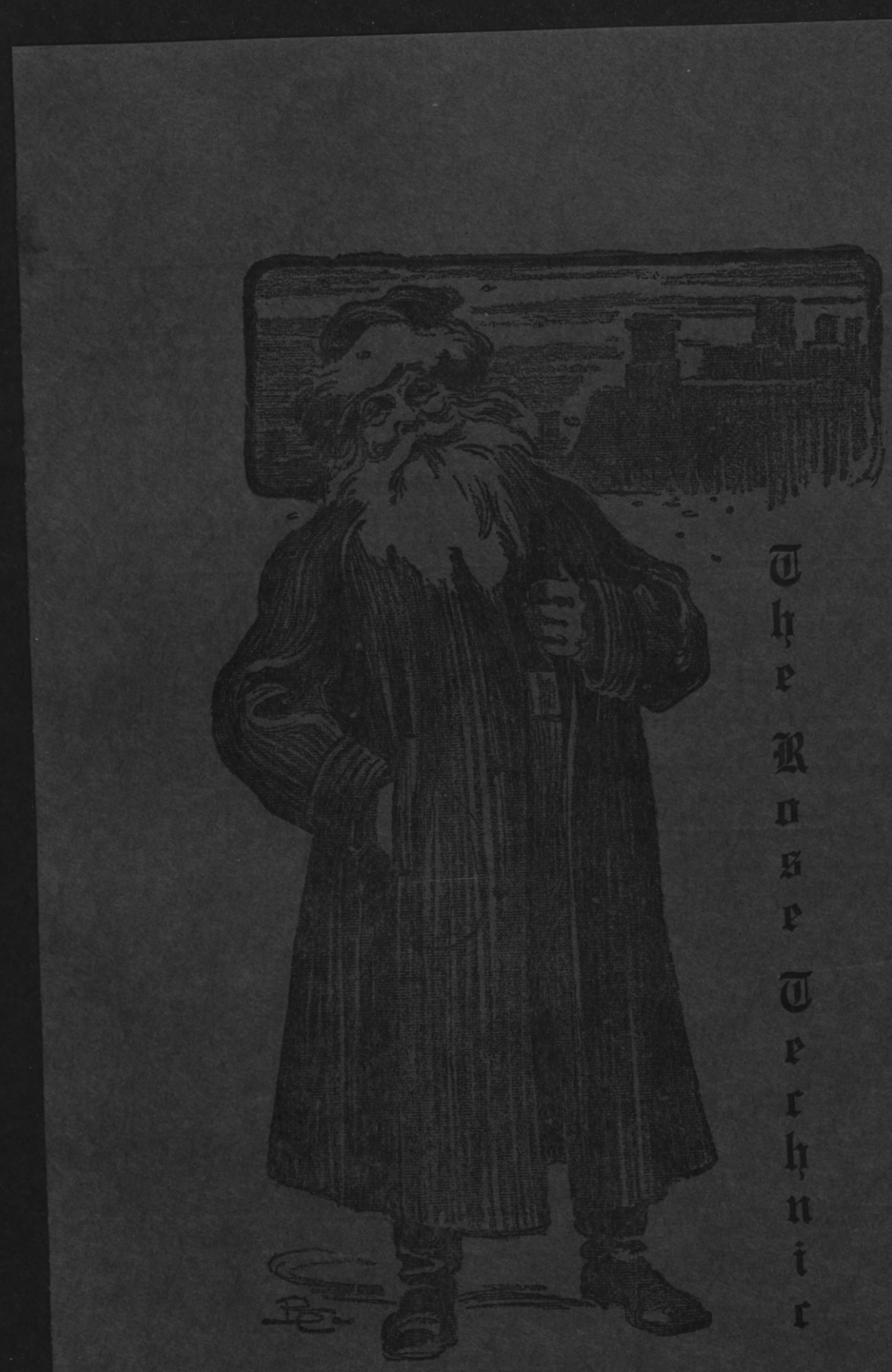

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